Panasonic
INDUSTRY

2021

# Inductors

Products Catalog

2021.8

# Inductors INDEX

# Guidelines and precautions regarding the technical information and use of our products described in this online catalog.

- If you want to use our products described in this online catalog for applications requiring special qualities or reliability, or for applications where the failure or malfunction of the products may directly jeopardize human life or potentially cause personal injury (e.g. aircraft and aerospace equipment, traffic and transportation equipment, combustion equipment, medical equipment, accident prevention, anti-crime equipment, and/or safety equipment), it is necessary to verify whether the specifications of our products fit to such applications. Please ensure that you will ask and check with our inquiry desk as to whether the specifications of our products fit to such applications use before you use our products.

- The quality and performance of our products as described in this online catalog only apply to our products when used in isolation. Therefore, please ensure you evaluate and verify our products under the specific circumstances in which our products are assembled in your own products and in which our products will actually be used.

- If you use our products in equipment that requires a high degree of reliability, regardless of the application, it is recommended that you set up protection circuits and redundancy circuits in order to ensure safety of your equipment.

- The products and product specifications described in this online catalog are subject to change for improvement without prior notice. Therefore, please be sure to request and confirm the latest product specifications which explain the specifications of our products in detail, before you finalize the design of your applications, purchase, or use our products.

- The technical information in this online catalog provides examples of our products' typical operations and application circuits. We do not guarantee the non-infringement of third party's intellectual property rights and we do not grant any license, right, or interest in our intellectual property.

- If any of our products, product specifications and/or technical information in this online catalog is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially with regard to security and export control, shall be observed.

# <Regarding the Certificate of Compliance with the EU RoHS Directive/REACH Regulations>

- The switchover date for compliance with the RoHS Directive/REACH Regulations varies depending on the part number or series of our products.

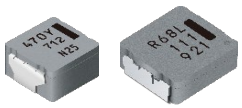
- When you use the inventory of our products for which it is unclear whether those products are compliant with the RoHS Directive/REACH Regulation, please select "Sales Inquiry" in the website inquiry form and contact us.

**We do not take any responsibility for the use of our products outside the scope of the specifications, descriptions, guidelines and precautions described in this online catalog.**

UPGRADE

# Power Choke Coil (Automotive Grade)

## PCC-M0530M, M0540M, M0630M, M0645M series
## PCC-M0754M, M0750M, M0854M, M0850M series
## PCC-M1054M, M1050M, M1050ML, M1060ML series



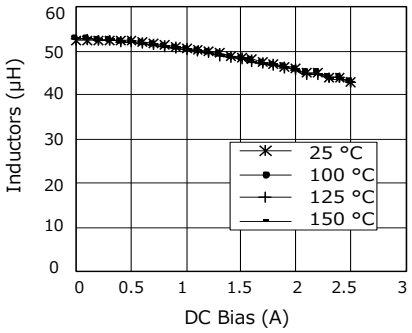
High heat resistance and high reliability using metal composite core (MC)

Industrial property : Patents 21 (Registered 2 / Pending 19)

## Features

- High heat resistance : Operation up to 150 ℃ including self-heating
- High-reliability :
  High vibration resistance as result of newly developed integral construction; under severe reliability conditions of automotive and other strenuous applications
- High bias current : Excellent inductance stability using ferrous alloy magnetic material (Fig.1)
- Temp. stability :
  Excellent inductance stability over broad temp. range (Fig.1)
- Low audible (buzz) noise :
  A gapless structure achieved with metal composite core
- High efficiency :
  Low DC resistance of winding and low eddy-current loss of the core
- Shielded construction
- AEC-Q200 compliant
- RoHS compliant

●Fig.1
Inductance v.s. DC current, Temp.
ETQP5M470YFM (reference)




## Recommended applications

- Noise filter for various drive circuitry requiring high temp. operation and peak current handling capability
- Boost-Converter, Buck-Converter DC/DC

## Standard packing quantity (Minimum quantity/Packing unit)

- 1,000 pcs/box (2 reel) : PCC - M0645M, M0754M, M0750M, M0854M, M0850M, M1054M, M1050M, M1050ML, M1060ML
- 2,000 pcs/box (2 reel) : PCC - M0530M, M0540M, M0630M

## Explanation of part numbers

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | T | Q | P | | M | | | | Y | | |
| Product code | | | Classification | Height | Winding | Inductance | | | Core | Suffix | Size |

(Example)

| Code | Inductance |
|---|---|
| 4R7 | 4.7 μH |
| 220 | 22 μH |
| 101 | 100 μH |

| Code | Size |
|---|---|
| P | □ 5 mm |
| N | □ 6 mm |
| M | □ 7 mm |
| K | □ 8 mm |
| C | □ 10 mm |

## Temperature rating

| | | |
|---|---|---|
| Operating temperature range | | Tc : -40 ℃ to +150 ℃ (Including self-temperature rise) |
| Storage condition | After PWB mounting | |
| | Before PWB mounting | Ta : -5 ℃ to +35 ℃ 85%RH max. |

## 1. Series PCC-M0530M/PCC-M0540M (ETQP3M□□□YFP/ETQP4M□□□YFP)

### Standard parts

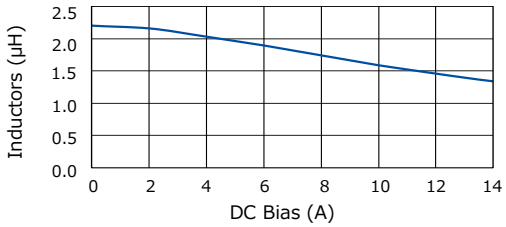
| Part No. | Inductance*1 | | DCR (at 20 ℃) (mΩ) | | Rated current (A) Typ. | | MSL level | Series [Size (mm)] |
|---|---|---|---|---|---|---|---|---|
| | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | △T= 40 K*2 ( )*3 | △L= −30 %*4 | *5 | |
| ETQP3M2R2YFP | 2.2 | ±20 | 22.6 ( 24.8) | ±10 | 5.8 (4.8) | 10.9 | 1 | PCC-M0530M [5.5×5.0×3.0] |
| ETQP3M3R3YFP | 3.3 | | 31.3 ( 34.4) | | 5.0 (4.1) | 8.6 | 1 | |
| ETQP4M4R7YFP | 4.6 | | 36.0 ( 39.6) | | 4.8 (4.0) | 7.7 | 1 | PCC-M0540M [5.5×5.0×4.0] |
| ETQP4M220YFP | 22.0 | | 163.0 (179.0) | | 2.3 (1.9) | 3.1 | 1 | |

*1: Measured at 100 kHz
*2: The proved current value for making the overall temperature rise of 40K, when mounted on a multi-layer board with high-heat dissipation (heat dissipation constant 5.5x5.0x3.0 mm : approx. 52 K/W, 5.5x5.0x4.0 mm : approx. 48 K/W).
*3: The proved current value for making the overall temperature rise of 40K, when mounted on a 4-layer circuit board of FR4 t=1.6 mm and DC current is applied.
*4: Saturation rated current : DC current which causes L(0) drop −30 %.
*5: The solderability is guaranteed for 1 year only. The product out of expiration date shall not be used.
◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +150℃ should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.

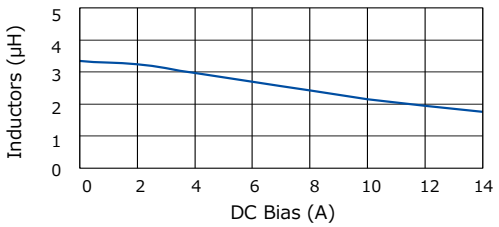
### Performance characteristics (Reference①)

● Inductance vs DC Current

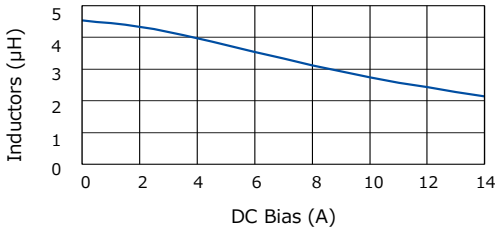
[ ETQP3M2R2YFP ]



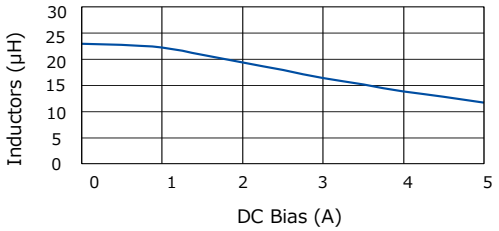

[ ETQP3M3R3YFP ]




[ ETQP4M4R7YFP ]



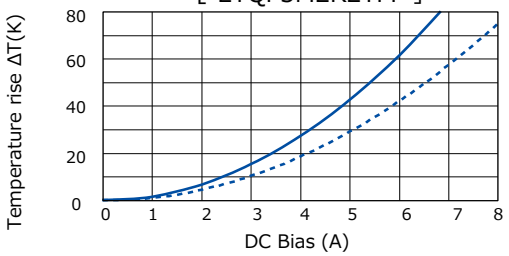

[ ETQP4M220YFP ]



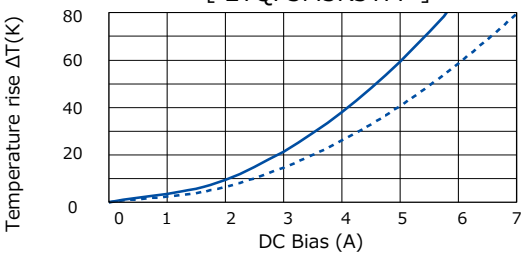
## Performance characteristics (Reference②)

- Case Temperature vs DC Current
  - PWB condition A : Four-layer PWB (1.6 mm FR4).*3
  - PWB condition B : Multilayer PWB with high heat dissipation performance.*2

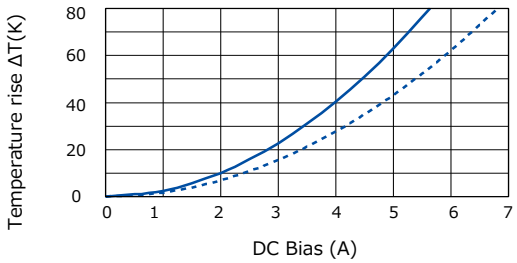
[ ETQP3M2R2YFP ]




[ ETQP3M3R3YFP ]




[ ETQP4M4R7YFP ]

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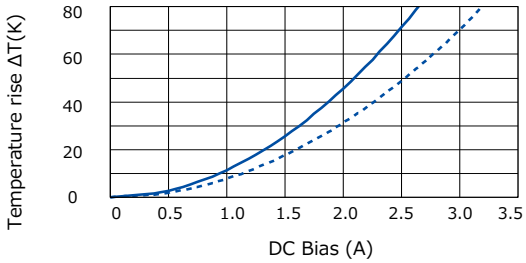


## 2. Series PCC-M0630M/PCC-M0645M (ETQP3M□□□YFN/ETQP4M□□□YFN)

### Standard parts

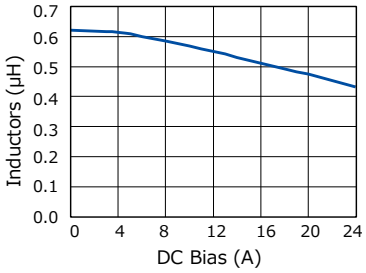
| Part No. | Inductance*1 | | DCR (at 20 ℃) (mΩ) | | Rated current (A) Typ. | | MSL level | Series [Size (mm)] |
|---|---|---|---|---|---|---|---|---|
| | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | △T= 40 K*2 ( )*3 | △L= −30 %*4 | *5 | |
| ETQP3MR68YFN | 0.68 | ±20 | 6.3 (6.90) | ±10 | 12.0 (9.8) | 24.0 | 1 | PCC-M0630M [6.5×6.0×3.0] |
| ETQP3M1R0YFN | 1.0 | | 7.9 (8.70) | | 10.7 (8.8) | 20.0 | 1 | |
| ETQP4M2R2YFN | 2.2 | | 10.4 (11.44) | | 10.2 (8.0) | 14.4 | 1 | PCC-M0645M [6.5×6.0×4.5] |
| ETQP4M3R3YFN | 3.3 | | 16.1 (17.71) | | 8.2 (6.4) | 13.3 | 1 | |
| ETQP4M6R8YFN | 6.8 | | 39.3 (43.20) | | 5.2 (4.1) | 10.0 | 1 | |
| ETQP4M100YFN | 10.0 | | 54.2 (59.60) | | 4.5 (3.5) | 8.3 | 1 | |
| ETQP4M220YFN | 22.0 | | 126.0 (138.60) | | 2.9 (2.3) | 6.0 | 1 | |
| ETQP4M330YFN | 33.0 | | 172.0 (189.20) | | 2.5 (2.0) | 4.1 | 3 | |
| ETQP4M470YFN | 47.0 | | 210.0 (231.00) | | 2.2 (1.8) | 3.8 | 1 | |

*1: Measured at 100 kHz
*2: The proved current value for making the overall temperature rise of 40K, when mounted on a multi-layer board with high-heat dissipation (heat dissipation constant 6.5x6.0x3.0 mm : approx. 44 K/W, 6.5x6.0x4.5 mm : approx. 37 K/W).
*3: The proved current value for making the overall temperature rise of 40K, when mounted on a 4-layer circuit board of FR4 t=1.6 mm and DC current is applied.
*4: Saturation rated current : DC current which causes L(0) drop −30 %.
*5: The solderability is guaranteed for 1 year only. The product out of expiration date shall not be used.
◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +150℃ should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.

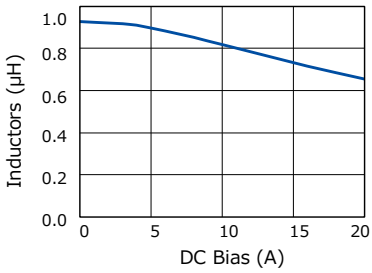
### Performance characteristics (Reference①)

● Inductance vs DC Current

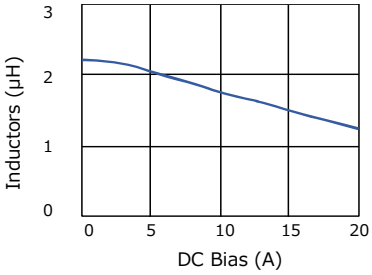
[ ETQP3MR68YFN ]



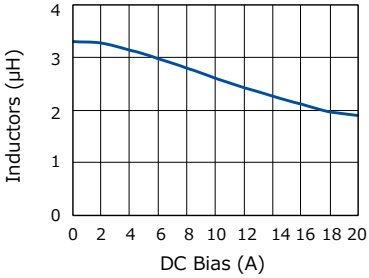

[ ETQP3M1R0YFN ]



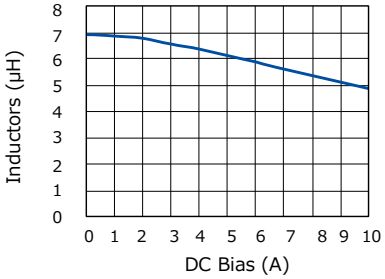

[ ETQP4M2R2YFN ]



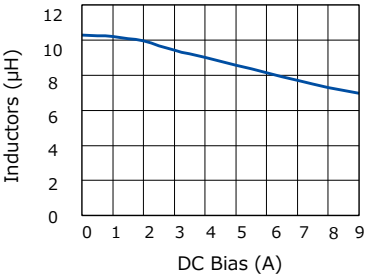

[ ETQP4M3R3YFN ]



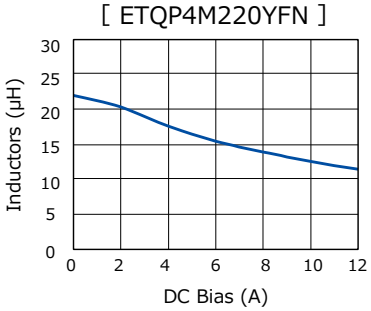

[ ETQP4M6R8YFN ]



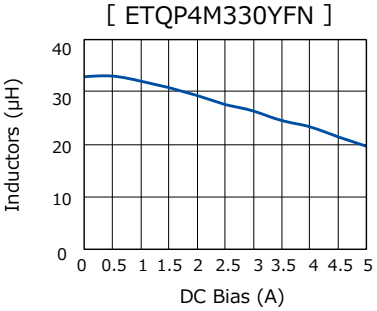

[ ETQP4M100YFN ]



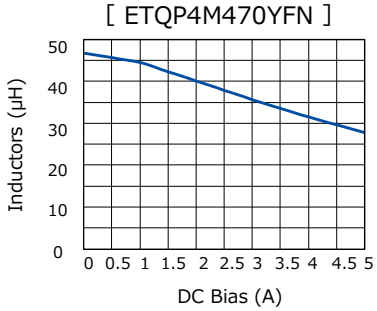

[ ETQP4M220YFN ]




[ ETQP4M330YFN ]




[ ETQP4M470YFN ]



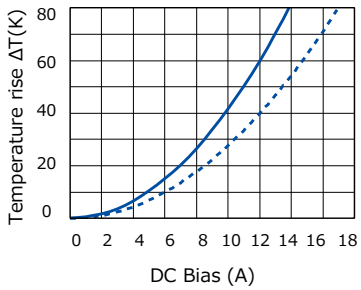
## Performance characteristics (Reference②)

● Case Temperature vs DC Current

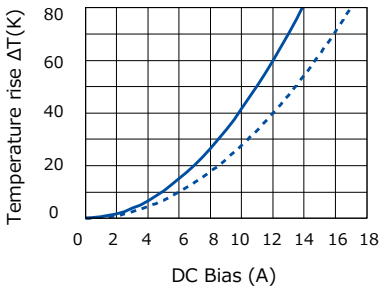
PWB condition A : Four-layer PWB (1.6 mm FR4).*3

PWB condition B : Multilayer PWB with high heat dissipation performance.*2

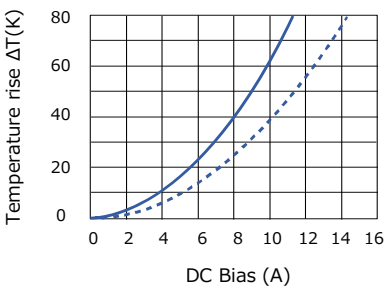
[ ETQP3MR68YFN ]



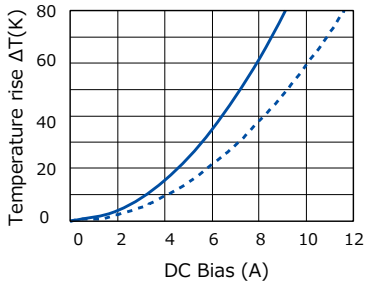

[ ETQP3M1R0YFN]



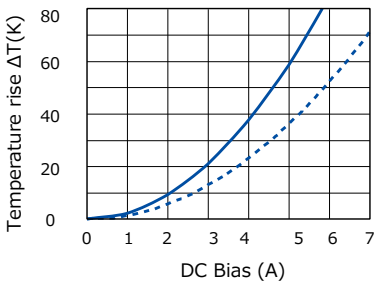

[ ETQP4M2R2YFN ]



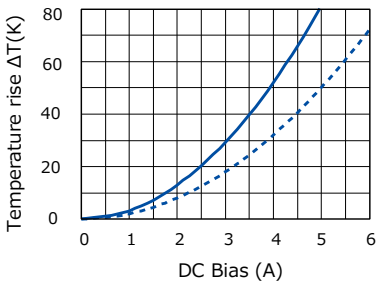

[ ETQP4M3R3YFN ]



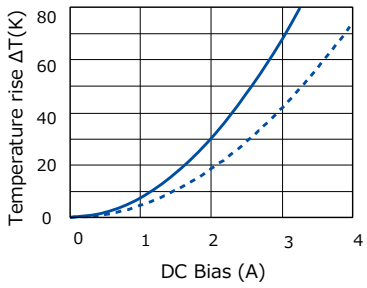

[ ETQP4M6R8YFN ]



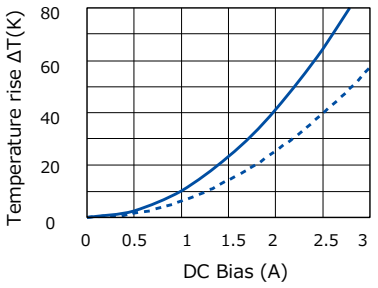

[ ETQP4M100YFN ]



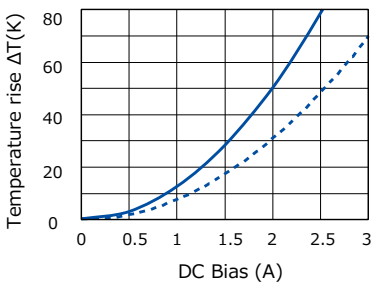

[ ETQP4M220YFN ]




[ ETQP4M330YFN ]




[ ETQP4M470YFN ]



## 3. Series PCC-M0754M/PCC-M750M (ETQP5M□□□YFM/ETQP5M□□□YGM)

### Standard parts

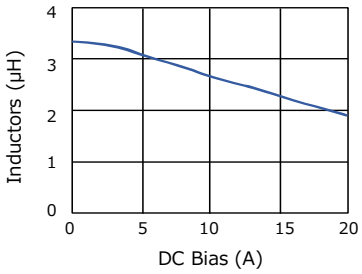
| Part No. | Inductance*1 | | DCR (at 20 ℃) (mΩ) | | Rated current (A) Typ. | | MSL level | Series [Size (mm)] |
|---|---|---|---|---|---|---|---|---|
| | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | △T= 40 K*2 ( )*3 | △L= −30 %*4 | *5 | |
| ETQP5M3R3YFM | 3.3 | ±20 | 11.9 (13.09) | ±10 | 10.4 (8.3) | 14.4 | 1 | PCC-M0754M [7.5×7.0×5.4] |
| ETQP5M4R7YFM | 4.7 | | 20.4 (22.50) | | 8.0 (6.3) | 13.1 | 1 | |
| ETQP5M6R8YFM | 6.8 | | 26.7 (29.40) | | 6.9 (5.5) | 12.1 | 1 | |
| ETQP5M100YFM | 10.0 | | 37.6 (41.30) | | 5.7 (4.7) | 10.6 | 1 | |
| ETQP5M220YFM | 22.0 | | 92.0 (102.00) | | 3.7 (3.0) | 5.8 | 1 | |
| ETQP5M330YFM | 33.0 | | 120.0 (132.00) | | 3.3 (2.6) | 4.8 | 1 | |
| ETQP5M470YFM | 48.0 | | 156.0 (172.00) | | 2.9 (2.3) | 4.1 | 1 | |
| ▲ETQP5M680YFM | 68.0 | | 251.0 (276.10) | | 2.3 (1.8) | 3.9 | 1 | |
| ETQP5M101YGM | 95.0 | | 348.0 (382.80) | | 1.9 (1.4) | 3.1 | 3 | PCC-M0750M [7.5×7.0×5.0] |

*1: Measured at 100 kHz ▲Underdevelopment
*2: The proved current value for making the overall temperature rise of 40K, when mounted on a multi-layer board with high-heat dissipation (heat dissipation constant 7.5x7.0x5.4 mm : approx. 31 K/W, 7.5x7.0x5.0 mm : approx. 29 K/W).
*3: The proved current value for making the overall temperature rise of 40K, when mounted on a 4-layer circuit board of FR4 t=1.6 mm and DC current is applied.
*4: Saturation rated current : DC current which causes L(0) drop −30 %.
*5: The solderability is guaranteed for 1 year only. The product out of expiration date shall not be used.
◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +150℃ should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.

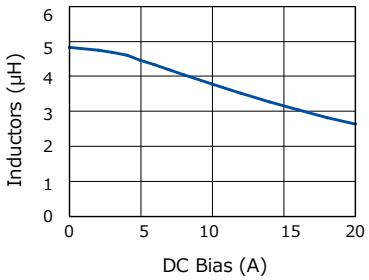
### Performance characteristics (Reference①)

● Inductance vs DC Current

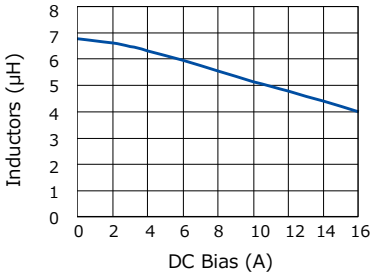
[ ETQP5M3R3YFM ]



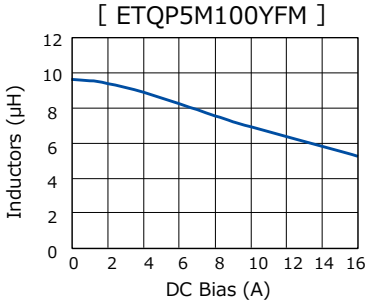

[ ETQP5M4R7YFM ]



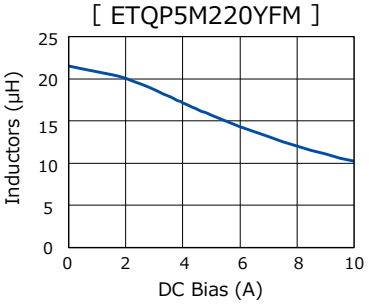

[ ETQP5M6R8YFM]



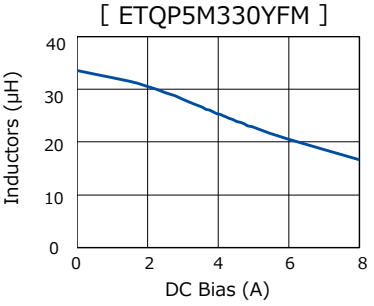

[ ETQP5M100YFM ]



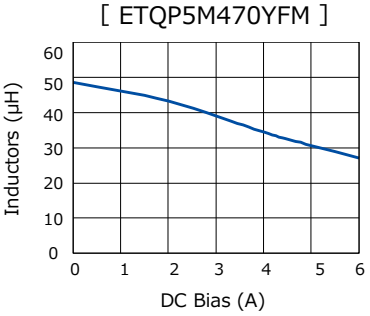

[ ETQP5M220YFM ]



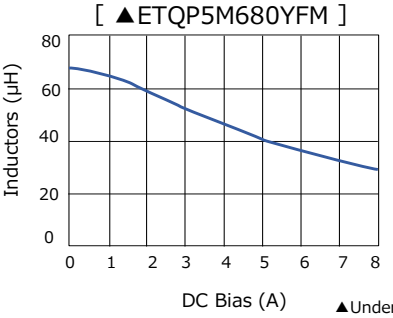

[ ETQP5M330YFM ]




[ ETQP5M470YFM ]

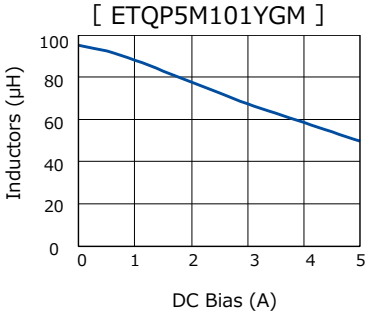



[ ▲ETQP5M680YFM ]




▲Underdevelopment

[ ETQP5M101YGM ]



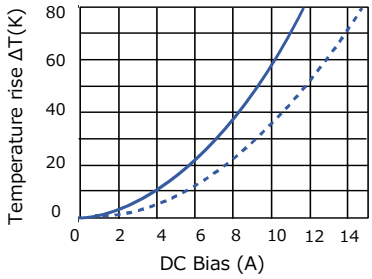
## Performance characteristics (Reference②)

● Case Temperature vs DC Current

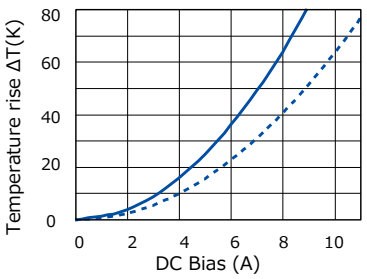
PWB condition A : Four-layer PWB (1.6 mm FR4).*3

PWB condition B : Multilayer PWB with high heat dissipation performance.*2

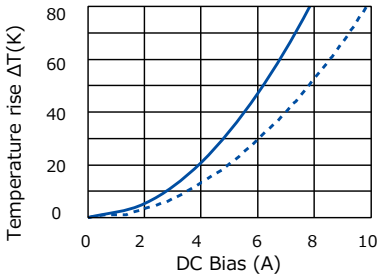
[ ETQP5M3R3YFM ]



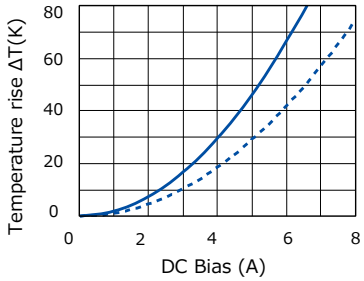

[ ETQP5M4R7YFM ]



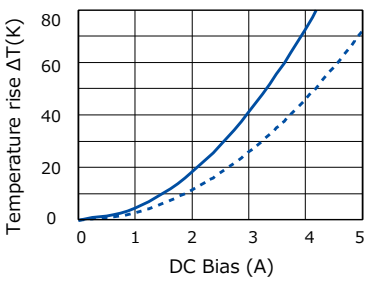

[ ETQP5M6R8YFM]



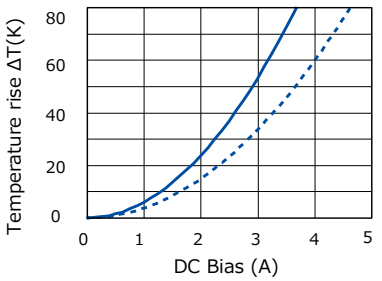

[ ETQP5M100YFM ]



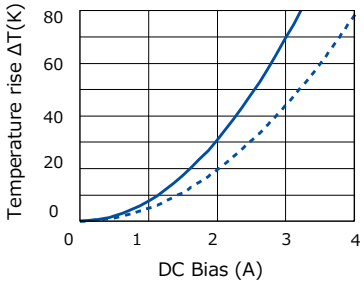

[ ETQP5M220YFM ]



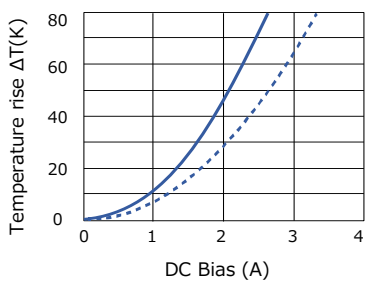

[ ETQP5M330YFM ]



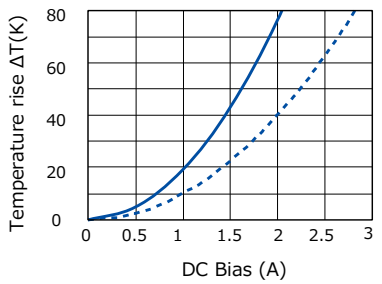

[ ETQP5M470YFM ]




[ ▲ETQP5M680YFM ]




[ ETQP5M101YGM ]




▲Underdevelopment

## 4. Series PCC-M0854M/PCC-M0850M (ETQP5M□□□YFK/ETQP5M□□□YGK)

### Standard parts

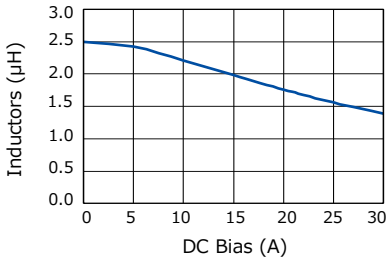
| Part No. | Inductance*1 | | DCR (at 20 ℃) (mΩ) | | Rated current (A) Typ. | | MSL level | Series [Size (mm)] |
|---|---|---|---|---|---|---|---|---|
| | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | △T= 40 K*2 ( )*3 | △L= −30 %*4 | *5 | |
| ETQP5M2R5YFK | 2.5 | ±20 | 7.6 (8.40) | ±10 | 14.0 (11.9) | 20.1 | 1 | PCC-M0854M [8.5×8.0×5.4] |
| ETQP5M3R3YFK | 3.3 | | 9.5 (10.45) | | 12.5 (10.7) | 17.9 | 1 | |
| ETQP5M100YFK | 10.0 | | 33.4 (36.80) | | 6.7 (5.7) | 13.0 | 1 | |
| ETQP5M150YFK | 15.0 | | 48.2 (53.10) | | 5.5 (4.7) | 7.2 | 1 | |
| ETQP5M220YFK | 22.0 | | 63.0 (70.00) | | 4.8 (4.1) | 6.9 | 1 | |
| ETQP5M470YFK | 48.0 | | 125.0 (138.00) | | 3.4 (2.9) | 5.4 | 1 | |
| ETQP5M101YGK | 100.0 | | 302.0 (333.00) | | 2.1 (1.7) | 3.0 | 3 | PCC-M0850M [8.5×8.0×5.0] |

*1: Measured at 100 kHz
*2: The proved current value for making the overall temperature rise of 40K, when mounted on a multi-layer board with high-heat dissipation (heat dissipation constant 8.5x8.0x5.4 mm : approx. 27 K/W, 8.5x8.0x5.0 mm : approx. 29 K/W).
*3: The proved current value for making the overall temperature rise of 40K, when mounted on a 4-layer circuit board of FR4 t=1.6 mm and DC current is applied.
*4: Saturation rated current : DC current which causes L(0) drop −30 %.
*5: The solderability is guaranteed for 1 year only. The product out of expiration date shall not be used.
◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +150℃ should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.

