



# SM2520Q Series



## 1. Features of SM2520Q series:

- AEC-Q200 Grade 1 Compliant .
- 8.05 x 7.50 mm foot Print, 5.40mm Max. height SMD Power Inductor for high frequency application, Operating frequency up to 5MHz.
- Inductance range from 4.7uH to 47.0uH. Custom values are welcomed.
- High saturation current characteristics by distributed gapped metal dust core.
- Ideal for portable device, Pad, E-reader and high density DC to DC Converter.
- Operating Temperature Range: -55°C to 165°C (ambient + self-temperature rise) .
- T & R Qty: 500 pcs , 13" Reel and Plastic tape: 16mm wide, 12mm pocket spacing.
- RoHS and HF Compliant.

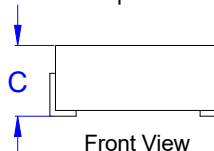
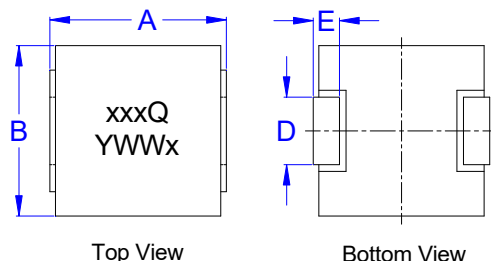


## 2. Electrical Characteristics of SM2520Q series:

| ITG Part Number | OCL <sup>1</sup><br>(uH)<br>±20% | DCR<br>(mΩ)<br>Typ.<br>@25°C | DCR<br>(mΩ)<br>Max.<br>@25°C | Saturation<br>Current<br>Isat <sup>2</sup> (A)<br>Typ. | Heat<br>Rating<br>Current<br>Irms <sup>3</sup> (A)<br>Typ. |
|-----------------|----------------------------------|------------------------------|------------------------------|--------------------------------------------------------|------------------------------------------------------------|
| SM2520Q-4R7MHF  | 4.70                             | 16.70                        | 19.20                        | 11.20                                                  | 6.30                                                       |
| SM2520Q-100MHF  | 10.00                            | 32.50                        | 37.50                        | 8.00                                                   | 4.70                                                       |
| SM2520Q-220MHF  | 22.00                            | 85.70                        | 98.50                        | 5.40                                                   | 3.00                                                       |
| SM2520Q-330MHF  | 33.00                            | 110.00                       | 127.00                       | 4.00                                                   | 2.80                                                       |
| SM2520Q-470MHF  | 47.00                            | 143.90                       | 165.00                       | 3.00                                                   | 2.20                                                       |

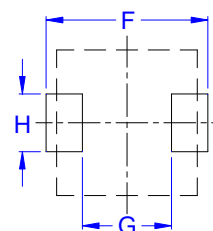
## 3. Mechanical Dimensions (unit: mm):

| A ±<br>0.35 | B ±<br>0.30 | C ±<br>0.20 | D ±<br>0.30 | E ±<br>0.30 |
|-------------|-------------|-------------|-------------|-------------|
| 7.70        | 7.20        | 5.20        | 3.00        | 2.00        |



Part Marking:  
xxx: Inductance value in uH(R:decimal point).  
Q: Automotive Grade Part Code.  
YWWx: Y is Year Code, WW: Week ,  
x is Special Code.

| Pad<br>Dimension | SM2520Q   |
|------------------|-----------|
| F                | 8.50 Typ. |
| G                | 3.70 Typ. |
| H                | 3.50 Typ. |



Recommend PCB Layout

### Notes:

1. Test conditions: 100KHz, 1.0V, 25°C ambient temperature .
2. Isat: DC current that causes inductance to drop 30% (Typ.) from OCL (Ta=25°C).
3. Irms: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents.  
PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise.  
It is recommended the part temperature not exceed 165° C under worst case operating conditions as verified in the end application.

