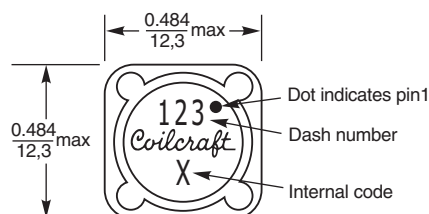


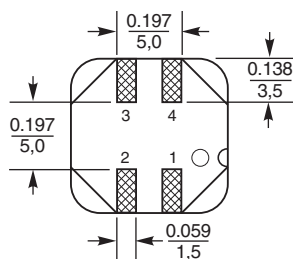


# Coupled Inductors - MSD1278

For Flyback, SEPIC and other Applications



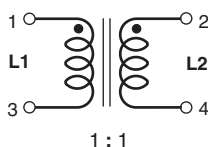
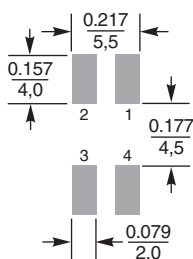
Parts manufactured prior to Sept. 2007 were marked with only the dash number.



\* 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  $\frac{\text{inches}}{\text{mm}}$

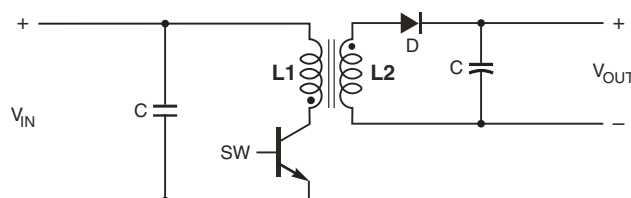
## Recommended Land Pattern



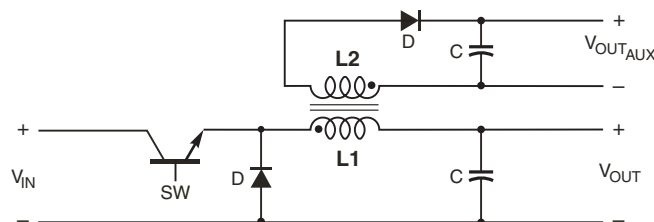
Tight coupling ( $k \geq 0.98$ ) and 500 V isolation make the MSD1278 series of shielded coupled inductors ideal for use in a variety of circuits including flyback, multi-output buck and SEPIC.

These inductors provide high inductance, high efficiency and excellent current handling in a rugged, low cost part.

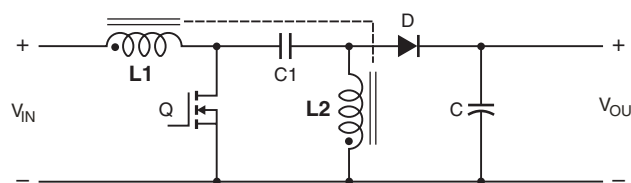
They can also be used as two single inductors connected in series or parallel or as a common mode choke.



Typical Flyback Converter



Typical Buck Converter with auxiliary output



Typical SEPIC schematic

**Designer's Kit C400** contains 3 each of all values.

**Core material** Ferrite

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

**Weight:** 3.7 – 4.4 g

**Ambient temperature**  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  with  $I_{\text{rms}}$  current,  $+85^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  with derated current

**Storage temperature** Component:  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ . Tape and reel packaging:  $-40^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$

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

**Resistance to soldering heat** Max three 40 second reflows at  $+260^{\circ}\text{C}$ , parts cooled to room temperature between cycles

**Moisture Sensitivity Level (MSL)** 1 (unlimited floor life at  $<30^{\circ}\text{C}$  / 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, 0.4 mm thick, 16 mm pocket spacing, 8.1 mm pocket depth

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



www.coilcraft.com

**US** +1-847-639-6400 sales@coilcraft.com  
**UK** +44-1236-730595 sales@coilcraft-europe.com  
**Taiwan** +886-2-2264 3646 sales@coilcraft.com.tw  
**China** +86-21-6218 8074 sales@coilcraft.com.cn  
**Singapore** +65-6484 8412 sales@coilcraft.com.sg

Document 499-1 Revised 01/13/12

© Coilcraft Inc. 2012

This product may not be used in medical of high risk applications without prior Coilcraft approval. Specification subject to change without notice. Please check out web site for latest information.



