

AXIAL LEAD PACKAGE

## DESCRIPTION

The P15KP Series, are discrete 15,000 Watt, silicon transient voltage suppressors (TVS) designed for use in applications where large voltage transients can permanently damage voltage sensitive components and equipment.

The P15KP series is available in voltages ranging from 17V to 280V with 5 percent and 10 percent tolerances. Both tolerances are referenced to the power supply output or operating voltage level. This series is compatible with IEC 61000-4-5 (Surge) requirements.

## FEATURES

- RTCA DO-160G COMPLIANT PRODUCT
- Compatible with IEC 61000-4-5 (Surge): 48A, 8/20 $\mu$ s - L3(Line-Ground), L4(Line-Line) & L1 (Power)
- 15,000 Watts Peak Pulse Power per Line (tp = 10/1000 $\mu$ s)
- Unidirectional and Bidirectional Configurations
- Easy Mounting to Printed Circuit Board
- tClamping (0V to V<sub>BR</sub> Min.) < 1 x 10<sup>-12</sup> seconds theoretical
- Available in Multiple Voltages Ranging From 17V to 280V

## APPLICATIONS

- Relay Drives
- Motor (Start/Stop) Back EMF Protection
- Module Lightning Protection
- Secondary Lightning Protection for AC/DC

## MECHANICAL CHARACTERISTICS

- Molded Case
- Approximate Weight: 5 grams
- Leaded Devices: Tin-Lead Plating
- Lead-Free Devices: Pure-Tin Plating
- Solder Reflow Temperature: 240-245°C
- Flammability Rating UL 94V-0

## CIRCUIT DIAGRAMS



UNIDIRECTIONAL



BIDIRECTIONAL

## TYPICAL DEVICE CHARACTERISTICS

## RTCA DO-160G COMPLIANT PRODUCT

## MAXIMUM RATINGS @ 25°C Unless Otherwise Specified

PARAMETER	SYMBOL	VALUE	UNITS
Peak Pulse Power (tp = 10/1000μs) - See Figure 1	P <sub>PP</sub>	15,000	Watts
Forward Surge Rating - 1/120 seconds - See Note 2	I <sub>F</sub>	200	Amps
Steady State Power Dissipation	P <sub>P</sub>	1.0	Watts
Storage Temperature	T <sub>STG</sub>	-55 to 150	°C
Operating Temperature	T <sub>L</sub>	-55 to 150	°C

## ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

PART NUMBER (Notes 1 - 2)	RATED STAND-OFF VOLTAGE  V <sub>WM</sub> VOLTS	BREAKDOWN VOLTAGE		MAXIMUM LEAKAGE CURRENT  @V <sub>WM</sub> I <sub>D</sub> μA	MAXIMUM CLAMPING VOLTAGE (Fig. 2)  @ 10/1000μS V <sub>C</sub> @ I <sub>PP</sub>	TEMPERATURE COEFFICIENT OF V <sub>(BR)</sub>  qV <sub>(BR)</sub> mV/°C
		MIN V <sub>(BR)</sub> VOLTS	@I <sub>T</sub> mA			
P15KP17	17.0	18.9	50	5000	32.3V @ 464.0A	19
P15KP17A	17.0	18.9	50	5000	29.3V @ 512.0A	17
P15KP18	18.0	20.0	50	5000	34.2V @ 439.0A	20
P15KP18A	18.0	20.0	50	5000	30.9V @ 485.0A	18
P15KP20	20.0	22.2	20	1500	37.9V @ 396.0A	24
P15KP20A	20.0	22.2	20	1500	34.3V @ 437.0A	21
P15KP22	22.0	24.4	10	500	41.1V @ 365.0A	27
P15KP22A	22.0	24.4	10	500	37.1V @ 404.0A	24
P15KP24	24.0	26.7	5	150	45.0V @ 333.0A	30
P15KP24A	24.0	26.7	5	150	40.7V @ 369.0A	27
P15KP26	26.0	28.9	5	50	48.7V @ 308.0A	32
P15KP26A	26.0	28.9	5	50	44.0V @ 341.0A	29
P15KP28	28.0	31.1	5	25	52.4V @ 286.0A	35
P15KP28A	28.0	31.1	5	25	47.5V @ 316.0A	31
P15KP30	30.0	33.3	5	15	56.2V @ 267.0A	27
P15KP30A	30.0	33.3	5	15	50.7V @ 296.0A	34
P15KP33	33.0	36.7	5	10	60.6V @ 248.0A	42
P15KP33A	33.0	36.7	5	10	54.8V @ 274.0A	38
P15KP36	36.0	40.0	5	10	66.0V @ 227.0A	46
P15KP36A	36.0	40.0	5	10	59.7V @ 251.0A	41
P15KP40	40.0	44.4	5	10	72.8V @ 206.0A	51
P15KP40A	40.0	44.4	5	10	65.8V @ 228.0A	46
P15KP43	43.0	47.8	5	10	77.1V @ 195.0A	55
P15KP43A	43.0	47.8	5	10	69.7V @ 215.0A	50
P15KP45	45.0	50.0	5	10	80.7V @ 186.0A	57
P15KP45A	45.0	50.0	5	10	73.0V @ 205.0A	52

