# HCV1605

## High current power inductors



### Applications

- Compatible with Picor® Cool-Power® ZVS Buck and Buck-Boost Regulator Families

### Environmental data

- Storage temperature range (Component): -55 °C to +125 °C
- Operating temperature range: -55 °C to +125 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant
- Halogen free, lead free, RoHS compliant

### Product features

- Flat-wire construction
- Low DCR, high efficiency
- Secure 3 terminal mounting
- 15.5 mm x 14 mm footprint surface mount package in a 4.98 mm height
- Ferrite core material
- Moisture Sensitivity Level: 1

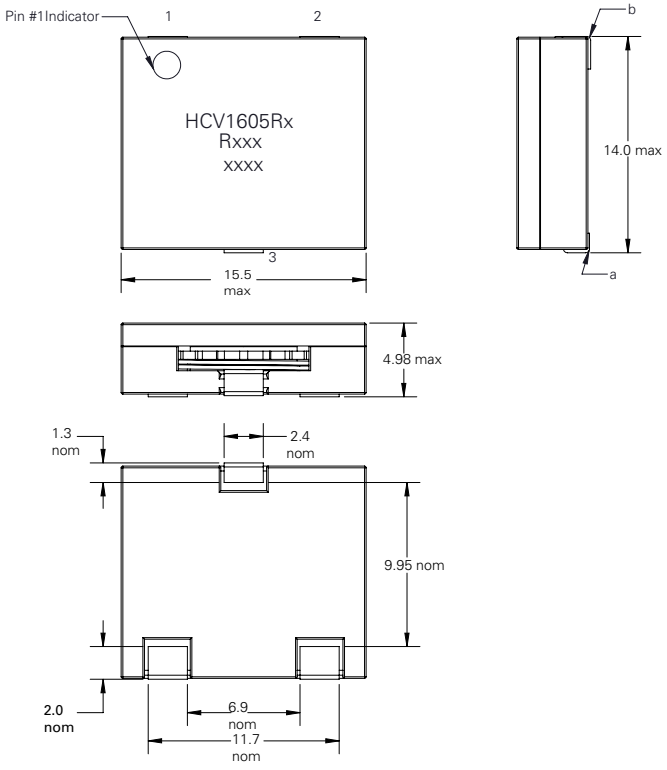
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## Product specifications

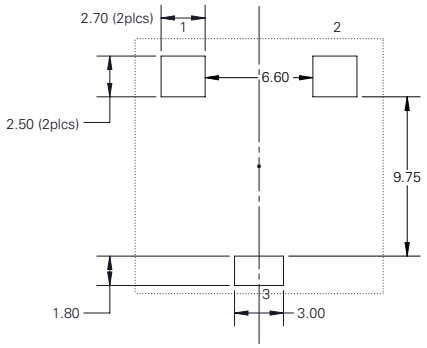
| Part Number[7] | OCL[1] (µH) | FLL[2] (µH) minimum | $I_{rms}$[3] (A) | $I_{sat}1$[4] (A) | $I_{sat}2$[5] (A) | $I_{sat}3$[6] (A) | DCR (mΩ) maximum @ +20 °C |
|---|---|---|---|---|---|---|---|
| HCV1605R1-R375-R | 0.375 ±6% | 0.346 | 20 | 60 | 53 | 50 | 1.98 |
| HCV1605R1-R500-R | 0.500 ±10% | 0.441 | 20 | 45 | 40 | 37 | 1.98 |

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.1 Vrms, 0.0 Adc, +25 °C
2. Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.1 Vrms, $I_{sat}1$, +25 °C
3. $I_{rms}$: DC current for an approximate temperature rise 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.
4. $I_{sat}1$: Peak current for approximately 2% rolloff @ +25 °C
5. $I_{sat}2$: Peak current for approximately 20% rolloff @ +100 °C
6. $I_{sat}3$: Peak current for approximately 20% rolloff @ +125 °C
7. Part Number Definition: HCV1605Rx-Rxxx-R
   HCV1605= Product code and size
   Rx= Version indicator
   Rxxx= Inductance value in µH, R= decimal point,
   If no R is present last character equals number of zeros
   -R suffix = RoHS compliant

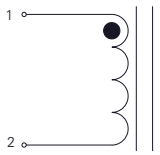
## Dimensions (mm)




