

## Transient Voltage Suppressor

Version: A8 2020/8/12

### Features

- IEC 61000-4-2(ESD)  $\pm 15\text{KV}(\text{air})$ ,  $\pm 8\text{KV}(\text{contact})$
- 400Watts peak pulse power ( $t_p=10/1000\mu\text{S}$ )
- Quick response to surge voltage
- Low clamping voltage
- Moisture sensitivity level: Level 1

### Exterior



DO-214AC (SMA)

### 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 Number and Electrical Parameter

Part Number		Marking		$V_R$ (V)	$V_{BR}$ min.(V)	$V_{BR}$ max.(V)	$I_t$ (mA)	$V_C@I_{PP}^{\text{①}}$ (V)	$I_{PP}^{\text{①}}$ (A)	$I_R@V_R$ ( $\mu\text{A}$ )
BI	UNI	BI	UNI							
BV-SMAJ5CA	BV-SMAJ5A	A5C	A5	5	6.4	7	10	9.2	43.5	800
BV-SMAJ6CA	BV-SMAJ6A	A6C	A6	6	6.67	7.37	10	10.3	38.8	800
BV-SMAJ6.5CA	BV-SMAJ6.5A	A6.5C	A6.5	6.5	7.22	7.98	10	11.2	35.7	500
BV-SMAJ7CA	BV-SMAJ7A	A7C	A7	7	7.78	8.6	10	12	33.3	200
BV-SMAJ7.5CA	BV-SMAJ7.5A	A7.5C	A7.5	7.5	8.33	9.21	1	12.9	31	100
BV-SMAJ8CA	BV-SMAJ8A	A8C	A8	8	8.89	9.83	1	13.6	29.4	50
BV-SMAJ8.5CA	BV-SMAJ8.5A	A8.5C	A8.5	8.5	9.44	10.4	1	14.4	27.8	20
BV-SMAJ9CA	BV-SMAJ9A	A9C	A9	9	10	11.1	1	15.4	26	10
BV-SMAJ10CA	BV-SMAJ10A	A10C	A10	10	11.1	12.3	1	17	23.5	5
BV-SMAJ11CA	BV-SMAJ11A	A11C	A11	11	12.2	13.5	1	18.2	22	1
BV-SMAJ12CA	BV-SMAJ12A	A12C	A12	12	13.3	14.7	1	19.9	20.1	1
BV-SMAJ13CA	BV-SMAJ13A	A13C	A13	13	14.4	15.9	1	21.5	18.6	1
BV-SMAJ14CA	BV-SMAJ14A	A14C	A14	14	15.6	17.2	1	23.2	17.2	1
BV-SMAJ15CA	BV-SMAJ15A	A15C	A15	15	16.7	18.5	1	24.4	16.4	1
BV-SMAJ16CA	BV-SMAJ16A	A16C	A16	16	17.8	19.7	1	26	15.4	1
BV-SMAJ17CA	BV-SMAJ17A	A17C	A17	17	18.9	20.9	1	27.6	14.5	1

