BORN SEMICONDUCTOR

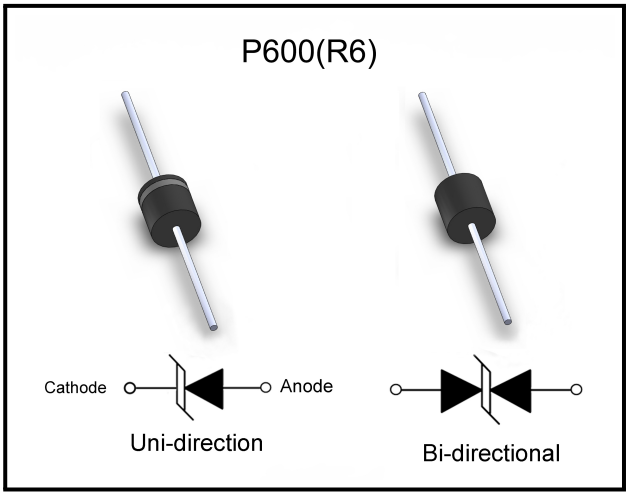
5KP Series

Transient Voltage Suppressor

Features

- Excellent clamping capability
- Low leakage current
- Low capacitance
- High surge capability
- Glass passivated chip
- Epoxy resin package
- Built-in strain relief
- Will not fatigue
- RoHS Compliant
- Fast response time:typically less than 1.0ps from 0 Volts to VBR min

Package



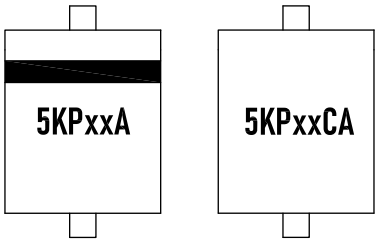
Mechanical Characteristics

- Package: P600 plastic package.
- Lead Finish: Matte Tin
- Case Material: Epoxy Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020

Applications

- Telecom
- Computer
- Industrial electronic
- Consumer electronic

Making Code



Summary of Packing Options

Package	Packing Description	Packing Quantity	Industry Standard
P600	Tape/Box,Box	300	BORN SPEC
	Tape/Reel,13” reel	800	EIA STD RS-296

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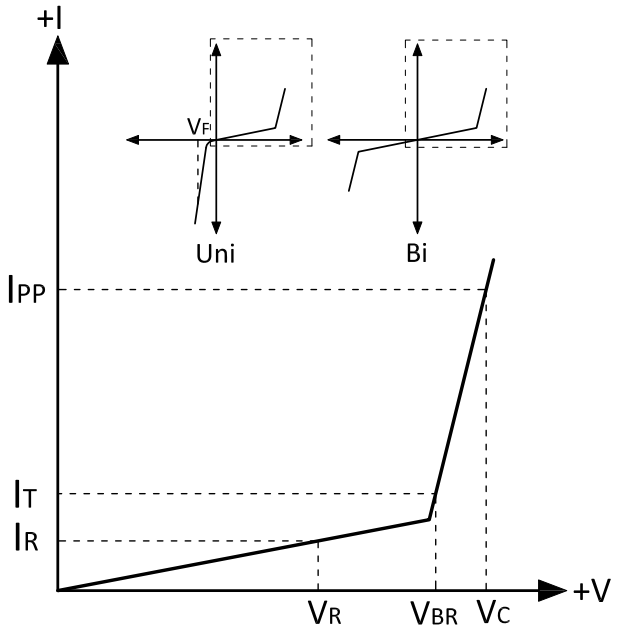
Electrical Parameters

Parameter	Definition
C_J	Junction Capacitance - typical capacitance measured with 0V orV_R bias
I_{PP}	Peak Pulse Current - maximum rated peak impulse current
V_C	Clamping Voltage - Peak voltage measured across the suppressor at a specified Ippm
V_{BR}	Breakdown Voltage - Maximum voltage that flows though the TVS at a specified test current (I_T)
I_R	Leakage Current - maximum peak off-state current measured at V_R
V_R	Peak Off-state Voltage - maximum voltage that can be applied while maintaining off state



