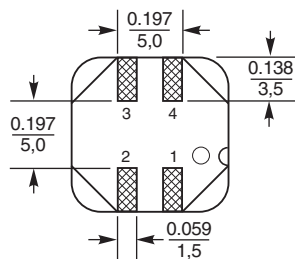
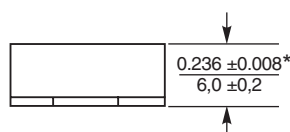
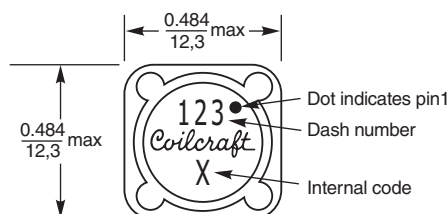


**NEW!**

# Coupled Inductors – MSD1260T

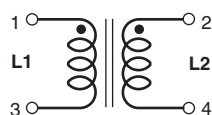
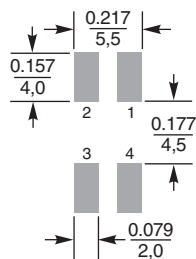
For high temperature applications



\* For optional tin-lead and tin-silver-copper terminations, dimensions are for the mounted part. Dimensions before mounting can be an additional 0.012 inch (0.3 mm).

Dimensions are in  $\frac{\text{inches}}{\text{mm}}$

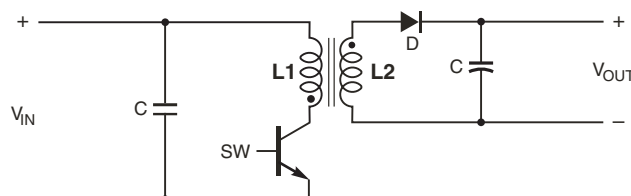
## Recommended Land Pattern



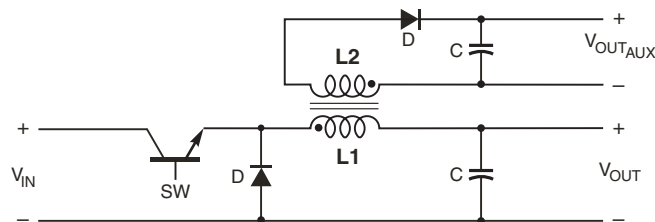
The MSD1260T series of shielded coupled inductors was designed specifically for high temperature applications – up to 125°C ambient.

Tight coupling ( $k \geq 0.94$ ) and 500 V isolation make them ideal for use in a variety of circuits including flyback, multi-output buck and SEPIC. These parts provide high inductance, high efficiency and excellent current handling.

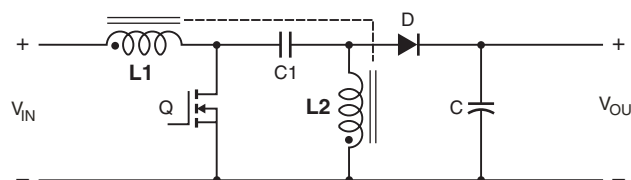
They can also be used as two single inductors connected in series or parallel or as a common mode choke.



