# HC8

## High current power inductors



### Product description

- Surface mount inductors, 4.0mm height, designed for higher speed switch mode applications requiring low voltage and high current
- Design utilizes high temperature powder iron material with a non-organic binder to eliminate thermal aging
- Inductance Range from 0.175 uH to 47.3 uH
- Current Range from 2.2 to 76 Amps
- Frequency Range 1kHz to 500kHz

### Applications

- Multi-phase regulators
- Voltage Regulator Modules (VRMs)
- Distributed power systems DC-DC converters
- Desktop and server VRMs and EVRDs
- Point-of-Load (POL) modules
- Field Programmable Gate Array (FPGA) DC-DC converters
- Battery power systems
- High current power supplies
- Data networking and storage systems

### Environmental data

- Storage temperature range (component): -40°C to +155°C
- Operating temperature range: -40°C to +155°C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020D compliant

RoHS

Powering Business Worldwide

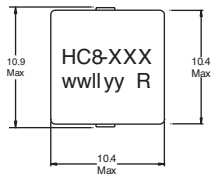
## Product specifications

| Part number[6] | OCL[1] (µH) ±20% | $I_{rms}$[2] (amps) | $I_{sat}$[3] (amps) 15% rolloff | $I_{sat}$[4] (amps) 30% rolloff | DCR (mΩ) maximum @ 20°C | Volt-µsec[5] (V-µs) |
|---|---|---|---|---|---|---|
| HC8-R15-R | 0.175 | 39.0 | 43 | 76 | 0.80 | 1.5 |
| HC8-R39-R | 0.390 | 28.3 | 26 | 45 | 1.55 | 2.5 |
| HC8-R75-R | 0.766 | 18.8 | 18.5 | 32.7 | 3.40 | 3.5 |
| HC8-1R2-R | 1.32 | 16.0 | 14.4 | 25.5 | 4.70 | 4.5 |
| HC8-1R9-R | 1.90 | 12.4 | 11.8 | 20.9 | 7.7 | 5.5 |
| HC8-2R6-R | 2.65 | 10.2 | 10.0 | 17.7 | 11.4 | 6.5 |
| HC8-3R5-R | 3.52 | 8.5 | 8.7 | 15.3 | 16.5 | 7.5 |
| HC8-4R5-R | 4.52 | 8.0 | 7.7 | 13.5 | 18.6 | 8.5 |
| HC8-5R6-R | 5.65 | 6.7 | 6.9 | 12.1 | 26.3 | 9.5 |
| HC8-6R9-R | 6.90 | 6.4 | 6.2 | 10.9 | 28.9 | 10.5 |
| HC8-8R2-R | 8.27 | 5.5 | 5.7 | 10.0 | 39.6 | 11.5 |
| HC8-100-R | 9.77 | 5.2 | 5.2 | 9.2 | 43.6 | 12.5 |
| HC8-150-R | 15.02 | 4.1 | 4.2 | 7.4 | 68.6 | 15.5 |
| HC8-220-R | 21.40 | 3.4 | 3.5 | 6.2 | 99.5 | 18.6 |
| HC8-330-R | 31.65 | 2.7 | 2.9 | 5.1 | 154 | 22.6 |
| HC8-470-R | 47.28 | 2.2 | 2.4 | 4.2 | 237 | 27.6 |

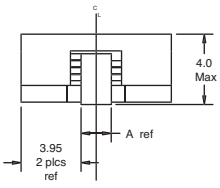
1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 1.0Vrms, 0.0Adc, @ +25°C
2. Irms: DC current for an approximately ΔT of 40°C without core loss. Derating is necessary for AC currents. Pad layout, trace thickness and width, airflow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 155°C under worst case conditions verified in the end application.
3. Peak current for approximately 15% rolloff @+20°C
4. Peak current for approximately 30% rolloff @+20°C
5. Applied Volt-Time product (V-µs) across the inductor. This value represents the applied V-µs at operating frequency necessary to generate additional core loss which contributes to the 40°C temperature rise. De-rating of the Irms is required to prevent excessive temperature rise. The 100% V-µs rating is equivalent to a ripple current $I_{p-p}$ of 20% of Isat (30% rolloff option).
6. Part number definition: HC8-XXX-R
   HC8 = Product code and size
   XXX = Inductance value in uH. R = Decimal point. If no R is present then last character equals number of zeros
   -R suffix indicates RoHS compliant

