Large-Current Power Inductors TPI

Overview

The KEMET TPI ferrite core inductors are designed for a very low core loss. Its flat wire, “one turn through the construction” design, enables high efficiency at large currents. The core material is ideal for high switching frequency applications.

Applications

- High-switching DC-DC power supplies
- Point of loads (POL)
- Servers and storage
- Supercomputers
- Various decentralized power supplies

Benefits

- One turn coil ferrite
- Operating temperature up to +125°C
- High switching frequency
- Low core loss
- Low DCR
- High current
- Low self-heating

Part Number System

TPI	128080	L	180	N
Series	Size Code	Inductor	Inductance Code nH	Core Material
TPI	077050 111065 128080 118082		xxx = xxx nH	N = Standard

Performance Characteristics

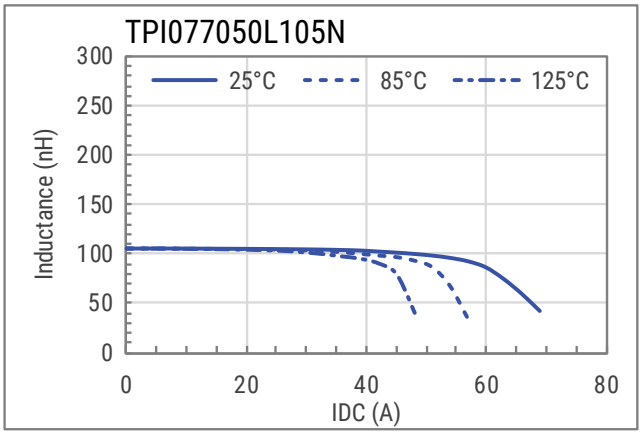
Item	Performance Characteristics
Operating Temperature	–40°C to +125°C (including self-temperature rise)
Rated Inductance Range	105 – 230 nH at 100 kHz, 1 mA
Inductance Tolerance	±10% (except ±20% for TPI077050L105N)
Rated DC Resistance	0.29 – 0.32 mΩ
DC Resistance Tolerance	±5% (except ±9.5% for TPI077050L105N)
Rated Current	36 – 50 A

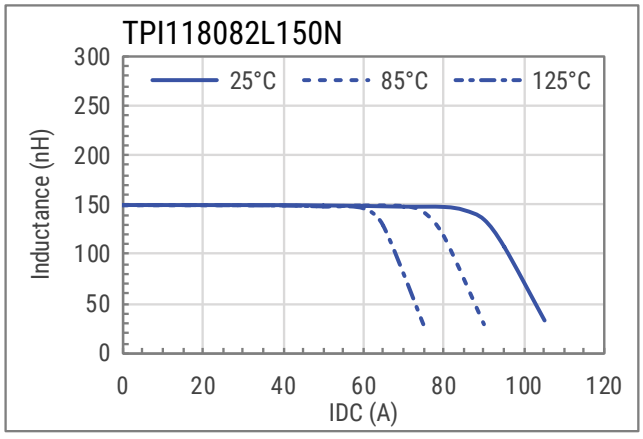
Table 1 – Ratings & Part Number Reference

Part Number	Inductance (nH) at 100 kHz, 1 mA	Inductance Tolerance	DC Resistance (mΩ) ±5%	Rated Current (A)			
				Irms[1] (Ref.)	Isat[2] (Ref.)		
					25°C	85°C	125°C
TPI077050L105N	105	±20%	0.32 ±9.5%	36	60	51	44
TPI118082L150N	150	±10%	0.29 ±5.0%	50	93	79	67
TPI118082L180N	180	±10%	0.29 ±5.0%	50	79	67	57
TPI111065L210N	210	±10%	0.29 ±5.0%	50	54	46	38
TPI128080L180N	180	±10%	0.29 ±5.0%	50	78	68	54
TPI128080L210N	210	±10%	0.29 ±5.0%	50	70	60	52
TPI128080L230N	230	±10%	0.29 ±5.0%	50	64	56	50

