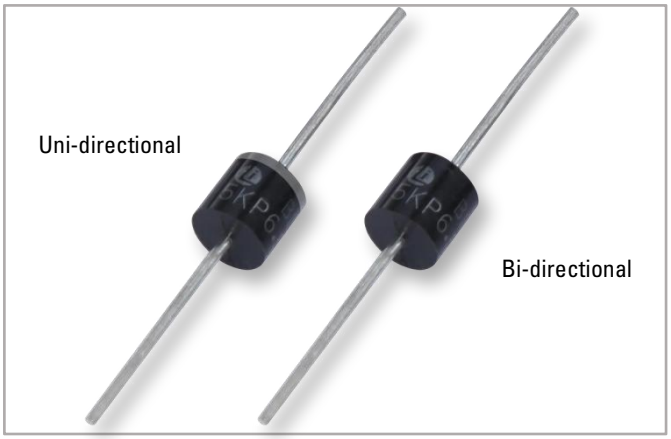
5KP-Q Series
Axial Leaded – 5000W

AUTOMOTIVE GRADE HF RoHS Pb e3



Additional Information

Resources | Accessories | Samples

Maximum Ratings and Thermal Characteristics

(T_A=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10/1000μs Waveform(Fig.1) (Note 1)-Single Die Parts	P_{PPM}	5000	W
Power Dissipation on Infinite Heat Sink at T_L=75℃	P_D	8	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 2)	I_{FSM}	400	A
Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only (Note 3)	V_F	3.5/5.0	V
Operating Temperature Range	T_J	-55 to 150	℃
Storage Temperature Range	T_{STG}	-55 to 150	℃
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	8	℃/W
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	40	℃/W

Notes:

1. Non-repetitive current pulse , per Fig.3 and derated above T_J (initial) =25℃ per Fig.2.
2. Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.
3. V_F < 3.5V for single die parts and V_F< 5.0V for stacked-die parts.

Description

The 5KP-Q series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

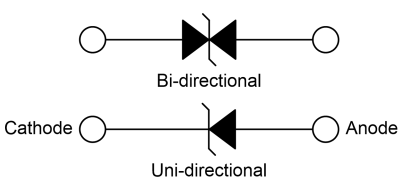
Features

- High reliability application and automotive grade AEC-Q101 qualified
- 5000W peak pulse power capability at 10/1000μs waveform, repetition rate (duty cycles):0.01%
- Glass passivated chip junction in P600 package
- Fast response time:typically less than 1.0ps from 0 Volts to V_B min
- Excellent clamping capability
- Typical failure mode is a short circuit
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ESD protection of data lines in accordance with IEC 61000-4-2, 30kV(Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Low incremental surge resistance
- Typical I_R less than 2μA when V_B min>12V
- High temperature to reflow soldering guaranteed: 260℃/ 20~40sec./ 0.375",(9.5mm) lead length, 5 lbs., (2.3kg) tension
- V_B @ T_J= V_B@25℃x (1+ α T x (T_J - 25))(α T:Temperature Coefficient, typical value is 0.1%)
- Matte tin lead–free plated
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD 609A.01)

Applications

TVS components are ideal for the protection of I/O interfaces, V_{CC} bus and other vulnerable circuits used in telecom, computer, industrial ICT equipment and consumer electronic applications.

Functional Diagram



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Electrical Characteristics (T_A=25℃ unless otherwise noted)

