



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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ECS-MPI4040

High Current, High Frequency, Miniature Power Inductors



Automotive Applications:

- Driver assistance
- Information
- Entertainment
- Lighting

Applications:

- Handheld/mobile devices
- Portable media players
- GPS/PDAs
- Battery operated devices
- Notebook/netbook
- Tablets/smartbooks
- LCD Displays
- LED Drivers
- POL Converters

Product description:

- AEC-Q200 Qualified, Grade 1
- Handles high transient inrush current spikes
- Magnetically shielded
- Frequency range 20kHz to 10MHz
- Inductance range from 0.09 μ H to 22 μ H
- Current range from 1.1A to 32.0A
- 4.7 x 4.31 footprint surface mount package in 1.2, 1.5, 1.85 or 2.0mm heights
- Rugged construction
- Halogen free, lead free, RoHS compliant

Environmental data:

- Storage temperature range (component): -55°C to +165°C
- Operating temperature range: -55°C to +125°C
- Solder reflow temperature: J-STD-020D compliant



Product specifications

Part Number ⁵	OCL ¹ ± 20% (µH)	Part Marking Designator	I _{rms} ² (Amps)	I _{sat} ³ @ 25°C (Amps)	DCR (mΩ) ± 20% @	K-factor ⁴
R1 -- 1.2mm Height						
ECS-MPI4040R1-R10-R	0.09	A	8.00	32.0 [†]	8.50	1401
ECS-MPI4040R1-R15-R	0.15	B	7.00	26.0 [†]	11.0	989
ECS-MPI4040R1-R22-R	0.23	C	5.50	21.0	18.0	814
ECS-MPI4040R1-R33-R	0.33	D	4.40	17.0	28.0	659
ECS-MPI4040R1-R47-R	0.47	E	5.20	11.5	20.0	1295
ECS-MPI4040R1-R68-R	0.68	F	3.30	9.00	51.0	461
ECS-MPI4040R1-1R0-R	1.0	G	3.70	7.70	40.0	990
ECS-MPI4040R1-1R5-R	1.5	H	3.00	6.50	60.0	732
ECS-MPI4040R1-2R2-R	2.2	I	2.60	5.90	80.0	623
ECS-MPI4040R1-3R3-R	3.3	J	2.20	5.10	115	481
ECS-MPI4040R1-4R7-R	4.7	K	1.80	3.80	180	411
ECS-MPI4040R1-6R8-R	6.8 ^{††}	L	1.50	3.20	250	344
ECS-MPI4040R1-100-R	10 ^{††}	M	1.20	2.80	370	276
R2 -- 1.5mm Height						
ECS-MPI4040R2-R47-R	0.47	A	6.40	12.2	13.0	1403
ECS-MPI4040R2-1R0-R	1.0	B	4.60	8.90	25.0	935
ECS-MPI4040R2-1R5-R	1.5	C	3.80	7.60	37.0	701
ECS-MPI4040R2-2R2-R	2.2	D	3.20	5.70	58.0	647
ECS-MPI4040R2-3R3-R	3.3	E	2.60	5.40	76.0	495
ECS-MPI4040R2-4R7-R	4.7	F	2.20	4.30	105	421
ECS-MPI4040R2-6R8-R	6.8	G	1.80	3.40	158	351
ECS-MPI4040R2-100-R	10.0 ^{††}	H	1.50	3.10	240	271

1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10V_{rms}, 0.0A_{dc}

2 I_{rms}: DC current for an approximate temperature rise of 40°C without core loss. De-rating is necessary for AC currents. Temperature rise is dependent upon several factors, including the PCB pad layout, trace thickness and width, air-flow and proximity to other heat generating components. It is recommended the part temperature not exceed 125°C under worst case operating conditions and therefore, the temperature rise should be verified in the end use application. Irms testing was performed on a 19.05mm long x 6.35mm wide x 0.070mm thick copper trace in still air.

3 I_{sat}: Peak current for approximately 30% rolloff at +25°C.

4 K-factor: Used to determine B_{p-p} for core loss (see graph). B_{p-p} = K * L * DI.
Bp-p: (Gauss), K: (K-factor from table), L: (inductance in µH),
DI (peak-to-peak ripple current in amps).