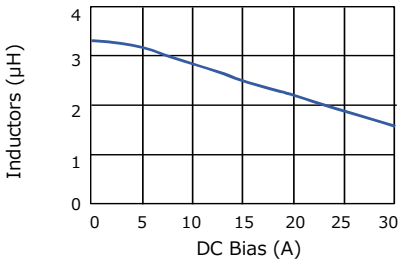
### Performance characteristics (Reference①)

● Inductance vs DC Current

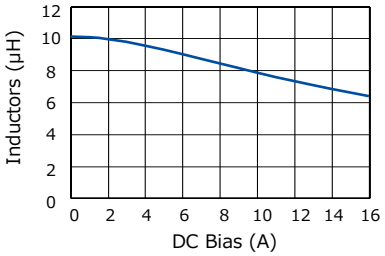
[ ETQP5M2R5YFK ]



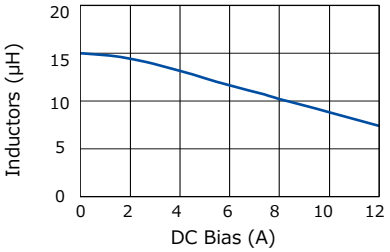

[ ETQP5M3R3YFK ]



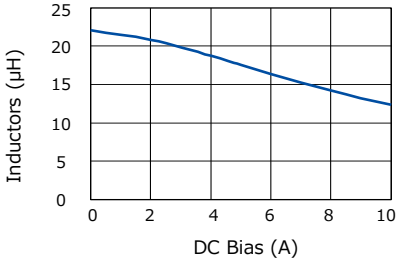

[ ETQP5M100YFK ]



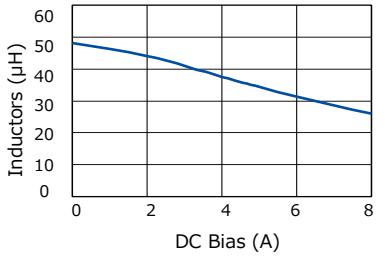

[ ETQP5M150YFK ]



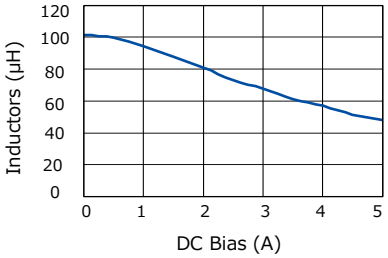

[ ETQP5M220YFK ]




[ ETQ5M470YFK ]



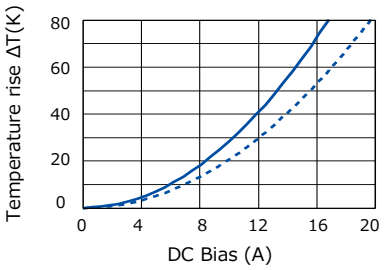

[ ETQP5M101YGK ]



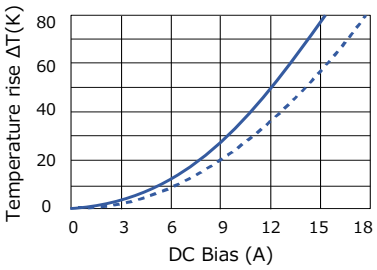
## Performance characteristics (Reference②)

- Case Temperature vs DC Current
  - PWB condition A : Four-layer PWB (1.6 mm FR4).*3
  - PWB condition B : Multilayer PWB with high heat dissipation performance.*2

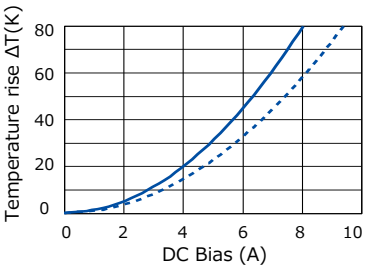
[ ETQP5M2R5YFK ]



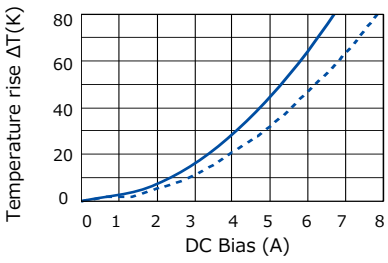

[ ETQP5M3R3YFK ]



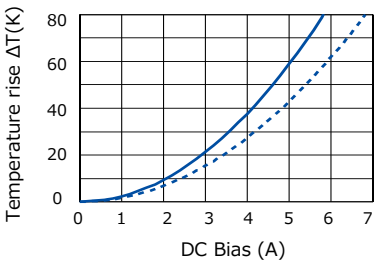

[ ETQP5M100YFK ]



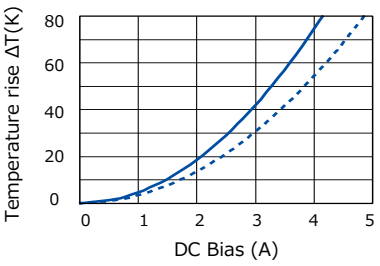

[ ETQP5M150YFK ]



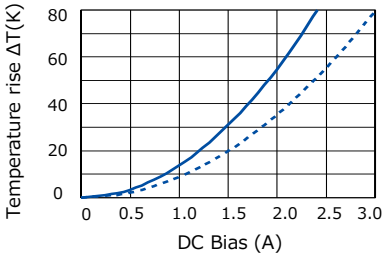

[ ETQP5M220YFK ]




[ ETQ5M470YFK ]




[ ETQP5M101YGK ]



## 5. Series PCC-M1054M/PCC-M1050M (ETQP5M□□□YFC/ETQP5M□□□YGC)

### Standard parts

| Part No. | Inductance*1 | | DCR (at 20 ℃) (mΩ) | | Rated current (A) Typ. | | MSL level | Series [Size (mm)] |
|---|---|---|---|---|---|---|---|---|
| | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | △T= 40 K*2 ( )*3 | △L= −30 %*4 | *5 | |
| ETQP5M1R5YFC | 1.5 | ±20 | 3.8 (4.20) | | 21.4 (17.9) | 35.1 | 1 | PCC-M1054M [10.7×10.0×5.4] |
| ETQP5M2R5YFC | 2.5 | | 5.3 (5.90) | | 18.1 (15.1) | 27.2 | 1 | |
| ETQP5M3R3YFC | 3.3 | | 7.1 (7.90) | | 15.7 (13.1) | 22.7 | 1 | |
| ETQP5M4R7YFC | 4.7 | | 10.2 (11.30) | | 13.1 (10.9) | 20.0 | 1 | |
| ETQP5M100YFC | 10.0 | | 23.8 (26.20) | | 8.5 (7.1) | 10.7 | 1 | |
| ETQP5M150YFC | 15.0 | | 35.6 (39.16) | | 7.0 (5.8) | 12.0 | 1 | |
| ETQP5M220YFC | 22.0 | | 45.0 (50.00) | | 6.2 (5.2) | 8.8 | 1 | |
| ETQP5M330YFC | 33.0 | | 68.5 (75.40) | | 5.0 (4.2) | 7.6 | 1 | |
| ETQP5M470YFC | 47.0 | | 99.0 (108.90) | | 4.2 (3.5) | 6.8 | 1 | |
| ETQP5M680YFC | 66.0 | | 136.0 (149.60) | | 3.6 (3.0) | 4.9 | 1 | |
| ETQP5M3R3YGC | 3.3 | | 7.1 (7.81) | | 14.7 (11.8) | 23.4 | 1 | PCC-M1050M [10.7×10.0×5.0] |
| ETQP5M101YGC | 97.0 | | 208.0 (229.00) | | 2.7 (2.2) | 3.0 | 3 | |

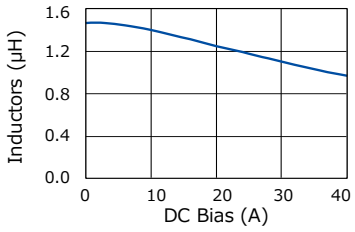
*1: Measured at 100 kHz
*2: The proved current value for making the overall temperature rise of 40K, when mounted on a multi-layer board with high-heat dissipation (heat dissipation constant 10.7x10.0x5.4 mm : approx. 23 K/W, 10.7x10.0x5.0 mm : approx. 26 K/W).
*3: The proved current value for making the overall temperature rise of 40K, when mounted on a 4-layer circuit board of FR4 t=1.6 mm and DC current is applied.
*4: Saturation rated current : DC current which causes L(0) drop −30 %.
*5: The solderability is guaranteed for 1 year only. The product out of expiration date shall not be used.

◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +150℃ should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.

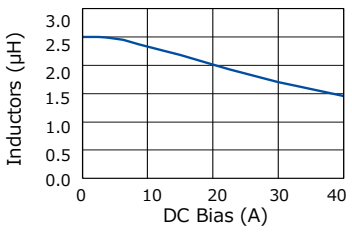
### Performance characteristics (Reference①)

● Inductance vs DC Current

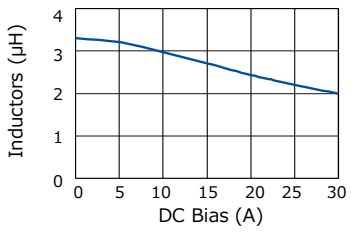
[ ETQP5M1R5YFC ]



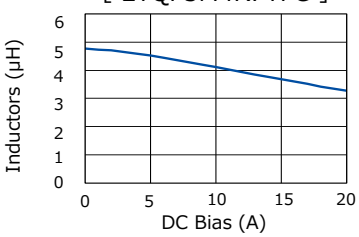

[ ETQP5M2R5YFC ]



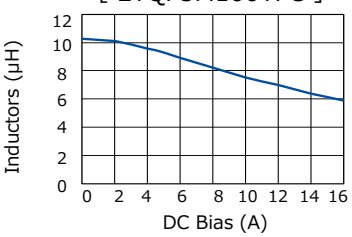

[ ETQP5M3R3YFC ]



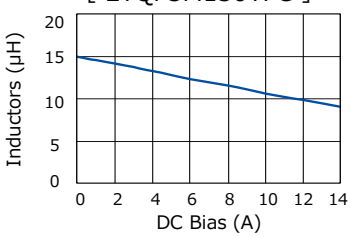

[ ETQP5M4R7YFC ]



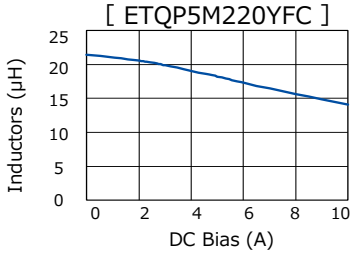

[ ETQP5M100YFC ]



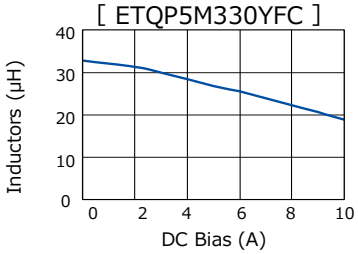

[ ETQP5M150YFC ]



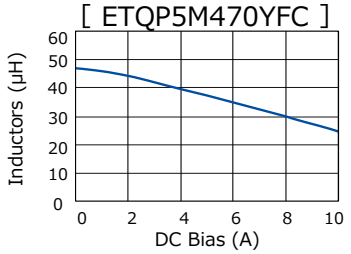

[ ETQP5M220YFC ]




[ ETQP5M330YFC ]

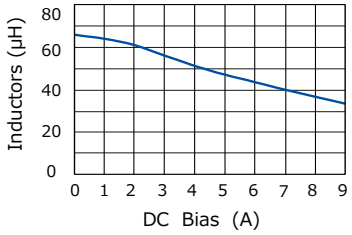



[ ETQP5M470YFC ]

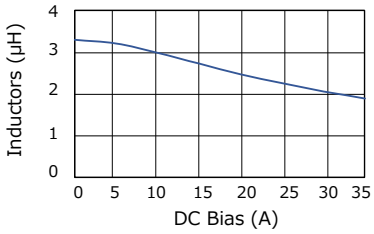


## Performance characteristics (Reference①)

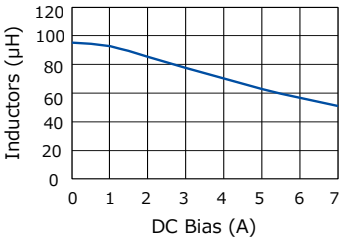
[ ETQP5M680YFC ]




[ ETQP5M3R3YGC ]




[ ETQP5M101YGC ]

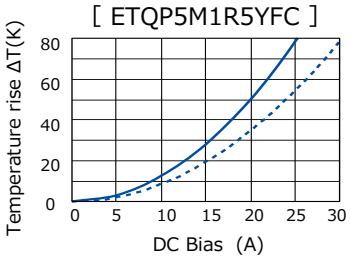



## Performance characteristics (Reference②)

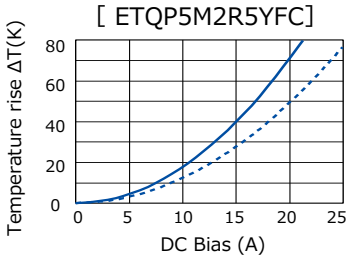
- Case Temperature vs DC Current

PWB condition A : Four-layer PWB (1.6 mm FR4).*3
PWB condition B : Multilayer PWB with high heat dissipation performance.*2

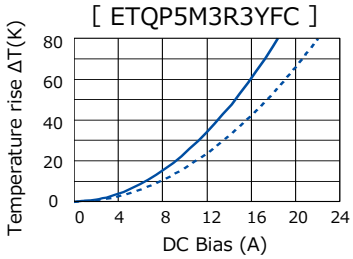
[ ETQP5M1R5YFC ]



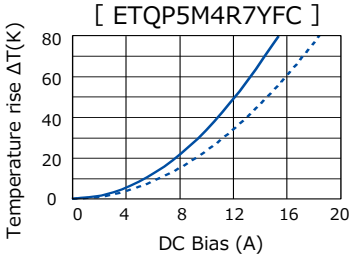

[ ETQP5M2R5YFC]



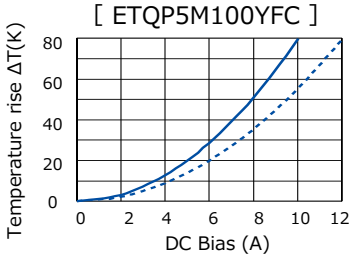

[ ETQP5M3R3YFC ]



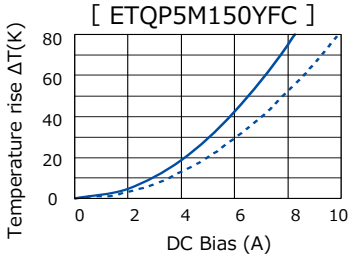

[ ETQP5M4R7YFC ]



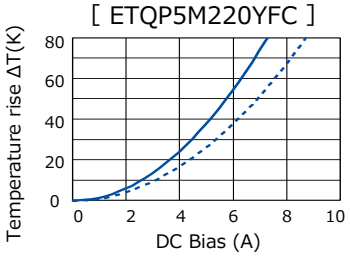

[ ETQP5M100YFC ]



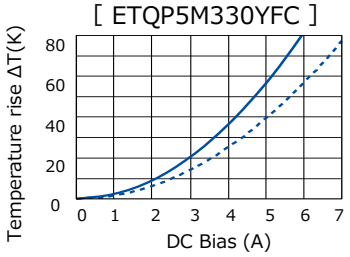

[ ETQP5M150YFC ]



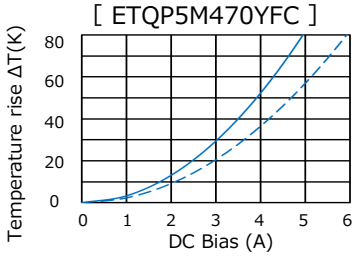

[ ETQP5M220YFC ]



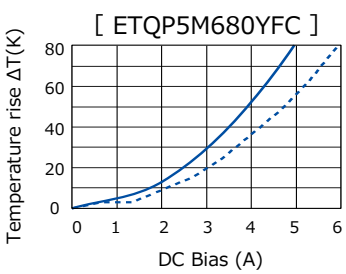

[ ETQP5M330YFC ]



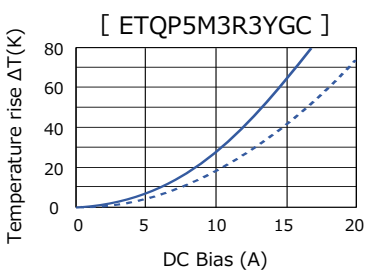

[ ETQP5M470YFC ]



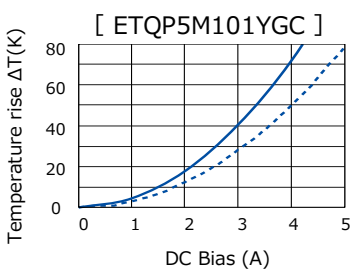

[ ETQP5M680YFC ]




[ ETQP5M3R3YGC ]




[ ETQP5M101YGC ]



## 6. Series PCC-M1050ML/PCC-M1060ML (ETQP5M□□□YLC/ETQP6M□□□YLC)

### Standard parts

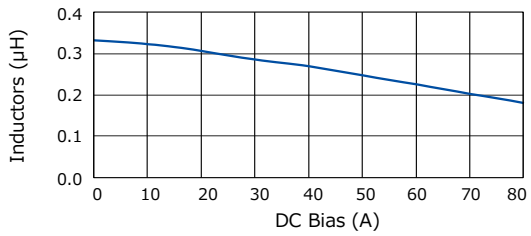
| Part No. | Inductance*1 | | DCR (at 20 ℃) (mΩ) | | Rated current (A) Typ. | | MSL level | Series [Size (mm)] |
|---|---|---|---|---|---|---|---|---|
| | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | △T= 40 K*2 ( )*3 | △L= −30 %*4 | *5 | |
| ETQP5MR33YLC | 0.33 | ±20 | 1.1 (1.21) | ±10 | 39.7 (33.2) | 56.7 | 1 | PCC-M1050ML [10.9×10.0×5.0] |
| ETQP5MR68YLC | 0.68 | | 1.75 (1.93) | | 31.5 (26.3) | 40.0 | 1 | |
| ETQP5M1R0YLC | 1.0 | | 2.3 (2.53) | | 27.5 (23.0) | 37.8 | 1 | |
| ETQP5M2R0YLC | 2.0 | | 4.6 (5.06) | | 19.4 (16.2) | 31.3 | 1 | |
| ETQP6M1R5YLC | 1.5 | | 3.2 (3.52) | | 23.3 (19.5) | 32.0 | 1 | PCC-M1060ML [10.9×10.0×6.0] |
| ETQP6M2R5YLC | 2.5 | | 4.55 (5.00) | | 19.6 (16.3) | 25.8 | 1 | |
| ETQP6M3R3YLC | 3.3 | | 6.0 (6.60) | | 17.0 (14.2) | 26.3 | 1 | |
| ETQP6M4R7YLC | 4.7 | | 8.7 (9.57) | | 14.1 (11.8) | 22.5 | 1 | |

*1: Measured at 100 kHz
*2: The proved current value for making the overall temperature rise of 40K, when mounted on a multi-layer board with high-heat dissipation (heat dissipation constant 10.9x10.0x5.0 mm : approx. 23 K/W, 10.9x10.0x6.0 mm : approx. 23 K/W).
*3: The proved current value for making the overall temperature rise of 40K, when mounted on a 4-layer circuit board of FR4 t=1.6 mm and DC current is applied.
*4: Saturation rated current : DC current which causes L(0) drop −30 %.
*5: The solderability is guaranteed for 1 year only. The product out of expiration date shall not be used.
◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +150℃ should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.

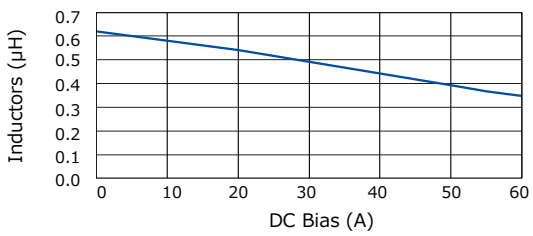
### Performance characteristics (Reference①)

● Inductance vs DC Current

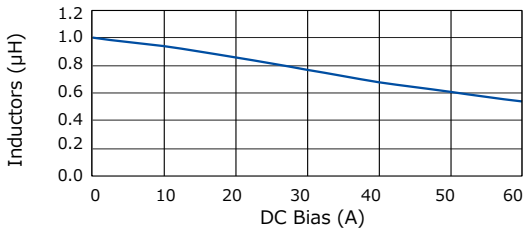
[ ETQP5MR33YLC ]



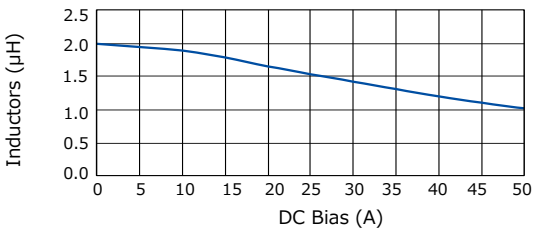

[ ETQP5MR68YLC ]



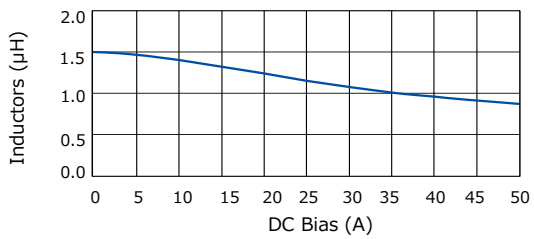

[ ETQP5M1R0YLC ]



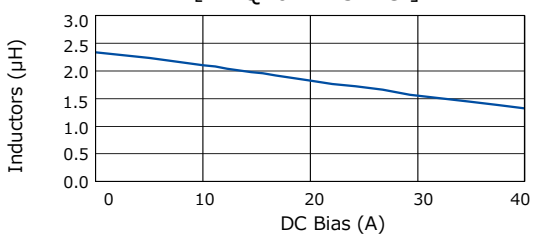

[ ETQP5M2R0YLC ]




[ ETQP6M1R5YLC ]

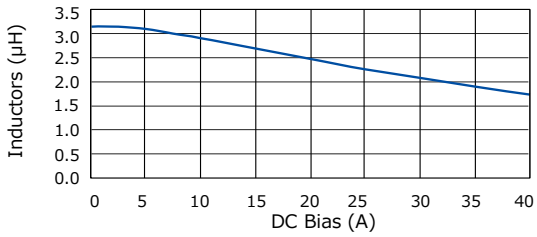



[ ETQP6M2R5YLC ]

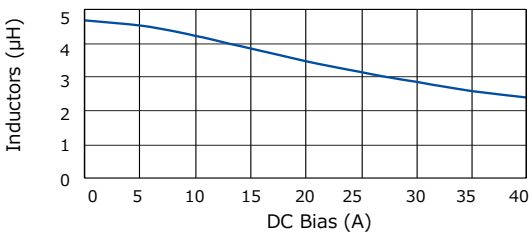


## Performance characteristics (Reference①)

[ ETQP6M3R3YLC ]




[ ETQP6M4R7YLC ]



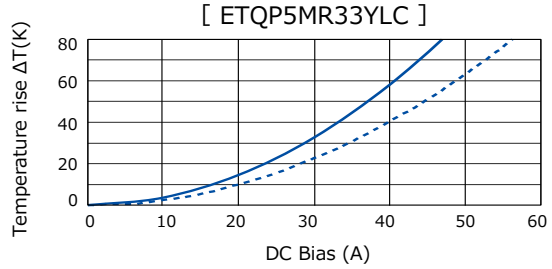

## Performance characteristics (Reference②)

● Case Temperature vs DC Current

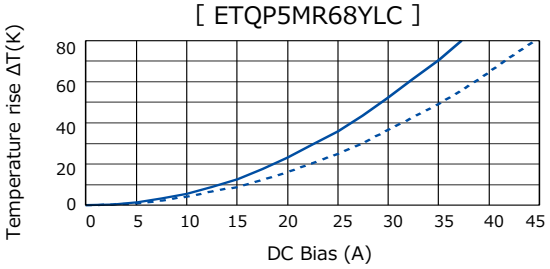
PWB condition A : Four-layer PWB (1.6 mm FR4).*3

PWB condition B : Multilayer PWB with high heat dissipation performance.*2

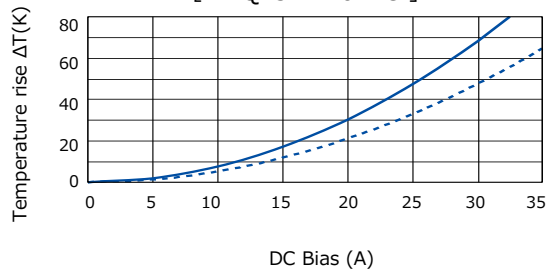
[ ETQP5MR33YLC ]



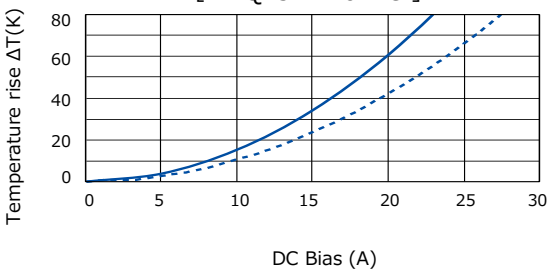

[ ETQP5MR68YLC ]



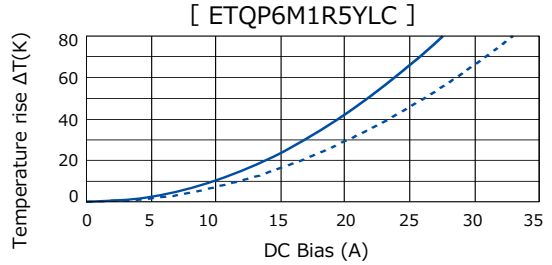

[ ETQP5M1R0YLC ]



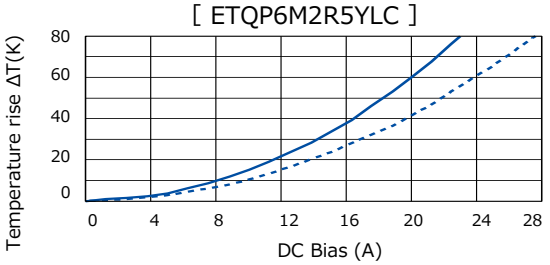

[ ETQP5M2R0YLC ]



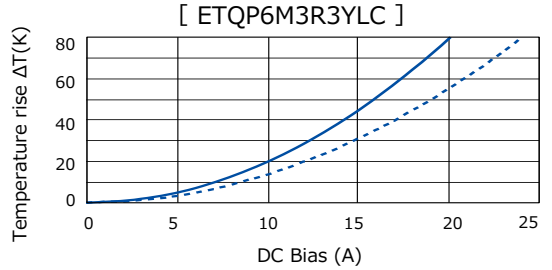

[ ETQP6M1R5YLC ]



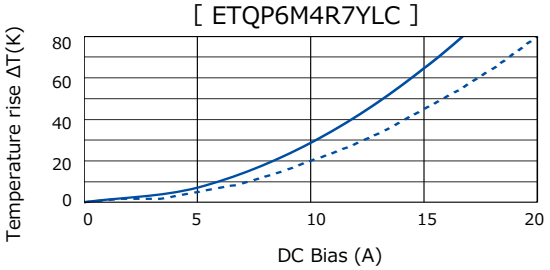

[ ETQP6M2R5YLC ]




[ ETQP6M3R3YLC ]



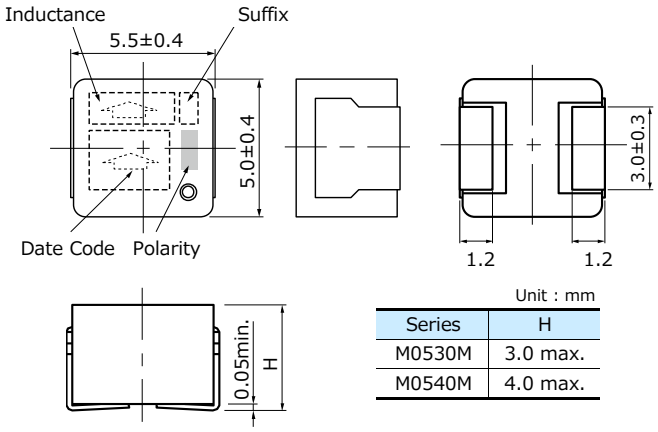

[ ETQP6M4R7YLC ]



## Dimensions in mm (not to scale)

Dimensional tolerance unless noted : ±0.5

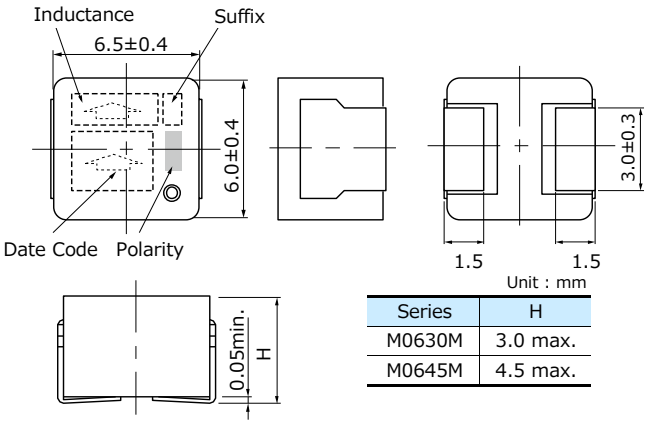
### Series PCC-M0530M
### Series PCC-M0540M
(ETQP3M□□□YFP/ETQP4M□□□YFP)




Unit : mm

| Series | H |
|---|---|
| M0530M | 3.0 max. |
| M0540M | 4.0 max. |

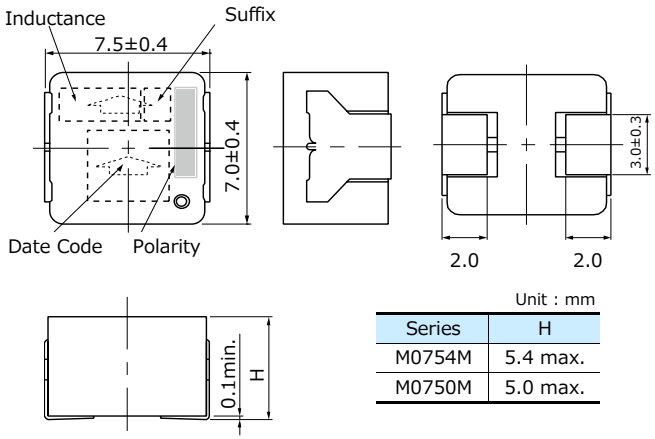
### Series PCC-M0630M
### Series PCC-M0645M
(ETQP3M□□□YFN/ETQP4M□□□YFN)




Unit : mm

| Series | H |
|---|---|
| M0630M | 3.0 max. |
| M0645M | 4.5 max. |

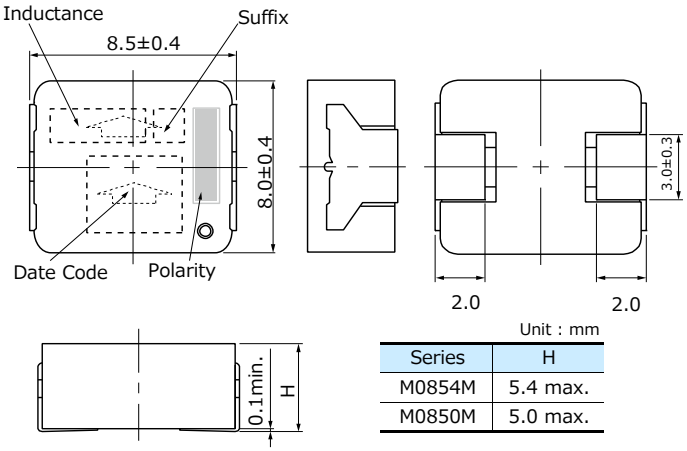
### Series PCC-M0754M
### Series PCC-M0750M
(ETQP5M□□□YFM/YGM)




Unit : mm

| Series | H |
|---|---|
| M0754M | 5.4 max. |
| M0750M | 5.0 max. |

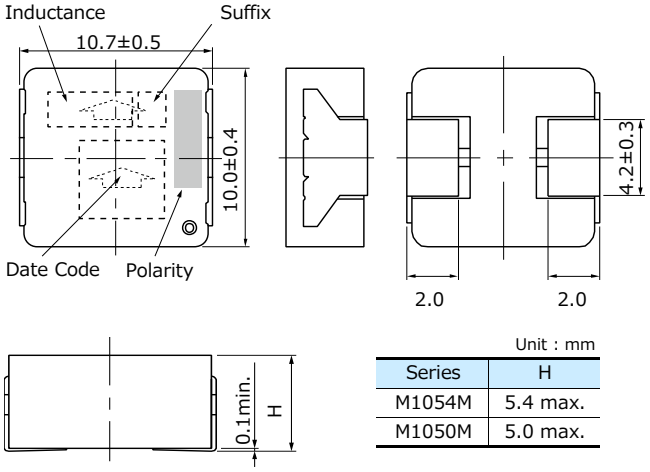
### Series PCC-M0854M
### Series PCC-M0850M
(ETQP5M□□□YFK/YGK)




Unit : mm

| Series | H |
|---|---|
| M0854M | 5.4 max. |
| M0850M | 5.0 max. |

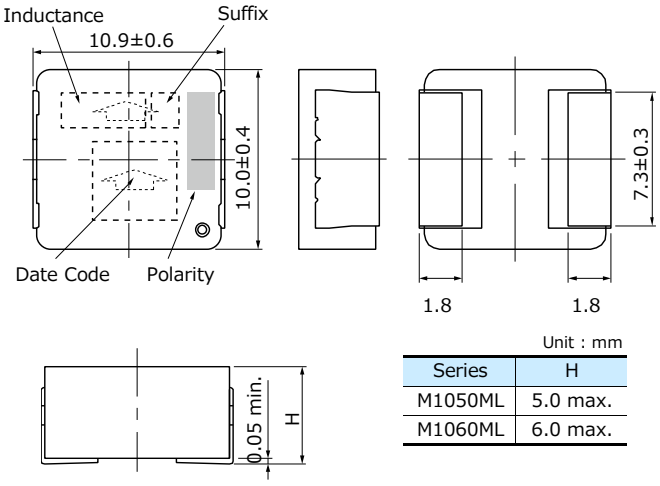
### Series PCC-M1054M
### Series PCC-M1050M
(ETQP5M□□□YFC/YGC)




Unit : mm

| Series | H |
|---|---|
| M1054M | 5.4 max. |
| M1050M | 5.0 max. |

### Series PCC-M1050ML
### Series PCC-M1060ML
(ETQP5M□□□YLC/ETQP6M□□□YLC)



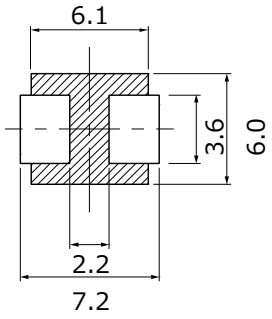

Unit : mm

| Series | H |
|---|---|
| M1050ML | 5.0 max. |
| M1060ML | 6.0 max. |

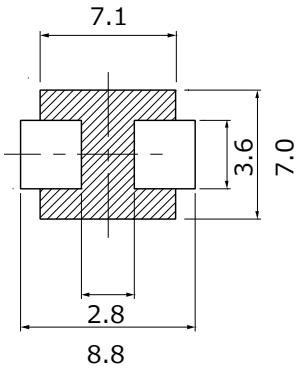
## Recommended land pattern in mm (not to scale)

Dimensional tolerance unless noted : ±0.5

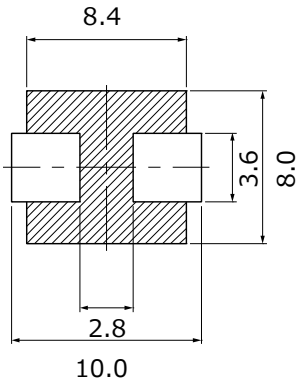
**Series PCC-M0530M**
**Series PCC-M0540M**
(ETQP3M□□□YFP/ETQP4M□□□YFP)



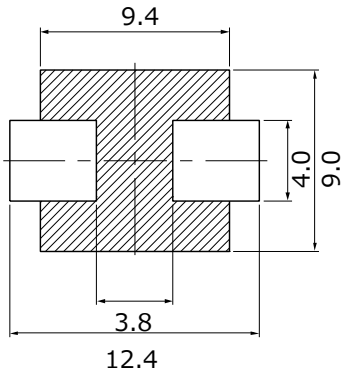

**Series PCC-M0630M**
**Series PCC-M0645M**
(ETQP3M□□□YFN/ETQP4M□□□YFN)



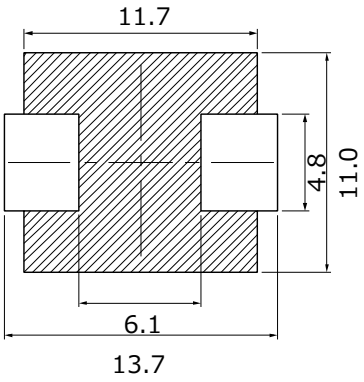

**Series PCC-M0754M**
**Series PCC-M0750M**
(ETQP5M□□□YFM/YGM)



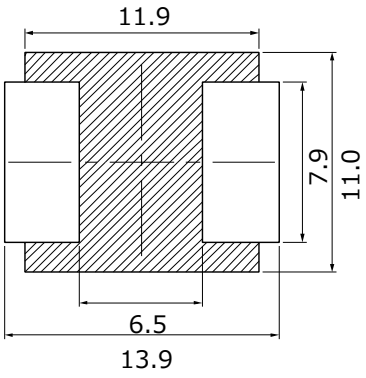

**Series PCC-M0854M**
**Series PCC-M0850M**
(ETQP5M□□□YFK/YGK)




**Series PCC-M1054M**
**Series PCC-M1050M**
(ETQP5M□□□YFC/YGC)




**Series PCC-M1050ML**
**Series PCC-M1060ML**
(ETQP5M□□□YLC/ETQP6M□□□YLC)



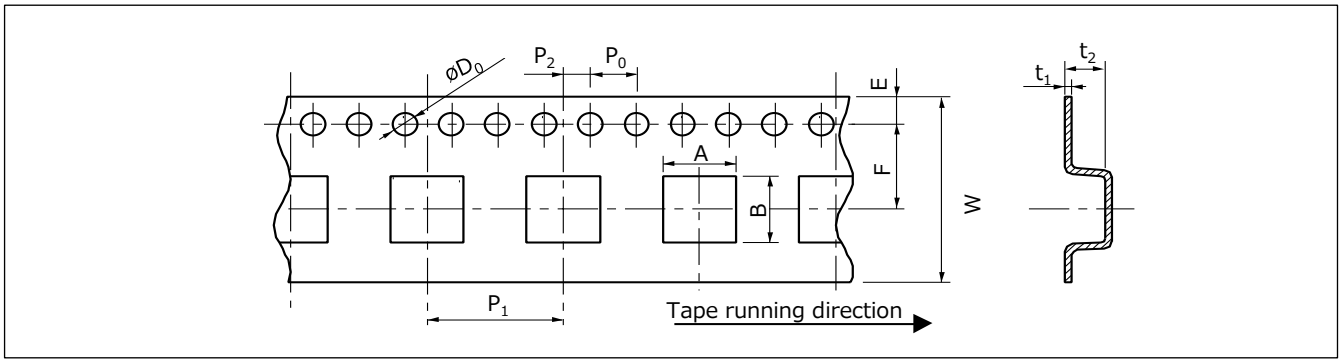

※Don't wire on the pattern on shaded portion the PWB.