## TYPICAL DEVICE CHARACTERISTICS

## RTCA DO-160G COMPLIANT PRODUCT

## ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

PART NUMBER (Notes 1 - 2)	RATED STAND-OFF VOLTAGE  $V_{WM}$ VOLTS	BREAKDOWN VOLTAGE		MAXIMUM LEAKAGE CURRENT  $@V_{WM}$ $I_D$ $\mu A$	MAXIMUM CLAMPING VOLTAGE (Fig. 2)  $@ 10/1000\mu S$ $V_C @ I_{PP}$	TEMPERATURE COEFFICIENT OF $V_{(BR)}$  $qV_{(BR)}$ $mV/^\circ C$
		MIN $V_{(BR)}$ VOLTS	$@I_T$ mA			
P15KP48	48.0	53.3	5	10	85.9V @ 175.0A	62
P15KP48A	48.0	53.3	5	10	77.7V @ 193.0A	56
P15KP51	51.0	56.7	5	10	91.5V @ 164.0A	66
P15KP51A	51.0	56.7	5	10	82.8V @ 181.0A	60
P15KP54	54.0	60.0	5	10	96.8V @ 155.0A	70
P15KP54A	54.0	60.0	5	10	87.5V @ 171.0A	63
P15KP58	58.0	64.4	5	10	104.0V @ 144.0A	76
P15KP58A	58.0	64.4	5	10	94.0V @ 160.0A	68
P15KP60	60.0	66.7	5	10	107.0V @ 140.0A	78
P15KP60A	60.0	66.7	5	10	97.3V @ 154.0A	71
P15KP64	64.0	71.1	5	10	115.0V @ 130.0A	84
P15KP64A	64.0	71.1	5	10	104.0V @ 144.0A	76
P15KP70	70.0	77.8	5	10	126.0V @ 119.0A	92
P15KP70A	70.0	77.8	5	10	114.0V @ 132.0A	83
P15KP75	75.0	83.3	5	10	135.0V @ 111.0A	100
P15KP75A	75.0	83.3	5	10	122.0V @ 123.0A	89
P15KP78	78.0	86.7	5	10	140.0V @ 107.0A	104
P15KP78A	78.0	86.7	5	10	126.0V @ 119.0A	93
P15KP85	85.0	94.4	5	10	152.0V @ 99.0A	113
P15KP85A	85.0	94.4	5	10	137.0V @ 109.0A	102
P15KP90	90.0	100.0	5	10	160.0V @ 94.0A	120
P15KP90A	90.0	100.0	5	10	146.0V @ 103.0A	109
P15KP100	100.0	111.0	5	10	179.0V @ 84.0A	134
P15KP100A	100.0	111.0	5	10	162.0V @ 93.0A	121
P15KP110	110.0	122.0	5	10	196.0V @ 77.0A	147
P15KP110A	110.0	122.0	5	10	178.0V @ 84.0A	133
P15KP120	120.0	133.0	5	10	214.0V @ 70.0A	161
P15KP120A	120.0	133.0	5	10	193.0V @ 78.0A	145
P15KP130	130.0	144.0	5	10	231.0V @ 65.0A	174
P15KP130A	130.0	144.0	5	10	209.0V @ 72.0A	157
P15KP150	150.0	167.0	5	10	268.0V @ 56.0A	202
P15KP150A	150.0	167.0	5	10	243.0V @ 62.0A	183
P15KP160	160.0	178.0	5	10	287.0V @ 52.0A	216
P15KP160A	160.0	178.0	5	10	259.0V @ 58.0A	195

