HC9

High current power inductors

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

Product description

- Surface mount inductors designed for higher speed switch mode applications requiring lower inductance, low voltage and high current
- Design utilizes high temperature powder iron material with a non-organic binder to eliminate thermal aging
- Inductance Range from 0.2µH to 47.0µH
- Current Range from 3.65 amps to 95.0 amps
- Frequency Range 1kHz to 500kHz

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

Pb RoHS

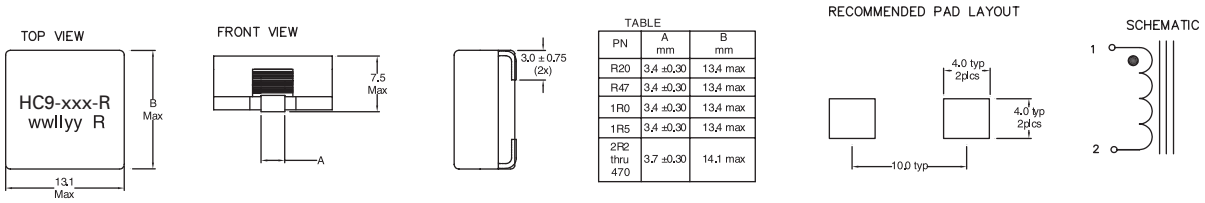
Powering Business Worldwide

Product specifications

Part number[6]	OCL[1] (µH) ±15%	I_{rms}[2] (amps)	I_{sat}[3] (amps) 20% rolloff	I_{sat}[4] (amps) 30% rolloff	DCR (mΩ) maximum @ 20°C	Volt-µsec[5] (V-µs)
HC9-R20-R	0.218	46.7	65	95	0.50	2.87
HC9-R47-R	0.544	33.7	40	57	0.88	4.78
HC9-1R0-R	1.04	23.7	28	41	1.87	6.70
HC9-1R5-R	1.70	21.0	22	32	2.27	8.46
HC9-2R2-R	2.53	17.2	18	26	3.37	10.4
HC9-3R3-R	3.52	14.3	15	22	4.87	12.4
HC9-4R3-R	4.67	13.0	13.2	19.1	5.90	14.4
HC9-6R8-R	7.45	10.3	11.4	15.1	9.40	18.1
HC9-100-R	10.9	8.50	8.6	12.5	14.0	22.0
HC9-220-R	22.4	6.30	6.0	8.7	25.7	31.5
HC9-330-R	34.5	4.42	4.8	7.0	48.8	37.3
HC9-470-R	49.2	3.65	3.9	5.7	72.3	44.8

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 20% 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 I_{rms} is required to prevent excessive temperature rise. The 100% Vµs rating is equivalent to a ripple current Ip-p of 20% of Isat (30% rolloff option).
6. Part number definition: HC9-xxx-R
   HC9= Product code and size
   xxx = Inductance in µH. R = decimal point. If no R is present last character equals number of zeros.
   -R suffix = RoHS compliant

Dimensions–mm



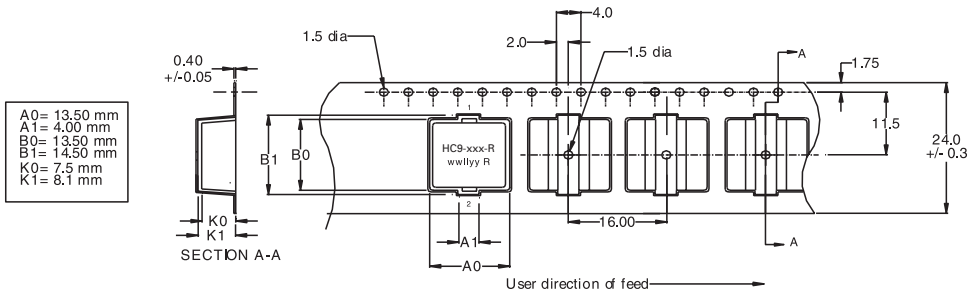
Part marking: HC9= (Product code and size)-xxx=(inductance value in uH, R= decimal point. If no R is present then last character equals number of zeros. wwlyly=date code, R=revision level

