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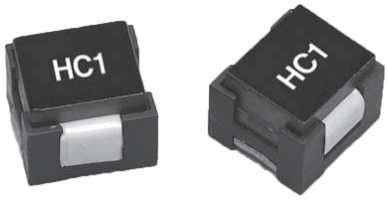
# HC1

## High current inductor




### Applications

- Distributed power systems DC-DC converters
- General-purpose low voltage supplies
- Computer systems
- Servers
- Industrial Equipment
- Data networking and storage systems

### Product description

- Designed for high current, low voltage applications
- Low DCR, high efficiency
- Foil construction for higher frequency circuit designs
- Frequency range 1kHz to 1MHz
- Ferrite core material

### Environmental data

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

RoHS

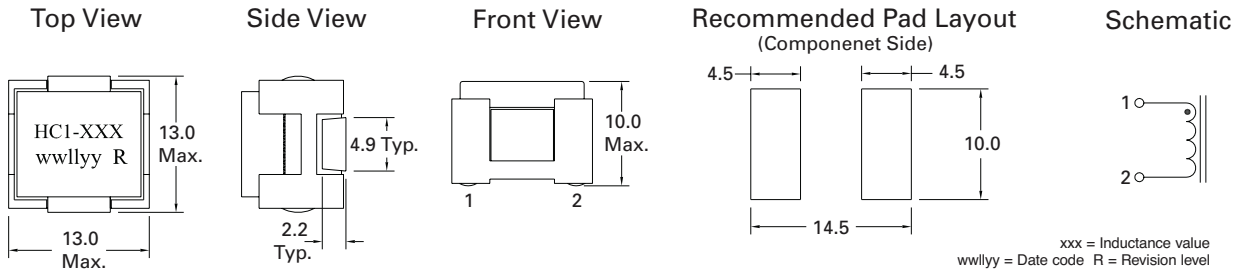
Powering Business Worldwide

## Product specifications

| Part number | OCL[1] (µH) ±15% | $I_{rms}$[2] amps (approx.) | $I_{sat}$[3] amps (approx.) | DCR (Ω) maximum @ 20°C | Volt-µsec[4] (V µs) ref. |
|---|---|---|---|---|---|
| HC1-R22-R | 0.218 | 51.42 | 40.5 | 0.00036 | 1.83 |
| HC1-R30-R | 0.291 | 51.42 | 31.8 | 0.00036 | 1.83 |
| HC1-R57-R | 0.572 | 37.83 | 33.4 | 0.00068 | 3.66 |
| HC1-R87-R | 0.866 | 28.01 | 31.0 | 0.00123 | 5.49 |
| HC1-1R0-R | 1.12 | 28.01 | 25.4 | 0.00123 | 5.49 |
| HC1-1R7-R | 1.66 | 22.30 | 22.2 | 0.0020 | 7.33 |
| HC1-2R3-R | 2.29 | 22.30 | 16.7 | 0.0020 | 7.33 |
| HC1-3R6-R | 3.59 | 16.76 | 13.4 | 0.0035 | 9.16 |
| HC1-5R1-R | 5.15 | 12.79 | 11.2 | 0.0057 | 10.99 |
| HC1-7R8-R | 7.85 | 12.79 | 6.7 | 0.0057 | 10.99 |
| HC1-100-R | 10.5 | 12.79 | 5.3 | 0.0057 | 10.99 |

