

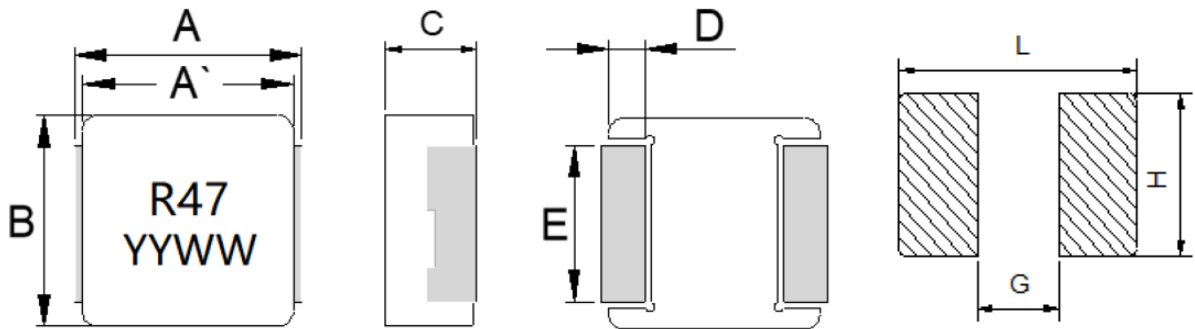
## 1. Part No. Expression

**PIAQ1707SPR47MN**

(a) (b) (c) (d) (e) (f)

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

## 2. Configuration & Dimensions (Unit: mm)



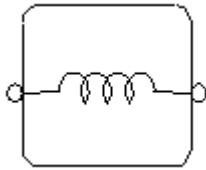
Recommended PCB Layout

- Note:
1. The above PCB layout reference only.
  2. Recommend solder paste thickness at 0.17 mm and above.
  3. Marking: Top= Inductance Code, Bottom=YYWW (Year/World week), Black

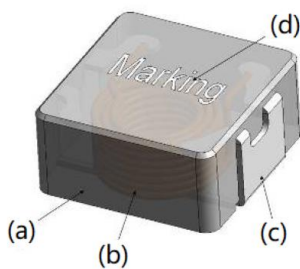
A	A'	B	C	D	E	L	G	H
17.8±0.5	16.9±0.3	16.9±0.3	6.7±0.3	2.3±0.3	11.9±0.3	18.5 Ref	12.0 Ref	12.5 Ref

NOTE: Specifications subject to change without notice. Please check our website for latest information.

## 3. Schematic



## 4. Material List



- (a) Core
- (b) Wire
- (c) Clip
- (d) Ink

## 5. General Specifications

- (a) Reliability test for this part meets AEC-Q200 standard.
- (b) Operating Temp.: -55°C to +155°C (including self-temperature rise)
- (c) Storage Temp.: -55°C to +155°C (on board)
- (d) All test data referenced to 25°C ambient.
- (e) Heat Rated Current ( $I_{rms}$ ) will cause the coil temperature rise approximately  $\Delta T$  of 40°C.
- (f) Saturation Current ( $I_{sat}$ ) will cause inductance  $L_0$  to drop approximately 30%.
- (g) Rated Current: The lower value of  $I_{sat}$  and  $I_{rms}$ .
- (h) Part Temperature (Ambient + Temp. Rise): Should not exceed 155°C under worst case operating conditions.
- (i) Maximum Operating Voltage: 90V
- (j) Storage Condition (Component in its packaging)
  - i) Temperature: Less than 40°C
  - ii) Humidity: Less than 60% RH

