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# DR1040

## Shielded power inductors



### Description

- Shielded drum core
- Inductance range from 1.4  $\mu$ H to 323  $\mu$ H
- Current range from 0.52 A to 10 A
- 10.5 mm x 10.3 mm footprint surface mount package in a 4.0 mm height
- Ferrite core material
- Halogen free, lead free, RoHS compliant

### Applications

- LED/LCD backlighting
- High definition televisions (HDTV)
- Server and desktop power supplies
- Portable electronics
- Graphics cards and battery powered systems
- Point-of-load (POL) modules
- Printers and peripherals

### 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>	OCL <sup>1</sup> ( $\mu$ H) $\pm 30\%$	$I_{rms}^2$ (A)	$I_{avg}^2$ (A)	DCR (m $\Omega$ ) typical @ 20°C	DCR (m $\Omega$ ) maximum @ 20°C	K-factor <sup>4</sup>
DR1040-1R5-R	1.35	6.5	10	6.0	8.1	15.5
DR1040-2R5-R	2.4	6.1	7.8	7.0	9.0	12.0
DR1040-3R8-R	3.6	5.5	6.4	9.6	13	9.9
DR1040-5R2-R	5.2	5.4	5.5	14	17	8.3
DR1040-7R0-R	6.8	4.5	4.8	17	20	7.2
DR1040-8R2-R	8.1	3.98	4.6	24	29	6.4
DR1040-100-R	9.6	3.8	4.4	26	35	5.7
DR1040-150-R	14.9	3.1	3.6	37	50	4.7
DR1040-220-R	21.1 $\pm 20\%$	2.5	2.9	54	73	4.0
DR1040-330-R	32.6	2.2	2.45	69	93	3.3
DR1040-470-R	45.8	1.9	2.1	95	128	2.8
DR1040-680-R	65.3	1.42	1.65	152	183	2.3
DR1040-820-R	87	1.29	1.47	214	260	2.0
DR1040-101-R	101	1.25	1.35	225	304	1.9
DR1040-151-R	148	0.85	1.15	356	430	1.6
DR1040-221-R	216	0.70	0.92	530	640	1.3
DR1040-331-R	323	0.52	0.70	810	1090	1.0

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 Vrms, 0.0 Adc, +25 °C

2.  $I_{rms}$ : DC current for an approximate temperature rise of 30 °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.  $I_{avg}$ : Peak current for approximately 35% rolloff @ +25 °C

4. K-factor: K-factor: Used to determine Bp-p for core loss (see graph).  $Bp-p = K * L * \Delta I$ . Bp-p: (mT), K: (K-factor from table), L: (Inductance in  $\mu$ H),  $\Delta I$  (Peak to peak ripple current in Amps).

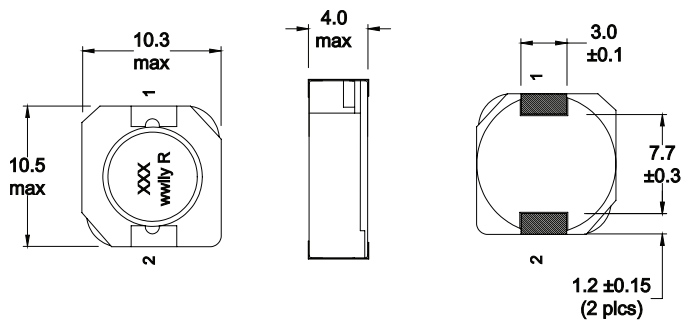
5. Part Number Definition: DR1040-xxx-R

DR1040 = Product code and size  
-xxx= inductance value in  $\mu$ H, R= decimal point,

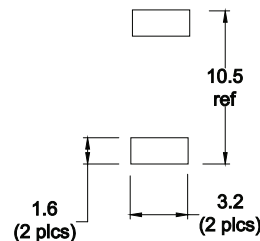
If no R is present then last character equals number of zeros