Part Number		Type	Reverse Stand-Off Voltage	Breakdown Voltage @I_T		Test Current	Maximum Clamping Voltage @I_{PP}	Peak Pulse Current	Reverse Leakage @V_R
Uni.	Bi.		V_R(V)	$V_{B\ Min.}$(V)	$V_{B\ Max.}$(V)	I_T(mA)	V_C(V)	I_{PP}(A)	I_R(μA)
5KP5.0A	5KP5.0CA	Q	5.0	6.40	7.00	50	9.2	554.3	5000
5KP6.0A	5KP6.0CA	Q	6.0	6.67	7.37	50	10.3	495.1	5000
5KP6.5A	5KP6.5CA	Q	6.5	7.22	7.98	50	11.2	455.4	2000
5KP7.0A	5KP7.0CA	Q	7.0	7.78	8.60	50	12.0	425.0	1000
5KP7.5A	5KP7.5CA	Q	7.5	8.33	9.21	5	12.9	395.3	250
5KP8.0A	5KP8.0CA	Q	8.0	8.89	9.83	5	13.6	375.0	150
5KP8.5A	5KP8.5CA	Q	8.5	9.44	10.40	5	14.4	354.2	50
5KP9.0A	5KP9.0CA	Q	9.0	10.00	11.10	5	15.4	331.2	20
5KP10A	5KP10CA	Q	10.0	11.10	12.30	5	17.0	300.0	15
5KP11A	5KP11CA	Q	11.0	12.20	13.50	5	18.2	280.2	2
5KP12A	5KP12CA	Q	12.0	13.30	14.70	5	19.9	256.3	2
5KP13A	5KP13CA	Q	13.0	14.40	15.90	5	21.5	237.2	2
5KP14A	5KP14CA	Q	14.0	15.60	17.20	5	23.2	219.8	2
5KP15A	5KP15CA	Q	15.0	16.70	18.50	5	24.4	209.0	2
5KP16A	5KP16CA	Q	16.0	17.80	19.70	5	26.0	196.2	2
5KP17A	5KP17CA	Q	17.0	18.90	20.90	5	27.6	184.8	2
5KP18A	5KP18CA	Q	18.0	20.00	22.10	5	29.2	174.7	2
5KP20A	5KP20CA	Q	20.0	22.20	24.50	5	32.4	157.4	2
5KP22A	5KP22CA	Q	22.0	24.40	26.90	5	35.5	143.7	2
5KP24A	5KP24CA	Q	24.0	26.70	29.50	5	38.9	131.1	2
5KP26A	5KP26CA	Q	26.0	28.90	31.90	5	42.1	121.1	2
5KP28A	5KP28CA	Q	28.0	31.10	34.40	5	45.4	112.3	2
5KP30A	5KP30CA	Q	30.0	33.30	36.80	5	48.4	105.4	2
5KP33A	5KP33CA	Q	33.0	36.70	40.60	5	53.3	95.7	2
5KP36A	5KP36CA	Q	36.0	40.00	44.20	5	58.1	87.8	2
5KP40A	5KP40CA	Q	40.0	44.40	49.10	5	64.5	79.1	2
5KP43A	5KP43CA	Q	43.0	47.80	52.80	5	69.4	73.5	2
5KP45A	5KP45CA	Q	45.0	50.00	55.30	5	72.7	70.2	2
5KP48A	5KP48CA	Q	48.0	53.30	58.90	5	77.4	65.9	2
5KP51A	5KP51CA	Q	51.0	56.70	62.70	5	82.4	61.9	2
5KP54A	5KP54CA	Q	54.0	60.00	66.30	5	87.1	58.6	2
5KP58A	5KP58CA	Q	58.0	64.40	71.20	5	93.6	54.5	2
5KP60A	5KP60CA	Q	60.0	66.70	73.70	5	96.8	52.7	2
5KP64A	5KP64CA	Q	64.0	71.10	78.60	5	103.0	49.5	2
5KP70A	5KP70CA	Q	70.0	77.80	86.00	5	113.0	45.1	2
5KP75A	5KP75CA	Q	75.0	83.30	92.10	5	121.0	42.1	2
5KP78A	5KP78CA	Q	78.0	86.70	95.80	5	126.0	40.5	2
5KP85A	5KP85CA	Q	85.0	94.40	104.00	5	137.0	37.2	2
5KP90A	5KP90CA	Q	90.0	100.00	111.00	5	146.0	34.9	2
5KP100A	5KP100CA	Q	100.0	110.00	123.00	5	162.0	31.5	2
5KP110A	5KP110CA	Q	110.0	122.00	135.00	5	177.0	28.8	2

Notes:

For bidirectional type having V_R of 10 volts and less, the I_R limit is double.

