

# SMD Power Inductor

## Low Profile, High Current Type

PIW04-A63

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### FEATURE

- Magnetic Shield Construction for Power Circuit.
- Large Current and Low DC Resistance
- Low Profile Power Inductors
- Application: DC/DC Converter, Battery Powered Devices, Low Profile High Current Power Supply, Notebook/Server

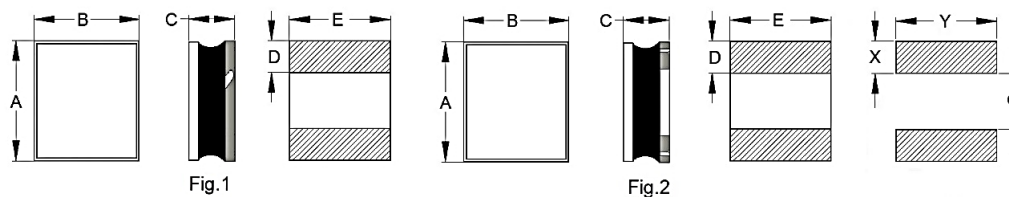


### ELECTRICAL CHARACTERISTICS

Part Number	Inductance (μH)	Tolerance (%)	Test Freq (Hz)	DCR Typ (Ω)	DCR Max (Ω)	I <sub>SAT</sub> (A)	I <sub>RMS</sub> (A)
PIW04R24MFA63	0.24	±20	1V/1M	0.040	0.048	4.0	3.5
PIW04R33MFA63	0.33	±20	1V/1M	0.050	0.060	3.3	3.0
PIW04R47MFA63	0.47	±20	1V/1M	0.070	0.084	2.8	2.6
PIW04R68MFA63	0.68	±20	1V/1M	0.100	0.120	2.3	2.2
PIW041R0MFA63	1.00	±20	1V/1M	0.145	0.174	2.0	1.6
PIW04R24MRA63	0.24	±20	1V/1M	0.075	0.090	4.00	2.80
PIW04R33MRA63	0.33	±20	1V/1M	0.095	0.114	3.50	2.50
PIW04R47MRA63	0.47	±20	1V/1M	0.120	0.144	3.00	2.10
PIW04R68MRA63	0.68	±20	1V/1M	0.170	0.204	2.00	1.80
PIW041R0MRA63	1.00	±20	1V/1M	0.190	0.228	1.50	1.50
PIW041R5MRA63	1.50	±20	1V/1M	0.270	0.324	1.30	1.30
PIW042R2MRA63	2.20	±20	1V/1M	0.480	0.576	1.25	1.00
PIW043R3MRA63	3.30	±20	1V/1M	0.750	0.900	1.15	0.85
PIW044R7MRA63	4.70	±20	1V/1M	1.100	1.320	0.90	0.65
PIW046R8MRA63	6.80	±20	1V/1M	1.750	2.100	0.65	0.50
PIW04100MRA63	10.0	±20	1V/1M	2.000	2.400	0.50	0.45

- Notes:
1. All test data referenced to 25°C ambient.
  2. Saturation Current (I<sub>sat</sub>) based on inductance drop ( $\Delta L/L_0$ : ≤30%) approximately
  3. Heat Rated Current (I<sub>rms</sub>) based on temperature rise ( $\Delta T$ : 40 °C) approximately
  4. Operating Temperature: -40°C ~ +125°C (Including Self-temperature rise)

### DIMENSIONS



Series	A	B	C Max	D ref.	E	X	Y	G	Fig
PIW04-FA63	1.2 ±0.2	1.0 ±0.2	0.8	0.40	1.0	0.45	1.2	0.5	1
PIW04-RA63	1.2 ±0.2	1.0 ±0.2	0.8	0.40	1.0	0.45	1.2	0.5	2

(Unit: mm)