Recommended Pad Layout



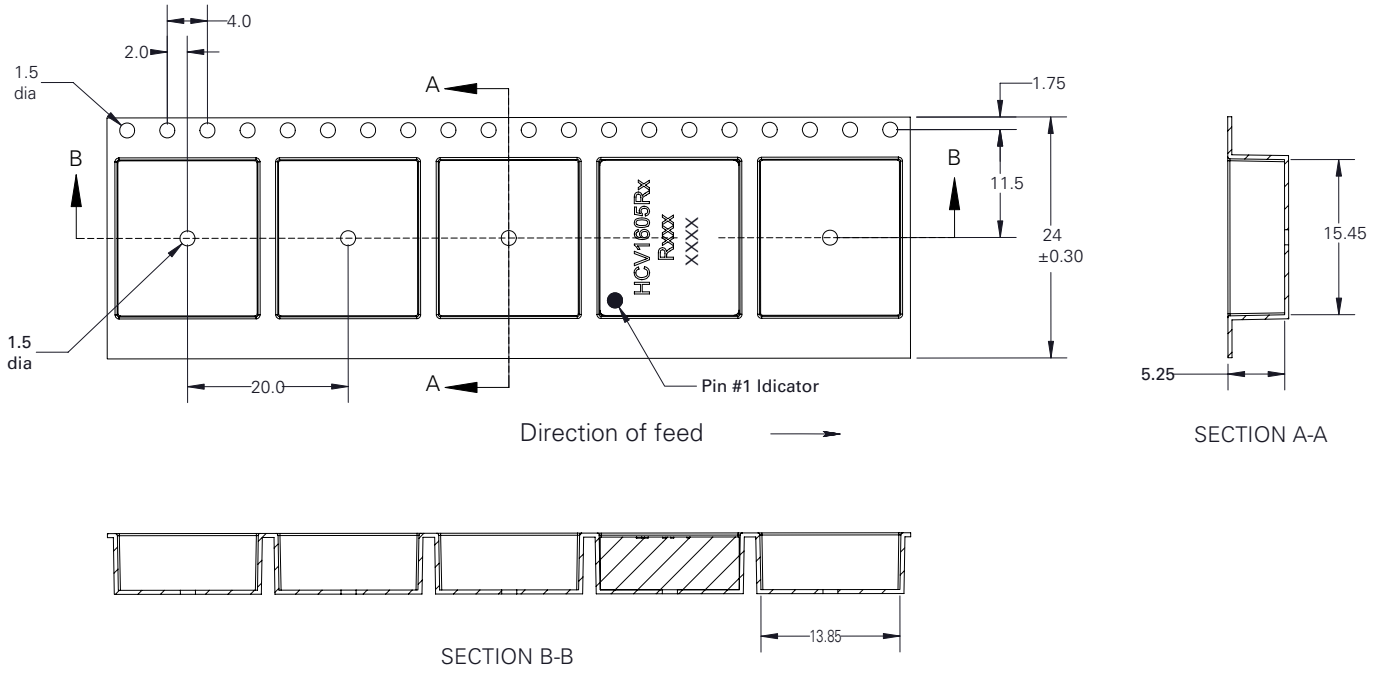

Schematic



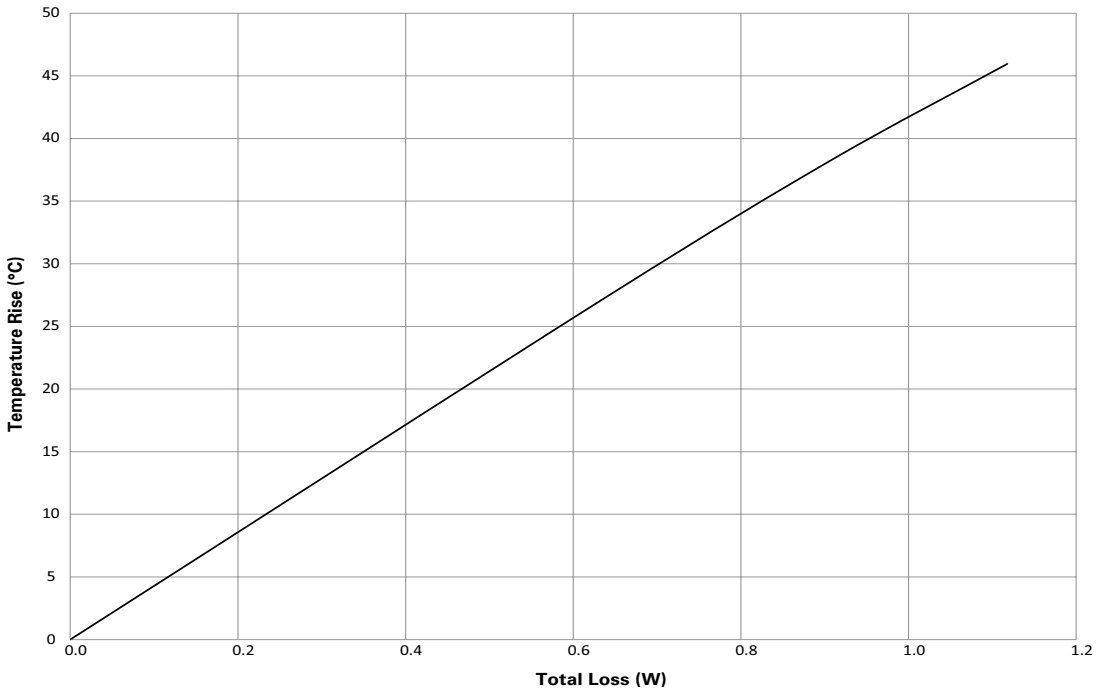

Part marking: HCV1605Rx-Rxxx, Rx= version indicator, Rxxx= inductance value in uH, R= decimal point, if no R is present last character equals number of zeros
xxxx=lot code
All soldering surface to be coplanar within 0.1 millimeters
Tolerances are ±0.15 millimeters unless stated otherwise
Pad layout tolerances are ±0.1 millimeters unless stated otherwise
Pin 3 is for mounting stability. No connection.
Terminal: Pins (1,2) - Copper, Pin (3) - Bronze
Terminal finish: Pins (1,2) Tin-silver-copper, Pin (3) Copper-nickel-gold
