# IoT OPTIMIZED LOW PROFILE QUARTZ CRYSTAL

## ABM12W SERIES

**1.6 x 1.2 x 0.4mm**

**RoHS/RoHS II Compliant**

**MSL = N/A: NOT APPLICABLE**

## FEATURES

- Optimized for energy saving wearables and IoT applications
- Plated at exceptionally low plating capacitance, as low as 4pF, with optimized ESR
- 0.4 mm max height ideally suited for height constrained designs
- Seam sealed for longterm reliability

## APPLICATIONS

- Wearables
- Internet of Things (IoT)
- Bluetooth/Bluetooth Low Energy (BLE)
- Wireless modules
- Machine-to-machine (M2M) connectivity
- Ultra-low power MCU
- Near Field Communication (NFC)
- ISM Band

## STANDARD SPECIFICATIONS

| Parameters | Minimum | Typical | Maximum | Units | Notes |
|---|---|---|---|---|---|
| Frequency Range | 24.0000 | | 52.0000 | MHz | |
| Operation Mode | Fundamental | | | | |
| Operating Temperature Range | -40 | | +125 | ºC | See options |
| Storage Temperature | -55 | | +125 | ºC | |
| Frequency Tolerance @ +25°C | -10 | | +10 | ppm | See options |
| Frequency Stability over the Operating Temperature ( ref. to +25°C) | -10 | | +10 | ppm | See options |
| Equivalent series resistance “R1” (over Operating Temperature Range) (CL=4pF) | | < 90 | 150 | Ω | 24.0000 – 31.9999MHz |
| | | < 80 | 100 | | 32.0000 – 36.9999MHz |
| | | < 60 | 80 | | 37.0000 – 52.0000MHz |
| Equivalent series resistance “R1” (over Operating Temperature Range) (CL=6pF, 7pF, 8pF) | | < 80 | 100 | Ω | 24.0000 – 31.9999MHz |
| | | < 60 | 80 | | 32.0000 – 36.9999MHz |
| | | < 35 | 50 | | 37.0000 – 52.0000MHz |
| Shunt capacitance (C0) | | < 1.0 | 2.0 | pF | |
| Load capacitance (CL) | | 4.0 | | pF | See options |
| Drive Level | | 10 | 100 | µW | |
| Aging (1 year) | -2 | | +2 | ppm | @ 25°C±3°C |
| Insulation Resistance | 500 | | | MΩ | @ 100Vdc ± 15V |

ABRACON

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Phone: 512-371-6159 | Fax: 512-351-8858
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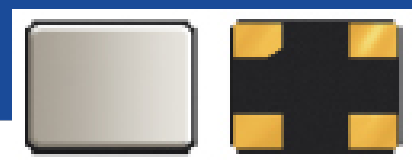

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## OPTIONS AND PART IDENTIFICATION (NOTE 1)

**Note 1: Contact Abracon for part number requests with carrier frequency callouts up to 5 & 6 digit accuracy after the decimal.**

**ABM12W-** ◯ **MHz -** ◯ **-** ◯ **-** ◯ ◯ ◯ **-** ◯

| Frequency in MHz |
|---|
| Please specify the Frequency in MHz out to **4 digit** accuracy after the decimal. (e.g. 16.0000MHz) |

| Load Capacitance (pF) |
|---|
| 8: 8pF |
| 7: 7pF |
| 6: 6pF |
| 4: 4pF |

| Custom ESR if other than standard |
|---|
| R □: Specify a value in Ω (e.g.: R70) |

| Operating Temp. |
|---|
| I: 0°C ~ 50°C |
| E: 0°C ~ +70°C |
| B: -20°C ~ +70°C |
| C: -30°C ~ +70°C |
| N: -30°C ~ +85°C |
| D: -40°C ~ +85°C |
| J: -40°C ~ +105°C (*) |
| K: -40°C ~ +125°C (*) |

(*) Only offered @ Freq. Stability options: Z & Q.