Unit : mm

■ **As for soldering conditions and safety precautions (Power choke coils (Automotive grade)), please see data files**

## Packaging methods (Taping)

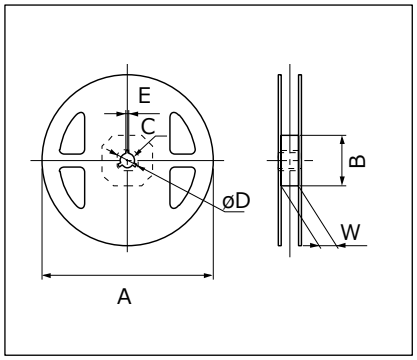
● Embossed carrier tape




Unit : mm

| Series | A | B | W | E | F | $P_1$ | $P_2$ | $P_0$ | $øD_0$ | $t_1$ | $t_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCC-M0530M | 5.6 | 6.1 | 16.0 | 1.75 | 7.5 | 12.0 | 2.0 | 4.0 | 1.5 | 0.4 | 3.3 |
| PCC-M0540M | | | | | | | | | | | 4.3 |
| PCC-M0630M | 7.1 | 6.6 | | | | | | | | | 3.3 |
| PCC-M0645M | | | | | | | | | | | 5.0 |
| PCC-M0754M/M0750M | 8.1 | 7.6 | | | | | | | | | 6.0 |
| PCC-M0854M/M0850M | 9.1 | 8.6 | | | | | | | | | |
| PCC-M1054M/M1050M<br>PCC-M1050ML/M1060ML | 10.65 | 11.75 | 24.0 | | 11.5 | 16.0 | | | | 0.5 | 6.35 |

● Taping reel

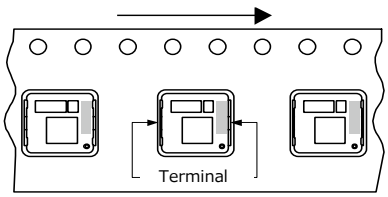



Unit : mm

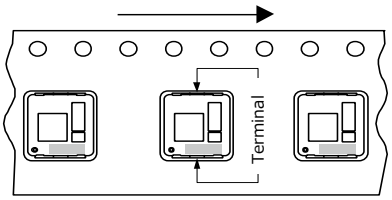
| Serise | A | B | C | øD | E | W |
|---|---|---|---|---|---|---|
| PCC-M0530M/M0540M<br>PCC-M0630M/M0645M<br>PCC-M0754M/M0750M<br>PCC-M0854M/M0850M | 330 | 100 | 13 | 21 | 2 | 17.5 |
| PCC-M1054M/M1050M<br>PCC-M1050ML/M1060ML | | | | | | 25.5 |

## Component placement (Taping)

Serise
M0630M/M0645M
M0754M/M0750M
M0854M/M0850M




Serise
M0530M/M0540M
M1054M/M1050M
M1050ML/M1060ML




## Standard packing quantity/reel

| Serise | Part No. | Minimum quantity / Packing unit | Quantity per reel |
|---|---|---|---|
| PCC-M0530M | ETQP3M□□□YFP | 2,000 pcs / box (2 reel) | 1,000 pcs |
| PCC-M0540M | ETQP4M□□□YFP | | |
| PCC-M0630M | ETQP3M□□□YFN | | |
| PCC-M0645M | ETQP4M□□□YFN | 1,000 pcs / box (2 reel) | 500 pcs |
| PCC-M0754M | ETQP5M□□□YFM | | |
| PCC-M0750M | ETQP5M□□□YGM | | |
| PCC-M0854M | ETQP5M□□□YFK | | |
| PCC-M0850M | ETQP5M□□□YGK | | |
| PCC-M1054M | ETQP5M□□□YFC | | |
| PCC-M1050M | ETQP5M□□□YGC | | |
| PCC-M1050ML | ETQP5M□□□YLC | | |
| PCC-M1060ML | ETQP6M□□□YLC | | |

UPGRADE

# Power Choke Coil (Automotive Grade)

## PCC-M0854MS series

## PCC-M1050MS series

High heat resistance and high reliability using metal composite core (MC)

Industrial property : Patents 18 (Registered 10 / Pending 8)

## Features

- The vibration-resistant structure achieves a vibration acceleration-resistance of 50 G or higher in 150 ℃ environments
- Reduce core loss in high frequency band (More than 2 MHz)
- High heat resistance : Operation up to 150 ℃ including self-heating
- SMD type
- High-reliability : High vibration resistance as result of newly developed integral construction; under severe reliability conditions of automotive and other strenuous applications
- High bias current : Excellent inductance stability using ferrous alloy magnetic material
- Temp. stability : Excellent inductance stability over broad temp. range
- Low audible (buzz) noise : A gapless structure achieved with metal composite core
- High efficiency : Low DC resistance of winding and low eddy-current loss of the core
- Shielded construction
- AEC-Q200 compliant
- RoHS compliant

## Recommended applications

- ECU placed in the engine itself, mechanical-electrical-integrated ECU
- Noise filter for various drive circuitry requiring high temp. operation and peak current handling capability
- Boost-Converter, Buck-Converter DC/DC

## Standard packing quantity (Minimum quantity/Packing unit)

- 1,000 pcs/box (2 reel)

## Explanation of part numbers

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | T | Q | P | | M | | | | Y | S | |
| Product Code | | | Classification | Height | Winding | Inductance | | | Core | Suffix | Size |

Inductance

| Code | Inductance |
|---|---|
| R68 | 0.68 μH |

Size

| Code | Size |
|---|---|
| K | □ 8 mm |
| C | □ 10 mm |

## Temperature rating

| | | |
|---|---|---|
| Operating temperature range | | Tc : -40 ℃ to +150 ℃ (Including self-temperature rise) |
| Storage condition | After PWB mounting | |
| | Before PWB mounting | Ta : -5 ℃ to +35 ℃ 85%RH max. |

## Standard parts

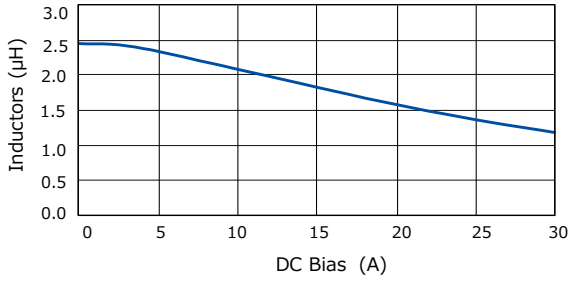
| Part No. | Inductance*1 | | DCR (at 20 ℃) (mΩ) | | Rated current (A) Typ. | | MSL level | Series [Size (mm)] |
|---|---|---|---|---|---|---|---|---|
| | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | △T= 40 K*2 ( )*3 | △L= −30 %*4 | *5 | |
| ETQP5M2R5YSK | 2.45 | ±20 | 7.4 (8.14) | ±10 | 14.1 (12.0) | 21.7 | 1 | PCC-M0854MS [8.5×8.0×5.4] |
| ETQP5MR68YSC | 0.68 | | 1.66 (1.83) | | 32.3 (27.0) | 40.0 | 1 | PCC-M1050MS [10.9×10.0×5.0] |

*1: Measured at 100 kHz
*2: The proved current value for making the overall temperature rise of 40K, when mounted on a multi-layer board with high-heat dissipation (heat dissipation constant 8.5x8.0x5.4 mm : approx. 30 K/W, 10.9x10.0x5.0 mm : approx. 20 K/W).
*3: The proved current value for making the overall temperature rise of 40K, when mounted on a 4-layer circuit board of FR4 t=1.6 mm and DC current is applied.
*4: Saturation rated current : DC current which causes L(0) drop −30 %.
*5: The solderability is guaranteed for 1 year only. The product out of expiration date shall not be used.
◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +150℃ should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.

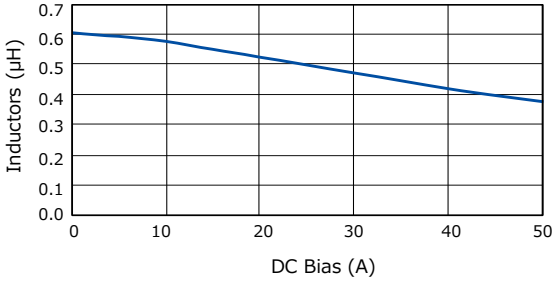
## Performance characteristics (Reference)

● Inductance vs DC Current

[ ETQP5M2R5YSK ]



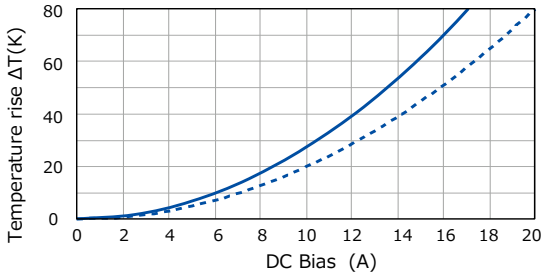

[ ETQP5MR68YSC ]



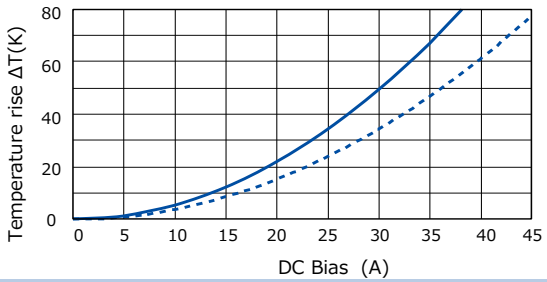

● Case Temperature vs DC Current

PWB condition A : Four-layer PWB (1.6 mm FR4), See also ✻2
PWB condition B : Multilayer PWB with high heat dissipation performance. See also ✻3

[ ETQP5M2R5YSK ]



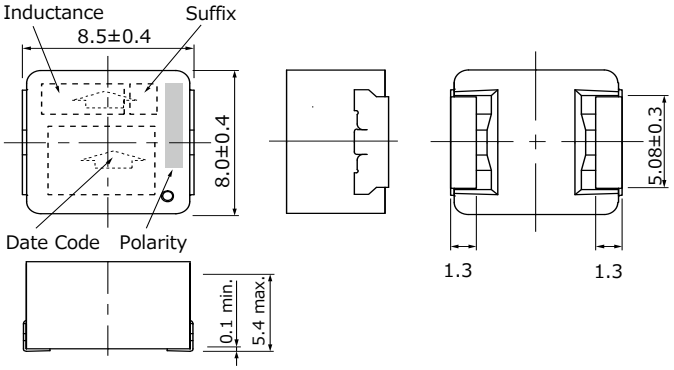

[ ETQP5MR68YSC ]



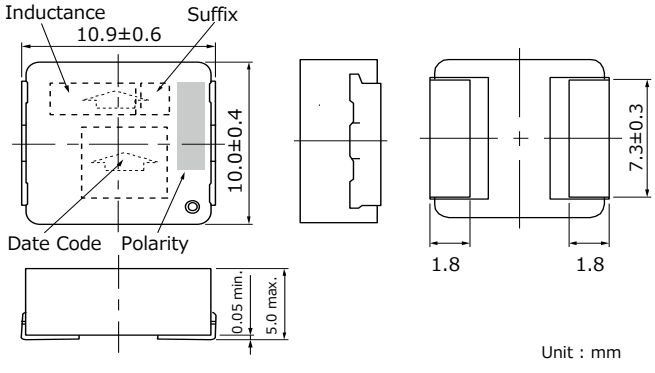

## Dimensions in mm (not to scale)

Dimensional tolerance unless noted : ±0.5

**Series PCC-M0854MS**
(ETQP5M□□□YSK)




**Series PCC-M1050MS**
(ETQP5M□□□YSC)

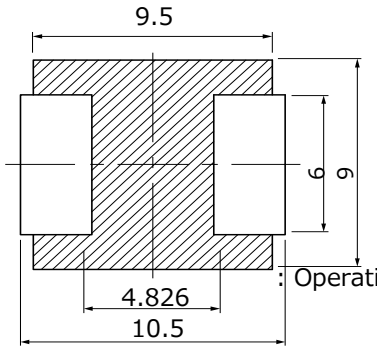



Unit : mm

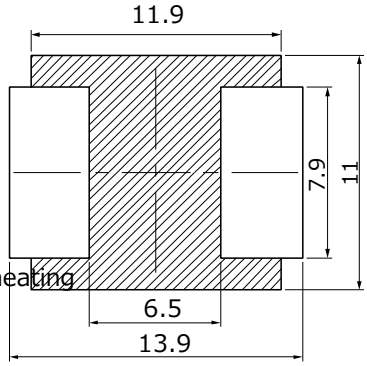
## Recommended land pattern in mm (not to scale)

Dimensional tolerance unless noted : ±0.5

**Series PCC-M0854MS**
(ETQP5M□□□YSK)




**Series PCC-M1050MS**
(ETQP5M□□□YSC)




: Operation up to 150 ℃ including self-heating

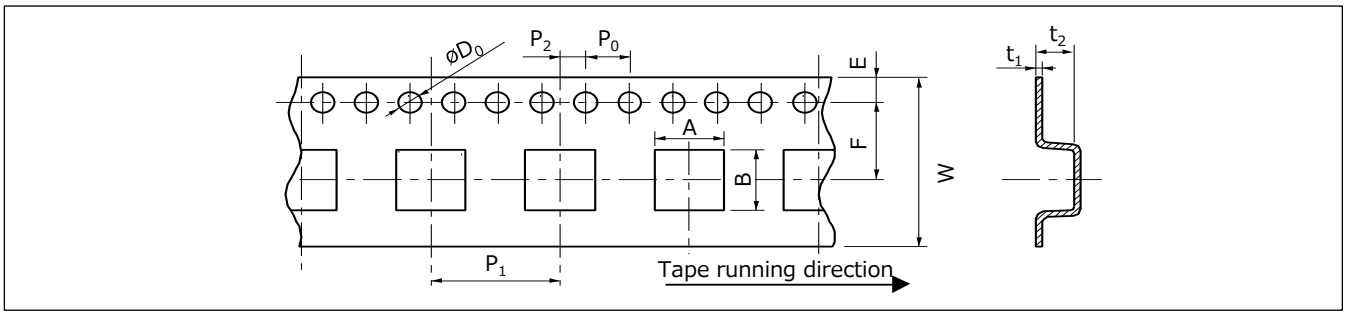
※Don't wire on the pattern on shaded portion the PWB.

Unit : mm

■ **As for soldering conditions and safety precautions (Power choke coils (Automotive grade)), please see data files**

## Packaging methods (Taping)

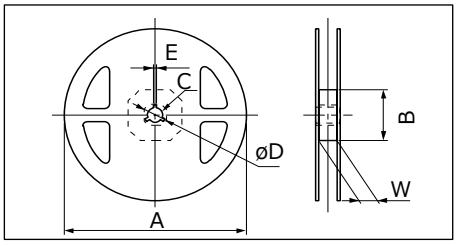
● Embossed Carrier Tape Dimensions in mm (not to scale)




Unit : mm

| Series | A | B | W | E | F | $P_1$ | $P_2$ | $P_0$ | $øD_0$ | $t_1$ | $t_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCC-M0854MS | 9.1 | 8.6 | 16.0 | 1.75 | 7.5 | 12.0 | 2.0 | 4.0 | 1.5 | 0.4 | 6.0 |
| PCC-M1050MS | 10.65 | 11.75 | 24.0 | | 11.5 | 16.0 | | | | 0.5 | 6.35 |

● Taping Reel Dimensions in mm (not to scale)

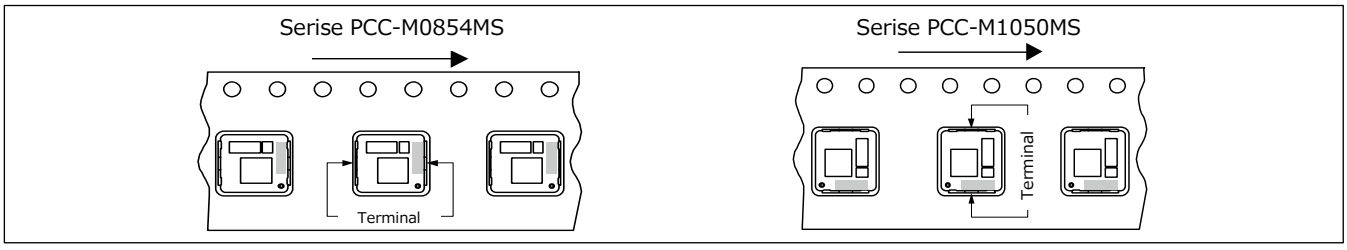



Standard Reel Dimensions

Unit : mm

| Series | A | B | C | øD | E | W |
|---|---|---|---|---|---|---|
| PCC-M0854MS | 330 | 100 | 13 | 21 | 2 | 17.5 |
| PCC-M1050MS | | | | | | 25.5 |

## Component placement (Taping)



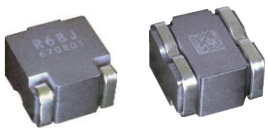

## Standard packing quantity/reel

| Serise | Part No. | Minimum quantity / Packing unit | Quantity per reel |
|---|---|---|---|
| PCC-M0854MS | ETQP5M□□□YSK | 1,000 pcs / box (2 reel) | 500 pcs |
| PCC-M1050MS | ETQP5M□□□YSC | | |

UPGRADE

# Power Choke Coil (Automotive Grade)

## PCC-M1280MF series



High heat resistance and high reliability using metal composite core (MC)

Industrial property : Patents 3 (Registered 1 / Pending 2)

## Features

- ●High heat resistance : Operation up to 160 ℃ including self-heating
- ●Large current power : 53 A (R33 type)
- ●High vibration resistance : 30 G
- ●SMD type
- ●High-reliability : High vibration resistance as result of newly developed integral construction ; under severe reliability conditions of automotive and other strenuous applications
- ●High bias current : Excellent inductance stability using ferrous alloy magnetic material
- ●Temp. stability : Excellent inductance stability over broad temp. range
- ●Low audible (buzz) noise : A gapless structure achieved with metal composite core
- ●High efficiency : Low DC resistance of winding and low eddy-current loss of the core
- ●Shielded construction
- ●AEC-Q200 compliant
- ●RoHS compliant

## Recommended applications

- ●Noise filter for various drive circuitry requiring high temp. operation and peak current handling capability
- ●Boost-Converter, Buck-Converter DC/DC

## Standard packing quantity (Minimum quantity/Packing unit)

- ● 500 pcs/box (2 reel)

## Explanation of part numbers

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | T | Q | P | 8 | M | | | | J | | |
| Product Code | | | Classification | Height | Winding | Inductance | | | Core | Suffix | Size |

(Example)

| Code | Inductance |
|---|---|
| R68 | 0.68 μH |
| 4R7 | 4.7 μH |

| Code | Size |
|---|---|
| A | □ 12 mm |

## Temperature rating

| | | |
|---|---|---|
| Operating temperature range | | Tc : -40 ℃ to +160 ℃ (Including self-temperature rise) |
| Storage condition | After PWB mounting | |
| | Before PWB mounting | Ta : -5 ℃ to +35 ℃ 85%RH max. |

## Standard parts

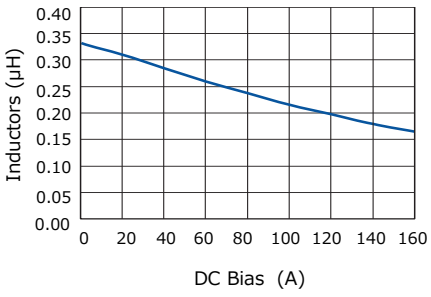
| Part No. | Inductance*1 | | DCR (at 20 ℃) (mΩ) | | Rated current (A) Typ. | | MSL level | Series [Size (mm)] |
|---|---|---|---|---|---|---|---|---|
| | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | △T= 40 K*2 ( )*3 | △L= −30 %*4 | *5 | |
| ▲ETQP8MR33JFA | 0.33 | ±20 | 0.7 (0.77) | ±10 | 53.5 (44.4) | 84.5 | 1 | PCC-M1280MF [12.6×13.2×8.0] |
| ETQP8MR68JFA | 0.68 | | 1.1 (1.21) | | 42.6 (35.4) | 56.9 | 1 | |
| ETQP8M1R0JFA | 1.0 | | 1.36 (1.50) | | 38.3 (31.8) | 44.4 | 1 | |
| ETQP8M1R5JFA | 1.5 | | 1.8 (1.98) | | 33.3 (27.7) | 29.9 | 1 | |
| ETQP8M2R5JFA | 2.5 | | 2.6 (2.86) | | 27.7 (23.0) | 32.1 | 1 | |
| ETQP8M3R3JFA | 3.3 | | 3.6 (3.96) | | 23.6 (19.6) | 27.6 | 1 | PCC-M1280MF [12.6×13.1×8.0] |
| ETQP8M4R7JFA | 4.7 | | 4.9 (5.39) | | 20.2 (16.8) | 24.7 | 1 | |

*1: Measured at 100 kHz
▲Under development
*2: The proved current value for making the overall temperature rise of 40K, when mounted on a multi-layer board with high-heat dissipation (heat dissipation constant : approx. 20 K/W).
*3: The proved current value for making the overall temperature rise of 40K, when mounted on a 4-layer circuit board of FR4 t=1.6 mm and DC current is applied.
*4: Saturation rated current : DC current which causes L(0) drop −30 %.
*5: The solderability is guaranteed for 1 year only. The product out of expiration date shall not be used.
◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +160°C should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.

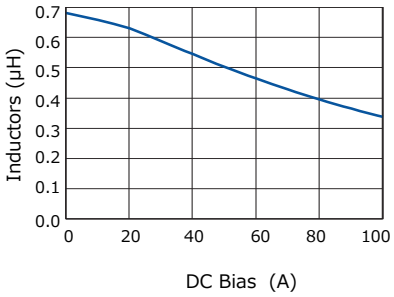
## Performance characteristics (Reference①)

● Inductance vs DC Current

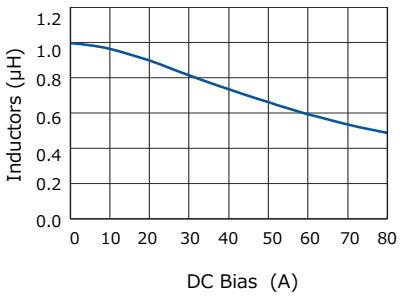
[▲ ETQP8MR33JFA ]



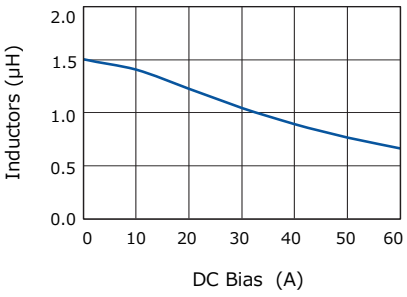

[ ETQP8MR68JFA ]



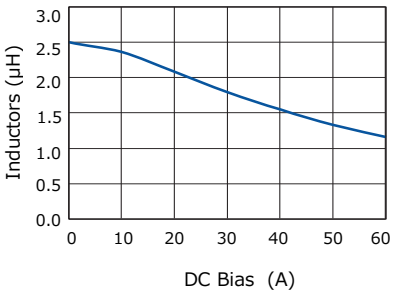

[ ETQP8M1R0JFA ]



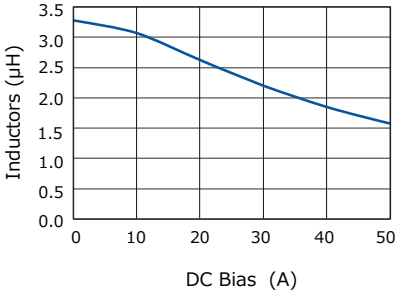

[ ETQP8M1R5JFA ]



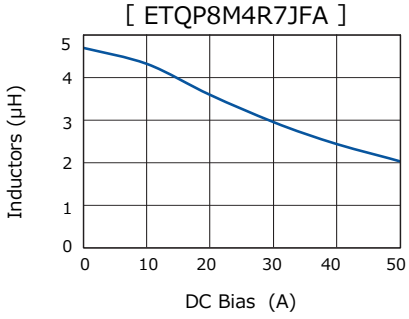

[ ETQP8M2R5JFA ]




[ ETQP8M3R3JFA ]




[ ETQP8M4R7JFA ]




▲Under development

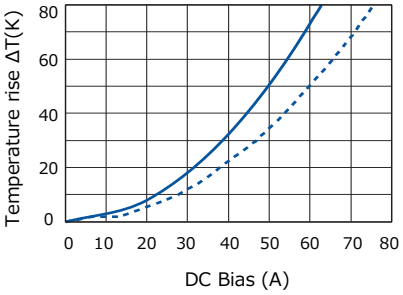
## Performance characteristics (Reference②)

● Case Temperature vs DC Current

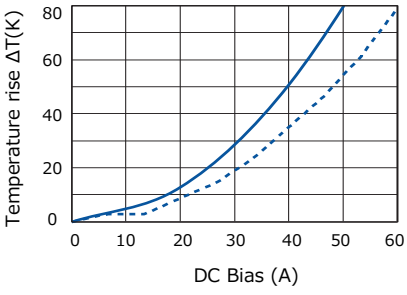
PWB condition A : Four-layer PWB (1.6 mm FR4).*3

PWB condition B : Multilayer PWB with high heat dissipation performance.*2

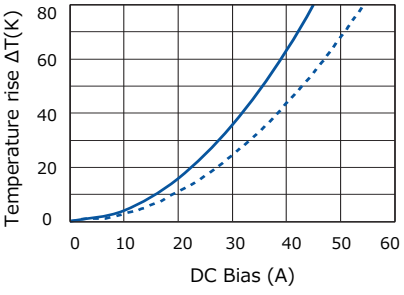
[ ▲ETQP8MR33JFA ]



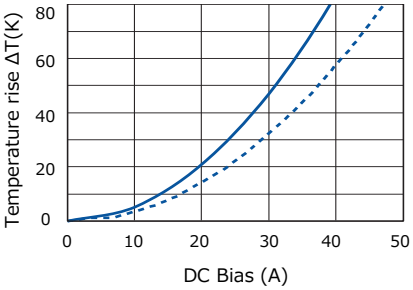

[ ETQP8MR68JFA]



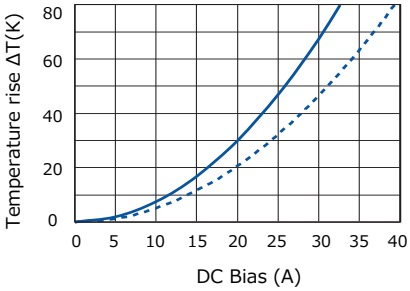

[ ETQP8M1R0JFA ]



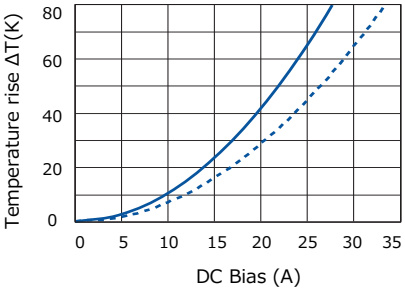

[ ETQP8M1R5JFA ]



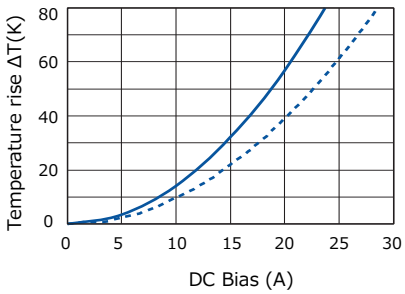

[ ETQP8M2R5JFA ]




[ ETQP8M3R3JFA ]




[ ETQP8M4R7JFA ]

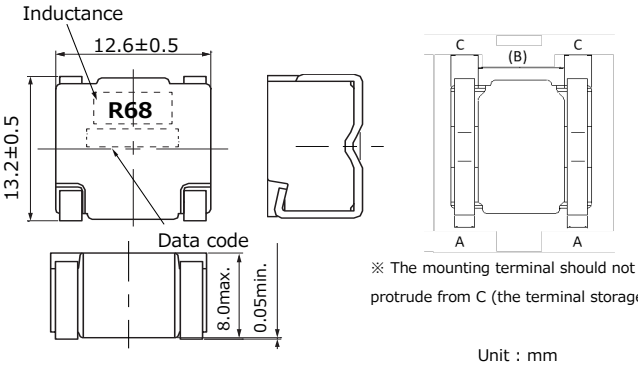



▲Under development

## Dimensions in mm (not to scale)

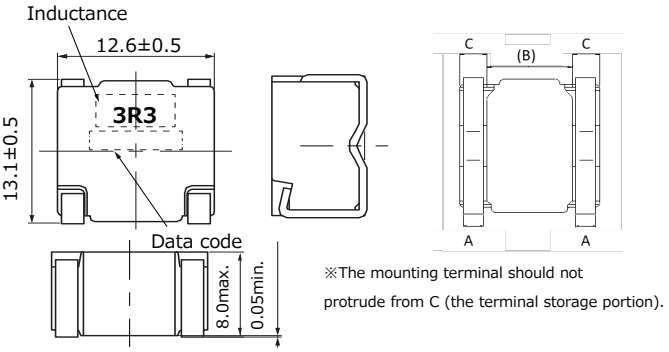
Dimensional tolerance unless noted : ±0.5

- ETQP8MR33JFA
- ETQP8MR68JFA
- ETQP8M1R0JFA
- ETQP8M1R5JFA
- ETQP8M2R5JFA
- ETQP8M3R3JFA
- ETQP8M4R7JFA




Unit : mm

| Part No. | A | B | C |
|---|---|---|---|
| ETQP8MR33JFA | 2.2±0.4 | (6.4) | 3.10±0.15 |
| ETQP8MR68JFA | 2.0±0.4 | (7.1) | 2.75±0.16 |
| ETQP8M1R0JFA | 2.0±0.4 | (7.1) | 2.75±0.16 |
| ETQP8M1R5JFA | 2.0±0.4 | (7.1) | 2.75±0.16 |




Unit : mm

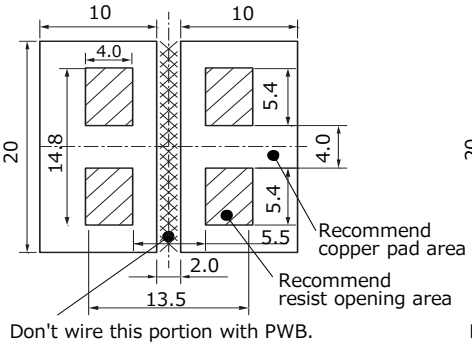
| Part No. | A | B | C |
|---|---|---|---|
| ETQP8M2R5JFA | 1.8±0.4 | (7.7) | 2.45±0.10 |
| ETQP8M3R3JFA | 1.5±0.4 | (8.1) | 2.25±0.14 |
| ETQP8M4R7JFA | 1.25±0.4 | (8.1) | 2.25±0.14 |

A : Terminal width B : Convex part on the bottom of the product
C : Terminal storage portion

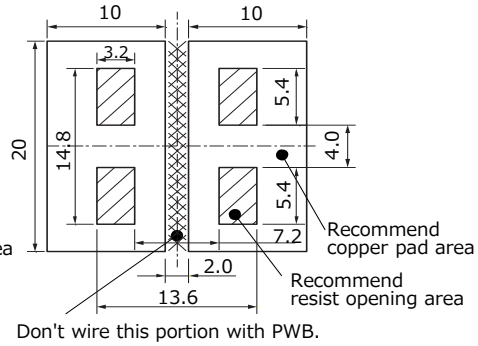
## Recommended land pattern in mm (not to scale)

Dimensional tolerance unless noted : ±0.5

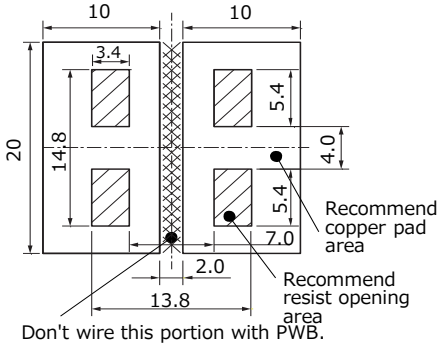
- ETQP8MR33JFA



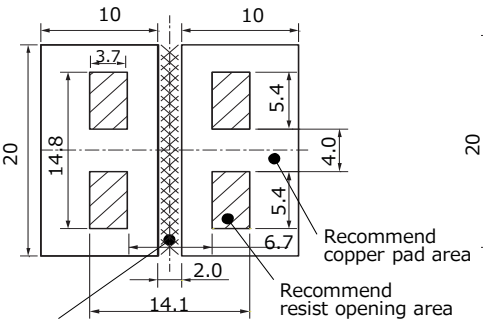

- ETQP8M4R7JFA



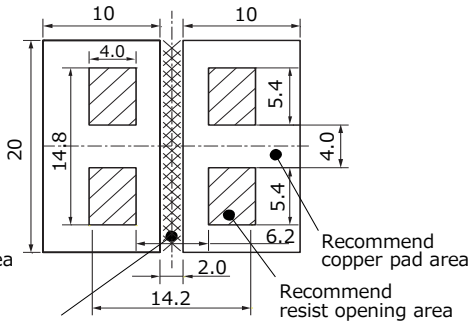

- ETQP8M3R3JFA




- ETQP8M2R5JFA




- ETQP8MR68JFA
- ETQP8M1R0JFA
- ETQP8M1R5JFA

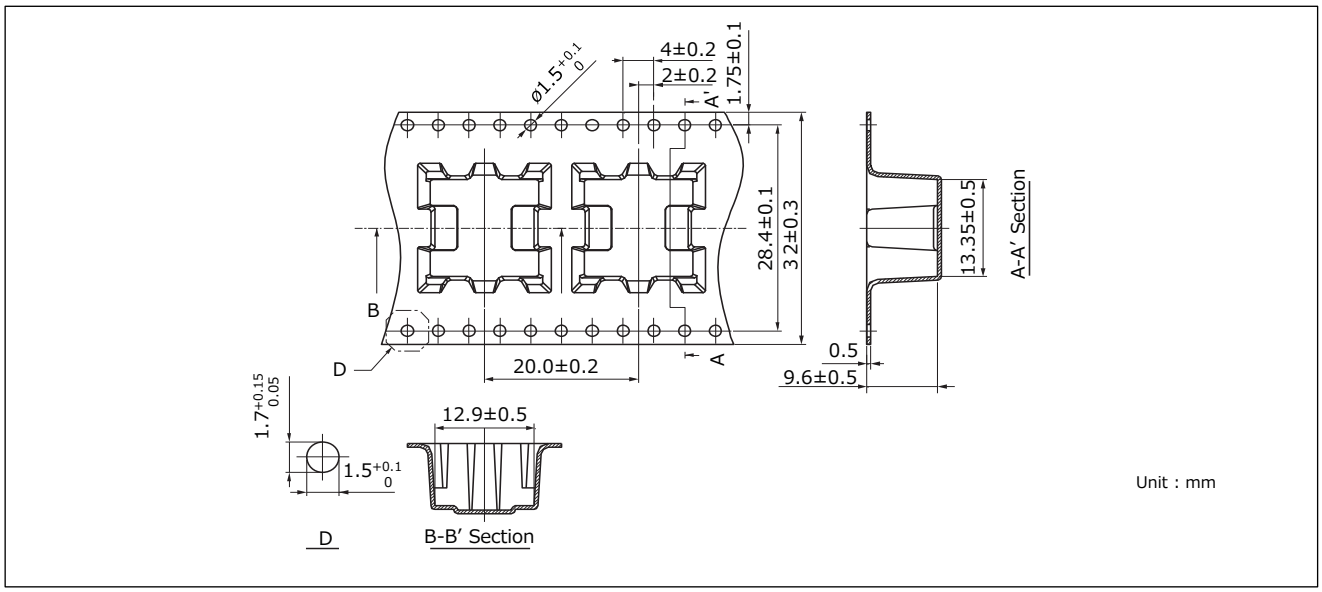



Unit : mm

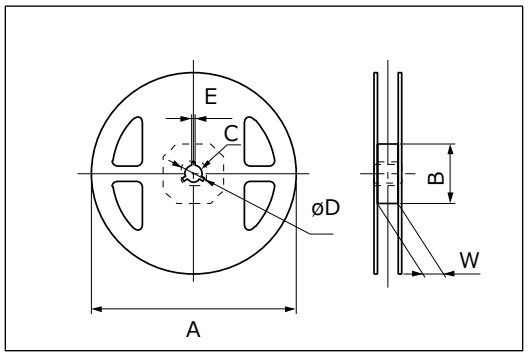
■ **As for soldering conditions and safety precautions (Power choke coils (Automotive grade)), please see data files**