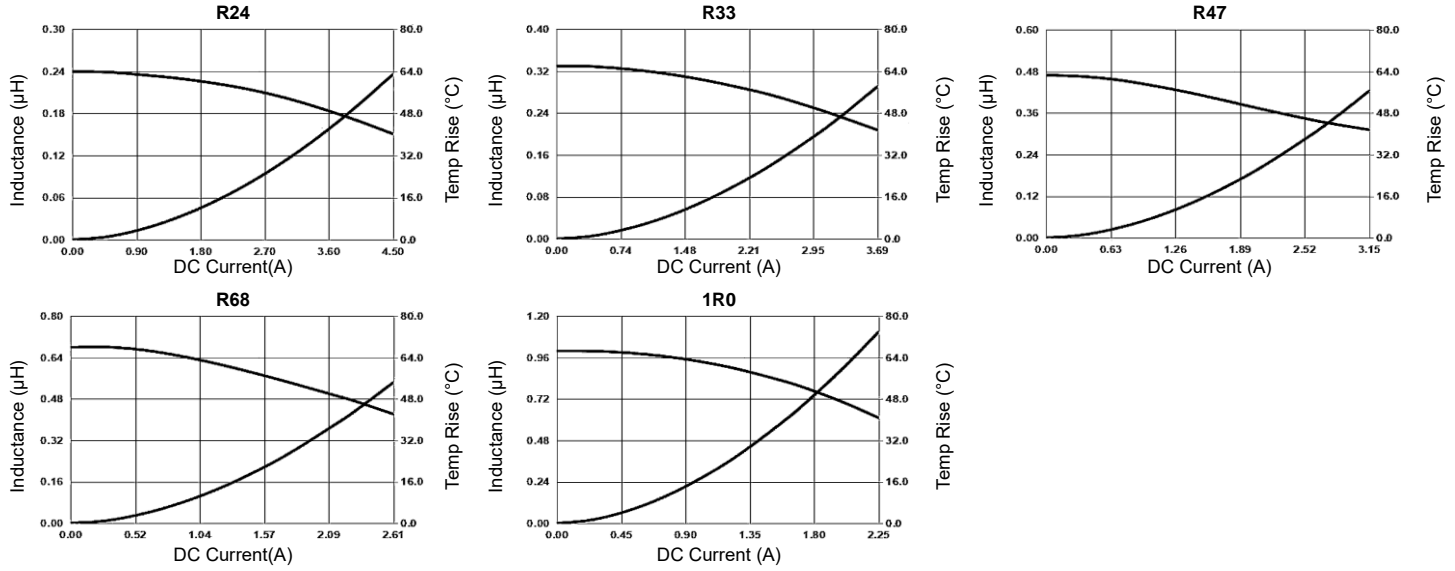
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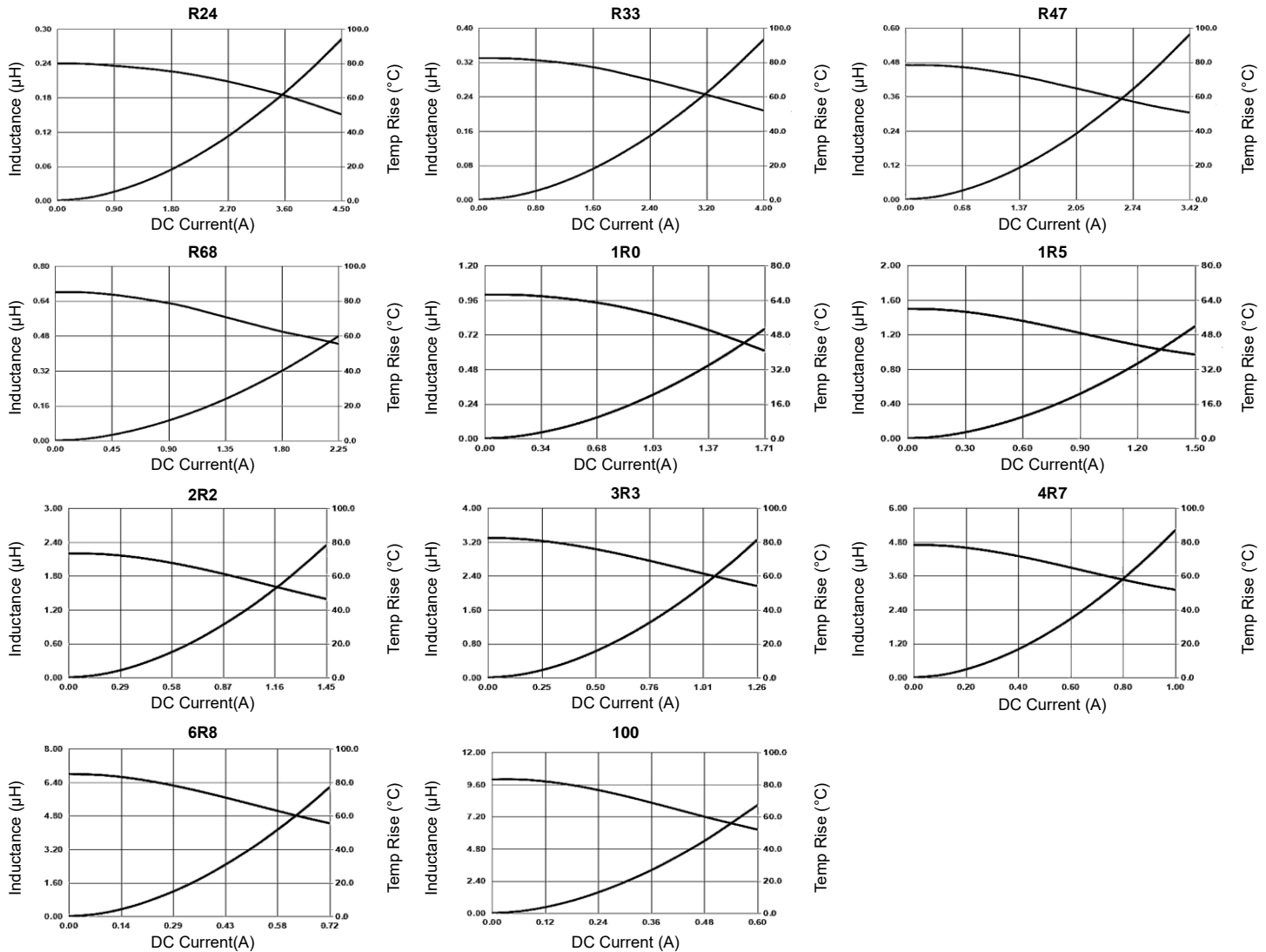
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### CHARACTERISTIC CURVES- PIW04-FA63 series