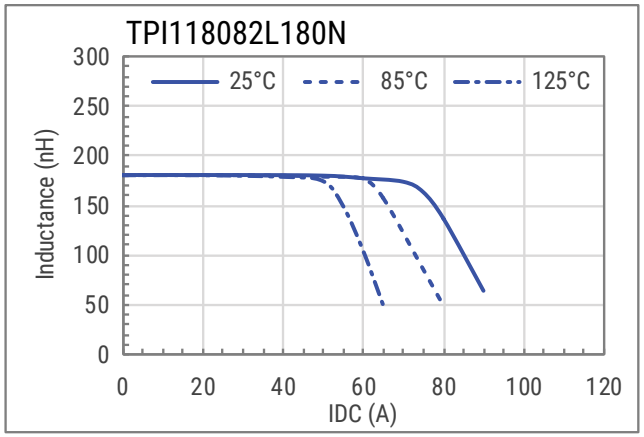
[1] *T = 40 K rise at rated current*
[2] *Inductance drop 20% at rated current*

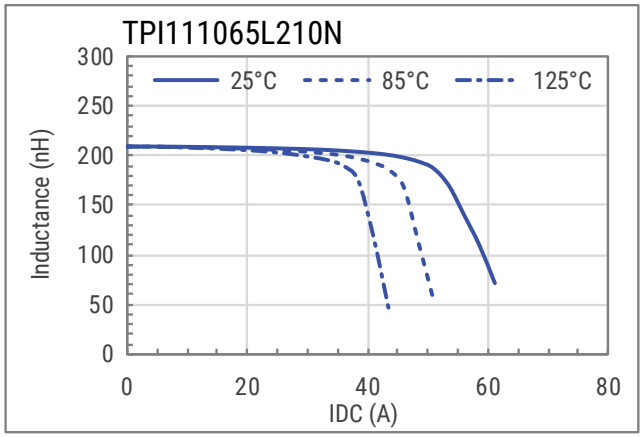
DC-Superposed Characteristics

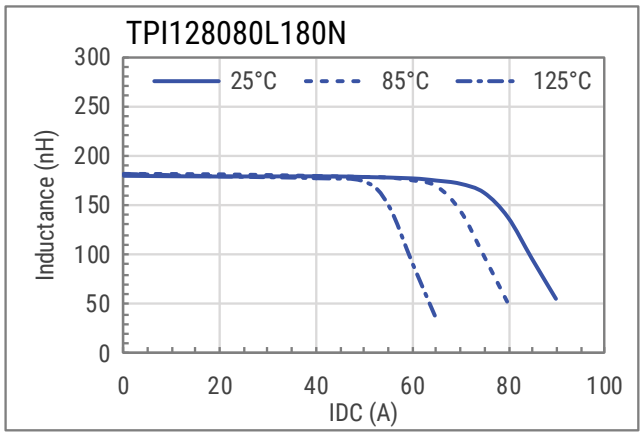


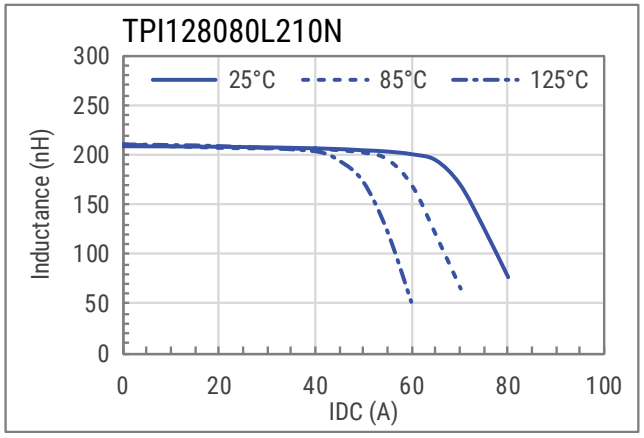


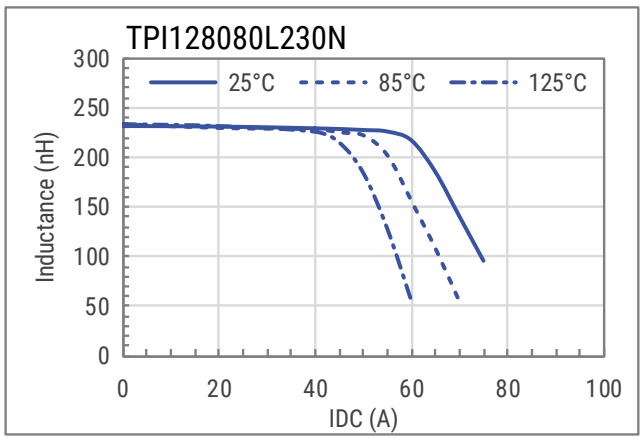
DC-Superposed Characteristics cont.



