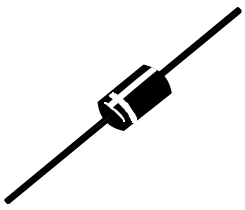
Transient Voltage Suppression Diodes
Axial Leaded – 15000W

Descriptions

Transient Voltage Suppressors (TVS) are semiconductor devices designed to provide protection against over voltage transients. When over voltage events occur, the silicon TVS actives from an very high impedance status to a very low impedance status by operating in the avalanche mode and uses a large junction area to absorb large transient currents in a fast response time, protecting voltage sensitive electronics equipment from damaging.

Boarden supplies unipolar and bipolar TVS devices with axial and SMD packages.



P600

Features

- Glass passivated chip junction in P600 Package
- 15000W peak pulse power @10/1000μs
- Typical I_R less than 2μA above 13V
- Low incremental surge resistance
- Excellent clamping capability
- Typical failure mode is short from over-specified voltage/current
- Fast response time: typically less than 1.0ps from 0V to BV min
- EFT protection of data lines in accordance with IEC 61000-4-4
- UL94V-0 Flammability Rating
- Halogen free and RoHS compliant

Applications

- Telecom and Network
- Industrial Products
- Business Machines
- Vehicles Electronics
- Power Adapter
- Consumer Products
- Security Protection

Maximum Ratings and Thermal Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10/1000μs Test Waveform	P_{PPM}	15000	W
Steady State Power Dissipation on Infinite Heat Sink at T_L=75°C	P_D	8.0	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave Unidirectional Only (1)	I_{FSM}	400	A
Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only (2)	V_F	3.5/5.0	V
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	°C
Typical Thermal Resistance Junction to Lead	R_{uJL}	8.0	°C/W
Typical Thermal Resistance Junction to Ambient	R_{uJA}	40	°C/W

Notes:

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

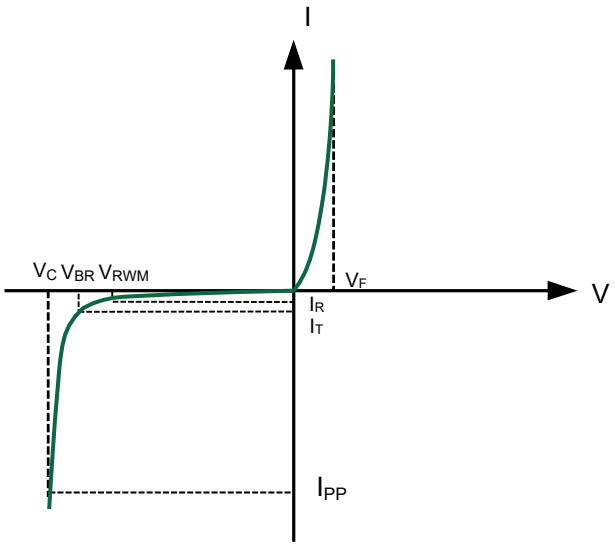
2) V_F<3.5V for devices of V_{BR} ≤200V and V_F<5.0V for devices of V_{BR} ≥201V.

Electrical Characteristics (TA=25°C unless otherwise noted)