## TYPICAL DEVICE CHARACTERISTICS

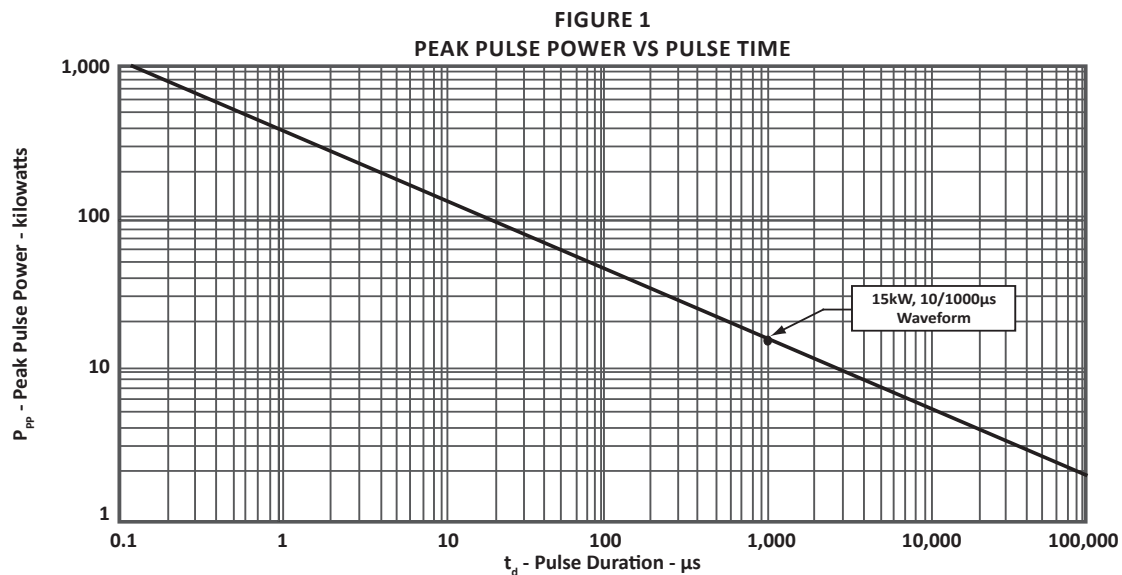
## RTCA DO-160G COMPLIANT PRODUCT

## ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

PART NUMBER (Notes 1 - 2)	RATED STAND-OFF VOLTAGE  $V_{WM}$ VOLTS	BREAKDOWN VOLTAGE		MAXIMUM LEAKAGE CURRENT  @ $V_{WM}$ $I_D$ $\mu A$	MAXIMUM CLAMPING VOLTAGE (Fig. 2)  @ 10/1000 $\mu S$ $V_C$ @ $I_{PP}$	TEMPERATURE COEFFICIENT OF $V_{(BR)}$  $qV_{(BR)}$ mV/°C
		MIN $V_{(BR)}$ VOLTS	@ $I_T$ mA			
P15KP170	170.0	189.0	5	10	304.0V @ 49.0A	229
P15KP170A	170.0	189.0	5	10	275.0V @ 55.0A	207
P15KP180	180.0	200.0	5	10	321.0V @ 47.0A	242
P15KP180A	180.0	200.0	5	10	291.0V @ 52.0A	219
P15KP200	200.0	222.0	5	10	356.0V @ 42.0A	269
P15KP200A	200.0	222.0	5	10	322.0V @ 47.0A	243
P15KP220	220.0	245.0	5	10	393.0V @ 38.0A	297
P15KP220A	220.0	245.0	5	10	356.0V @ 42.0A	269
P15KP240	240.0	267.0	5	10	428.0V @ 35.0A	324
P15KP240A	240.0	267.0	5	10	388.0V @ 39.0A	293
P15KP260	260.0	289.0	5	10	464.0V @ 32.0A	352
P15KP260A	260.0	289.0	5	10	419.0V @ 36.0A	317
P15KP280	280.0	311.0	5	10	500.0V @ 30.0A	378
P15KP280A	280.0	311.0	5	10	452.0V @ 33.0A	342