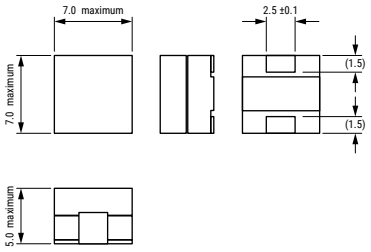
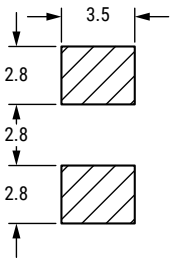
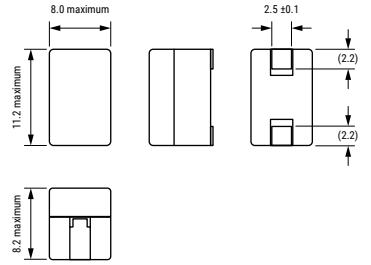
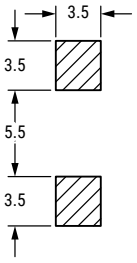
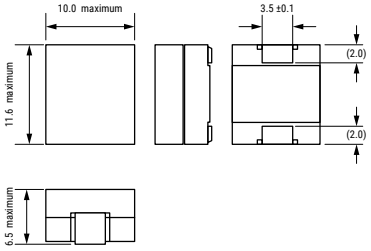
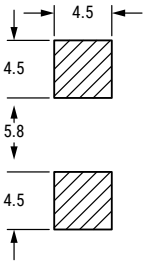
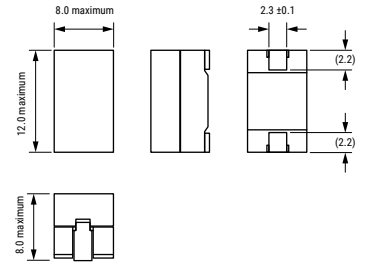
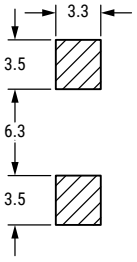






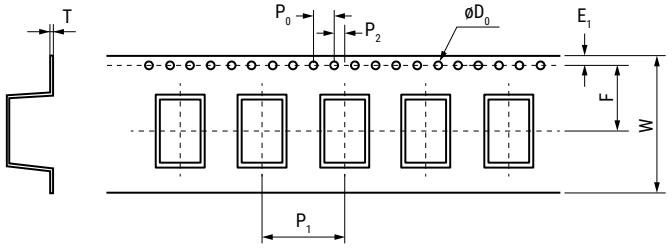


Dimensions

Case Size	Dimensions (mm)	Land Pattern (mm)
TPI077050		
TPI118082		
TPI111065		
TPI128080		

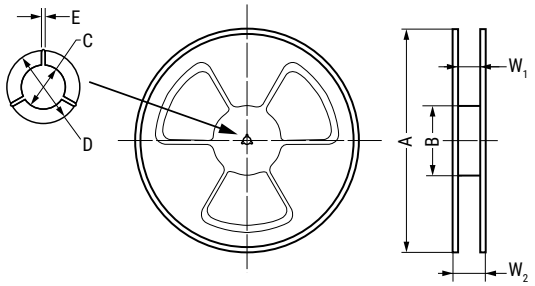
Taping Specification

Dimensions of Indented Square Hole Plastic Tape



Case Size	Reel Quantity		Dimensions (mm)							
			W	F	E_1	P_1	P_2	P_0	$øD_0$	T
TPI077050	1,000	Tolerance	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05	±0.05
		Nominal	16.00	7.50	1.75	12.00	2.00	4.00	1.55	0.40
TPI118082	400	Tolerance	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05	±0.05
		Nominal	24.00	11.50	1.75	16.00	2.00	4.00	1.55	0.40
TPI111065	500	Tolerance	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05	±0.05
		Nominal	24.00	11.50	1.75	16.00	2.00	4.00	1.55	0.40
TPI128080	400	Tolerance	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05	±0.05
		Nominal	24.00	11.50	1.75	16.00	2.00	4.00	1.55	0.40