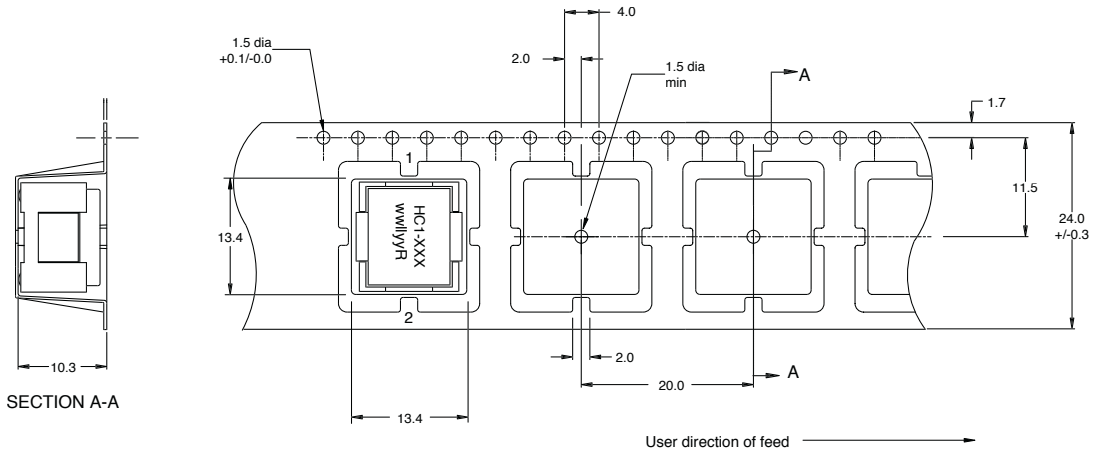
1. OCL (Open Circuit Inductance) Test parameters: 300kHz, .25$V_{rms}$, 0.0Adc & $I_{sat}$.
2. $I_{rms}$ Amps for approximately ΔT of 40°C. DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.
3. $I_{sat}$ Amps Peak for approximately 30% rolloff @ 20°C.
4. Applied Volt-Time product (V-µs) across the inductor. This value represents the applied V-µs at 200kHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise. See Core Loss Graph.
5. Part number definition - HC1-xxx-R:
   HC1 = Product code and size
   -xxx = Inductance value
   R = Decimal point (if no "R" is present, last character equals number of zeros )
   -R Suffix = RoHS compliant

