

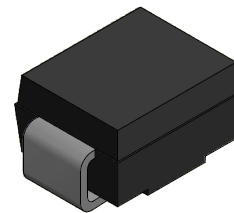
## Transient Voltage Suppressor

Version: A8 2020/8/12

### Features

- IEC 61000-4-2(ESD)  $\pm 15KV$ (air),  $\pm 8KV$ (contact)
- 600Watts peak pulse power ( $t_p=10/1000\mu S$ )
- Quick response to surge voltage
- Low clamping voltage
- Moisture sensitivity level: level 1

### Exterior



DO-214AA (SMB)

### Application Information

- DC Port
- RS485/232/422
- I/O Port

### Agency Approvals

Icon	Description
<b>RoHS</b>	Compliance with 2011/65/EU
<b>HF</b>	Compliance with IEC61249-2-21:2003
<b>UL</b>	UL Certificated E232249

### Schematic Symbol



BI-directional



UNI-directional

### Part Numbering and Electrical Parameter

Part Number		Marking		VR (V)	VBR min.(V)	VBR max.(V)	It (mA)	Vc@IPP <sup>①</sup> (V)	IPP <sup>①</sup> (A)	IR@VR (uA)
BI	UNI	BI	UNI							
BV-SMBJ5CA	BV-SMBJ5A	B5C	B5	5	6.4	7	10	9.2	65.3	800
BV-SMBJ6CA	BV-SMBJ6A	B6C	B6	6	6.67	7.37	10	10.3	58.3	800
BV-SMBJ6.5CA	BV-SMBJ6.5A	B6.5C	B6.5	6.5	7.22	7.98	10	11.2	53.6	500
BV-SMBJ7CA	BV-SMBJ7A	B7C	B7	7	7.78	8.6	10	12	50	200
BV-SMBJ7.5CA	BV-SMBJ7.5A	B7.5C	B7.5	7.5	8.33	9.21	1	12.9	46.6	100
BV-SMBJ8CA	BV-SMBJ8A	B8C	B8	8	8.89	9.83	1	13.6	44.2	50
BV-SMBJ8.5CA	BV-SMBJ8.5A	B8.5C	B8.5	8.5	9.44	10.4	1	14.4	41.7	20
BV-SMBJ9CA	BV-SMBJ9A	B9C	B9	9	10	11.1	1	15.4	39	10
BV-SMBJ10CA	BV-SMBJ10A	B10C	B10	10	11.1	12.3	1	17	35.3	5
BV-SMBJ11CA	BV-SMBJ11A	B11C	B11	11	12.2	13.5	1	18.2	33	1
BV-SMBJ12CA	BV-SMBJ12A	B12C	B12	12	13.3	14.7	1	19.9	30.2	1
BV-SMBJ13CA	BV-SMBJ13A	B13C	B13	13	14.4	15.9	1	21.5	28	1
BV-SMBJ14CA	BV-SMBJ14A	B14C	B14	14	15.6	17.2	1	23.2	25.9	1
BV-SMBJ15CA	BV-SMBJ15A	B15C	B15	15	16.7	18.5	1	24.4	24.6	1
BV-SMBJ16CA	BV-SMBJ16A	B16C	B16	16	17.8	19.7	1	26	23.1	1
BV-SMBJ17CA	BV-SMBJ17A	B17C	B17	17	18.9	20.9	1	27.6	21.8	1
BV-SMBJ18CA	BV-SMBJ18A	B18C	B18	18	20	22.1	1	29.2	20.6	1
BV-SMBJ20CA	BV-SMBJ20A	B20C	B20	20	22.2	24.5	1	32.4	18.6	1