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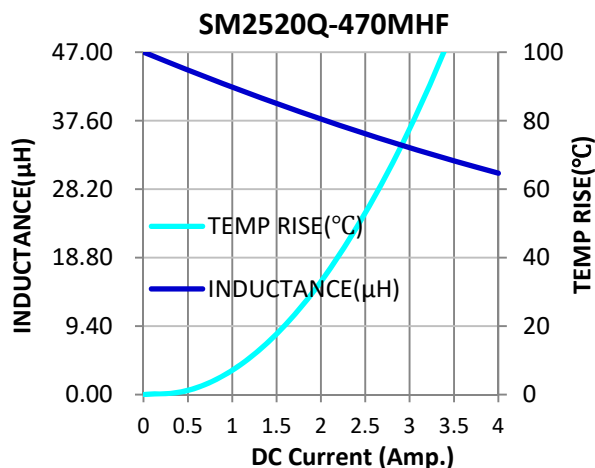
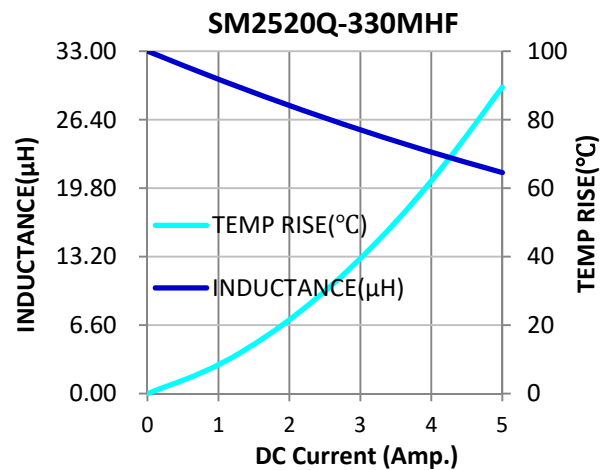
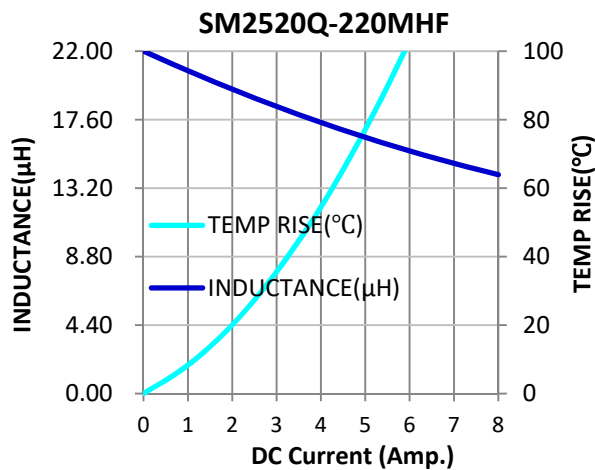
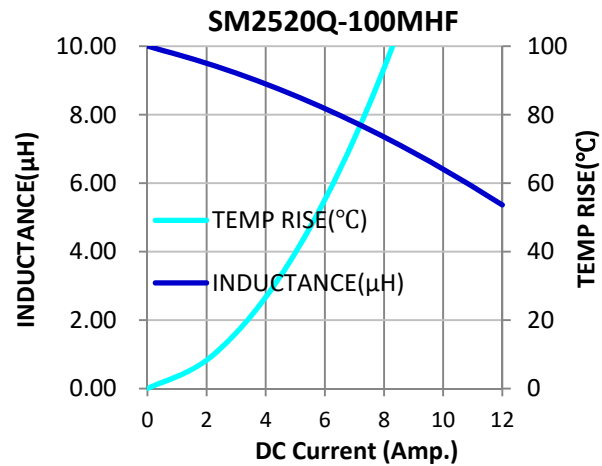
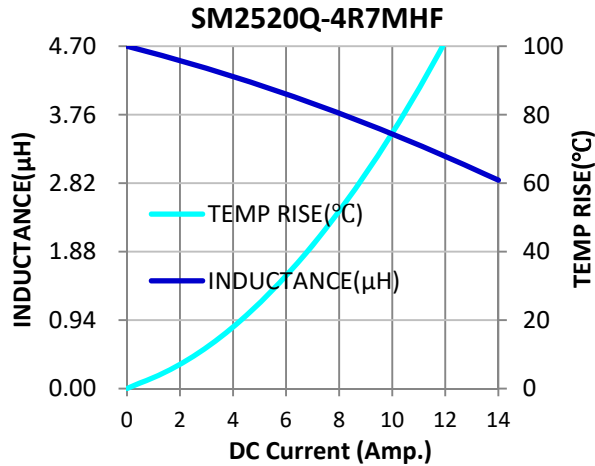
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## 4. Inductance vs. Temperature Rise Characteristics of SM2520Q Series:



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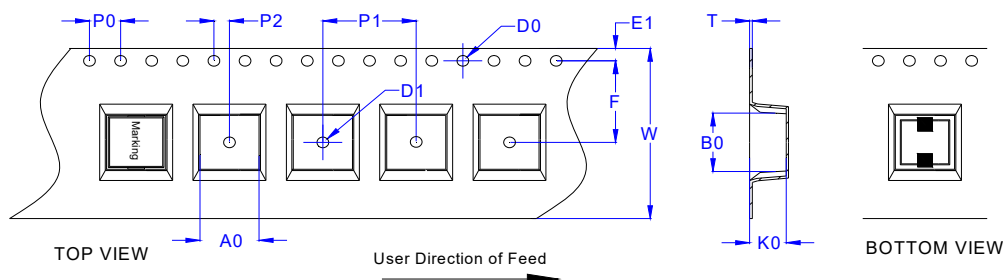