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Part Number		Marking		V <sub>R</sub> (V)	V <sub>BR</sub> min.(V)	V <sub>BR</sub> max.(V)	I <sub>t</sub> (mA)	V <sub>c@I<sub>pp</sub></sub> <sup>①</sup> (V)	I <sub>pp</sub> <sup>①</sup> (A)	I <sub>R@V<sub>R</sub></sub> (uA)
BI	UNI	BI	UNI							
BV-SMAJ18CA	BV-SMAJ18A	A18C	A18	18	20	22.1	1	29.2	13.7	1
BV-SMAJ20CA	BV-SMAJ20A	A20C	A20	20	22.2	24.5	1	32.4	12.3	1
BV-SMAJ22CA	BV-SMAJ22A	A22C	A22	22	24.4	26.9	1	35.5	11.3	1
BV-SMAJ24CA	BV-SMAJ24A	A24C	A24	24	26.7	29.5	1	38.9	10.3	1
BV-SMAJ26CA	BV-SMAJ26A	A26C	A26	26	28.9	31.9	1	42.1	9.5	1
BV-SMAJ28CA	BV-SMAJ28A	A28C	A28	28	31.1	34.4	1	45.4	8.8	1
BV-SMAJ30CA	BV-SMAJ30A	A30C	A30	30	33.3	36.8	1	48.4	8.3	1
BV-SMAJ33CA	BV-SMAJ33A	A33C	A33	33	36.7	40.6	1	53.3	7.5	1
BV-SMAJ36CA	BV-SMAJ36A	A36C	A36	36	40	44.2	1	58.1	6.9	1
BV-SMAJ40CA	BV-SMAJ40A	A40C	A40	40	44.4	49.1	1	64.5	6.2	1
BV-SMAJ43CA	BV-SMAJ43A	A43C	A43	43	47.8	52.8	1	69.4	5.8	1
BV-SMAJ45CA	BV-SMAJ45A	A45C	A45	45	50	55.3	1	72.7	5.5	1
BV-SMAJ48CA	BV-SMAJ48A	A48C	A48	48	53.3	58.9	1	77.4	5.2	1
BV-SMAJ51CA	BV-SMAJ51A	A51C	A51	51	56.7	62.7	1	82.4	4.9	1
BV-SMAJ54CA	BV-SMAJ54A	A54C	A54	54	60	66.3	1	87.1	4.6	1
BV-SMAJ58CA	BV-SMAJ58A	A58C	A58	58	64.4	71.2	1	93.6	4.3	1
BV-SMAJ60CA	BV-SMAJ60A	A60C	A60	60	66.7	73.7	1	96.8	4.1	1
BV-SMAJ64CA	BV-SMAJ64A	A64C	A64	64	71.1	78.6	1	103	3.9	1
BV-SMAJ70CA	BV-SMAJ70A	A70C	A70	70	77.8	86	1	113	3.5	1
BV-SMAJ75CA	BV-SMAJ75A	A75C	A75	75	83.3	92.1	1	121	3.3	1
BV-SMAJ78CA	BV-SMAJ78A	A78C	A78	78	86.7	95.8	1	126	3.2	1
BV-SMAJ85CA	BV-SMAJ85A	A85C	A85	85	94.4	104	1	137	2.9	1
BV-SMAJ90CA	BV-SMAJ90A	A90C	A90	90	100	111	1	146	2.7	1
BV-SMAJ100CA	BV-SMAJ100A	A100C	A100	100	111	123	1	162	2.5	1
BV-SMAJ110CA	BV-SMAJ110A	A110C	A110	110	122	135	1	177	2.3	1
BV-SMAJ120CA	BV-SMAJ120A	A120C	A120	120	133	147	1	193	2.1	1
BV-SMAJ130CA	BV-SMAJ130A	A130C	A130	130	144	159	1	209	1.9	1
BV-SMAJ150CA	BV-SMAJ150A	A150C	A150	150	167	185	1	243	1.6	1
BV-SMAJ160CA	BV-SMAJ160A	A160C	A160	160	178	197	1	259	1.5	1
BV-SMAJ170CA	BV-SMAJ170A	A170C	A170	170	189	209	1	275	1.5	1
BV-SMAJ180C <sup>②</sup>	BV-SMAJ180 <sup>②</sup>	A180C	A180	180	201	222	1	292	1.4	1
BV-SMAJ200C <sup>②</sup>	BV-SMAJ200 <sup>②</sup>	A200C	A200	200	224	247	1	324	1.2	1
BV-SMAJ220C <sup>②</sup>	BV-SMAJ220 <sup>②</sup>	A220C	A220	220	246	272	1	356	1.1	1
BV-SMAJ250C <sup>②</sup>	BV-SMAJ250 <sup>②</sup>	A250C	A250	250	279	309	1	405	1.0	1
BV-SMAJ300C <sup>②</sup>	BV-SMAJ300 <sup>②</sup>	A300C	A300	300	335	371	1	486	0.8	1
BV-SMAJ350C <sup>②</sup>	BV-SMAJ350 <sup>②</sup>	A350C	A350	350	391	432	1	567	0.7	1
BV-SMAJ400C <sup>②</sup>	BV-SMAJ400 <sup>②</sup>	A400C	A400	400	447	494	1	648	0.6	1
BV-SMAJ440C <sup>②</sup>	BV-SMAJ440 <sup>②</sup>	A440C	A440	440	492	543	1	713	0.6	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:AXXC