### CHARACTERISTIC CURVES- PIW04-RA63 series



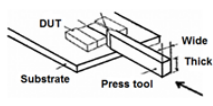
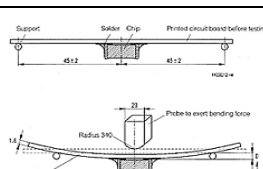
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### RELIABILITY TEST CONDITON AND REQUIREMENT

Item	Test Standards / Conditions / Equipment	Requirement															
Inductance	HP4284A, CH11025, CH3302, CH1320, CH1320S, LCR Meter	Refer to specification															
DC Resistance	CH16502, Agilent33420A Micro-Ohm Meter	Refer to specification															
Mechanical Shock	<table border="1"> <thead> <tr> <th>Type</th> <th>Peak value (g's)</th> <th>Normal duration (D) (ms)</th> <th>Wave form</th> <th>Velocity change (Vi) ft/sec</th> </tr> </thead> <tbody> <tr> <td>SMD</td> <td>50</td> <td>11</td> <td>Half-sine</td> <td>11.3</td> </tr> <tr> <td>Lead</td> <td>50</td> <td>11</td> <td>Half-sine</td> <td>11.3</td> </tr> </tbody> </table>	Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi) ft/sec	SMD	50	11	Half-sine	11.3	Lead	50	11	Half-sine	11.3	Appearance: No damage Inductance: within $\pm 10\%$ of initial value Q: Shall not exceed the specification value RDC: within $\pm 15\%$ of initial value and shall not exceed the specification value
	Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi) ft/sec												
SMD	50	11	Half-sine	11.3													
Lead	50	11	Half-sine	11.3													
3 shocks in each direction along 3 perpendicular axes (18 shocks).																	
Solderability	Method B1, 4 Hrs at 155°C dry heat at 255°C $\pm$ 5°C Test Time: 5 +0/-0.5 seconds. Method D category 3. (steam aging 8 hours $\pm$ 15min) at 260°C $\pm$ 5°C Test Time: 30+0/-0.5 seconds.	More than 95% of the terminal electrode should be covered with solder.															
Resistance to Soldering Heat	Solder temperature: 260 $\pm$ 5°C for 10 seconds Temperature ramp/immersion and emersion rate 25mm/s $\pm$ 6 mm/s. Completely cover the termination. Number of cycles: 1 heat cycle																
Vibration	Oscillation Frequency: 10~2K~10 Hz for 20 minutes Equipment : Vibration Checker Total Amplitude:10g Testing Time: 12 hours (20 minutes, 12 cycles each of 3 orientations)	Appearance: No damage Inductance: within $\pm 10\%$ of initial value Q: Shall not exceed the specification value RDC: within $\pm 15\%$ of initial value and shall not exceed the specification value															
Load Humidity	Humidity: 85 $\pm$ 3% R.H. Temperature: 85°C $\pm$ 2°C Duration: 1000Hrs Min at 100% rated current Measured at Room Temperature after 24 $\pm$ 2hrs																
Life Test	Temperature: 125 $\pm$ 2°C Duration: 1000Hrs Min. with 100% rated current Measured at Room Temperature after 24 $\pm$ 2Hrs																
Thermal Shock	Condition for 1 cycle	Appearance: No damage Inductance: within $\pm 10\%$ of initial value Q: Shall not exceed the specification value RDC: within $\pm 15\%$ of initial value and shall not exceed the specification value															
	<table border="1"> <thead> <tr> <th>Step</th> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>Temperature</td> <td>-40 <math>\pm</math>2°C</td> <td>125 <math>\pm</math>2°C</td> <td>125 <math>\pm</math>2°C</td> </tr> <tr> <td>Duration</td> <td>30<math>\pm</math>5min</td> <td><math>\leq</math>0.5min</td> <td>30<math>\pm</math>5min</td> </tr> </tbody> </table> Number of cycles : 500 Measured at room temperature after 24 $\pm$ 2 hrs.		Step	1	2	3	Temperature	-40 $\pm$ 2°C	125 $\pm$ 2°C	125 $\pm$ 2°C	Duration	30 $\pm$ 5min	$\leq$ 0.5min	30 $\pm$ 5min			
Step	1	2	3														
Temperature	-40 $\pm$ 2°C	125 $\pm$ 2°C	125 $\pm$ 2°C														
Duration	30 $\pm$ 5min	$\leq$ 0.5min	30 $\pm$ 5min														
Terminal Strength	Component mounted on a PCB apply a force to the side of a device being tested. >0805inch(2012mm): 1Kg, $\leq$ 0805inch(2012mm): 0.5Kg Duration 60 +1 seconds. The force shall be applied gradually as not to shock the component being tested.		Appearance : No damage														
Board Flex	Place the 100x40mm FR4 board into a fixture with the component facing down. Apply a force which will bend the board: $\geq$ 0805in(2012mm): 1.2mm <0805in(2012mm): 0.8mm Duration: 10 seconds. The Force is to be applied only once to the board		Appearance : No damage														
Moisture Resistance	<ol style="list-style-type: none"> <li>Baked at 50°C for 25hrs, measure at room after 4hrs.</li> <li>Raise temperature to 65<math>\pm</math>2°C 90-100%RH in 2.5hrs,</li> <li>Keep at 65°C for 3 hours, cool down to 25°C in 2.5hrs.</li> <li>Raise temperature to 65<math>\pm</math>2°C 90-100%RH in 2.5hrs</li> <li>Keep at 65°C for 3hrs, cool down to 25°C in 2.5hrs</li> <li>Keep at 25°C for 2hrs then keep at -10°C for 3hrs</li> <li>Keep at 25°C 80-100%RH for 15min, Vibrate at the frequency of 10 to 55 Hz to 10 Hz, Measure at room temperature after 1~2 hrs.</li> </ol>	Appearance: No damage Inductance: within $\pm 10\%$ of initial value Q: Shall not exceed the specification value RDC: within $\pm 15\%$ of initial value and shall not exceed the specification value															