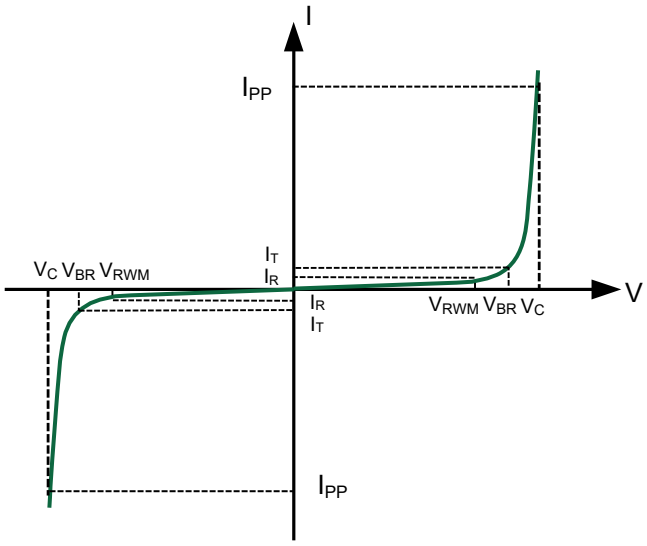
Type Number		V_{RMW}	I_R @V_{RMW}	V_{BR} @I_T (V)			I_T	V_C @I_{PP}	I_{PP} MAX
Uni	Bi	(V)	(μA)	Min	Nom	Max	(mA)	(V)	(A)
15KP15A	15KP15CA	15	2	16.7	17.6	18.5	5	24.4	614.8
15KP16A	15KP16CA	16	2	17.8	18.8	19.7	5	26.0	576.9
15KP17A	15KP17CA	17	2	18.9	19.9	20.9	5	27.6	543.5
15KP18A	15KP18CA	18	2	20.0	21.1	22.1	5	29.2	513.7
15KP20A	15KP20CA	20	2	22.2	23.4	24.5	5	32.4	463.0
15KP22A	15KP22CA	22	2	24.0	25.5	26.9	5	35.5	422.5
15KP24A	15KP24CA	24	2	26.7	28.1	29.5	5	38.9	385.6
15KP26A	15KP26CA	26	2	28.9	30.4	31.9	5	42.1	356.3
15KP28A	15KP28CA	28	2	31.1	32.8	34.4	5	45.4	330.4
15KP30A	15KP30CA	30	2	33.3	35.1	36.8	5	48.4	309.9
15KP33A	15KP33CA	33	2	36.7	38.7	40.6	5	53.3	281.4
15KP36A	15KP36CA	36	2	40.0	42.1	44.2	5	58.1	258.2
15KP40A	15KP40CA	40	2	44.4	46.8	49.1	5	64.5	232.6
15KP43A	15KP43CA	43	2	47.8	50.3	52.8	5	69.4	216.1
15KP45A	15KP45CA	45	2	50.0	52.7	55.3	5	72.7	206.3
15KP48A	15KP48CA	48	2	53.3	56.1	58.9	5	77.4	193.8
15KP51A	15KP51CA	51	2	56.7	59.7	62.7	5	82.4	182.0
15KP54A	15KP54CA	54	2	60.0	63.2	66.3	5	87.1	172.2
15KP58A	15KP58CA	58	2	64.4	67.8	71.2	5	93.6	160.3
15KP60A	15KP60CA	60	2	66.7	70.2	73.7	5	96.8	155.0
15KP64A	15KP64CA	64	2	71.1	74.9	78.6	5	103.0	145.6
15KP70A	15KP70CA	70	2	77.8	81.9	86.0	5	113.0	132.7
15KP75A	15KP75CA	75	2	83.3	87.7	92.1	5	121.0	124.0
15KP78A	15KP78CA	78	2	86.7	91.3	95.8	5	126.0	119.0
15KP85A	15KP85CA	85	2	94.4	99.2	104	5	137.0	109.5
15KP90A	15KP90CA	90	2	100	105.5	111	5	146.0	102.7
15KP100A	15KP100CA	100	2	110	116.5	123	5	162.0	92.6
15KP110A	15KP110CA	110	2	122	128.5	135	5	177.0	84.7
15KP120A	15KP120CA	120	2	133	140.0	147	5	193.0	77.7
15KP130A	15KP130CA	130	2	144	151.5	159	5	209.0	71.8
15KP150A	15KP150CA	150	2	167	176.0	185	5	243.0	61.7
15KP160A	15KP160CA	160	2	178	187.5	197	5	259.0	57.9
15KP170A	15KP170CA	170	2	189	199.0	209	5	275.0	54.5
15KP180A	15KP180CA	180	2	200	210.5	221	5	292.0	51.4
15KP190A	15KP190CA	190	2	211	222.0	233	5	310.0	48.4
15KP200A	15KP200CA	200	2	222	234.0	246	5	329.2	45.6
15KP210A	15KP210CA	210	2	233	245.5	258	5	349.5	42.9
15KP220A	15KP220CA	220	2	244	257.0	270	5	371.1	40.4
15KP250A	15KP250CA	250	2	277	291.5	306	5	425.0	35.3

For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.

I-V Curve Characteristics



Uni-Directional TVS



Bi-Directional TVS

V_{RWM} - Reverse Stand-Off Voltage - Working Peak Reverse Voltage

V_{BR} - Breakdown Voltage - Maximum current that flows though the TVS at a specified test current (I_T)

I_T - Test Current - Test Current

V_C - Clamping Voltage - Peak voltage measured across the suppressor at a specified Ippm (peak impulse current)

