

# WCL2520

## Wire wound chip inductor



### Product features

- 1008 (2520 metric) package
- High Q value
- Tight inductance tolerance
- Inductance range from 0.12  $\mu$ H to 220  $\mu$ H
- Moisture sensitivity level (MSL): 1

### Applications

- Industrial connectivity (IoT)
- Computing/gaming consoles
- Smart meters
- Industrial equipment
- Machine-to-machine (M2M)
- Mobile phones
- Wearable devices
- Wireless LAN
- Wireless communications
  - Bluetooth
  - WiFi
  - Antenna
- RF transceiver modules

### Environmental data

- Operating temperature range: -40 °C to +85 °C
- Solder reflow temperature:  
J-STD-020 (latest revision) compliant



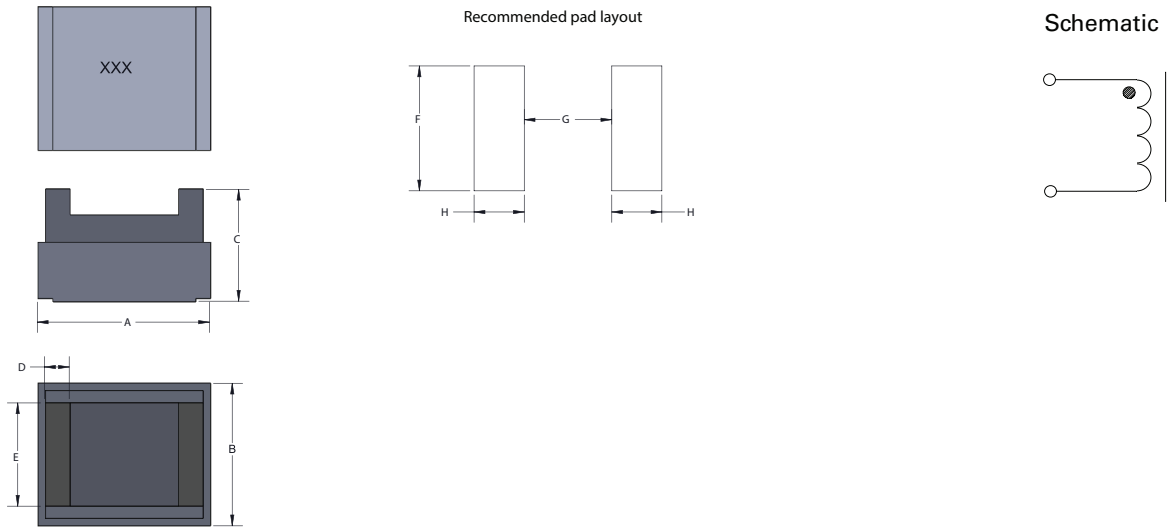
Product specifications

| Part number    | OCL (uH) ±5% | I Rated (mA) maximum | OCL Test frequency (MHz) | Test voltage (mV) | DCR (Ω) maximum @ +25°C | SRF (MHz) minimum | Q minimum | Q Test frequency (MHz) |
|----------------|--------------|----------------------|--------------------------|-------------------|-------------------------|-------------------|-----------|------------------------|
| WCL2520-R120-R | 0.12         | 800                  | 25.2                     | 500               | 0.15                    | 850               | 12        | 25.2                   |
| WCL2520-R390-R | 0.39         | 600                  | 25.2                     | 500               | 0.29                    | 480               | 12        | 25.2                   |
| WCL2520-R560-R | 0.56         | 600                  | 25.2                     | 500               | 0.42                    | 330               | 12        | 25.2                   |
| WCL2520-R680-R | 0.68         | 600                  | 25.2                     | 500               | 0.45                    | 330               | 12        | 25.2                   |
| WCL2520-R820-R | 0.82         | 600                  | 25.2                     | 500               | 0.62                    | 300               | 12        | 25.2                   |
| WCL2520-1R0-R  | 1.0          | 580                  | 25.2                     | 500               | 0.55                    | 300               | 12        | 25.2                   |
| WCL2520-1R2-R  | 1.2          | 550                  | 7.96                     | 500               | 0.75                    | 250               | 12        | 7.96                   |
| WCL2520-1R5-R  | 1.5          | 400                  | 7.96                     | 500               | 0.85                    | 230               | 12        | 7.96                   |
| WCL2520-1R8-R  | 1.8          | 320                  | 7.96                     | 500               | 0.95                    | 168               | 12        | 7.96                   |
| WCL2520-2R2-R  | 2.2          | 315                  | 7.96                     | 500               | 1.3                     | 150               | 12        | 7.96                   |
| WCL2520-2R7-R  | 2.7          | 300                  | 7.96                     | 500               | 1.4                     | 100               | 12        | 7.96                   |
| WCL2520-3R3-R  | 3.3          | 280                  | 7.96                     | 500               | 1.5                     | 80                | 12        | 7.96                   |
| WCL2520-3R9-R  | 3.9          | 250                  | 7.96                     | 500               | 1.55                    | 60                | 12        | 7.96                   |
| WCL2520-4R7-R  | 4.7          | 210                  | 7.96                     | 500               | 1.72                    | 50                | 12        | 7.96                   |
| WCL2520-5R6-R  | 5.6          | 190                  | 7.96                     | 500               | 1.9                     | 40                | 12        | 7.96                   |