5 Part Number Definition: ECS-MPI4040RX-XXX-R
· ECS-MPI4040X = product code and size
· XXX = inductance value in all, "R" = decimal point
· If no "R" is present, then third digit equals the number of zeros
· "-R" suffix = RoHS compliant

† Transient pulse not to exceed 1 millisecond.

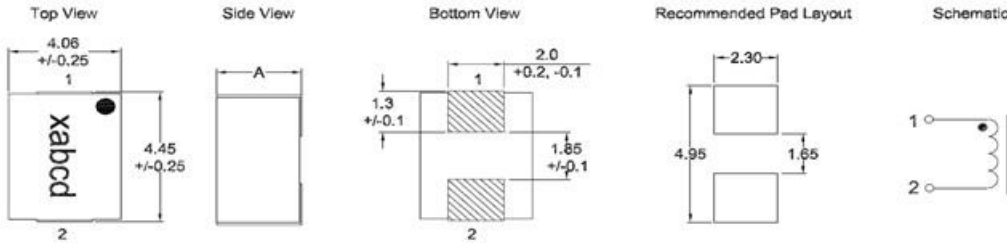
†† Maximum operating frequency less than 10MHz, consult factory for application specific values.

Part Number ⁵	OCL ¹ ± 20% (µH)	Part Marking Designator	I _{rms} ² (Amps)	I _{sat} ³ @ 25°C (Amps)	DCR (mΩ) ± 20% @ 20°C	K-factor ⁴
R3 -- 1.85mm Height						
ECS-MPI4040R3-R22-R	0.22	A	8.00	20.0	5.8	1870
ECS-MPI4040R3-R47-R	0.47	B	5.80	17.0	10.3	1530
ECS-MPI4040R3-1R2-R	1.2	C	4.00	9.40	32.0	732
ECS-MPI4040R3-1R5-R	1.5	D	3.80	8.20	36.0	673
ECS-MPI4040R3-2R2-R	2.2	E	3.40	7.90	48.0	543
ECS-MPI4040R3-3R3-R	3.3	F	3.00	6.60	60.0	432
ECS-MPI4040R3-4R7-R	4.7	G	2.30	4.80	92.0	374
ECS-MPI4040R3-6R8-R	6.8	H	2.00	4.50	120	306
ECS-MPI4040R3-100-R	10.0	I	1.50	3.80	213	251
ECS-MPI4040R3-150-R	15.0	J	1.30	3.00	285	213
ECS-MPI4040R3-220-R	22.0††	K	1.10	2.20	408	174
R4 -- 2.0mm Height						
ECS-MPI4040R4-R22-R	0.22	A	10.1	15.0	5.3	2405
ECS-MPI4040R4-R33-R	0.33	B	9.50	12.8	6.0	1870
ECS-MPI4040R4-R47-R	0.45	C	8.10	11.5	8.2	1530
ECS-MPI4040R4-1R0-R	1.0	D	5.70	8.20	17.0	990
ECS-MPI4040R4-1R5-R	1.5	E	4.90	6.90	23.0	802
ECS-MPI4040R4-2R2-R	2.2	F	3.90	5.70	35.0	673
ECS-MPI4040R4-3R3-R	3.3††	G	3.30	4.50	49.0	510
ECS-MPI4040R4-4R7-R	4.7††	H	2.90	3.90	67.0	455
ECS-MPI4040R4-6R8-R	6.8††	I	2.40	3.20	91.0	374
ECS-MPI4040R4-100-R	10.0††	J	1.90	2.60	148	306
ECS-MPI4040R4-220-R	22.0††	K	1.30	1.80	316	203

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Bp-p : (Gauss), K: (K-factor from table), L: (inductance in µH),
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 - XXX = inductance value in all, "R" = decimal point
 - If no "R" is present, then third digit equals the number of zeros
 - "-R" suffix = RoHS compliant
- † Transient pulse not to exceed 1 millisecond.
- †† Maximum operating frequency less than 10MHz, consult factory for application specific values.