Contact ABRACON for tighter Frequency Stability.

| Freq. Tolerance |
|---|
| 1: ± 10 ppm |
| 7: ± 15 ppm |
| 2: ± 20 ppm |
| 3: ± 25 ppm |
| 4: ± 30 ppm |
| 5: ± 50 ppm |

| Freq. Stability |
|---|
| U: ± 10 ppm (*) |
| G: ± 15 ppm (**) |
| X: ± 20 ppm (**) |
| W: ± 25 ppm (**) |
| Y: ± 30 ppm (**) |
| H: ± 35 ppm (**) |
| Z: ± 50 ppm |
| Q: ± 100 ppm |

(*) Only offered @ Operating Temp. Range options: I, E, & B

(**) Only offered @ Operating Temp. Range options: I, E, B, C, N, & D

Contact ABRACON for wider Operating Temp. Range.

| Packaging |
|---|
| Blank: Bulk |
| T3: 3kpcs / reel |

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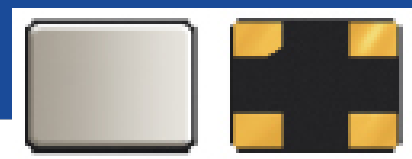

**1.6 x 1.2 x 0.4mm**

**RoHS/RoHS II Compliant**

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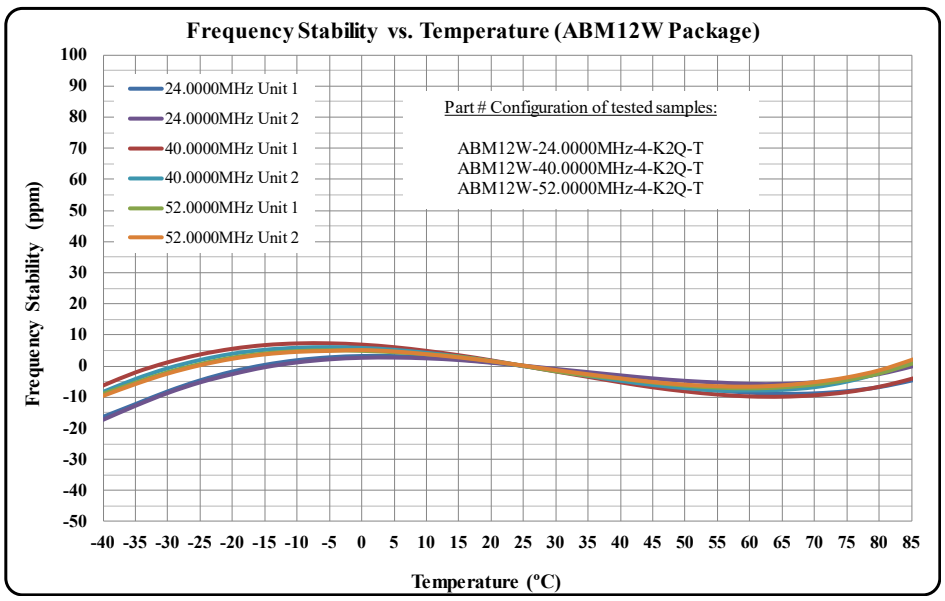
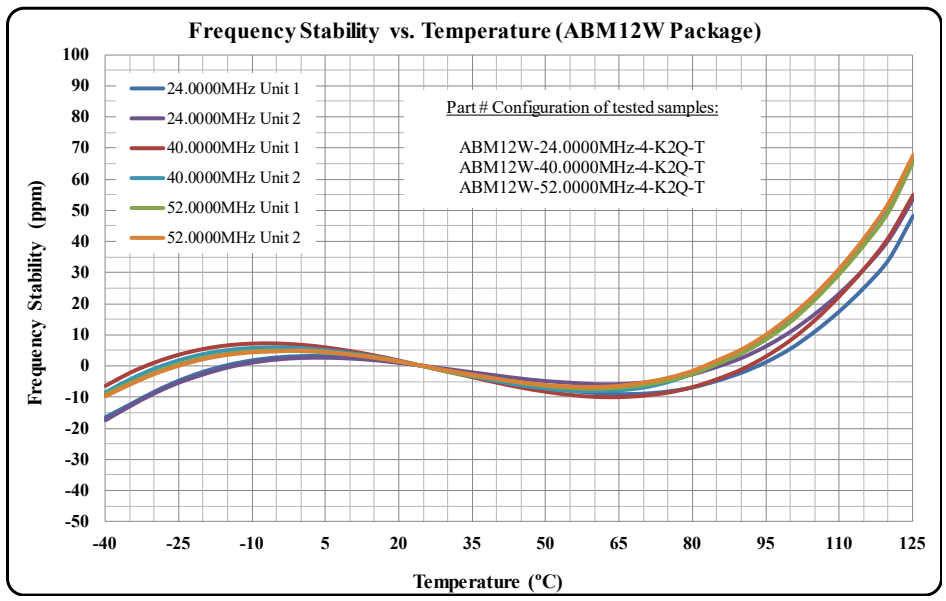
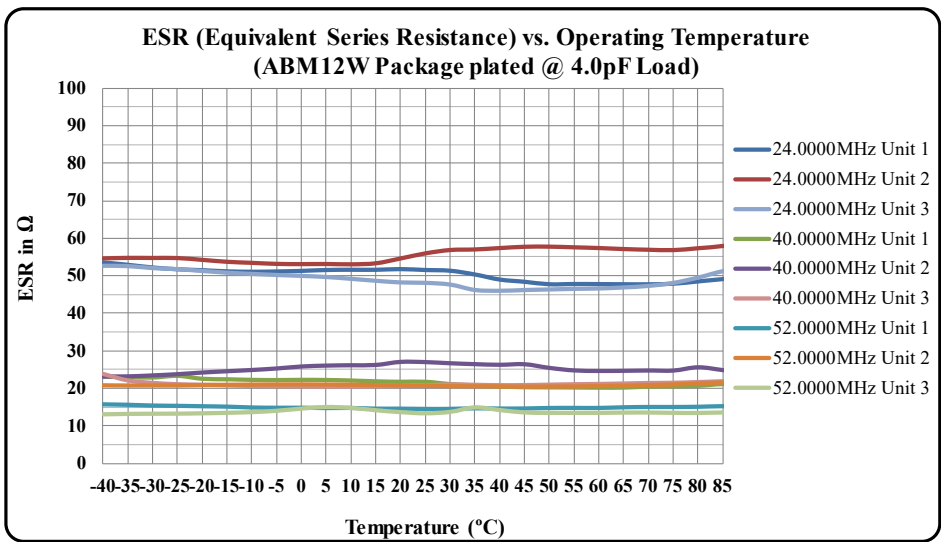
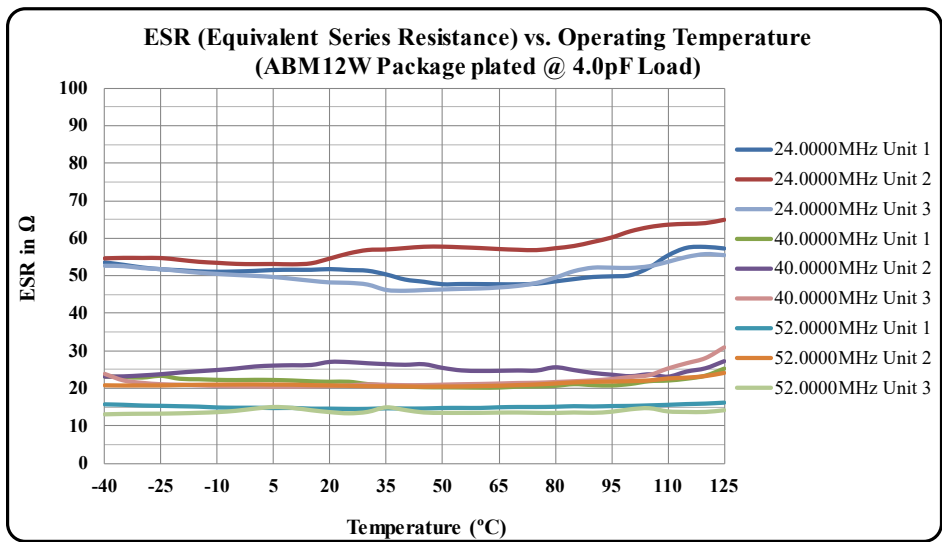
## TYPICAL FREQUENCY Vs. TEMPERATURE CHARACTERISTICS




