MPI25-V2
High current, low profile, miniature power inductors

Product features
• High current carrying capacity in a compact standard 1008 (2520 metric) footprint
• Magnetically shielded, Low EMI
• Rugged construction
• Self resonant frequency (SRF) greater than 25 MHz
• Inductance range from 0.33 μH to 4.7 μH
• Current range from 1.2 A to 7.5 A
• 2.7 mm x 2.2 mm footprint surface mount package in 1.05 mm, 1.25 mm heights
• Moisture Sensitivity Level (MSL): 1

Applications
• Mobile/smart phones
• Handheld/mobile equipment
• Tablets/e-readers
• Digital cameras
• Wearable devices
• Notebook/netbook/laptop regulators
• Portable media players

Environmental data
• Storage temperature range (Component): -40 °C to +125 °C
• Operating temperature range: -40 °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 specifications

<table>
<thead>
<tr>
<th>Part Number</th>
<th>OCL (μH) ±20%</th>
<th></th>
<th></th>
<th>DCR (mΩ)</th>
<th>DCR (mΩ)</th>
<th>SRF (MHz)</th>
<th>K-factor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>typical @ +20 °C</td>
<td>maximum @ +20 °C</td>
<td>typical</td>
<td></td>
</tr>
<tr>
<td>1.0 mm height</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPI2510V2-R33-R</td>
<td>0.33</td>
<td>4.8</td>
<td>6.6</td>
<td>15</td>
<td>20</td>
<td>120</td>
<td>6336</td>
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<tr>
<td>MPI2510V2-R47-R</td>
<td>0.47</td>
<td>4.4</td>
<td>6.0</td>
<td>19</td>
<td>25</td>
<td>100</td>
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<tr>
<td>MPI2510V2-R68-R</td>
<td>0.68</td>
<td>3.1</td>
<td>4.3</td>
<td>37</td>
<td>44</td>
<td>80</td>
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<tr>
<td>MPI2510V2-1RD-R</td>
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<td>3.1</td>
<td>4.3</td>
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<td>52</td>
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<tr>
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<td>2.5</td>
<td>2.5</td>
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<td>85</td>
<td>45</td>
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<td>110</td>
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<td>140</td>
<td>170</td>
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<td>MPI2510V2-4R7-R</td>
<td>4.70</td>
<td>1.22</td>
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<td>220</td>
<td>262</td>
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<td>1616</td>
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<tr>
<td>1.2 mm height</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>MPI2512V2-R33-R</td>
<td>0.33</td>
<td>5.1</td>
<td>7.5</td>
<td>14</td>
<td>19</td>
<td>130</td>
<td>6560</td>
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<tr>
<td>MPI2512V2-R47-R</td>
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<td>4.9</td>
<td>6.7</td>
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<td>23</td>
<td>100</td>
<td>3628</td>
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<tr>
<td>MPI2512V2-R68-R</td>
<td>0.68</td>
<td>3.4</td>
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<td>35</td>
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<tr>
<td>MPI2512V2-1RD-R</td>
<td>1.00</td>
<td>3.3</td>
<td>4.4</td>
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<td>44</td>
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<td>3083</td>
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<tr>
<td>MPI2512V2-1R5-R</td>
<td>1.50</td>
<td>2.3</td>
<td>3.2</td>
<td>64</td>
<td>77</td>
<td>45</td>
<td>4850</td>
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<tr>
<td>MPI2512V2-2R2-R</td>
<td>2.20</td>
<td>2.2</td>
<td>3.5</td>
<td>73</td>
<td>87</td>
<td>30</td>
<td>2924</td>
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<tr>
<td>MPI2512V2-3R3-R</td>
<td>3.30</td>
<td>1.8</td>
<td>2.8</td>
<td>110</td>
<td>135</td>
<td>35</td>
<td>1965</td>
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<tr>
<td>MPI2512V2-4R7-R</td>
<td>4.70</td>
<td>1.4</td>
<td>1.9</td>
<td>196</td>
<td>235</td>
<td>25</td>
<td>1580</td>
</tr>
</tbody>
</table>

1. Open Circuit Inductance (OCL) Test Parameters: 1.0 MHz, 0.1 Vrms, 0.0 Adc, +25 °C.
2. 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.
3. I_{sat}: Peak current for approximately 30% rolloff @ +25 °C.
4. K-factor: Used to determine Bp-p for core loss (see graph). Bp-p = K * L * ΔI. Bp-p (Gauss), K: (K-factor from table), L: (Inductance in μH), ΔI (Peak to peak ripple current in Amps).
5. Part Number Definition: MPI25xxV2-xxx-R
   - MPI25 = Product code
   - xx= Height indicator
   - V2=Version indicator
   - xxx= inductance value in μH, R= decimal point, If no R is present then last character equals number of zeros
   - R suffix = RoHS compliant

Dimensions (mm)

<table>
<thead>
<tr>
<th>Dimension A</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPI2510V2</td>
</tr>
<tr>
<td>MPI2512V2</td>
</tr>
</tbody>
</table>

No marking
All soldering surfaces to be coplanar within 0.10 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
MPI25-V2
High current, low profile, miniature power inductors