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Part Number		Marking		VR	VBR	VBR	It	Vc@Ipp <sup>①</sup>	IPP <sup>①</sup>	IR@VR
BI	UNI	BI	UNI	(V)	min.(V)	max.(V)	(mA)	(V)	(A)	(uA)
BV-SMBJ22CA	BV-SMBJ22A	B22C	B22	22	24.4	26.9	1	35.5	16.9	1
BV-SMBJ24CA	BV-SMBJ24A	B24C	B24	24	26.7	29.5	1	38.9	15.5	1
BV-SMBJ26CA	BV-SMBJ26A	B26C	B26	26	28.9	31.9	1	42.1	14.3	1
BV-SMBJ28CA	BV-SMBJ28A	B28C	B28	28	31.1	34.4	1	45.4	13.3	1
BV-SMBJ30CA	BV-SMBJ30A	B30C	B30	30	33.3	36.8	1	48.4	12.4	1
BV-SMBJ33CA	BV-SMBJ33A	B33C	B33	33	36.7	40.6	1	53.3	11.3	1
BV-SMBJ36CA	BV-SMBJ36A	B36C	B36	36	40	44.2	1	58.1	10.4	1
BV-SMBJ40CA	BV-SMBJ40A	B40C	B40	40	44.4	49.1	1	64.5	9.3	1
BV-SMBJ43CA	BV-SMBJ43A	B43C	B43	43	47.8	52.8	1	69.4	8.7	1
BV-SMBJ45CA	BV-SMBJ45A	B45C	B45	45	50	55.3	1	72.7	8.3	1
BV-SMBJ48CA	BV-SMBJ48A	B48C	B48	48	53.3	58.9	1	77.4	7.8	1
BV-SMBJ51CA	BV-SMBJ51A	B51C	B51	51	56.7	62.7	1	82.4	7.3	1
BV-SMBJ54CA	BV-SMBJ54A	B54C	B54	54	60	66.3	1	87.1	6.9	1
BV-SMBJ58CA	BV-SMBJ58A	B58C	B58	58	64.4	71.2	1	93.6	6.5	1
BV-SMBJ60CA	BV-SMBJ60A	B60C	B60	60	66.7	73.7	1	96.8	6.2	1
BV-SMBJ64CA	BV-SMBJ64A	B64C	B64	64	71.1	78.6	1	103	5.9	1
BV-SMBJ70CA	BV-SMBJ70A	B70C	B70	70	77.8	86	1	113	5.3	1
BV-SMBJ75CA	BV-SMBJ75A	B75C	B75	75	83.3	92.1	1	121	5	1
BV-SMBJ78CA	BV-SMBJ78A	B78C	B78	78	86.7	95.8	1	126	4.8	1
BV-SMBJ85CA	BV-SMBJ85A	B85C	B85	85	94.4	104	1	137	4.4	1
BV-SMBJ90CA	BV-SMBJ90A	B90C	B90	90	100	111	1	146	4.1	1
BV-SMBJ100CA	BV-SMBJ100A	B100C	B100	100	111	123	1	162	3.7	1
BV-SMBJ110CA	BV-SMBJ110A	B110C	B110	110	122	135	1	177	3.4	1
BV-SMBJ120CA	BV-SMBJ120A	B120C	B120	120	133	147	1	193	3.1	1
BV-SMBJ130CA	BV-SMBJ130A	B130C	B130	130	144	159	1	209	2.9	1
BV-SMBJ150CA	BV-SMBJ150A	B150C	B150	150	167	185	1	243	2.5	1
BV-SMBJ160CA	BV-SMBJ160A	B160C	B160	160	178	197	1	259	2.3	1
BV-SMBJ170CA	BV-SMBJ170A	B170C	B170	170	189	209	1	275	2.2	1
BV-SMBJ180CA <sup>②</sup>	BV-SMBJ180A <sup>②</sup>	B180C	B180	180	201	222	1	292	2.1	1
BV-SMBJ188CA <sup>②</sup>	BV-SMBJ188A <sup>②</sup>	B188C	B188	188	209	231	1	304	2.0	1
BV-SMBJ200CA <sup>②</sup>	BV-SMBJ200A <sup>②</sup>	B200C	B200	200	224	247	1	324	1.9	1
BV-SMBJ220CA <sup>②</sup>	BV-SMBJ220A <sup>②</sup>	B220C	B220	220	246	272	1	356	1.7	1
BV-SMBJ250CA <sup>②</sup>	BV-SMBJ250A <sup>②</sup>	B250C	B250	250	279	309	1	405	1.5	1
BV-SMBJ300CA <sup>②</sup>	BV-SMBJ300A <sup>②</sup>	B300C	B300	300	335	371	1	486	1.3	1
BV-SMBJ350CA <sup>②</sup>	BV-SMBJ350A <sup>②</sup>	B350C	B350	350	391	432	1	567	1.1	1
BV-SMBJ400CA <sup>②</sup>	BV-SMBJ400A <sup>②</sup>	B400C	B400	400	447	494	1	648	0.9	1
BV-SMBJ440CA <sup>②</sup>	BV-SMBJ440A <sup>②</sup>	B440C	B440	440	492	543	1	713	0.9	1

