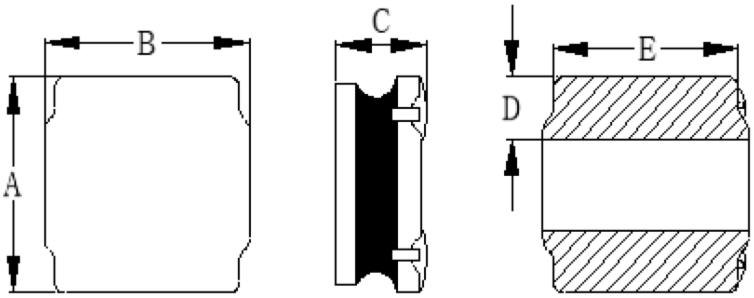
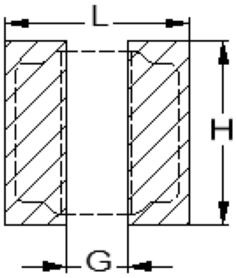
1. Part No. Expression

SPSQ	3012	BM	R22	M
(a)	(b)	(c)	(d)	(e)

- (a) Series Code
- (b) Dimension Code
- (c) Material Code
- (d) Inductance Code
- (e) Tolerance Code

2. Configuration & Dimensions (Unit: mm)





Recommended PCB Layout

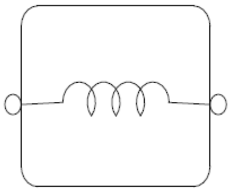
Note: 1. The above PCB layout reference only.

2. Recommend solder paste thickness at 0.12 mm and above.

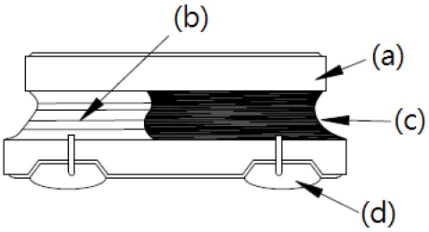
3. Dimensions are not including the termination. For maximum overall dimensions with termination, add 0.1mm.

A	B	C	D	E	L	G	H
3.0±0.2	3.0±0.2	1.0±0.2	0.9±0.3	2.7±0.3	3.5 Ref	0.9 Ref	3.5 Ref

3. Schematic

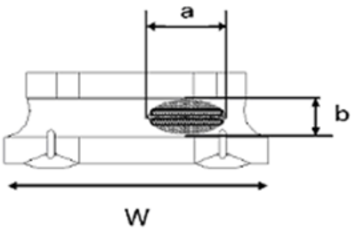


4. Material List



(a) Core
(b) Wire
(c) Glue
(d) Terminal

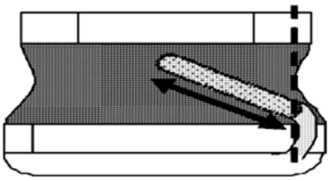
Void appearance tolerance limit & size of voids occurring to coating resin is specified below.



Exposed wire tolerance limit of coating resin part on product side.

Size of exposed wire occurring to coating resin is specified below:

1. Width direction (dimension a) : Acceptable when a ≦ w/2;
   Nonconforming when a＞w/2
2. Length direction (dimension b): Dimension b is not specified
3. The total area of exposed wire occurring to each side is not greater than 50% of coating resin area and is acceptable



External appearance criterion for exposed wire.

Exposed end of the winding wire at the secondary side should be 2mm and below.

5. General Specifications

(a) Reliability test for this part meets AEC-Q200 standard.

(b) Operating Temp.: -55°C to +125°C (including self-temperature rise)

(c) Storage Temp.: -55°C to +125°C (on board)

(d) All test data referenced to 25°C ambient.

(e) Heat Rated Current (Irms) will cause the coil temperature rise approximately ΔT of 40°C.

(f) Saturation Current (Isat) will cause inductance L0 to drop approximately 30%.

(g) Rated Current: The lower value of Isat and Irms.

(h) Part Temperature (Ambient + Temp. Rise): Should not exceed 125°C under worst case operating conditions.