## Dimensions–mm

TOP VIEW



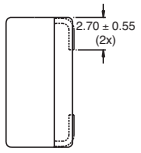

FRONT VIEW



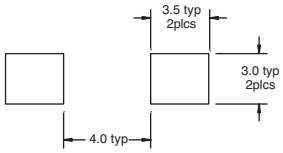

FRONT VIEW TABLE

| PN | A mm |
|---|---|
| R15 | 2.1 |
| R39 | 2.1 |
| R75 | 2.1 |
| 1R | 2.1 |
| 1R9 thru 470 | 2.7 |

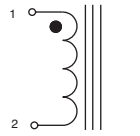
SIDE VIEW




RECOMMENDED PAD LAYOUT




SCHEMATIC




Part marking: HC8= (Product code and size)-xxx=(inductance value in uH, R= decimal point. If no R is present then last character equals number of zeros. wwlyly=date code, R=revision level

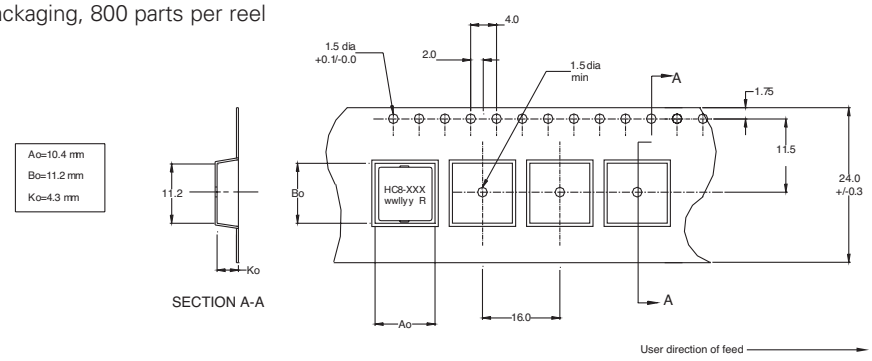
Tolerances are ±0.2 millimeters unless stated otherwise

All soldering surfaces to be coplanar within 0.1 millimeters

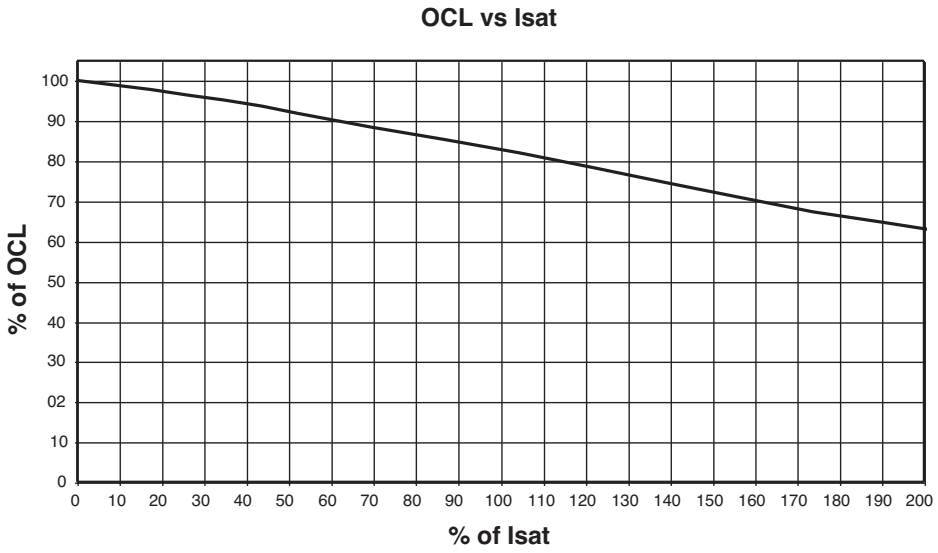
Do not route traces or vias underneath the inductor