Packaging information (mm)
Supplied in tape and reel packaging, 3000 parts per 7” diameter reel

Core loss vs. Bp-p (+25 °C)
Core loss vs. Bp-p (+25 °C)

**MPI2510V2-R68-R**

**MPI2510V2-1R0-R**

**MPI2510V2-1R5-R**

**MPI2510V2-2R2-R**

**MPI2510V2-3R3-R**

**MPI2510V2-4R7-R**
Core loss vs. Bp-p (+25 °C)

MPI2512V2-R33-R

MPI2512V2-R47-R

MPI2512V2-R68-R

MPI2512V2-1R0-R

MPI2512V2-1R5-R

MPI2512V2-2R2-R

Core loss vs. Bp-p (+25 °C)
**Core loss vs. Bp-p (+25 °C)**

**Inductance and Q vs. Frequency**
Inductance and Q vs. Frequency

**MPI2510V2-1R5-R**

- **Frequency (MHz):** 0.1 to 1000.0
- **Inductance (uH):** 0 to 3.0
- **Q value:** 0 to 35

**MPI2510V2-2R2-R**

- **Frequency (MHz):** 0.1 to 1000.0
- **Inductance (uH):** 0 to 5.0
- **Q value:** 0 to 35

**MPI2510V2-3R3-R**

- **Frequency (MHz):** 0.1 to 1000.0
- **Inductance (uH):** 0 to 9.0
- **Q value:** 0 to 45

**MPI2510V2-4R7-R**

- **Frequency (MHz):** 0.1 to 1000.0
- **Inductance (uH):** 0 to 3.0
- **Q value:** 0 to 35

**MPI2512V2-R33-R**

- **Frequency (MHz):** 0.1 to 1000.0
- **Inductance (uH):** 0 to 0.15
- **Q value:** 0 to 0.8

**MPI2512V2-R47-R**

- **Frequency (MHz):** 0.1 to 1000.0
- **Inductance (uH):** 0 to 0.15
- **Q value:** 0 to 0.8
Inductance and Q vs. Frequency

MPI2512V2-R68-R

MPI2512V2-R0-R

MPI2512V2-1R0-R

MPI2512V2-2R2-R

MPI2512V2-3R3-R

MPI2512V2-4R7-R
Inductance and temperature rise vs. Current

MPI2510V2-R33-R

MPI2510V2-R47-R

MPI2510V2-R68-R

MPI2510V2-1R0-R

MPI2510V2-1R5-R

MPI2510V2-2R2-R
Inductance and temperature rise vs. Current

MPI2510V2-3R3-R

MPI2510V2-4R7-R

MPI2512V2-R33-R

MPI2512V2-R47-R

MPI2512V2-R68-R

MPI2512V2-1R0-R
Inductance and temperature rise vs. Current

MPI2512V2-1R5-R

Inductance (μH) vs. Idc (A)

Temperature rise (°C)

MPI2512V2-2R2-R

Inductance (μH) vs. Idc (A)

Temperature rise (°C)

MPI2512V2-3R3-R

Inductance (μH) vs. Idc (A)

Temperature rise (°C)

MPI2512V2-4R7-R

Inductance (μH) vs. Idc (A)

Temperature rise (°C)
Solder reflow profile

![Solder reflow profile diagram]

Reference JDEC J-STD-020

<table>
<thead>
<tr>
<th>Profile Feature</th>
<th>Standard SnPb Solder</th>
<th>Lead (Pb) Free Solder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preheat and Soak</td>
<td>• Temperature min. (T_{\text{min}}) 100 °C</td>
<td>150 °C</td>
</tr>
<tr>
<td></td>
<td>• Temperature max. (T_{\text{max}}) 150 °C</td>
<td>200 °C</td>
</tr>
<tr>
<td></td>
<td>• Time (T_{\text{min}}) to (T_{\text{max}}) (t) 60-120 Seconds</td>
<td>60-120 Seconds</td>
</tr>
<tr>
<td>Average ramp up rate (T_{\text{max}}) to (T_{\text{p}})</td>
<td>3°C/ Second Max.</td>
<td>3 °C/ Second Max.</td>
</tr>
<tr>
<td>Liquidous temperature (T_{l})</td>
<td>183 °C</td>
<td>217 °C</td>
</tr>
<tr>
<td>Time at liquidous (T_{l})</td>
<td>60-150 Seconds</td>
<td>60-150 Seconds</td>
</tr>
<tr>
<td>Peak package body temperature (T_{p})*</td>
<td>Table 1</td>
<td>Table 2</td>
</tr>
<tr>
<td>Time (T_{p})* within 5 °C of the specified classification temperature (T_{c})</td>
<td>20 Seconds**</td>
<td>30 Seconds**</td>
</tr>
<tr>
<td>Average ramp-down rate (T_{p}) to (T_{\text{max}})</td>
<td>6 °C/ Second Max.</td>
<td>6 °C/ Second Max.</td>
</tr>
<tr>
<td>Time 25 °C to Peak Temperature</td>
<td>6 Minutes Max.</td>
<td>8 Minutes Max.</td>
</tr>
</tbody>
</table>

* 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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