## TYPICAL ESR (EQUIVALENT SERIES RESISTANCE) VS. TEMPERATURE CHARACTERISTICS




(*) Plating Load = Load Capacitance (CL)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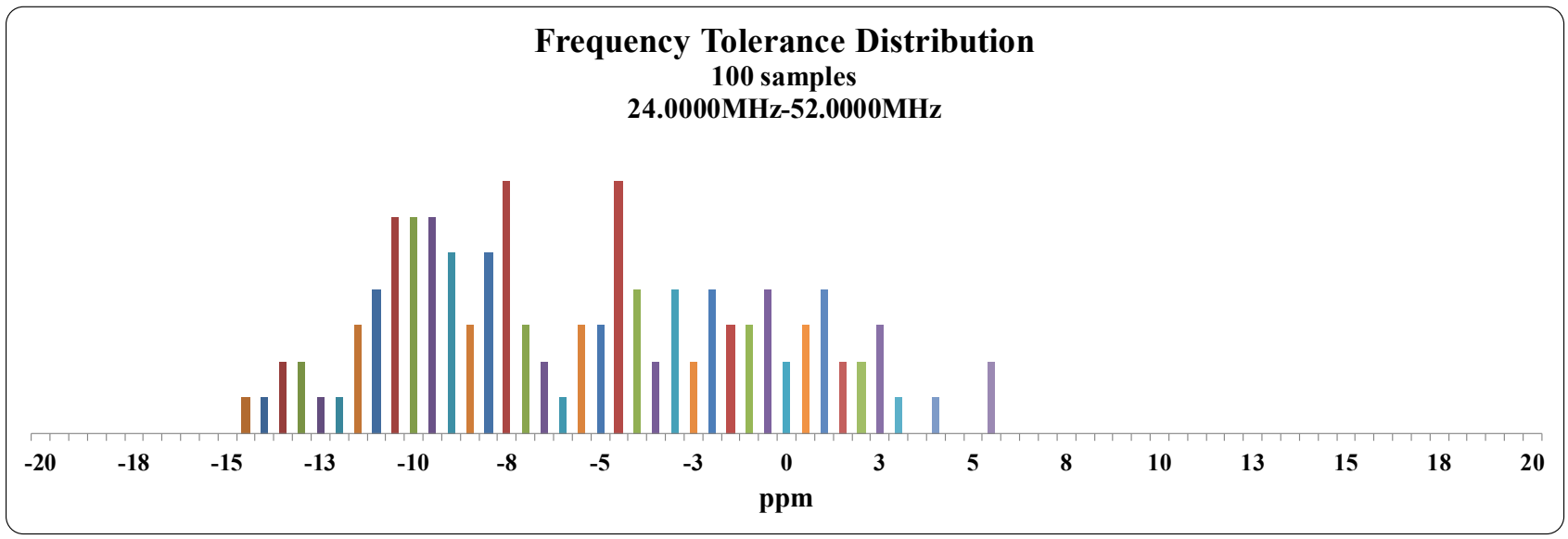
## TYPICAL FREQUENCY TOLERANCE DISTRIBUTION (AT 25°C ± 3°C)

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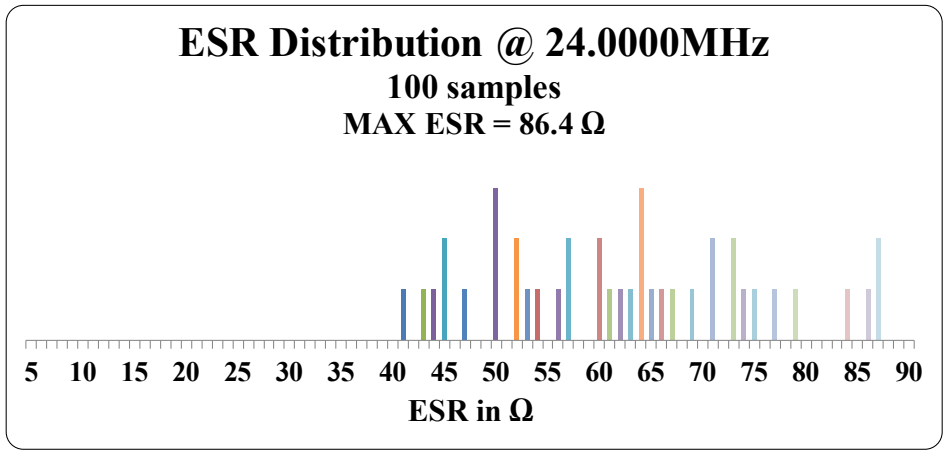