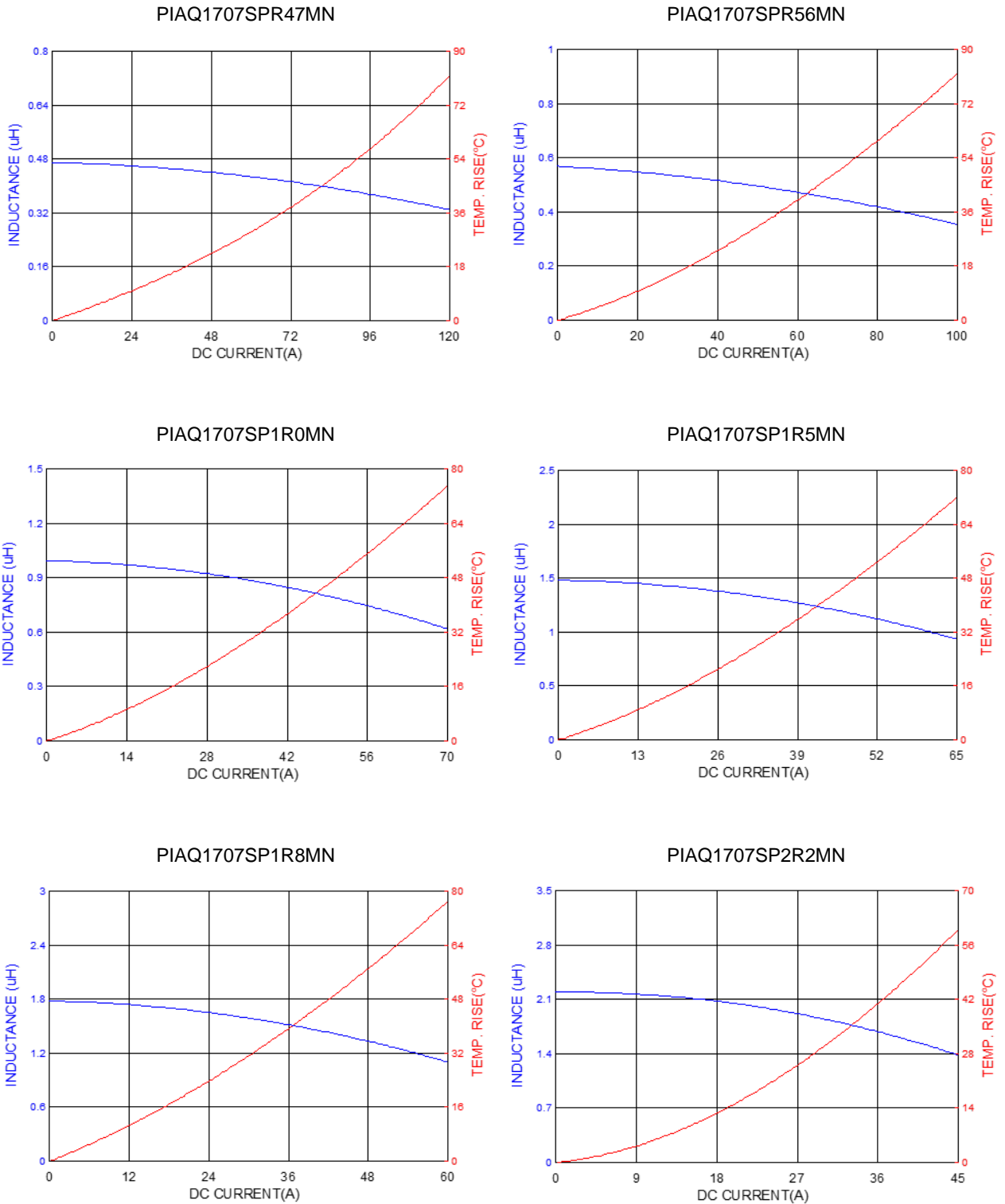
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## 6. Electrical Characteristics