Dimensions – mm

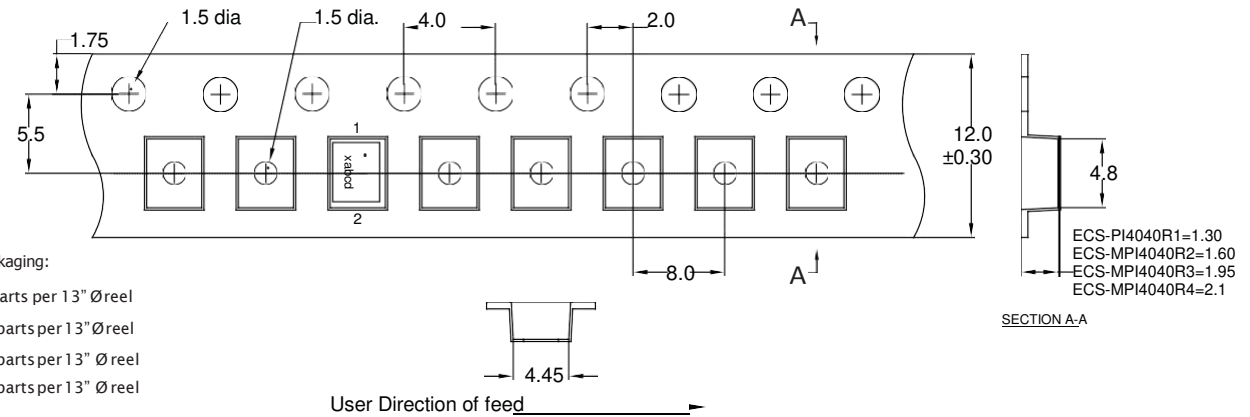


Part #	A Max.
MPI4040R1-xxx-R	1.2
MPI4040R2-xxx-R	1.5
MPI4040R3-xxx-R	1.85
MPI4040R4-xxx-R	2.0

Part Marking: xabc
 x = height: 1=R1 (1.2mm), 2=R2 (1.5 mm), 3=R3 (1.85 mm), 4=R4 (2.0 mm).
 a = Inductance value per the "Part Marking Designator" letter code in product table
 b = Bi-weekly date code
 c = Last digit of year manufactured

Soldering Surface to be coplanar within 0.1018 mm
 PCM tolerance ± 0.1 mm unless otherwise specified

