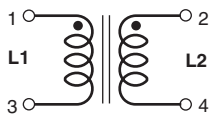
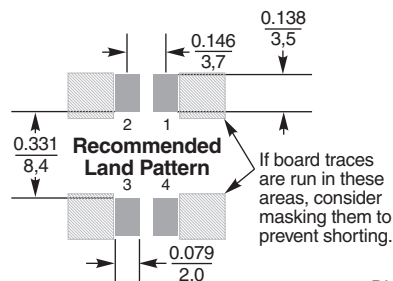
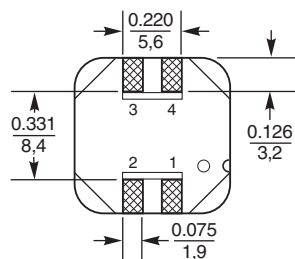
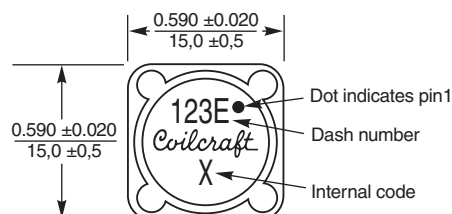
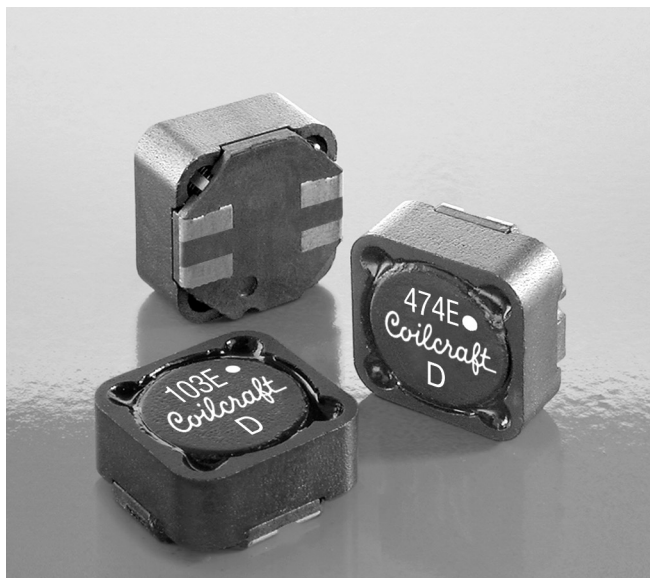


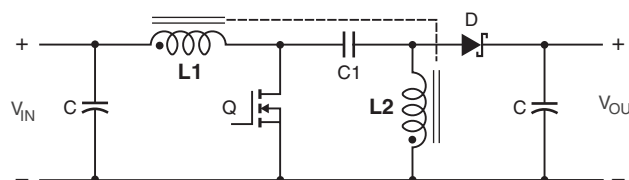
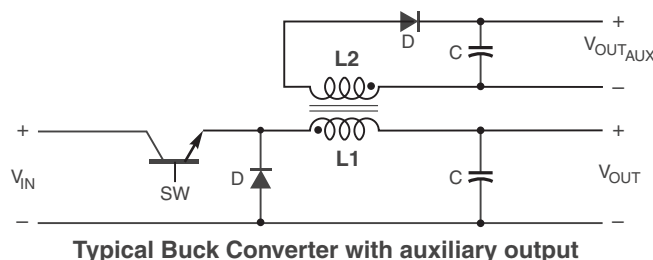
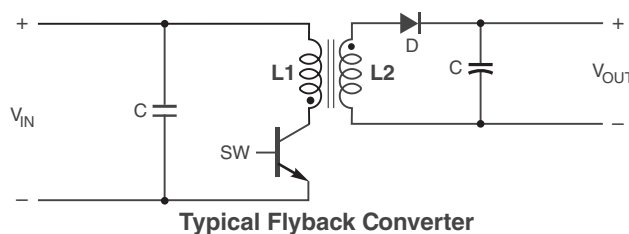
# Coupled Inductors MSD1583

For Flyback, SEPIC, Zeta and other Applications



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

Excellent coupling coefficient ( $k \geq 0.98$ ) and 500 Vrms isolation makes the MSD1583 series of coupled inductors ideal for use in a variety of circuits including flyback, multi-output buck, SEPIC and Zeta. These parts provide high inductance, high efficiency and excellent current handling. In SEPIC topologies, the required inductance for each winding is half the value needed for two separate inductors, allowing selection of a part with lower DCR and higher current handling.