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Ratings and Characteristic Curves (T_A=25℃ unless otherwise noted)

Figure 1:
Peak Pulse Power Rating Curve

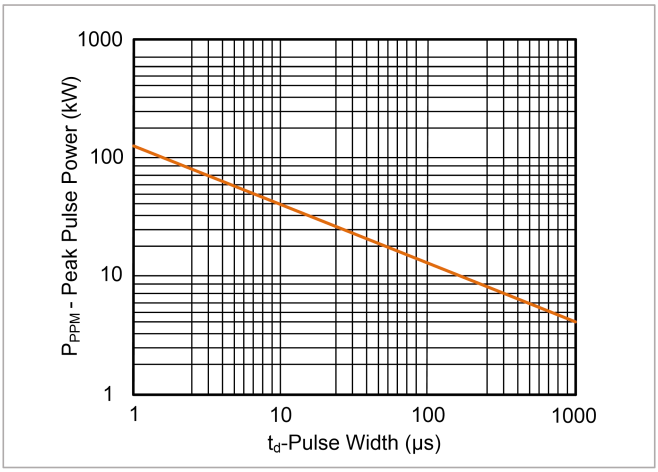


Figure 2:
Pulse Derating Curve

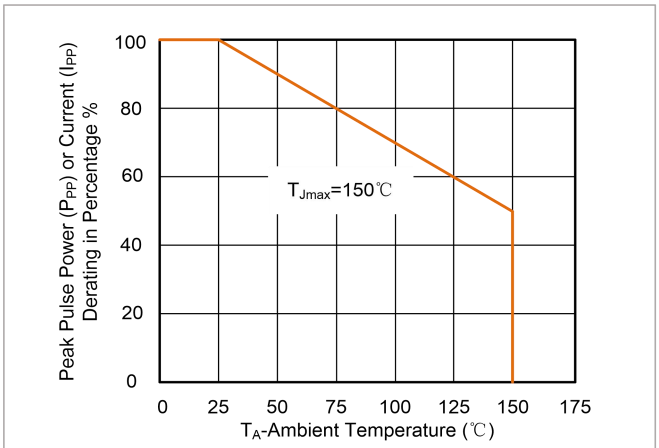


Figure 3:
Pulse Waveform

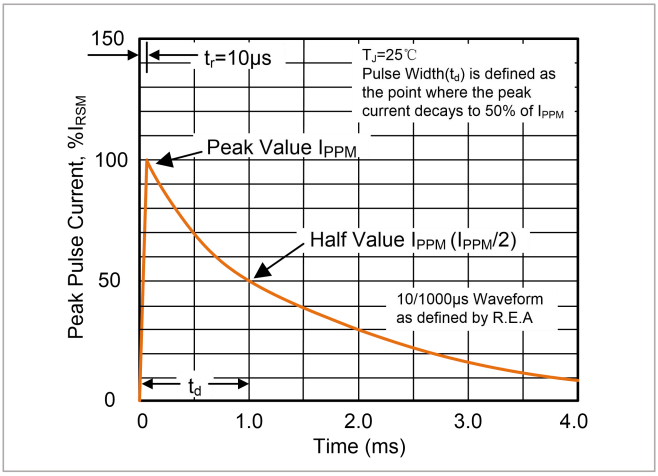


Figure 4:
Typical Junction Capacitance

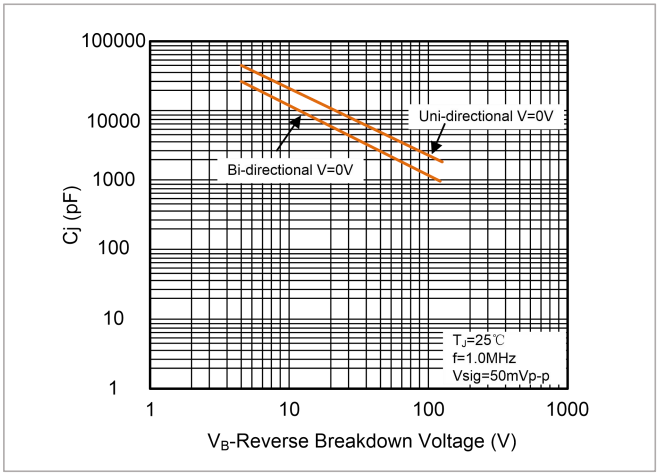


Figure 5:
Steady State Power Dissipation Derating Curve

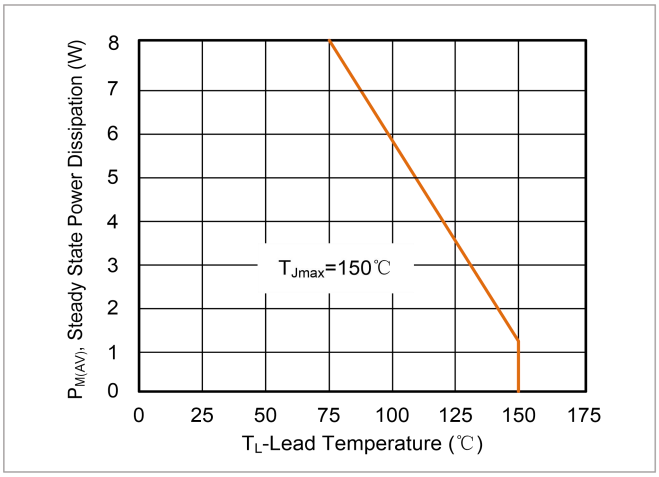
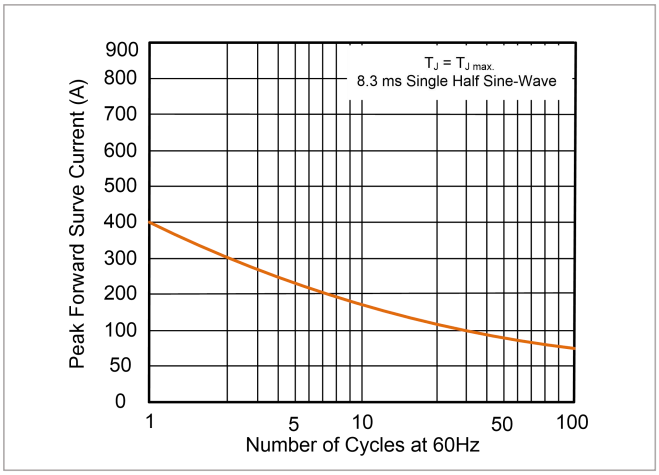


Figure 6:
Maximum Non-Repetitive Forward Surge Current Uni-Directional