| WCL2520-6R8-R  | 6.8          | 175                  | 7.96                     | 500               | 2.0                     | 35                | 12        | 7.96                   |
| WCL2520-8R2-R  | 8.2          | 160                  | 7.96                     | 500               | 2.2                     | 25                | 12        | 7.96                   |
| WCL2520-100-R  | 10           | 155                  | 2.52                     | 500               | 2.5                     | 25                | 10        | 2.52                   |
| WCL2520-120-R  | 12           | 145                  | 2.52                     | 500               | 2.6                     | 20                | 10        | 2.52                   |
| WCL2520-150-R  | 15           | 130                  | 2.52                     | 500               | 3.0                     | 20                | 10        | 2.52                   |
| WCL2520-180-R  | 18           | 130                  | 2.52                     | 500               | 3.0                     | 20                | 10        | 2.52                   |
| WCL2520-220-R  | 22           | 105                  | 2.52                     | 500               | 3.9                     | 18                | 10        | 2.52                   |
| WCL2520-270-R  | 27           | 100                  | 2.52                     | 500               | 4.0                     | 10                | 10        | 2.52                   |
| WCL2520-330-R  | 33           | 85                   | 2.52                     | 500               | 4.8                     | 8                 | 10        | 2.52                   |
| WCL2520-390-R  | 39           | 80                   | 2.52                     | 500               | 5.0                     | 7                 | 10        | 2.52                   |
| WCL2520-470-R  | 47           | 60                   | 2.52                     | 500               | 5.7                     | 7                 | 10        | 2.52                   |
| WCL2520-560-R  | 56           | 55                   | 2.52                     | 500               | 6.0                     | 6.5               | 10        | 2.52                   |
| WCL2520-680-R  | 68           | 50                   | 2.52                     | 500               | 6.7                     | 6.5               | 10        | 2.52                   |
| WCL2520-820-R  | 82           | 45                   | 2.52                     | 500               | 7.5                     | 6.5               | 10        | 2.52                   |
| WCL2520-101-R  | 100          | 40                   | 0.796                    | 500               | 11                      | 4.5               | 8         | 0.796                  |
| WCL2520-121-R  | 120          | 30                   | 0.796                    | 500               | 13                      | 3                 | 8         | 0.796                  |
| WCL2520-151-R  | 150          | 25                   | 0.796                    | 500               | 15                      | 3                 | 8         | 0.796                  |
| WCL2520-221-R  | 220          | 20                   | 0.796                    | 500               | 18                      | 2.5               | 8         | 0.796                  |

1. Test frequency and voltage at +25 °C. Test voltage is for both OCL and Q.
2. Resistance to soldering heat: +260 ±5 °C for 10 ± 1 second
3. At low temperature resistance (-40 ±2°C) the inductance change is within ±5% and the Q within ±10%
4. At high temperature resistance (+85 ±5°C) the inductance change is within ±5% and the Q within ±10%
5. At high temperature load (+85 ±2°C) the inductance change is within ±5% and the Q within ±10%