Typical Flyback Converter



Typical Buck Converter with auxiliary output



Typical SEPIC schematic

**Core material** Ferrite

**Terminations** RoHS compliant matte tin over nickel over phos bronze. Other terminations available at additional cost.

**Weight:** 2.8 – 3.2 g

**Ambient temperature** –40°C to +125°C with  $I_{rms}$  current, +125°C to +165°C with derated current

**Storage temperature** Component: –40°C to +165°C.

**Packaging:** –40°C to +80°C

**Winding-to-winding and winding-to-core isolation** 500 Vrms

**Resistance to soldering heat** Max three 40 second reflows at +260°C, parts cooled to room temperature between cycles

**Moisture Sensitivity Level (MSL)** 1 (unlimited floor life at <30°C / 85% relative humidity)

**Failures in Time (FIT) / Mean Time Between Failures (MTBF)**

38 per billion hours / 26,315,789 hours, calculated per Telcordia SR-332

**Packaging** 500/13" reel; Plastic tape: 24 mm wide, 0.35 mm thick, 16 mm pocket spacing, 6.6 mm pocket depth

**PCB washing** Only pure water or alcohol recommended



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**NEW!**

# High Temperature Coupled Inductors – MSD1260T

| Part number <sup>1</sup> | Inductance <sup>2</sup><br>(μH) | DCR<br>max <sup>3</sup><br>(Ohms) | SRF<br>typ <sup>4</sup><br>(MHz) | Coupling<br>coefficient<br>typ | Leakage<br>L typ <sup>5</sup><br>(μH) | Isat (A) <sup>6</sup> |             |             | Irms (A)                      |                             |
|--------------------------|---------------------------------|-----------------------------------|----------------------------------|--------------------------------|---------------------------------------|-----------------------|-------------|-------------|-------------------------------|-----------------------------|
|                          |                                 |                                   |                                  |                                |                                       | 10%<br>drop           | 20%<br>drop | 30%<br>drop | both<br>windings <sup>7</sup> | one<br>winding <sup>8</sup> |
| MSD1260T-332ML_          | 3.3 ±20%                        | 0.020                             | 52.0                             | 0.97                           | 0.20                                  | 11.50                 | 12.90       | 14.10       | 3.60                          | 6.10                        |
| MSD1260T-472ML_          | 4.7 ±20%                        | 0.036                             | 38.0                             | 0.98                           | 0.20                                  | 9.00                  | 10.18       | 11.08       | 3.16                          | 4.47                        |
| MSD1260T-562ML_          | 5.6 ±20%                        | 0.040                             | 30.0                             | 0.98                           | 0.20                                  | 8.00                  | 9.06        | 9.84        | 3.00                          | 4.24                        |
| MSD1260T-682ML_          | 6.8 ±20%                        | 0.048                             | 27.0                             | 0.98                           | 0.24                                  | 7.00                  | 8.00        | 8.64        | 2.75                          | 3.88                        |
| MSD1260T-822ML_          | 8.2 ±20%                        | 0.052                             | 26.0                             | 0.98                           | 0.25                                  | 6.44                  | 7.38        | 7.98        | 2.63                          | 3.72                        |
| MSD1260T-103ML_          | 10 ±20%                         | 0.060                             | 22.0                             | 0.99                           | 0.26                                  | 5.40                  | 6.32        | 6.88        | 2.45                          | 3.46                        |
| MSD1260T-123ML_          | 12 ±20%                         | 0.074                             | 20.0                             | 0.99                           | 0.28                                  | 5.30                  | 6.18        | 6.70        | 2.21                          | 3.12                        |
| MSD1260T-153ML_          | 15 ±20%                         | 0.085                             | 18.0                             | 0.99                           | 0.32                                  | 4.60                  | 5.30        | 5.80        | 2.06                          | 2.92                        |
| MSD1260T-183ML_          | 18 ±20%                         | 0.097                             | 16.0                             | 0.99                           | 0.40                                  | 4.50                  | 5.22        | 5.68        | 1.93                          | 2.73                        |
| MSD1260T-223ML_          | 22 ±20%                         | 0.116                             | 15.0                             | 0.98                           | 0.67                                  | 4.00                  | 4.62        | 5.02        | 1.76                          | 2.49                        |
| MSD1260T-273ML_          | 27 ±20%                         | 0.124                             | 13.0                             | 0.99                           | 0.50                                  | 3.60                  | 4.14        | 4.50        | 1.70                          | 2.41                        |
| MSD1260T-333ML_          | 33 ±20%                         | 0.134                             | 12.4                             | 0.99                           | 0.65                                  | 3.30                  | 3.80        | 4.14        | 1.64                          | 2.32                        |
| MSD1260T-393ML_          | 39 ±20%                         | 0.142                             | 12.0                             | 0.99                           | 1.09                                  | 3.00                  | 3.48        | 3.82        | 1.59                          | 2.25                        |
| MSD1260T-473ML_          | 47 ±20%                         | 0.174                             | 11.6                             | 0.99                           | 0.80                                  | 2.70                  | 3.12        | 3.40        | 1.44                          | 2.03                        |
| MSD1260T-563ML_          | 56 ±20%                         | 0.198                             | 10.5                             | 0.99                           | 0.75                                  | 2.50                  | 2.90        | 3.14        | 1.35                          | 1.91                        |
| MSD1260T-683ML_          | 68 ±20%                         | 0.216                             | 10.0                             | >0.99                          | 0.57                                  | 2.30                  | 2.66        | 2.88        | 1.29                          | 1.83                        |
| MSD1260T-823ML_          | 82 ±20%                         | 0.274                             | 8.6                              | 0.99                           | 1.52                                  | 2.10                  | 2.40        | 2.60        | 1.15                          | 1.62                        |
| MSD1260T-104ML_          | 100 ±20%                        | 0.322                             | 7.8                              | 0.99                           | 1.41                                  | 1.90                  | 2.18        | 2.38        | 1.06                          | 1.50                        |
| MSD1260T-124KL_          | 120 ±10%                        | 0.418                             | 6.8                              | 0.99                           | 1.34                                  | 1.60                  | 1.84        | 2.04        | 0.93                          | 1.31                        |
| MSD1260T-154KL_          | 150 ±10%                        | 0.476                             | 6.4                              | 0.99                           | 1.52                                  | 1.50                  | 1.76        | 1.92        | 0.87                          | 1.23                        |
| MSD1260T-184KL_          | 180 ±10%                        | 0.536                             | 6.1                              | 0.99                           | 1.80                                  | 1.40                  | 1.64        | 1.78        | 0.82                          | 1.16                        |
| MSD1260T-224KL_          | 220 ±10%                        | 0.691                             | 5.5                              | >0.99                          | 1.60                                  | 1.30                  | 1.48        | 1.60        | 0.72                          | 1.02                        |
| MSD1260T-274KL_          | 270 ±10%                        | 0.806                             | 4.3                              | >0.99                          | 2.23                                  | 1.10                  | 1.30        | 1.40        | 0.67                          | 0.95                        |
| MSD1260T-334KL_          | 330 ±10%                        | 1.09                              | 4.0                              | >0.99                          | 2.39                                  | 1.00                  | 1.16        | 1.26        | 0.57                          | 0.81                        |
| MSD1260T-394KL_          | 390 ±10%                        | 1.20                              | 3.6                              | >0.99                          | 3.72                                  | 0.950                 | 1.11        | 1.23        | 0.55                          | 0.77                        |
| MSD1260T-474KL_          | 470 ±10%                        | 1.59                              | 3.0                              | >0.99                          | 2.89                                  | 0.900                 | 0.994       | 1.09        | 0.48                          | 0.67                        |
| MSD1260T-564KL_          | 560 ±10%                        | 1.81                              | 2.8                              | >0.99                          | 2.55                                  | 0.800                 | 0.908       | 0.948       | 0.45                          | 0.63                        |
| MSD1260T-684KL_          | 680 ±10%                        | 2.06                              | 2.6                              | >0.99                          | 5.76                                  | 0.700                 | 0.804       | 0.874       | 0.42                          | 0.59                        |
| MSD1260T-824KL_          | 820 ±10%                        | 2.65                              | 2.5                              | >0.99                          | 2.86                                  | 0.640                 | 0.732       | 0.802       | 0.37                          | 0.52                        |
| MSD1260T-105KL_          | 1000 ±10%                       | 3.06                              | 2.4                              | >0.99                          | 4.32                                  | 0.590                 | 0.674       | 0.728       | 0.34                          | 0.49                        |