## Dimensions–mm

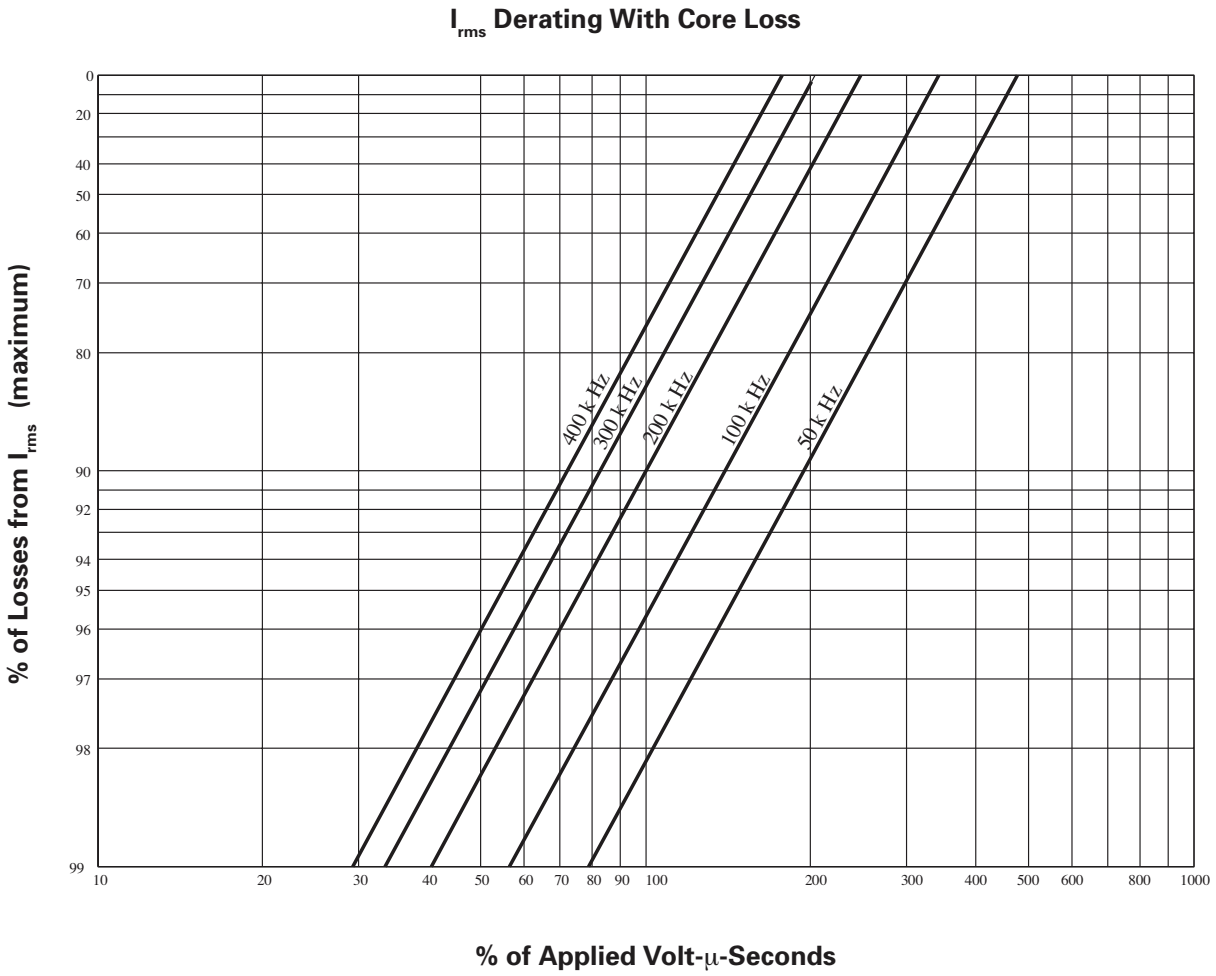



## Packaging information (mm)

Supplied in tape and reel packaging, 250 parts per reel, 13" diameter reel.

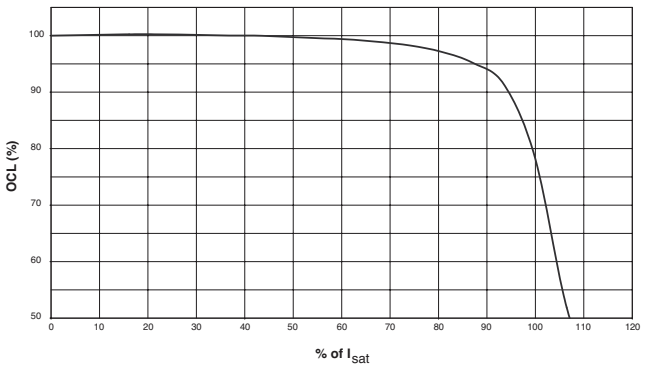


**Core loss**

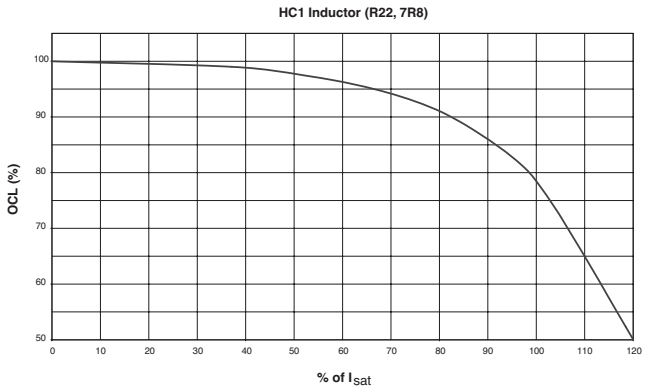

$I_{rms}$ Derating With Core Loss
% of Losses from $I_{rms}$ (maximum)
0
20
40
50
60
70
80
90
92
94
95
96
97
98
99
400 k Hz
300 k Hz
200 k Hz
100 k Hz
50 k Hz
10
20
30
40
50
60
70
80
90
100
200
300
400
500
600
800
1000
% of Applied Volt-μ-Seconds

## Inductance characteristics

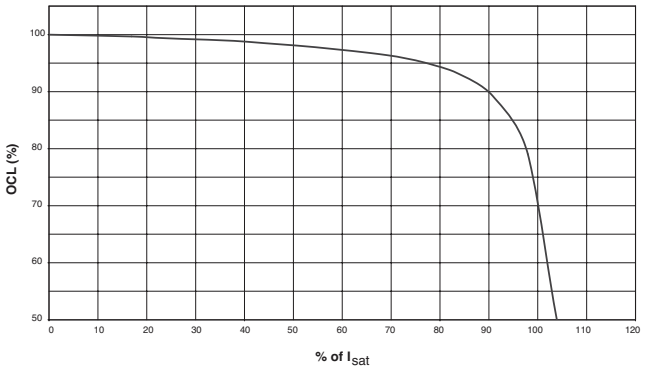
HC1 Inductor (R87)