Note: Absolute maximum ratings measured at T = 25°C RH = 45%-75% (unless otherwise noted).

① Surge Waveform: 10/1000μs      ② These part numbers do not have UL497b safety certification

Mark



BI: BXXC



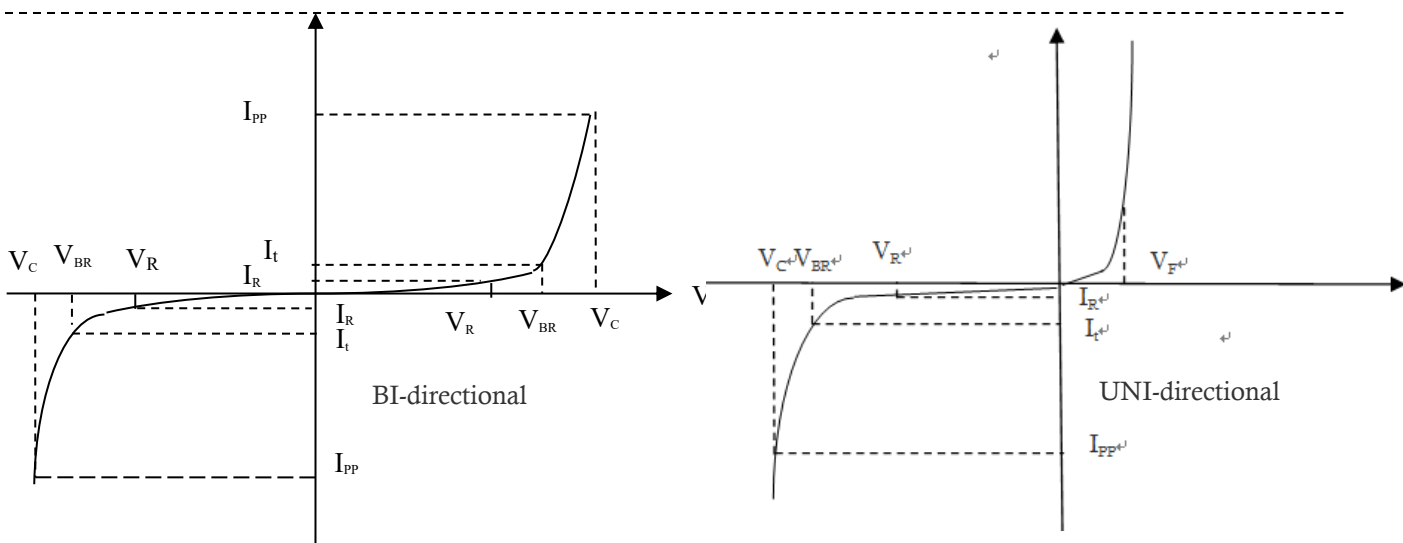
UNI: BXX

Part Number System

BV —SMBJ XX C A  
 (1) (2) (3) (4) (5)

- (1) Bencent Transient Voltage Suppressor
- (2) Series Code
- (3)  $V_R=XXV$
- (4) BI-directional
- (5) Suffix 'A' denotes 5% tolerance devices