Part Number	Inductance ( $\mu$ H) @ 0A $\pm$ 20%	Test Frequency	I <sub>rms</sub> (A)		I <sub>sat</sub> (A)		DCR (m $\Omega$ )	
			Typ	Max	Typ	Max	Typ	Max
PIAQ1707SPR47MN	0.47	1.0V/100KHz	60	55	110	100	0.7	0.9
PIAQ1707SPR56MN	0.56	1.0V/100KHz	56	50	80	70	0.81	0.97
PIAQ1707SP1R0MN	1.00	1.0V/100KHz	46	42	50	45	1.06	1.3
PIAQ1707SP1R5MN	1.50	1.0V/100KHz	39	35	46	40	1.5	1.8
PIAQ1707SP1R8MN	1.80	1.0V/100KHz	35	32	40	34	1.7	2.0
PIAQ1707SP2R2MN	2.20	1.0V/100KHz	32	30	35	32	1.8	2.2
PIAQ1707SP3R3MN	3.30	1.0V/100KHz	30	28	32	29	2.7	3.3
PIAQ1707SP4R7MN	4.70	1.0V/100KHz	28	26	29	26	3.7	4.5
PIAQ1707SP6R8MN	6.80	1.0V/100KHz	24	22	25	22	6.0	7.2
PIAQ1707SP100MN	10.0	1.0V/100KHz	21	19	22	19	9.2	10.6
PIAQ1707SP150MN	15.0	1.0V/100KHz	16	14	16	14	12.8	15.5
PIAQ1707SP220MN	22.0	1.0V/100KHz	13.5	11.5	13.5	11.5	20.5	24
PIAQ1707SP330MN	33.0	1.0V/100KHz	12	10	12	10	32	37
PIAQ1707SP470MN	47.0	1.0V/100KHz	9.5	8.0	9.5	8.0	40	47
PIAQ1707SP680MN	68.0	1.0V/100KHz	8.0	6.5	8.5	7.2	66	76
PIAQ1707SP820MN	82.0	1.0V/100KHz	6.5	5.7	8.0	6.5	69	83

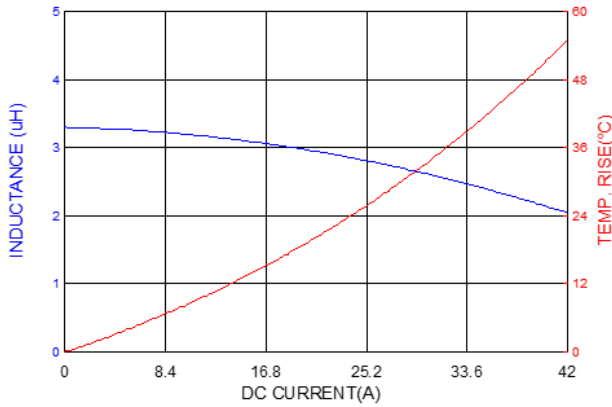
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7. Characteristics Curve

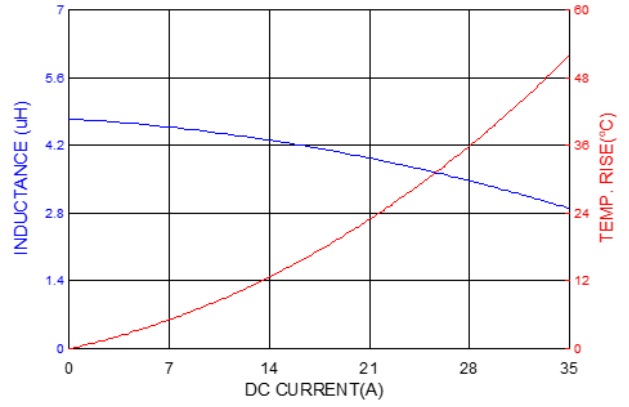


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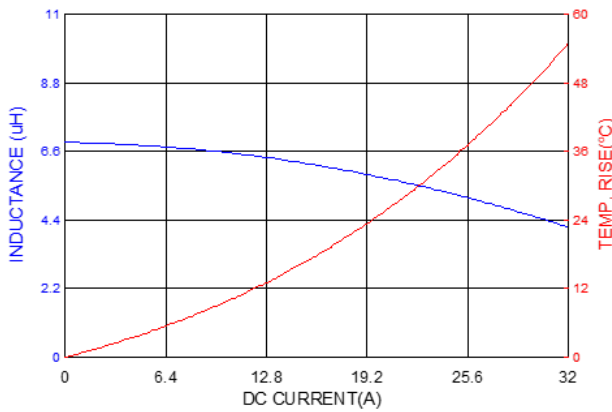
PIAQ1707SP3R3MN



