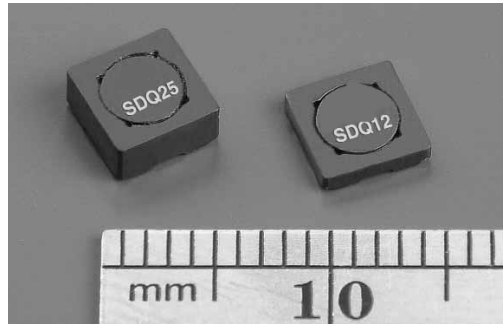


# SDQ

## Low-profile dual winding shielded drum inductor/transformer



### Applications

- Transformer: (1:1), SEPIC, flyback
- Buck, boost, coupled inductor
- Mobile phones
- Notebook and laptop power
- Digital cameras
- Media players
- PCMCIA cards
- GPS systems

### Product features

- Dual winding inductors that can be used as either a single inductor, or in coupled inductor/transformer applications (1:1 turns ratio)
- Windings can be connected in series or parallel, offering a broad range of inductance and current ratings
- Current range from 0.063 A to 6.43 A
- Inductance range from 0.47  $\mu$ H to 4.03 mH
- Ferrite shielded, low EMI
- Ferrite core material
- 500 Vdc isolation between windings

### 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



Product specifications

| Part Number | Rated Inductance (µH) | Part Marking | Parallel Ratings             |                                     |                                     |                             |                                   | Series Ratings               |                                     |                                     |                |                                   |
|-------------|-----------------------|--------------|------------------------------|-------------------------------------|-------------------------------------|-----------------------------|-----------------------------------|------------------------------|-------------------------------------|-------------------------------------|----------------|-----------------------------------|
|             |                       |              | OCL <sup>(1)</sup> ±20% (µH) | I <sub>rms</sub> <sup>(2)</sup> (A) | I <sub>sat</sub> <sup>(3)</sup> (A) | DCR <sup>(4)</sup> (Ω) typ. | Volts <sup>(5)</sup> (u-sec) typ. | OCL <sup>(1)</sup> ±20% (µH) | I <sub>rms</sub> <sup>(2)</sup> (A) | I <sub>sat</sub> <sup>(3)</sup> (A) | DCR Ω (4) typ. | Volts <sup>(5)</sup> (u-sec) typ. |
| SDQ12-R47-R | 0.47                  | A            | 0.49±30%                     | 2.78                                | 4.34                                | 0.0325                      | 2.45                              | 1.96±30%                     | 1.39                                | 2.17                                | 0.1298         | 4.90                              |
| SDQ12-1R0-R | 1                     | B            | 0.81                         | 2.49                                | 3.38                                | 0.0403                      | 3.15                              | 3.24                         | 1.25                                | 1.69                                | 0.1611         | 6.30                              |
| SDQ12-1R5-R | 1.5                   | C            | 1.69                         | 1.69                                | 2.34                                | 0.0870                      | 4.55                              | 6.76                         | 0.847                               | 1.17                                | 0.3481         | 9.10                              |
| SDQ12-2R2-R | 2.2                   | D            | 2.25                         | 1.60                                | 2.03                                | 0.0977                      | 5.25                              | 9.00                         | 0.800                               | 1.01                                | 0.3908         | 10.5                              |
| SDQ12-3R3-R | 3.3                   | E            | 3.61                         | 1.28                                | 1.60                                | 0.1527                      | 6.65                              | 14.44                        | 0.640                               | 0.800                               | 0.6106         | 13.3                              |
| SDQ12-4R7-R | 4.7                   | F            | 4.41                         | 1.12                                | 1.45                                | 0.1990                      | 7.35                              | 17.64                        | 0.560                               | 0.724                               | 0.7959         | 14.7                              |
| SDQ12-6R2-R | 6.2                   | G            | 6.25                         | 1.02                                | 1.22                                | 0.2387                      | 8.75                              | 25.00                        | 0.512                               | 0.608                               | 0.9548         | 17.5                              |
| SDQ12-8R2-R | 8.2                   | H            | 8.41                         | 0.868                               | 1.05                                | 0.3318                      | 10.15                             | 33.64                        | 0.434                               | 0.524                               | 1.33           | 20.3                              |
| SDQ12-100-R | 10                    | J            | 9.61                         | 0.831                               | 0.981                               | 0.3620                      | 10.85                             | 38.44                        | 0.416                               | 0.490                               | 1.45           | 21.7                              |
| SDQ12-150-R | 15                    | K            | 15.21                        | 0.658                               | 0.779                               | 0.5766                      | 13.65                             | 60.84                        | 0.329                               | 0.390                               | 2.31           | 27.3                              |
