15KPA17e3 to 15KPA280CAe3

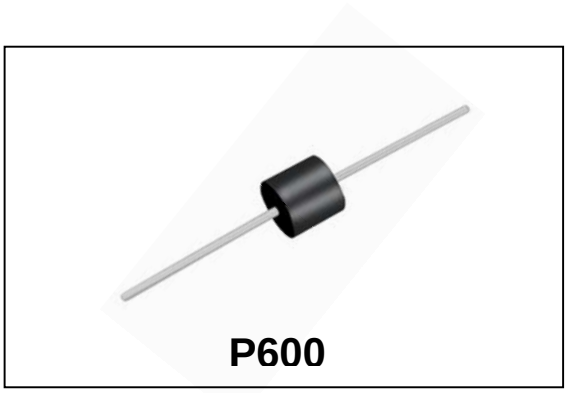
15000W Transient Voltage Suppressor (TVS) protection device

Main product characteristics

V_{WM}	17V – 280V
$V_{BR(min)}$	19V – 312V
I_{PP}	515A – 33A
$V_{CL(MAX)}$	29.3V – 454.5V
P_{PP}	15000W

RoHS COMPLIANT

HALOGEN FREE



P600

Description and applications

This device has the ability to clamp dangerous high voltage, short term transients such as produced by directed or radiated electrostatic discharge phenomena before entering sensitive component regions of a circuit design. Response time of clamping action is virtually instantaneous. As a result, they may also be used effectively for protection from ESD or EFT per IEC61000-4-2 and IEC61000-4-4 or for inductive switching environments and induced RF. They can also be used for protecting other sensitive components from secondary lightning effects per IEC61000-4-5 and class levels defined herein. Microsemi also offers numerous other TVS products to meet higher and lower power demands and special applications.

- RoHS compliant (2002/95/EC), MSL level 1 (J-STD-020)
- Qualified to automotive grade – AEC Q101
- Bi-directional devices are denoted by the suffixes C or CA, electrical characteristics apply in both directions.

Maximum ratings and characteristics(1)

Symbol	Parameter	Value	Unit
P_{PPM}	Peak power dissipation with a 10/1000µs waveform (fig. 1)	Min. 15000	W
I_{PPM}	Peak pulse current with a 10/1000µs waveform (2)	See next table	A
$P_{M(AV)}$	Steady state power dissipation at T_L = 75ºC, lead lengths 0.375” (9.5mm) (3)	8.0	W
I_{FSM}	Non repetitive peak forward surge current (8.3ms single half sine wave) (4)	400	A
$R_{\Theta JL}$	Typical thermal resistance junction to lead	8.0	ºC/W
$R_{\Theta JA}$	Typical thermal resistance junction to ambient	40	ºC/W
T_{STG}	Storage temperature	-55 to +175	ºC
T_J	Junction temperature	-55 to +175	ºC

(1) All ratings at 25ºC unless specified otherwise
(2) Non-repetitive current pulse, per Fig. 3 and derated above T_A = 25ºC per Fig. 2
(3) Mounted as shown in Fig.5
(4) Measured on 8.3ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

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15000W Transient Voltage Suppressor (TVS) protection device

Electrical characteristics(1)