(i) Storage Condition (Component in its packaging)

  i) Temperature: Less than 40°C

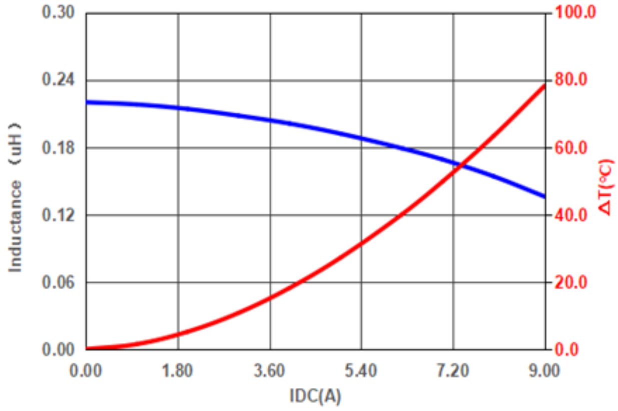
  ii) Humidity: Less than 60% RH

6. Electrical Characteristics

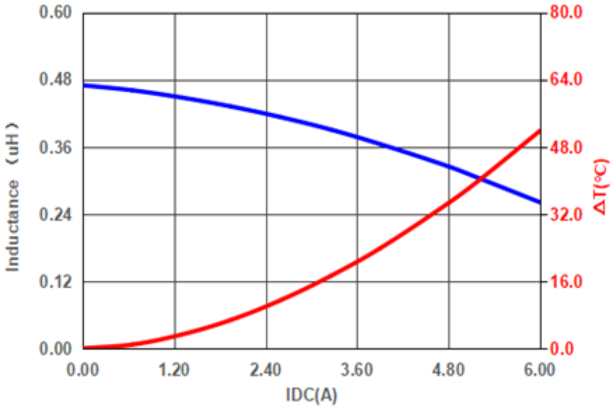
Part Number	Inductance (μH) @0A ±20%	Test Frequency	Irms (A)		Isat (A)		DCR (mΩ)	
			Typ	Max	Typ	Max	Typ	Max
SPSQ3012BMR22M	0.22	1.0V/100KHz	6.20	5.70	8.00	7.00	15	19
SPSQ3012BMR47M	0.47	1.0V/100KHz	5.20	4.80	4.80	4.40	24	29
SPSQ3012BMR68M	0.68	1.0V/100KHz	4.80	4.50	4.30	4.00	31	37
SPSQ3012BM1R0M	1.00	1.0V/100KHz	4.20	3.80	3.60	3.30	40	48
SPSQ3012BM1R2M	1.20	1.0V/100KHz	4.00	3.50	3.30	3.00	47	56
SPSQ3012BM1R5M	1.50	1.0V/100KHz	3.60	3.30	3.00	2.60	52	62
SPSQ3012BM2R2M	2.20	1.0V/100KHz	2.90	2.50	2.40	2.10	75	90
SPSQ3012BM2R7M	2.70	1.0V/100KHz	2.60	2.30	2.10	1.90	95	114
SPSQ3012BM3R3M	3.30	1.0V/100KHz	2.40	2.10	1.80	1.60	108	130
SPSQ3012BM4R7M	4.70	1.0V/100KHz	2.10	1.70	1.50	1.30	140	168
SPSQ3012BM5R6M	5.60	1.0V/100KHz	1.90	1.60	1.40	1.20	200	240
SPSQ3012BM6R8M	6.80	1.0V/100KHz	1.70	1.40	1.30	1.10	210	252
SPSQ3012BM100M	10.0	1.0V/100KHz	1.50	1.20	1.10	0.90	288	345
SPSQ3012BM150M	15.0	1.0V/100KHz	1.20	1.00	0.80	0.70	400	480
SPSQ3012BM220M	22.0	1.0V/100KHz	0.90	0.80	0.70	0.63	700	840
SPSQ3012BM330M	33.0	1.0V/100KHz	0.80	0.70	0.61	0.56	1100	1320
SPSQ3012BM470M	47.0	1.0V/100KHz	0.65	0.60	0.52	0.47	1500	1800