-R suffix = RoHS compliant

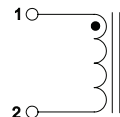
**Dimensions (mm)**



**Recommended Pad Layout**



**Schematic**



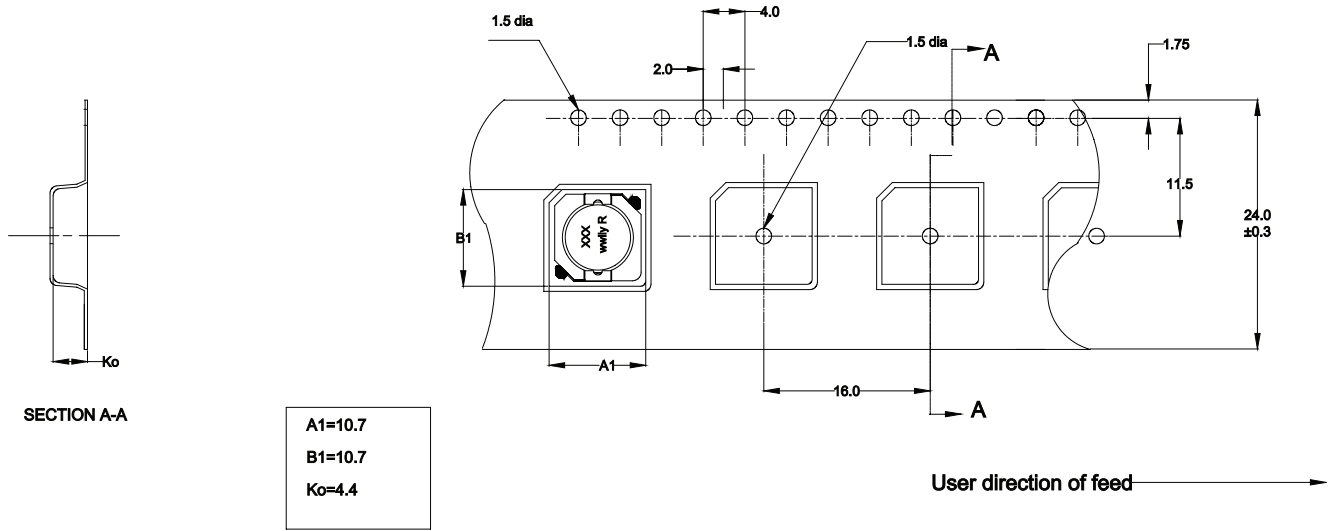
Part marking: inductance value in  $\mu$ H. R = decimal point. If no R is present then last character equals number of zeroes.

wwlly = date code, R = revision level

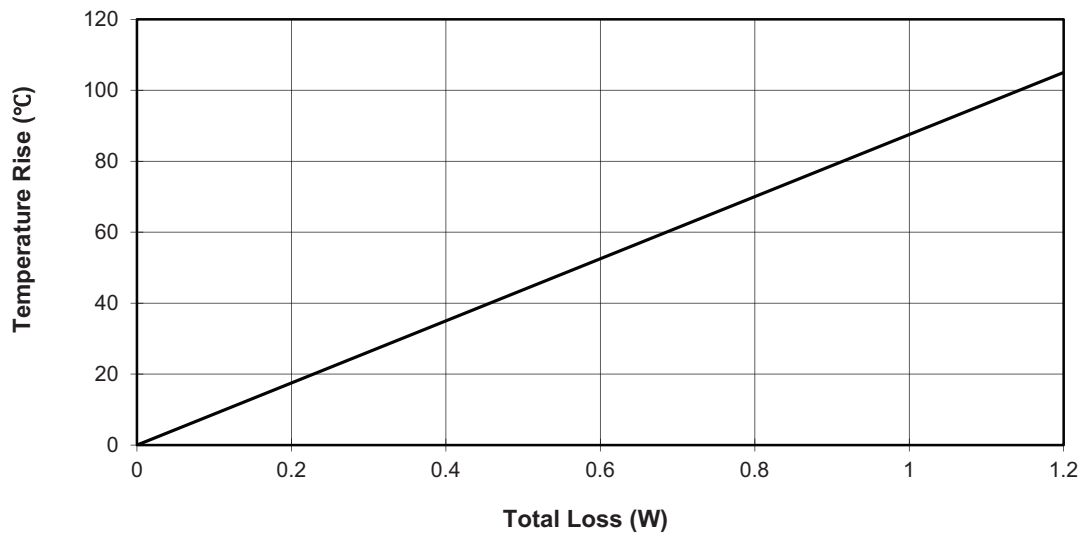
Do not route traces or vias underneath the inductor

**Packaging information (mm)**

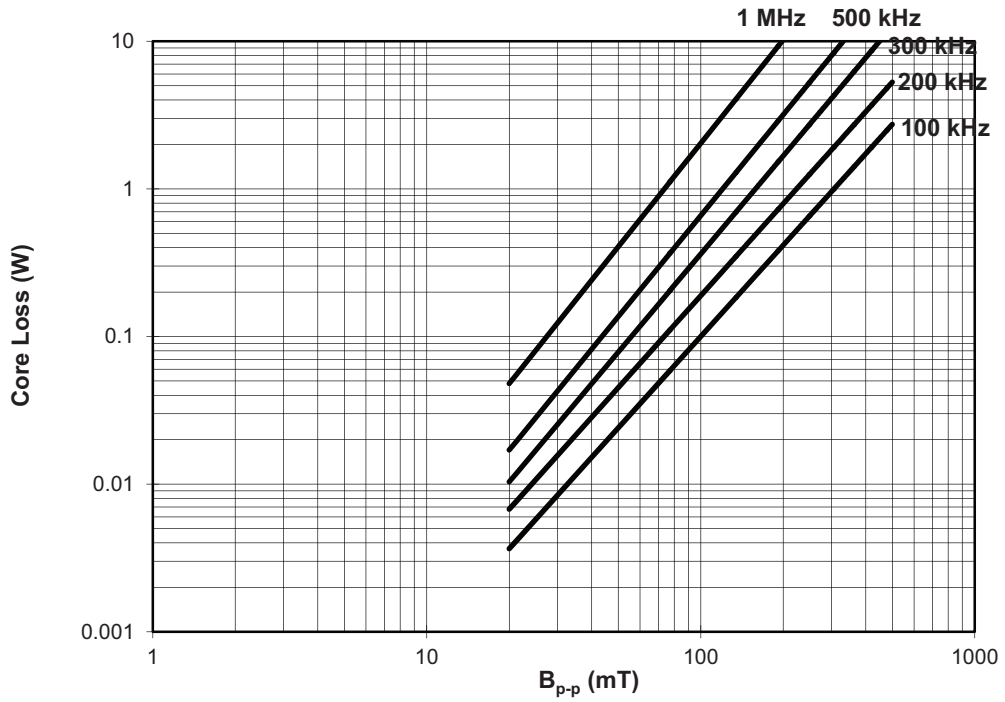
Supplied in tape and reel packaging , 850 parts per 13" diameter reel



