

# SD53

## Low profile shielded power inductors



### Product description

- Octagonal shape utilizes board space
- Shielded drum core
- Inductance range from 1.1 uH to 100 uH
- Current range from 0.44 A to 4.8 A
- 5.7 mm x 5.2 mm footprint surface mount package in a 3.0 mm height
- Ferrite core material
- Halogen free, lead free, RoHS compliant

### Applications

- Desktop computers
- Notebook and laptop regulators
- LED and White LED drivers
- Digital cameras, media devices
- Battery power systems

### Environmental Data

- Storage temperature range (component): -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

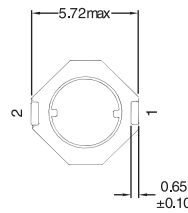
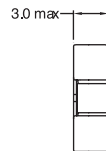
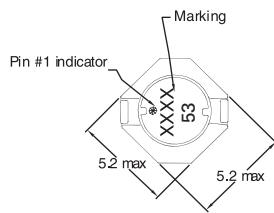


**Product Specifications**

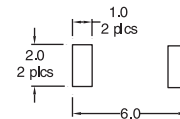
Part Number <sup>5</sup>	OCL1 (µH) ±20%	Part marking	$I_{rms}^2$ (A)	$I_{sat}^3$ (A)	DCR (Ω) typical @ 20 °C	DCR (Ω) maximum @ 20 °C	K-factor <sup>4</sup>
SD53-1R1-R	1.10	A	3.25	4.80	0.017	0.020	48
SD53-2R0-R	2.00	B	2.64	3.30	0.023	0.027	35
SD53-3R3-R	3.30	C	2.26	2.60	0.029	0.034	28
SD53-4R7-R	4.70	D	2.01	2.10	0.039	0.045	21
SD53-6R8-R	6.80	E	1.65	1.85	0.059	0.068	20
SD53-100-R	10.0	F	1.41	1.40	0.077	0.090	15
SD53-150-R	15.0	G	1.10	1.10	0.122	0.142	12
SD53-220-R	22.0	H	0.81	0.94	0.179	0.208	10
SD53-330-R	33.0	I	0.75	0.76	0.221	0.257	8
SD53-470-R	47.0	J	0.64	0.64	0.303	0.352	7
SD53-680-R	68.0	K	0.52	0.58	0.452	0.525	6
SD53-101-R	100	L	0.44	0.45	0.689	0.801	5

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.1 Vrms, 0.0 Adc.
2. Irms: DC current for an approximate ΔT of 40 °C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125 °C under worst case operating conditions verified in the end application
3. Isat: Peak current for approximately 30% rolloff @ 25 °C.
4. K-factor: Used to determine B p-p for core loss (see graph). B p-p = K\*L\*ΔI, B p-p(mT), K: (K factor from table), L: (Inductance in uH), ΔI (Peak to peak ripple current in Amps).
5. Part Number Definition: SD53-xxx-R  
SD53 = Product code and size; -xxx = Inductance value in uH; R = decimal point; If no R is present then third character equals the number of zeros.  
-R suffix = RoHS compliant.