# MSD1583 Coupled Inductors for SEPIC applications

| Part number <sup>1</sup> | Inductance <sup>2</sup><br>( $\mu$ H) | DCR (Ohms) <sup>3</sup> |       | SRF<br>typ <sup>4</sup><br>(MHz) | Coupling<br>coefficient<br>typ | Leakage<br>inductance<br>typ ( $\mu$ H) | Isat (A) <sup>5</sup> |             |             | Irms (A)                      |                             |
|--------------------------|---------------------------------------|-------------------------|-------|----------------------------------|--------------------------------|-----------------------------------------|-----------------------|-------------|-------------|-------------------------------|-----------------------------|
|                          |                                       | typ                     | max   |                                  |                                |                                         | 10%<br>drop           | 20%<br>drop | 30%<br>drop | both<br>windings <sup>6</sup> | one<br>winding <sup>7</sup> |
| MSD1583-103ME_           | 10 $\pm$ 20%                          | 0.026                   | 0.031 | 16.0                             | 0.98                           | 0.33                                    | 11.7                  | 13.3        | 14.5        | 3.68                          | 5.20                        |
| MSD1583-123ME_           | 12 $\pm$ 20%                          | 0.029                   | 0.037 | 14.5                             | 0.98                           | 0.36                                    | 10.6                  | 12.1        | 13.2        | 3.54                          | 5.00                        |
| MSD1583-153ME_           | 15 $\pm$ 20%                          | 0.039                   | 0.045 | 12.0                             | 0.99                           | 0.38                                    | 9.50                  | 10.8        | 11.8        | 3.18                          | 4.50                        |
| MSD1583-183ME_           | 18 $\pm$ 20%                          | 0.042                   | 0.048 | 11.5                             | 0.99                           | 0.40                                    | 8.70                  | 9.90        | 10.8        | 3.04                          | 4.30                        |
| MSD1583-223ME_           | 22 $\pm$ 20%                          | 0.054                   | 0.065 | 10.5                             | 0.99                           | 0.40                                    | 7.90                  | 8.95        | 9.80        | 2.44                          | 3.45                        |
| MSD1583-333ME_           | 33 $\pm$ 20%                          | 0.083                   | 0.095 | 8.0                              | 0.99                           | 0.54                                    | 6.40                  | 7.30        | 8.00        | 2.16                          | 3.05                        |
| MSD1583-473ME_           | 47 $\pm$ 20%                          | 0.100                   | 0.115 | 7.1                              | 0.99                           | 0.46                                    | 5.40                  | 6.10        | 6.70        | 1.98                          | 2.80                        |
| MSD1583-683ME_           | 68 $\pm$ 20%                          | 0.145                   | 0.165 | 5.7                              | 0.99                           | 0.79                                    | 4.50                  | 5.10        | 5.50        | 1.56                          | 2.20                        |
| MSD1583-104KE_           | 100 $\pm$ 10%                         | 0.230                   | 0.260 | 5.1                              | >0.99                          | 0.59                                    | 3.70                  | 4.20        | 4.60        | 1.24                          | 1.75                        |
| MSD1583-154KE_           | 150 $\pm$ 10%                         | 0.340                   | 0.380 | 3.7                              | >0.99                          | 0.70                                    | 3.00                  | 3.42        | 3.75        | 1.06                          | 1.50                        |
| MSD1583-224KE_           | 220 $\pm$ 10%                         | 0.420                   | 0.460 | 3.2                              | >0.99                          | 0.89                                    | 2.50                  | 2.83        | 3.10        | 0.92                          | 1.30                        |
| MSD1583-474KE_           | 470 $\pm$ 10%                         | 0.950                   | 1.04  | 2.2                              | >0.99                          | 1.16                                    | 1.70                  | 1.93        | 2.12        | 0.65                          | 0.92                        |
| MSD1583-105KE_           | 1000 $\pm$ 10%                        | 2.20                    | 2.40  | 1.6                              | >0.99                          | 2.02                                    | 1.17                  | 1.32        | 1.45        | 0.42                          | 0.60                        |