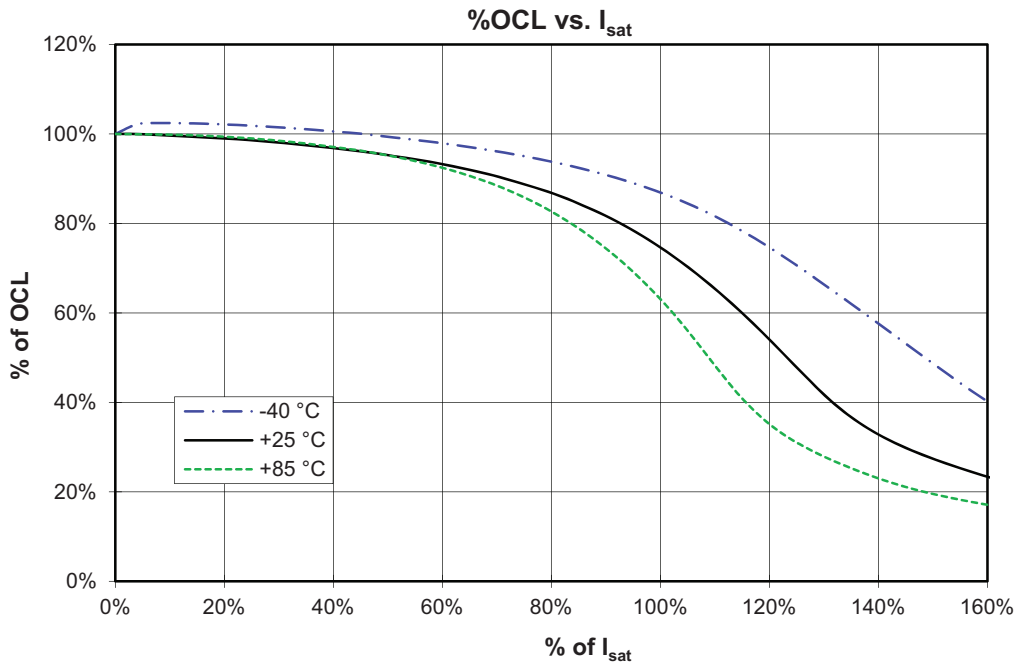
**Temperature rise vs. total loss**



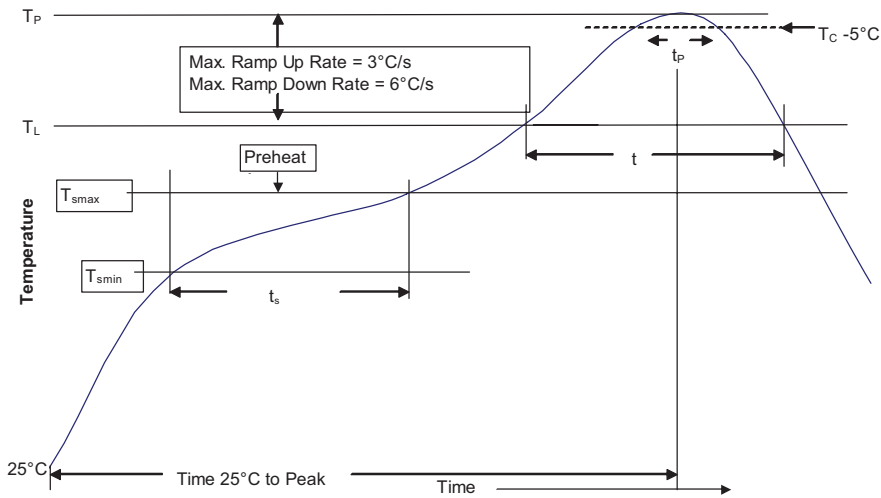
Core loss vs.  $B_{p-p}$



Inductance characteristics



**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 JEDEC 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.

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

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