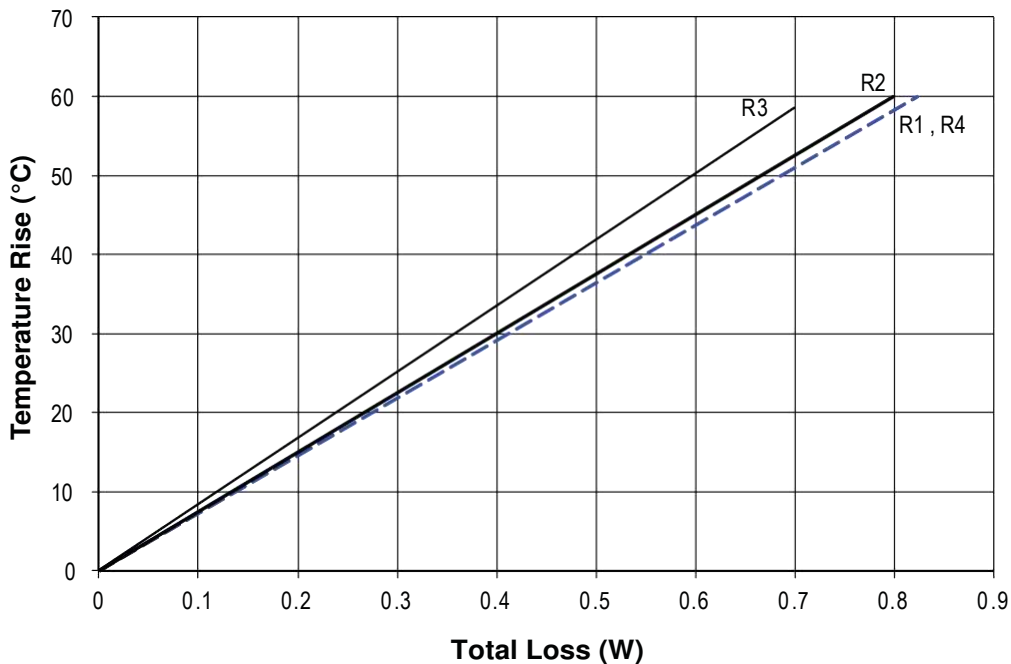
Packaging information - mm



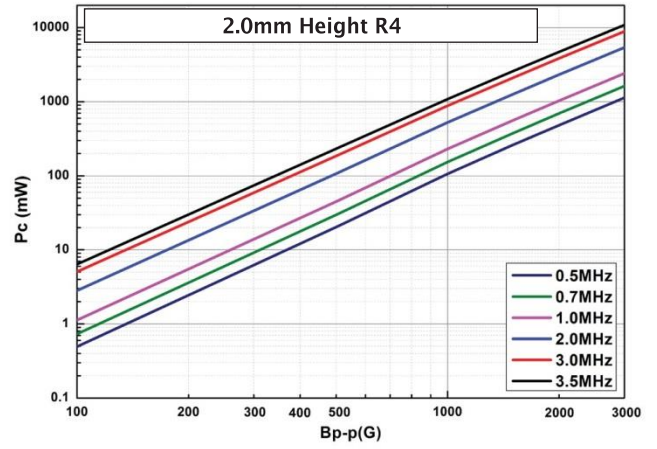
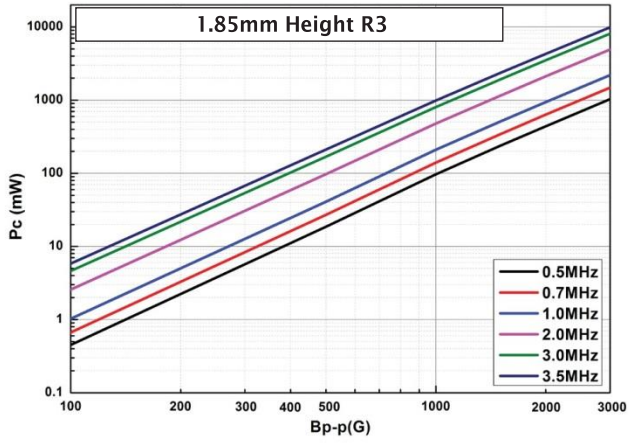
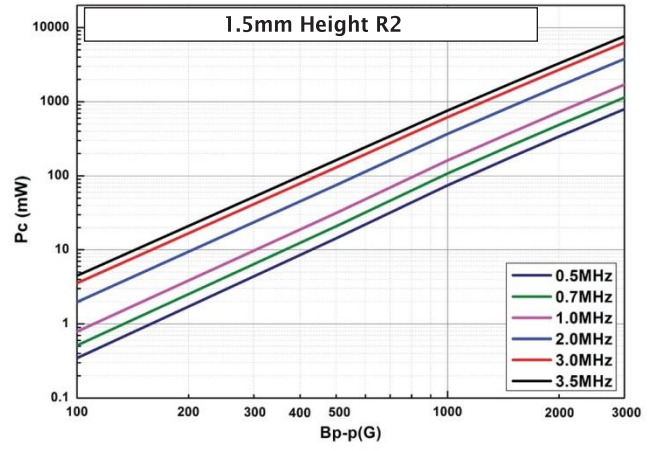
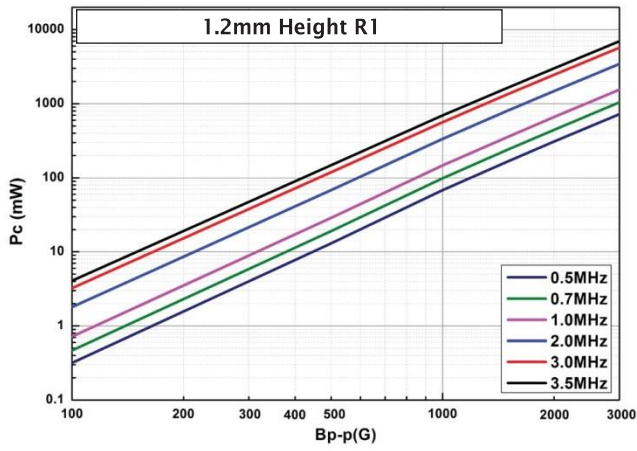
Supplied in tape and reel packaging:

- ECS-MPI4040R1 = 5500 parts per 13" Ø reel
- ECS-MPI4040R2 = 4500 parts per 13" Ø reel
- ECS-MPI4040R3 = 3500 parts per 13" Ø reel
- ECS-MPI4040R4 = 3000 parts per 13" Ø reel