**Dimensions (mm)**



RECOMMENDED PCB LAYOUT

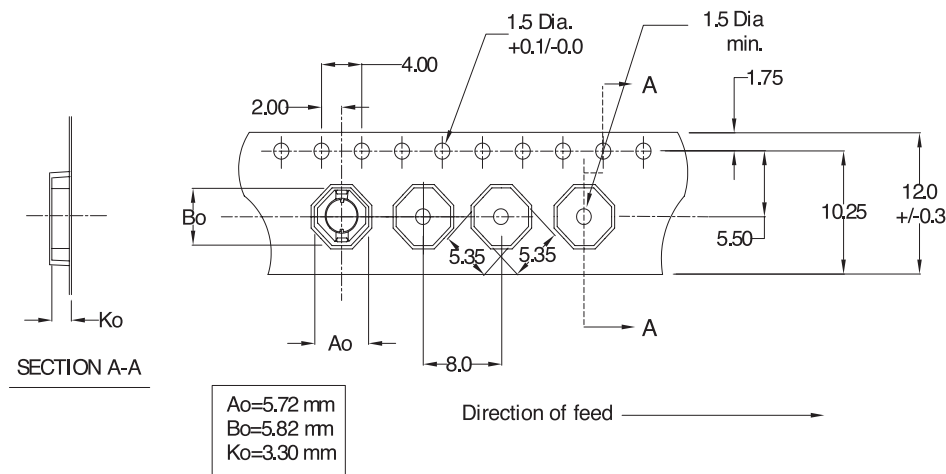


Part Marking: Line 1: (1st digit= inductance value per Part Marking Designator); (2nd digit= Bi-weekly production date code); (3rd digit= Last digit of the year produced), (4th digit= Internal manufacturing code). Line 2: 53=product size code)

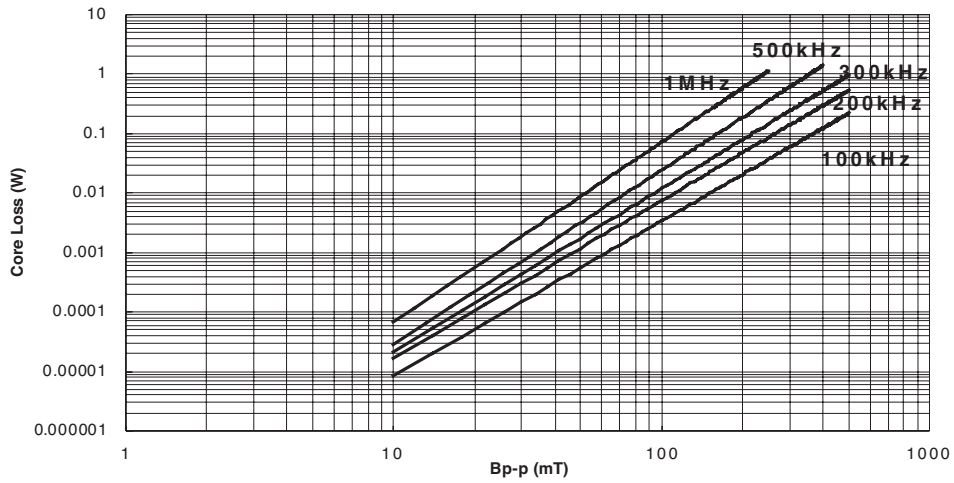
Do not route traces or vias underneath the inductor

**Packaging information (mm)**

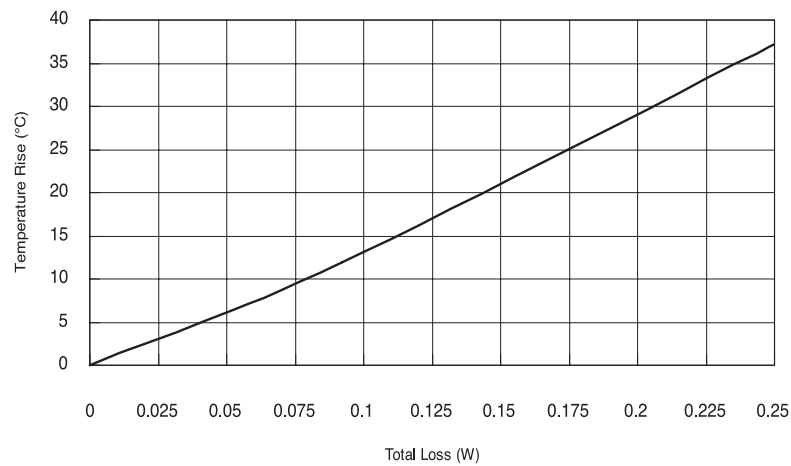
Parts packaged on 13" diameter reel, 2,600 parts per reel.