Absolute Maximum Ratings (T_A=+25°C, unless otherwise noted)

Parameter	Symbol	Value	Units
Peak Pulse Power Dissipation(Note1)	P_{PPM}	5000	W
Steady State Power Dissipation (Note2)	P_D	8	W
Peak Forward Surge Current (Note3)	I_{FSM}	400	A
Maximum Instantaneous Forward Voltage at 100A (Note4)	V_{FM}	3.5/5	V
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	8	°C/W
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	40	°C/W
Operating Junction Temperature Range	T_J	-55 to 150	°C
Storage Temperature Range	T_{SJG}	-55 to 150	°C

Notes:

(1) Non-repetitive current pulse , 10/1000us Waveform.

(2) Infinite Heat Sink at T_L=75°C, at 0.375”(9.5mm) lead length, P.C.B. mounted.

(3) Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.

(4) For Unidirectional Only, V_{FW}<3.5V for V_{BR} ≤200V and V_{FM}<5.0V for V_{BR}≥201V.

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Absolute Maximum Ratings (T_A=+25°C, unless otherwise noted)

Part Number		Reverse Stand-Off Votage V_R	Breakdown Voltage V_{BR}@ I_T		Test Current I_T	Maximum Clamping Voltage V_C@ I_{pp}	Maximum Peak Pulse Current I_{pp}	Maximum Reverse Leakage I_R@ V_R
(Uni)	(Bi)	(V)	Min.(V)	Max.(V)	(mA)	(V)	(A)	(uA)
5KP5.0A	5KP5.0CA	5	6.4	7	50	9.2	554	5000
5KP6.0A	5KP6.0CA	6	6.67	7.37	50	10.3	495	5000
5KP6.5A	5KP6.5CA	6.5	7.22	7.98	50	11.2	455	2000
5KP7.0A	5KP7.0CA	7	7.78	8.6	50	12	425	1000
5KP7.5A	5KP7.5CA	7.5	8.33	9.21	5	12.9	395	250
5KP8.0A	5KP8.0CA	8	8.89	9.83	5	13.6	375	150
5KP8.5A	5KP8.5CA	8.5	9.44	10.4	5	14.4	354	50
5KP9.0A	5KP9.0CA	9	10	11.1	5	15.4	331	20
5KP10A	5KP10CA	10	11.1	12.3	5	17	300	15
5KP11A	5KP11CA	11	12.2	13.5	5	18.2	280	2
5KP12A	5KP12CA	12	13.3	14.7	5	19.9	256	2
5KP13A	5KP13CA	13	14.4	15.9	5	21.5	237	2
5KP14A	5KP14CA	14	15.6	17.2	5	23.2	220	2
5KP15A	5KP15CA	15	16.7	18.5	5	24.4	209	2
5KP16A	5KP16CA	16	17.8	19.7	5	26	196	2
5KP17A	5KP17CA	17	18.9	20.9	5	27.6	185	2
5KP18A	5KP18CA	18	20	22.1	5	29.2	175	2
5KP20A	5KP20CA	20	22.2	24.5	5	32.4	157.4	2
5KP22A	5KP22CA	22	24	26.9	5	35.5	143.7	2
5KP24A	5KP24CA	24	26.7	29.5	5	38.9	131.1	2
5KP26A	5KP26CA	26	28.9	31.9	5	42.1	121.1	2
5KP28A	5KP28CA	28	31.1	34.4	5	45.4	112.3	2
5KP30A	5KP30CA	30	33.3	36.8	5	48.4	105.4	2
5KP33A	5KP33CA	33	36.7	40.6	5	53.3	95.7	2
5KP36A	5KP36CA	36	40	44.2	5	58.1	87.8	2
5KP40A	5KP40CA	40	44.4	49.1	5	64.5	79.1	2
5KP43A	5KP43CA	43	47.8	52.8	5	69.4	73.5	2
5KP45A	5KP45CA	45	50	55.3	5	72.7	70.2	2
5KP48A	5KP48CA	48	53.3	58.9	5	77.4	65.9	2
5KP51A	5KP51CA	51	56.7	62.7	5	82.4	61.9	2