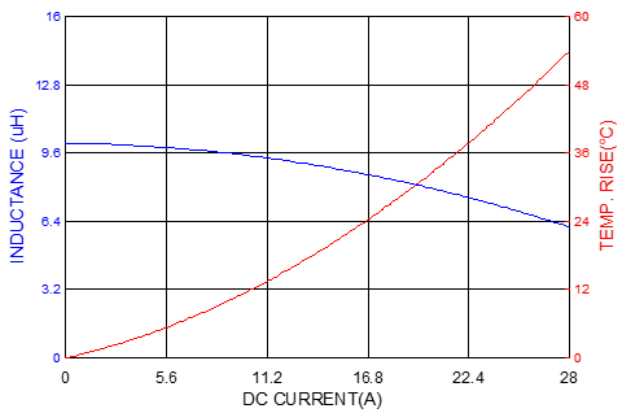
PIAQ1707SP4R7MN



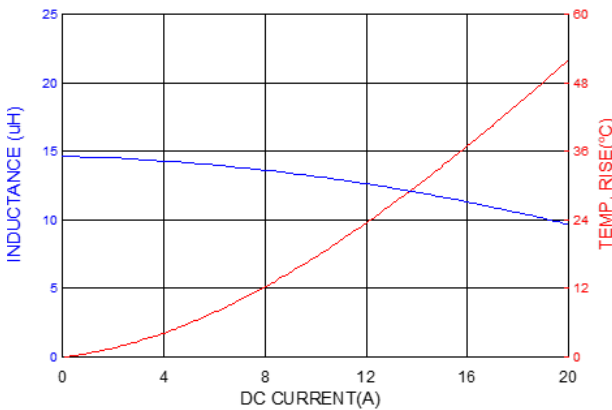
PIAQ1707SP6R8MN



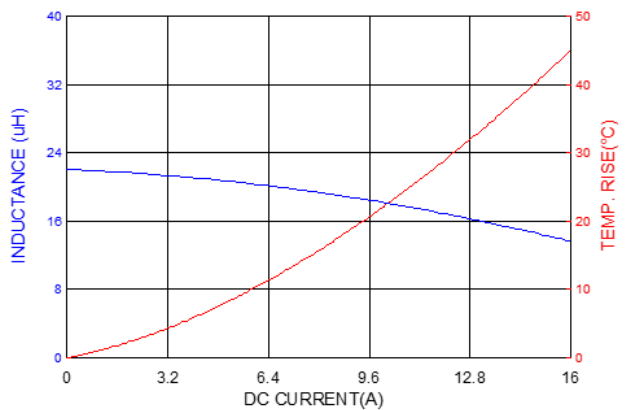
PIAQ1707SP100MN



PIAQ1707SP150MN

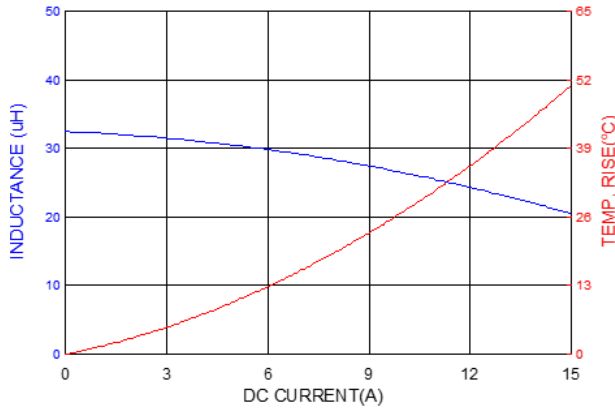


PIAQ1707SP220MN

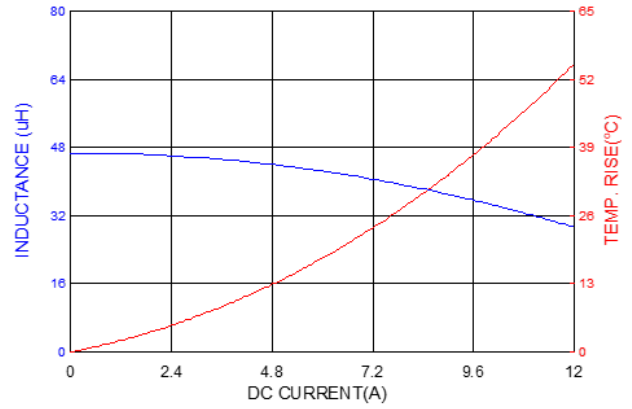


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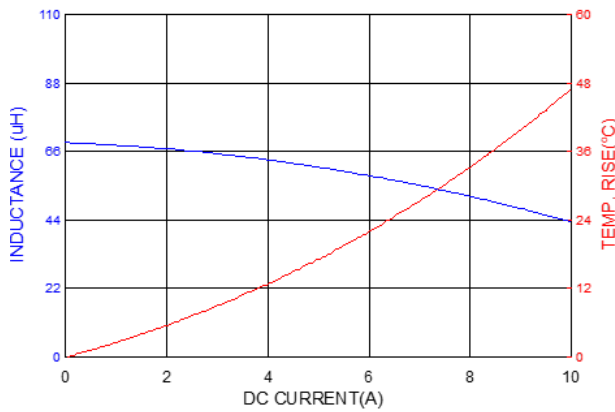
PIAQ1707SP330MN



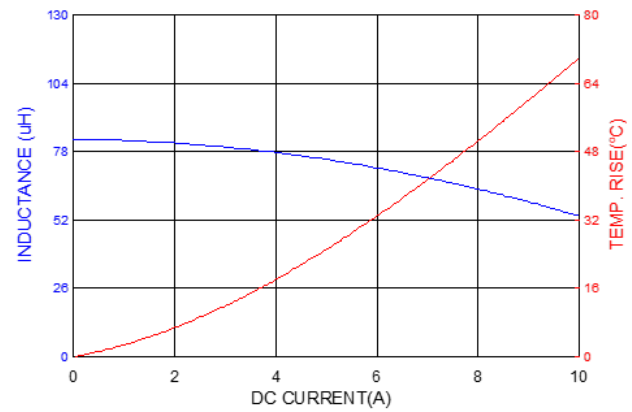
PIAQ1707SP470MN



PIAQ1707SP680MN