Tolerances are ±0.2 millimeters unless stated otherwise

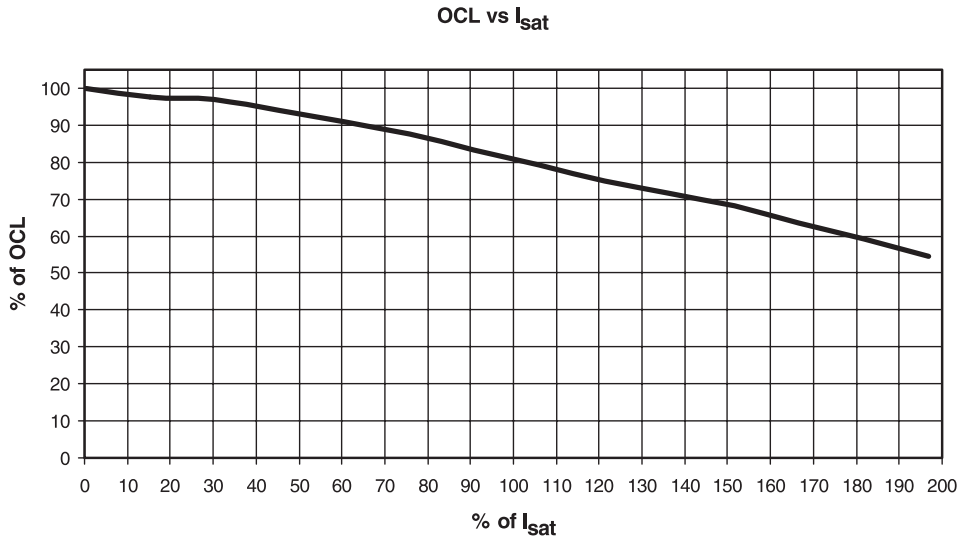
Do not route traces or vias underneath the inductor

Packaging information–mm

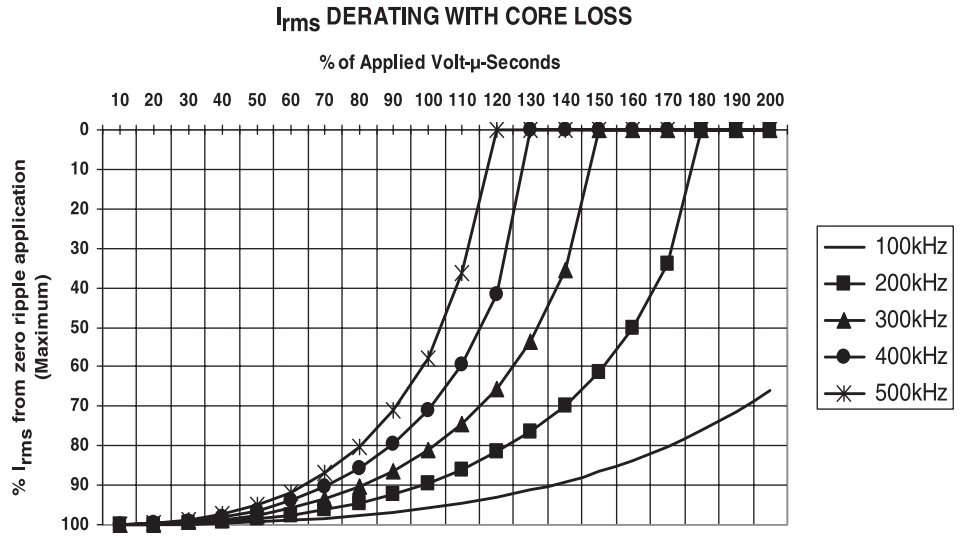
Supplied in tape and reel packaging, 450 parts per reel, 13" diameter reel.



Rolloff



Core loss



Solder reflow profile

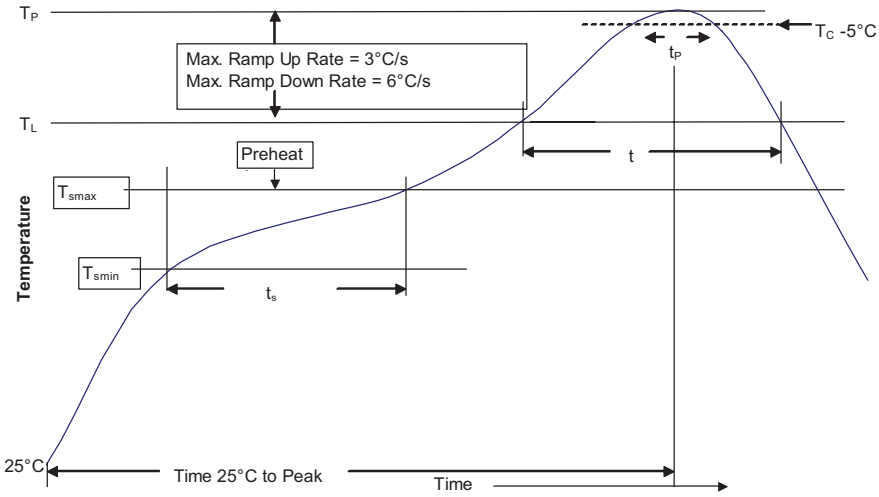


Table 1 - Standard SnPb Solder (T_C)

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) Time at liquidous (t_L)		183°C 60-150 Seconds	217°C 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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