

## Transient Voltage Suppressors (TVS) Data Sheet

### Features

- Glass passivated junction
- Low incremental surge resistance.
- Excellent clamping capability
- 20000W peak pulse power capability at 10/1000 $\mu$ s waveform, repetition rate (duty cycle): 0.05%
- Fast response time
- Typical  $I_R$  less than 2 $\mu$ A above 40V.
- High Temperature soldering guaranteed: 265 $^{\circ}$ C/10 seconds/.375", (9.5mm) lead length, 5lbs (2.3kg) tension
- Plastic package has underwriters laboratory flammability 94V-0
- Meets MSL level 1, per J-STD-020.
- Safety certification: UL: E244458



### Mechanical Data

- Case: Moulded plastic over glass passivated junction
- Terminal: Plated Axial leads, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Mounting Position: Any
- Weight: 2.40g

### Applications

- I/O interface
- AC/DC power supply
- Low frequency signal transmission line (RS232, RS485, etc.)

### Maximum Ratings and Characteristics

Ratings at 25 $^{\circ}$ C ambient temperature unless otherwise specified.

Rating	Symbol	Value	Units
Peak pulse power dissipation at 10/1000 $\mu$ s waveform (Note1, Fig.1)	$P_{PPM}$	Minimum 20000	Watts
Peak pulse current of at 10/1000 $\mu$ s waveform (Note 1, Fig.3)	$I_{PPM}$	See Table	Amps
Steady state power dissipation at $T_L=75^{\circ}$ C (Fig.5)	$P_{M(AV)}$	8.0	Watts
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note2, Fig.6)	$I_{FSM}$	400	Amps
Operating junction and Storage Temperature Range.	$T_J, T_{STG}$	-55 to +175	$^{\circ}$ C
Typical thermal resistance junction to lead	$R_{\theta JL}$	8	$^{\circ}$ C/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	40	$^{\circ}$ C/W

Notes: 1. Non-repetitive current pulse, per Fig.3 and derated above  $T_A=25^{\circ}$ C per Fig.2.

2. 8.3ms single half sine-wave, or equivalent square wave, duty cycle=4 pulses per minutes maximum.

**Dimensions (P600)**

	Symbol	Millimeters		Inches	
		Min.	Max.	Min.	Max.
	L	25.40	-	1.000	-
	T	8.60	9.10	0.340	0.360
	d	8.60	9.10	0.340	0.360
s	1.19	1.32	0.048	0.052	

**Electrical Characteristics (T<sub>A</sub>=25°C)**

Part Number		Reverse Stand-Off Voltage	Breakdown Voltage @I <sub>T</sub>	Test Current	Maximum Clamping Voltage @I <sub>PP</sub>	Peak Pulse Current	Reverse Leakage @V <sub>RWM</sub>
Unidirectional	Bidirectional	V <sub>RWM</sub> (V)	V <sub>BR</sub> (V)	I <sub>T</sub> (mA)	V <sub>C</sub> (V)	I <sub>PP</sub> (A)	I <sub>R</sub> (μA)
20KPA20A	20KPA20CA	20.0	22.34~24.94	50	36.8	548.9	5000
20KPA24A	20KPA24CA	24.0	26.81~29.93	50	41.2	490.3	5000
20KPA26A	20KPA26CA	26.0	29.04~32.42	50	44.7	451.9	2000
20KPA28A	20KPA28CA	28.0	31.28~34.92	50	48.0	420.8	1000
20KPA30A	20KPA30CA	30.0	33.51~37.41	5	51.5	392.2	250
20KPA32A	20KPA32CA	32.0	35.74~39.90	5	54.3	372.0	150
20KPA34A	20KPA34CA	34.0	38.00~42.42	5	57.5	351.3	50
20KPA36A	20KPA36CA	36.0	40.20~44.88	5	61.5	328.5	20
20KPA40A	20KPA40CA	40.0	44.70~49.90	5	67.8	297.9	15
20KPA44A	20KPA44CA	44.0	49.10~54.81	5	72.7	277.9	2
20KPA48A	20KPA48CA	48.0	53.60~59.83	5	79.4	254.4	2
20KPA52A	20KPA52CA	52.0	58.10~64.86	5	85.8	235.4	2
20KPA56A	20KPA56CA	56.0	62.60~69.88	5	92.6	218.1	2
20KPA60A	20KPA60CA	60.0	67.00~74.79	5	97.6	207.0	2
20KPA64A	20KPA64CA	64.0	71.50~79.82	5	104.0	194.2	2
20KPA68A	20KPA68CA	68.0	76.00~84.84	5	110.0	183.6	2
20KPA72A	20KPA72CA	72.0	80.40~89.75	5	116.0	174.1	2