## Packaging methods (Taping)

● Embossed carrier tape dimensions in mm (not to scale)




● **Taping reel dimensions in mm (not to scale)**

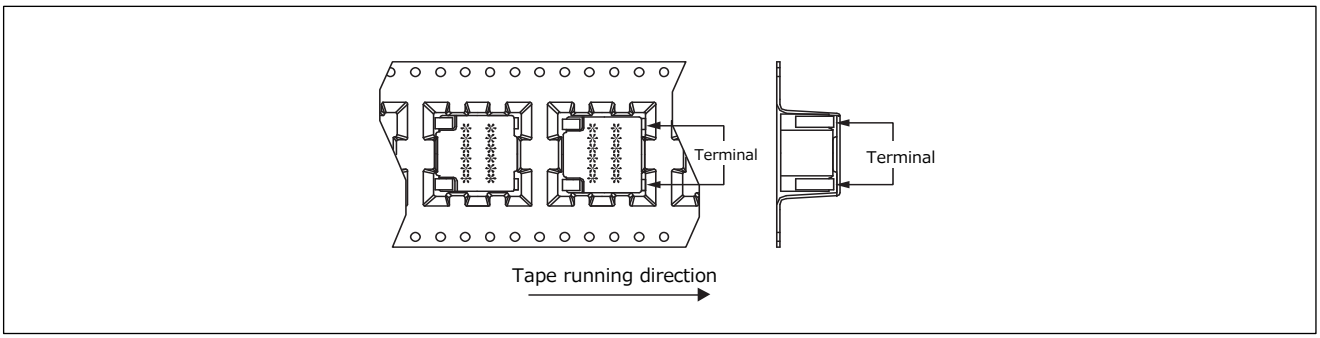



Standard reel dimensions Unit : mm

| Serise | A | B | C | øD | E | W |
|---|---|---|---|---|---|---|
| PCC-M1280MF | 330 | (100) | 13 | 21 | 2 | 33.5 |

## Parts mounting (Taping)

● Component placement (Taping)




## Standard packaging quantity

| Series | Part No. | Minimum packaging quantity | 1 reel quantity |
|---|---|---|---|
| PCC-M1280F | ETQP8M□□□JFA | 500 pcs / box (2 reels) | 250 pcs |

UPGRADE

# Power Choke Coil (Automotive Grade)

## PCC-M0530M-LP, PCC-M0630M-LP series
## PCC-M0840M-LP, PCC-M1040M-LP series

High heat resistance and high reliability using metal composite core (MC)

Industrial property : Patents 3 (Registered 2 / Pending 1)

## Features

- ●High heat resistance : Operation up to 155 ℃ including self-heating
- ●Low profile : 3 mm max. height (PCC-M0530M-LP, PCC-M0630M-LP)
  4 mm max. height (PCC-M0840M-LP, PCC-M1040M-LP)
- ●SMD type
- ●High-reliability : High vibration resistance as result of newly developed integral construction ; under severe reliability conditions of automotive and other strenuous applications
- ●High bias current : Excellent inductance stability using ferrous alloy magnetic material
- ●Temp. stability : Excellent inductance stability over broad temp. range
- ●Low audible (buzz) noise : A gapless structure achieved with metal composite core
- ●High efficiency : Low DC resistance of winding and low eddy-current loss of the core
- ●Shielded construction
- ●AEC-Q200 compliant
- ●RoHS compliant

## Recommended applications

- ●Noise filter for various drive circuitry requiring high temp. operation and peak current handling capability
- ●Boost-Converter, Buck-Converter DC/DC

## Standard packing quantity (Minimum quantity/Packing unit)

- ●4,000 pcs/box (2 reel) : PCC-M0530M-LP, M0630M-LP
- ●1,000 pcs/box (2 reel) : PCC-M0840M-LP, M1040M-LP

## Explanation of part numbers

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | T | Q | P | | M | | | | K | V | |
| Product Code | | | Classification | Height | Winding | Inductance | | | Core | Suffix | Size |

(Example)

| Code | Inductance |
|---|---|
| 4R7 | 4.7 μH |
| 220 | 22 μH |
| R68 | 0.68 μH |

| Code | Size |
|---|---|
| P | □ 5 mm |
| N | □ 6 mm |
| K | □ 8 mm |
| C | □ 10 mm |

## Temperature rating

| | | |
|---|---|---|
| Operating temperature range | | Tc : -55 ℃ to +155 ℃ (Including self-temperature rise) |
| Storage condition | After PWB mounting | |
| | Before PWB mounting | Ta : -5 ℃ to +35 ℃ 85%RH max. |

## 1. Series PCC-M0530M-LP (ETQP3M□□□KVP)

### Standard parts

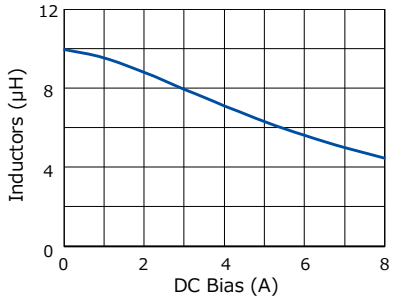
| Part No. | Inductance*1 | | DCR (at 20 ℃) (mΩ) | | Rated current (A) Typ. | | MSL level | Series [Size (mm)] |
|---|---|---|---|---|---|---|---|---|
| | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | △T= 40 K*2 ( )*3 | △L= −30 %*4 | *5 | |
| ETQP3M100KVP | 10.0 | ±20 | 96.0 (105.60) | ±10 | 2.9 (2.4) | 4.2 | 1 | PCC-M0530M-LP [5.5×5.0×3.0] |
| ETQP3M6R8KVP | 6.8 | | 65.7 (72.27) | | 3.5 (2.9) | 6.1 | 1 | |
| ETQP3M4R7KVP | 4.7 | | 45.6 (50.16) | | 4.1(3.4) | 6.7 | 1 | |
| ETQP3M3R3KVP | 3.3 | | 27.3 (30.03) | | 5.4 (4.4) | 8.0 | 1 | |
| ETQP3M2R2KVP | 2.2 | | 20.0 (22.00) | | 6.3 (5.2) | 10.1 | 1 | |
| ETQP3M1R5KVP | 1.5 | | 12.0 (13.20) | | 8.1 (6.7) | 12.0 | 1 | |
| ETQP3M1R0KVP | 1.0 | | 9.6 (10.56) | | 9.0 (7.5) | 14.1 | 1 | |
| ETQP3MR68KVP | 0.68 | | 7.6 (8.36) | | 10.2 (8.4) | 15.9 | 1 | |
| ETQP3MR33KVP | 0.33 | | 4.85 (5.34) | | 12.7 (10.6) | 21.8 | 1 | |

*1: Measured at 100 kHz
*2: The proved current value for making the overall temperature rise of 40K, when mounted on a multi-layer board with high-heat dissipation (heat dissipation constant 5.5 x 5.0 x 3.0 mm : approx. 51 K/W).
*3: The proved current value for making the overall temperature rise of 40K, when mounted on a 4-layer circuit board of FR4 t=1.6 mm and DC current is applied.
*4: Saturation rated current : DC current which causes L(0) drop −30 %.
*5: The solderability is guaranteed for 1 year only. The product out of expiration date shall not be used.
◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +155°C should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.

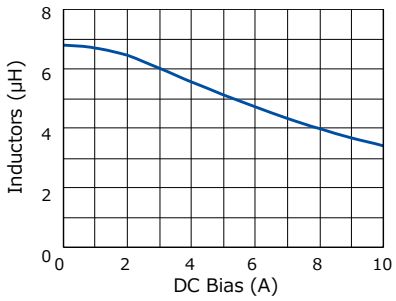
### Performance characteristics (Reference①)

● Inductance vs DC Current

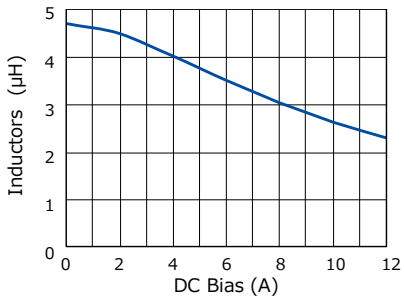
[ ETQP3M100KVP ]



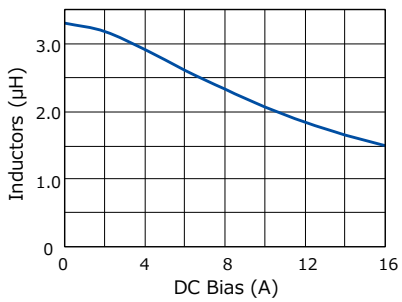

[ ETQP3M6R8KVP ]



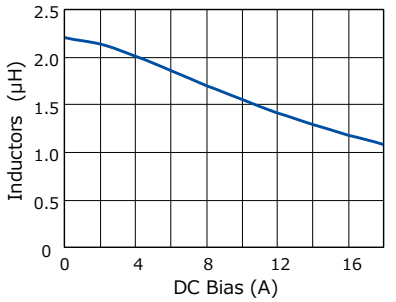

[ ETQP3M4R7KVP ]



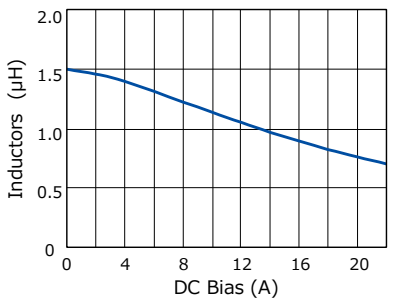

[ ETQP3M3R3KVP ]



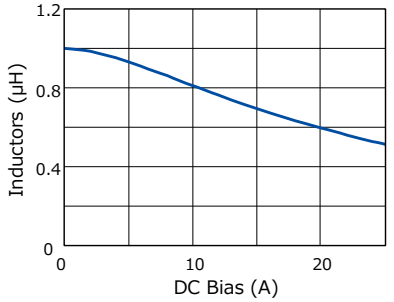

[ ETQP3M2R2KVP ]



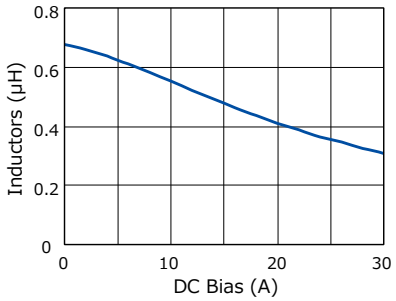

[ ETQP3M1R5KVP ]



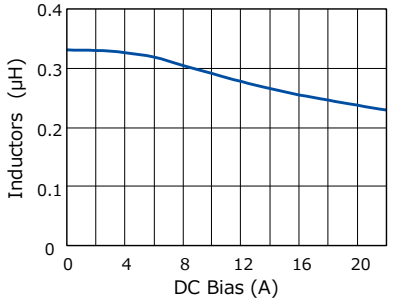

[ ETQP3M1R0KVP ]




[ ETQP3MR68KVP ]




[ ETQP3MR33KVP ]



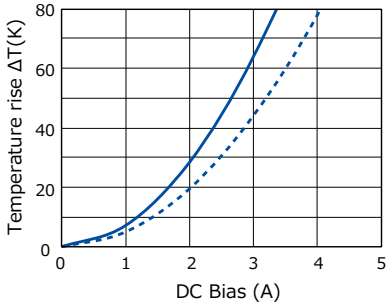
## Performance characteristics (Reference②)

● Case Temperature vs DC Current

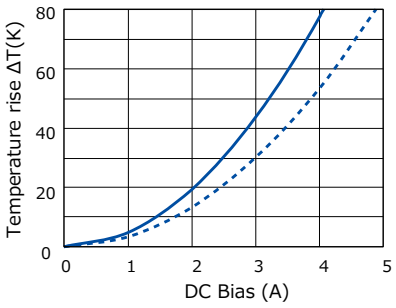
PWB condition A : Four-layer PWB (1.6 mm FR4).*3

PWB condition B : Multilayer PWB with high heat dissipation performance.*2

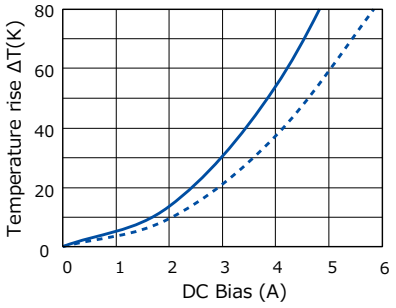
[ ETQP3M100KVP ]



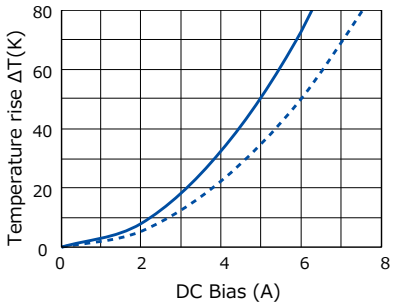

[ ETQP3M6R8KVP ]



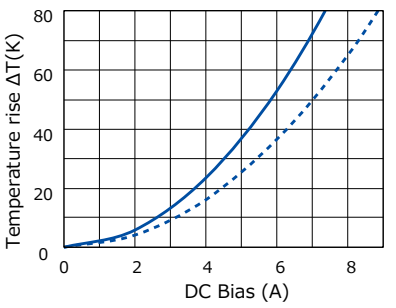

[ ETQP3M4R7KVP ]



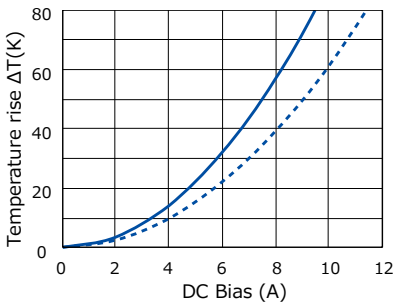

[ ETQP3M3R3KVP ]



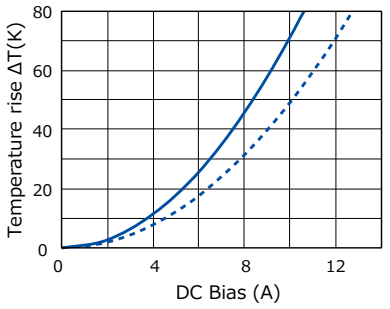

[ ETQP3M2R2KVP ]



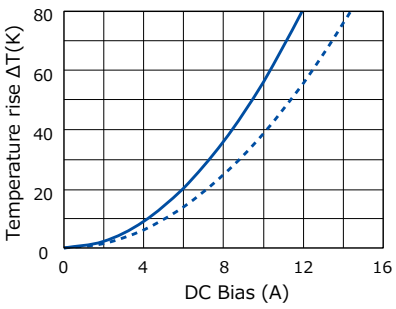

[ ETQP3M1R5KVP ]



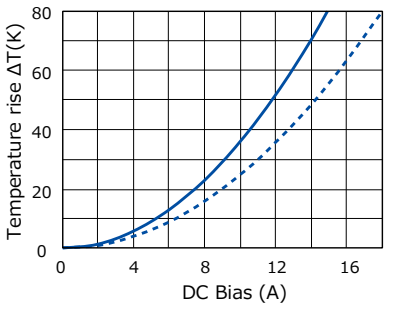

[ ETQP3M1R0KVP ]




[ ETQP3MR68KVP ]




[ ETQP3MR33KVP ]



## 2. Series PCC-M0630M-LP (ETQP3M□□□KVN)

### Standard parts

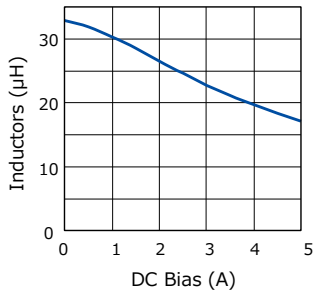
| Part No. | Inductance*1 | | DCR (at 20 ℃) (mΩ) | | Rated current (A) Typ. | | MSL level | Series [Size (mm)] |
|---|---|---|---|---|---|---|---|---|
| | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | △T= 40 K*2 ( )*3 | △L= −30 %*4 | *5 | |
| ETQP3M330KVN | 33.0 | ±20 | 206.0 (226.60) | ±10 | 2.1 (1.7) | 3.0 | 1 | PCC-M0630M-LP [6.4×6.0×3.0] |
| ETQP3M220KVN | 22.0 | | 128.0 (140.80) | | 2.7 (2.2) | 4.3 | 1 | |
| ETQP3M150KVN | 15.0 | | 99.2 (109.12) | | 3.0 (2.5) | 5.1 | 1 | |
| ETQP3M100KVN | 10.0 | | 71.0 (78.10) | | 3.6 (2.9) | 5.8 | 1 | |
| ETQP3M6R8KVN | 6.8 | | 45.6 (50.16) | | 4.5 (3.6) | 8.1 | 1 | |
| ETQP3M4R7KVN | 4.7 | | 29.0 (31.90) | | 5.6 (4.6) | 9.8 | 1 | |
| ETQP3M3R3KVN | 3.3 | | 24.1 (26.51) | | 6.1 (5.0) | 11.5 | 1 | |
| ETQP3M2R2KVN | 2.2 | | 14.5 (15.95) | | 7.9 (6.5) | 12.8 | 1 | |
| ETQP3M1R5KVN | 1.5 | | 11.0 (12.10) | | 9.1 (7.4) | 14.2 | 1 | |
| ETQP3M1R0KVN | 1.0 | | 6.2 (6.82) | | 12.1 (9.9) | 16.0 | 1 | |
| ETQP3MR68KVN | 0.68 | | 5.2 (5.72) | | 13.2 (10.8) | 20.2 | 1 | |

*1: Measured at 100 kHz
*2: The proved current value for making the overall temperature rise of 40K, when mounted on a multi-layer board with high-heat dissipation (heat dissipation constant 6.5 x 6.0 x 3.0 mm : approx. 44 K/W).
*3: The proved current value for making the overall temperature rise of 40K, when mounted on a 4-layer circuit board of FR4 t=1.6 mm and DC current is applied.
*4: Saturation rated current : DC current which causes L(0) drop −30 %.
*5: The solderability is guaranteed for 1 year only. The product out of expiration date shall not be used.
◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +155°C should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.

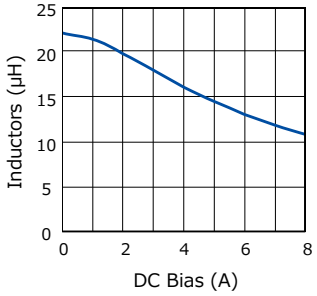
### Performance characteristics (Reference①)

● Inductance vs DC Current

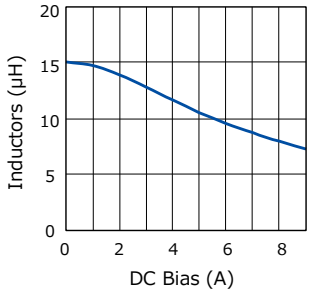
[ ETQP3M330KVN ]



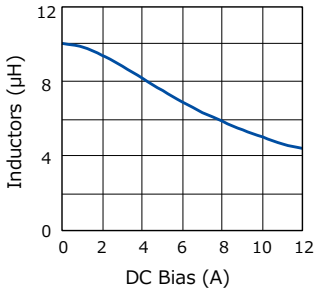

[ ETQP3M220KVN ]



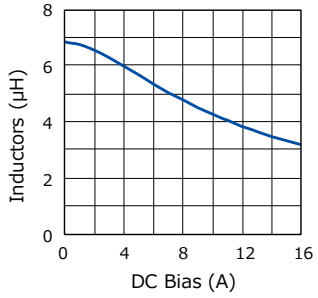

[ ETQP3M150KVN ]



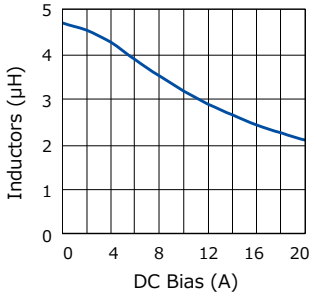

[ ETQP3M100KVN ]



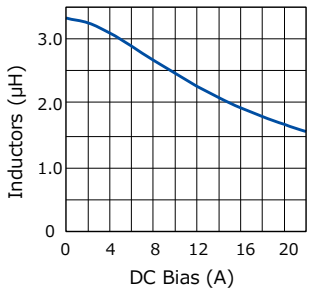

[ ETQP3M6R8KVN ]



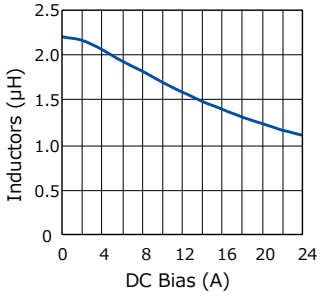

[ ETQP3M4R7KVN ]



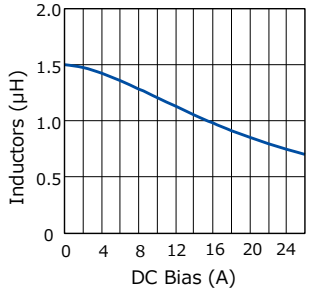

[ ETQP3M3R3KVN ]



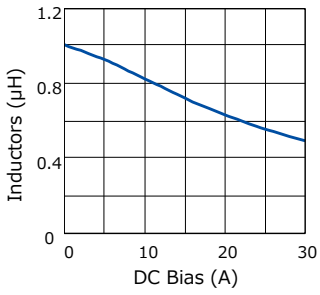

[ ETQP3M2R2KVN ]



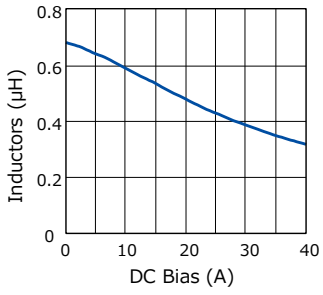

[ ETQP3M1R5KVN ]




[ ETQP3M1R0KVN ]




[ ETQP3MR68KVN ]



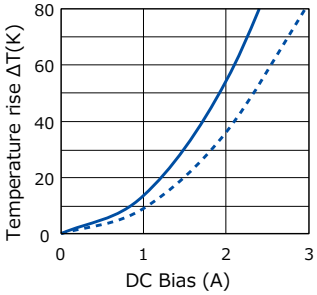
## Performance characteristics (Reference②)

● Case Temperature vs DC Current

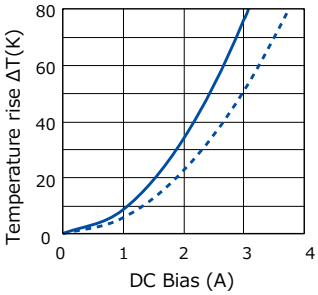
PWB condition A : Four-layer PWB (1.6 mm FR4).*3

PWB condition B : Multilayer PWB with high heat dissipation performance.*2

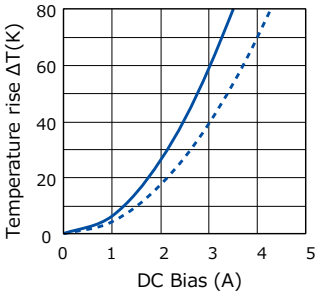
[ ETQP3M330KVN ]



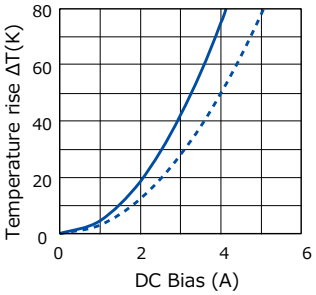

[ ETQP3M220KVN ]



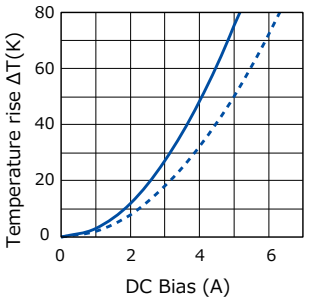

[ ETQP3M150KVN ]



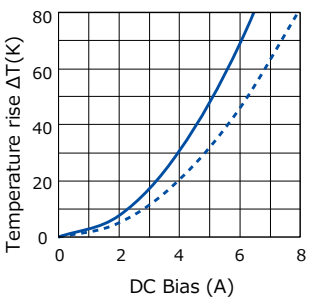

[ ETQP3M100KVN ]



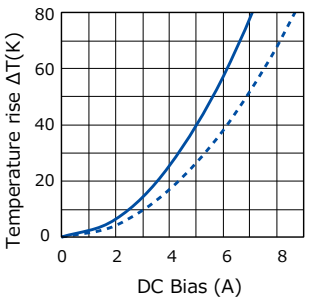

[ ETQP3M6R8KVN ]



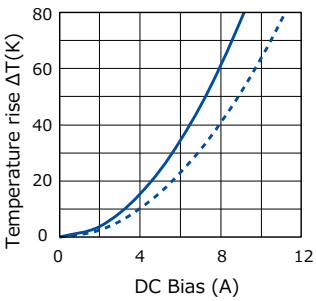

[ ETQP3M4R7KVN ]



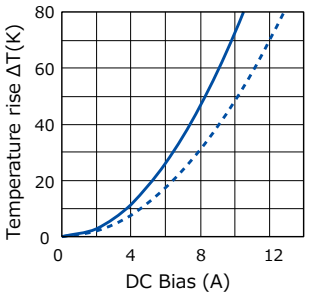

[ ETQP3M3R3KVN ]



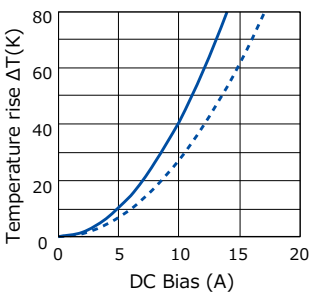

[ ETQP3M2R2KVN ]



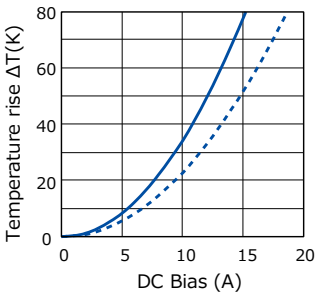

[ ETQP3M1R5KVN ]




[ ETQP3M1R0KVN ]




[ ETQP3MR68KVN ]



## 3. Series PCC-M0840M-LP (ETQP4M□□□KVK)

### Standard parts

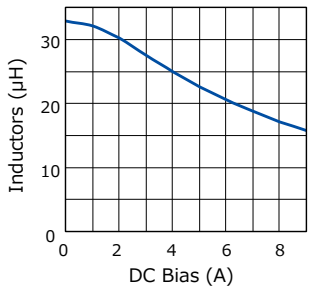
| Part No. | Inductance*1 | | DCR (at 20 ℃) (mΩ) | | Rated current (A) Typ. | | MSL level | Series [Size (mm)] |
|---|---|---|---|---|---|---|---|---|
| | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | △T= 40 K*2 ( )*3 | △L= −30 %*4 | *5 | |
| ETQP4M330KVK | 33.0 | ±20 | 118.0 (129.80) | ±10 | 3.1 (2.6) | 4.7 | 1 | PCC-M0840M-LP [8.5×8.0×4.0] |
| ETQP4M220KVK | 22.0 | | 78.4 (86.24) | | 3.8 (3.2) | 6.0 | 1 | |
| ETQP4M150KVK | 15.0 | | 55.0 (60.50) | | 4.5 (3.8) | 7.6 | 1 | |
| ETQP4M100KVK | 10.0 | | 41.6 (45.76) | | 5.2 (4.4) | 9.1 | 1 | |
| ETQP4M6R8KVK | 6.8 | | 23.5 (25.85) | | 6.9 (5.9) | 11.0 | 1 | |
| ETQP4M4R7KVK | 4.7 | | 16.1 (17.71) | | 8.3 (7.1) | 15.1 | 1 | |
| ETQP4M3R3KVK | 3.3 | | 14.1 (15.51) | | 8.9 (7.6) | 17.4 | 1 | |
| ETQP4M2R2KVK | 2.2 | | 8.5 (9.35) | | 11.4 (9.8) | 20.4 | 1 | |
| ETQP4M1R5KVK | 1.5 | | 4.9 (5.39) | | 15.1 (12.8) | 22.5 | 1 | |
| ETQP4M1R0KVK | 1.0 | | 3.7 (4.07) | | 17.3 (14.8) | 24.4 | 1 | |
| ETQP4MR68KVK | 0.68 | | 2.92 (3.21) | | 19.5 (16.6) | 29.0 | 1 | |

*1: Measured at 100 kHz
*2: The proved current value for making the overall temperature rise of 40K, when mounted on a multi-layer board with high-heat dissipation (heat dissipation constant 8.5×8.0×4.0 mm : approx. 36 K/W).
*3: The proved current value for making the overall temperature rise of 40K, when mounted on a 4-layer circuit board of FR4 t=1.6 mm and DC current is applied.
*4: Saturation rated current : DC current which causes L(0) drop −30 %.
*5: The solderability is guaranteed for 1 year only. The product out of expiration date shall not be used.
◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +155°C should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.

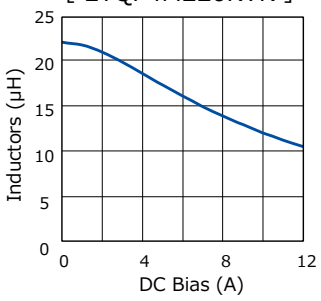
### Performance characteristics (Reference①)

● Inductance vs DC Current

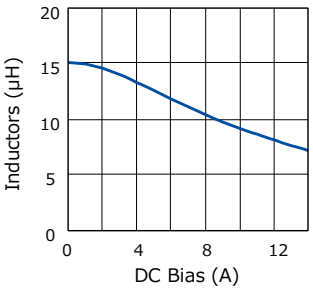
[ ETQP4M330KVK ]



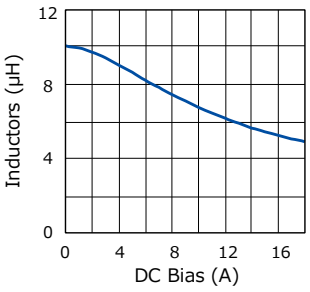

[ ETQP4M220KVK ]



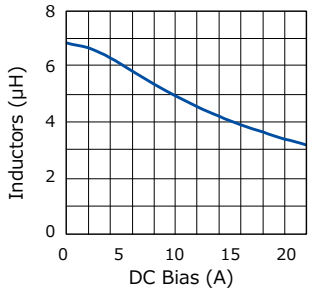

[ ETQP4M150KVK ]



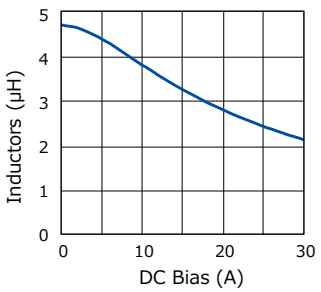

[ ETQP4M100KVK ]



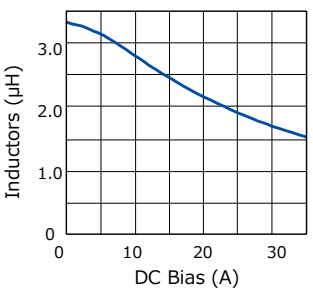

[ ETQP4M6R8KV ]



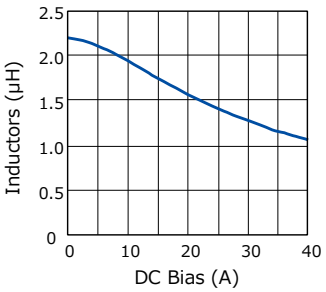

[ ETQP4M4R7KVK ]



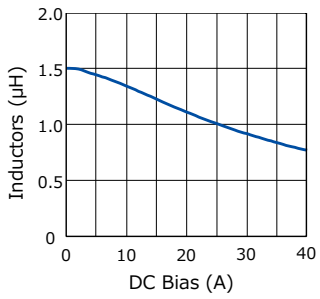

[ ETQP4M3R3KVK ]



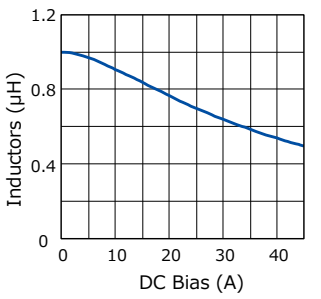

[ ETQP4M2R2KVK ]



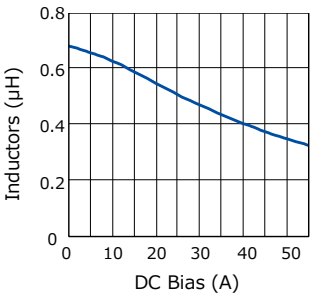

[ ETQP4M1R5KVK ]




[ ETQP4M1R0KVK ]




[ ETQP4MR68KVK ]



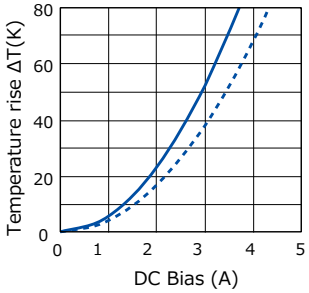
## Performance characteristics (Reference②)

● Case Temperature vs DC Current

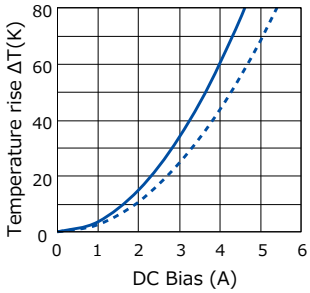
PWB condition A : Four-layer PWB (1.6 mm FR4).*3

PWB condition B : Multilayer PWB with high heat dissipation performance.*2

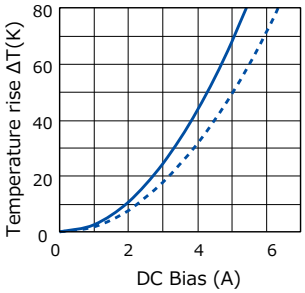
[ ETQP4M330KVK ]



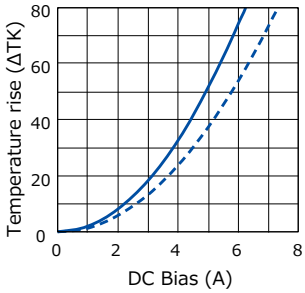

[ ETQP4M220KVK ]



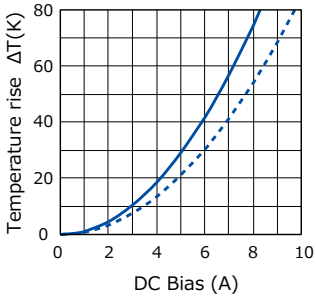

[ ETQP4M150KVK ]



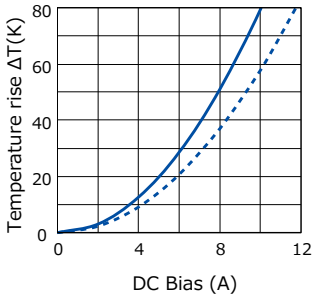

[ ETQP4M100KVK ]



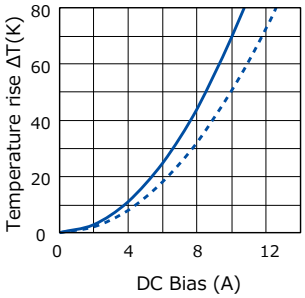

[ ETQP4M6R8KVK ]



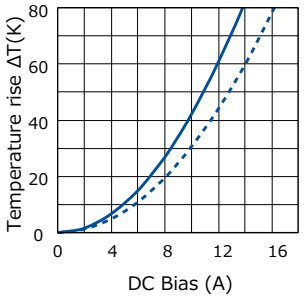

[ ETQP4M4R7KVK ]



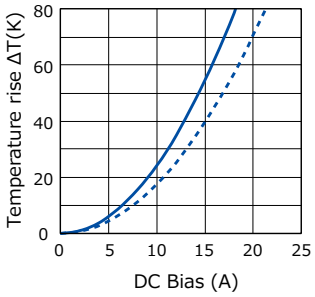

[ ETQP4M3R3KVK ]



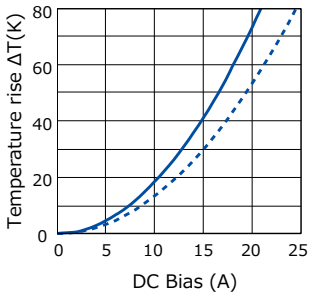

[ ETQP4M2R2KVK ]



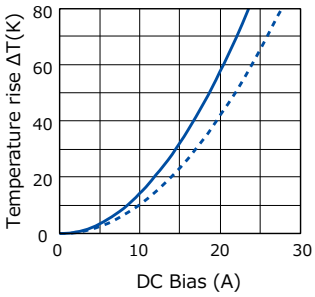

[ ETQP4M1R5KVK ]




[ ETQP4M1R0KVK ]




[ ETQP4MR68KVK ]



## 4. Series PCC-M1040M-LP (ETQP4M□□□KVC)

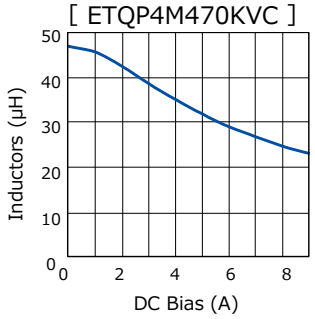
### Standard parts

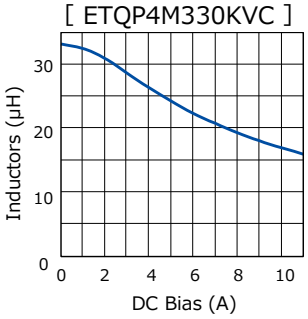
| Part No. | Inductance*1 | | DCR (at 20 ℃) (mΩ) | | Rated current (A) Typ. | | MSL level | Series [Size (mm)] |
|---|---|---|---|---|---|---|---|---|
| | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | △T= 40 K*2 ( )*3 | △L= −30 %*4 | *5 | |
| ETQP4M470KVC | 47.0 | ±20 | 132.0 (145.20) | ±10 | 3.4 (2.8) | 4.7 | 1 | PCC-M1040M-LP [10.7×10.0×4.0] |
| ETQP4M330KVC | 33.0 | | 84.6 (93.06) | | 4.2 (3.4) | 5.6 | 1 | |
| ETQP4M220KVC | 22.0 | | 60.0 (66.00) | | 5.0 (4.1) | 7.4 | 1 | |
| ETQP4M150KVC | 15.0 | | 37.0 (40.70) | | 6.3 (5.2) | 9.2 | 1 | |
| ETQP4M100KVC | 10.0 | | 25.4 (27.94) | | 7.6 (6.3) | 10.8 | 1 | |
| ETQP4M6R8KVC | 6.8 | | 18.5 (20.35) | | 8.9 (7.4) | 12.1 | 1 | |
| ETQP4M4R7KVC | 4.7 | | 12.3 (13.53) | | 11.2 (9.2) | 13.9 | 1 | |
| ETQP4M3R3KVC | 3.3 | | 9.4 (10.34) | | 12.6 (10.3) | 17.1 | 1 | |
| ETQP4M2R2KVC | 2.2 | | 6.8 (7.48) | | 14.8 (12.1) | 21.0 | 1 | |
| ETQP4M1R5KVC | 1.5 | | 4.9 (5.39) | | 17.4 (14.3) | 25.0 | 1 | |
| ETQP4M1R0KVC | 1.0 | | 2.6 (2.86) | | 23.9 (19.6) | 34.6 | 1 | |

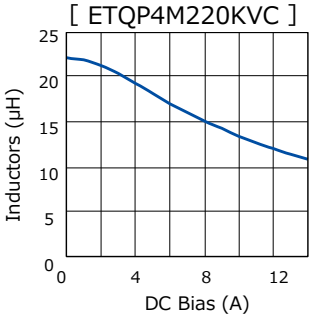
*1: Measured at 100 kHz
*2: The proved current value for making the overall temperature rise of 40K, when mounted on a multi-layer board with high-heat dissipation (heat dissipation constant 10.7×10.0×4.0 mm : approx. 27 K/W).
*3: The proved current value for making the overall temperature rise of 40K, when mounted on a 4-layer circuit board of FR4 t=1.6 mm and DC current is applied.
*4: Saturation rated current : DC current which causes L(0) drop −30 %.
*5: The solderability is guaranteed for 1 year only. The product out of expiration date shall not be used.
◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +155°C should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.
▲ ETQP4M4R7KVC Under development (Start of mass production: the 2nd half of 2020) Please contact us for customized part no.