6. Insulation Resistance: ≥ 500 MΩ with an input voltage of 100 V ±15 Vdc
7. Temperature Characteristics: From -40 °C to +85 °C the inductance is within ±5%
8. Rated I: When rated I is applied to the product, self-temperature rise will be 20 °C or less.
9. Part Number Definition: WCL2520-xxx-R  
 WCL2520 = 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 = RoHS compliant

**Dimensions (mm)**

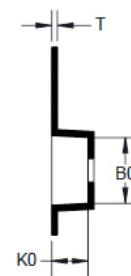
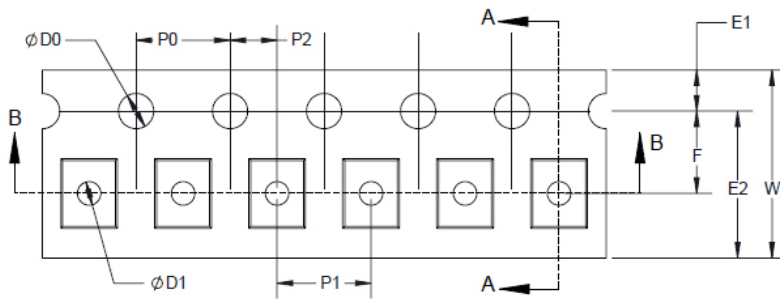


| Part Number   | A        | B        | C        | D        | E       | F    | G    | H    |
|---------------|----------|----------|----------|----------|---------|------|------|------|
| WCL2520-xxx-R | 2.92 max | 2.79 max | 2.10 max | 0.50 ref | 2.0 ref | 2.54 | 1.27 | 1.02 |

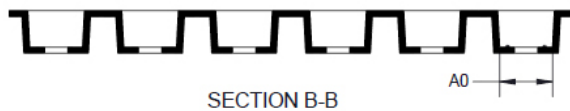
Part marking: xxx= Inductance value in uH, R=decimal point. If no R is present then last character equals number of zeros  
 All soldering surfaces to be coplanar within 0.1 millimeters  
 Tolerances are ±0.2 millimeters unless stated otherwise  
 Pad layout tolerances are ±0.1 millimeters unless stated otherwise  
 Do not route traces or vias underneath the inductor

**Packaging information (mm)**

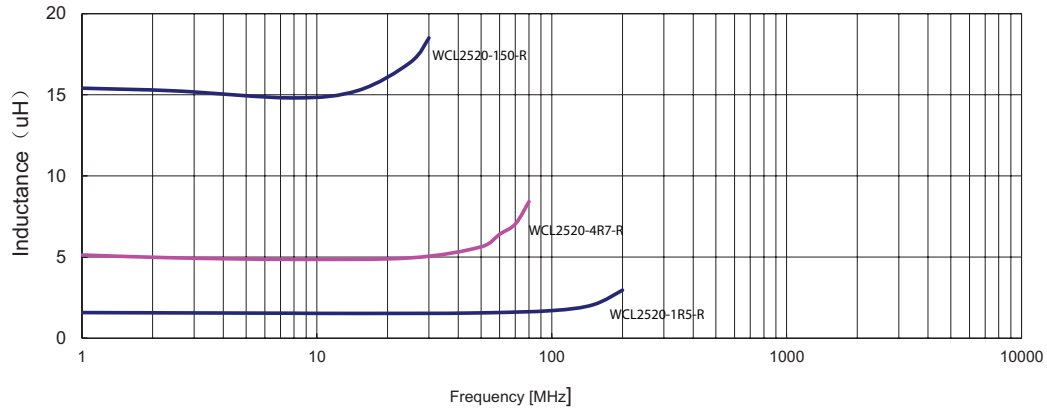
Drawing not to scale  
 Supplied in tape and reel packaging, 2000 parts per 7" diameter reel