# Coupled Inductors – MSD1278 Series

| Part number <sup>1</sup> | Inductance <sup>2</sup><br>(μH) | DCR max <sup>3</sup><br>(Ohms) | SRF typ <sup>4</sup><br>(MHz) | Coupling coefficient typ | Leakage inductance <sup>5</sup><br>typ (μH) | Isat <sup>6</sup><br>(A) | Irms (A)                   |                          |
|--------------------------|---------------------------------|--------------------------------|-------------------------------|--------------------------|---------------------------------------------|--------------------------|----------------------------|--------------------------|
|                          |                                 |                                |                               |                          |                                             |                          | both windings <sup>7</sup> | one winding <sup>8</sup> |
| MSD1278-472ML_           | 4.7 ±20%                        | 0.038                          | 32.0                          | 0.98                     | 0.22                                        | 14.9                     | 3.16                       | 4.47                     |
| MSD1278-562ML_           | 5.6 ±20%                        | 0.046                          | 25.0                          | 0.98                     | 0.23                                        | 13.4                     | 2.87                       | 4.06                     |
| MSD1278-682ML_           | 6.8 ±20%                        | 0.048                          | 24.0                          | 0.98                     | 0.22                                        | 13.1                     | 2.81                       | 3.98                     |
| MSD1278-822ML_           | 8.2 ±20%                        | 0.050                          | 18.0                          | 0.98                     | 0.34                                        | 10.8                     | 2.76                       | 3.90                     |
| MSD1278-103ML_           | 10 ±20%                         | 0.058                          | 16.5                          | 0.98                     | 0.34                                        | 10.5                     | 2.56                       | 3.62                     |
| MSD1278-123ML_           | 12 ±20%                         | 0.062                          | 14.5                          | 0.98                     | 0.36                                        | 9.6                      | 2.48                       | 3.50                     |
| MSD1278-153ML_           | 15 ±20%                         | 0.072                          | 11.8                          | 0.99                     | 0.41                                        | 9.1                      | 2.30                       | 3.25                     |
| MSD1278-183ML_           | 18 ±20%                         | 0.080                          | 10.5                          | 0.99                     | 0.37                                        | 8.0                      | 2.18                       | 3.08                     |
| MSD1278-223ML_           | 22 ±20%                         | 0.096                          | 9.0                           | 0.99                     | 0.41                                        | 6.8                      | 1.99                       | 2.81                     |
| MSD1278-273ML_           | 27 ±20%                         | 0.120                          | 8.4                           | 0.99                     | 0.43                                        | 6.5                      | 1.78                       | 2.52                     |
| MSD1278-333ML_           | 33 ±20%                         | 0.150                          | 7.6                           | 0.99                     | 0.56                                        | 5.6                      | 1.59                       | 2.25                     |
| MSD1278-393ML_           | 39 ±20%                         | 0.160                          | 6.5                           | 0.99                     | 0.64                                        | 5.5                      | 1.54                       | 2.18                     |
| MSD1278-473ML_           | 47 ±20%                         | 0.180                          | 6.0                           | 0.99                     | 0.70                                        | 5.2                      | 1.45                       | 2.05                     |
| MSD1278-563ML_           | 56 ±20%                         | 0.190                          | 5.6                           | 0.99                     | 0.76                                        | 4.5                      | 1.41                       | 2.00                     |
| MSD1278-683ML_           | 68 ±20%                         | 0.210                          | 5.0                           | 0.99                     | 0.88                                        | 4.1                      | 1.35                       | 1.90                     |
| MSD1278-823ML_           | 82 ±20%                         | 0.280                          | 4.1                           | 0.99                     | 0.85                                        | 3.8                      | 1.16                       | 1.65                     |
| MSD1278-104ML_           | 100 ±20%                        | 0.300                          | 3.6                           | >0.99                    | 0.90                                        | 3.4                      | 1.13                       | 1.59                     |
| MSD1278-124KL_           | 120 ±10%                        | 0.410                          | 3.2                           | 0.99                     | 1.31                                        | 3.2                      | 0.96                       | 1.36                     |
| MSD1278-154KL_           | 150 ±10%                        | 0.460                          | 3.0                           | >0.99                    | 1.46                                        | 2.8                      | 0.91                       | 1.29                     |
| MSD1278-184KL_           | 180 ±10%                        | 0.510                          | 2.7                           | >0.99                    | 0.93                                        | 2.5                      | 0.86                       | 1.22                     |
| MSD1278-224KL_           | 220 ±10%                        | 0.690                          | 2.5                           | >0.99                    | 1.54                                        | 2.3                      | 0.74                       | 1.05                     |
| MSD1278-274KL_           | 270 ±10%                        | 0.900                          | 2.1                           | >0.99                    | 1.17                                        | 2.1                      | 0.65                       | 0.92                     |
| MSD1278-334KL_           | 330 ±10%                        | 1.02                           | 2.0                           | 0.99                     | 4.14                                        | 1.9                      | 0.61                       | 0.86                     |
| MSD1278-394KL_           | 390 ±10%                        | 1.12                           | 1.8                           | >0.99                    | 1.64                                        | 1.7                      | 0.58                       | 0.82                     |
| MSD1278-474KL_           | 470 ±10%                        | 1.43                           | 1.6                           | >0.99                    | 0.25                                        | 1.6                      | 0.50                       | 0.70                     |
| MSD1278-564KL_           | 560 ±10%                        | 1.69                           | 1.5                           | >0.99                    | 2.68                                        | 1.5                      | 0.47                       | 0.67                     |
| MSD1278-684KL_           | 680 ±10%                        | 2.29                           | 1.4                           | >0.99                    | 2.11                                        | 1.3                      | 0.41                       | 0.58                     |
| MSD1278-824KL_           | 820 ±10%                        | 2.55                           | 1.3                           | >0.99                    | 2.39                                        | 1.2                      | 0.39                       | 0.55                     |
| MSD1278-105KL_           | 1000 ±10%                       | 2.83                           | 1.1                           | >0.99                    | 4.28                                        | 1.1                      | 0.37                       | 0.52                     |