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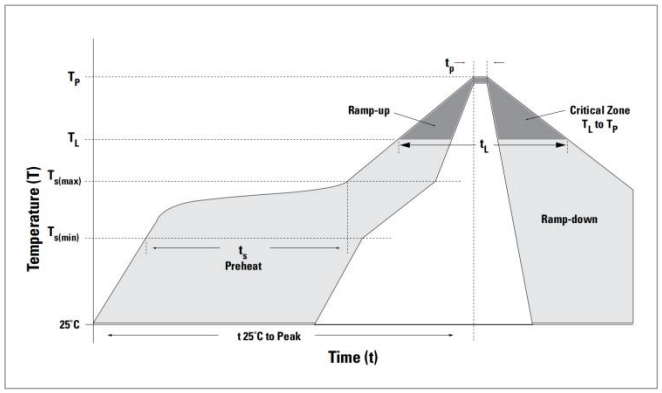
Soldering Parameters

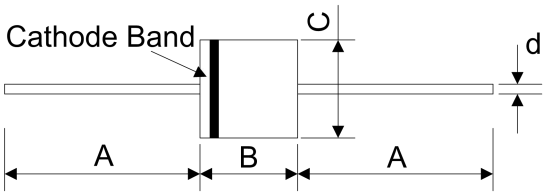
Reflow Condition		Lead–free assembly
Pre Heat	**-Temperature Min ($T_{S\ min}$)**	150℃
	-Temperature Max ($T_{S\ max}$)	200℃
	-Time (min to max) (t_S)	60 – 180 secs
Average ramp-up rate(Liquidus Temp (T_L) to peak		3℃/second max.
$T_{S\ (max)}$ to T_L-Ramp-up Rate		3℃/second max.
Reflow	**-Temperature (T_L) (Liquidus)**	217℃
	-Time (min to max) (t_L)	60-150 seconds
Peak Temperature (T_P)		260℃
Time within 5℃ of actual Peak Temperature (t_P)		20-40 seconds
Ramp-down Rate		6℃/second max.
Time 25℃ to Peak Temperature		8 minutes max.
Do not exceed		260℃