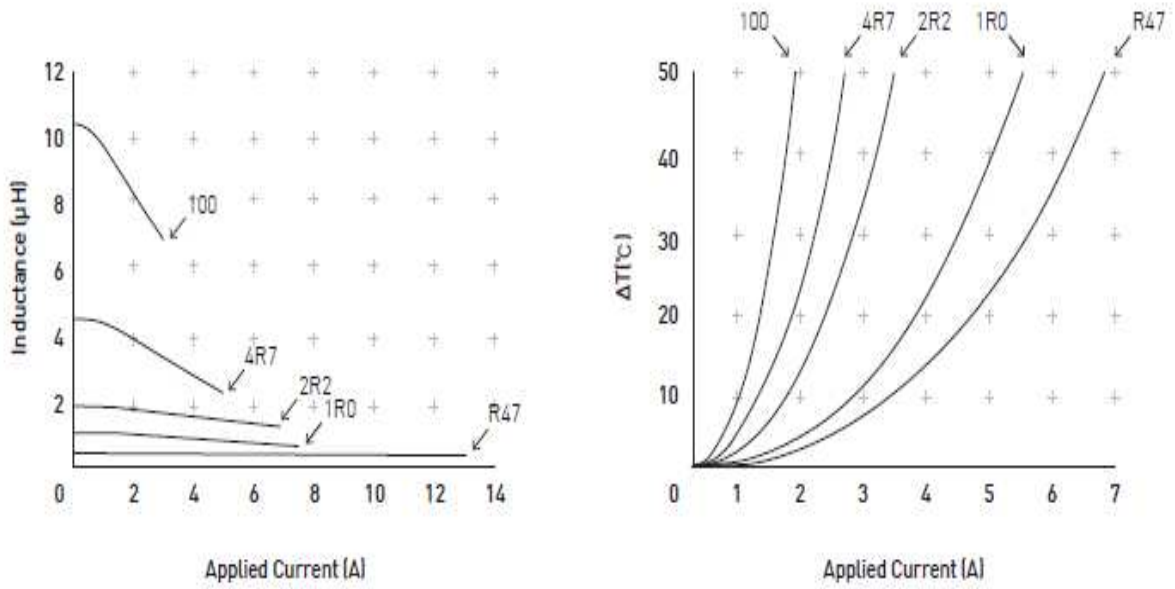
Temperature rise vs. total loss



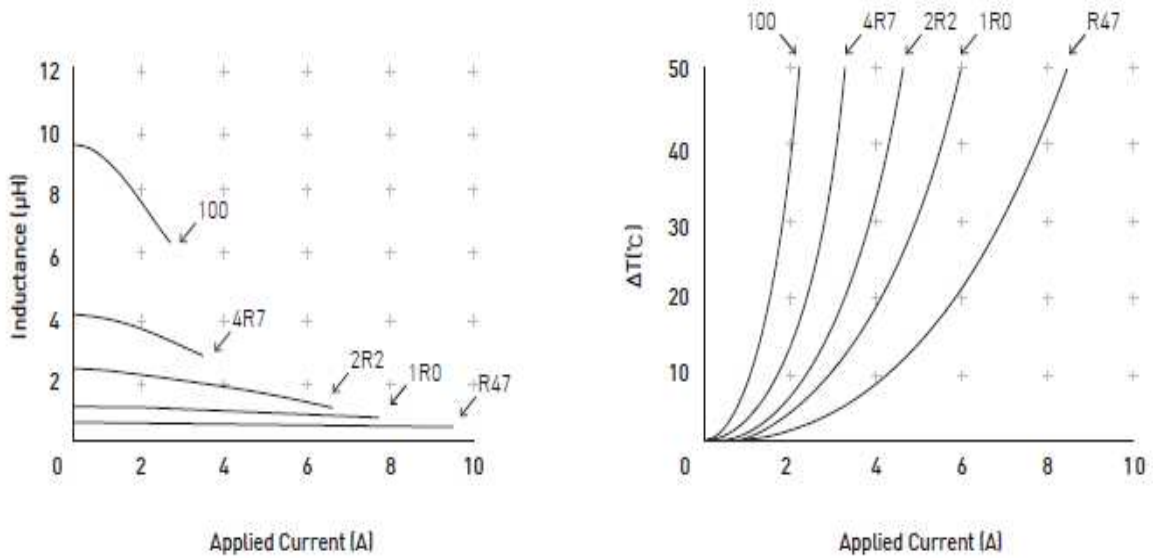
Core loss



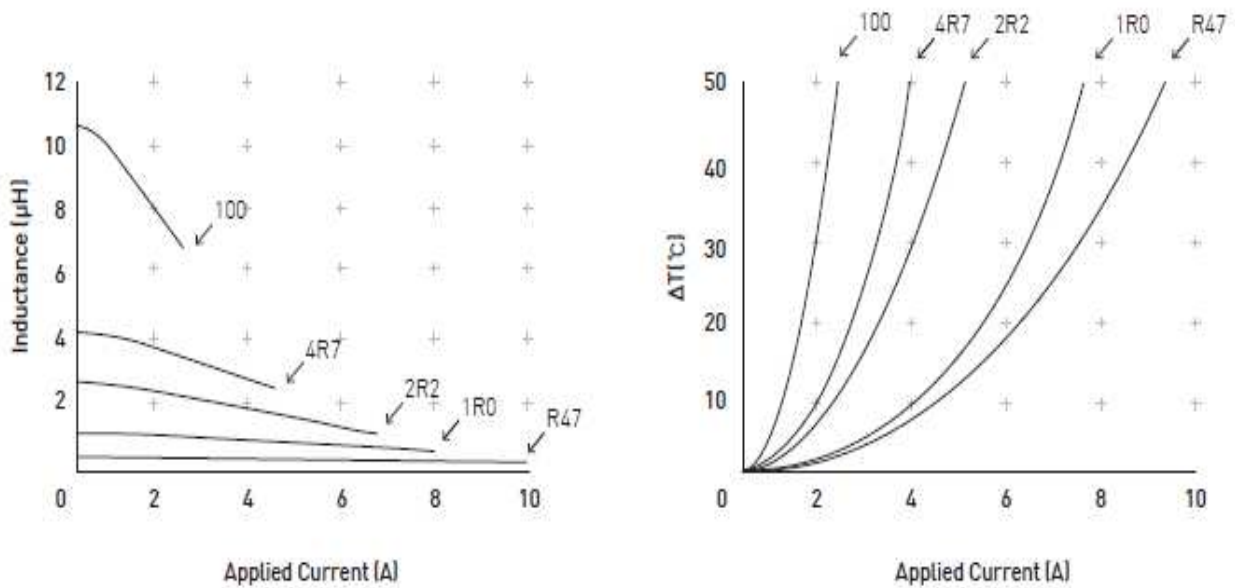