## NOTES

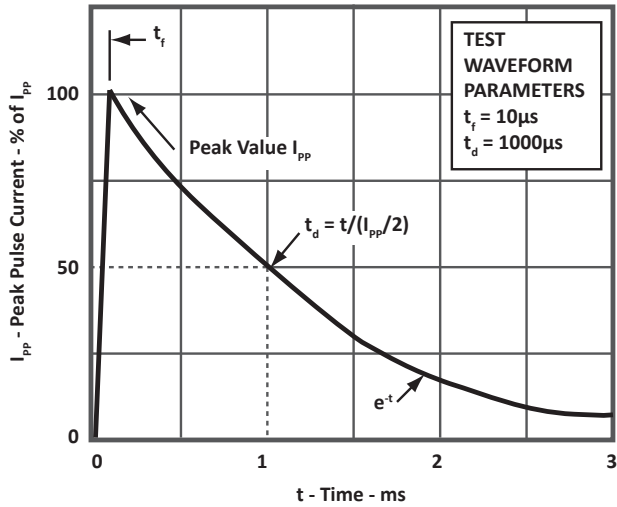
- Part numbers shown are unidirectional devices. Add a "CA" suffix to specify bidirectional devices, such as P15KP20CA.
- $V_f = 7.5$  Volts @ 200A, 8.3ms(1/2 Sine Wave) - Unidirectional devices only.