7. Characteristics Curve

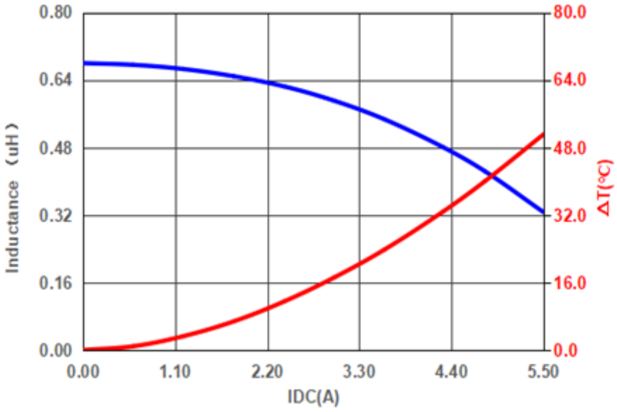
SPSQ3012BMR22M



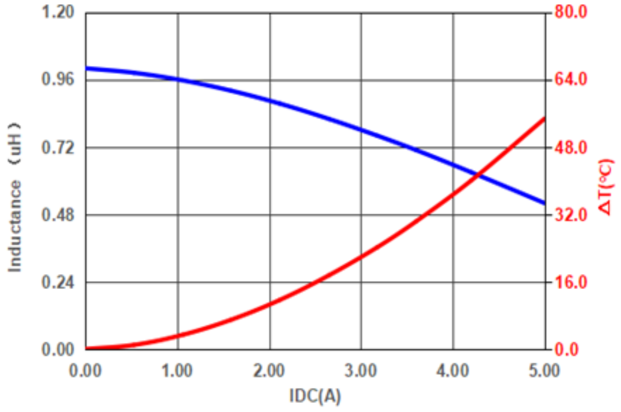
SPSQ3012BMR47M



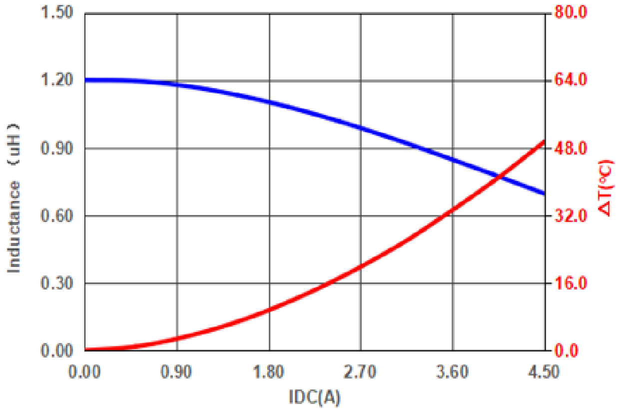
SPSQ3012BMR68M



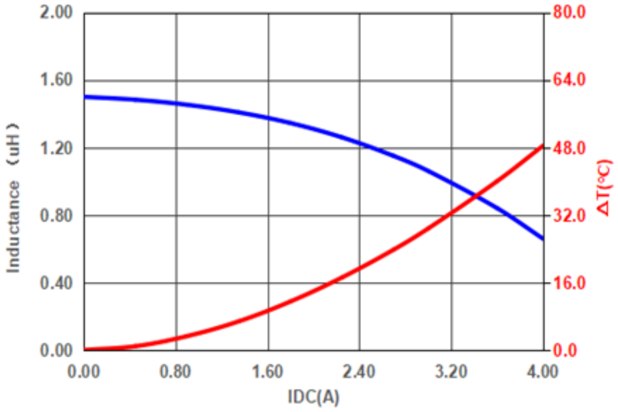
SPSQ3012BM1R0M



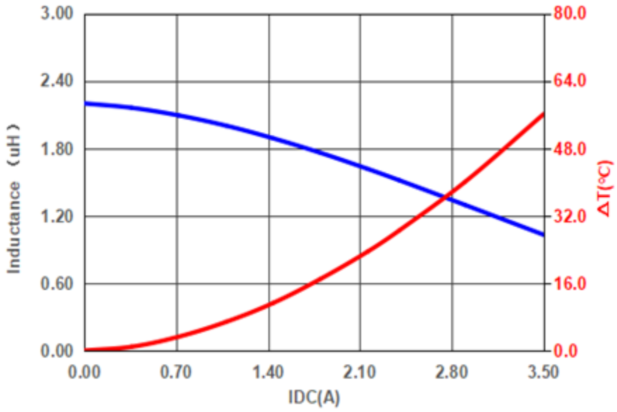
SPSQ3012BM1R2M



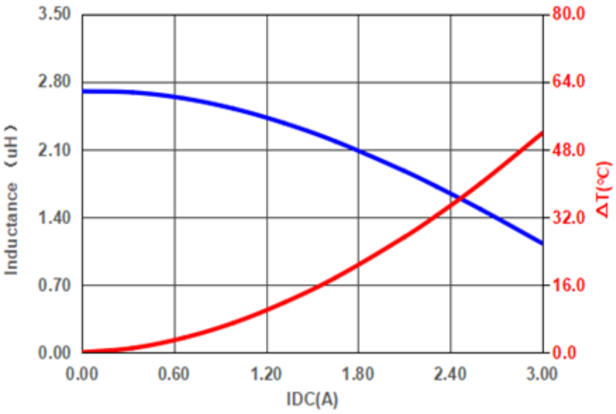
SPSQ3012BM1R5M



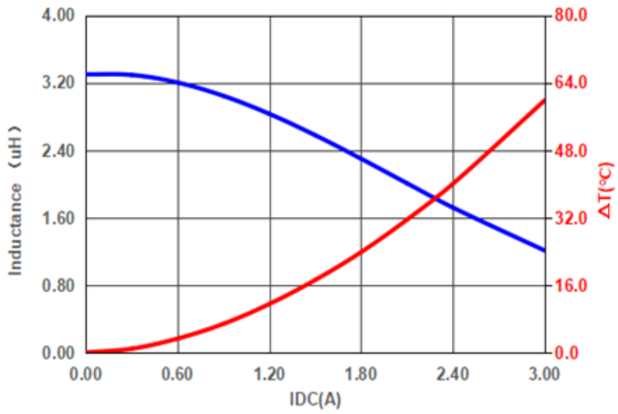