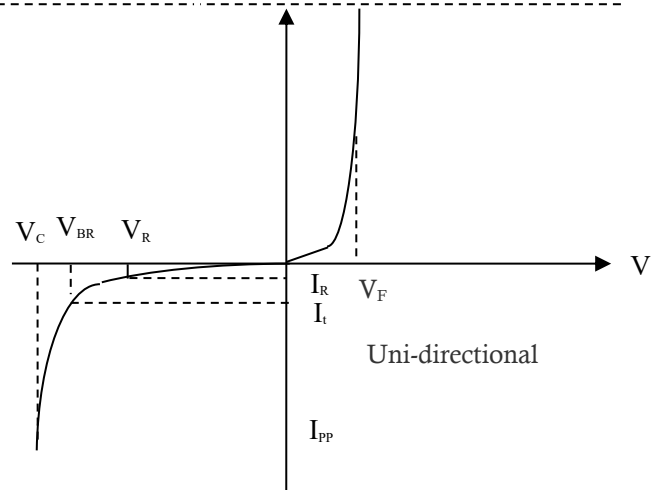
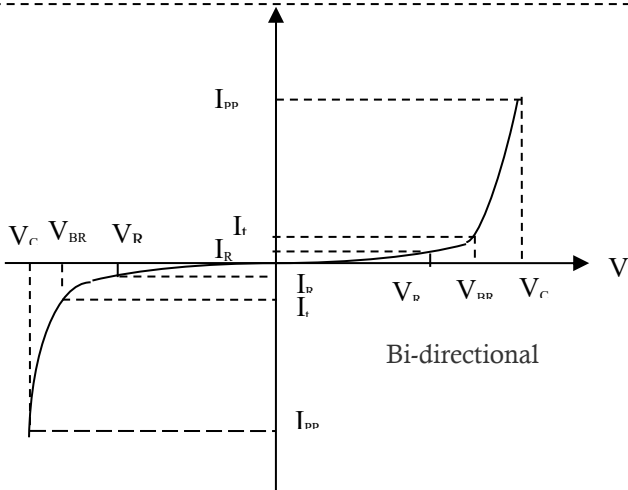
UNI:AXX

#### Part Number System

BV —SMAJ 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

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Thermal Considerations

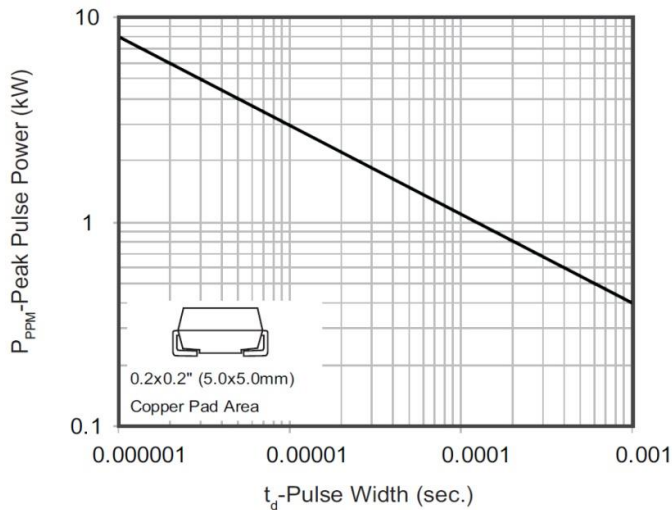
symbol	Parameter	Value	Unit
$T_J$	Operating Junction Temperature Range	-55 to +150	°C
$T_S$	Storage Temperature Range	-55 to +150	°C
VF	Maximum Instantaneous Forward; Voltage at 25A for Unidirectional Only (Note 1)	3.5/5	V
$I_{FSM}$	Peak Forward Surge Current, 8.3ms;Single Half Sine Wave (Note 2)	40	A