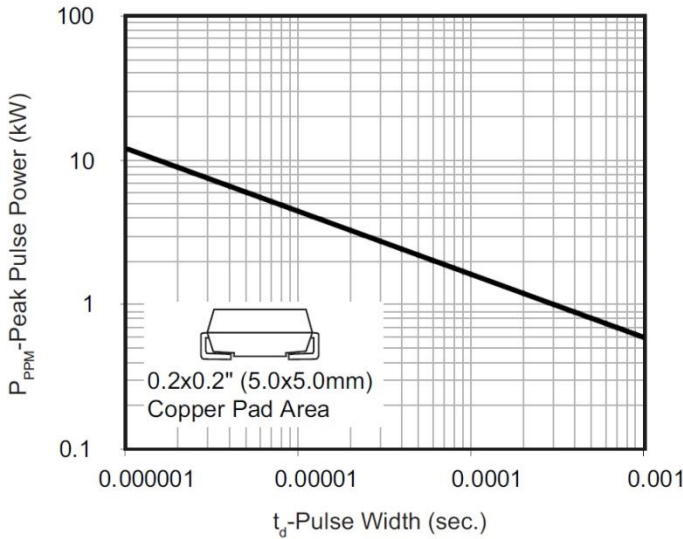
V-I Curve



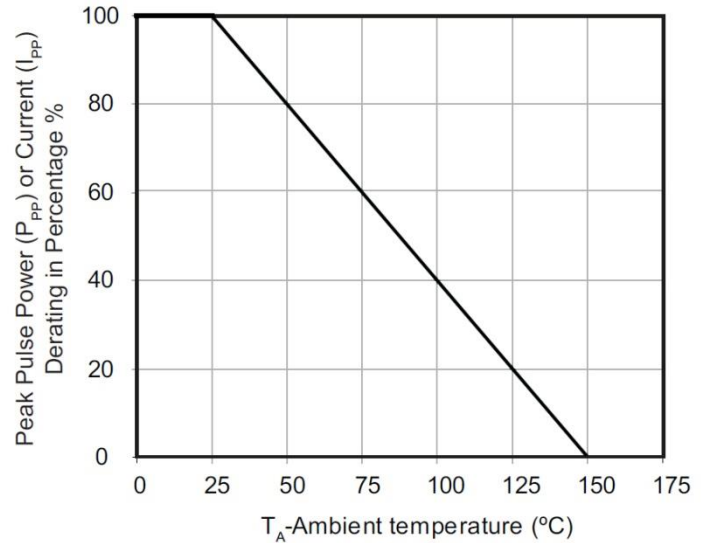
Parameters	Definition
$V_F$	Forward Voltage drop for UNI-directional
$V_C$	Clamping Voltage
$I_{PP}$	Surge Waveform 10/1000 $\mu$ s
$V_R$	Stand-off Voltage
$V_{BR}$	Breakdown Voltage
$I_R$	Reverse Leakage Current
$I_t$	Test Current
$P_{pp}$	Peak Pulse Power Dissipation

