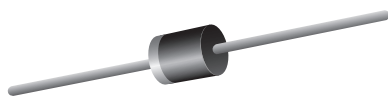


## TRANSZORB® Transient Voltage Suppressors


**P600**

**RoHS**  
COMPLIANT

### FEATURES

- P600 glass passivated chip junction
- Available in unidirectional polarity only
- 5000 W peak pulse power capability with a 10/1000  $\mu$ s waveform, repetitive rate (duty cycle): 0.01 %
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Solder dip 275 °C max. 10 s, per JESD 22-B106
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

PRIMARY CHARACTERISTICS	
$V_{WM}$	8.5 V to 188 V
$V_{BR}$	9.4 V to 231 V
$P_{PPM}$	5000 W
$P_D$	8.0 W
$I_{FSM}$	500 A
$T_J$ max.	175 °C
Polarity	Unidirectional
Package	P600

### TYPICAL APPLICATIONS

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lightning on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial, automotive, and telecommunication.

### MECHANICAL DATA

**Case:** P600, molded epoxy body over passivated junction  
Molding compound meets UL 94 V-0 flammability rating  
Base P/N-E3 - RoHS compliant, commercial grade  
Base P/NHE3\_X - RoHS compliant, AEC-Q101 qualified  
(\_X denotes revision code e.g. A, B,...)

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

E3 suffix meets JESD 201 class 1A whisker test, HE3 suffix meets JESD 201 class 2 whisker test

**Polarity:** color band denotes cathode end

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Peak pulse power dissipation with a 10/1000 $\mu$ s waveform <sup>(1)</sup>	$P_{PPM}$	5000	W
Peak pulse current with a 10/1000 $\mu$ s waveform <sup>(1)</sup>	$I_{PPM}$	See next table	A
Power dissipation on infinite heatsink at $T_L = 75$ °C (fig. 5)	$P_D$	8.0	W
Peak forward surge current 8.3 ms single half sine-wave (fig. 5)	$I_{FSM}$	500	A
Instantaneous forward voltage at 100 A <sup>(2)</sup>	$V_F$	3.5	V
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +175	°C

#### Notes

<sup>(1)</sup> Non-repetitive current pulse, per fig. 3 and derated above  $T_A = 25$  °C per fig. 2