SPSQ3012BM2R2M



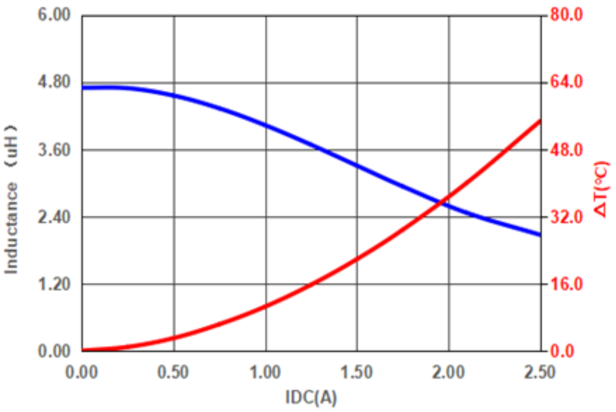
SPSQ3012BM2R7M



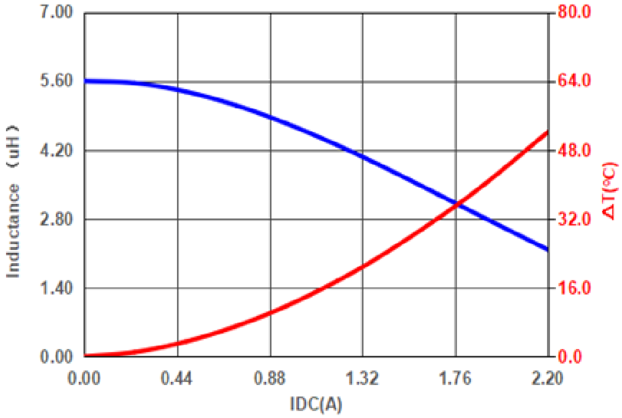
SPSQ3012BM3R3M



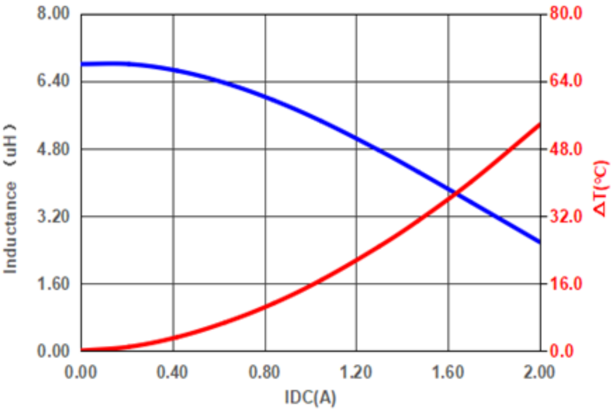
SPSQ3012BM4R7M



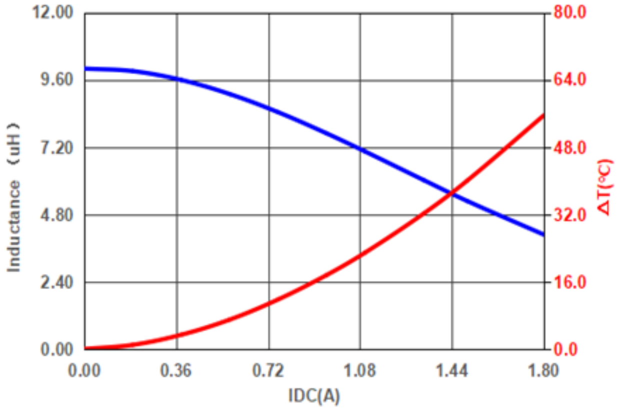
SPSQ3012BM5R6M



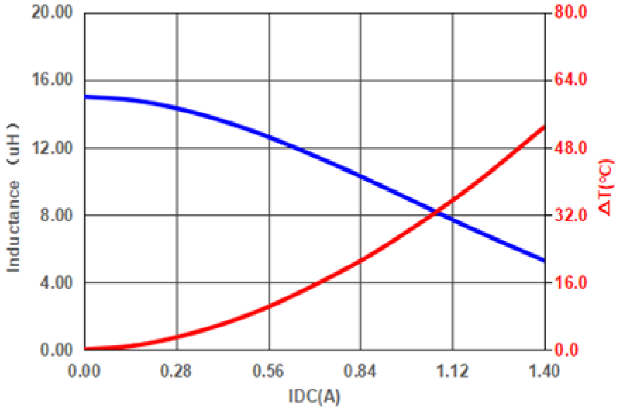
SPSQ3012BM6R8M



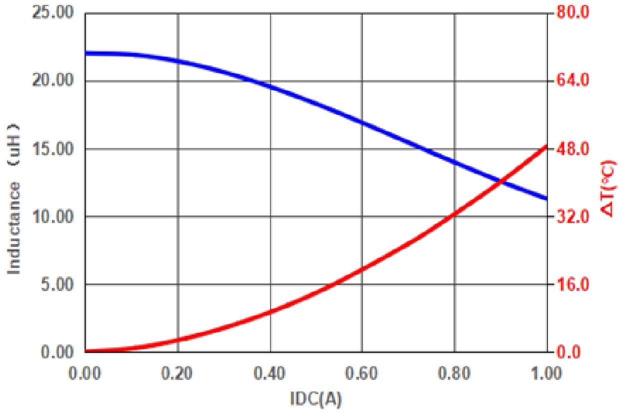
SPSQ3012BM100M



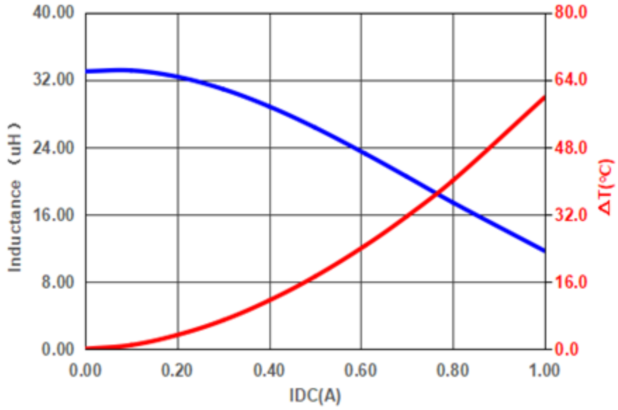
SPSQ3012BM150M



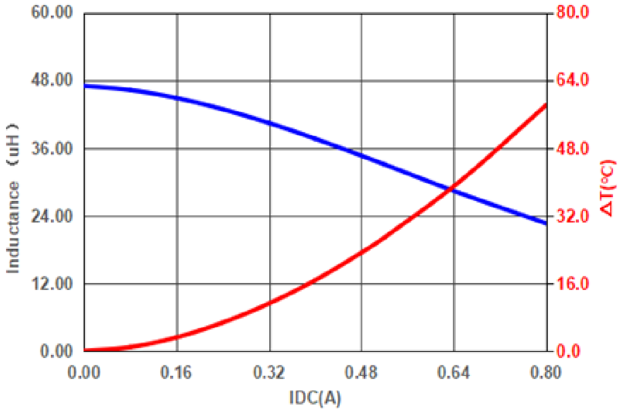
SPSQ3012BM220M



SPSQ3012BM330M



SPSQ3012BM470M



8. Soldering Specification

Mildly activated rosin fluxes are preferred. Our terminations are suitable for re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

8-1. IR Soldering Reflow

Recommended temperature profiles for lead free re-flow soldering in Figure 1, Table 1.1 & 1.2 (J-STD-020F).