## Packaging information–mm

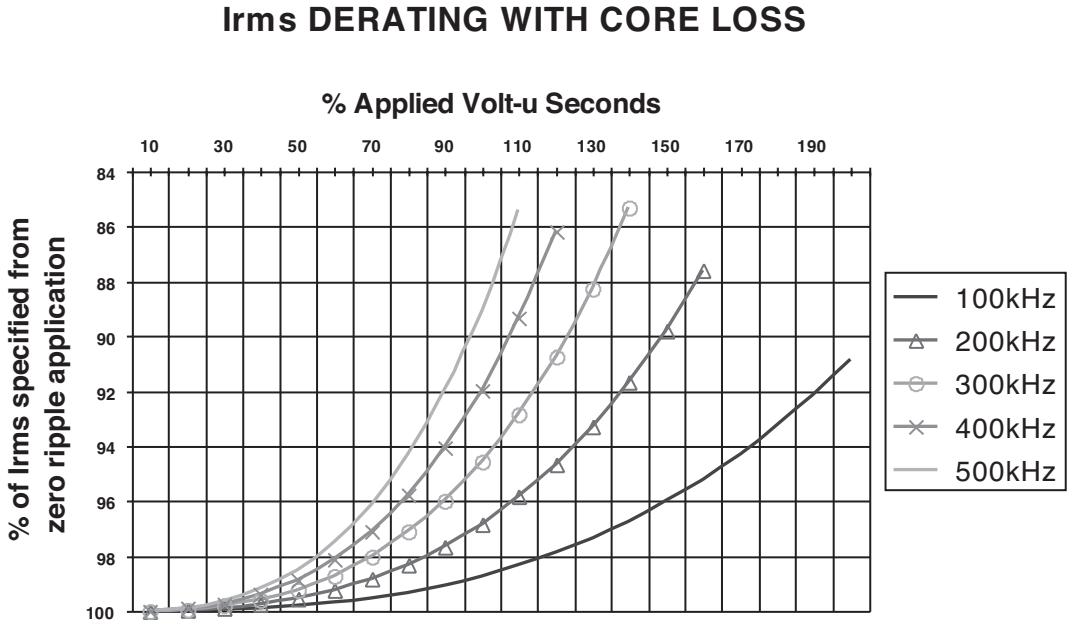
Supplied in tape and reel packaging, 800 parts per reel



**Inductance characteristics**




**Core loss**



## Solder reflow profile

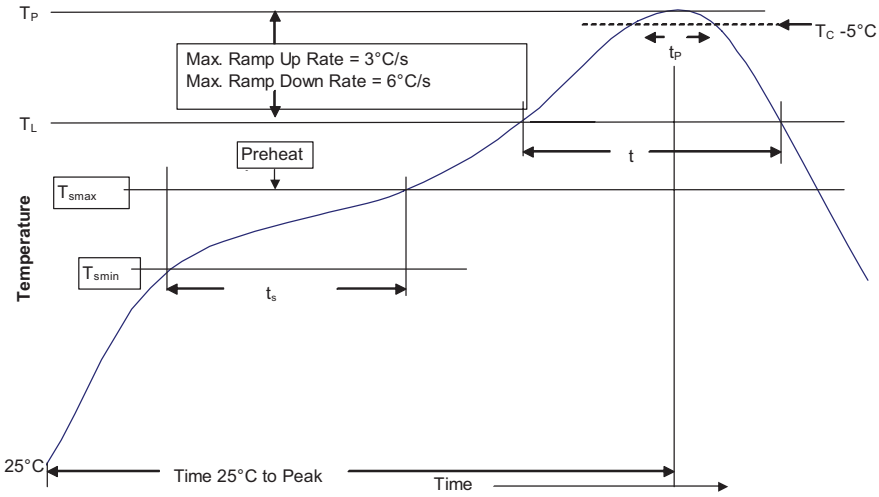



**Table 1 - Standard SnPb Solder ($T_C$)**

| 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 $mm^3$ <350 | Volume $mm^3$ 350 - 2000 | Volume $mm^3$ >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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