Reel Specifications

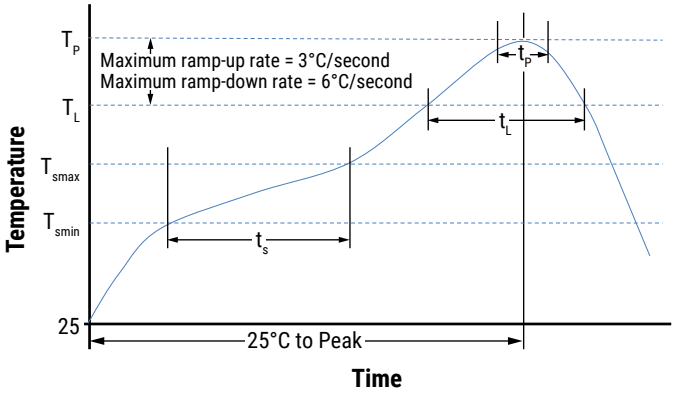


Case Size		Dimensions (mm)						
		A	B	C	D	E	W_1	W_2
TPI077050	Tolerance	±2.0	±1.0	±0.2	±0.2	±0.3		
	Nominal	ø330	ø100	ø13.2	ø21.5	2.0	16.5	20.9
TPI118082	Tolerance	±2.0	±1.0	±0.2	±0.2	±0.3		
	Nominal	ø330	ø100	ø13.2	ø21.5	2.0	24.5	28.9
TPI111065	Tolerance	±2.0	±1.0	±0.2	±0.2	±0.2		
	Nominal	ø330	ø100	ø13.2	ø21.5	2.0	24.5	28.9
TPI128080	Tolerance	±2.0	±1.0	±0.2	±0.2	±0.3		
	Nominal	ø330	ø100	ø13.2	ø21.5	2.0	24.5	28.9

Soldering Process

Recommended Reflow Soldering Profile
Reference ICP/JEDEC J-STD-020E

Profile Feature	Pb-Free Assembly
Preheat/Soak	
Temperature minimum (T_{Smin})	150°C
Temperature maximum (T_{Smax})	200°C
Time (t_s) from T_{smin} to T_{smax}	60 – 120 seconds
Ramp-up rate (T_L to T_P)	3°C/second maximum
Liquidous Temperature (T_L)	217°C
Time Above Liquidous (t_L)	60 – 150 seconds
Peak Temperature (T_P)	245°C for TPI1xxxxx 250°C for TPI077050
Time within 5°C of Maximum Peak temperature (t_P)	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum
Time 25°C to Peak Temperature	8 minutes maximum



Handling Precautions

Inductors should be stored in normal working environments. While the inductors themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage.

KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 70% relative humidity. Atmospheres should be free of chlorine and sulfur bearing compounds. Temperature fluctuations should be minimized to avoid condensation on the parts. For optimized solderability, inductors' stock should be used promptly, preferably within six months of receipt.

Export Control

For customers in Japan
For products which are controlled items subject to the "Foreign Exchange and Foreign Trade Law" of Japan, the export license specified by the law is required for export.

For customers outside Japan
Inductors should not be used or sold for use in the development, production, stockpiling or utilization of any conventional weapons or mass-destruction weapons (nuclear, chemical, biological weapons or missiles), or any other weapons.

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Although KEMET designs and manufactures its products to the most stringent quality and safety standards, given the current state of the art, isolated component failures may still occur. Accordingly, customer applications which require a high degree of reliability or safety should employ suitable designs or other safeguards (such as installation of protective circuitry or redundancies) in order to ensure that the failure of an electrical component does not result in a risk of personal injury or property damage.

Although all product–related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicted or that other measures may not be required.