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

## MSD1278-105KLD

**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 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.
  - Leakage inductance is for L1 and is measured with L2 shorted.
  - DC current, at which the inductance drops 30% (typ) 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  $\times \frac{52.6^\circ\text{C}}{\text{W}}$

$$\Delta t = (I_{L1}^2 + I_{L2}^2) \times \text{DCR} \times \frac{52.6^\circ\text{C}}{\text{W}}$$

**Example 1.** MSD1278-153ML (Equal current in each winding)

Winding power loss =  $(2.3^2 + 2.3^2) \times 0.072 = 0.761 \text{ W}$

$$\Delta t = 0.761 \text{ W} \times \frac{52.6^\circ\text{C}}{\text{W}} = 40^\circ\text{C}$$

**Example 2.** MSD1278-153ML ( $I_{L1} = 2.4 \text{ A}$ ,  $I_{L2} = 1.3 \text{ A}$ )

Winding power loss =  $(2.4^2 + 1.3^2) \times 0.072 = 0.536 \text{ W}$

$$\Delta t = 0.536 \text{ W} \times \frac{52.6^\circ\text{C}}{\text{W}} = 28.2^\circ\text{C}$$

## 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).



[www.coilcraft.com](http://www.coilcraft.com)

**US** +1-847-639-6400 [sales@coilcraft.com](mailto:sales@coilcraft.com)  
**UK** +44-1236-730595 [sales@coilcraft-europe.com](mailto:sales@coilcraft-europe.com)  
**Taiwan** +886-2-2264 3646 [sales@coilcraft.com.tw](mailto:sales@coilcraft.com.tw)  
**China** +86-21-6218 8074 [sales@coilcraft.com.cn](mailto:sales@coilcraft.com.cn)  
**Singapore** +65-6484 8412 [sales@coilcraft.com.sg](mailto:sales@coilcraft.com.sg)