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Part Number		Reverse Stand-Off Votage V_R	Breakdown Voltage V_{BR}@ I_T		Test Current I_T	Maximum Clamping Voltage V_C@ I_{pp}	Maximum Peak Pulse Current I_{pp}	Maximum Reverse Leakage I_R@ V_R
(Uni)	(Bi)	(V)	Min.(V)	Max.(V)	(mA)	(V)	(A)	(uA)
5KP54A	5KP54CA	54	60	66.3	5	87.1	58.6	2
5KP58A	5KP58CA	58	64.4	71.2	5	93.6	54.5	2
5KP60A	5KP60CA	60	66.7	73.7	5	96.8	52.7	2
5KP64A	5KP64CA	64	71.1	78.6	5	103	49.5	2
5KP70A	5KP70CA	70	77.8	86	5	113	45.1	2
5KP75A	5KP75CA	75	83.3	92.1	5	121	42.1	2
5KP78A	5KP78CA	78	86.7	95.8	5	126	40.5	2
5KP85A	5KP85CA	85	94.4	104	5	137	37.2	2
5KP90A	5KP90CA	90	100	111	5	146	34.9	2
5KP100A	5KP100CA	100	110	123	5	162	31.5	2
5KP110A	5KP110CA	110	122	135	5	177	28.8	2
5KP120A	5KP120CA	120	133	147	5	193	26.4	2
5KP130A	5KP130CA	130	144	159	5	209	24.4	2
5KP150A	5KP150CA	150	167	185	5	243	21	2
5KP160A	5KP160CA	160	178	197	5	259	19.7	2
5KP170A	5KP170CA	170	189	209	5	275	18.5	2
5KP180A	5KP180CA	180	200	221	5	292	17.5	2
5KP190A	5KP190CA	190	211	233	5	310	16.5	2
5KP200A	5KP200CA	200	222	246	5	329.2	15.5	2
5KP210A	5KP210CA	210	233	258	5	349.5	14.6	2
5KP220A	5KP220CA	220	244	270	5	371.1	13.7	2
5KP250A	5KP250CA	250	277	306	5	425	12	2

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Ratings and Characteristic Curves (T_A=+25°C, unless otherwise noted)