1. When ordering, please specify **termination** and **packaging** codes:

## MSD1260T-105KLD

**Termination:** L = RoHS compliant matte tin over nickel over phos bronze.

Special order: T = RoHS tin-silver-copper (95.5/4/0.5) or S = non-RoHS tin-lead (63/37).

**Packaging:** D = 13" machine-ready reel. EIA-481 embossed plastic tape (500 parts per full reel).

B = Less than full reel. In tape, but not machine ready. To have a leader and trailer added (\$25 charge), use code letter D instead.

- Inductance shown for each winding, measured at 100 kHz, 0.1 Vrms, 0 A on an Agilent/HP 4284A LCR meter or equivalent. When leads are connected in parallel, inductance is the same value. When leads are connected in series, inductance is four times the value.
- DCR is for each winding. When leads are connected in parallel, DCR is half the value. When leads are connected in series, DCR is twice the value.
- SRF measured using an Agilent/HP 4191A or equivalent. When leads are connected in parallel, SRF is the same value.
- Leakage inductance is for L1 and is measured with L2 shorted.
- DC current, at which the inductance drops the specified amount from its value without current. It is the sum of the current flowing in both windings.
- Equal current when applied to each winding simultaneously that causes a 40°C temperature rise from 25°C ambient. See temperature rise calculation.
- Maximum current when applied to one winding that causes a 40°C temperature rise from 25°C ambient. See temperature rise calculation.
- Electrical specifications at 25°C.

Refer to Doc 639 "Selecting Coupled Inductors for SEPIC Applications."

Refer to Doc 362 "Soldering Surface Mount Components" before soldering.