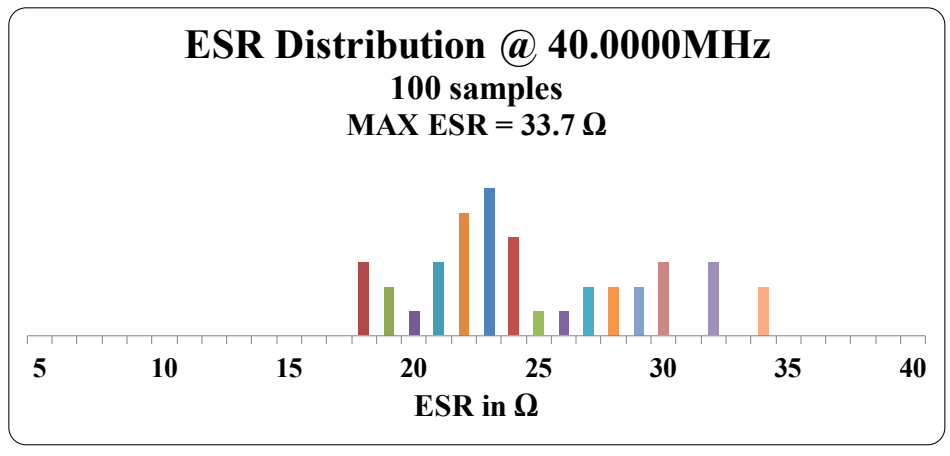


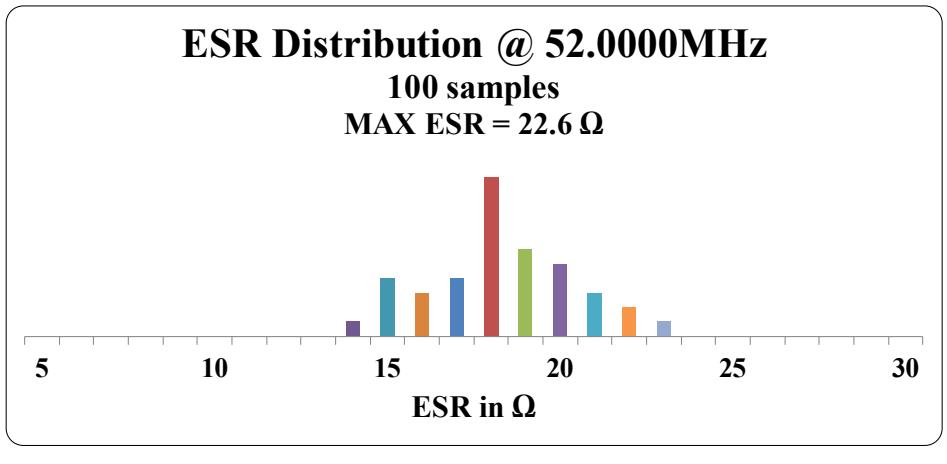


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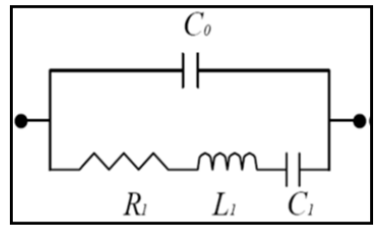
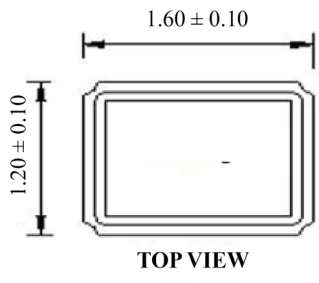
## SPICE MODELS (BASED ON TYPICAL VALUES AT 25°C ± 3°C)