<sup>(2)</sup> Measured 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum



ELECTRICAL CHARACTERISTICS (JEDEC REGISTERED DATA) (T <sub>A</sub> = 25 °C unless otherwise noted)								
DEVICE TYPE	BREAKDOWN VOLTAGE V <sub>BR</sub> AT I <sub>T</sub> <sup>(1)</sup> (V)		TEST CURRENT I <sub>T</sub> (mA)	STAND-OFF VOLTAGE V <sub>WM</sub> (V)	MAXIMUM REVERSE LEAKAGE AT V <sub>WM</sub> I <sub>D</sub> (µA)	MAXIMUM PEAK PULSE CURRENT I <sub>PPM</sub> <sup>(2)</sup> (A)	MAXIMUM CLAMPING VOLTAGE AT I <sub>PPM</sub> V <sub>C</sub> (V)	MAXIMUM TEMP. COEFFICIENT OF V <sub>BR</sub> (%/°C)
	MIN.	MAX.						
5KP8.5A	9.44	10.4	5.0	8.5	50	347	14.4	0.078
5KP9.0A	10.0	11.1	5.0	9.0	20	325	15.4	0.081
5KP10A	11.1	12.3	5.0	10.0	15	294	17.0	0.084
5KP11A	12.2	13.5	5.0	11.0	10	275	18.2	0.086
5KP12A	13.3	14.7	5.0	12.0	5.0	251	19.9	0.088
5KP13A	14.4	15.9	5.0	13.0	2.0	233	21.5	0.090
5KP14A	15.6	17.2	5.0	14.0	2.0	216	23.2	0.092
5KP15A	16.7	18.5	5.0	15.0	2.0	205	24.4	0.094
5KP16A	17.8	19.7	5.0	16.0	2.0	192	26.0	0.096
5KP17A	18.9	20.9	5.0	17.0	2.0	181	27.6	0.097
5KP18A	20.0	22.1	5.0	18.0	2.0	171	29.2	0.098
5KP20A	22.2	24.5	5.0	20.0	2.0	154	32.4	0.099
5KP22A	24.4	26.9	5.0	22.0	2.0	141	35.5	0.100
5KP24A	26.7	29.5	5.0	24.0	2.0	129	38.9	0.101
5KP26A	28.9	31.9	5.0	26.0	2.0	119	42.1	0.101
5KP28A	31.1	34.4	5.0	28.0	2.0	110	45.4	0.102
5KP30A	33.3	36.8	5.0	30.0	2.0	103	48.4	0.103
5KP33A	36.7	40.6	5.0	33.0	2.0	93.8	53.3	0.104
5KP36A	40.0	44.2	5.0	36.0	2.0	86.1	58.1	0.104
5KP40A	44.4	49.1	5.0	40.0	2.0	77.5	64.5	0.105
5KP43A	47.8	52.8	5.0	43.0	2.0	72.0	69.4	0.105
5KP45A	50.0	55.3	5.0	45.0	2.0	68.8	72.7	0.106
5KP48A	53.3	58.9	5.0	48.0	2.0	64.6	77.4	0.106
5KP51A	56.7	62.7	5.0	51.0	2.0	60.7	82.4	0.107
5KP54A	60.0	66.3	5.0	54.0	2.0	57.4	87.1	0.107
5KP58A	64.4	71.2	5.0	58.0	2.0	53.4	94	0.107
5KP60A	66.7	73.7	5.0	60.0	2.0	51.7	97.0	0.108
5KP64A	71.1	78.6	5.0	64.0	2.0	48.5	103	0.108
5KP70A	77.8	86.0	5.0	70.0	2.0	44.2	113	0.108
5KP75A	83.3	92.1	5.0	75.0	2.0	41.3	121	0.108
5KP78A	86.7	95.8	5.0	78.0	2.0	39.7	126	0.108
5KP85A	94.4	104	5.0	85.0	2.0	36.5	137	0.110
5KP90A	100	111	5.0	90.0	2.0	34.2	146	0.110
5KP100A	111	123	5.0	100	2.0	30.9	162	0.110
5KP110A	122	135	5.0	110	2.0	28.2	177	0.112
5KP120A	133	147	5.0	120	2.0	25.9	193	0.112
5KP130A	144	159	5.0	130	2.0	23.9	209	0.112
5KP150A	167	185	5.0	150	2.0	20.6	243	0.112
5KP160A	178	197	5.0	160	2.0	19.3	259	0.112
5KP170A	189	209	5.0	170	2.0	18.2	275	0.112
5KP188A	209	231	5.0	188	2.0	15.2	328	0.112

Notes

- (1) Pulse test: t<sub>p</sub> ≤ 50 ms
- (2) Surge current waveform per fig. 3 and derate per fig. 2
- (3) All terms and symbols are consistent with ANSI/IEEE CA62.35



ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
5KP8.5A-E3/54	2.776	54	800	13" diameter paper tape and reel
5KP8.5AHE3_A/C <sup>(1)</sup>	2.776	C	800	13" diameter paper tape and reel