Notes:

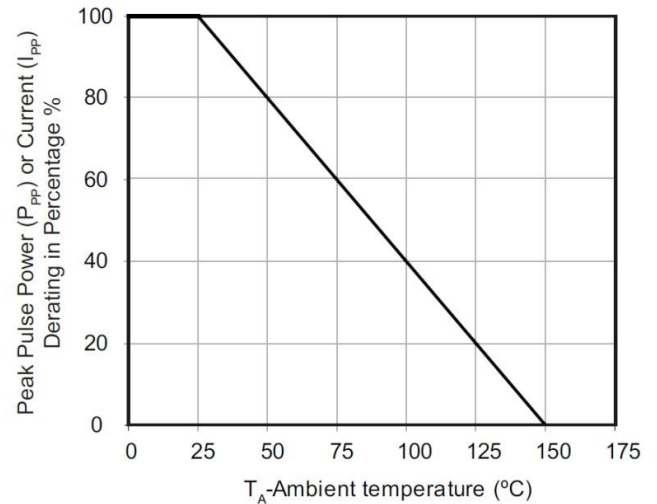
1. VF < 3.5V for single die parts and VF < 5.0V for stacked-die parts.
2. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only.

Typical Characteristics

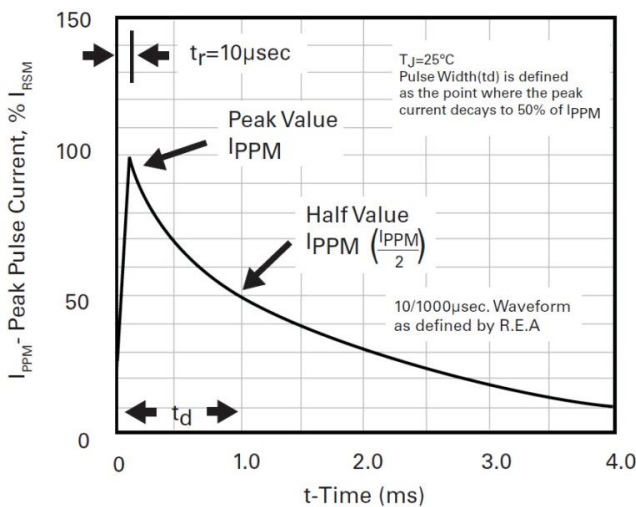
Peak Pulse Power Rating Curve



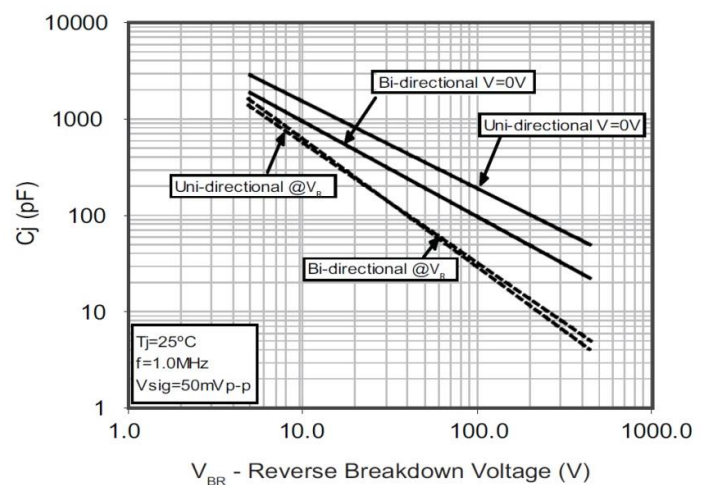
Pulse Derating Curve



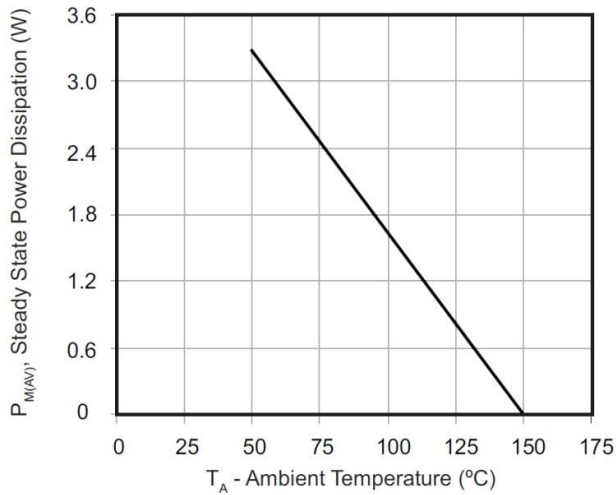
Pulse Waveform



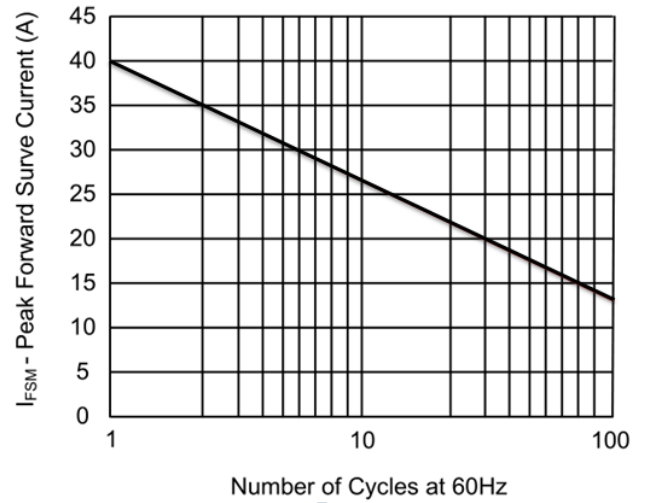
Typical Junction Capacitance



