Effective November 2015 Supersedes March <u>2007</u>

# SD52 High power density, low profile shielded power inductors





#### **Product description**

- Octagonal shape shielded drum core
- Inductance range from 1.2 uH to 150 uH
- Current range from 0.28 A to 3.14 A
- 5.6 mm x 5.2 mm footprint surface mount package in a 2.0 mm height
- Ferrite core material
- Halogen free, lead free, RoHS compliant

# Applications

- Desktop computers
- Notebook and laptop regulators
- · Graphics cards
- Digital cameras, media devices

#### **Environmental Data**

- Storage temperature range: -40 °C to +125 °C
- Operating temperature range: -40 °C to +125 °C (ambient plus self-temperature rise).
- Solder reflow temperature: J-STD-020D compliant





# **Product Specifications**

Part Number <sup>6</sup>	OCL¹ (μΗ) ±20%	Part marking	I <sub>rms</sub> <sup>2</sup> ( <b>A</b> )	l <sup>3</sup> sat (A)	DCR⁴ (Ω) typ.	(V us) typ.
SD52-1R2-R	1.20	А	2.33	3.14	0.0279	1.49
SD52-2R2-R	2.20	В	1.98	2.30	0.0385	2.03
SD52-3R5-R	3.50	С	1.73	1.82	0.0503	2.57
SD52-4R7-R	4.70	D	1.63	1.64	0.0568	2.84
SD52-6R8-R	6.80	E	1.39	1.28	0.0777	3.65
SD52-100-R	10.0	F	1.11	1.11	0.1215	4.19
SD52-150-R	15.0	G	0.97	0.88	0.1618	5.27
SD52-220-R	22.0	Н	0.86	0.73	0.2042	6.35
SD52-270-R	27.0	J	0.73	0.65	0.2864	7.16
SD52-330-R	33.0	К	0.70	0.61	0.3074	7.70
SD52-470-R	47.0	L	0.58	0.50	0.4465	9.32
SD52-680-R	68.0	Μ	0.47	0.42	0.6829	11.21
SD52-101-R	100	Ν	0.39	0.35	1.0000	13.37
SD52-151-R	150	0	0.31	0.28	1.6100	17.00

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 Vrms, 0.0 Adc.

2. Irms: DC current for an approximate ∆T 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.

3. Isat: Peak current for approximately 30% rolloff at +20 °C.

4. DCR limits @ 20°C.

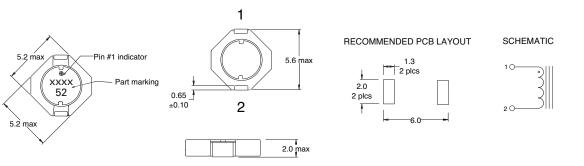
5. Applied Volt-Time product (V-us) across the inductor at 100 kHz necessary to generate a core loss equal to 10% of the total losses for 40 °C temperature rise.

6. Part number definition: SD52-xxx-R

SD52= Product code and size

-xxx=Inductance value in µH, R= decimal point - If no R is present, then last character equals the number of zeros

# **Dimensions (mm)**



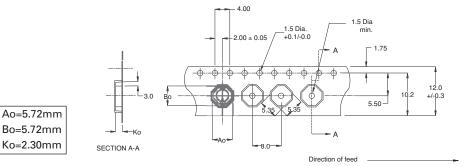
Part Marking: 1st digit= the inductance value per part marking designator, 2nd digit = bi-weekly production date code, 3rd digit = last digit of the year produced, 4th digit= internal manufacturing code.

52 = the product size code.

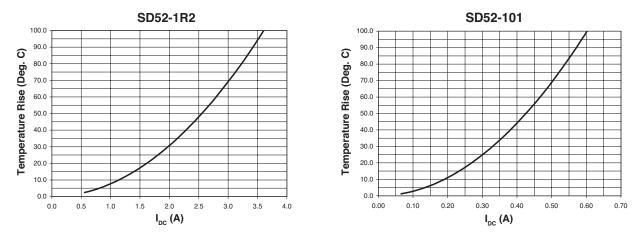
Do not route traces or vias underneath the inductor.

# Packaging information (mm)

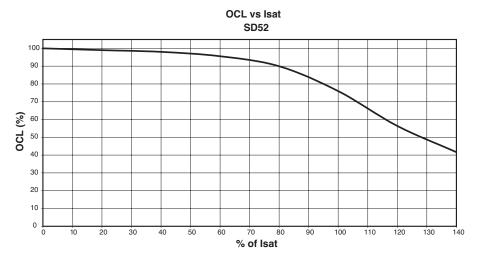
Parts packaged on 13" Diameter reel, 3,500 parts per reel.



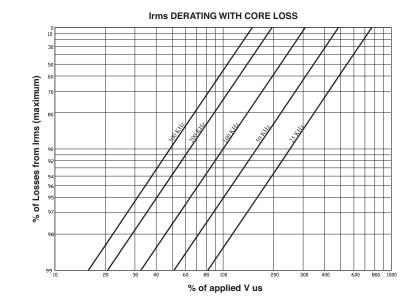
# DC current vs.temperature



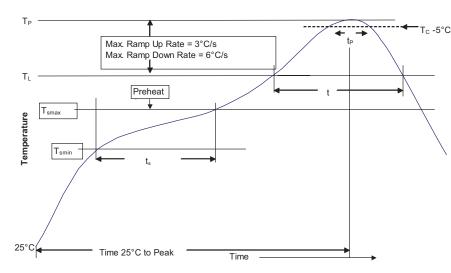
#### Inductance characteristics



#### **Core loss**



# Solder reflow profile



 $-_{T_c - 5^{\circ}C}$  Table 1 - Standard SnPb Solder (T<sub>c</sub>)

Package Thickness	Volume mm3 <350	Volume mm3 ≥350
<2.5mm)	235°C	220°C
≥2.5mm	220°C	220°C

#### Table 2 - Lead (Pb) Free Solder (T<sub>c</sub>)

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

#### **Reference JDEC J-STD-020D**

Profile Feature	Standard SnPb Solder	Lead (Pb) Free Solder	
Preheat and Soak • Temperature min. (T <sub>smin</sub> )	100°C	150°C	
• Temperature max. (T <sub>smax</sub> )	150°C	200°C	
• Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )	60-120 Seconds	60-120 Seconds	
Average ramp up rate T <sub>smax</sub> to T <sub>p</sub>	3°C/ Second Max.	3°C/ Second Max.	
Liquidous temperature (TL) Time at liquidous (tL)	183°C 60-150 Seconds	217°C 60-150 Seconds	
Peak package body temperature (Tp)*	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 <sub>p</sub> to T <sub>smax</sub> )	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<sub>n</sub>) is defined as a supplier minimum and a user maximum.

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

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