#### Typical Characteristics

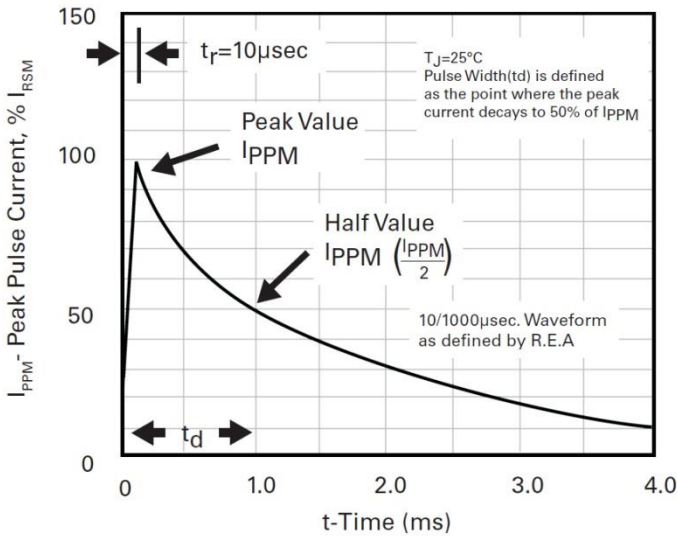
Peak Pulse Power Rating Curve



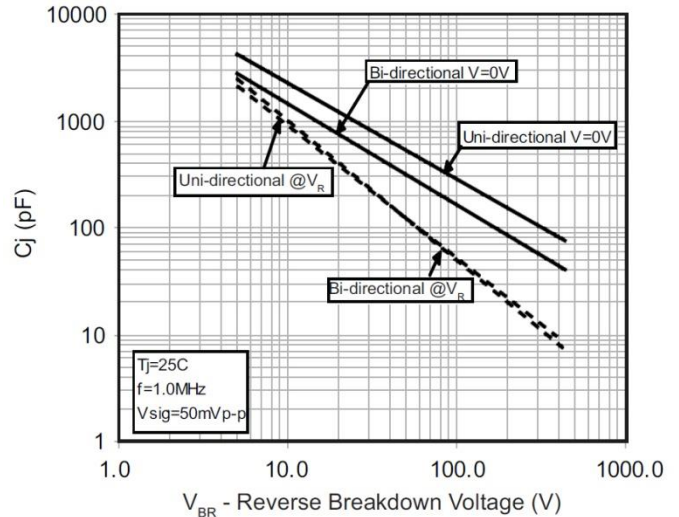
Pulse Derating Curve



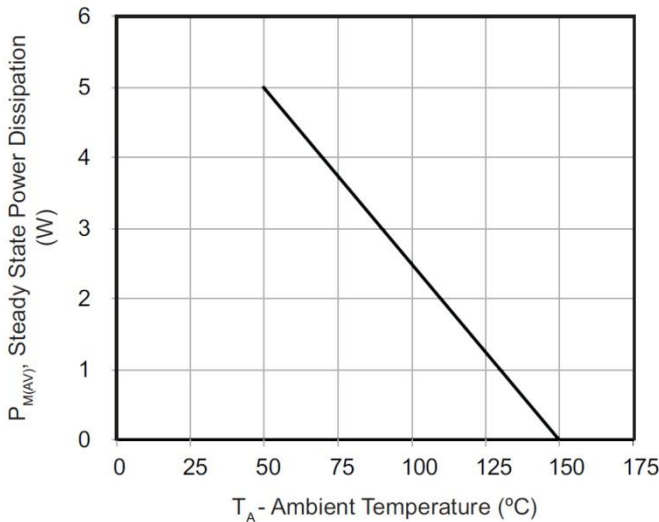
Pulse Waveform



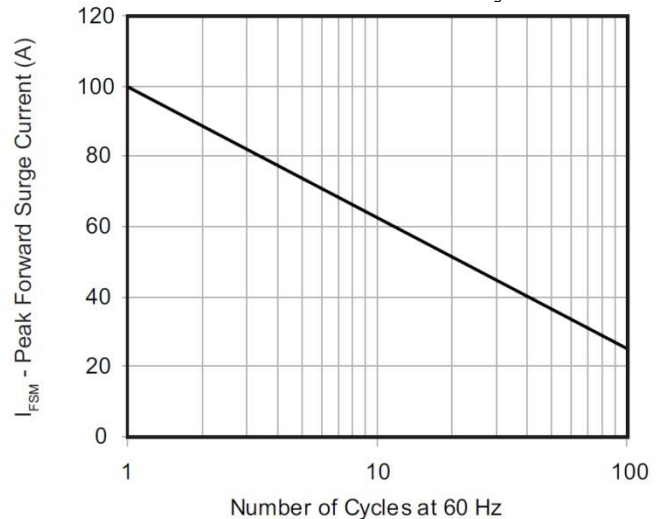
Typical Junction Capacitance



Steady State Power Dissipation Derating Curve



Maximum Non-Repetitive Forward Surge Current Uni-Directional Only

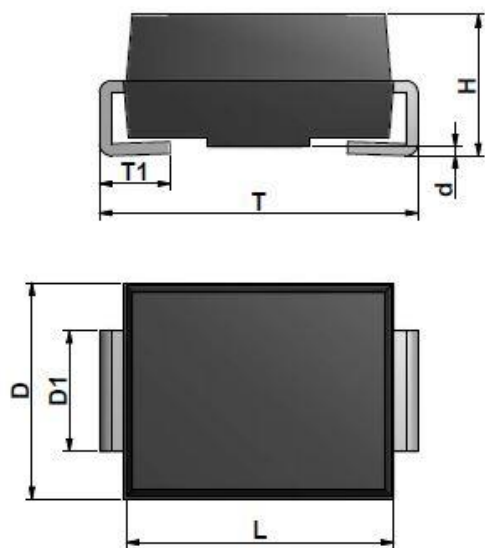


**Thermal Considerations**

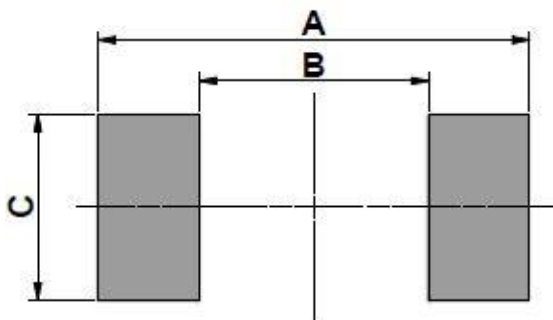
symbol	Parameter	Value	Unit
$T_J$	Operating Junction Temperature Range	-55 to +150	°C
$T_S$	Storage Temperature Range	-55 to +150	°C
VF	Maximum Instantaneous Forward; Voltage at 50A for Unidirectional Only (Note 1)	3.5/5	V
$I_{FSM}$	Peak Forward Surge Current, 8.3ms;Single Half Sine Wave (Note 2)	100	A

Notes:

1.  $V_F < 3.5V$  for single die parts and  $V_F < 5.0V$  for stacked-die parts.
2. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only.