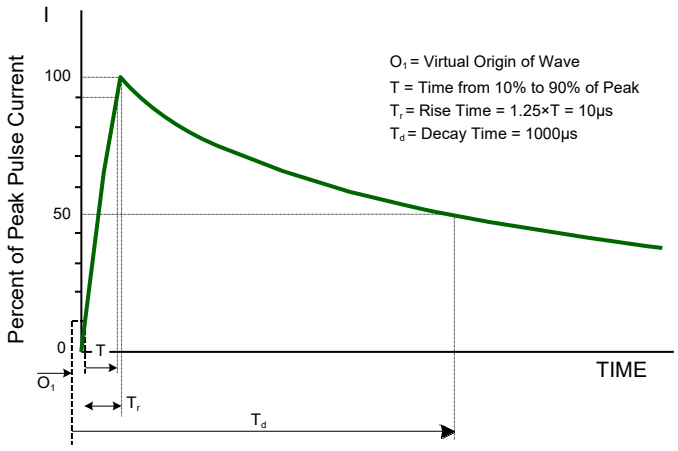
I_{PP} - Peak Pulse Current - Maximum Reverse Peak Pulse Current

P_{PP} - Peak Pulse Power Dissipation - Max power dissipation

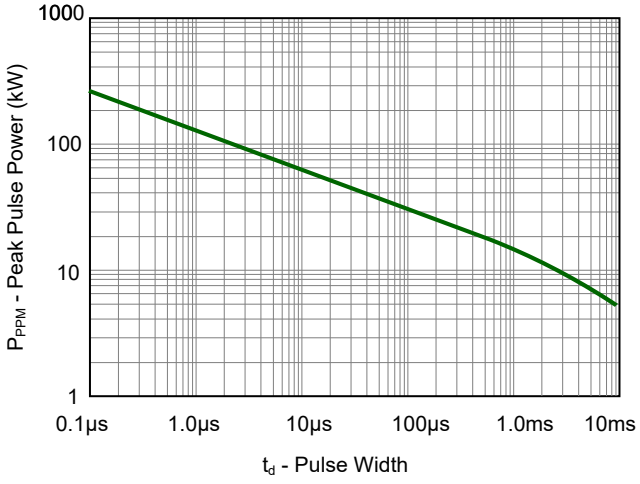
I_R - Reverse Leakage Current - Current measured at V_{RWM}

V_F - Forward Voltage - Drop for Uni-directional

Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

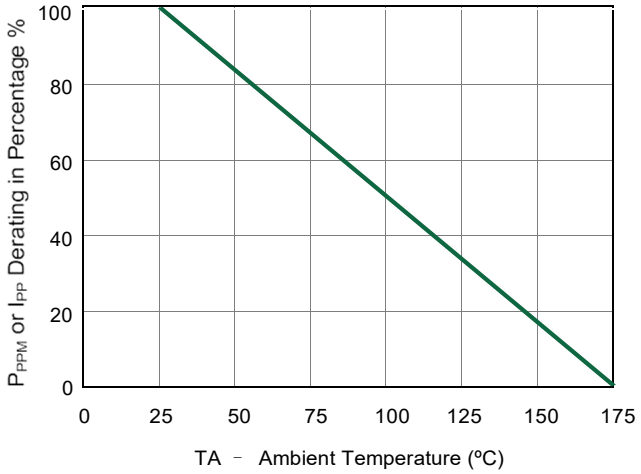


Pulse Waveform- 10/1000μs

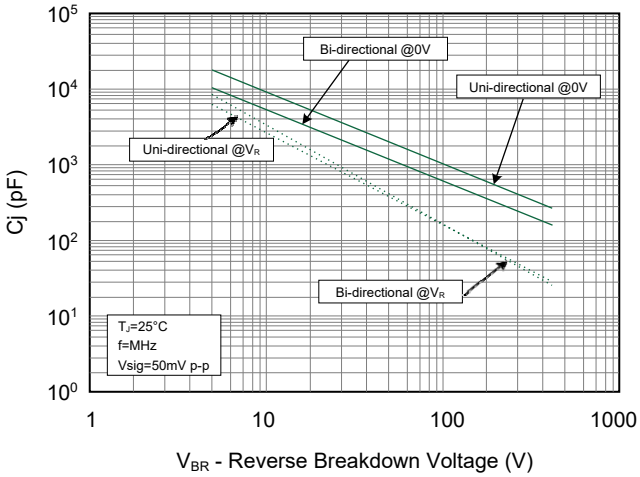


Peak Pulse Power Rating Curve

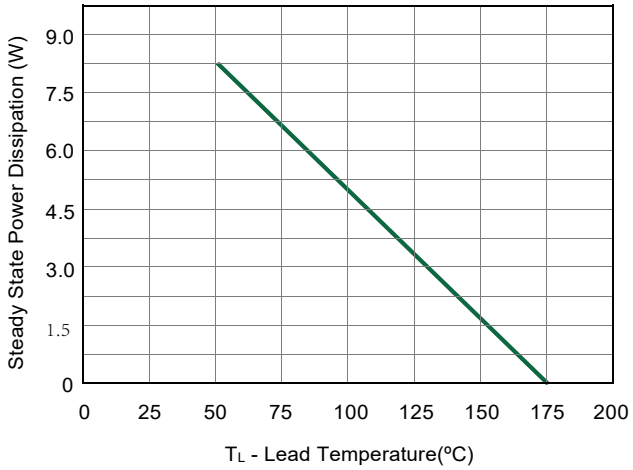
Ratings and Characteristic Curves (TA=25°C unless otherwise noted)