Core loss vs. Bp-p

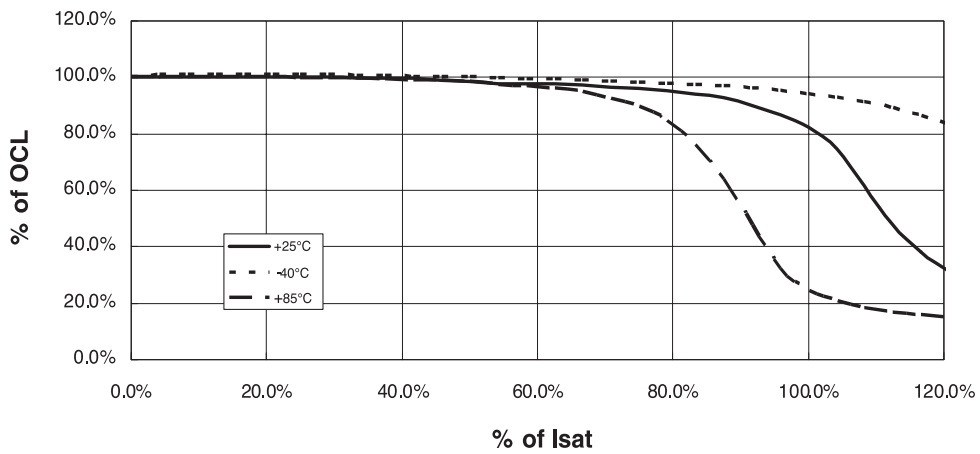


Temperature rise vs. total loss

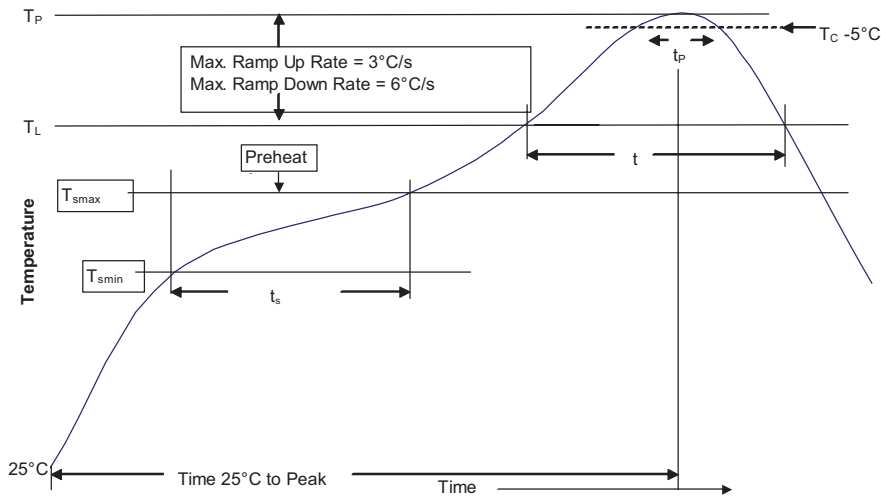


Inductance characteristics

OCL vs. Isat



**Solder reflow profile**



**Table 1 - Standard SnPb Solder ( $T_C$ )**

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> ≥350
<2.5mm)	235°C	220°C
≥2.5mm	220°C	220°C

**Table 2 - Lead (Pb) Free Solder ( $T_C$ )**

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. ( $T_{smin}$ )	100°C	150°C
• Temperature max. ( $T_{smax}$ )	150°C	200°C
• Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	60-120 Seconds	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.

Life Support Policy: Eaton does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

Eaton reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Eaton also reserves the right to change or update, without notice, any technical information contained in this bulletin.

**Eaton**  
Electronics Division  
1000 Eaton Boulevard  
Cleveland, OH 44122  
United States  
www.eaton.com/elx

© 2015 Eaton  
All Rights Reserved  
Printed in USA  
Publication No. 4149  
November 2015



Eaton is a registered trademark.

All other trademarks are property of their respective owners.