Do not route traces or vias underneath the inductor

**Packaging information (mm)**

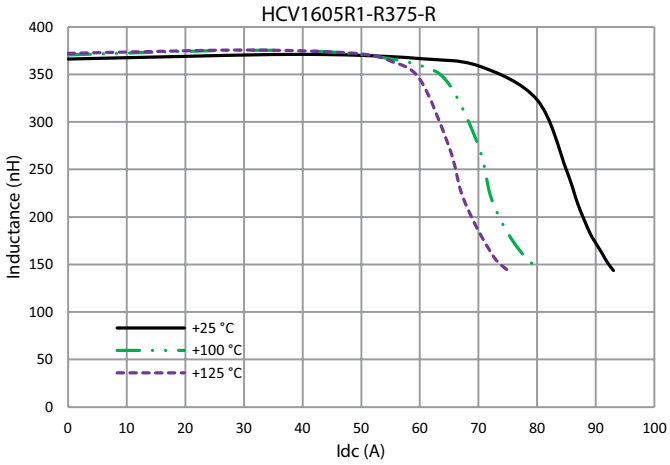
Supplied in tape and reel packaging , 500 parts per 13" diameter reel

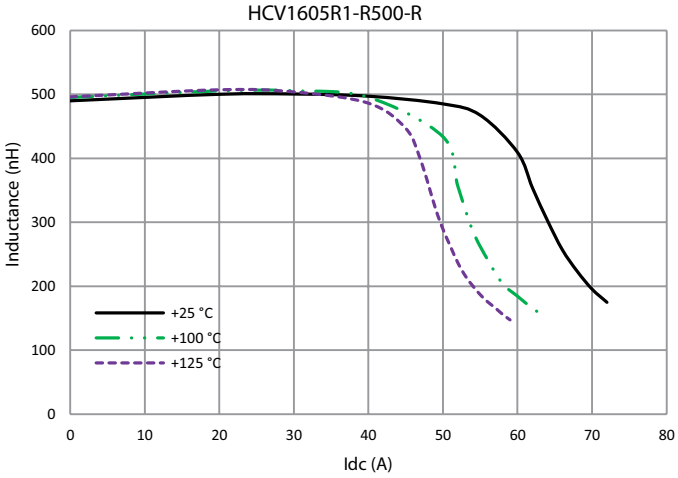



**Temperature rise vs. total loss**



**Inductance characteristics**



## Solder reflow profile

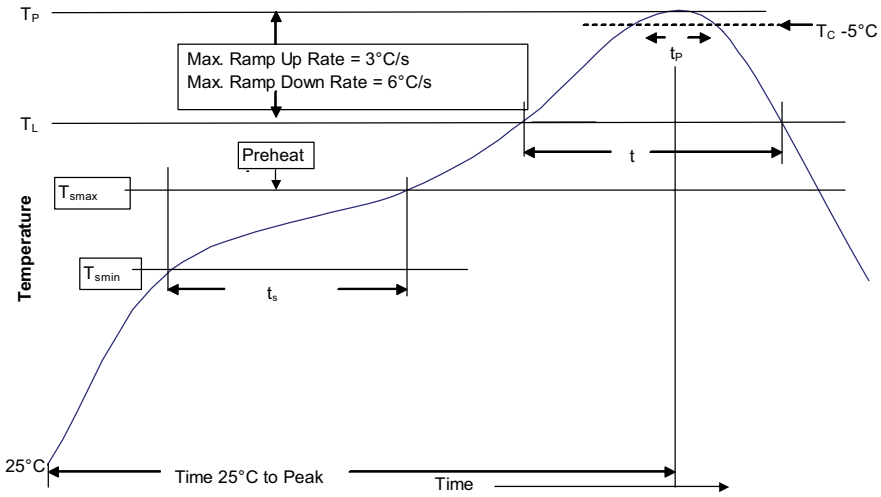



**Table 1 - Standard SnPb Solder ($T_C$)**

| 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-020

| 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 (Tp)* | | 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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