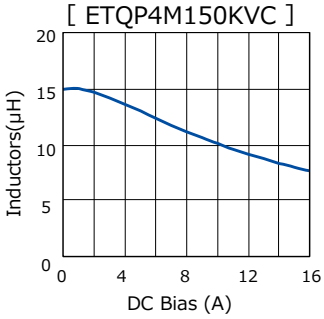
### Performance characteristics (Reference①)

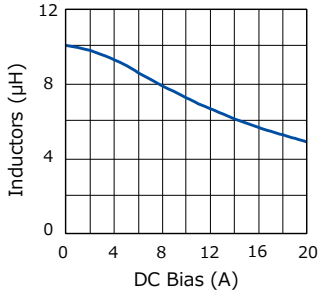
● Inductance vs DC Current

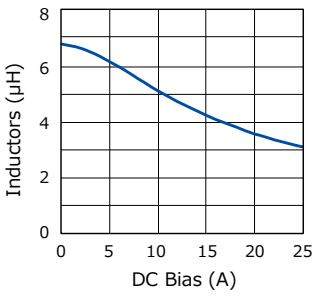
[ ETQP4M470KVC ]


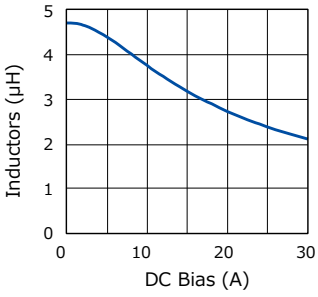

[ ETQP4M330KVC ]


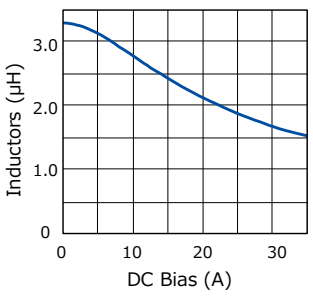

[ ETQP4M220KVC ]


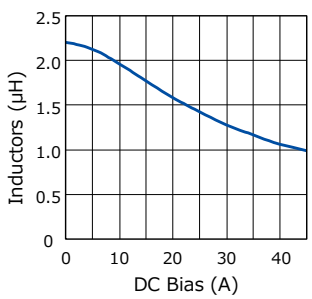

[ ETQP4M150KVC ]


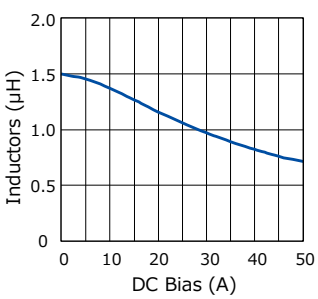

[ ETQP4M100KVC ]


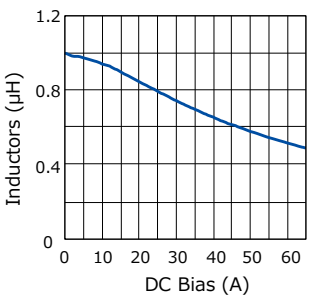

[ ETQP4M6R8KVC ]



[ ETQP4M4R7KVC ]



[ ETQP4M3R3KVC ]



[ ETQP4M2R2KVC ]



[ ETQP4M1R5KVC ]



[ ETQP4M1R0KVC ]


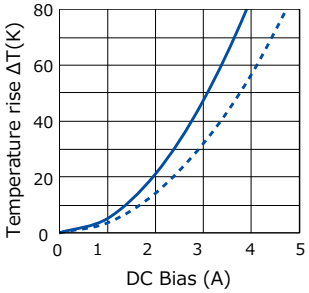
## Performance characteristics (Reference②)

● Case Temperature vs DC Current

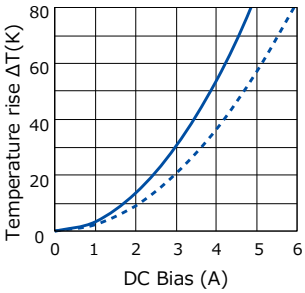
PWB condition A : Four-layer PWB (1.6 mm FR4).*3

PWB condition B : Multilayer PWB with high heat dissipation performance.*2

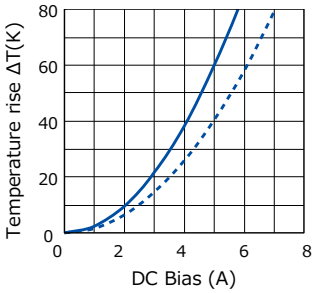
[ ETQP4M470KVC ]



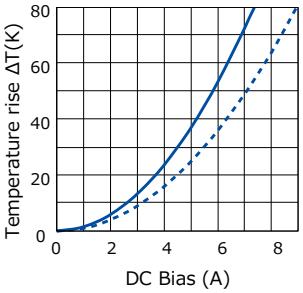

[ ETQP4M330KVC ]



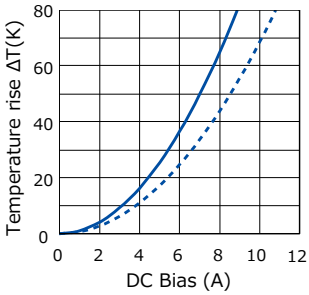

[ ETQP4M220KVC ]



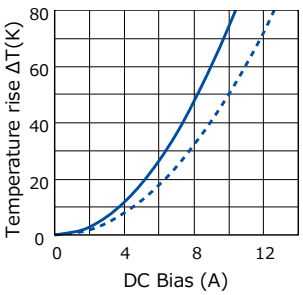

[ ETQP4M150KVC ]



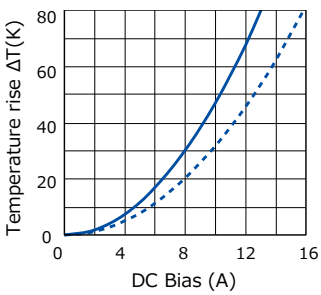

[ ETQP4M100KVC ]



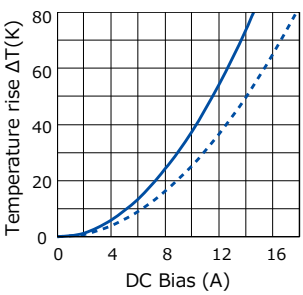

[ ETQP4M6R8KVC ]



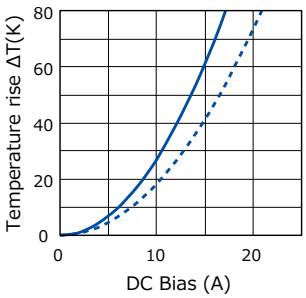

[ ETQP4M4R7KVC ]



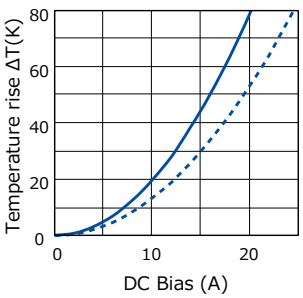

[ ETQP4M3R3KVC ]



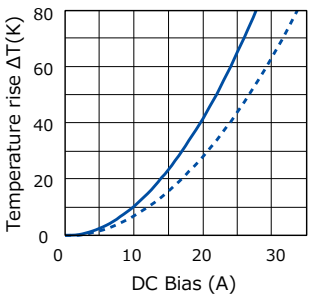

[ ETQP4M2R2KVC ]




[ ETQP4M1R5KVC ]



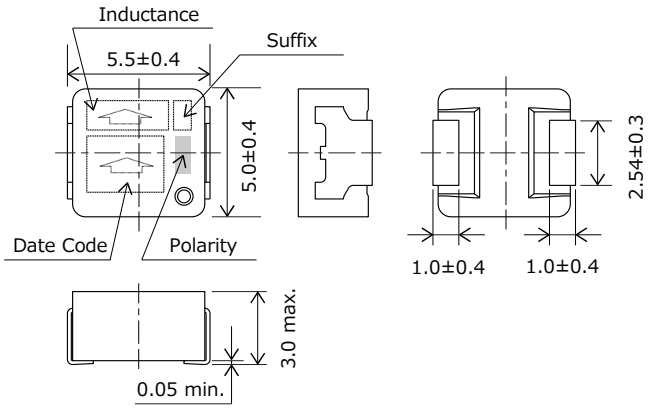

[ ETQP4M1R0KVC ]



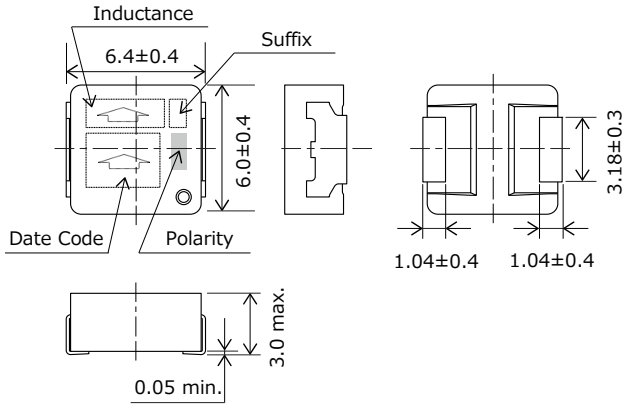
## Dimensions in mm (not to scale)

Dimensional tolerance unless noted : ±0.5

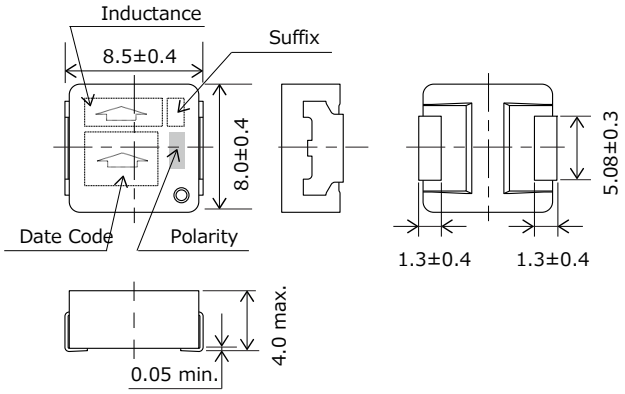
### Series PCC-M0530M-LP
(ETQP3M□□□KVP)



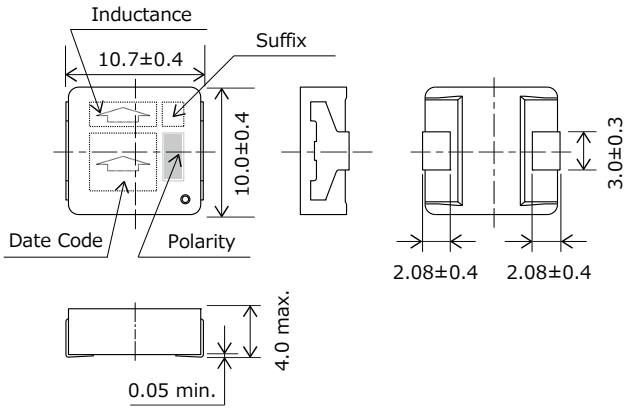

### Series PCC-M0630M-LP
(ETQP3M□□□KVN)



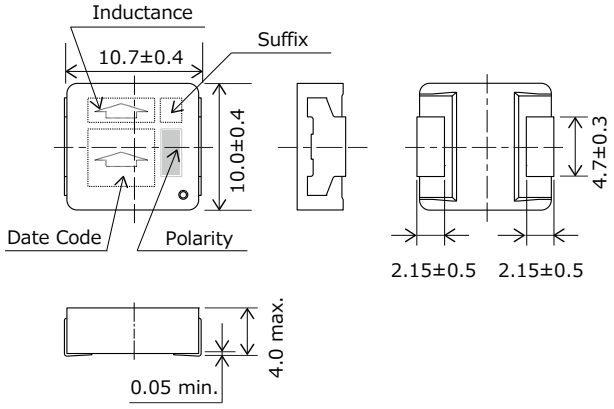

### Series PCC-M0840M-LP
(ETQP4M□□□KVK)




### Series PCC-M1040M-LP
(ETQP4M□□□✻KVC) ✻Exemption 1R0




### Series PCC-M1040M-LP
(ETQP4M1R0KVC)

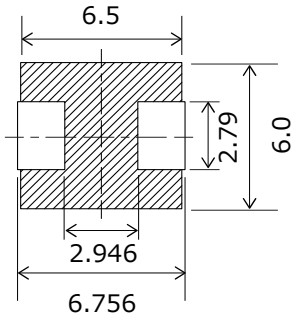



Unit : mm

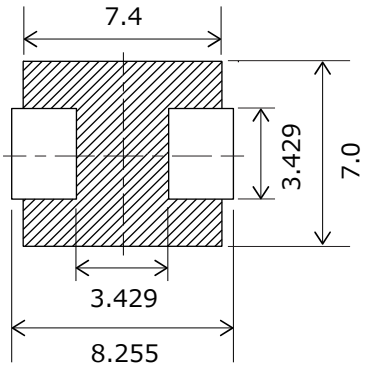
## Recommended land pattern in mm (not to scale)

Dimensional tolerance unless noted : ±0.5

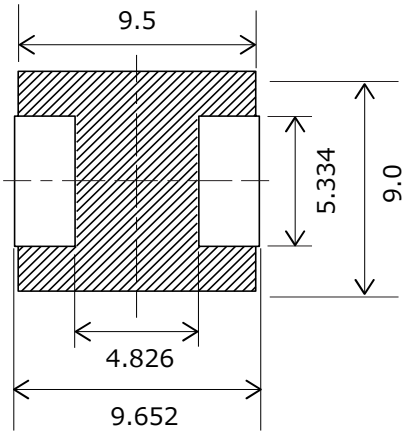
**Series PCC-M0530M-LP**
(ETQP3M□□□KVP)



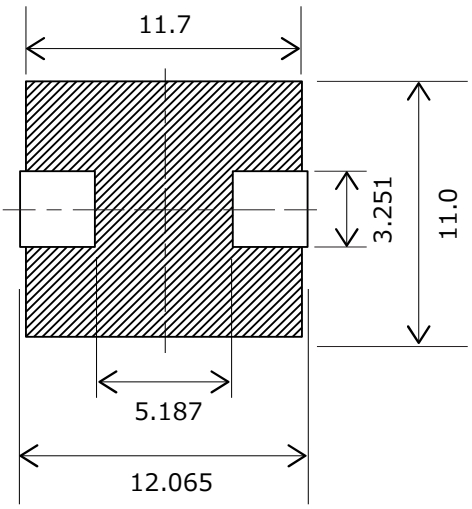

**Series PCC-M0630M-LP**
(ETQP3M□□□KVN)



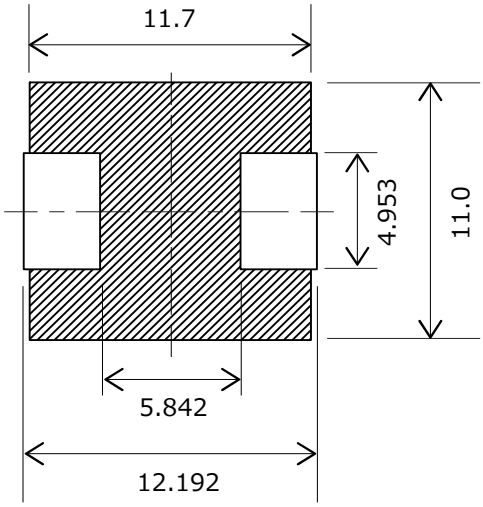

**Series PCC-M0840M-LP**
(ETQP4M□□□KVK)




**Series PCC-M1040M-LP**
(ETQP4M□□□✻KVC)✻Exemption 1R0




**Series PCC-M1040M-LP**
(ETQP4M1R0KVC)



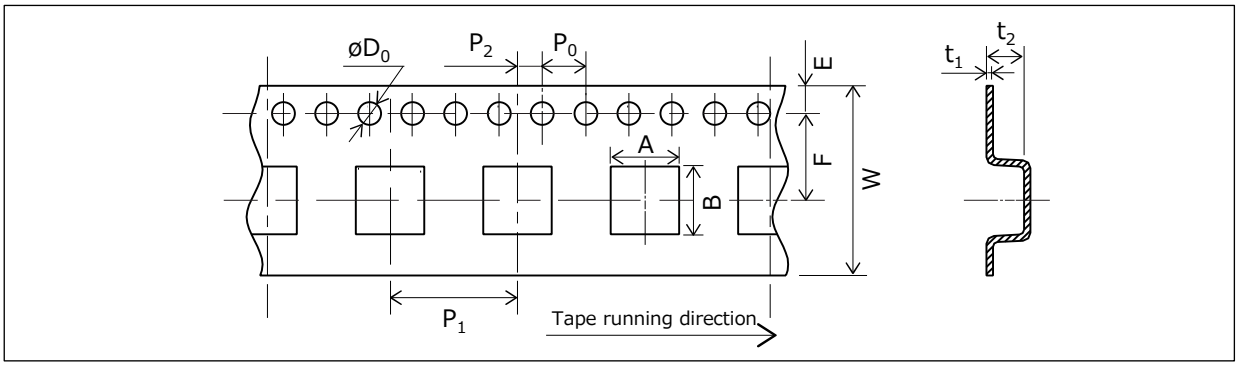

※Don't wire on the pattern on shaded portion the PWB.

Unit : mm

■ As for Soldering Conditions and Safety Precautions (Power Choke Coils (Automotive Grade)), Please see Data Files

## Packaging methods (Taping)

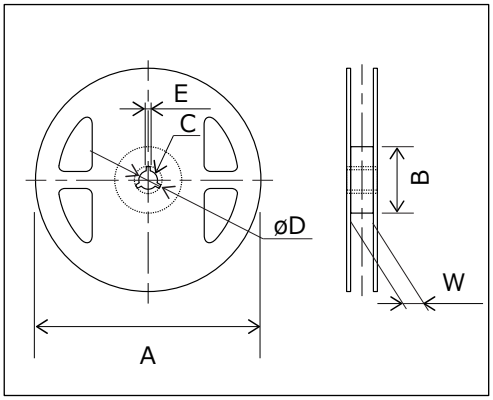
● Embossed carrier tape dimensions in mm (not to scale)




Unit : mm

| Series | A | B | W | E | F | $P_1$ | $P_2$ | $P_0$ | $øD_0$ | $t_1$ | $t_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCC-M0530M-LP | 5.6 | 6.1 | 12 | 1.75 | 5.5 | 8 | 2 | 4 | 1.5 | 0.3 | 3.3 |
| PCC-M0630M-LP | 6.5 | 7.1 | 16 | 1.75 | 7.5 | 8 | 2 | 4 | 1.5 | 0.3 | 3.3 |
| PCC-M0840M-LP | 8.63 | 9.1 | 16 | 1.75 | 7.5 | 12 | 2 | 4 | 1.5 | 0.4 | 6.0 |
| PCC-M1040M-LP | 10.65 | 11.75 | 24 | 1.75 | 11.5 | 16 | 2 | 4 | 1.5 | 0.5 | 6.35 |

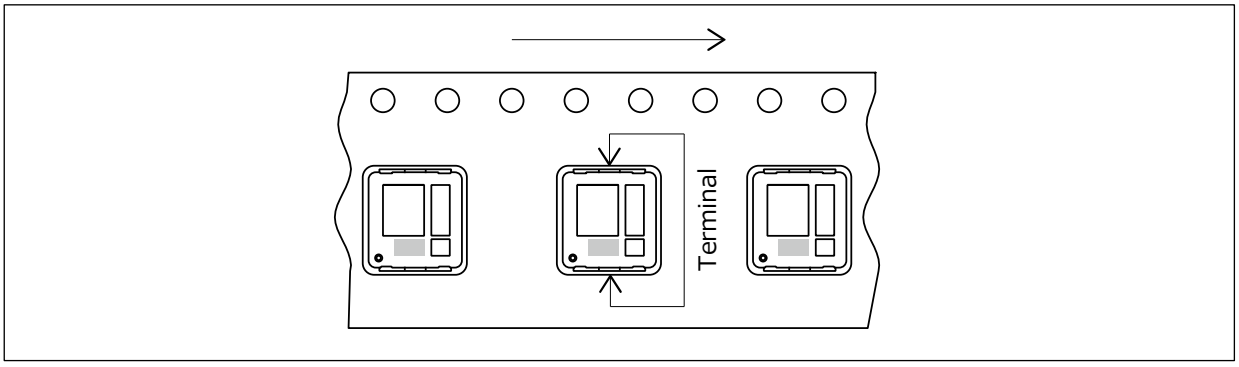
● Taping reel dimensions in mm (not to scale)




Unit : mm

| Series | A | B | C | øD | E | W |
|---|---|---|---|---|---|---|
| PCC-M0530M-LP | 330 | (100) | 13 | 21 | 2 | 13.5 |
| PCC-M0630M-LP | | | | | | 17.5 |
| PCC-M0840M-LP | | | | | | |
| PCC-M1040M-LP | | | | | | 25.5 |

## Component placement (Taping)




## Standard packing quantity/reel

| Serise | Part No. | Minimum quantity / Packing unit | Quantity per reel |
|---|---|---|---|
| PCC-M0530M-LP | ETQP3M□□□KVP | 4,000 pcs / box(2 reel) | 2,000 pcs |
| PCC-M0630M-LP | ETQP3M□□□KVN | | |
| PCC-M0840M-LP | ETQP4M□□□KVK | 1,000 pcs / box(2 reel) | 500 pcs |
| PCC-M1040M-LP | ETQP4M□□□KVC | | |

UPGRADE

# Power Choke Coil (Automotive Grade)

## PCC-M0648M-LE series
## PCC-M0748M-LE series

High heat resistance and high reliability using metal composite core (MC)

Industrial property : Patents 3 (Registered 2 / Pending 1)

## Features

- Low loss (Low DC resistance)
- High heat resistance : Operation up to 150 ℃ including self-heating
- SMD type
- High-reliability : High vibration resistance as result of newly developed integral construction ; under severe reliability conditions of automotive and other strenuous applications
- High bias current : Excellent inductance stability using ferrous alloy magnetic material
- Temp. stability : Excellent inductance stability over broad temp. range
- Low audible (buzz) noise : A gapless structure achieved with metal composite core
- High efficiency : Low DC resistance of winding and low eddy-current loss of the core
- Shielded construction
- AEC-Q200 compliant
- RoHS compliant

## Recommended applications

- Noise filter for various drive circuitry requiring high temp. operation and peak current handling capability
- Boost-Converter, Buck-Converter DC/DC

## Standard packing quantity (Minimum quantity/Packing unit)

- 1,000 pcs/box (2 reel)

## Explanation of part numbers

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | T | Q | P | | M | | | | K | F | |
| Product code | | | Classification | Height | Winding | Inductance | | | Core | Suffix | Size |

(Example)

| Code | Inductance |
|---|---|
| 4R7 | 4.7 μH |
| 220 | 22 μH |

| Code | Size |
|---|---|
| N | □ 6 mm |
| M | □ 7 mm |

## Temperature rating

| | | |
|---|---|---|
| Operating temperature range | | Tc : -40 ℃ to +150 ℃ (Including self-temperature rise) |
| Storage condition | After PWB mounting | |
| | Before PWB mounting | Ta : -5 ℃ to +35 ℃ 85%RH max. |

## 1. Series PCC-M0648M-LE (ETQP4M□□□KFN)

### Standard parts

| Part No. | Inductance*1 | | DCR (at 20 ℃) (mΩ) | | Rated current (A) Typ. | | MSL level | Series [Size (mm)] |
|---|---|---|---|---|---|---|---|---|
| | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | △T= 40 K*2 ( )*3 | △L= −30 %*4 | *5 | |
| ETQP4M3R3KFN | 3.3 | ±20 | 13.1 (14.41) | ±10 | 9.2 (7.2) | 12.0 | 1 | PCC-M0648M-LE [6.4×6.0×4.8] |
| ETQP4M4R7KFN | 4.7 | | 20.7 (22.77) | | 7.3 (5.7) | 9.3 | 1 | |
| ETQP4M100KFN | 10.0 | | 40.4 (44.44) | | 5.2 (4.1) | 8.1 | 1 | |
| ETQP4M150KFN | 15.0 | | 63.8 (70.18) | | 4.2 (3.3) | 6.7 | 1 | |

*1: Measured at 100 kHz

*2: The proved current value for making the overall temperature rise of 40K, when mounted on a multi-layer board with high-heat dissipation (heat dissipation constant 6.4 x 6.0 x 4.8 mm : approx. 30 K/W).

*3: The proved current value for making the overall temperature rise of 40K, when mounted on a 4-layer circuit board of FR4 t=1.6 mm and DC current is applied.

*4: Saturation rated current : DC current which causes L(0) drop −30 %.

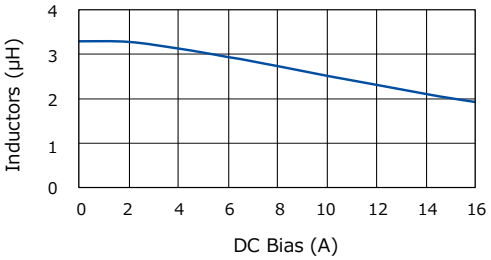
*5: The solderability is guaranteed for 1 year only. The product out of expiration date shall not be used.

◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +150°C should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.

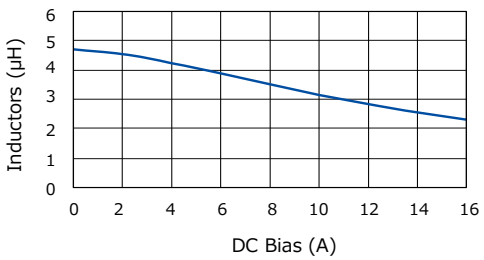
### Performance characteristics (Reference①)

● Inductance vs DC Current

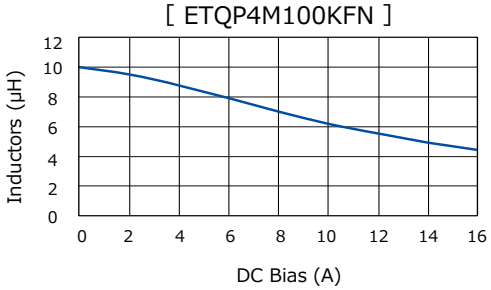
[ ETQP4M3R3KFN ]



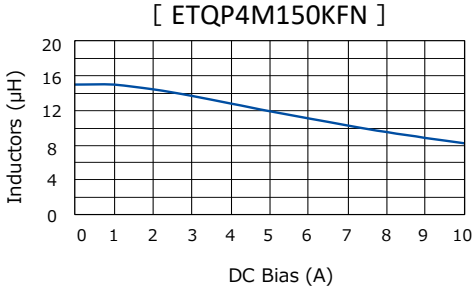

[ ETQP4M4R7KFN ]




[ ETQP4M100KFN ]




[ ETQP4M150KFN ]



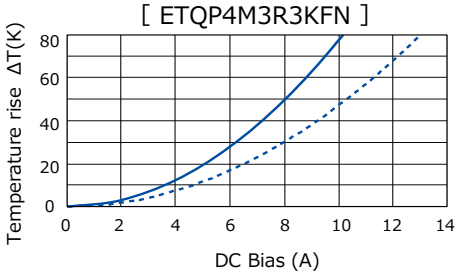
## Performance characteristics (Reference②)

- Case Temperature vs DC Current

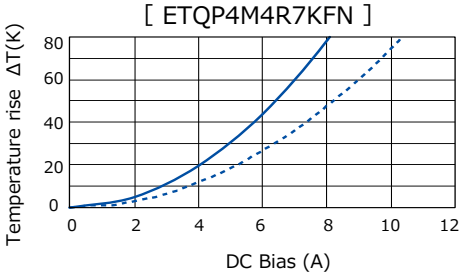
  PWB condition A : Four-layer PWB (1.6 mm FR4).*3

  PWB condition B : Multilayer PWB with high heat dissipation performance.*2

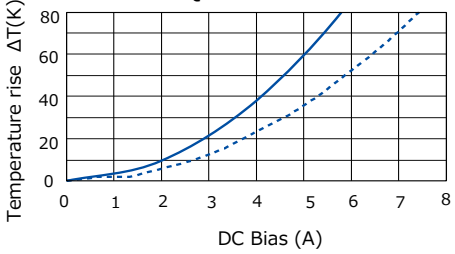
[ ETQP4M3R3KFN ]



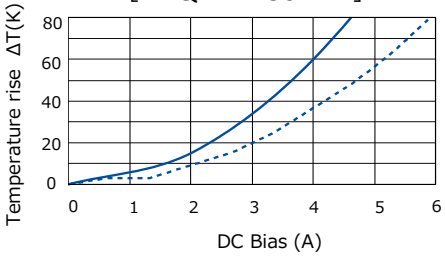

[ ETQP4M4R7KFN ]




[ ETQP4M100KFN ]




[ ETQP4M150KFN ]



## 2. Series PCC-M0748M-LE (ETQP4M□□□KFM)

### Standard parts

| Part No. | Inductance*1 | | DCR (at 20 ℃) (mΩ) | | Rated current (A) Typ. | | MSL level | Series [Size (mm)] |
|---|---|---|---|---|---|---|---|---|
| | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | △T= 40 K*2 ( )*3 | △L= −30 %*4 | *5 | |
| ETQP4M4R7KFM | 4.7 | ±20 | 16.8 (18.48) | ±10 | 8.8 (6.5) | 10.7 | 1 | PCC-M0748M-LE [7.4×7.0×4.8] |
| ETQP4M100KFM | 10.0 | | 36.0 (39.60) | | 6.0 (4.5) | 9.6 | 1 | |
| ETQP4M220KFM | 22.0 | | 84.1 (92.51) | | 3.9 (2.9) | 4.6 | 1 | |
| ETQP4M470KFM | 47.0 | | 148.6 (163.46) | | 2.9 (2.2) | 3.7 | 1 | |

*1: Measured at 100 kHz

*2: The proved current value for making the overall temperature rise of 40K, when mounted on a multi-layer board with high-heat dissipation (heat dissipation constant 7.4 x 7.0 x 4.8 mm : approx. 30 K/W).

*3: The proved current value for making the overall temperature rise of 40K, when mounted on a 4-layer circuit board of FR4 t=1.6 mm and DC current is applied.

*4: Saturation rated current : DC current which causes L(0) drop −30 %.

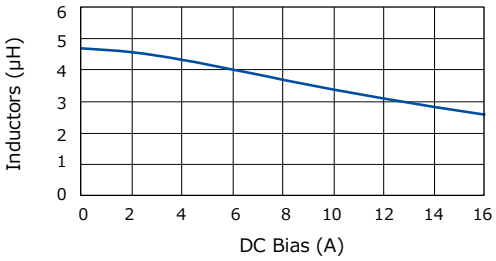
*5: The solderability is guaranteed for 1 year only. The product out of expiration date shall not be used.

◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +150°C should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.