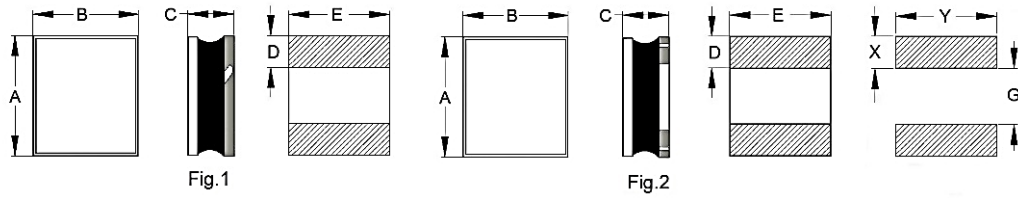
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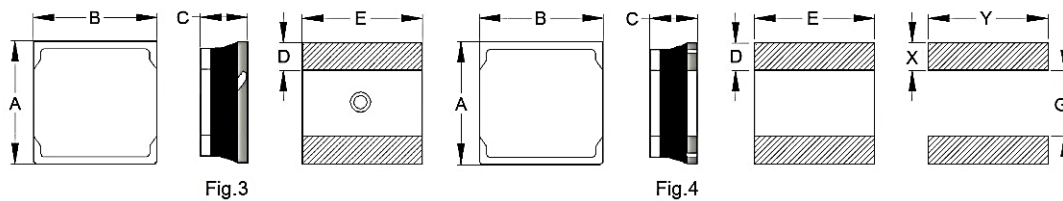
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### DIMENSIONS



(Unit: mm)

Series	A	B	C Max	D ref.	E	X	Y	G	Fig
PIW03-FA63	1.6 ±0.2	0.8 ±0.2	0.8	0.5	0.8	0.75	1.15	0.6	1
PIW03-RA63	1.6 ±0.2	0.8 ±0.2	0.8	0.5	0.8	0.75	1.15	0.6	2
PIW04-FA63	1.2 ±0.2	1.0 ±0.2	0.8	0.4	1.0	0.45	1.2	0.5	1
PIW04-RA63	1.2 ±0.2	1.0 ±0.2	0.8	0.4	1.0	0.45	1.2	0.5	2
PIW05-FA63	2.0 ±0.2	1.2 ±0.2	0.8	0.5	1.2	0.75	1.4	0.8	1
PIW05-RA63	2.0 ±0.2	1.2 ±0.2	0.8	0.5	1.2	0.75	1.4	0.8	2
PIW05-FB63	2.0 ±0.2	1.2 ±0.2	1.0	0.5	1.2	0.75	1.4	0.8	1
PIW05-RB63	2.0 ±0.2	1.2 ±0.2	1.0	0.5	1.2	0.75	1.4	0.8	2
PIW06-FA63	1.9~2.2	1.5~1.8	0.8	0.5	1.6	0.75	1.9	0.8	1
PIW06-RA63	1.9~2.2	1.5~1.8	0.8	0.5	1.6	0.75	1.9	0.8	2
PIW06-FB63	1.9~2.2	1.5~1.8	1.0	0.5	1.6	0.75	1.9	0.8	1
PIW06-HB63	1.9~2.2	1.5~1.8	1.0	0.5	1.6	0.75	1.9	0.8	1
PIW06-RB63	2.0 ±0.2	1.6 ±0.2	1.0	0.65 ±0.20	1.6	0.75	1.9	0.8	2
PIW08-FA63	2.4~2.7	1.9~2.2	0.8	0.75	2.0	0.95	2.4	1.0	1
PIW08-RA63	2.4~2.7	1.9~2.2	0.8	0.75	2.0	0.95	2.4	1.0	2
PIW08-FB63	2.4~2.7	1.9~2.2	1.0	0.75	2.0	0.95	2.4	1.0	1
PIW08-HB63	2.4~2.7	1.9~2.2	1.0	0.75	2.0	0.95	2.4	1.0	1
PIW08-RB63	2.5 ±0.2	2.0 ±0.2	1.0	0.80 ±0.20	2.0	0.95	2.4	1.0	2
PIW08-FC63	2.4~2.7	1.9~2.2	1.2	0.75	2.0	0.95	2.4	1.0	1
PIW08-HC63	2.4~2.7	1.9~2.2	1.2	0.75	2.0	0.95	2.4	1.0	1
PIW08-RC63	2.5 ±0.2	2.0 ±0.2	1.2	0.80 ±0.20	2.0	0.95	2.4	1.0	2
PIW10-FA63	3.2 ±0.2	2.5 ±0.2	0.8	0.95	2.5	1.20	2.8	1.2	1
PIW10-RA63	3.2 ±0.2	2.5 ±0.2	0.8	0.95	2.5	1.20	2.8	1.2	2
PIW10-FB63	3.2 ±0.2	2.5 ±0.2	1.0	0.95	2.5	1.20	2.8	1.2	1
PIW10-FC63	3.2 ±0.2	2.5 ±0.2	1.2	0.95	2.5	1.20	2.8	1.2	1
PIW10-RC63	3.2 ±0.2	2.5 ±0.2	1.2	0.95	2.5	1.20	2.8	1.2	2
PIW-R40A63	4.0 ±0.2	4.0 ±0.2	0.8	1.4 ±0.25	4.0	1.50	4.5	1.5	2