PIAQ1707SP820MN



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### 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

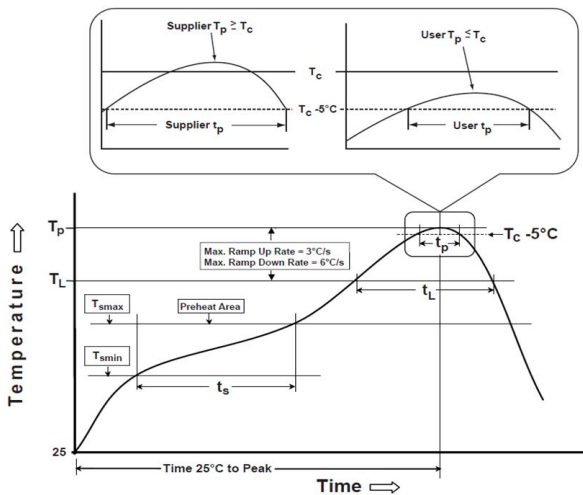
Recommended temperature profiles for lead free re-flow soldering in Figure 1, Table 1.1 & 1.2 (J-STD-020E).

#### 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).

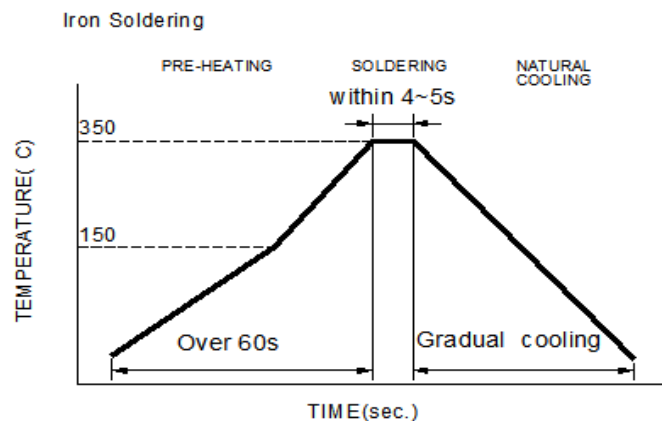
Note:

- (a) Preheat circuit and products to 150°C.
- (b) 355°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.