DEVICE	BREAKDOWN VOLTAGE (2), V_{BR} V_{BR} (V) @ I_T (mA)		TEST CURRENT I_T (mA)	STAND-OFF VOLTAGE V_{WM} (V)	MAXIMUM STANDBY CURRENT (4) I_D (µA) @ V_{WM}	MAXIMUM PEAK PULSE CURRENT (3) I_{PP} (A)	MAXIMUM CLAMPING VOLTAGE V_C (V) @ I_{PP}	MAXIMUM TEMPERATURE COEFFICIENT OF V_{BR} α_{VBR} (%/ °C)
	Min	Max						
15KPA17e3 / 15KPA17Ce3	18.99	20.89	50	17	5000	515.4	29.3	0.1
15KPA17Ae3 / 15KPA17CAe3	**18.99**	**19.94**	**50**	**17**	**5000**	**515.4**	**29.3**	**0.1**
15KPA18e3 / 15KPA18Ce3	20.11	22.12	50	18	5000	488.7	30.9	0.1
15KPA18Ae3 / 15KPA18CAe3	**20.11**	**21.12**	**50**	**18**	**5000**	**488.7**	**30.9**	**0.1**
15KPA20e3 / 15KPA20Ce3	22.34	24.57	20	20	1500	440.2	34.3	0.1
15KPA20Ae3 / 15KPA20CAe3	**22.34**	**23.46**	**20**	**20**	**1500**	**440.2**	**34.3**	**0.1**
15KPA22e3 / 15KPA22Ce3	24.57	27.03	10	22	500	407.0	37.1	0.1
15KPA22Ae3 / 15KPA22CAe3	**24.57**	**25.80**	**10**	**22**	**500**	**407.0**	**37.1**	**0.1**
15KPA24e3 / 15KPA24Ce3	26.81	29.49	5	24	150	371.0	40.7	0.1
15KPA24Ae3 / 15KPA24CAe3	**26.81**	**28.15**	**5**	**24**	**150**	**371.0**	**40.7**	**0.1**
15KPA26e3 / 15KPA26Ce3	29.04	31.94	5	26	50	343.2	44.0	0.1
15KPA26Ae3 / 15KPA26CAe3	**29.04**	**30.49**	**5**	**26**	**50**	**343.2**	**44.0**	**0.1**
15KPA28e3 / 15KPA28Ce3	31.28	34.41	5	28	25	317.9	47.5	0.1
15KPA28Ae3 / 15KPA28CAe3	**31.28**	**32.84**	**5**	**28**	**25**	**317.9**	**47.5**	**0.1**
15KPA30e3 / 15KPA30Ce3	33.51	36.86	5	30	15	297.8	50.7	0.1
15KPA30Ae3 / 15KPA30CAe3	**33.51**	**35.19**	**5**	**30**	**15**	**297.8**	**50.7**	**0.1**
15KPA33e3 / 15KPA33Ce3	36.90	40.59	5	33	2	276.1	54.7	0.1
15KPA33Ae3 / 15KPA33CAe3	**36.90**	**38.75**	**5**	**33**	**2**	**276.1**	**54.7**	**0.1**
15KPA36e3 / 15KPA36Ce3	40.20	44.22	5	36	2	252.5	59.8	0.1
15KPA36Ae3 / 15KPA36CAe3	**40.20**	**42.21**	**5**	**36**	**2**	**252.5**	**59.8**	**0.1**
15KPA40e3 / 15KPA40Ce3	44.70	49.17	5	40	2	229.5	65.8	0.1
15KPA40Ae3 / 15KPA40CAe3	**44.70**	**46.94**	**5**	**40**	**2**	**229.5**	**65.8**	**0.1**
15KPA43e3 / 15KPA43Ce3	48.00	52.80	5	43	2	216.3	69.8	0.1
15KPA43Ae3 / 15KPA43CAe3	**48.00**	**50.40**	**5**	**43**	**2**	**216.3**	**69.8**	**0.1**
15KPA45e3 / 15KPA45Ce3	50.30	55.33	5	45	2	207.4	72.8	0.1
15KPA45Ae3 / 15KPA45CAe3	**50.30**	**52.82**	**5**	**45**	**2**	**207.4**	**72.8**	**0.1**
15KPA48e3 / 15KPA48Ce3	53.60	58.96	5	48	2	194.3	77.7	0.1
15KPA48Ae3 / 15KPA48CAe3	**53.60**	**56.28**	**5**	**48**	**2**	**194.3**	**77.7**	**0.1**
15KPA51e3 / 15KPA51Ce3	57.00	62.70	5	51	2	182.1	82.9	0.1
15KPA51Ae3 / 15KPA51CAe3	**57.00**	**59.85**	**5**	**51**	**2**	**182.1**	**82.9**	**0.1**

(1) All ratings at 25ºC unless specified otherwise

(2) V_{BR} measured after I_T applied for 300µs, I_T=square wave pulse or equivalent

(3) Surge current waveform per Fig.3 and derated per Fig.2

(4) For bidirectional types with V_{WM} of 30 volts and less, the I_D limit is doubled

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15000W Transient Voltage Suppressor (TVS) protection device

Electrical characteristics (cont.)