**Product Dimensions**


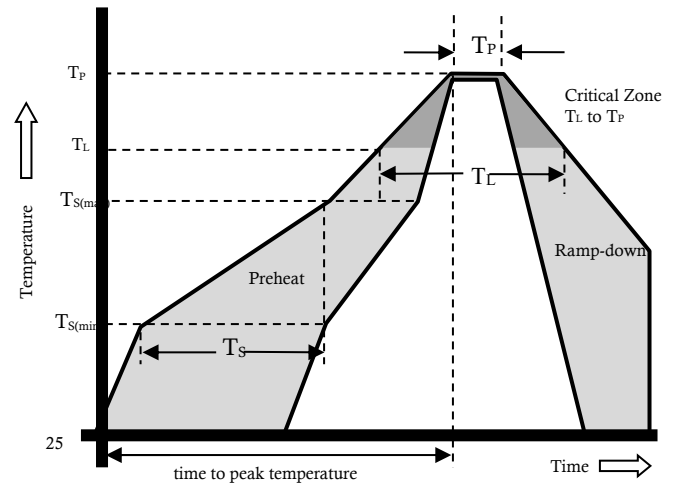
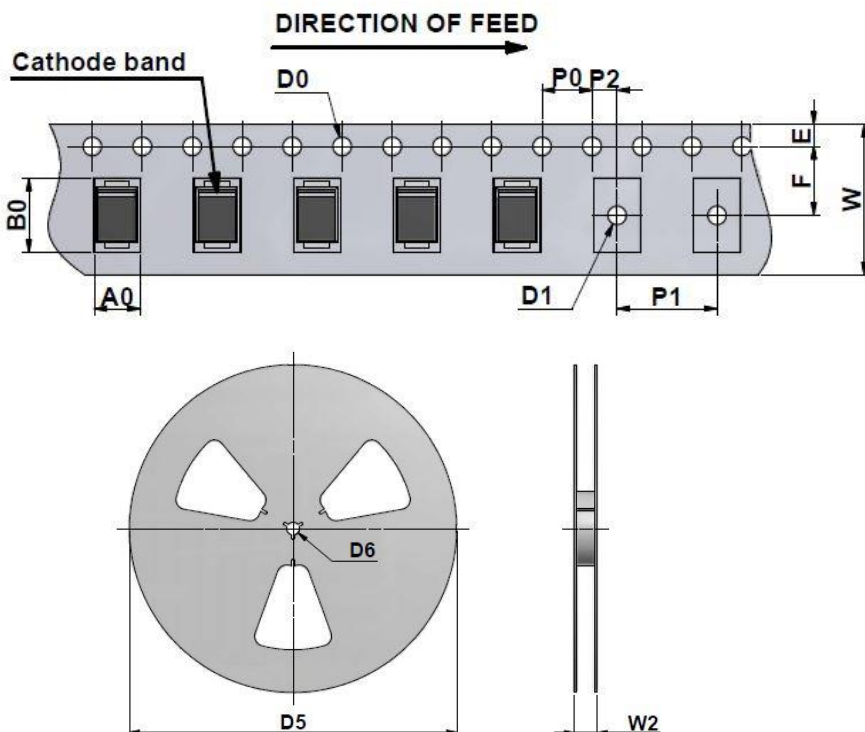
REF.	mm	inch
D	$3.6 \pm 0.3$	$0.142 \pm 0.012$
D1	$2 \pm 0.15$	$0.079 \pm 0.006$
L	$4.6 \pm 0.3$	$0.181 \pm 0.012$
T	$5.4 \pm 0.3$	$0.213 \pm 0.012$
T1	$1.1 \pm 0.3$	$0.043 \pm 0.012$
d	0~0.4	0~0.016
H	2.10~2.60	0.083~0.102

**Recommended Soldering Pad**


REF	mm	inch
A	5.45	0.215
B	2.45	0.096
C	2.15	0.085

**Reflow Profile**

Reflow Condition		Pb-Free Assembly
Pre Heat	Temperature Min.	+150°C
	Temperature Max.	+200°C
	Time (Min to Max)	60 – 180 seconds
Average ramp up rate (Liquidus Temp (T <sub>L</sub> ) to peak)		3°C/second max
Ts(max) to T <sub>L</sub> - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T <sub>L</sub> ) (Liquidus)	217°C
	- Temperature (T <sub>i</sub> )	60 – 150 seconds
Peak Temp (T <sub>P</sub> )		260+0/-5 °C
Time within 5°C of actual Peak Temp (T <sub>P</sub> )		8-15 seconds
Ramp-down Rate		6°C/s max
Time 25°C to peak Temp (T <sub>P</sub> )		8 min max.
Do not exceed		260°C


**Package Reel Information**


REF.	mm	inch
W	12±1	0.472 ± 0.039
E	1.75±0.3	0.069 ± 0.012
F	5.5±0.3	0.217 ± 0.012
D0	1.55±0.15	0.061 ± 0.006
D1	1.5±0.2	0.059 ± 0.008
P0	4.0±0.2	0.157 ± 0.008
P1	8.0±0.2	0.315 ± 0.008
P2	2.0±0.2	0.079 ± 0.008
A0	3.6±0.3	0.142 ± 0.012
B0	5.7±0.3	0.224 ± 0.012
D5	Ø330	Ø13
D6	Ø13.5±1.0	Ø0.531 ± 0.039
W2	18±2.0	0.709 ± 0.079

Outline	Reel (pcs)	Per Carton (pcs)	Reel Diameters (mm)	Carton Size(mm)		
				L	W	H
Taping	3,000	48,000	330	360	360	385