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

## MSD1583-105KED

**Termination:** E = RoHS compliant matte tin over nickel over phos bronze.  
Special order: Q = RoHS tin-silver-copper (95.5/4/0.5)  
or P = non-RoHS tin-lead (63/37).

**Packaging:** D = 13" machine-ready reel. EIA-481 embossed plastic tape (300 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 Adc 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.
- 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.
- Maximum current when applied to one winding that causes a 40°C temperature rise from 25°C ambient. [Go to online calculator](#) for 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.

## 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. [Go to online calculator](#).

**Core material** Ferrite

**Core and winding loss** [Go to online calculator](#)

**Environmental** RoHS compliant, halogen free

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

**Weight:** 3.7 – 4.4 g

**Ambient temperature** –40°C to +85°C with (40°C rise) Irms current.

**Maximum part temperature** +125°C (ambient + temp rise).

**Storage temperature** Component: –40°C to +125°C.

Tape and reel packaging: –40°C to +80°C

**Winding to winding isolation (hipot)** 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)

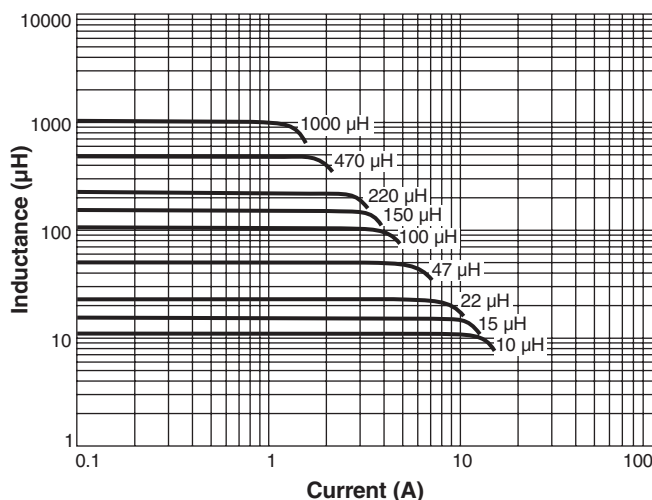
**Failures in Time (FIT) / Mean Time Between Failures (MTBF)**

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

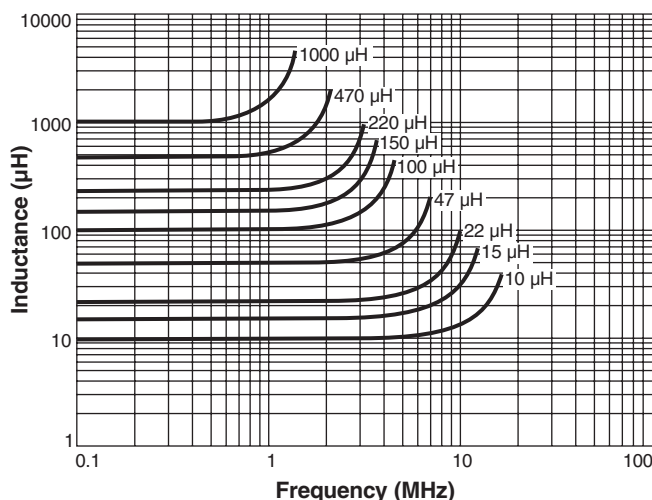
**Packaging** 300/13" reel; Plastic tape: 32 mm wide, 0.5 mm thick, 24 mm pocket spacing, 8.6 mm pocket depth