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## 5. PACKAGE SPECIFICATION.(UNIT:mm):

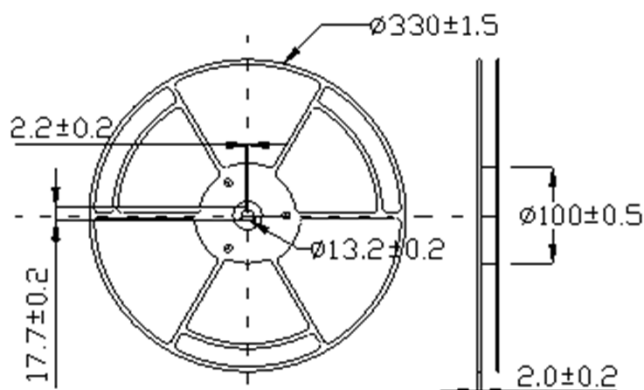
### (1).ENCAPSULATION MODE:



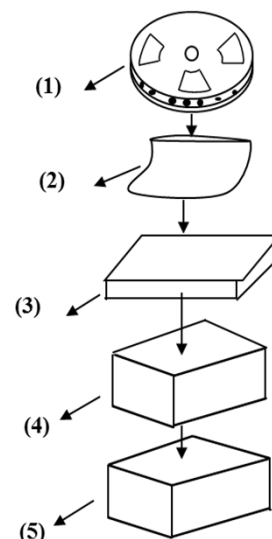
### (2).DIMENSION(mm):

| W         | A0       | B0       | K0       | P1        | P0       | P2       | D0       | D1          | F        | E1        | T         |
|-----------|----------|----------|----------|-----------|----------|----------|----------|-------------|----------|-----------|-----------|
| 16.0±0.30 | 7.8±0.10 | 8.4±0.10 | 6.0±0.15 | 12.0±0.10 | 4.0±0.10 | 2.0±0.10 | 1.5±0.10 | 1.5+0.10/-0 | 7.5±0.10 | 1.75±0.10 | 0.50±0.05 |

### (3).REEL SIZE:



### (4).PACKAGE MODE:



### (5).PACKAGING LIST:

| No. | Packing Part | Dimension (mm)    | Material | Quantity                  |
|-----|--------------|-------------------|----------|---------------------------|
| 1   | Reel         | 330               | Plastic  | 500Pcs / Reel             |
| 2   | Bag          | 450 X 360 X 0.075 | Plastic  | 1Reel / Bag               |
| 3   | Small Box    | 340 X 335 X 45    | Paper    | 2Bag / Small Box          |
| 4   | Middle Box   | 356 X 350 X 226   | Paper    | 4Small Boxes / Middle Box |
| 5   | Outer Box    | 378 X 362 X 252   | Paper    | 1Middle Box / Outer Box   |

(6).WEIGHT: N.W: 1.52 g/pcs (APPROX), TOTAL 6.08 Kg(APPROX),G.W:TOTAL 9.58Kg (APPROX).

(7).Storage conditions: -40°C~85°C ,75%RH (Max.).

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## 6.RELIABILITY TEST:

| 6.1 Mechanical Reliability  |                                                                                               |                                                                                                                                                                                                                                                      |
|-----------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item                        | Specification and Requirement                                                                 | Test Method                                                                                                                                                                                                                                          |
| Solderability               | The surface of terminal immersed shall be minimum of 95% covered with a new coating of solder | Solder heat proof:<br>1.Precondition: 8 hours steam aging<br>2.Retention time: $255 \pm 5$ °C for $5 \pm 0.5$ seconds                                                                                                                                |
| Vibration                   | Inductance change: Within $\pm 10\%$ Without mechanical damage such as break                  | 1.Vibration frequency:(10 Hz to 2000 Hz)<br>2.Vibration time:Each four hours (12 times) in X, Y, Z direction: 12 hours in total<br>3.Amplitude: 1mm or 10 G                                                                                          |
| Shock                       | Inductance change: Within $\pm 10\%$ Without mechanical damage such as break                  | 1.Peak value: 100 G<br>2.Duration of pulse: 6ms<br>3.Waveform: Half-sine Shocks; 3 times in X, Y, Z direction, 9 times in total                                                                                                                      |
| 6.2 Endurance Reliability   |                                                                                               |                                                                                                                                                                                                                                                      |
| Thermal Shock               | Inductance change: Within $\pm 10\%$ Without distinct damage in appearance                    | 1.Repeat 1000 cycles as follow:<br>( $-55 \pm 2$ °C; $30 \pm 3$ min)<br>→ ( $+165 \pm 2$ °C, $30 \pm 3$ min) change over time of temperature: $\leq 10s$<br>2.Recovery: $24 + 4 / -0$ hours of recovery under the standard condition after the test. |
| High Temperature & Humidity | Inductance change: Within $\pm 10\%$ Without distinct damage in appearance                    | $85^{\circ}\text{C}85\%\text{RH}$ , Duration: $240+4/-0$ hours                                                                                                                                                                                       |
| Operational Life            | Inductance change: Within $\pm 10\%$ Without distinct damage in appearance                    | 1.Rated current (Idc) Environment condition: $85^{\circ}\text{C}$<br>2.Duration: $1000 + 4 / -0$ hours                                                                                                                                               |
| Low Temperature Store       | Inductance change: Within $\pm 10\%$ Without distinct damage in appearance                    | Store temperature:<br>$-55 \pm 2$ °C, $1000 + 4 / -0$ hours                                                                                                                                                                                          |
| High Temperature Store      | Inductance change: Within $\pm 10\%$ Without distinct damage in appearance                    | Store temperature:<br>$+165 \pm 2$ °C, $1000 + 4 / -0$ hours                                                                                                                                                                                         |

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## Soldering Reflow Chart

### Solder Reflow Profile:

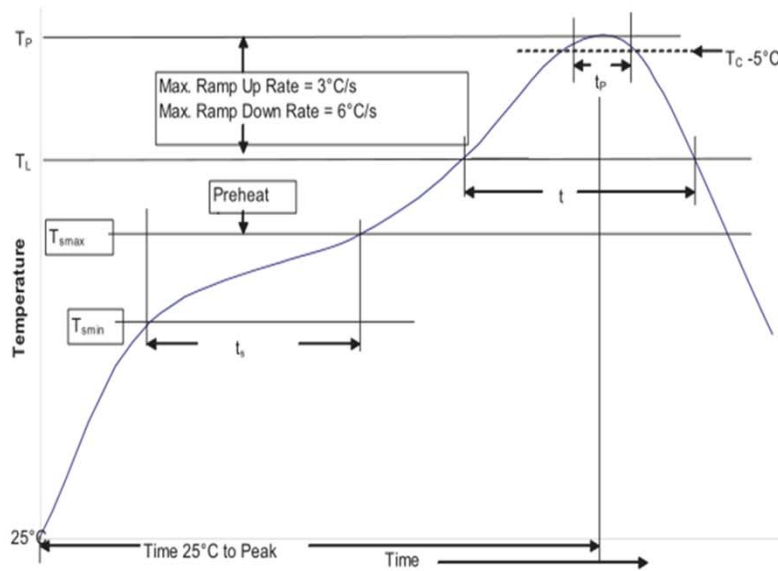


Table 1 - Standard SnPb Solder ( $T_C$ )

| Package Thickness | Volume $\leq 350$ mm <sup>3</sup> | Volume $> 350$ mm <sup>3</sup> |
|-------------------|-----------------------------------|--------------------------------|
| $< 2.5$ mm        | 235°C                             | 220°C                          |
| $\geq 2.5$ mm     | 220°C                             | 220°C                          |

Table 2 - Lead (Pb) Free Solder ( $T_C$ )

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

### Reference JEDEC J-STD-020E:

| Profile Feature                                                                    | Standard SnPb Solder | Lead (Pb) Free Solder |
|------------------------------------------------------------------------------------|----------------------|-----------------------|
| Preheat and Soak                                                                   |                      |                       |
| • Temperature min. ( $T_{smin}$ )                                                  | 100°C                | 150°C                 |
| • Temperature max. ( $T_{smax}$ )                                                  | 150°C                | 200°C                 |
| • Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )                                      | 60-120 Seconds       | 60-120 Seconds        |
| Average ramp up rate $T_{smax}$ to $T_p$                                           | 3°C/ Second Max.     | 3°C/ Second Max.      |
| Liquidous temperature ( $T_L$ )                                                    | 183°C                | 217°C                 |
| Time at liquidous ( $t_l$ )                                                        | 60-150 Seconds       | 60-150 Seconds        |
| Peak package body temperature ( $T_p$ )*                                           | Table 1              | Table 2               |
| Time ( $t_p$ )** within 5 °C of the specified classification temperature ( $T_C$ ) | 20 Seconds**         | 30 Seconds**          |
| Average ramp-down rate ( $T_p$ to $T_{smax}$ )                                     | 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 ( $T_p$ ) 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.