8-2. Iron Reflow

Products attachment with a soldering iron is discouraged due to the inherent process control limitations. In the event that a soldering iron must be employed the following precautions are recommended (Figure 2).

Note:

(a) Preheat circuit and products to 150°C.

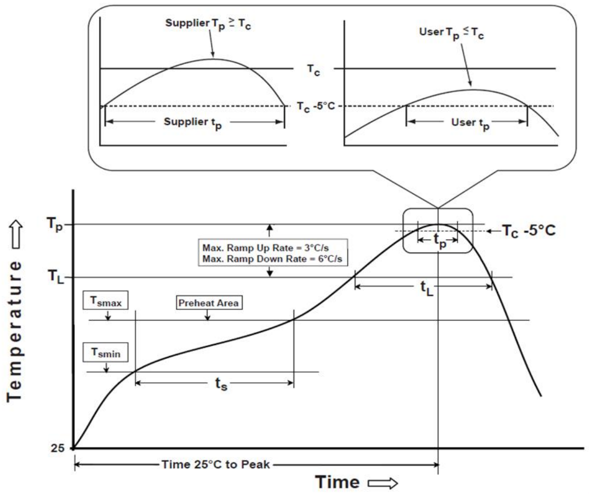
(b) 350°C tip temperature (Max.)

(c) Never contact the ceramic with the iron tip

(d) 1.0mm tip diameter (Max.)

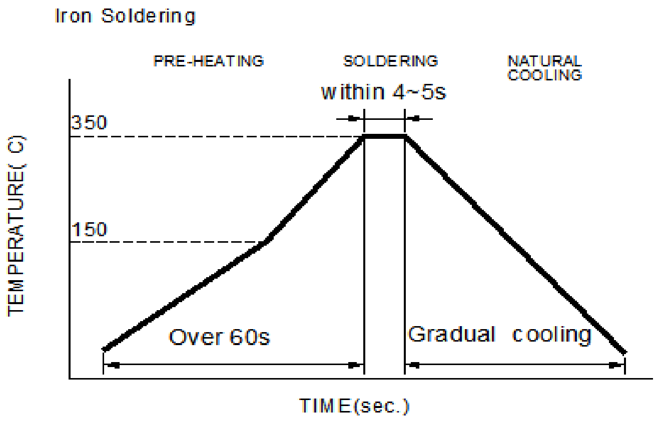
(e) Use a 20 watt soldering iron with tip diameter of 1.0mm

(f) Limit soldering time to 4~5 sec.



Reflow times: 3 times Max

Figure 1: IR Soldering Reflow



Iron Soldering times：1 times max

Figure 2: Iron soldering temperature profiles

Table (1.1) Reflow Profiles

Profile Type:	Pb-Free Assembly
Preheat -Temperature Min (T_{smin}) -Temperature Max (T_{smax}) -Time (t_s) from (T_{smin} to T_{smax})	 150°C 200°C 60-120seconds
Ramp-up rate ($T_L$to T_p)	3°C /second max.
Liquids temperature (T_L) Time (t_L) maintained above T_L	217°C 60-150 seconds
Classification temperature (T_c)	See Table (1.2)
Time (t_p) at Tc- 5°C (Tp should be equal to or less than Tc.)	< 30 seconds
Ramp-down rate (T_p to T_L)	6°C /second max.
Time 25°C to peak temperature	8 minutes max.

Tp: maximum peak package body temperature, **Tc**: the classification temperature.

For user (customer) **Tp** should be equal to or less than **Tc.**

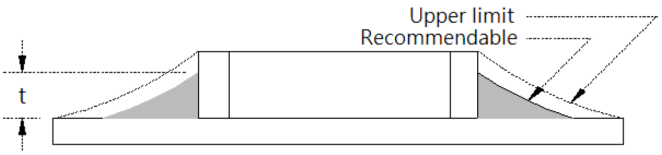
Table (1.2) Package Thickness/Volume and Classification Temperature (T_c)

	Package Thickness	Volume mm^3 <350	Volume mm^3 350-2000	Volume mm^3 >2000
PB-Free Assembly	<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

Reflow is referred to standard IPC/JEDEC J-STD-020F.