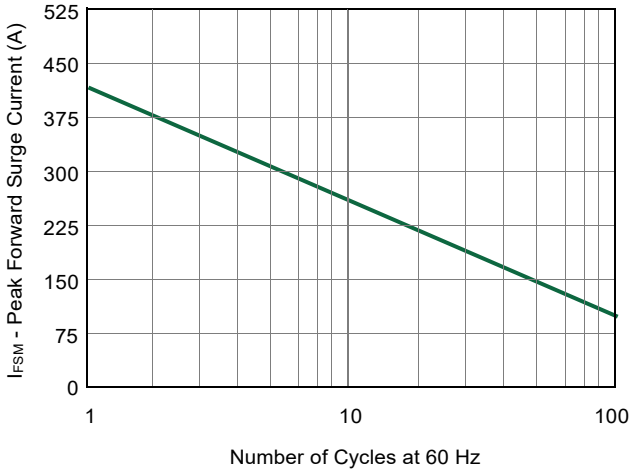
Pulse Derating Curve



Typical Junction Capacitance



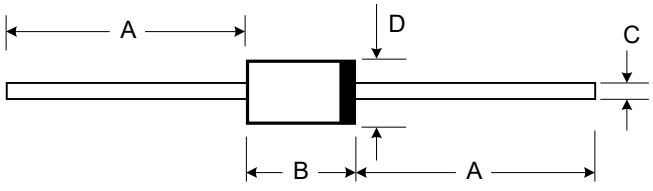
Steady State Power Derating Curve



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

Product Dimensions

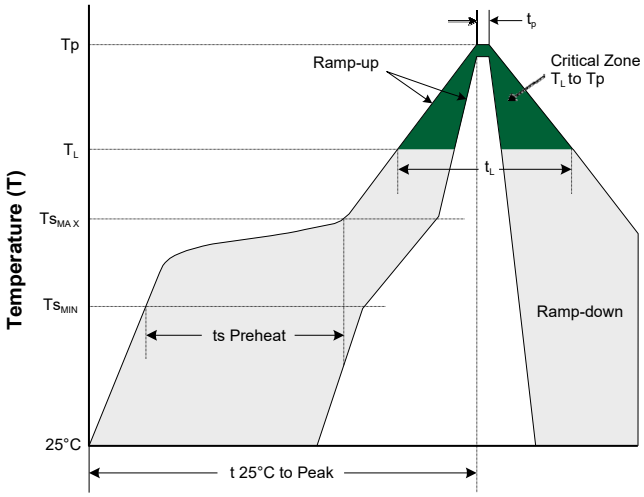
Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.340	0.360	8.60	9.10
C	0.048	0.052	1.22	1.32
D	0.340	0.360	8.60	9.10



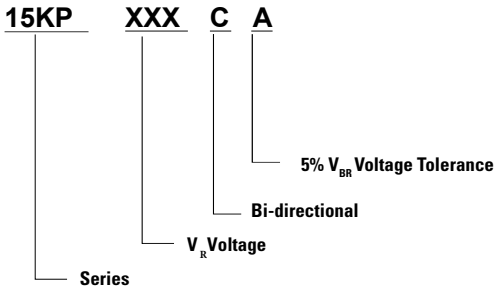
P600

Soldering Parameters

Profile Feature	Lead-Free Assembly
Average Ramp-up Rate (Ts_{MAX} to Tp) Average Ramp-down Rate (Tp to T_L)	3°C/second max. 6°C/second max.
Preheat • Temperature Min (Ts_{MIN}) • Temperature Max (Ts_{MAX}) • Time (ts Preheat)	 150°C 200°C 60-180 seconds
Time maintained above: • Temperature (T_L) • Time (t_L)	 217°C 60-150 seconds
Peak/Classification Temperature • Temperature (Tp)	 $260^{+0/-5}$°C
Time within 5°C of actual Peak Time (t_p)	 20-40 seconds
Time 25°C to peak Temperature	8 minutes max
Do not exceed	260 °C



Part Numbering System



Order Information

Device	Package	Qty per Box	Packaging
15KP series	P600	300	Box