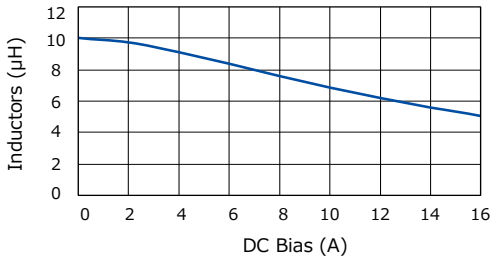
### Performance characteristics (Reference①)

● Inductance vs DC Current

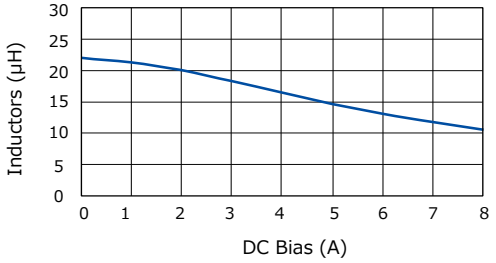
[ ETQP4M4R7KFM ]



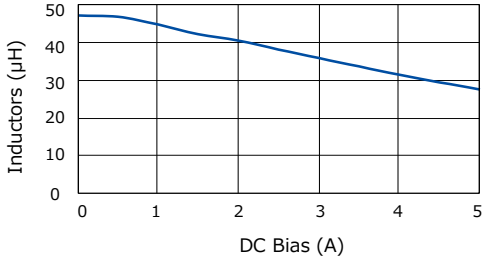

[ ETQP4M100KFM ]




[ ETQP4M220KFM ]




[ ETQP4M470KFM ]



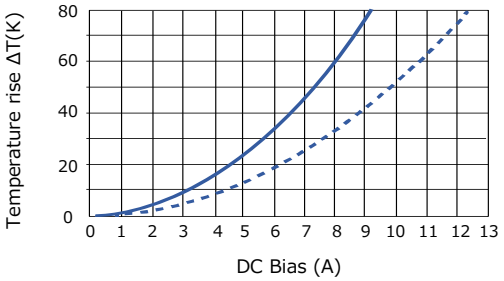
## Performance characteristics (Reference②)

● Case Temperature vs DC Current

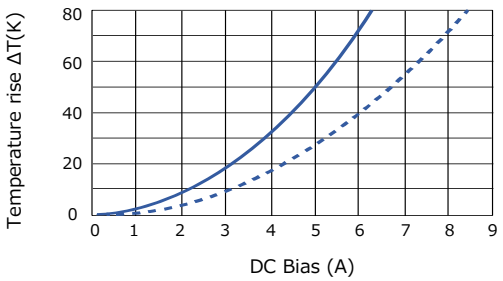
PWB condition A : Four-layer PWB (1.6 mm FR4).*3

PWB condition B : Multilayer PWB with high heat dissipation performance.*2

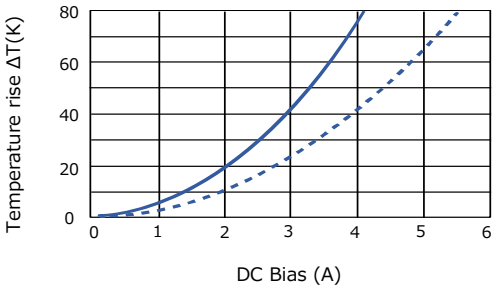
[ ETQP4M4R7KFM ]



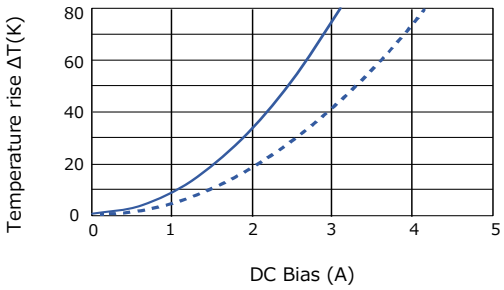

[ ETQP4M100KFM ]




[ ETQP4M220KFM ]



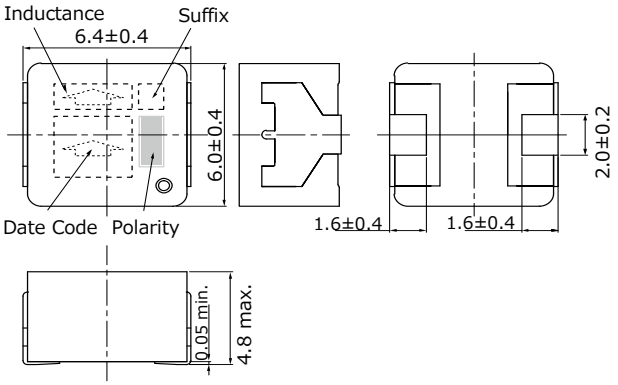

[ ETQP4M470KFM ]



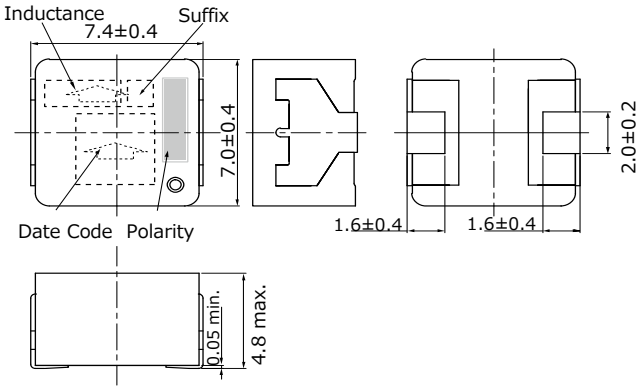
## Dimensions in mm (not to scale)

Dimensional tolerance unless noted : ±0.5

**Series PCC-M0648M-LE**
(ETQP4M□□□KFN)




**Series PCC-M0748M-LE**
(ETQP4M□□□KFM)

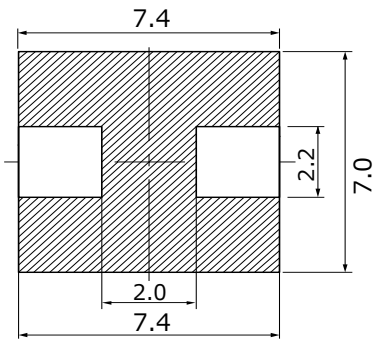



Unit : mm

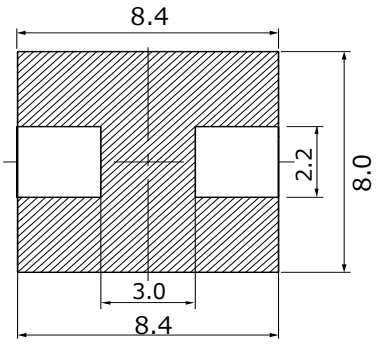
## Recommended land pattern in mm (not to scale)

Dimensional tolerance unless noted : ±0.5

**Series PCC-M0648M-LE**
(ETQP4M□□□KFN)




**Series PCC-M0748M-LE**
(ETQP4M□□□KFM)



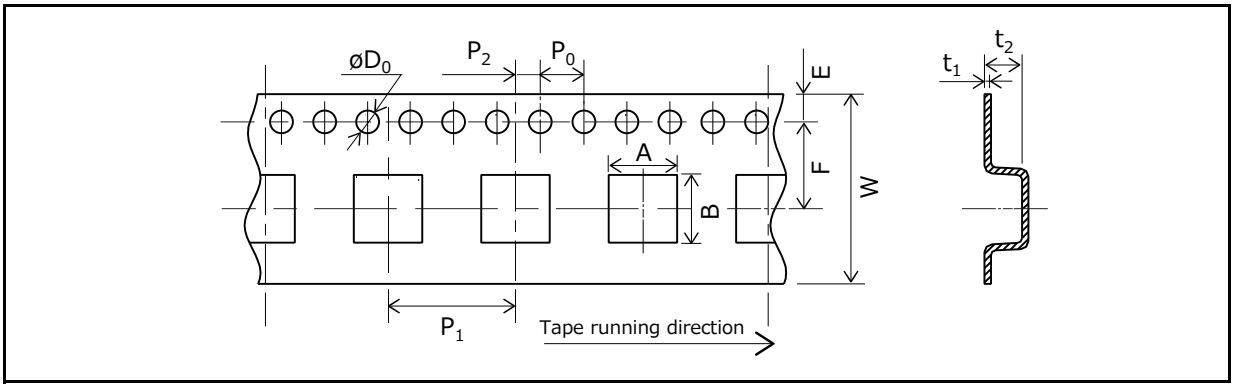

※Don't wire on the pattern on shaded portion the PWB.

Unit : mm

■ **As for soldering conditions and safety precautions (Power choke coils (Automotive grade)), please see data files**

## Packaging methods (Taping)

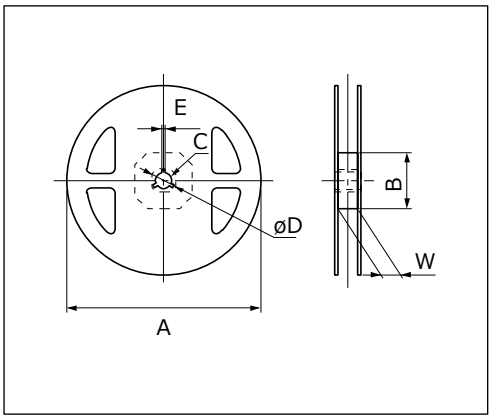
● Embossed Carrier Tape Dimensions in mm (not to scale)




Unit : mm

| Series | A | B | W | E | F | $P_1$ | $P_2$ | $P_0$ | $øD_0$ | $t_1$ | $t_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCC-M0648M-LE | 6.6 | 7.1 | 16 | 1.75 | 7.5 | 12 | 2 | 4 | 1.5 | 0.4 | 5.0 |
| PCC-M0748M-LE | 7.6 | 8.1 | 16 | 1.75 | 7.5 | 12 | 2 | 4 | 1.5 | 0.4 | 6.0 |

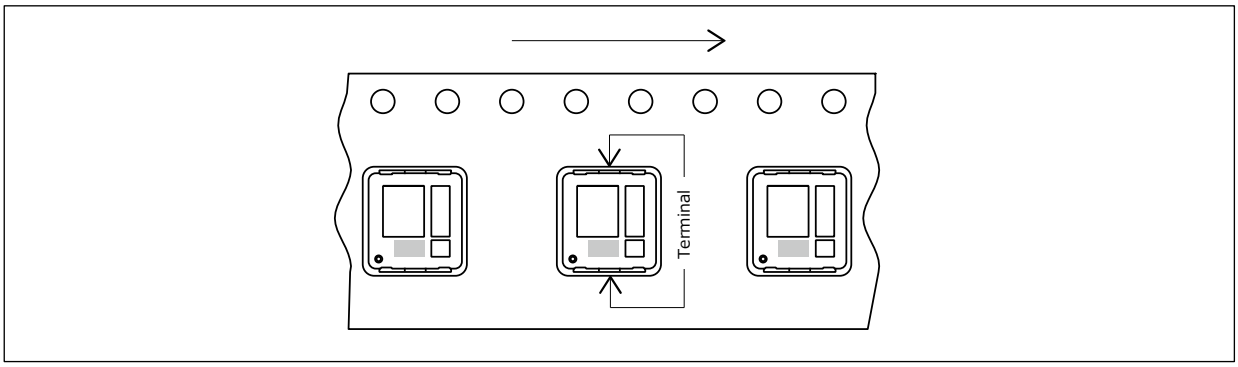
● Taping Reel Dimensions in mm (not to scale)




Unit : mm

| Series | A | B | C | øD | E | W |
|---|---|---|---|---|---|---|
| PCC-M0648M-LE | 330 | (100) | 13 | 21 | 2 | 17.5 |
| PCC-M0748M-LE | | | | | | |

## Component placement (Taping)




## Standard packing quantity/reel

| Serise | Part No. | Minimum quantity / Packing unit | Quantity per reel |
|---|---|---|---|
| PCC-M0648M-LE | ETQP4M□□□KFN | 1,000 pcs / box(2 reel) | 500 pcs |
| PCC-M0748M-LE | ETQP4M□□□KFM | | |

UPGRADE

# Power Choke Coil (Automotive Grade)

## PCC-M0530M-H series

## PCC-M0630M-H series


High heat resistance and high reliability using metal composite core (MC)

## Features

- Reduce core loss in high frequency band (More than 2 MHz)
- High heat resistance : Operation up to 150 ℃ including self-heating
- Low profile : 3 mm max. height
- SMD type
- High-reliability : High vibration resistance as result of newly developed integral construction ; under severe reliability conditions of automotive and other strenuous applications
- High bias current : Excellent inductance stability using ferrous alloy magnetic material
- Temp. stability : Excellent inductance stability over broad temp. range
- Low audible (buzz) noise : A gapless structure achieved with metal composite core
- High efficiency : Low DC resistance of winding and low eddy-current loss of the core
- Shielded construction
- AEC-Q200 compliant
- RoHS compliant

## Recommended applications

- Noise filter for various drive circuitry requiring high temp. operation and peak current handling capability
- Boost-Converter, Buck-Converter DC/DC

## Standard packing quantity (Minimum quantity/Packing unit)

- 2,000 pcs/box (2 reel)

## Explanation of part numbers

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | T | Q | P | | M | | | | H | F | |
| Product Code | | | Classification | Height | Winding | Inductance | | | Core | Suffix | Size |

(Example)

| Code | Inductance |
|---|---|
| 2R2 | 2.2 μH |
| 100 | 10 μH |

| Code | Size |
|---|---|
| P | □ 5 mm |
| N | □ 6 mm |

## Temperature rating

| | | |
|---|---|---|
| Operating temperature range | | Tc : -40 ℃ to +150 ℃ (Including self-temperature rise) |
| Storage condition | After PWB mounting | |
| | Before PWB mounting | Ta : -5 ℃ to +35 ℃ 85%RH max. |

## Series PCC-M0530M-H/PCC-M0630M-H (ETQP3M□□□HFP/ETQP3M□□□HFN)

### Standard parts

| Part No. | Inductance*1 | | DCR (at 20 ℃) (mΩ) | | Rated current (A) Typ. | | MSL level | Series [Size (mm)] |
|---|---|---|---|---|---|---|---|---|
| | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | △T= 40 K*2 ( )*3 | △L= −30 %*4 | *5 | |
| ETQP3M2R2HFP | 2.2 | ±20 | 19.5 (21.45) | ±20 | 6.3 (5.2) | 9.0 | 1 | PCC-M0530M-H [5.5×5.0×3.0] |
| ETQP3M100HFN | 10.0 | | 68.0 (74.8) | | 3.7 (3.0) | 5.5 | 1 | PCC-M0630M-H [6.5×6.0×3.0] |
| ETQP3M220HFN | 22.0 | | 144.0 (158.4) | | 2.5 (2.1) | 4.0 | 1 | |

*1: Measured at 100 kHz

*2: The proved current value for making the overall temperature rise of 40K, when mounted on a multi-layer board with high-heat dissipation (heat dissipation constant : approx. 20 K/W).

*3: The proved current value for making the overall temperature rise of 40K, when mounted on a 4-layer circuit board of FR4 t=1.6 mm and DC current is applied.

*4: Saturation rated current : DC current which causes L(0) drop −30 %.

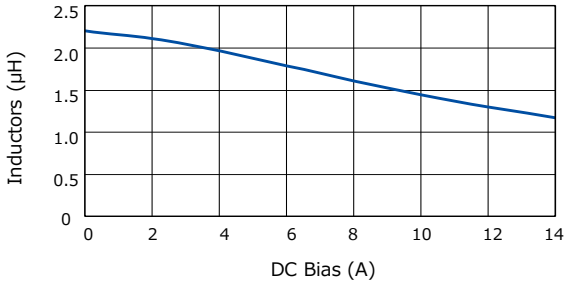
*5: The solderability is guaranteed for 1 year only. The product out of expiration date shall not be used.

◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +150°C should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.

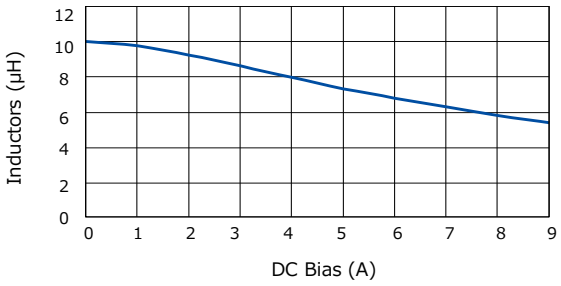
### Performance characteristics (Reference①)

● Inductance vs DC Current

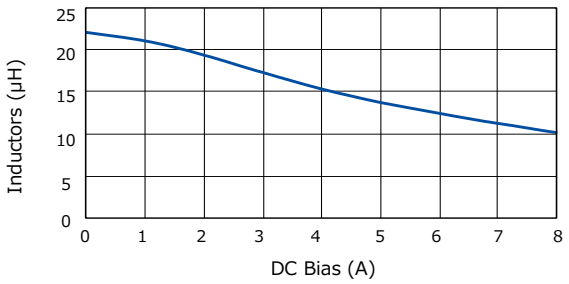
[ ETQP3M2R2HFP ]




[ ETQP3M100HFN ]



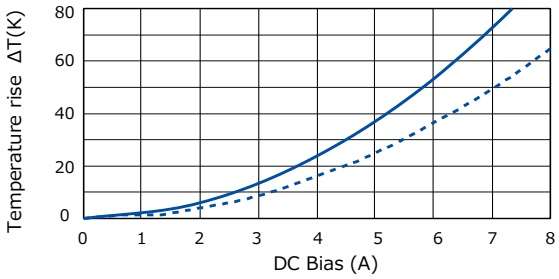

[ ETQP3M220HFN ]



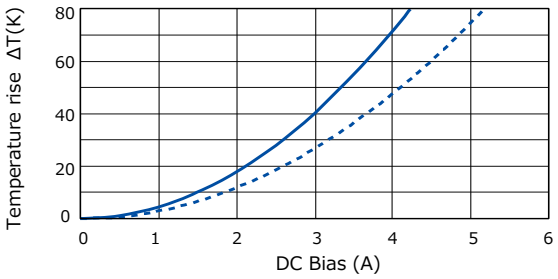
## Performance characteristics (Reference②)

- Case Temperature vs DC Current
  - PWB condition A : Four-layer PWB (1.6 mm FR4).*3
  - PWB condition B : Multilayer PWB with high heat dissipation performance.*2

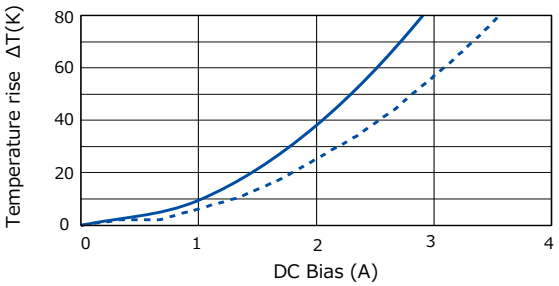
[ ETQP3M2R2HFP ]




[ ETQP3M100HFN ]



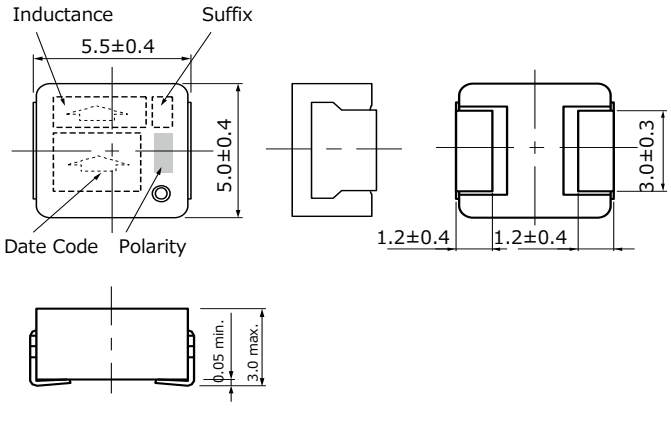

'QP3M2208/208/208/20H|



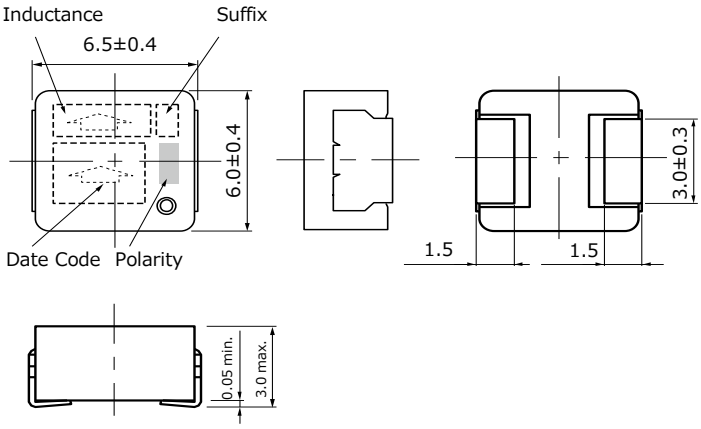
## Dimensions in mm (not to scale)

Dimensional tolerance unless noted : ±0.5

**Series PCC-M0530M-H**
(ETQP3M□□□HFP)




**Series PCC-M0630M-H**
(ETQP3M□□□HFN)

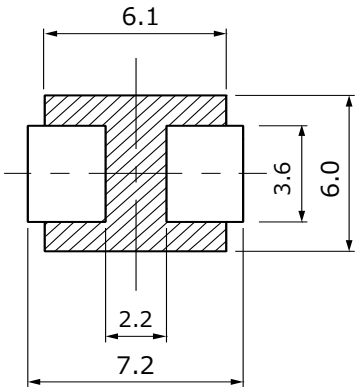



Unit : mm

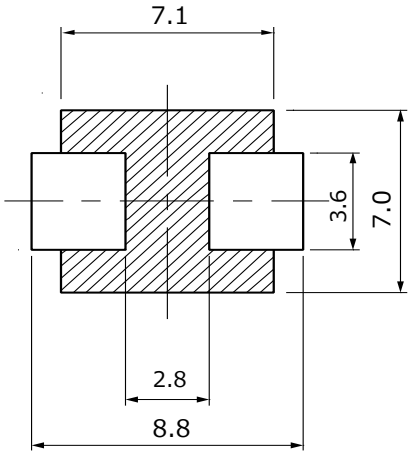
## Recommended land pattern in mm (not to scale)

Dimensional tolerance unless noted : ±0.5

**Series PCC-M0530M-H**
(ETQP3M□□□HFP)




**Series PCC-M0630M-H**
(ETQP3M□□□HFN)



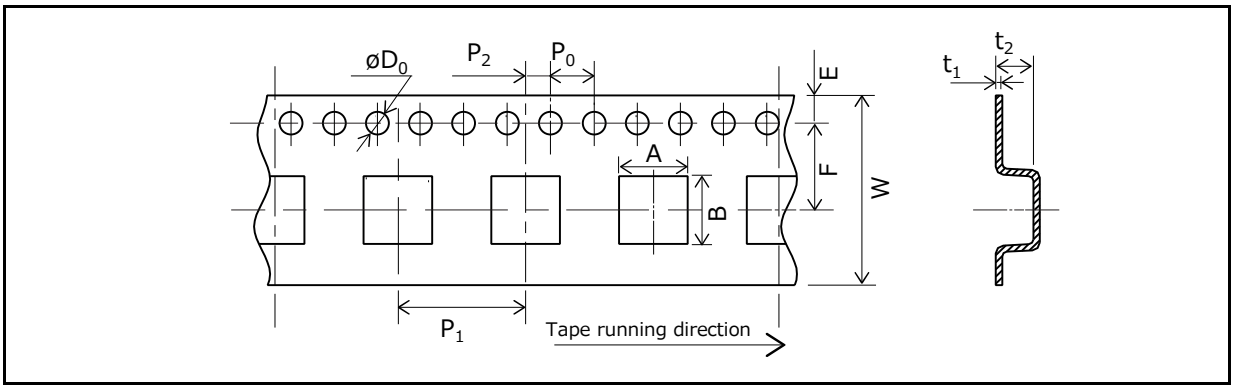

※Don't wire on the pattern on shaded portion the PWB.

Unit : mm

■ **As for soldering conditions and safety precautions (Power choke coils (Automotive grade)), please see data files**

## Packaging methods (Taping)

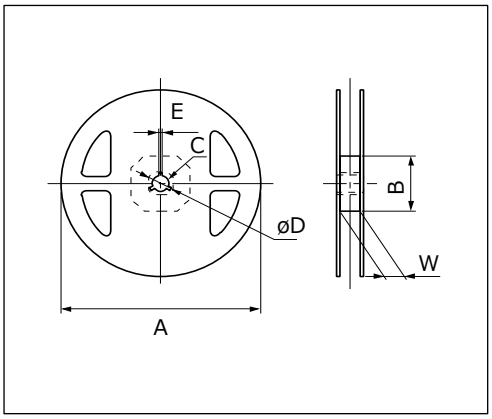
● Embossed carrier tape dimensions in mm (not to scale)




Unit : mm

| Series | A | B | W | E | F | $P_1$ | $P_2$ | $P_0$ | $øD_0$ | $t_1$ | $t_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCC-M0530M-H | 5.6 | 6.1 | 16 | 1.75 | 7.5 | 12 | 2 | 4 | 1.5 | 0.4 | 3.3 |
| PCC-M0630M-H | 7.1 | 6.6 | 16 | 1.75 | 7.5 | 12 | 2 | 4 | 1.5 | 0.4 | 3.3 |

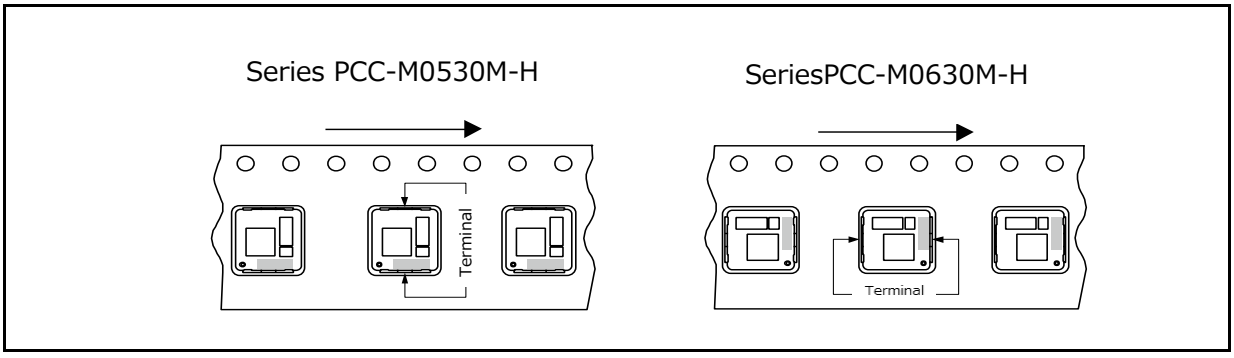
● Taping reel dimensions in mm (not to scale)




Unit : mm

| Series | A | B | C | øD | E | W |
|---|---|---|---|---|---|---|
| PCC-M0530M-H | 330 | (100) | 13 | 21 | 2 | 17.5 |
| PCC-M0630M-H | | | | | | |

## Component placement (Taping)




## Standard packing quantity/reel

| Serise | Part No. | Minimum quantity / Packing unit | Quantity per reel |
|---|---|---|---|
| PCC-M0530M-H | ETQP3M□□□HFP | 2,000 pcs / box (2 reel) | 1,000 pcs |
| PCC-M0630M-H | ETQP3M□□□HFN | | |

# Power Choke Coil (Automotive Grade)

## PCC-D1413H (DUST) series

Realize high heat resistance, low loss and high reliability with dust core (DUST)

Industrial Property : patents 5 (Pending)

## Features

- ●High heat resistance : Operation up to 150 ℃ including self-heating
- ●SMD and small package : L 14.7×W 13.2×H 13.1 mm
- ●High-reliability : High vibration resistance as result of newly developed integral construction ; under severe reliability conditions of automotive and other strenuous applications
- ●High bias current : Excellent inductance stability using ferrous alloy magnetic material
- ●High Vibration proof : 5 Hz to 2 kHz/30 G
- ●High efficiency : Achieve by Low loss Dust core and Edgewise coil with rectangular wire
- ●Shielded construction
- ●AEC-Q200 compliant
- ●RoHS compliant

## Recommended applications

● Driver circuits of fuel injection systems in automotive, driver circuits of diesel common rail injection, step-up power supplies for motor driver-circuits

## Standard packing quantity

● 600 pcs /10 tray

## Explanation of part numbers

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | T | Q | P | | H | | | | D | | |
| Product Code | | | Classification | Height | Winding | Inductance | | | Core | Suffix | Size |

## Temperature rating

| | | |
|---|---|---|
| Operating temperature range | | Tc : -40 ℃ to +150 ℃ (Including self-temperature rise) |
| Storage condition | After PWB mounting | |
| | Before PWB mounting | Ta : -5 ℃ to +35 ℃ 85%RH max. |

## Standard parts

| Part No. | Inductance*1 | | DCR | ACR | Rated current*3 |
|---|---|---|---|---|---|
| | L0 at 0A (μH) | L1 at 10A (μH) | at 20 ℃ (mΩ) | at 20 kHz (mΩ) | △T=40K (A) |
| ETQPDH240DTV | 36.0±30 % | (24.0)*2 | 25.8 typ. | 50.0 typ. | 6.9 |

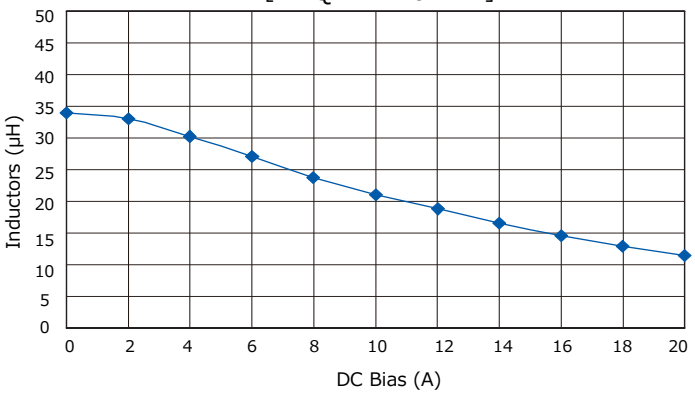
*1: Measured at 100 kHz.
*2: Reference Only.
*3: DC current which causes temperature rise of 40K. Parts are soldered by reflow on four-layer PWB(1.6 mm FR4) and measured at room temperature.

◆ Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +150℃ should not be exceeded. For higher operating temperature conditions, please contact Panasonic representative in your area.

## Performance characteristics (Reference)

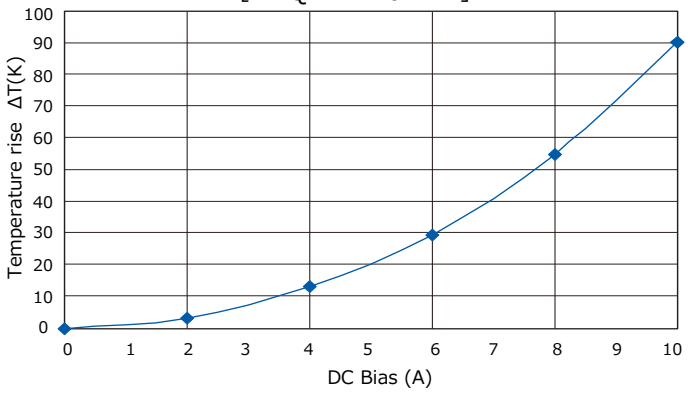
● Inductance vs DC Current

[ ETQPDH240DTV ]



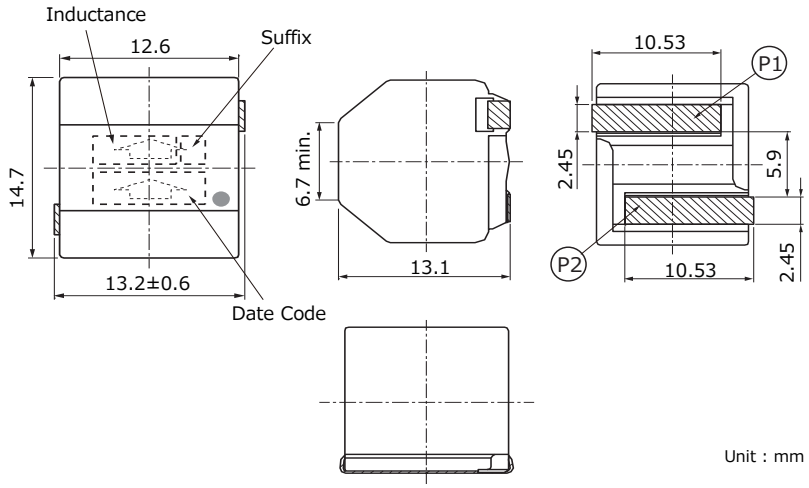

● Case Temperature vs DC Current

[ ETQPDH240DTV ]



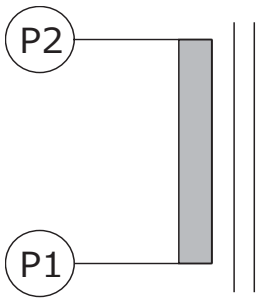

## Dimensions in mm (not to scale)

Dimensional tolerance unless noted : ±0.5




Unit : mm

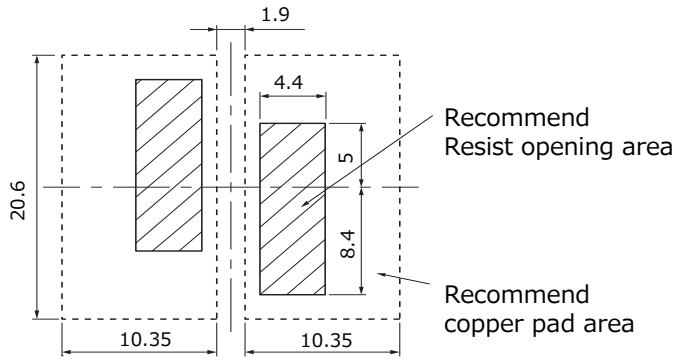
## Connection




✻None polar character

## Recommended land pattern in mm (not to scale)

Dimensional tolerance unless noted : ±0.5




✻ Due to bigger part, Thermal Capacity is large and may occure PWB temperature differences during reflow process.
Recommended land pattern (Heat absorb) should be designed with reflow mountablity.