| SDQ12-220-R | 22                    | L            | 22.09                        | 0.548                               | 0.647                               | 0.8332                      | 16.45                             | 88.36                        | 0.274                               | 0.323                               | 3.33           | 32.9                              |
| SDQ12-330-R | 33                    | M            | 32.49                        | 0.439                               | 0.533                               | 1.29                        | 19.95                             | 130.0                        | 0.220                               | 0.267                               | 5.18           | 39.9                              |
| SDQ12-470-R | 47                    | N            | 47.61                        | 0.401                               | 0.441                               | 1.55                        | 24.15                             | 190.4                        | 0.201                               | 0.220                               | 6.21           | 48.3                              |
| SDQ12-680-R | 68                    | O            | 68.89                        | 0.326                               | 0.366                               | 2.36                        | 29.05                             | 275.6                        | 0.163                               | 0.183                               | 9.43           | 58.1                              |
| SDQ12-820-R | 82                    | P            | 82.81                        | 0.309                               | 0.334                               | 2.62                        | 31.85                             | 331.2                        | 0.154                               | 0.167                               | 10.49          | 63.7                              |
| SDQ25-R47-R | 0.47                  | A            | 0.392±30%                    | 3.71                                | 6.43                                | 0.0181                      | 2.31                              | 1.57±30%                     | 1.86                                | 3.21                                | 0.0725         | 4.62                              |
| SDQ25-R82-R | 0.82                  | B            | 0.648±30%                    | 3.37                                | 5.00                                | 0.0221                      | 2.97                              | 2.59±30%                     | 1.68                                | 2.50                                | 0.0883         | 5.94                              |
| SDQ25-1R0-R | 1                     | C            | 0.97                         | 3.15                                | 4.09                                | 0.0252                      | 3.63                              | 3.87                         | 1.58                                | 2.05                                | 0.1007         | 7.26                              |
| SDQ25-1R5-R | 1.5                   | D            | 1.35                         | 2.97                                | 3.46                                | 0.0283                      | 4.29                              | 5.41                         | 1.49                                | 1.73                                | 0.1130         | 8.58                              |
| SDQ25-2R2-R | 2.2                   | E            | 2.31                         | 2.67                                | 2.65                                | 0.0351                      | 5.61                              | 9.25                         | 1.34                                | 1.32                                | 0.1402         | 11.2                              |
| SDQ25-3R3-R | 3.3                   | F            | 2.89                         | 2.50                                | 2.37                                | 0.0399                      | 6.27                              | 11.55                        | 1.25                                | 1.18                                | 0.1595         | 12.5                              |
| SDQ25-4R7-R | 4.7                   | G            | 5                            | 1.96                                | 1.80                                | 0.0653                      | 8.25                              | 20.00                        | 0.98                                | 0.900                               | 0.2612         | 16.5                              |
| SDQ25-6R8-R | 6.8                   | H            | 6.73                         | 1.84                                | 1.55                                | 0.0741                      | 9.57                              | 26.91                        | 0.918                               | 0.776                               | 0.2964         | 19.1                              |
| SDQ25-8R2-R | 8.2                   | J            | 8.71                         | 1.57                                | 1.36                                | 0.1015                      | 10.9                              | 34.85                        | 0.785                               | 0.682                               | 0.4059         | 21.8                              |