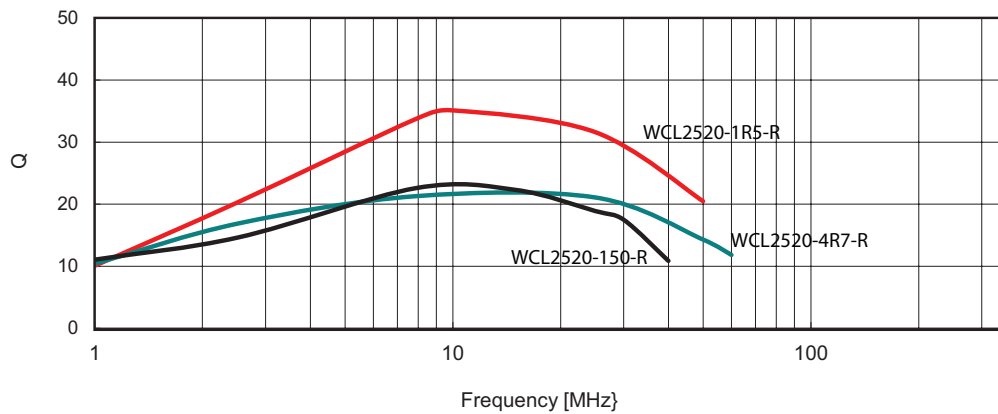
|                   |             |
|-------------------|-------------|
| $W \pm 0.30$      | 8.00        |
| $F \pm 0.05$      | 3.50        |
| $E1 \pm 0.10$     | 1.75        |
| E2 Min            | 6.25        |
| $P0 \pm 0.10$     | 4.00        |
| $P1 \pm 0.10$     | 4.00        |
| $P2 \pm 0.05$     | 2.00        |
| $D0 + 0.10 / - 0$ | 1.50        |
| $D1 + 0.10 / - 0$ | 0.65        |
| A0                | 2.73 ± 0.05 |
| B0                | 2.9 ± 0.10  |
| K0                | 2.34 ± 0.10 |
| T Max             | 0.25        |



**Inductance vs frequency**



**Q vs frequency**



Solder reflow profile

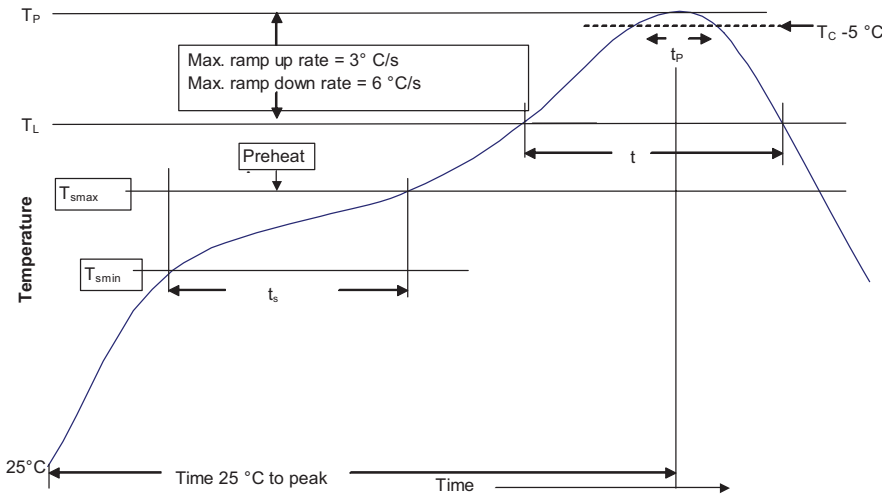


Table 1 - Standard SnPb solder ( $T_C$ )

| Package Thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> ≥350 |
|-------------------|-----------------------------|-----------------------------|
| <2.5 mm)          | 235 °C                      | 220 °C                      |
| ≥2.5 mm           | 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 |
|-------------------|-----------------------------|-----------------------------------|------------------------------|
| <1.6 mm           | 260 °C                      | 260 °C                            | 260 °C                       |
| 1.6 – 2.5 mm      | 260 °C                      | 250 °C                            | 245 °C                       |
| >2.5 mm           | 250 °C                      | 245 °C                            | 245 °C                       |

Reference 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 ( $T_L$ )  | 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 ( $T_C$ ) | 10 seconds**         | 10 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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