DEVICE	BREAKDOWN VOLTAGE, V_{BR} V_{BR} (V) @ I_T (mA)		TEST CURRENT I_T (mA)	STAND-OFF VOLTAGE V_{WM} (V)	MAXIMUM STANDBY CURRENT I_D (µA) @ V_{WM}	MAXIMUM PEAK PULSE CURRENT I_{PP} (A)	MAXIMUM CLAMPING VOLTAGE V_C (V) @ I_{PP}	MAXIMUM TEMPERATURE COEFFICIENT OF V_{BR} α_{VBR} (%/ °C)
	Min	Max						
15KPA54e3 / 15KPA54Ce3	60.30	66.33	5	54	2	172.2	87.7	0.1
15KPA54Ae3 / 15KPA54CAe3	**60.30**	**63.32**	**5**	**54**	**2**	**172.2**	**87.7**	**0.1**
15KPA58e3 / 15KPA58Ce3	64.80	71.28	5	58	2	161.0	93.8	0.1
15KPA58Ae3 / 15KPA58CAe3	**64.80**	**68.04**	**5**	**58**	**2**	**161.0**	**93.8**	**0.1**
15KPA60e3 / 15KPA60Ce3	67.00	73.70	5	60	2	155.0	97.4	0.1
15KPA60Ae3 / 15KPA60CAe3	**67.00**	**70.35**	**5**	**60**	**2**	**155.0**	**97.4**	**0.1**
15KPA64e3 / 15KPA64Ce3	71.50	78.65	5	64	2	144.9	104.2	0.1
15KPA64Ae3 / 15KPA64CAe3	**71.50**	**75.08**	**5**	**64**	**2**	**144.9**	**104.2**	**0.1**
15KPA70e3 / 15KPA70Ce3	78.20	86.02	5	70	2	132.9	113.6	0.1
15KPA70Ae3 / 15KPA70CAe3	**78.20**	**82.11**	**5**	**70**	**2**	**132.9**	**113.6**	**0.1**
15KPA75e3 / 15KPA75Ce3	83.80	92.18	5	75	2	123.8	122.0	0.1
15KPA75Ae3 / 15KPA75CAe3	**83.80**	**87.99**	**5**	**75**	**2**	**123.8**	**122.0**	**0.1**
15KPA78e3 / 15KPA78Ce3	87.10	95.81	5	78	2	119.7	126.1	0.1
15KPA78Ae3 / 15KPA78CAe3	**87.10**	**91.46**	**5**	**78**	**2**	**119.7**	**126.1**	**0.1**
15KPA85e3 / 15KPA85Ce3	94.90	104.39	5	85	2	109.7	137.6	0.1
15KPA85Ae3 / 15KPA85CAe3	**94.90**	**99.65**	**5**	**85**	**2**	**109.7**	**137.6**	**0.1**
15KPA90e3 / 15KPA90Ce3	100.50	110.55	5	90	2	103.7	145.6	0.1
15KPA90Ae3 / 15KPA90CAe3	**100.50**	**105.53**	**5**	**90**	**2**	**103.7**	**145.6**	**0.1**
15KPA100e3 / 15KPA100Ce3	111.70	122.87	5	100	2	93.6	161.3	0.1
15KPA100Ae3 / 15KPA100CAe3	**111.70**	**117.29**	**5**	**100**	**2**	**93.6**	**161.3**	**0.1**
15KPA110e3 / 15KPA110Ce3	122.90	135.19	5	110	2	84.5	178.6	0.1
15KPA110Ae3 / 15KPA110CAe3	**122.90**	**129.05**	**5**	**110**	**2**	**84.5**	**178.6**	**0.1**
15KPA120e3 / 15KPA120Ce3	134.00	147.40	5	120	2	78.5	192.3	0.1
15KPA120Ae3 / 15KPA120CAe3	**134.00**	**140.70**	**5**	**120**	**2**	**78.5**	**192.3**	**0.1**
15KPA130e3 / 15KPA130Ce3	145.20	159.72	5	130	2	72.5	208.3	0.1
15KPA130Ae3 / 15KPA130CAe3	**145.20**	**152.46**	**5**	**130**	**2**	**72.5**	**208.3**	**0.1**
15KPA150e3 / 15KPA150Ce3	167.60	184.36	5	150	2	62.4	241.9	0.1
15KPA150Ae3 / 15KPA150CAe3	**167.60**	**175.98**	**5**	**150**	**2**	**62.4**	**241.9**	**0.1**
15KPA160e3 / 15KPA160Ce3	178.70	196.57	5	160	2	58.4	258.6	0.1
15KPA160Ae3 / 15KPA160CAe3	**178.70**	**187.64**	**5**	**160**	**2**	**58.4**	**258.6**	**0.1**
15KPA170e3 / 15KPA170Ce3	189.90	208.89	5	170	2	55.4	272.7	0.1
15KPA170Ae3 / 15KPA170CAe3	**189.90**	**199.40**	**5**	**170**	**2**	**55.4**	**272.7**	**0.1**
15KPA180e3 / 15KPA180Ce3	201.10	221.21	5	180	2	52.3	288.5	0.1
15KPA180Ae3 / 15KPA180CAe3	**201.10**	**211.16**	**5**	**180**	**2**	**52.3**	**288.5**	**0.1**
15KPA200e3 / 15KPA200Ce3	223.40	245.74	5	200	2	47.3	319.1	0.1
15KPA200Ae3 / 15KPA200CAe3	**223.40**	**234.57**	**5**	**200**	**2**	**47.3**	**319.1**	**0.1**