Document 499-2 Revised 01/13/12

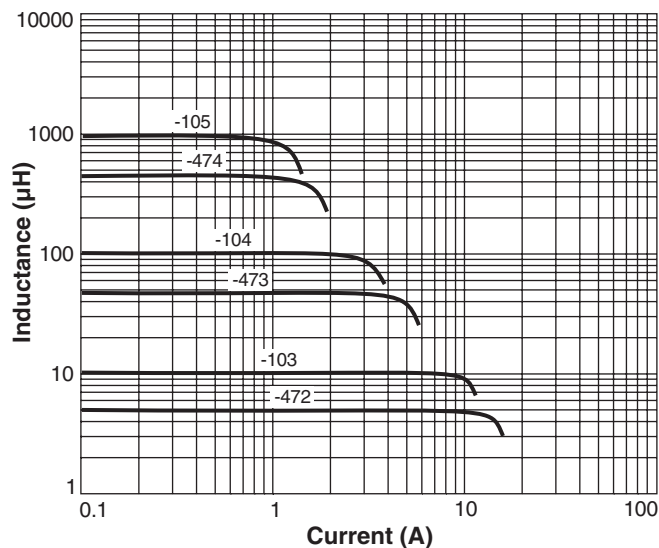
© Coilcraft Inc. 2012

This product may not be used in medical or high risk applications without prior Coilcraft approval. Specification subject to change without notice. Please check out web site for latest information.

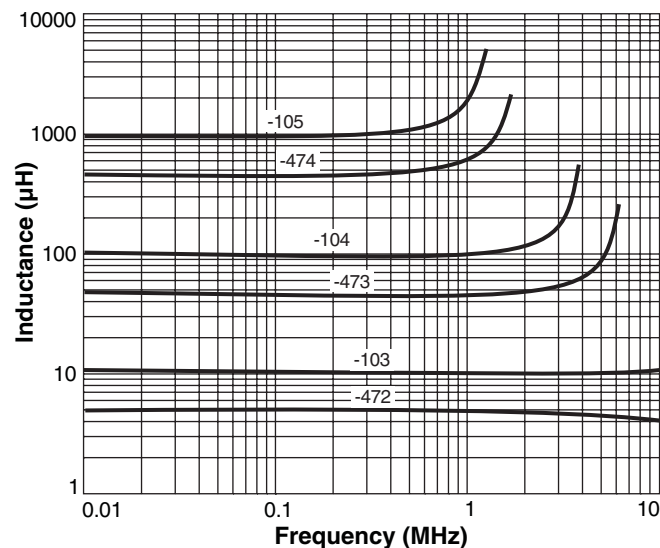


# Coupled Inductors – MSD1278 Series

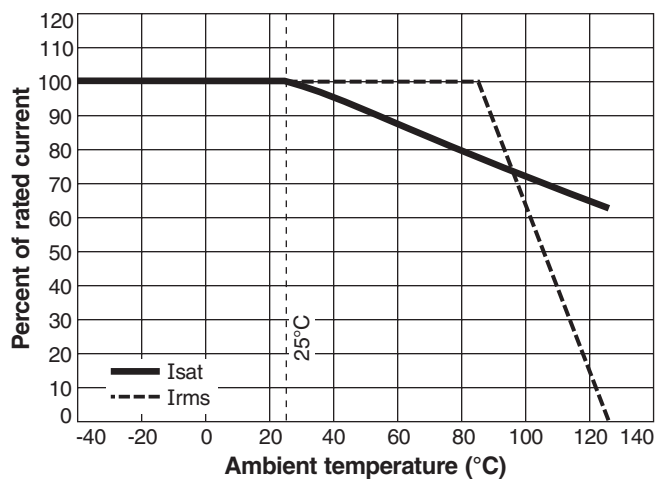
## Typical L vs Current



## Typical L vs Frequency



## Current Derating



## Данный компонент на территории Российской Федерации

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

moschip.ru\_9