Unit : mm

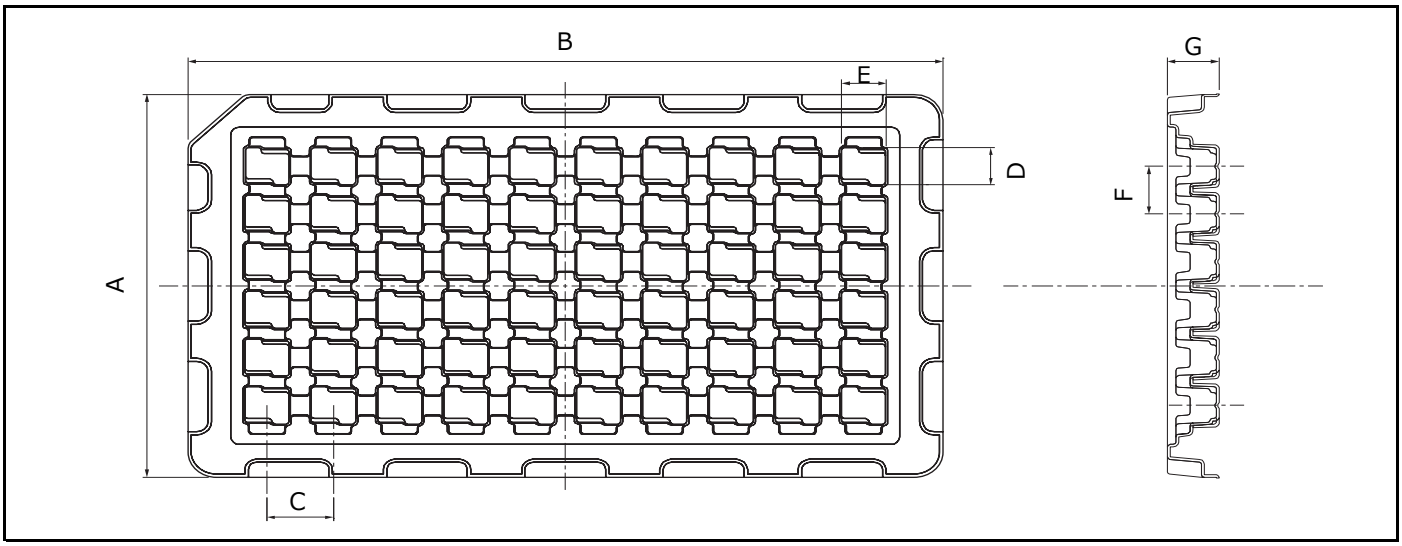
■ **As for soldering conditions and safety precautions (Power choke coils (Automotive grade)), please see data files**



1-Feb-20

## Packaging methods (Tray)

● Blister Tray (mm) 60 pcs

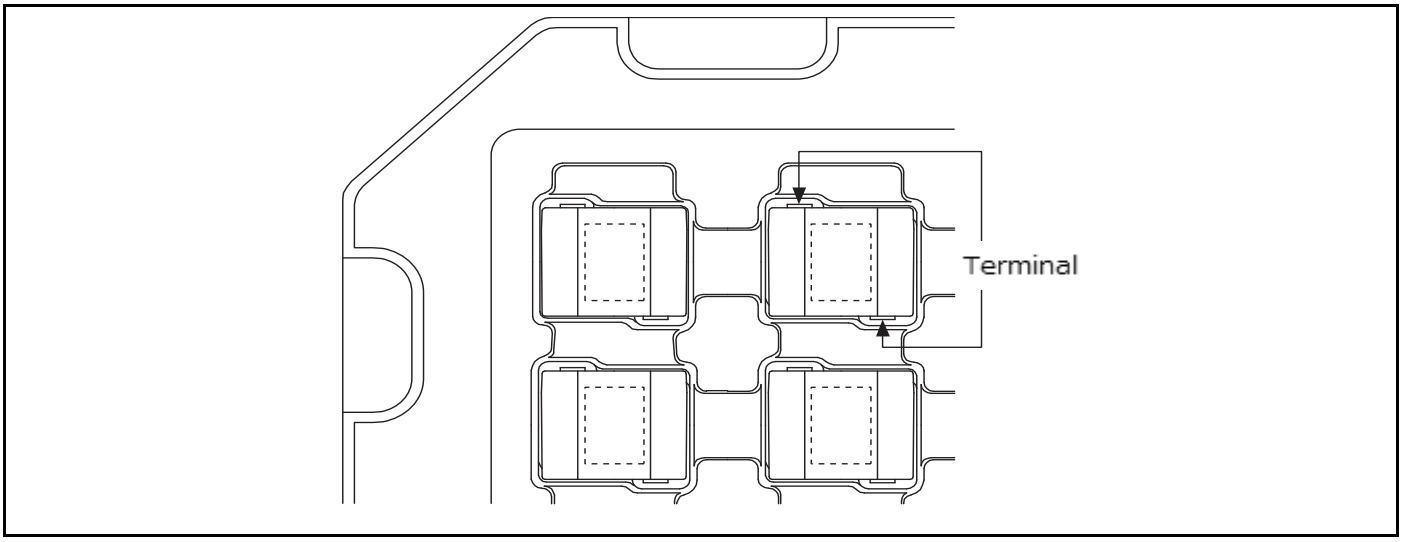



● Blister Tray Dimention

Unit : mm

| Part No. | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| ETQPDH240DTV | 152 | 262 | 23 | 14.8 | 15.1 | 19 | 18 |

## Component placement (Tray)

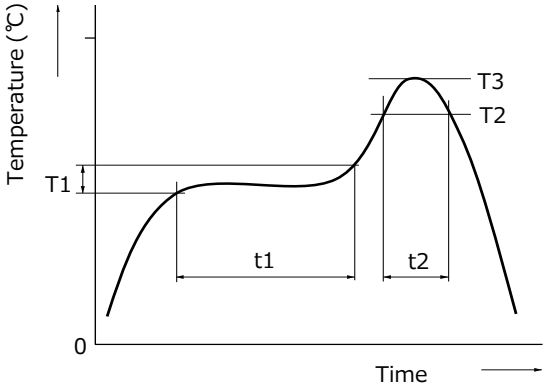



## Standard packing quantity/Tray

| Part No. | Quantity |
|---|---|
| ETQPDH240DTV | 600 pcs /10 Tray (60 pcs / 1 Tray ) |

# Soldering conditions

## Reflow soldering conditions




- Pb free solder recommended temperature profile

  Power Choke Coils (Automotive Grade)

| Series | Preheat | | Soldering | | Peak temperature | | Time of reflow |
|---|---|---|---|---|---|---|---|
| | T1 [℃] | t1 [s] | T2 [℃] | t2 [s] | T3 | T3 limit | |
| ETQP3M□□□YFP | 150 to 170 | 60 to 120 | 230℃ | 30 to 40 | 250℃, 5 s | 260℃, 10 s | 2 times max. |
| ETQP4M□□□YFP | | | | | | | |
| ETQP3M□□□YFN | | | | | | | |
| ETQP4M□□□YFN | | | | | | | |
| ETQP5M□□□YFM | | | | | | | |
| ETQP5M□□□YGM | | | | | | | |
| ETQP5M□□□YFK | | | | | | | |
| ETQP5M□□□YGK | | | | | | | |
| ETQP5M□□□YFC | | | | | | | |
| ETQP5M□□□YGC | | | | | | | |
| ETQP5M□□□YLC | | | | | | | |
| ETQP6M□□□YLC | | | | | | | |
| ETQP5M□□□YSK | | | | | | | |
| ETQP5M□□□YSC | | | | | | | |
| ETQP8M□□□JFA | | | | | | | |
| ETQP3M□□□KVP | | | | | | | |
| ETQP3M□□□KVN | | | | | | | |
| ETQP4M□□□KVK | | | | | | | |
| ETQP4M□□□KVC | | | | | | | |
| ETQP4M□□□KFN | | | | | | | |
| ETQP4M□□□KFM | | | | | | | |
| ETQP3M□□□HFP | | | | | | | |
| ETQP3M□□□HFN | | | | | | | |
| ETQPDH□□□DTV | | | | | | | |

# ⚠Safety Precautions

(Common precautions for Power Choke Coils (Automotive Grade) : Series DUST, Series MC)

- When using our products, no matter what sort of equipment they might be used for, be sure to make a written agreement on the specifications with us in advance. The design and specifications in this catalog are subject to change without prior notice.
- Do not use the products beyond the specifications described in this catalog.
- This catalog explains the quality and performance of the products as individual components. Before use, check and evaluate their operations when installed in your products.
- Install the following systems for a failsafe design to ensure safety if these products are to be used in equipment where a defect in these products may cause the loss of human life or other significant damage, such as damage to vehicles (automobile, train, vessel), traffic lights, medical equipment, aerospace equipment, electric heating appliances, combustion/gas equipment, rotating equipment, and disaster/crime prevention equipment.

✻ Systems equipped with a protection circuit and a protection device.
✻ Systems equipped with a redundant circuit or other system to prevent an unsafe status in the event of a single fault.

# ■Precautions for use

## 1. Provision to abnormal condition

This power choke coil itself does not have any protective function in abnormal condition such as overload, short-circuit and open-circuit conditions, etc.
Therefore, it shall be confirmed as the end product that there is no risk of smoking, fire, dielectric withstand voltage, insulation resistance, etc. in abnormal conditions to provide protective devices and/or protection circuit in the end product.

## 2. Temperature rise

Temperature rise of power choke coil depends on the installation condition in end products. It shall be confirmed in the actual end product that temperature rise of power choke coil is in the limit of specified temperature class.

## 3. Dielectric strength

Dielectric withstanding test with higher voltage than specific value will damage Insulating material and shorten its life.

## 4. Water

This Power choke coil must not be used in wet condition by water, coffee or any liquid because insulation strength becomes very low in such condition.

## 5. Potting

If this power choke coil is potted in some compound, coating material of magnet wire might be occasionally damaged. Please ask us if you intend to pot this power choke coil.

## 6. Model

When this power choke coil is used in a similar or new product to the original one, it might be unable to satisfy he specifications due to difference of condition of usage.
Please ask us if you use this power choke coil in the manner such as above.

## 7. Drop

If the power choke coil receives mechanical stress such as drop, characteristics may become poor (due to damage on coil bobbin, etc.). Never use such stressed power choke coil.

## 8. Buzz Noise

When this coil is used in the frequency band of the audible range (≒ 20 Hz to 20 kHz), or, when using in burst mode, depending on the operating conditions (conditions of the energized waveform) sounds (buzz noise) may occur. Depending on the circuit / board installation environment it may be heard as abnormal sounds, so please check in advance.

## 9. Solvent (Series MC)

If this power choke coil is dipped in the cleaning agent, and the coating agent of the toluene and the xylene system, there is a possibility that the performance decreases greatly. Please ask us if you intend to pot this power choke coil.

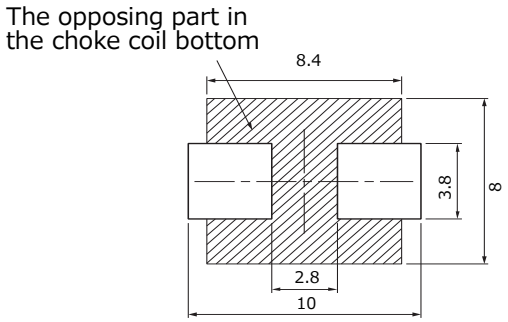
## 10. Static electricity measures (Series MC)

①Circuit design
Please set up the ESD measures parts such as capacitors in the former steps of this power choke coil for static electricity when there is a possibility that static electricity is impressed to the choke coil on the circuit.
Moreover, please consult our company about such a case once.

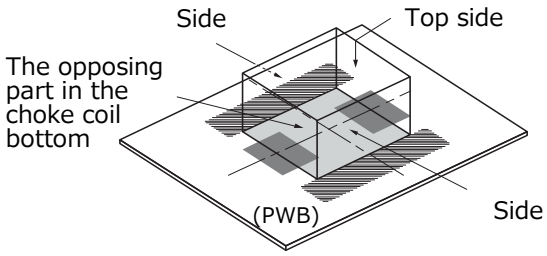
②Treatment with single
Take countermeasures against static electricity when using single power choke coil. (process and equipment)
There is a possibility that the characteristic changes when the voltage of 200 V or more is impressed to this power choke coil. Please handle 200 V or less.

## 11. Printed circuit board design

①Land pattern and Via which exceed Operating Voltage, should not be placed top layer PWB under the products for keeping isolation between inside coil and surface of PWB. (Series DUST)
②To the opposing part in this power choke coil bottom please install neither pattern nor the beer, etc. (Series MC)




③Parts arranged around this power choke coil do not touch the surface of this power choke coil (Top side and side). (Series MC)




④This power choke coil is different from the ferrite core-type that installs general concentration GAP.
It has the leakage magnetic bunch distribution of the choke coil to the vertical direction. Please be cautious when using parts and circuit compositions which are easily affected by the leakage flux.

## 12. Other using emviroment

This power choke coil is not designed for the use in the following, special environment.
Therefore, please do not use it in the following special environment.

- Use in place where a lot of causticity gases such as sea breeze, $Cl_2$, $H_2S$, $NH_3$, $SO_2$, and NOx exist.
- Use in place where out-of-door exposure and direct sunshine strike.

## 13. Core Chipping and Core Crack

This choke coil has a possibility to make partial chipping or crack in the core due to excessive mechanical stress from outside, and might have initially a partial chipping and/or cracks that do not affect the quality.

## 14. Keeping environment

If this power choke coil is kept under following environment and condition, there is a possibility that the performance and soldering decreases greatly.

- Keep in place where a lot of causticity gases such as sea breeze, $Cl_2$, $H_2S$, $NH_3$, $SO_2$, and NOx exist.
- Keep in place where out-of-door exposure and direct sunshine strike.

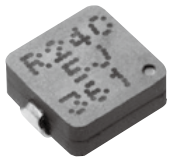
# ■AEC-Q200 Compliant

The products are tested based on all or part of the test conditions and methods defined in AEC-Q200.
Please consult with Panasonic for the details of the product specification and specific evaluation test results, etc., and please review and approve Panasonic's product specification before ordering.

<Package markings>
Package markings include the product number, quantity, and country of origin.
In principle, the country of origin should be indicated in English.

# Power Choke Coil

## PCC-M0730L (MC) series



Small mounting size for multi-phase DC/DC converter circuits

## Features

- Small type (8.7×7.0×H3.0 mm)
- High power (22 A)
- Low loss (DCR : 1.12 mΩ)
- Tighter DCR tolerance (±7 %)
- Suitable for high frequency circuit (up to 1 MHz)
- Low buzz noise due to its gap-less structure
- Shielded construction
- RoHS compliant

## Recommended applications

- Notebook and Desktop PC power supply modules
- Servers, Routers, DC/DC converters for driving CPUs

## Standard packing quantity (Minimum quantity/Packing unit)

- 3,000 pcs/box（2 reel）

## Explanation of part numbers

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | T | Q | P | 3 | L | | | | | | |
| Product code | | | Classification | Size | Winding | Inductance | | | Core | Packaging | Suffix |

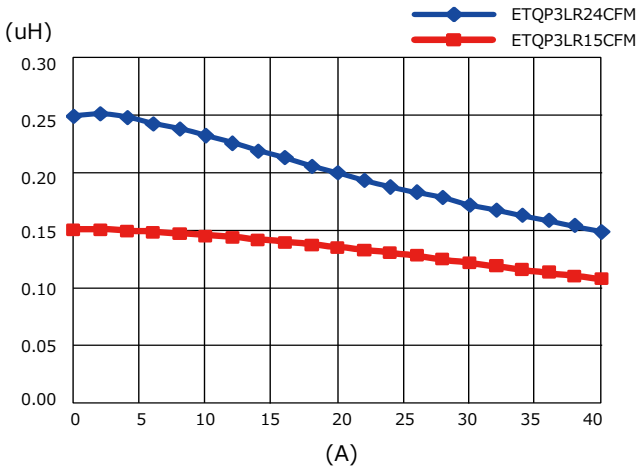
## Standard parts

| Part No. | Inductance (at 20℃)*1 | | | Rated current (A)*2 | Rated current (reference) (A)*3 | DC resistance (at 20℃) (mΩ) max. |
|---|---|---|---|---|---|---|
| | L0 at 0A | L1*4 | | | | |
| | (μH) | (μH) | Measurement current (A) | | | |
| ETQP3LR15CFM | 0.15±20 % | (0.12) | 29 | 29 | 43 | 0.66±7 % |
| ETQP3LR24CFM | 0.24±20 % | (0.19) | 22 | 22 | 35 | 1.12±7 % |

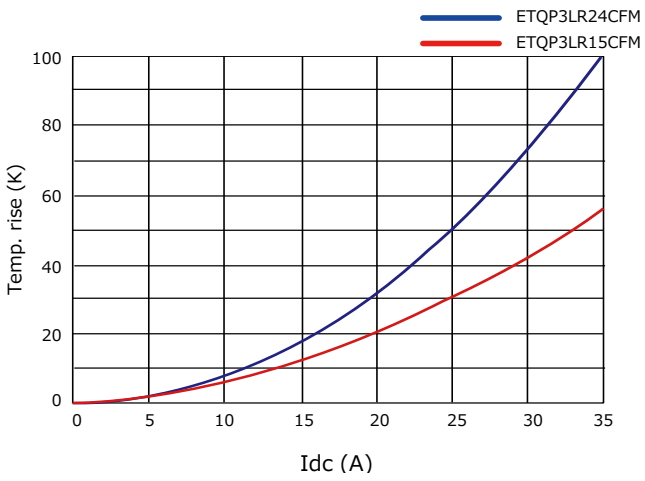
*1: Inductance is measured at 1.0 MHz.
*2: Rated current defines actual value of DC current, when temperature rise of coil becomes 40 K. (Method A)
*3: Rated current (reference) defines actual value of DC current, when temperature rise of coil becomes 40 K. (Method B)
*4: Reference only
◆ Method A (PANASONIC's standard measurement conditions), Method B (high heat dissipation measurement) is different from Method A by the measurement methods. In normal application condition, the part's temperature depends on circuit design and heat dissipation condition. This condition shall be verified by the worst operational condition.

## Performance characteristics (Reference)

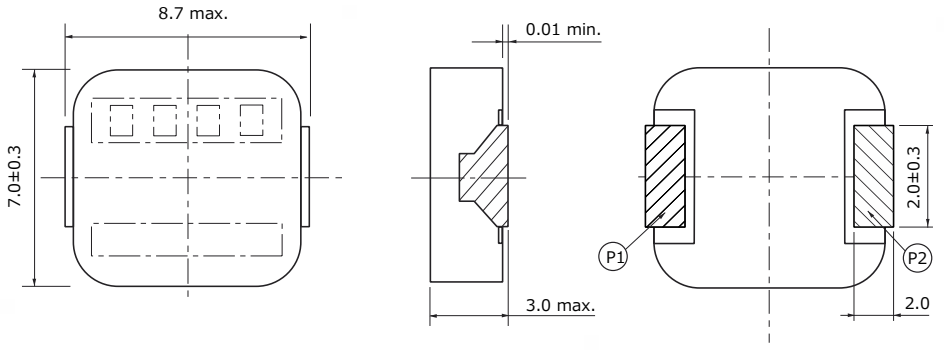
Inductance vs DC Current




Case Temperature vs DC Current (Method A)

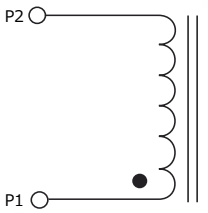



## Dimensions in mm (not to scale)

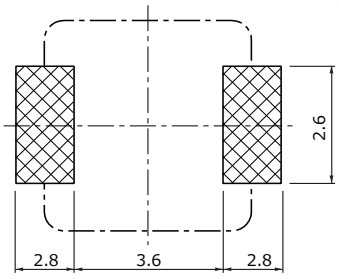



Unit : mm

## Connection




## Recommended land patterns in mm (not to scale)




Unit : mm

■ **As for soldering conditions and safety precautions (Power choke coils for consumer use), please see data files.**

# Power Choke Coil
# Low DCR type
## PCC-M0740L (MC) series


Small mounting size for multi-phase DC/DC converter circuits

## Features

- Small type (8.7×7.0×H4.0 mm)
- High power (17 A to 24 A)
- Low loss (DCR : 1.0 to 1.5 mΩ)
- Tighter DCR tolerance (±7 %)
- Suitable for high frequency circuit (up to 1 MHz)
- Low buzz noise due to its gap-less structure
- Shielded construction
- RoHS compliant

## Recommended applications

- Notebook and Desktop PC power supply modules
- Servers, Routers, DC/DC converters for driving CPUs

## Standard packing quantity (Minimum quantity/Packing unit)

- 3,000 pcs/box (2 reel)

## Explanation of part numbers

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | T | Q | P | 4 | L | | | | | | |
| Product code | | | Classification | Size | Winding | Inductance | | | Core | Packaging | Suffix |

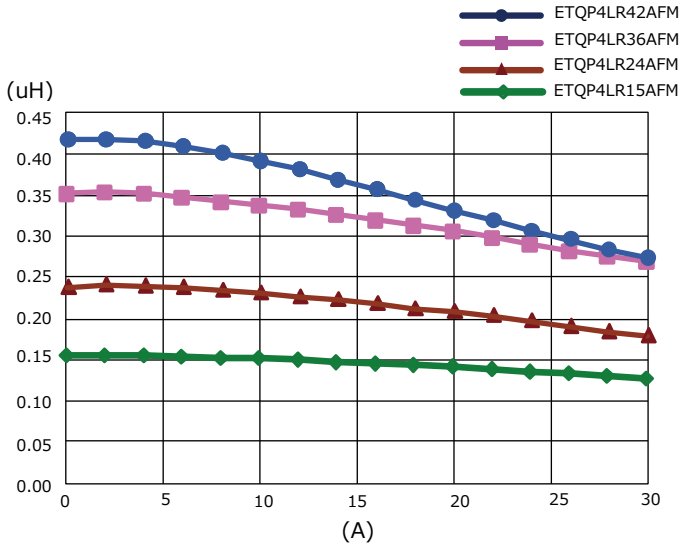
## Standard parts

| Part No. | Inductance (at 20℃)*1 | | | Rated current (A)*2 | Rated current (reference) (A)*3 | DC resistance (at 20℃) (mΩ) max. |
|---|---|---|---|---|---|---|
| | L0 at 0A | L1*4 | | | | |
| | (μH) | (μH) | Measurement current (A) | | | |
| ETQP4LR15AFM | 0.15±20 % | -0.13 | 29 | 29 | 43.0 | 0.66±7 % |
| ETQP4LR24AFM | 0.24±20 % | -0.2 | 24 | 24 | 35.5 | 1.00±7 % |
| ETQP4LR36AFM | 0.36±20 % | -0.3 | 20 | 20 | 31.0 | 1.35±7 % |
| ETQP4LR42AFM | 0.42±20 % | -0.35 | 17 | 17 | 28.5 | 1.50±7 % |

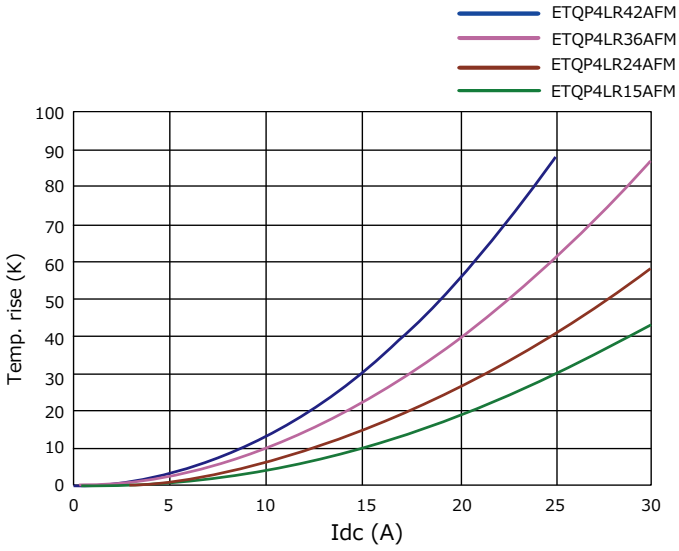
*1: Inductance is measured at 1.0 MHz.
*2: Rated current defines actual value of DC current, when temperature rise of coil becomes 40 K. (Method A)
*3: Rated current (reference) defines actual value of DC current, when temperature rise of coil becomes 40 K. (Method B)
*4: Reference only
◆ Method A (PANASONIC's standard measurement conditions), Method B (high heat dissipation measurement) is different from Method A by the measurement methods. In normal application condition, the part's temperature depends on circuit design and heat dissipation condition. This condition shall be verified by the worst operational condition.

## Performance characteristics (Reference)

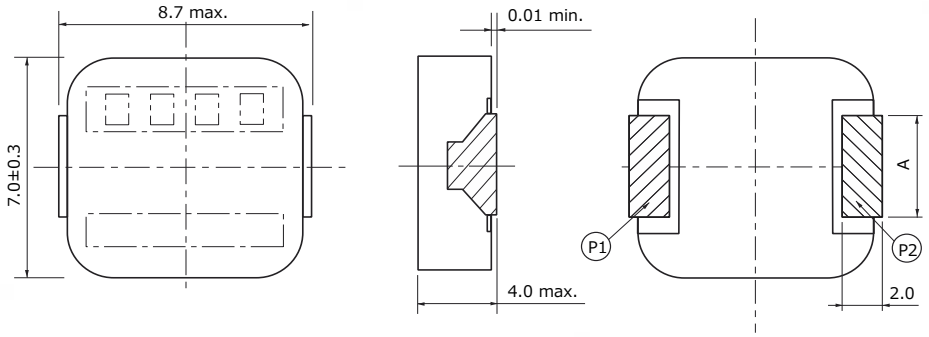
Inductance vs DC Current




Case Temperature vs DC Current (Method A)



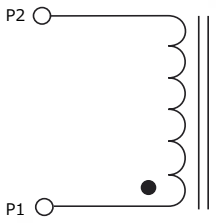

## Dimensions in mm (not to scale)



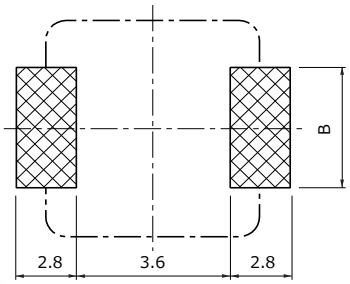

Unit : mm

| Part No. | A |
|---|---|
| ETQP4LR15AFM | 3.0±0.3 |
| ETQP4LR24AFM | |
| ETQP4LR36AFM | 2.0±0.3 |
| ETQP4LR42AFM | |

## Connection




## Recommended land patterns in mm (not to scale)




Unit : mm

| Part No. | B |
|---|---|
| ETQP4LR15AFM | 3.6 |
| ETQP4LR24AFM | |
| ETQP4LR36AFM | 2.6 |
| ETQP4LR42AFM | |

■ **As for soldering conditions and safety precautions (Power choke coils for consumer use), please see data files.**

# Power Choke Coil

## PCC-M1040L (MC) series


Small mounting size for multi-phase DC/DC converter circuits

## Features

- Small type (11.5×10.0×H4.0 mm)
- High power (21 A to 28 A)
- Low loss (DCR : 0.7 to 1.56 mΩ)
- Tighter DCR tolerance (±5 % to ±10 %)
- Suitable for high frequency circuit (up to 1 MHz)
- Low buzz noise due to its gap-less structure
- Shielded construction
- RoHS compliant

## Recommended applications

- Notebook and Desktop PC power supply modules
- Servers, Routers, DC/DC converters for driving CPUs

## Standard packing quantity (Minimum quantity/Packing unit)

- 2,000 pcs/box(2 reel): ETQP4LR36WFC, ETQP4LR56WFC, ETQP4LR45XFC
- 1,000 pcs/box(2 reel): ETQP4LR19WFC

## Explanation of part numbers

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | T | Q | P | 4 | L | | | | | | |
| Product code | | | Classification | Size | Winding | Inductance | | | Core | Packaging | Suffix |

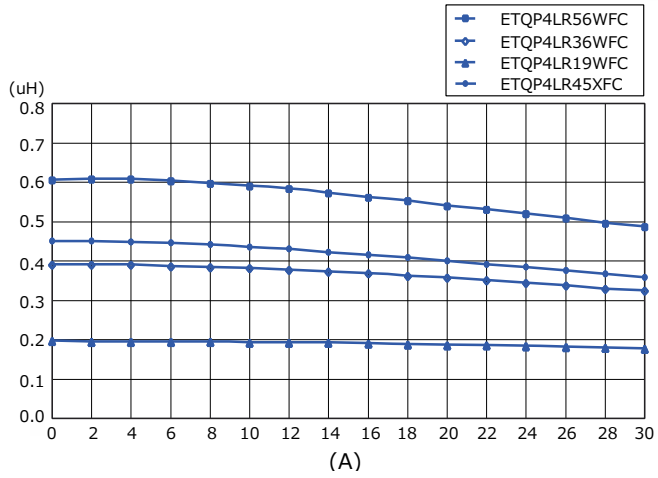
## Standard parts

| Part No. | Inductance (at 20℃)*1 | | | | | Rated current (A)*2 | Rated current (reference) (A)*3 | DC resistance (at 20℃) (mΩ) |
|---|---|---|---|---|---|---|---|---|
| | L0 at 0A | L1 | | L2*4 | | | | |
| | (μH) | (μH) | Measurement current (A) | (μH) | Measurement current (A) | | | |
| ETQP4LR19WFC | -0.2 | 0.19±20 % | 21 | -0.17 | 30 | 28 | 38 | 0.70±10 % |
| ETQP4LR36WFC | -0.37 | 0.36±20 % | 17 | -0.34 | 24 | 24 | 33 | 1.10± 5 % |
| ETQP4LR56WFC | -0.6 | 0.56±20 % | 15 | -0.53 | 21 | 21 | 28 | 1.56± 5 % |
| ETQP4LR45XFC | 0.45 +20 % −25 % | — | — | -0.38 | 25 | 25 | 33 | 1.10± 5 % |

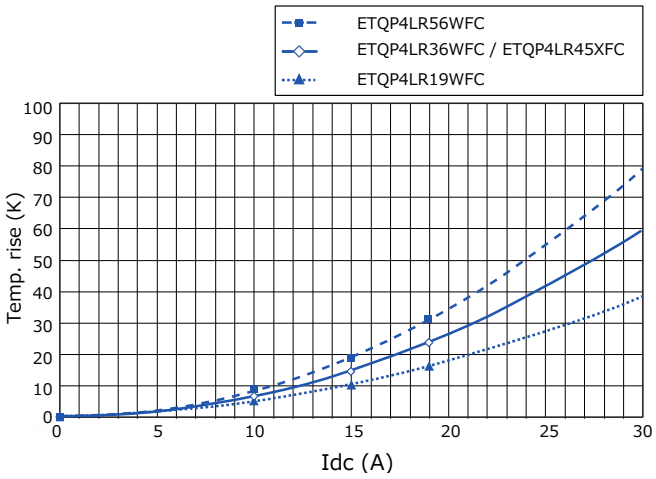
*1: Inductance is measured at 1.0 MHz.
*2: Rated current defines actual value of DC current, when temperature rise of coil becomes 40 K. (Method A)
*3: Rated current (reference) defines actual value of DC current, when temperature rise of coil becomes 40 K. (Method B)
*4: Reference only
◆ Method A (PANASONIC's standard measurement conditions), Method B (high heat dissipation measurement) is different from Method A by the measurement methods. In normal application condition, the part's temperature depends on circuit design and heat dissipation condition. This condition shall be verified by the worst operational condition.

## Performance characteristics (Reference)

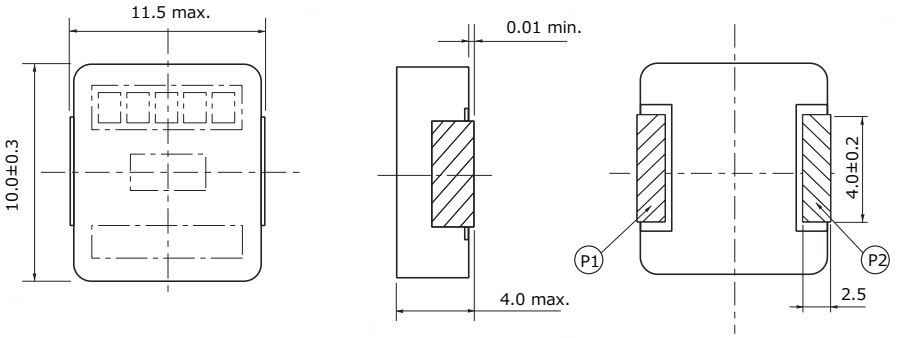
Inductance vs DC Current




Case Temperature vs DC Current (Method A)

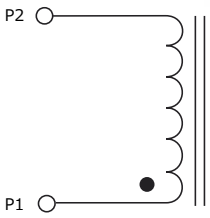



## Dimensions in mm (not to scale)

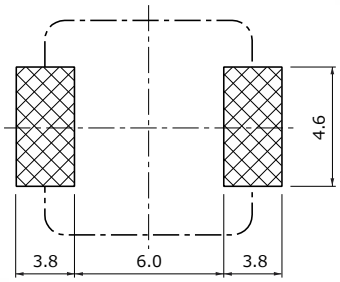



Unit : mm

## Connection




## Recommended land patterns in mm (not to scale)




Unit : mm

■ **As for soldering conditions and safety precautions (Power choke coils for consumer use), please see data files.**

# Power Choke Coil
# Low DCR type
## PCC-M1040L (MC) series


Small mounting size for multi-phase DC/DC converter circuits

## Features

- Small type (11.7×10.0×H4.0 mm)
- High power (21 A to 30 A)
- Low loss (DCR : 0.76 to 1.58 mΩ)
- Tighter DCR tolerance (±5 %, ±7 %)
- Suitable for high frequency circuit (up to 1 MHz)
- Low buzz noise due to its gap-less structure
- Shielded construction
- RoHS compliant

## Recommended applications

- Notebook and Desktop PC power supply modules
- Servers, Routers, DC/DC converters for driving CPUs

## Standard packing quantity (Minimum quantity/Packing unit)

- 2,000 pcs/box（2 reel）

## Explanation of part numbers

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | T | Q | P | 4 | L | | | | | | |
| Product code | | | Classification | Size | Winding | Inductance | | | Core | Packaging | Suffix |

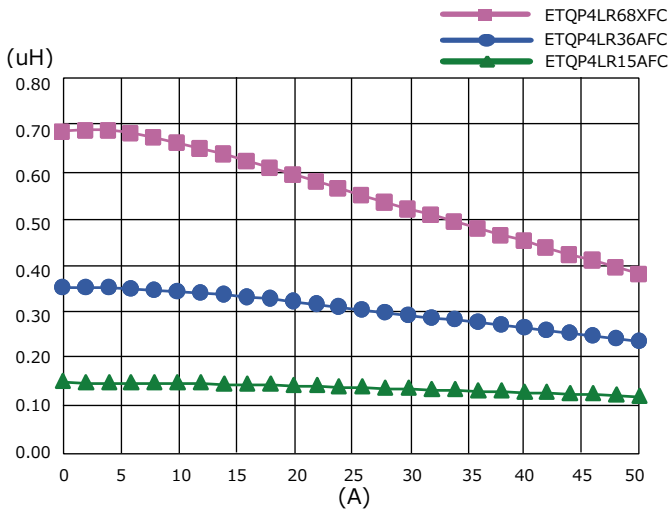
## Standard parts

| Part No. | Inductance (at 20℃)*1 | | | Rated current (A)*2 | Rated current (reference) (A)*3 | DC resistance (at 20℃) (mΩ) max. |
|---|---|---|---|---|---|---|
| | L0 at 0A | L1*4 | | | | |
| | (μH) | (μH) | Measurement current (A) | | | |
| ETQP4LR15AFC | 0.15±20 % | (0.13) | 42 | 42 | 51 | 0.45±7 % |
| ETQP4LR36AFC | 0.36±20 % | (0.29) | 30 | 30 | 40 | 0.76±5 % |
| ETQP4LR68XFC | 0.68±20 % | (0.59) | 21 | 21 | 28 | 1.58±5 % |

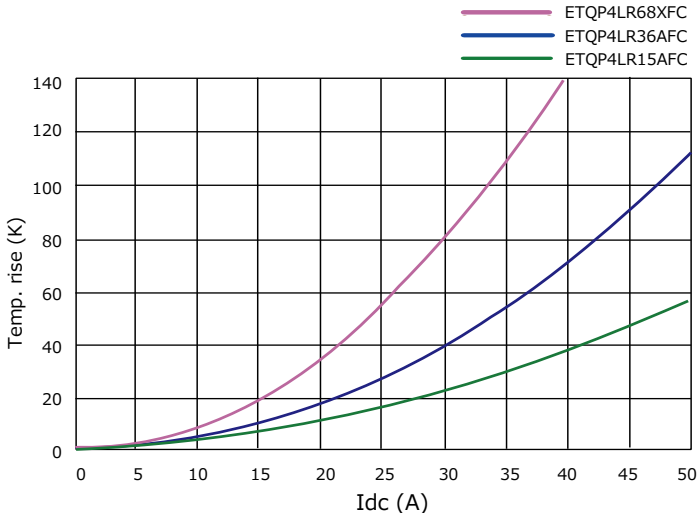
*1: Inductance is measured at 1.0 MHz.
*2: Rated current defines actual value of DC current, when temperature rise of coil becomes 40 K. (Method A)
*3: Rated current (reference) defines actual value of DC current, when temperature rise of coil becomes 40 K. (Method B)
*4: Reference only
◆ Method A (PANASONIC's standard measurement conditions), Method B (high heat dissipation measurement) is different from Method A by the measurement methods. In normal application condition, the part's temperature depends on circuit design and heat dissipation condition. This condition shall be verified by the worst operational condition.