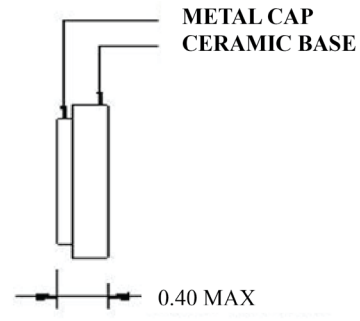


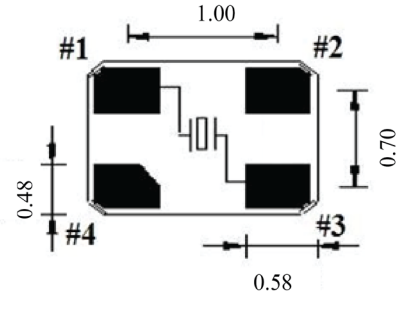

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Frequency: 24.0000MHz** | | | | **Frequency: 24.0000MHz** | | | |
| **Plating Load: 4pF** | | | | **Plating Load: 6pF** | | | |
| C0 | = | 0.58 | pF | C0 | = | 0.49 | pF |
| R1 | = | 54.20 | Ω | R1 | = | 67.91 | Ω |
| L1 | = | 52.83 | mH | L1 | = | 50.66 | mH |
| C1 | = | 0.83 | fF | C1 | = | 0.87 | fF |
| **Frequency: 40.0000MHz** | | | | **Frequency: 40.0000MHz** | | | |
| **Plating Load: 4pF** | | | | **Plating Load: 6pF** | | | |
| C0 | = | 0.65 | pF | C0 | = | 0.63 | pF |
| R1 | = | 27.21 | Ω | R1 | = | 22.99 | Ω |
| L1 | = | 10.55 | mH | L1 | = | 10.47 | mH |
| C1 | = | 1.50 | fF | C1 | = | 1.51 | fF |
| **Frequency: 52.0000MHz** | | | | **Frequency: 52.0000MHz** | | | |
| **Plating Load: 4pF** | | | | **Plating Load: 6pF** | | | |
| C0 | = | 0.63 | pF | C0 | = | 0.64 | pF |
| R1 | = | 18.03 | Ω | R1 | = | 18.27 | Ω |
| L1 | = | 5.74 | mH | L1 | = | 5.50 | mH |
| C1 | = | 1.63 | fF | C1 | = | 1.70 | fF |

## MECHANICAL DIMENSIONS

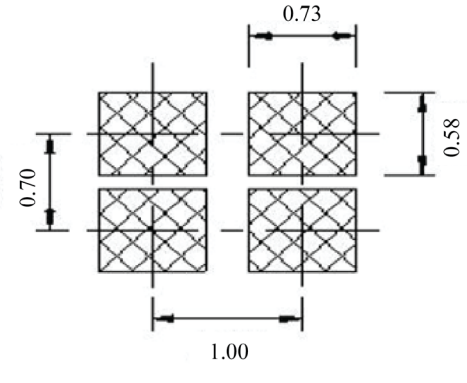



**TOP VIEW**




**BOTTOM VIEW**
**Pin #2: GND**
**Pin #4: GND**




**RECOMMENDED LANDING PATTERN**
**DIMENSIONS: mm**

Note:
Due to material availability the Chamfer could be located on pin #1, 2 or 4. Be advised that the Chamfer location has no impact on the electrical performance of the device.