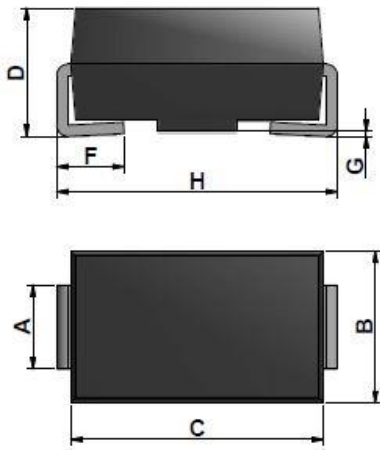
### Steady State Power Dissipation Derating Curve



### Maximum Non-Repetitive Forward Surge Current Uni-Directional Only

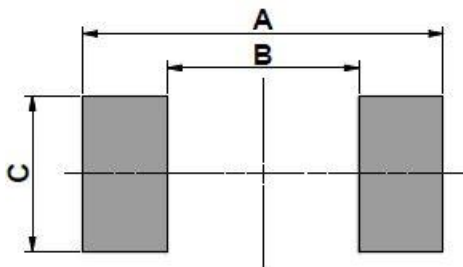


### Product Dimensions



REF.	mm	inch
A	$1.5 \pm 0.15$	$0.059 \pm 0.006$
B	$2.7 \pm 0.3$	$0.106 \pm 0.012$
C	$4.4 \pm 0.3$	$0.173 \pm 0.012$
D	2~2.50	0.079~0.098
F	$1.2 \pm 0.3$	$0.047 \pm 0.012$
G	0~0.4	0~0.016
H	$5 \pm 0.3$	$0.197 \pm 0.012$