1.2mm Height R1 inductance characteristics — % of OCL vs. I_{DC}



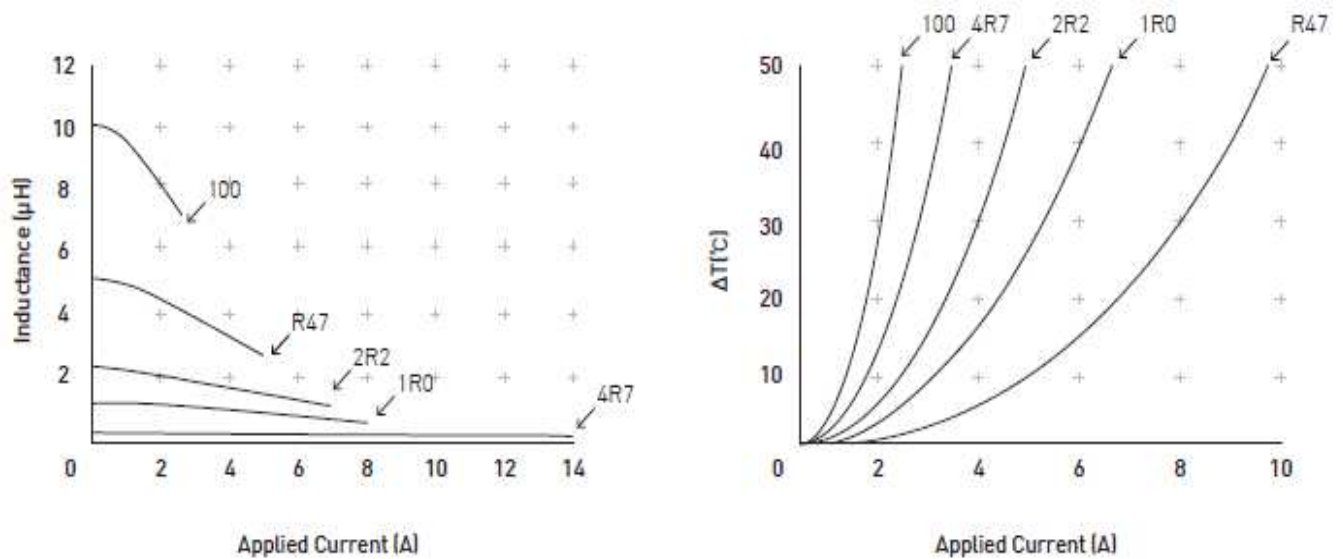
1.5mm Height R2 inductance characteristics — % of OCL vs. I_{DC}