Figure 1: Peak Pulse Power Rating

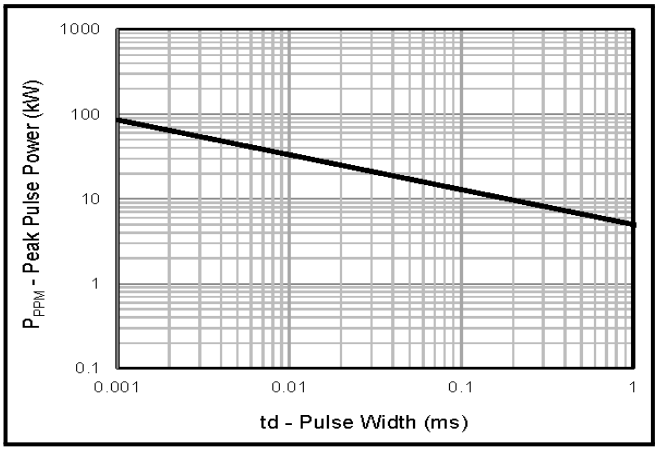


Figure 2: Pulse Derating Curve

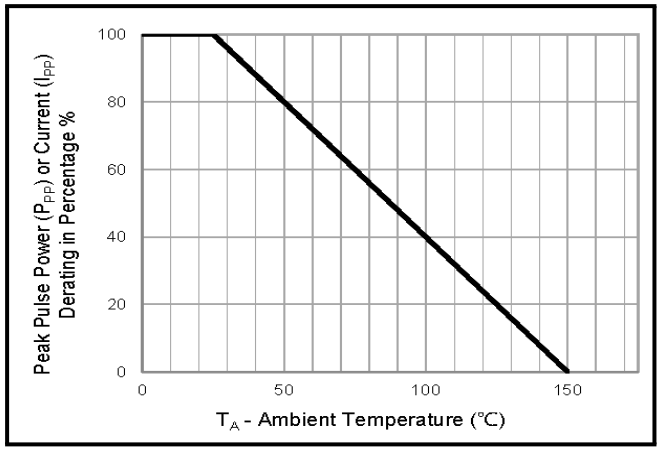


Figure 3: Pulse Waveform

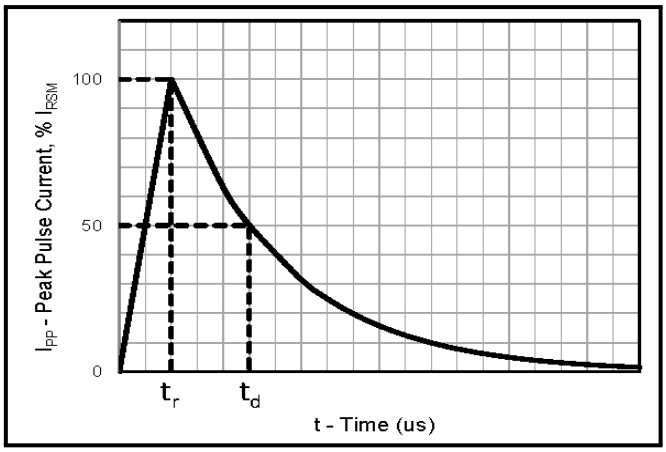


Figure 4 : Typical Junction Capacitance

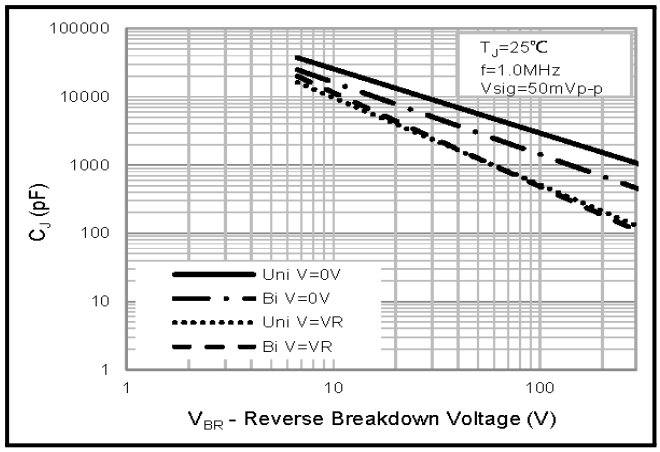


Figure 5: Steady State Power Dissipation Derating Curve

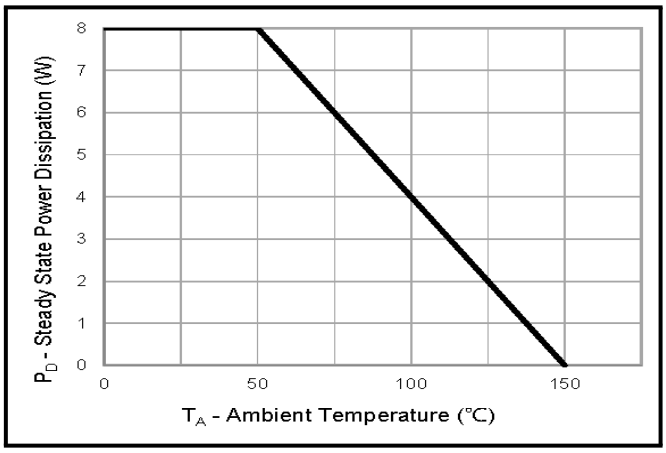
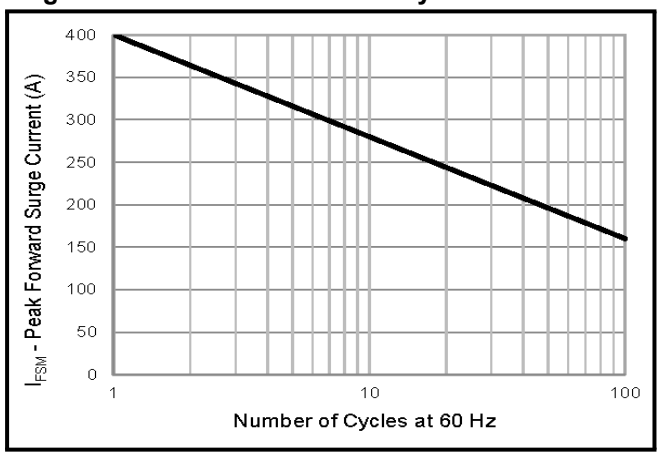