**Note**

<sup>(1)</sup> AEC-Q101 qualified

**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)

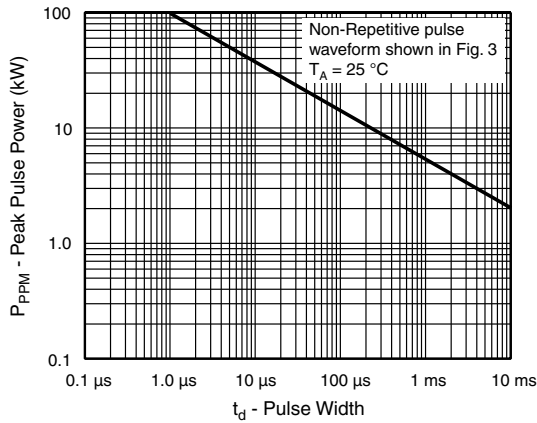


Fig. 1 - Peak Pulse Power Rating Curve

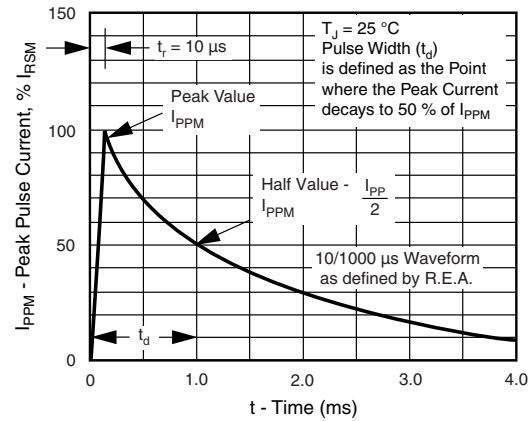


Fig. 3 - Pulse Waveform

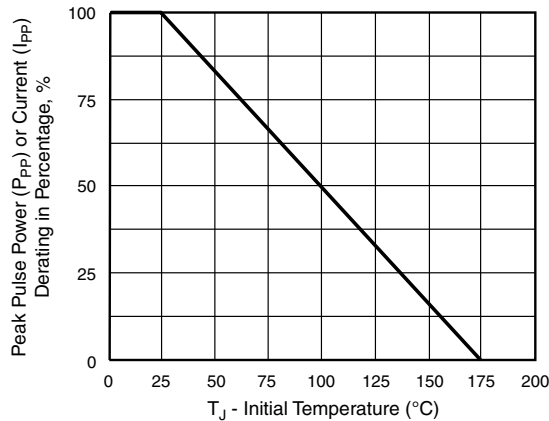


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

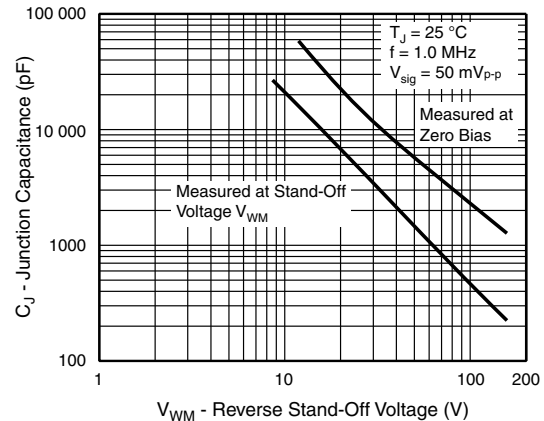


Fig. 4 - Typical Junction Capacitance

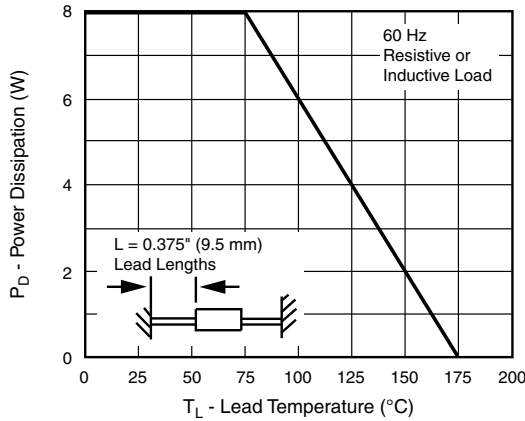


Fig. 5 - Power Derating Curve

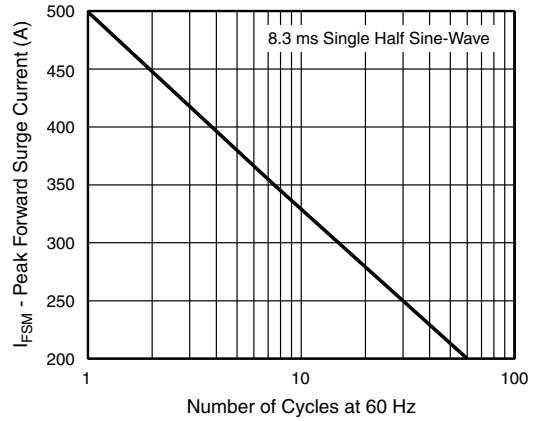
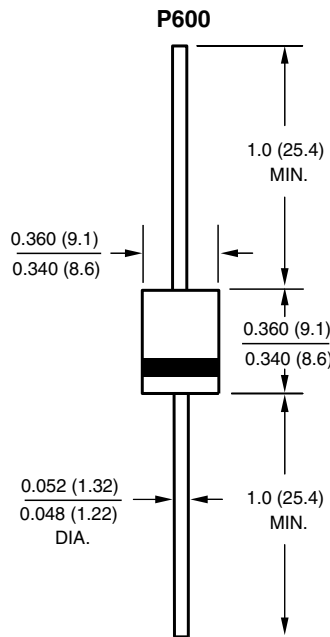


Fig. 6 - Maximum Non-Repetitive Forward Surge Current

**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)



**APPLICATION NOTES**

The 5KP series of high power transient voltage suppressors were designed to be used on the output of switching power supplies. These devices may be used to replace crowbar circuits.

They are able to withstand high levels of peak current while allowing a circuit breaker to trip or a fuse blow before

shorting. This will enable the user to reset the breaker or replace the fuse and continue operation. For this type operation, it is recommended that a sufficient mounting surface be used for dissipating the heat generated by the Transient Voltage Suppressor during the transient or over-voltage condition.



## **Disclaimer**

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.