1.85mm Height R3 inductance characteristics — % of OCL vs. I_{DC}



2.0mm Height R4 inductance characteristics — % of OCL vs. I_{DC}



Solder reflow profile

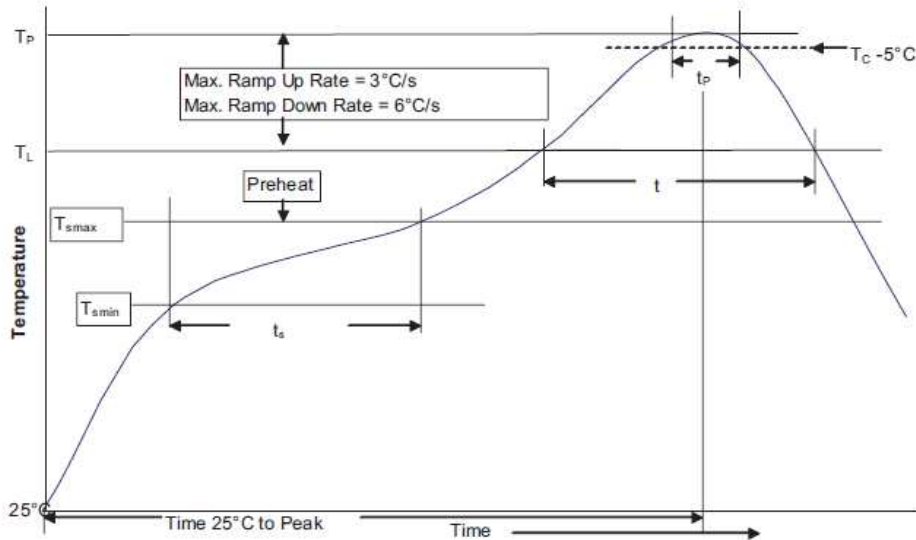


Table 1 - Standard SnPb Solder (T_c)

Package Thickness	Volume ≤ 350 mm ³	Volume ≥ 350 mm ³
<2.5mm	235°C	220°C
≥ 2.5 mm	220°C	220°C

Table 2 - Lead (Pb) Free Solder (T_c)

Package Thickness	Volume ≤ 350 mm ³	Volume 350 - 2000 mm ³	Volume > 2000 mm ³
<1.6mm	260°C	260°C	260°C
1.6 - 2.5mm	260°C	250°C	245°C
> 2.5 mm	250°C	245°C	245°C

Reference JEDEC J-STD-020D

Profile Feature	Standard SnPb Solder	Lead (Pb) Free Solder
Preheat and Soak	· Temperature min. (T_{smin})	100°C
	· Temperature max. (T_{smax})	150°C
	· Time (T_{smin} to T_{smax}) (t_s)	60-120 Seconds
Average ramp up rate T_{smax} to T_p	3°C/ Second Max.	3°C/ Second Max.
Liquidous temperature (T_L)	183°C	217°C
Time at liquidous (t_l)	60-150 Seconds	60-150 Seconds
Peak package body temperature (T_p)*	Table 1	Table 2
Time (t_p)** within 5 °C of the specified classification temperature (T_c)	20 Seconds**	30 Seconds**
Average ramp-down rate (T_p to T_{smax})	6°C/ Second Max.	6°C/ Second Max.
Time 25°C to Peak Temperature	6 Minutes Max.	8 Minutes Max.

* Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.