Flow/Wave Soldering (Solder Dipping)	
Peak Temperature :	265℃
Dipping Time :	10 seconds (max.)
Soldering :	1 time

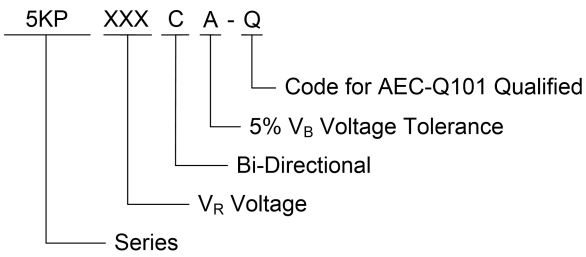
Dimensions

P600

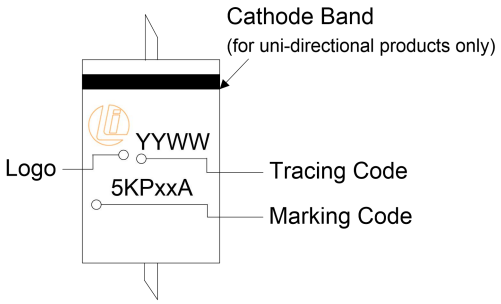


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	25.40	-	1.000	-
B	8.60	9.10	0.340	0.360
C	8.60	9.10	0.340	0.360
d	1.19	1.35	0.047	0.053

Part Numbering System



Part Marking System



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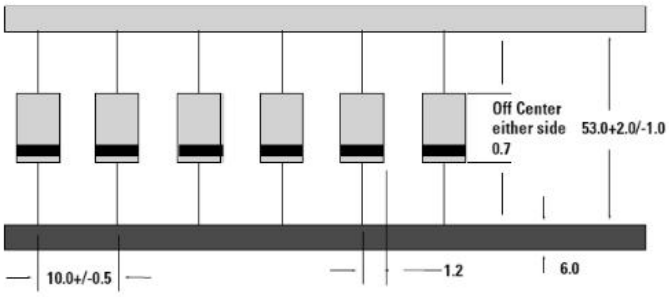
Packaging

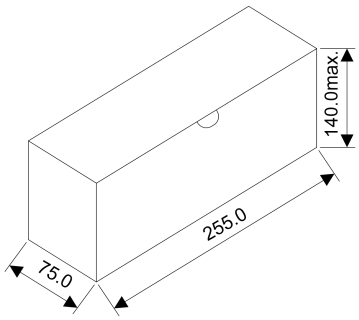
Part number	Component Package	Quantity	Packaging Option	Packaging Specification
5KPxxxXX-Q/L/BOX	P600	300	Tape & Box	EIA STD RS-296
5KPxxxXX-Q/L/TR13	P600	800	Tape & Reel	EIA STD RS-296

Tape/Box/Reel Specification

Tape（Unit: mm）

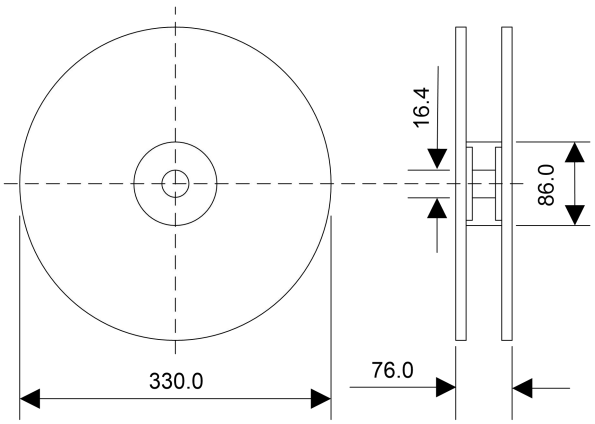


Box（Unit: mm）



Quantity：300pcs/box

Reel（Unit: mm）



Quantity：800pcs/reel