## Performance characteristics (Reference)

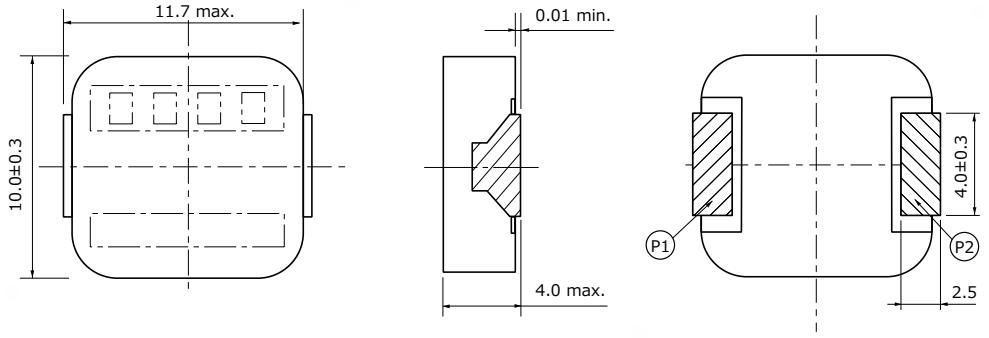
Inductance vs DC Current




Case Temperature vs DC Current (Method A)

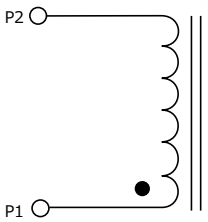



## Dimensions in mm (not to scale)

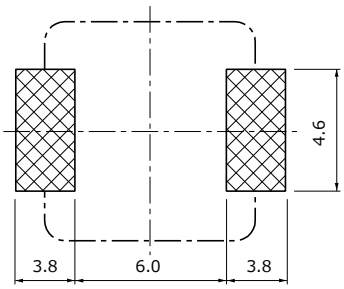



Unit : mm

## Connection




## Recommended land patterns in mm (not to scale)




Unit : mm

■ **As for soldering conditions and safety precautions (Power choke coils for consumer use), please see data files.**

# Power Choke Coil
## PCC-M1250L (MC) series


High power, Low loss, Low-profile

## Features

- High power (25 A to 30 A)
- Low loss (DCR : 0.8 to 1.1 mΩ)
- Tighter DCR tolerance (±5 % to ±7 %)
- Low profile (14.5×12.5×H5.0 mm)
- Suitable for high frequency circuit (up to 1 MHz)
- Low buzz noise due to its gap-less structure
- Shielded construction
- RoHS compliant

## Recommended applications

- Notebook and Desktop PC power supply modules
- Servers, Routers, DC/DC converters for driving CPUs

## Standard packing quantity (Minimum quantity/Packing unit)

- 1,000 pcs/box (2 reel)

## Explanation of part numbers

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | T | Q | P | 5 | L | | | | | | |
| Product code | | | Classification | Size | Winding | Inductance | | | Core | Packaging | Suffix |

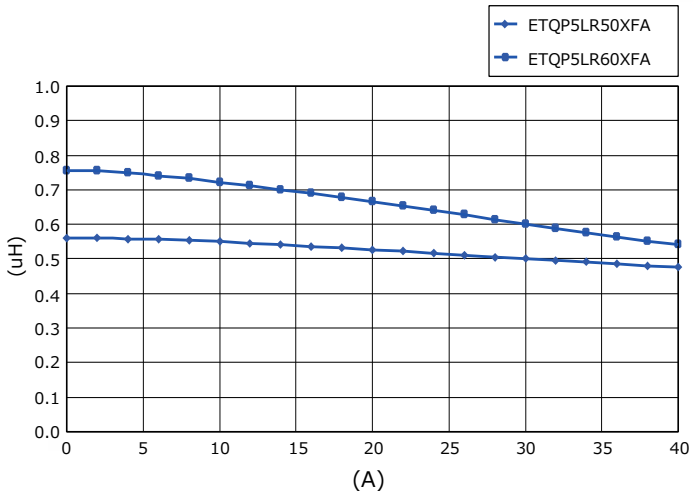
## Standard parts

| Part No. | Inductance (at 20℃)*1 | | | | Rated current (A)*2 | DC resistance (at 20℃) (mΩ) |
|---|---|---|---|---|---|---|
| | L1 | | L2*3 | | | |
| | (μH) | Measurement current (A) | (μH) | Measurement current (A) | | |
| ETQP5LR50XFA | 0.50±20 % | 30 | (0.46) | 42 | 30 | 0.80±7 % |
| ETQP5LR60XFA | 0.60±20 % | 30 | (0.54) | 42 | 27 | 1.10±5 % |

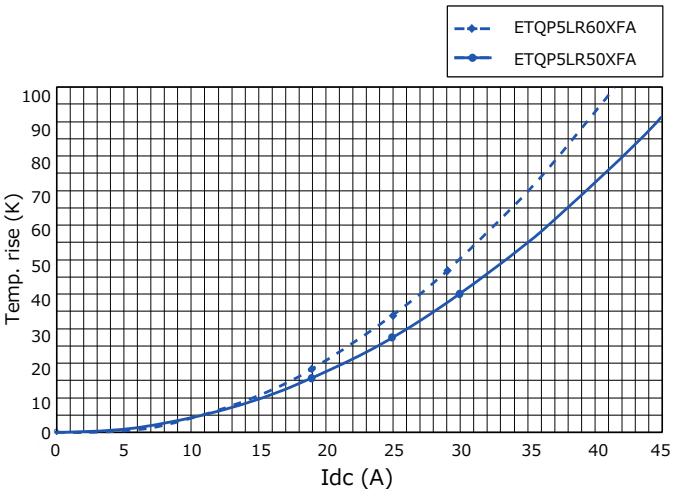
*1: Inductance is measured at 1.0 MHz.
*2: Rated current defines actual value of DC current, when temperature rise of coil becomes 40 K.
*3: Reference only

## Performance characteristics (Reference)

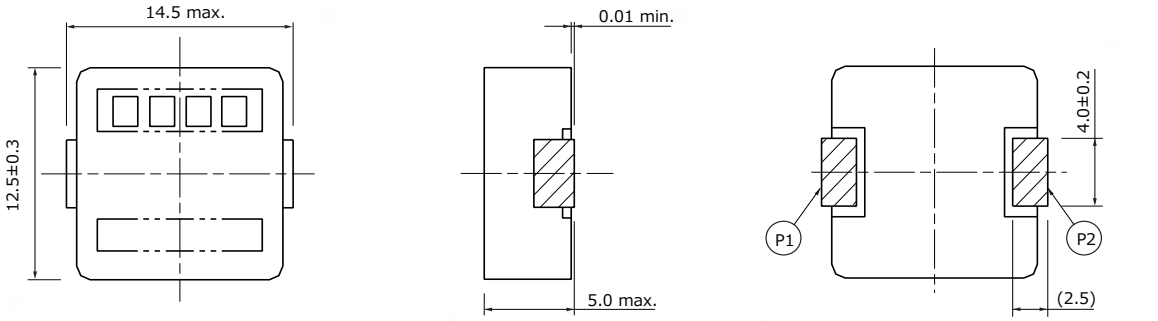
Inductance vs DC Current




Case Temperature vs DC Current

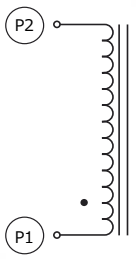



## Dimensions in mm (not to scale)

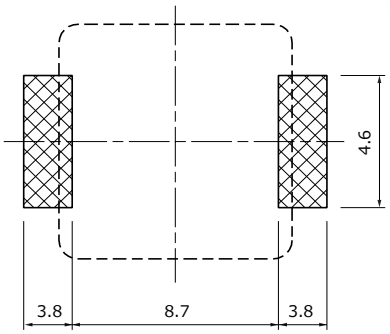



Unit : mm

## Connection




## Recommended land patterns in mm (not to scale)

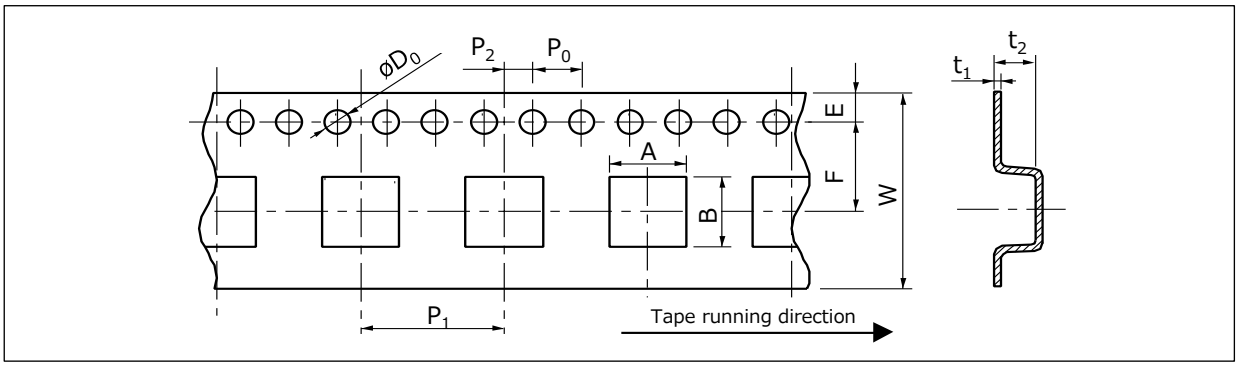



Unit : mm

■ **As for soldering conditions and safety precautions (Power choke coils for consumer use), please see data files.**

## Packaging methods (Taping)

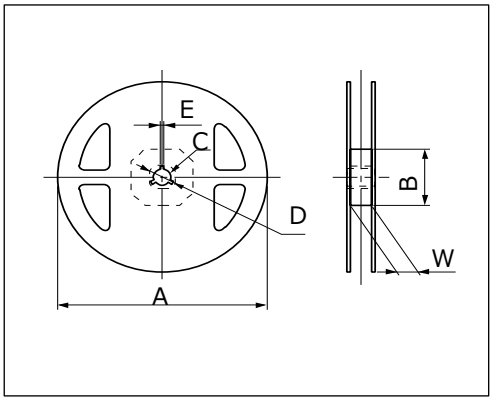
● Embossed carrier tape dimensions in mm (not to scale)




Unit : mm

| Series | A | B | W | E | F | $P_1$ | $P_2$ | $P_0$ | $øD_0$ | $t_1$ | $t_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCC-M0730L | 7.6 | 8.9 | 16 | 1.75 | 7.5 | 12 | 2 | 4 | 1.5 | 0.4 | 4.2 |
| PCC-M0740L | 7.6 | 8.9 | 16 | 1.75 | 7.5 | 12 | 2 | 4 | 1.5 | 0.4 | 4.3 |
| PCC-M1040L | 10.6 | 11.8 | 24 | 1.75 | 11.5 | 16 | 2 | 4 | 1.5 | 0.4 | 5.2 |
| PCC-M1250L | 13.1 | 14.8 | 24 | 1.75 | 11.5 | 16 | 2 | 4 | 1.5 | 0.4 | 5.3 |

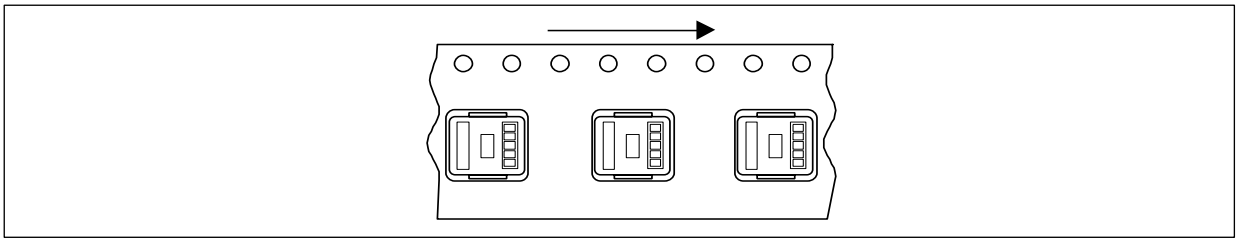
● Taping reel dimensions in mm (not to scale)




Unit : mm

| Series | A | B | C | D | E | W |
|---|---|---|---|---|---|---|
| PCC-M0730L | 380 | 80 | 13 | 21 | 2 | 17.5 |
| PCC-M0740L | | | | | | |
| PCC-M1040L | | | | | | 25.4 |
| PCC-M1250L | | | | | | |

## Component placement (Taping)

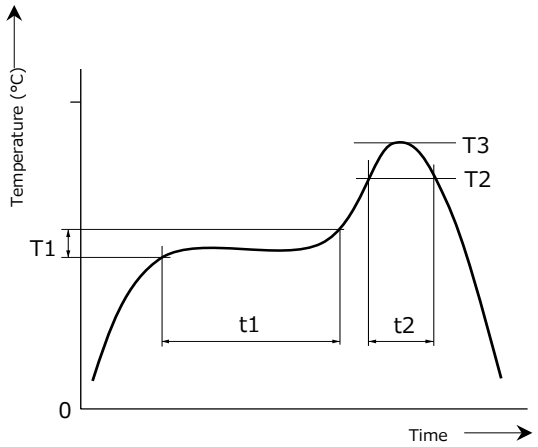


## Standard packing quantity/Reel

| Series | Part No. | Minimum quantity/ Packing unit | Quantity per reel |
|---|---|---|---|
| PCC-M0730L | ETQP3L□□□CFM | 3,000 pcs / box (2 reel) | 1,500 pcs |
| PCC-M0740L | ETQP4L□□□AFM | | |
| PCC-M1040L | ETQP4L□□□WFC | 2,000 pcs / box (2 reel) | 1,000 pcs |
| | ETQP4L□□□XFC | | |
| | ETQP4L□□□AFC | | |
| PCC-M1040L | ETQP4LR19WFC | 1,000 pcs / box (2 reel) | 500 pcs |
| PCC-M1250L | ETQP5L□□□XFA | | |

# Soldering conditions

## Reflow soldering conditions




- Pb free solder recommended temperature profile
  Power Choke Coils for Consumer use

| Series | Preheat | | Soldering | | Peak temperature | | Time of reflow |
|---|---|---|---|---|---|---|---|
| | T1 [℃] | t1 [s] | T2 [℃] | t2 [s] | T3 | T3 Limit | |
| PCC-M0730L<br>PCC-M0740L<br>PCC-M1040L<br>PCC-M1250L | 150 to 170 | 60 to 120 | 230 °C | 30 to 40 | 250 °C, 5 s | 260 °C, 10 s | 2 times max. |

# ⚠Safety Precautions

## (Common precautions for Power Choke Coils for consumer use)

- When using our products, no matter what sort of equipment they might be used for, be sure to make a written agreement on the specifications with us in advance. The design and specifications in this catalog are subject to change without prior notice.
- Do not use the products beyond the specifications described in this catalog.
- This catalog explains the quality and performance of the products as individual components. Before use, check and evaluate their operations when installed in your products.
- Install the following systems for a failsafe design to ensure safety if these products are to be used in equipment where a defect in these products may cause the loss of human life or other significant damage, such as damage to vehicles (automobile, train, vessel), traffic lights, medical equipment, aerospace equipment, elec tric heating appliances, combustion/gas equipment, rotating equipment, and disaster/crime prevention equipment.

✻ Systems equipped with a protection circuit and a protection device.
✻ Systems equipped with a redundant circuit or other system to prevent an unsafe status in the event of a single fault.

# ⚠Precautions for use

### 1. Provision to abnormal condition

This power choke coil itself does not have any protective function in abnormal condition such as overload, short-circuit and open-circuit conditions, etc.
Therefore, it shall be confirmed as the end product that there is no risk of smoking, fire, dielectric withstand voltage, insulation resistance, etc. in abnormal conditions to provide protective devices and/or protection circuit in the end product.

### 2. Temperature rise

Temperature rise of power choke coil depends on the installation condition in end products. It shall be confirmed in the actual end product that temperature rise of power choke coil is in the limit of specified temperature class.

### 3. Dielectric strength

Dielectric withstanding test with higher voltage than specific value will damage Insulating material and shorten its life.

### 4. Water

This Power choke coil must not be used in wet condition by water, coffee or any liquid because insulation strength becomes very low in such condition.

### 5. Potting

If this power choke coil is potted in some compound, coating material of magnet wire might be occasionally damaged. Please ask us if you intend to pot this power choke coil.

### 6. Solvent

If this power choke coil is dipped in the cleaning agent, and the coating agent of the toluene and the xylene system, there is a possibility that the performance decreases greatly. Please ask us if you intend to pot this power choke coil.

### 7. Static electricity measures

① Circuit design
Please set up the ESD measures parts such as capacitors in the former steps of this power choke coil for static electricity when there is a possibility that static electricity is impressed to the choke coil on the circuit.
Moreover, please consult our company about such a case once.
② Treatment with single
Take countermeasures against static electricity when using single power choke coil. (process and equipment)
There is a possibility that the characteristic changes when the voltage of 200 V or more is impressed to this power choke coil. Please handle 200 V or less.

## 8. Core Chipping and Core Crack

This choke coil has a possibility to make partial chipping or crack in the core due to excessive mechanical stress from outside, and might have initially a partial chipping and/or cracks that do not affect the quality.

## 9. Storage temperature

-5 °C to +35 °C

## 10. Operating temperature

Minimum temperature : -40 °C (Ambient temperature of the power choke coil)
Maximum temperature : 130 °C (Ambient temperature of the power choke coil plus the temperature rise)
100 °C (Only series : PCC-F126F(N6))

## 11. Model

When this power choke coil is used in a similar or new product to the original one, it might be unable to satisfy he specifications due to difference of condition of usage.
Please ask us if you use this power choke coil in the manner such as above.

## 12. Drop

If the power choke coil receives mechanical stress such as drop, characteristics may become poor (due to damage on coil bobbin, etc.). Never use such stressed power choke coil.

<Package markings>
Package markings include the product number, quantity, and country of origin.
In principle, the country of origin should be indicated in English.

# Chip type

## ELT3KN series

High inductance Voltage Step-up coil chip series for piezoelectric buzzers and DC/DC circuitry of EL panels

## Features

- Small and thin
- High inductance
- RoHS compliant

## Recommended applications

- Piezoelectric buzzer, Booster circuit for EL backlight (Watch, Electric thermometer, Portable device)

## Standard packing quantity (Minimum quantity/Packing unit)

- 1,000 pcs or 5,000 pcs / reel

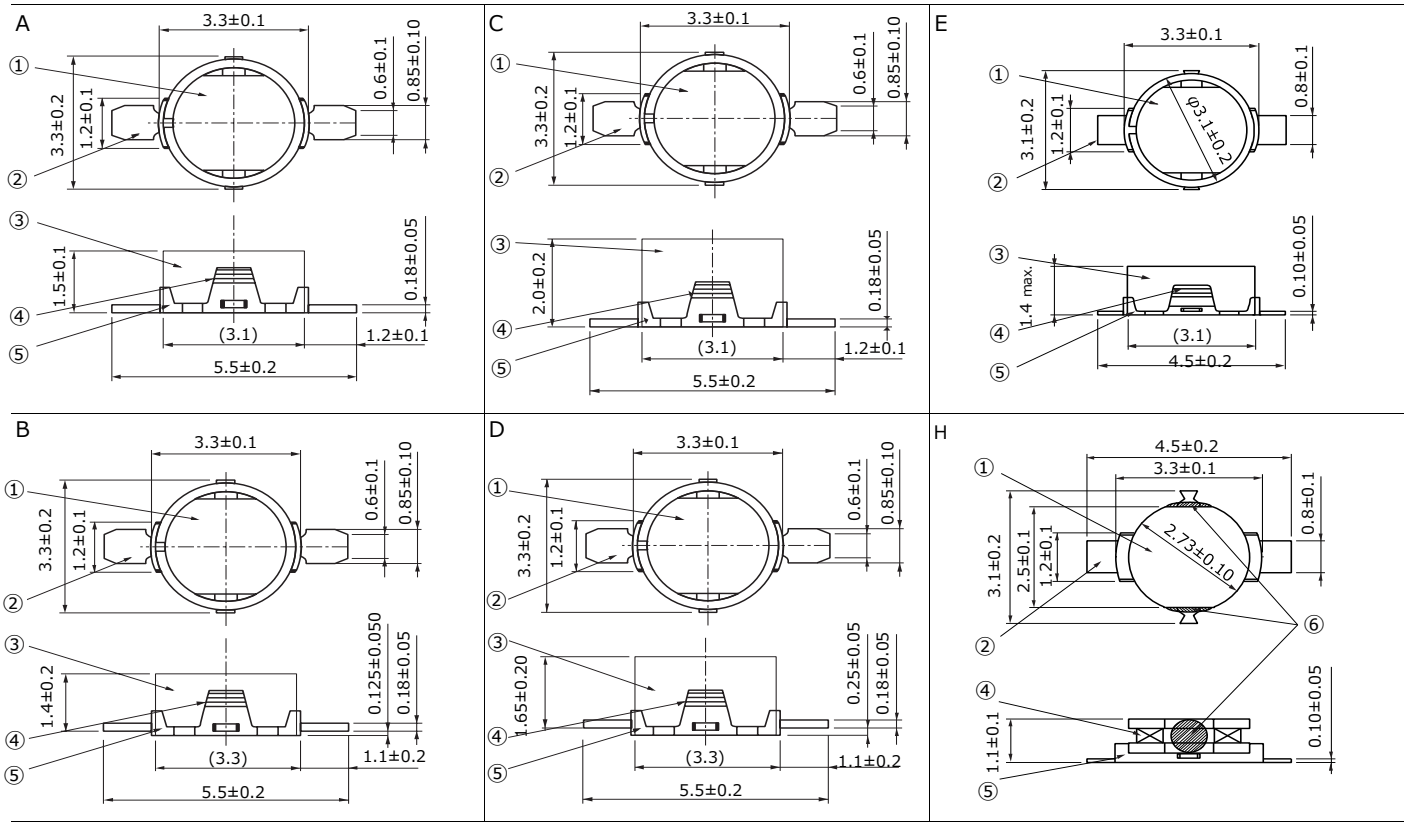
## Explanation of part numbers

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| E | L | T | 3 | K | N | 0 | 0 | 4 | C |

Product code | Outer size | Construction | Design No. | Packaging

| Code | Packaging |
|---|---|
| B | ø180 Reel |
| C | ø370 Reel |

## Dimensions in mm (not to scale)



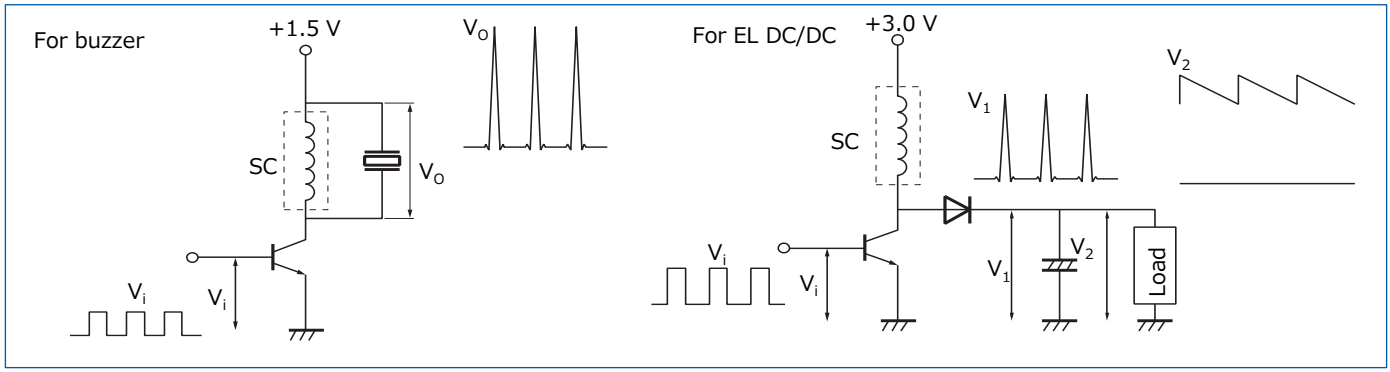

Part Name: ①Core ②Terminal ③Ring ④Coil ⑤Terminal board ⑥Adhesive

## Standard parts

| Part No. | Inductance | | DC resistance | | DC current | Dimensions | Magnetic composition |
|---|---|---|---|---|---|---|---|
| | (mH) | Tolerance(%) | (Ω) | Tolerance(%) | (mA) max. | | |
| ELT3KN004□ | 14.00 | ±40 | 125 | ±10 | 1.7 | A | Permalloy ring |
| ELT3KN007□ | 20.00 | | 170 | | 1.4 | | |
| ELT3KN113□ | 1.00 | ±10 | 34 | ±15 | 25.0 | | Brass ring |
| ELT3KN126□ | 1.50 | | 49 | | 29.0 | | |
| ELT3KN142□ | 0.82 | | 24 | | 30.0 | | |
| ELT3KN019□ | 14.00 | ±40 | 125 | ±10 | 1.7 | B | Permalloy ring |
| ELT3KN109□ | 3.80 | ±10 | 115 | ±20 | 15.0 | | Brass ring |
| ELT3KN114□ | 2.50 | | 83 | ±15 | 15.0 | | |
| ELT3KN014□ | 30.00 | ±40 | 150 | | 1.9 | C | Permalloy ring |
| ELT3KN018□ | 35.00 | | 235 | ±10 | 1.9 | | |
| ELT3KN028□ | 50.00 | ±35 | 250 | ±15 | 1.4 | | |
| ELT3KN032□ | 25.00 | ±40 | 185 | | 10.0 | | |
| ELT3KN101□ | 10.00 | ±10 | 285 | ±10 | 1.4 | | Brass ring |
| ELT3KN104□ | 1.00 | | 35 | ±15 | 30.0 | | |
| ELT3KN118□ | 2.50 | | 64 | | 20.0 | | |
| ELT3KN121□ | 1.00 | | 22.5 | | 40.0 | | |
| ELT3KN122□ | 2.00 | | 44 | | 20.0 | | |
| ELT3KN123□ | 1.00 | | 25 | | 30.0 | | |
| ELT3KN124□ | 4.00 | | 85 | | 15.0 | | |
| ELT3KN127□ | 0.47 | | 14 | | 50.0 | | |
| ELT3KN128□ | 0.56 | | 15 | | 45.0 | | |
| ELT3KN129□ | 0.68 | | 17 | | 34.0 | | |
| ELT3KN130□ | 2.30 | | 51 | | 23.0 | | |
| ELT3KN131□ | 2.00 | | 44 | | 20.0 | | |
| ELT3KN020□ | 30.00 | ±30 | 150 | | 2.5 | D | Permalloy ring |
| ELT3KN111□ | 7.50 | ±10 | 177 | | 10.0 | | Brass ring |
| ELT3KN125□ | 4.00 | | 85 | | 15.0 | | |
| ELT3KN041□ | 14.00 | ±40 | 125 | ±10 | 1.7 | E | Permalloy ring |
| ELT3KN042□ | 20.00 | | 175 | | 1.4 | | |
| ELT3KN043□ | 12.00 | | 117 | | 1.7 | | |
| ELT3KN139□ | 0.68 | ±10 | 19 | ±15 | 40.0 | | Brass ring |
| ELT3KN140□ | 0.82 | | 22 | | 30.0 | | |
| ELT3KN135□ | 1.10 | | 32 | | 30.0 | | |
| ELT3KN136□ | 2.00 | | 55 | | 20.0 | | |
| ELT3KN137□ | 4.00 | | 117 | ±10 | 15.0 | | |
| ELT3KN149□ | 0.33 | | 11 | ±15 | 60.0 | | |
| ELT3KN151□ | 0.56 | | 17 | | 50.0 | | |
| ELT3KN152□ | 0.47 | | 14 | | 50.0 | | |
| ELT3KN155□ | 1.10 | | 38 | | 25.0 | H | Ring less |
| ELT3KN162□ | 4.00 | | 117 | ±10 | 15.0 | E | Brass ring |
| ELT3KN163□ | 1.10 | | 32 | ±15 | 30.0 | | |

"□" shows the packaging specifications.

## Applied diagram examples

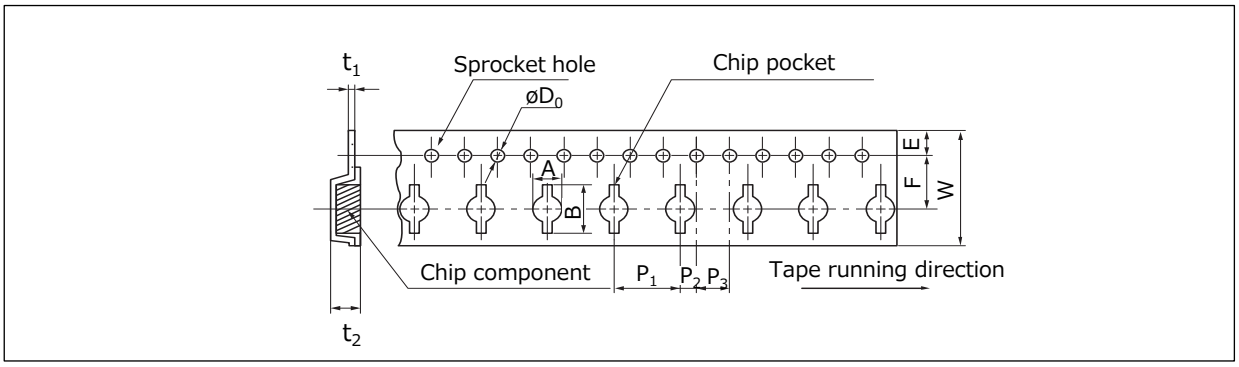


## Packaging methods (Taping)

- Standard packing quantity

| Packaging | Quantity per reel | Kind of taping<br>B 1,000 pcs. Embossed carrier |
|---|---|---|
| B | 1,000 pcs | Embossed carrier taping |
| C | 5,000 pcs | |

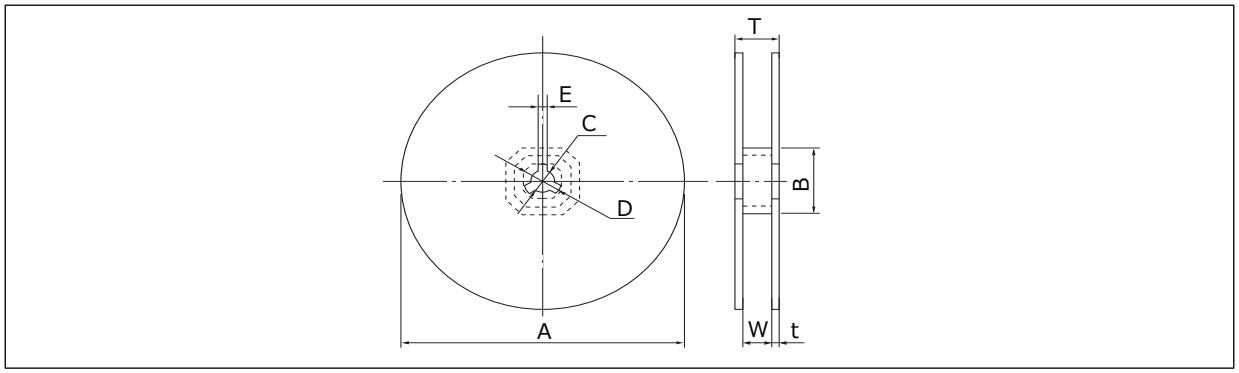
- Embossed carrier tape dimensions in mm (not to scale)




Unit : mm

| Part No. | A | B | W | E | F | $P_1$ | $P_2$ | $P_0$ | $øD_0$ | $t_1$ | $t_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ELT3KN | 3.7 | 6.4 | 12.0 | 1.75 | 5.5 | 8.0 | 2.0 | 4.0 | 1.5 | 0.3 | 2.6 |

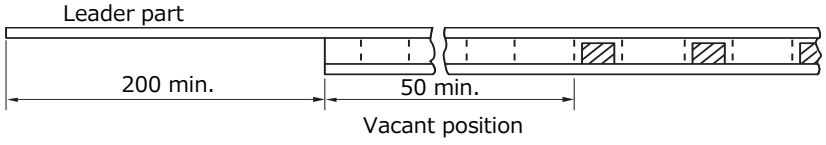
- Reel dimensions in mm (not to scale)

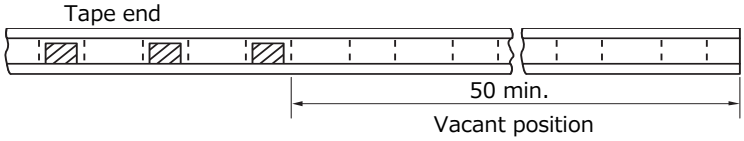



Unit : mm

| Packaging | A | B | C | D | E | W | t | T |
|---|---|---|---|---|---|---|---|---|
| B | 180 | 60 | 13 | 21 | 2 | 13 | 1.1 | 15.2 |
| C | 370 | 60 | 13 | 21 | 2 | 14 | 2.0 | 18.0 |

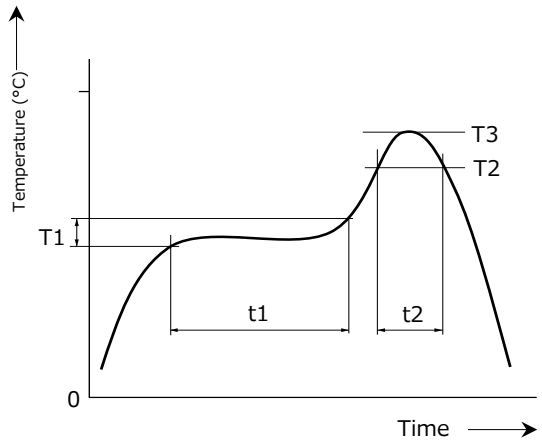
- Leader Part, Vacant Position



# Soldering Conditions

## Reflow soldering conditions




- Pb free solder recommended temperature profile

  Voltage Step-up Coils

| Part No. | Preheat | | Soldering | | Peak Temperature | | Time of Reflow |
|---|---|---|---|---|---|---|---|
| | T1 [℃] | t1 [s] | T2 [℃] | t2 [s] | T3 | T3 Limit | |
| ELT3KN | 150 to 170 | 60 to 120 | 230 ℃ | 30 max. | 245 ℃, 10 s | 260 ℃, 10 s | 2 times max. |

# ⚠Safety Precautions

(Common precautions for Voltage Step-up Coils )

- When using our products, no matter what sort of equipment they might be used for, be sure to make a written agreement on the specifications with us in advance. The design and specifications in this catalog are subject to change without prior notice.
- Do not use the products beyond the specifications described in this catalog.
- This catalog explains the quality and performance of the products as individual components. Before use, check and evaluate their operations when installed in your products.
- Install the following systems for a failsafe design to ensure safety if these products are to be used in equipment where a defect in these products may cause the loss of human life or other significant damage, such as damage to vehicles (automobile, train, vessel), traffic lights, medical equipment, aerospace equipment, electric heating appliances, combustion/gas equipment, rotating equipment, and disaster/crime prevention equipment.

✻ Systems equipped with a protection circuit and a protection device.
✻ Systems equipped with a redundant circuit or other system to prevent an unsafe status in the event of a single fault.

# ⚠Precautions for use

## 1. Operation range and environments

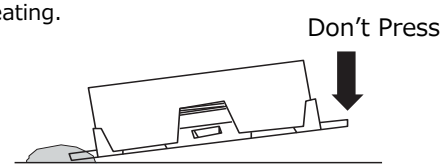
①These products are designed and manufactured for general and standard use in general electronic equipment (e.g. AV equipment, home electric appliances, office equipment, information and communication equipment)
②These products are not designed for the use in the following special conditions. Before using the products, carefully check the effects on their quality and performance, and determine whether or not they can be used.
- ·In liquid, such as water, oil, chemicals, or organic solvent
- ·In direct sunlight, outdoors, or in dust
- ·In salty air or air with a high concentration of corrosive gas, such as $Cl_2$, $H_2S$, $NH_3$, $SO_2$, or NOx
- ·In an environment where these products cause dew condensation

## 2. Handling

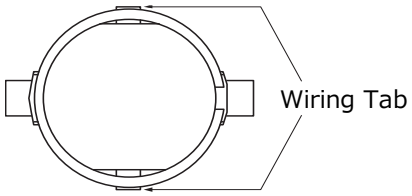
①Do not bring magnets or magnetized materials close to the product. The influence of their magnetic field can change the inductance value.
②Do not apply strong mechanical shocks by either dropping or collision with other parts.
Excessive schock can damage the part.

## 3. Resoldering with a soldering iron

①Resoldering should be done within 3 seconds by soldering iron, the temperature with 350 °C or less and should be cooling down after ward. Both side of terminals shall be fixed closely to PWB. And terminals shall not be pressed in heating.




② The wiring tab shall not be held by sharp-edged tool.




③ Iron shall not be put to the component itself.

## 4. Mounting side

① External force must be less than 4.9N while mounting.
② The wiring tab is expose the terminal, so please be careful when you design PWB pattern of coil circumference.

## 5. Cleaning

If you clean the inductor, please use own your ultrasonic cleaning to check specified conditions.

## 6. Storage conditions

Normal temperature（-5 to 35 ℃）, normal humidity（85 %RH max.）, shall not be exposed to direct sunlight and harmful gases and care should be taken so as not to cause dew.

<Package markings>
Package markings include the product number, quantity, and country of origin.
In principle, the country of origin should be indicated in English.

## CAUTION AND WARNING

1. The electronic components contained in this catalog are designed and produced for use in home electric appliances, office equipment, information equipment,communications equipment, and other general purpose electronic devices.
   Before use of any of these components for equipment that requires a high degree of safety, such as medical instruments, aerospace equipment, disaster-prevention equipment, security equipment, vehicles (automobile, train, vessel), please be sure to contact our sales representative corporation.

2. When applying one of these components for equipment requiring a high degree of safety, no matter what sort of application it might be, be sure to install a protective circuit or redundancy arrangement to enhance the safety of your equipment. In addition, please carry out the safety test on your own responsibility.

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6. No ozone-depleting substances (ODSs) under the Montreal Protocol are used in the manufacturing processes of Automotive & Industrial Systems Company, Panasonic Corporation.


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The information in this catalog is valid as of July 2021.

# Mouser Electronics

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