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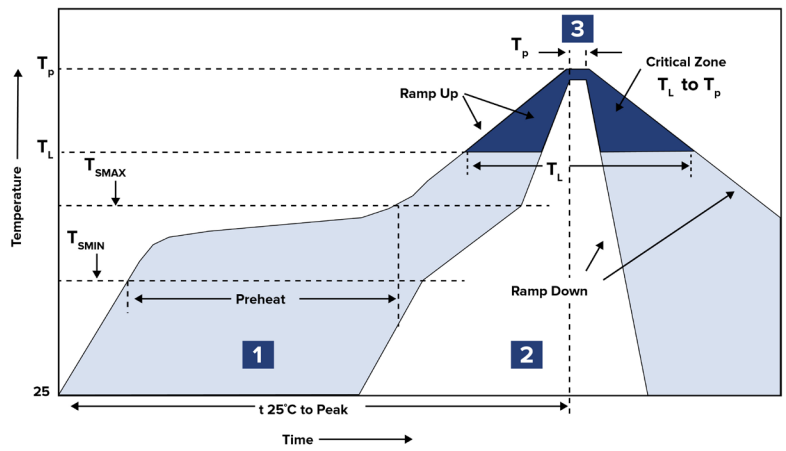
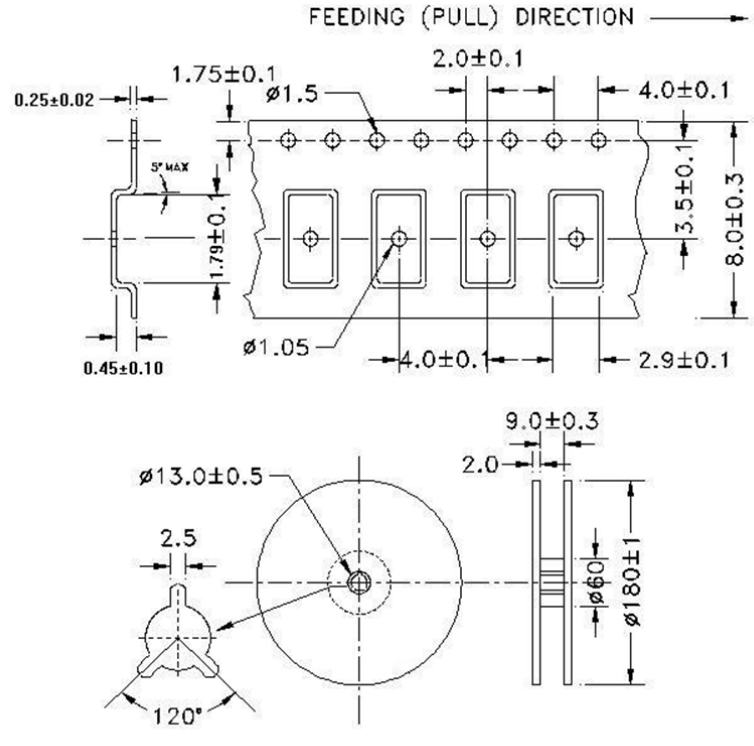
## REFLOW PROFILE




| Zone | Description | Temperature | Time |
|---|---|---|---|
| 1 | Preheat | $T_{SMIN}$ ~ $T_{SMAX}$<br>150°C ~ 180°C | 60 ~ 120 sec. |
| 2 | Reflow | $T_L$<br>217°C | 45 ~ 90 sec. |
| 3 | Peak Heat | $T_P$<br>260°C MAX | 10 sec. |

## PACKAGING

### T3: Tape and reel (3,000 pcs/reel)




**DIMENSIONS: mm**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# Mouser Electronics

Authorized Distributor

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## ABRACON:

ABM12W-38.8800MHZ-8-B1U-T3 ABM12W-33.3333MHZ-7-J1J-T3 ABM12W-26.0000MHZ-6-B2U-T3 ABM12W-37.0000MHZ-8-K1J-T3 ABM12W-33.3333MHZ-7-K1Z-T3 ABM12W-24.5454MHZ-8-K1Z-T3 ABM12W-37.4000MHZ-4-J1Z-T3 ABM12W-25.0000MHZ-7-J2J-T3 ABM12W-24.5760MHZ-8-J2J-T3 ABM12W-24.0000MHZ-7-J2J-T3 ABM12W-27.0000MHZ-6-B1U-T3 ABM12W-38.8800MHZ-8-D1X-T3 ABM12W-33.0000MHZ-8-B1U-T3 ABM12W-24.5455MHZ-4-D2X-T3 ABM12W-38.8800MHZ-7-K1J-T3 ABM12W-33.0000MHZ-6-B1U-T3 ABM12W-33.0000MHZ-8-K1J-T3 ABM12W-33.3333MHZ-7-J2Z-T3 ABM12W-37.0500MHZ-8-D1X-T3 ABM12W-38.4000MHZ-7-D2X-T3 ABM12W-24.5455MHZ-6-J1J-T3 ABM12W-33.0000MHZ-7-D1X-T3 ABM12W-38.8800MHZ-7-K2J-T3 ABM12W-37.0500MHZ-8-K1J-T3 ABM12W-24.5454MHZ-6-D1X-T3 ABM12W-24.0000MHZ-7-J1J-T3 ABM12W-37.4000MHZ-6-K2J-T3 ABM12W-24.9231MHZ-7-J2Z-T3 ABM12W-38.8800MHZ-7-J1Z-T3 ABM12W-26.0000MHZ-6-J2Z-T3 ABM12W-33.3333MHZ-8-K1Z-T3 ABM12W-24.9231MHZ-8-D1X-T3 ABM12W-33.3300MHZ-7-D2X-T3 ABM12W-30.3200MHZ-4-J1Z-T3 ABM12W-36.0000MHZ-7-K2Z-T3 ABM12W-33.3330MHZ-6-J1Z-T3 ABM12W-38.4000MHZ-6-K1J-T3 ABM12W-37.0500MHZ-6-J1J-T3 ABM12W-38.8800MHZ-6-K2Z-T3 ABM12W-32.0000MHZ-7-B1U-T3 ABM12W-24.5455MHZ-6-K1J-T3 ABM12W-24.5727MHZ-8-K2Z-T3 ABM12W-24.5727MHZ-8-J1Z-T3 ABM12W-24.0000MHZ-8-K2Z-T3 ABM12W-37.4000MHZ-8-J2Z-T3 ABM12W-37.0500MHZ-8-K1Z-T3 ABM12W-40.0000MHZ-4-J1J-T3 ABM12W-26.0000MHZ-4-B1U-T3 ABM12W-24.0000MHZ-6-D2X-T3 ABM12W-24.5727MHZ-7-J2J-T3 ABM12W-26.0410MHZ-8-K1Z-T3 ABM12W-33.3300MHZ-7-K1Z-T3 ABM12W-30.0000MHZ-4-D2X-T3 ABM12W-24.9231MHZ-7-K1Z-T3 ABM12W-33.0000MHZ-7-D2X-T3 ABM12W-25.0000MHZ-7-K2Z-T3 ABM12W-37.0000MHZ-6-B1U-T3 ABM12W-37.0500MHZ-6-D1X-T3 ABM12W-24.5760MHZ-7-B2U-T3 ABM12W-25.0000MHZ-8-D2X-T3 ABM12W-38.4000MHZ-7-B1U-T3 ABM12W-33.0000MHZ-7-B2U-T3 ABM12W-33.0000MHZ-8-B2U-T3 ABM12W-24.5454MHZ-8-J2J-T3 ABM12W-24.0000MHZ-8-J2Z-T3 ABM12W-38.8800MHZ-4-J2Z-T3 ABM12W-33.3333MHZ-6-K2Z-T3 ABM12W-24.5760MHZ-6-D2X-T3 ABM12W-29.4912MHZ-4-B2U-T3 ABM12W-24.5455MHZ-8-D1X-T3 ABM12W-24.5454MHZ-8-K2Z-T3 ABM12W-24.5535MHZ-8-K2Z-T3 ABM12W-33.3333MHZ-6-K1J-T3 ABM12W-24.9231MHZ-8-K2J-T3 ABM12W-37.4000MHZ-8-B2U-T3 ABM12W-38.4000MHZ-6-B1U-T3 ABM12W-38.0000MHZ-8-J2Z-T3 ABM12W-36.0000MHZ-7-K2J-T3 ABM12W-32.0000MHZ-8-D2X-T3 ABM12W-48.0000MHZ-8-D2X-T3 ABM12W-33.3330MHZ-8-D2X-T3 ABM12W-24.9231MHZ-7-B2U-T3 ABM12W-24.5455MHZ-7-B1U-T3 ABM12W-25.0000MHZ-6-D2X-T3 ABM12W-37.0000MHZ-7-J2J-T3 ABM12W-38.4000MHZ-6-J2J-T3 ABM12W-33.3300MHZ-4-J1Z-T3 ABM12W-24.5454MHZ-7-J2Z-T3 ABM12W-30.0000MHZ-6-J2J-T3 ABM12W-37.0000MHZ-6-D2X-T3 ABM12W-24.0000MHZ-7-D2X-T3 ABM12W-30.0000MHZ-8-D1X-T3 ABM12W-26.0410MHZ-6-K2Z-T3 ABM12W-33.3333MHZ-6-B1U-T3 ABM12W-32.0000MHZ-7-J1Z-T3 ABM12W-38.8800MHZ-7-J2J-T3 ABM12W-24.5535MHZ-8-

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