| SDQ25-100-R | 10                    | K            | 9.8                          | 1.53                                | 1.29                                | 0.1068                      | 11.6                              | 39.20                        | 0.765                               | 0.643                               | 0.4273         | 23.1                              |
| SDQ25-150-R | 15                    | L            | 14.79                        | 1.24                                | 1.05                                | 0.1632                      | 14.2                              | 59.17                        | 0.619                               | 0.523                               | 0.6526         | 28.4                              |
| SDQ25-220-R | 22                    | M            | 22.47                        | 1.01                                | 0.849                               | 0.2431                      | 17.5                              | 89.89                        | 0.507                               | 0.425                               | 0.9724         | 35.0                              |
| SDQ25-330-R | 33                    | N            | 33.8                         | 0.812                               | 0.692                               | 0.3795                      | 21.5                              | 135.2                        | 0.406                               | 0.346                               | 1.52           | 42.9                              |
| SDQ25-470-R | 47                    | O            | 47.43                        | 0.749                               | 0.584                               | 0.4461                      | 25.4                              | 189.7                        | 0.374                               | 0.292                               | 1.78           | 50.8                              |
| SDQ25-680-R | 68                    | P            | 69.19                        | 0.603                               | 0.484                               | 0.6865                      | 30.7                              | 276.8                        | 0.302                               | 0.242                               | 2.75           | 61.4                              |
| SDQ25-820-R | 82                    | Q            | 81.61                        | 0.580                               | 0.446                               | 0.7435                      | 33.3                              | 326.4                        | 0.290                               | 0.223                               | 2.97           | 66.7                              |
| SDQ25-101-R | 100                   | R            | 98.57                        | 0.499                               | 0.405                               | 1.00                        | 36.6                              | 394.3                        | 0.249                               | 0.203                               | 4.02           | 73.3                              |
| SDQ25-151-R | 150                   | S            | 150.2                        | 0.408                               | 0.328                               | 1.50                        | 45.2                              | 600.6                        | 0.204                               | 0.164                               | 6.00           | 90.4                              |
| SDQ25-221-R | 220                   | T            | 223.1                        | 0.326                               | 0.269                               | 2.36                        | 55.1                              | 892.4                        | 0.163                               | 0.135                               | 9.42           | 110                               |
| SDQ25-331-R | 330                   | U            | 329.7                        | 0.292                               | 0.222                               | 2.93                        | 67.0                              | 1318.7                       | 0.146                               | 0.111                               | 11.71          | 134                               |
| SDQ25-471-R | 470                   | V            | 472.4                        | 0.243                               | 0.185                               | 4.25                        | 80.2                              | 1889.6                       | 0.121                               | 0.093                               | 16.99          | 160                               |
| SDQ25-681-R | 680                   | W            | 677.4                        | 0.197                               | 0.155                               | 6.45                        | 96.0                              | 2709.8                       | 0.098                               | 0.077                               | 25.78          | 192                               |
| SDQ25-821-R | 820                   | X            | 824.3                        | 0.186                               | 0.140                               | 7.25                        | 106                               | 3297.3                       | 0.093                               | 0.070                               | 28.99          | 212                               |
| SDQ25-102-R | 1000                  | Y            | 1008.2                       | 0.160                               | 0.127                               | 9.82                        | 117                               | 4032.8                       | 0.080                               | 0.063                               | 39.26          | 234                               |