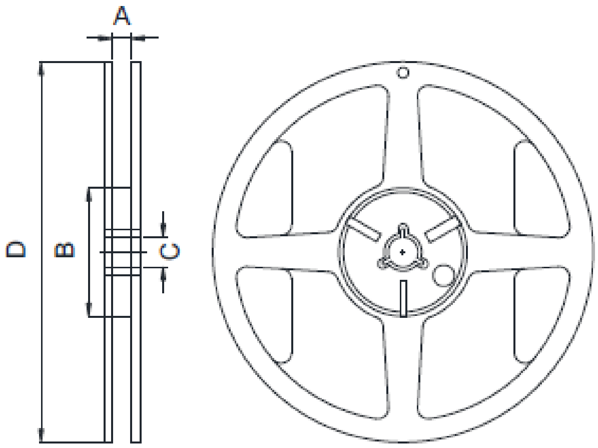
8-3. Soldering Volume

Accordingly increasing the solder volume, the mechanical stress to product is also increased. Exceeding solder volume may cause the failure of mechanical or electrical performance. Solder shall be used not to be exceeded as shown in the Figure below. Minimum fillet height = soldering thickness + 25% product height.



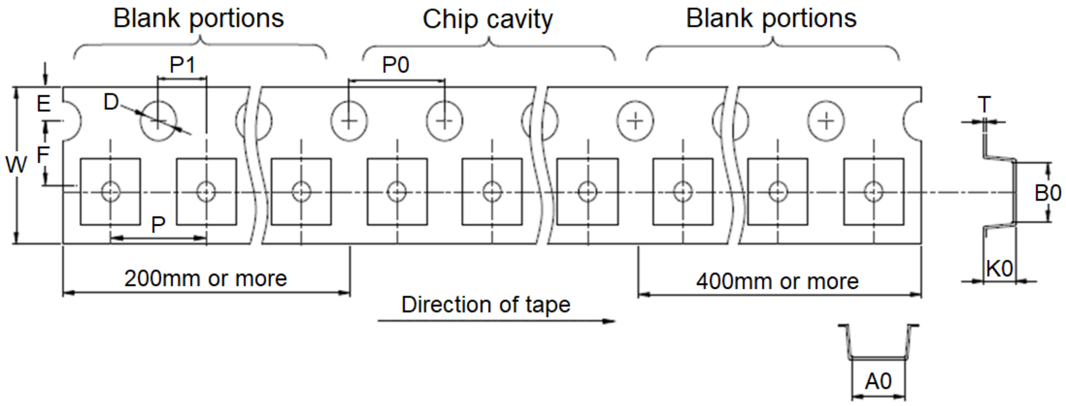
9. Packaging Information

9-1. Reel Dimension (Unit: mm)



Type	A	B	C	D
7"x 8 mm	8.4 Ref	60.0 Ref	13.0 Ref	178.0 Ref

9-2. Tape Dimension (Unit: mm)

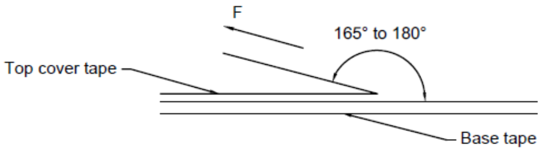


B0	A0	K0	P	W	T
3.40±0.10	3.40±0.10	1.40±0.10	4.00±0.10	8.00±0.30	0.23±0.10
E	F	D	P0	P1	-
1.75±0.10	3.50±0.10	1.50±0.10	4.00±0.10	2.00±0.10	-

9-3. Packaging Quantity (Unit: Pcs)

Chip/ Reel	3,000

9-4. Tearing Off Force



The force for tearing off cover tape is according to the follow table, in the arrow direction under the following conditions.

(Referenced ANSI/EIA-481-D-2008 of 4.11 standard)

Room Temp. (°C)	Room Humidity (%)	Room atm (hPa)	Tearing Speed (mm/min)
5~35	45~85	860~1060	300±10

Tape Size	8 mm	12 to 56 mm	72 mm or Wider
Tearing Off Force (grams)	10~100	10~130	10~150

Application Notice

1. Storage Conditions

   To maintain the solderability of terminal electrodes:

   (a) Products meet IPC/JEDEC J-STD-020F standard-MSL, level 1.

   (b) Recommended products should be used within 12 months from the time of delivery.

   (c) The packaging material should be kept where no chlorine or sulfur exists in the air.

2. Transportation

   (a) Products should be handled with care to avoid damage or contamination from perspiration and skin oils.

   (b) Vacuum pick up is strongly recommended for individual components.

   (c) Bulk handling should ensure that abrasion and mechanical shock are minimized.