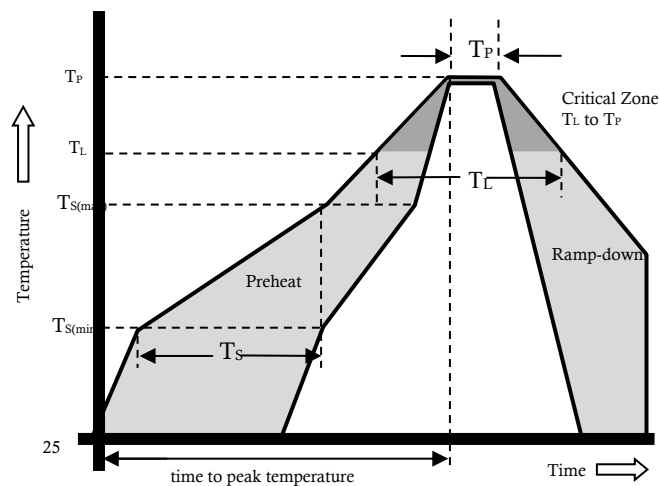
### Recommended Soldering Pad



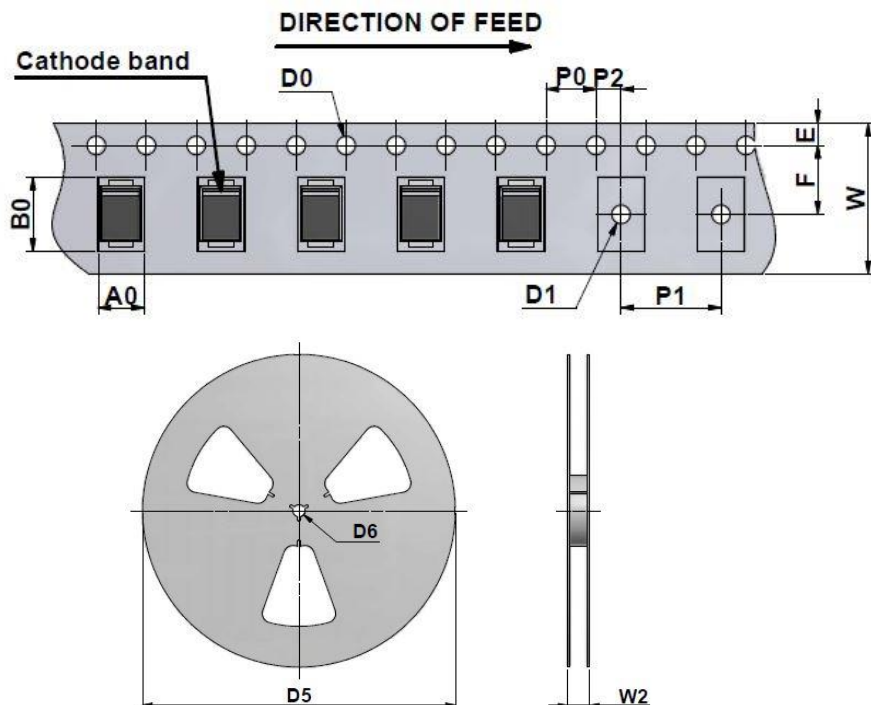
REF	mm	inch
A	6	0.236
B	2	0.079
C	2	0.079

### 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
T <sub>S(max)</sub> to T <sub>L</sub> - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T <sub>L</sub> ) (Liquidus)	217°C
	- Temperature (T <sub>L</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	1.55±0.15	0.061±0.006
P0	4.0±0.2	0.157±0.008
P1	4.0±0.2	0.157±0.008
P2	2.0±0.2	0.079±0.008
A0	2.85±0.3	0.112±0.012
B0	5.4±0.3	0.213±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	5,000	80,000	330	360	360	385