**PCB washing** Tested with pure water or alcohol only. For other solvents, see [Doc787\\_PCB\\_Washing.pdf](#).

## Typical L vs Current



## Typical L vs Frequency



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Document 889-2 Revised 07/10/15

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# MSD1583 Coupled Inductors for Flyback applications

| Part number <sup>1</sup> | Inductance<br>at 0 A <sup>2</sup><br>( $\mu$ H) | Inductance<br>at I <sub>pk</sub> A <sup>3</sup><br>typ ( $\mu$ H) | DCR<br>max<br>(Ohms) | Leakage<br>inductance <sup>4</sup><br>typ ( $\mu$ H) | Turns<br>ratio | I <sub>pk</sub> <sup>3</sup><br>(A) |
|--------------------------|-------------------------------------------------|-------------------------------------------------------------------|----------------------|------------------------------------------------------|----------------|-------------------------------------|
| MSD1583-103ME_           | 10 $\pm$ 20%                                    | 7.0                                                               | 0.031                | 0.33                                                 | 1 : 1          | 14.5                                |
| MSD1583-123ME_           | 12 $\pm$ 20%                                    | 8.4                                                               | 0.037                | 0.36                                                 | 1 : 1          | 13.2                                |
| MSD1583-153ME_           | 15 $\pm$ 20%                                    | 10.5                                                              | 0.045                | 0.38                                                 | 1 : 1          | 11.8                                |
| MSD1583-183ME_           | 18 $\pm$ 20%                                    | 12.6                                                              | 0.048                | 0.40                                                 | 1 : 1          | 10.8                                |
| MSD1583-223ME_           | 22 $\pm$ 20%                                    | 15.4                                                              | 0.065                | 0.40                                                 | 1 : 1          | 9.80                                |
| MSD1583-333ME_           | 33 $\pm$ 20%                                    | 23.1                                                              | 0.095                | 0.54                                                 | 1 : 1          | 8.00                                |
| MSD1583-473ME_           | 47 $\pm$ 20%                                    | 32.9                                                              | 0.115                | 0.46                                                 | 1 : 1          | 6.70                                |
| MSD1583-683ME_           | 68 $\pm$ 20%                                    | 47.6                                                              | 0.165                | 0.79                                                 | 1 : 1          | 5.50                                |
| MSD1583-104KE_           | 100 $\pm$ 10%                                   | 70.0                                                              | 0.26                 | 0.59                                                 | 1 : 1          | 4.60                                |
| MSD1583-154KE_           | 150 $\pm$ 10%                                   | 105                                                               | 0.38                 | 0.70                                                 | 1 : 1          | 3.75                                |
| MSD1583-224KE_           | 220 $\pm$ 10%                                   | 154                                                               | 0.46                 | 0.89                                                 | 1 : 1          | 3.10                                |
| MSD1583-474KE_           | 470 $\pm$ 10%                                   | 329                                                               | 1.04                 | 1.16                                                 | 1 : 1          | 2.12                                |
| MSD1583-105KE_           | 1000 $\pm$ 10%                                  | 700                                                               | 2.4                  | 2.02                                                 | 1 : 1          | 1.45                                |

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

## MSD1583-105KED

- Termination:** **E** = 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 (300 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.

2. Inductance is for the primary (L1), measured at 100 kHz, 0.1 Vrms, 0 Adc on an Agilent/HP 4284A LCR meter or equivalent.
3. Peak primary current drawn at minimum input voltage.
4. Leakage inductance is for the primary winding (L1) with the secondary winding (L2) shorted.
5. Electrical specifications at 25°C.  
Refer to Doc 362 "Soldering Surface Mount Components" before soldering.



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