Soldering iron method: 350±5°C Max

Figure 2: Iron soldering temperature profiles

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**Table (1.1) Reflow Profiles**

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

**T<sub>p</sub>**: maximum peak package body temperature, **T<sub>c</sub>**: the classification temperature.

For user (customer) **T<sub>p</sub>** should be equal to or less than **T<sub>c</sub>**.

\*Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.

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

	Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> 350-2000	Volume mm <sup>3</sup> >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

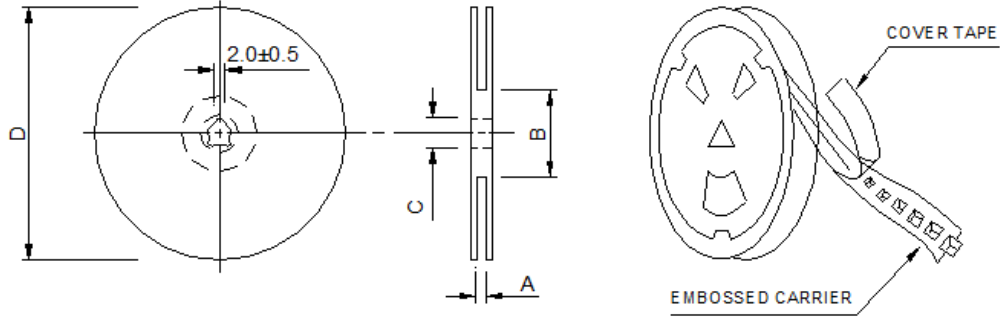
Reflow is referred to standard IPC/JEDEC J-STD-020E.

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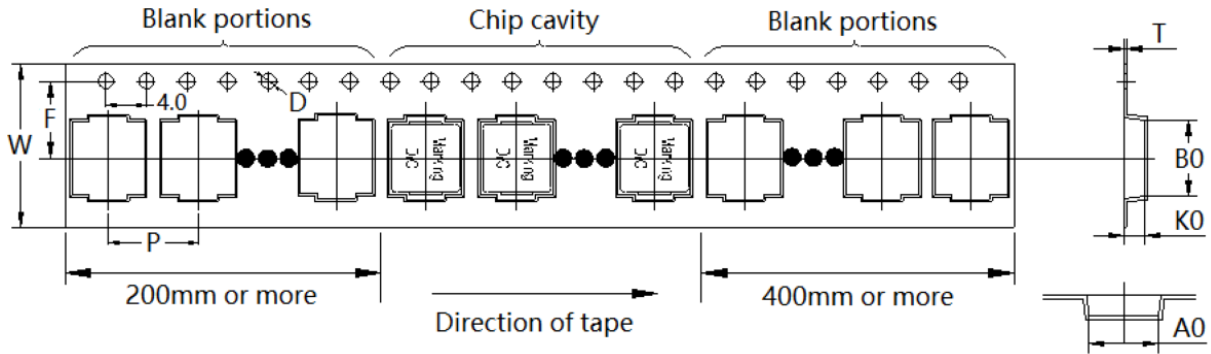
9. Packaging Information

9-1. Reel Dimension (Unit: mm)



Type	A	B	C	D
13"x32mm	32.4+2.0/-0.0	100.0±2.0	13.5+0.5/-0.2	330.0

9-2. Tape Dimension (Unit: mm)



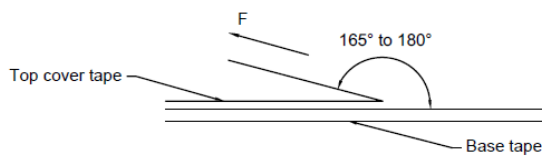
B0	A0	K0	P
18.50±0.10	17.50±0.10	7.50±0.10	24.00±0.10
W	F	T	D
32.00±0.30	14.20±0.10	0.50±0.05	1.50±0.10

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### 9-3. Packaging Quantity (Unit: Pcs)

Chip/ Reel	200
Inner Box	200
Carton	800

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

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