## Temperature rise calculation based on specified Irms:

Winding power loss =  $(I_{L1}^2 + I_{L2}^2) \times \text{DCR}$  in Watts (W)

Temperature rise ( $\Delta t$ ) = Winding power loss  $\times \frac{55.6^\circ\text{C}}{\text{W}}$

$\Delta t = (I_{L1}^2 + I_{L2}^2) \times \text{DCR} \times \frac{55.6^\circ\text{C}}{\text{W}}$

**Example 1.** MSD1260T-153ML (Equal current in each winding)

Winding power loss =  $(2.06^2 + 2.06^2) \times 0.085 = 0.721 \text{ W}$

$\Delta t = 0.721 \text{ W} \times \frac{55.6^\circ\text{C}}{\text{W}} = 40^\circ\text{C}$

**Example 2.** MSD1260T-153ML ( $I_{L1} = 2.4 \text{ A}$ ,  $I_{L2} = 1.3 \text{ A}$ )

Winding power loss =  $(2.4^2 + 1.3^2) \times 0.085 = 0.633 \text{ W}$

$\Delta t = 0.633 \text{ W} \times \frac{55.6^\circ\text{C}}{\text{W}} = 35.2^\circ\text{C}$

## Coupled Inductor Core and Winding Loss Calculator

This web-based utility allows you to enter frequency, peak-to-peak (ripple) current, and Irms current to predict temperature rise and overall losses, including core loss. Visit [www.coilcraft.com/coupledloss](http://www.coilcraft.com/coupledloss).



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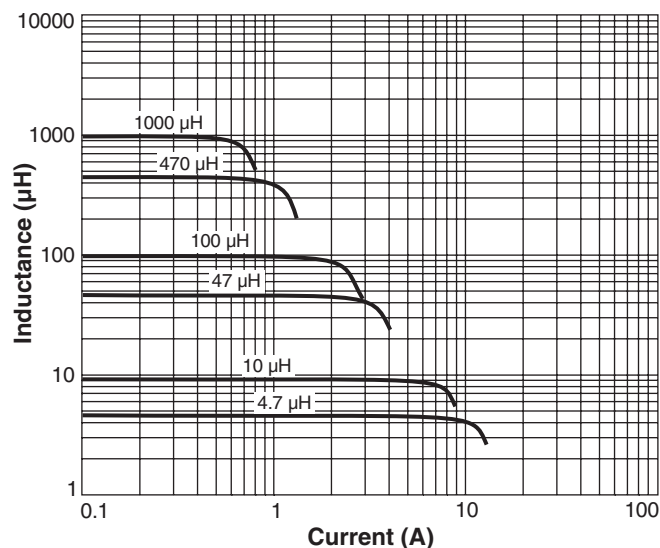
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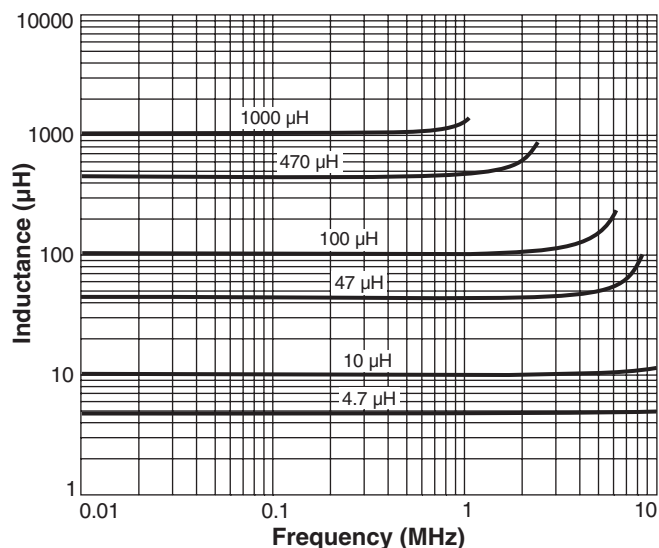

**NEW!**

# High Temperature Coupled Inductors – MSD1260T

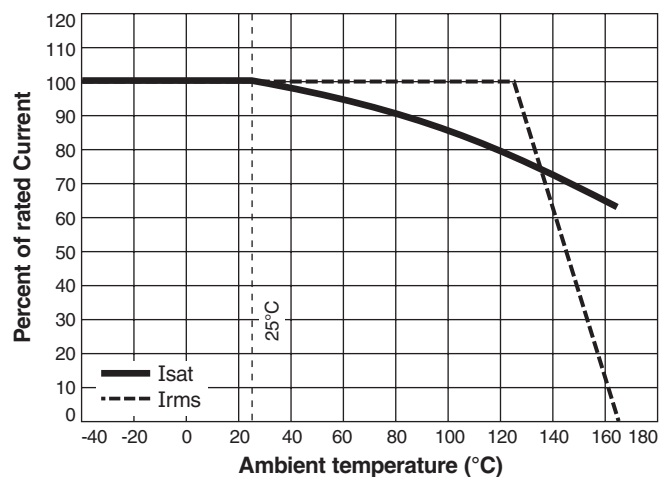
## Typical L vs Current



## Typical L vs Frequency



## Current Derating


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