(1) Test Parameters: 100 kHz, 0.25 Vrms 0.0 Adc

(2) I<sub>rms</sub>: DC current for approximately ΔT of 40 °C without core loss. It is recommended that the temperature of the part not to exceed +125 °C. Derating is necessary for AC currents

(3) I<sub>sat</sub>: Peak current for approximately 30% rolloff @ +20 °C

(4) DCR limits @ +20 °C

(5) Applied Volt-Time product (V-µs) across the inductor at 100 kHz necessary to generate a core loss equal to 10% of the total losses for a 40 °C temperature rise. Derating of the I<sub>rms</sub> is required to prevent excessive temperature rise.

Part Number Definition:

SDQ12-XXX-R

SDQ12 = Product code and Size

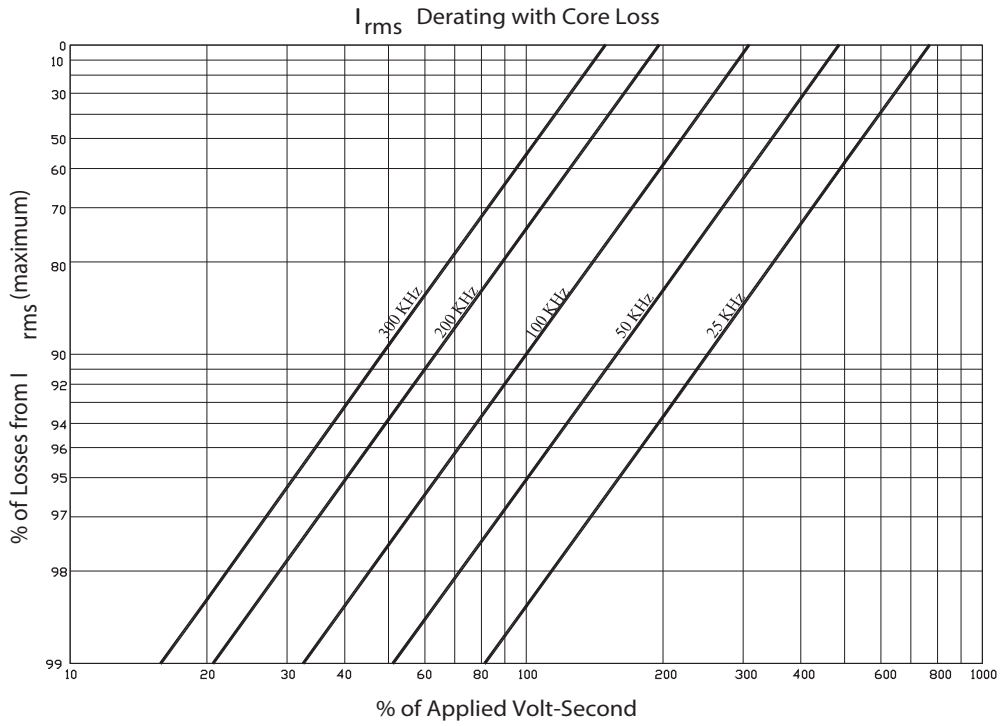
XXX = Inductance in uH, R = Decimal point

If no R is present, third character = # of zeros.

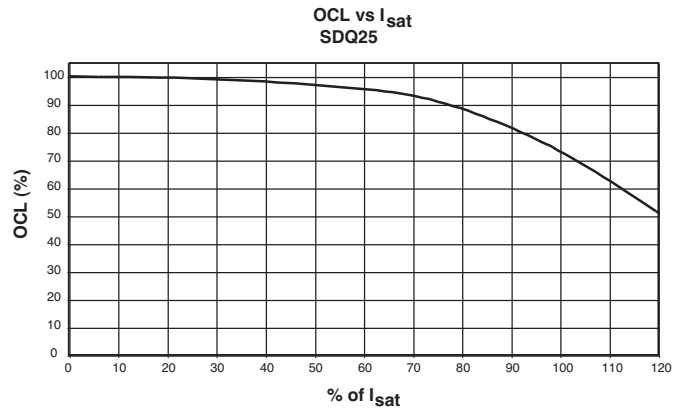
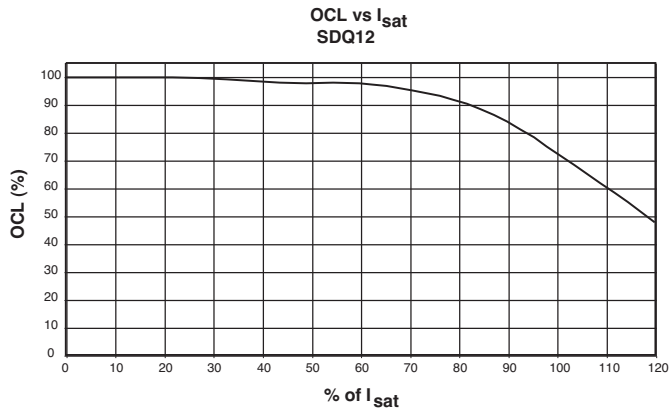
-R suffix indicated RoHS compliant