Figure 6 : Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only



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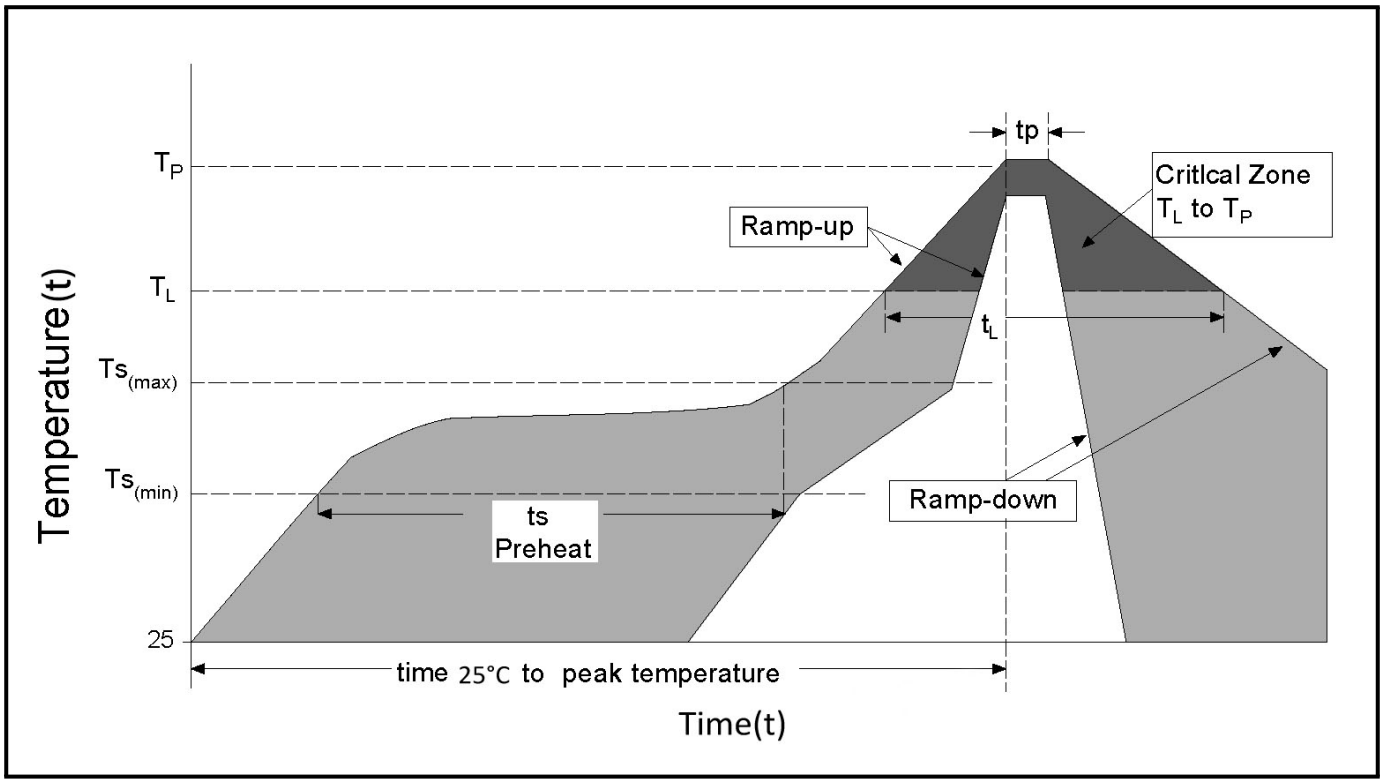
Soldering Parameters