(Unit: mm)

Series	A	B	C Max	D ref.	E	X	Y	G	Fig
PIW-F30A63	3.0 ±0.2	3.0 ±0.2	0.8	1.0	3.0	1.25	3.5	0.9	3
PIW-R30A63	3.0 ±0.2	3.0 ±0.2	0.8	1.0	3.0	1.25	3.5	0.9	4
PIW-H30B63	3.0 ±0.2	3.0 ±0.2	1.0	1.0	3.0	1.25	3.5	0.9	3
PIW-H30C63	3.0 ±0.2	3.0 ±0.2	1.2	1.0	3.0	1.25	3.5	0.9	3
PIW-R30D63	3.0 ±0.2	3.0 ±0.2	1.5	1.0	3.0	1.25	3.5	0.9	4
PIW-H40B63	4.0 ±0.2	4.0 ±0.2	1.0	1.4 ±0.25	4.0	1.5	4.5	1.5	3
PIW-H40C63	4.0 ±0.2	4.0 ±0.2	1.2	1.4 ±0.25	4.0	1.5	4.5	1.5	3

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### PART NUMBERING SYSTEM

**PIW** **04** **100M** **R** **A63**  
 (1) (2) (3) (4) (5)

No	Item	Code	Description	
(1)	Product Code	PIW	Power Inductor Series, Wire Wound Type	
(2)	Size Code	04	0504, 1.2x1.0mm	L x W (mm)
(3)	Inductance	100M	10 $\mu$ H $\pm$ 20 (M)	R47: 0.47 $\mu$ H, 2R2: 2.2 $\mu$ H
(4)	Internal Code	R	R: R type	F: F type
(5)	Series Code	A63	Surface Mount Shielded, Low Profile, High Current series, A: 0.8mm Height	

### RECOMMENDED SOLDERING PROFILES

Reflow Condition		
Pre Heat	Temp. Min $T_{s(min)}$	150°C
	Temp. Max $T_{s(max)}$	200°C
	Time (min. to max.) ( $t_s$ )	60 ~120 seconds
Average ramp up rate (Liquidus Temperature) ( $T_L$ ) to peak		3°C/second max
$T_{s(max)}$ to $T_L$ (Ramp-up rate)		3°C/second max
Reflow	Temp. ( $T_L$ )	217°C
	Time (min. to max.) ( $t_L$ )	60 ~150 seconds
Peak Temperature ( $T_P$ )		See table below
Time within 5°C of actual peak Temperature ( $t_p$ )		10 seconds max
Ramp-down Rate		6°C/second max
Reflow Times		3 times max

Peak Temperature ( $T_P$ )			
Volume	< 350mm <sup>3</sup>	350-2000mm <sup>3</sup>	> 2000mm <sup>3</sup>
Thickness < 1.6mm	260°C	260°C	260°C
Thickness 1.6-2.5mm	260°C	250°C	245°C
Thickness $\geq$ 2.5mm	250°C	245°C	245°C

\*Specifications subject to change without notice