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Electrical characteristics (cont.)

DEVICE	BREAKDOWN VOLTAGE, V_{BR} V_{BR} (V) @ I_T (mA)		TEST CURRENT I_T (mA)	STAND-OFF VOLTAGE V_{WM} (V)	MAXIMUM STANDBY CURRENT I_D (µA) @ V_{WM}	MAXIMUM PEAK PULSE CURRENT I_{PP} (A)	MAXIMUM CLAMPING VOLTAGE V_C (V) @ I_{PP}	MAXIMUM TEMPERATURE COEFFICIENT OF V_{BR} α_{VBR} (%/ °C)
	Min	Max						
15KPA220e3 / 15KPA220Ce3	245.70	270.27	5	220	2	35.2	428.6	0.1
15KPA220Ae3 / 15KPA220CAe3	**245.70**	**257.99**	**5**	**220**	**2**	**35.2**	**428.6**	**0.1**
15KPA240e3 / 15KPA240Ce3	268.10	294.91	5	240	2	39.3	384.6	0.1
15KPA240Ae3 / 15KPA240CAe3	**268.10**	**281.51**	**5**	**240**	**2**	**39.3**	**384.6**	**0.1**
15KPA260e3 / 15KPA260Ce3	290.40	319.44	5	260	2	36.2	416.7	0.1
15KPA260Ae3 / 15KPA260CAe3	**290.40**	**304.92**	**5**	**260**	**2**	**36.2**	**416.7**	**0.1**
15KPA280e3 / 15KPA280Ce3	312.80	344.08	5	280	2	33.2	454.5	0.1
15KPA280Ae3 / 15KPA280CAe3	**312.80**	**328.44**	**5**	**280**	**2**	**33.2**	**454.5**	**0.1**

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Fig. 1 - Peak Pulse Power Rating Curve