Reflow Condition		Lead-free assembly
Pre Heat	- Temperature Min (T_S(min))	150°C
	- Temperature Max (T_S(max))	200°C
	- Time (min to max) (t_S)	60 - 180 secs
Average ramp up rate (Liquidus Temp (T_L) to peak)		3°C/second max
T_S(max) to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Time (t_L)	60 -150 secs
Peak Temperature (T_P)		$260^{+0/-5°C}$
Time within 5°C of actual peak Temperature (t_p)		20 - 40 secs
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (t)		8 minutes Max.
Do not exceed		260°C

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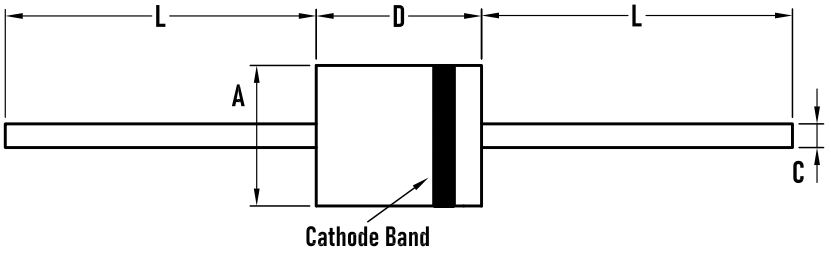
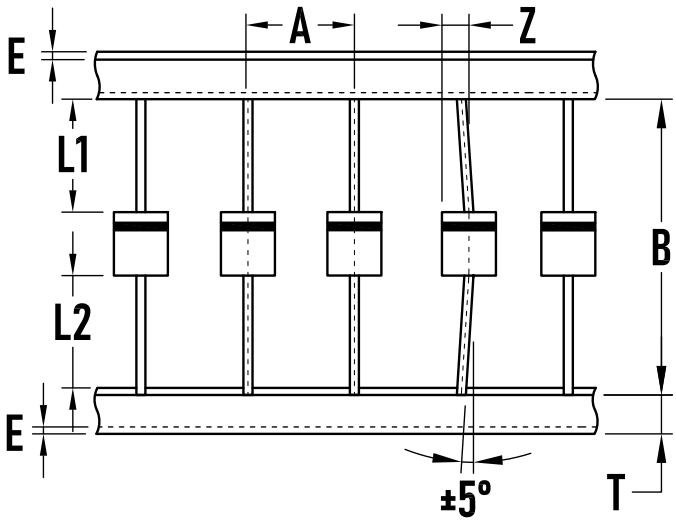
Package Mechanical Data - P600



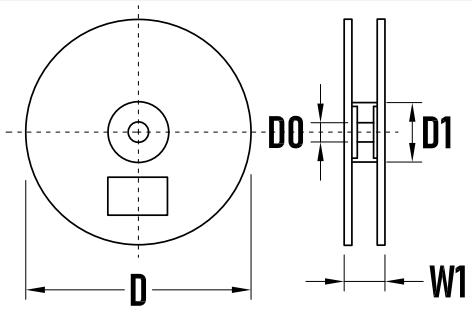
SYMBOL	Inches		MILLIMETER	
	MIN	MAX	MIN	MAX
A	0.339	0.358	8.6	9.1
C	0.048	0.052	1.22	1.32
D	0.339	0.358	8.6	9.1
L	1	–	25.4	–

Packaging Tape-P600



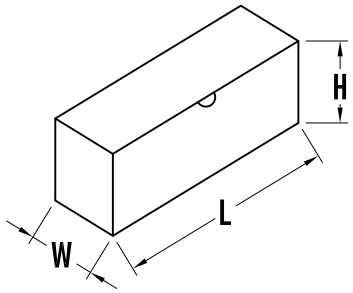
SYMBOL	Dimension(mm)
A	10.0±0.5
B	53.0±1.0
Z	1.2Max.
T	6.0±0.4
E	0.8Max.
L1-L2	1.0Max.

Packaging Reel



SYMBOL	Dimension(mm)
D	330.0±3.0
D0	16.4±2.0
D1	86.0±2.0
W1	76.0±3.0
Quantity	800PCS

Packaging BOX



SYMBOL	Dimension(mm)
L	250.0±5.0
W	75.0±5.0
H	114.0±5.0
Quantity	300PCS

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