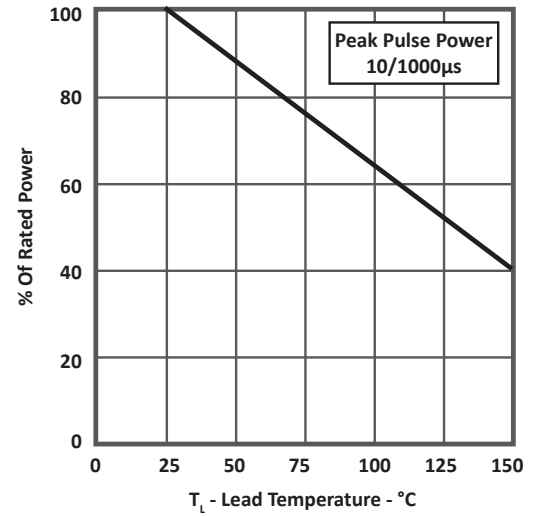
**TYPICAL DEVICE CHARACTERISTICS**

**RTCA DO-160G COMPLIANT PRODUCT**

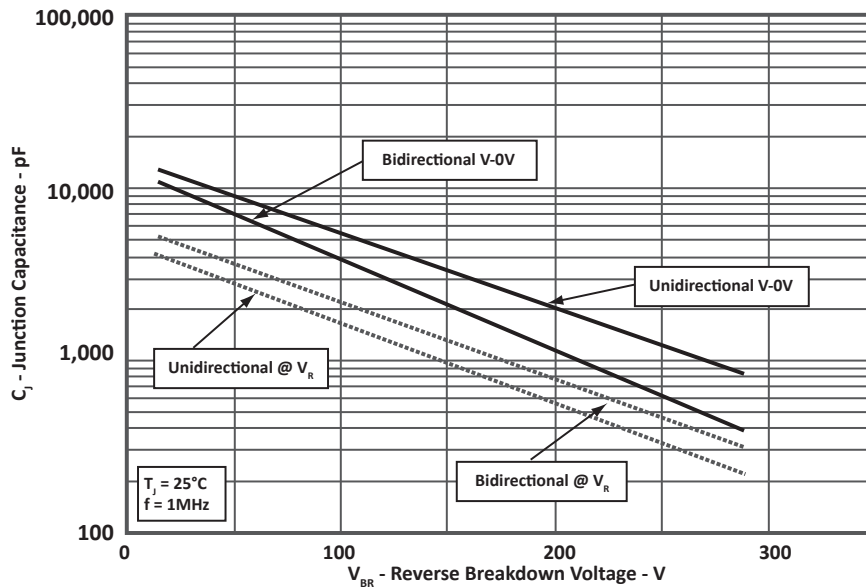
**FIGURE 2  
PULSE WAVEFORM**



**FIGURE 3  
POWER DERATING CURVE**



**FIGURE 4  
TYPICAL JUNCTION CAPACITANCE**



## AXIAL LEAD(MOD) PACKAGE INFORMATION

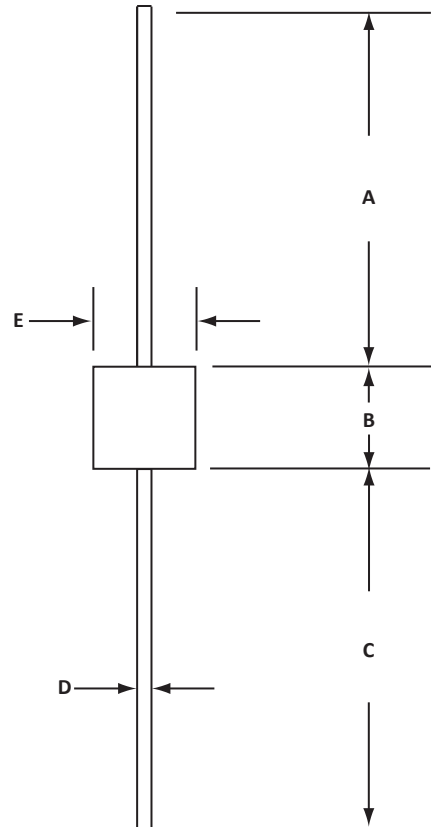
## RTCA DO-160G COMPLIANT PRODUCT

## OUTLINE DIMENSIONS

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	25.4	-	1.00	-
B	9.27	9.77	0.365	0.385
C	25.4	-	1.00	-
D	1.20 DIA.	1.30 DIA.	0.048 DIA.	0.052 DIA.
E	5.96	6.47	0.235	0.255

## NOTES

- Dimensions are exclusive of mold flash and metal burrs.



## ORDERING INFORMATION

BASE PART NUMBER (xx = Voltage)	LEADFREE SUFFIX	TAPE SUFFIX	QTY/REEL	REEL SIZE	TUBE QTY
P15KPxx	-LF	n/a	n/a	n/a	n/a
P15KPxxA	-LF	n/a	n/a	n/a	n/a
P15KPxxCA	-LF	n/a	n/a	n/a	n/a

## NOTES

- Marking on Part - logo, part number, date code and positive terminal marked with band (unidirectional only).
- For lead-free devices, use the -LF suffix when ordering.
- Lead-free: Pure-Tin plating.

## MARKING DIAGRAM



**COMPANY INFORMATION****RTCA DO-160G COMPLIANT PRODUCT****COMPANY PROFILE**

In business more than 20 years, ProTek Devices™ is a privately held semiconductor company. The company offers a product line of overvoltage protection and overcurrent protection components. These include transient voltage suppressor array (TVS arrays) avalanche breakdown diode, steering diode TVS array and electronics SMD chip fuses. These components deliver circuit protection in electronic systems from numerous overvoltage and overcurrent events. They include lightning; electrostatic discharge (ESD); nuclear electromagnetic pulses (NEMP); inductive switching; and electromagnetic interference (EMI) / radio frequency interference (RFI). ProTek Devices also offers LED wafer die for ESD protection and related high frequency products.

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