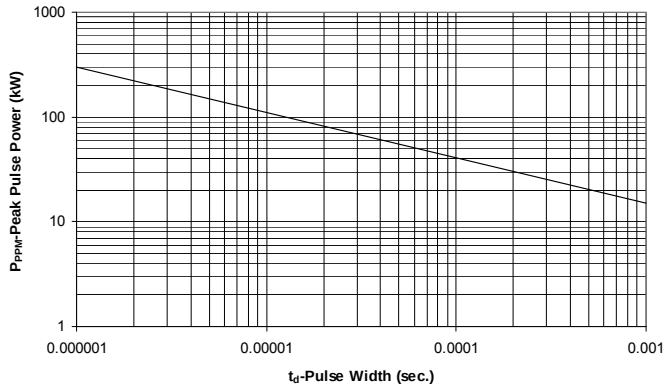


Fig. 2 - Pulse Derating Curve

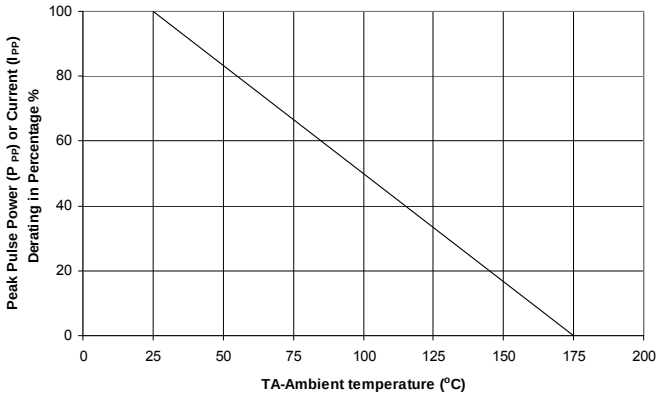


Fig. 3 - Test Pulse Waveform

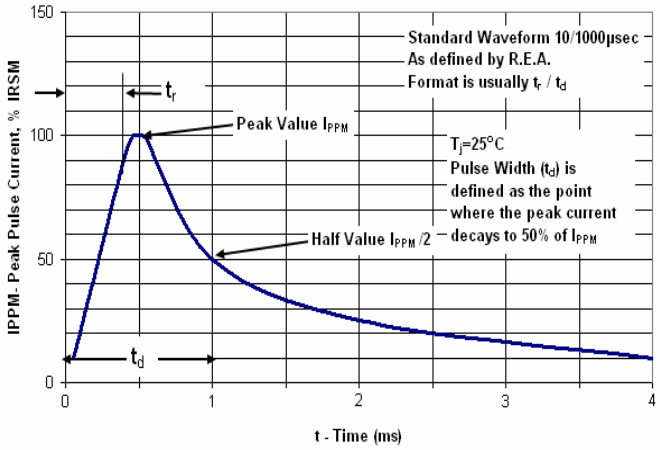


Fig. 4 - Typical Junction capacitance

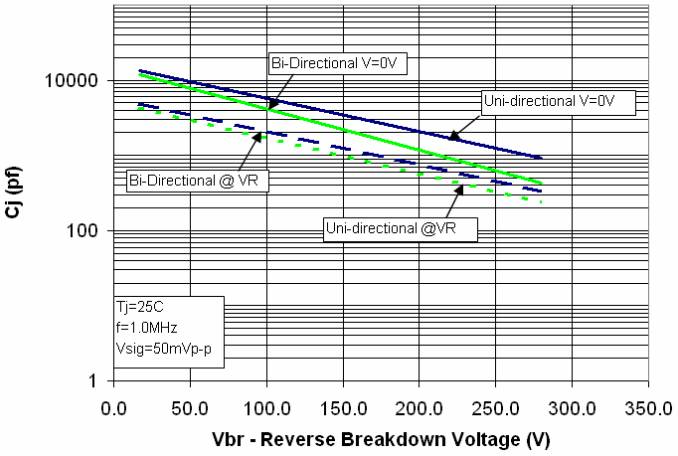


Fig. 5 - Steady State Power Derating Curve

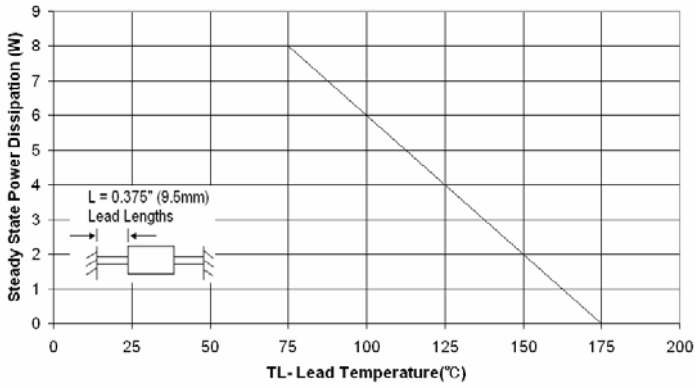
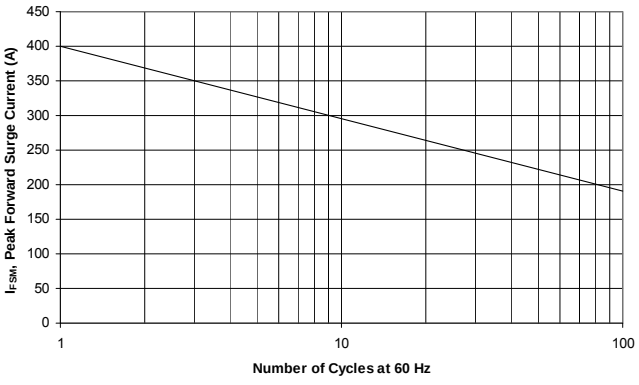
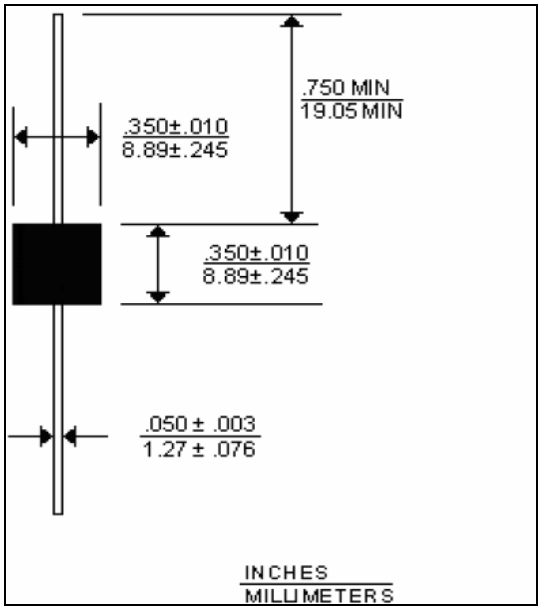


Fig. 6 - Maximum Non-repetitive Forward Surge Current



Mechanical Characteristics

Physical dimensions



Package materials & information

Case : Epoxy meets UL94V-0
Electrode finish : Matte Sn plating - fully RoHS compliant
Terminals : solderable per MIL-STD-750, Method 2026
Marking code :

MSC-YYWW
15KPAxxQZ

YYWW = Date code
xx = Breakdown voltage, V_{BR}
Q = "C" if bi-directional or blank if uni-directional
Z = "A" if V_{BR} has 5% tolerance or blank if V_{BR} has 10% tolerance

POLARITY : For unidirectional types the color band denotes the cathode, which is positive with respect to the anode under normal TVS operation.

Ordering information

Product order code	Package	Weight	Base qty	Delivery mode
15KPAxxYZe3/TR13 For example : 15KPA17CAe3/TR13 or 15KPA36Ae3/TR13	P600	0.07oz. 2.5g	800	Tape and reel (13 inch)

Commercial Business Unit
Microsemi Corporation

Microsemi Commercial Offshore de Macau Limitada
Avenida Doutor Mario Soares
Bank of China Building, 18/F, Unit D
Macau SAR

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