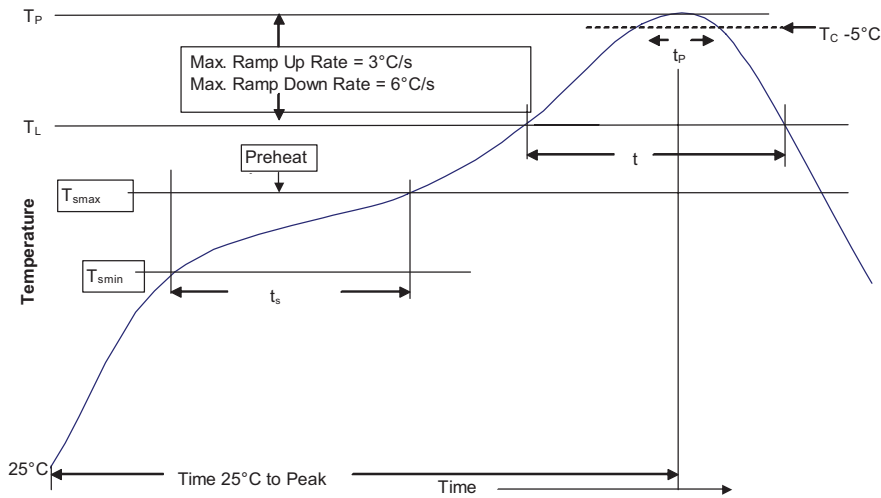
**Core loss**



**Inductance characteristics**



**Solder reflow profile**



**Table 1 - Standard SnPb Solder (T<sub>C</sub>)**

| Package Thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> ≥350 |
|-------------------|-----------------------------|-----------------------------|
| <2.5mm)           | 235°C                       | 220°C                       |
| ≥2.5mm            | 220°C                       | 220°C                       |

**Table 2 - Lead (Pb) Free Solder (T<sub>C</sub>)**

| Package Thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> 350 - 2000 | Volume mm <sup>3</sup> >2000 |
|-------------------|-----------------------------|-----------------------------------|------------------------------|
| <1.6mm            | 260°C                       | 260°C                             | 260°C                        |
| 1.6 – 2.5mm       | 260°C                       | 250°C                             | 245°C                        |
| >2.5mm            | 250°C                       | 245°C                             | 245°C                        |

**Reference JDEC J-STD-020**

| Profile Feature  | Standard SnPb Solder | Lead (Pb) Free Solder |
|--|----------------------|-----------------------|
| Preheat and Soak   |                      |                       |
| • Temperature min. (T <sub>smin</sub> )  | 100°C                | 150°C                 |
| • Temperature max. (T <sub>smax</sub> )  | 150°C                | 200°C                 |
| • Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )                                 | 60-120 Seconds       | 60-120 Seconds        |
| Average ramp up rate T <sub>smax</sub> to T <sub>p</sub>   | 3°C/ Second Max.     | 3°C/ Second Max.      |
| Liquidous temperature (T <sub>L</sub> )  | 183°C                | 217°C                 |
| Time at liquidous (t <sub>L</sub> )  | 60-150 Seconds       | 60-150 Seconds        |
| Peak package body temperature (T <sub>p</sub> )*   | Table 1              | Table 2               |
| Time (t <sub>p</sub> )** within 5 °C of the specified classification temperature (T <sub>C</sub> ) | 20 Seconds**         | 30 Seconds**          |
| Average ramp-down rate (T <sub>p</sub> to T <sub>smax</sub> )                                      | 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<sub>p</sub>) is defined as a supplier minimum and a user maximum.  
\*\* Tolerance for time at peak profile temperature (t<sub>p</sub>) is defined as a supplier minimum and a user maximum.

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