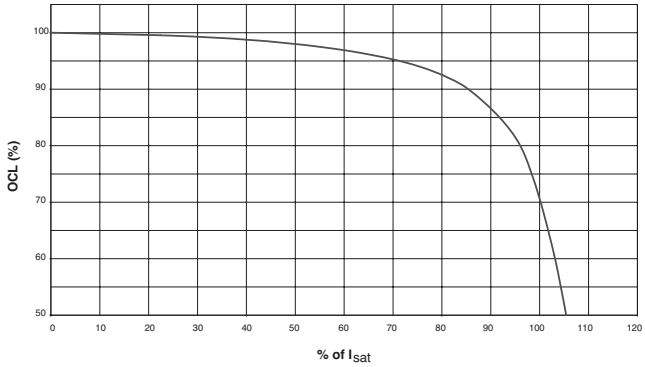

HC1 Inductor (R22, 7R8)



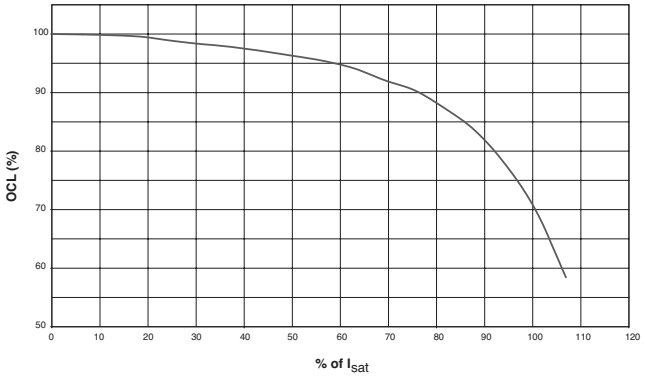

HC1 Inductor (1R7)



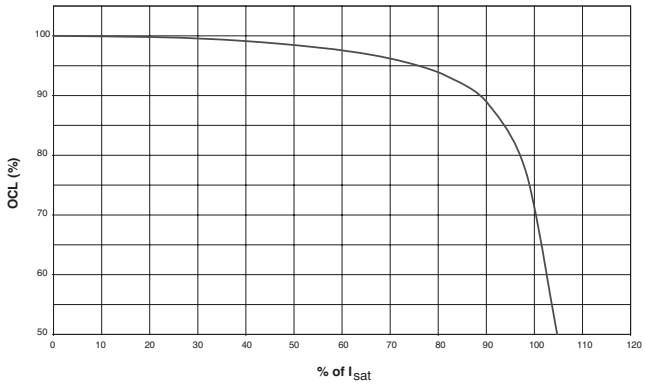

HC1 Inductor (R57, 2R3, 3R6, 5R1)




HC1 Inductor (R30, 100)




HC1 Inductor (1R0)



## Solder reflow profile

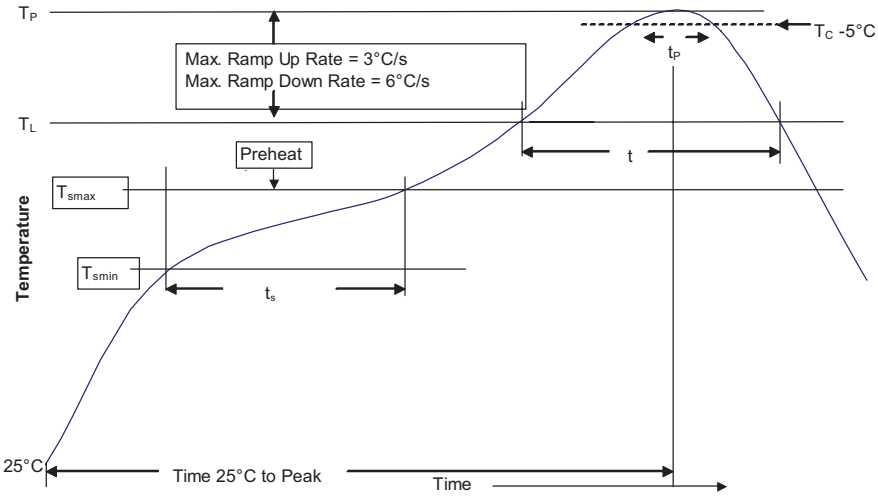



**Table 1 - Standard SnPb Solder ($T_C$)**

| 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 ($T_C$)**

| Package Thickness | Volume mm³ <350 | Volume mm³ 350 - 2000 | Volume mm³ >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 ($T_L$)<br>Time at liquidous ($t_L$) | | 183°C<br>60-150 Seconds | 217°C<br>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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