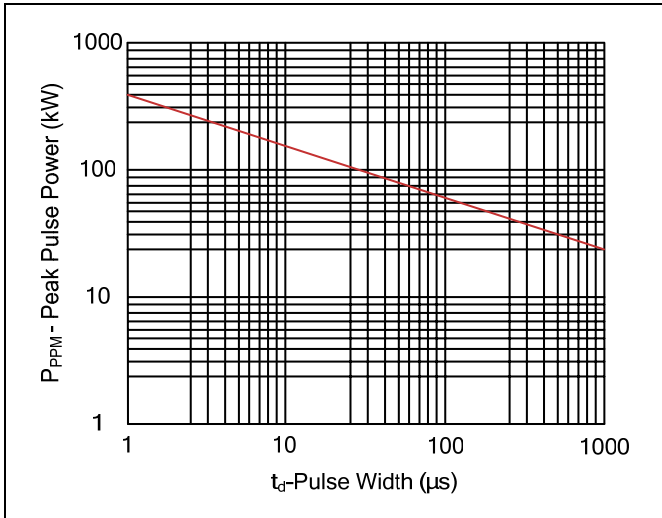
**Electrical Characteristics ( $T_A=25^{\circ}\text{C}$ )**

Part Number		Reverse Stand-Off Voltage	Breakdown Voltage @ $I_T$	Test Current	Maximum Clamping Voltage @ $I_{PP}$	Peak Pulse Current	Reverse Leakage @ $V_{RWM}$
Unidirectional	Bidirectional	$V_{RWM}(V)$	$V_{BR}(V)$	$I_T(mA)$	$V_C(V)$	$I_{PP}(A)$	$I_R(\mu A)$
20KPA80A	20KPA80CA	80.0	89.40~99.80	5	130.0	155.4	2
20KPA88A	20KPA88CA	88.0	98.30~109.73	5	142.0	142.3	2
20KPA96A	20KPA96CA	96.0	107.20~119.67	5	155.0	130.3	2
20KPA104A	20KPA104CA	104.0	116.20~129.72	5	168.0	120.2	2
20KPA112A	20KPA112CA	112.0	125.10~139.65	5	182.0	111.0	2
20KPA120A	20KPA120CA	120.0	134.00~149.59	5	194.0	104.1	2
20KPA132A	20KPA132CA	132.0	147.40~164.54	5	213.0	94.8	2
20KPA144A	20KPA144CA	144.0	160.80~179.50	5	232.0	87.1	2
20KPA160A	20KPA160CA	160.0	178.70~199.49	5	258.0	78.3	2
20KPA172A	20KPA172CA	172.0	192.10~214.44	5	277.0	72.9	2
20KPA180A	20KPA180CA	180.0	201.10~224.49	5	291.0	69.4	2
20KPA192A	20KPA192CA	192.0	214.50~239.45	5	309.0	65.4	2
20KPA204A	20KPA204CA	204.0	227.90~254.41	5	329.0	61.4	2
20KPA216A	20KPA216CA	216.0	241.30~269.37	5	348.0	58.0	2
20KPA232A	20KPA232CA	232.0	259.10~289.24	5	374.0	54.0	2
20KPA240A	20KPA240CA	240.0	268.10~299.28	5	387.0	52.2	2
20KPA256A	20KPA256CA	256.0	286.00~319.27	5	412.0	49.0	2
20KPA280A	20KPA280CA	280.0	312.80~349.18	5	451.0	44.8	2
20KPA300A	20KPA300CA	300.0	335.10~374.08	5	483.0	41.8	2

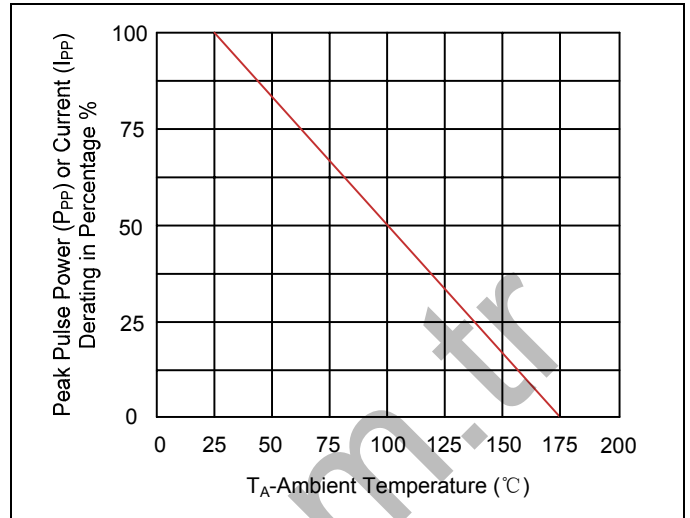
Notes: For bidirectional type having  $V_{RWM}$  of 40V and less, the  $I_R$  limit is double.

**Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$  unless otherwise noted)**

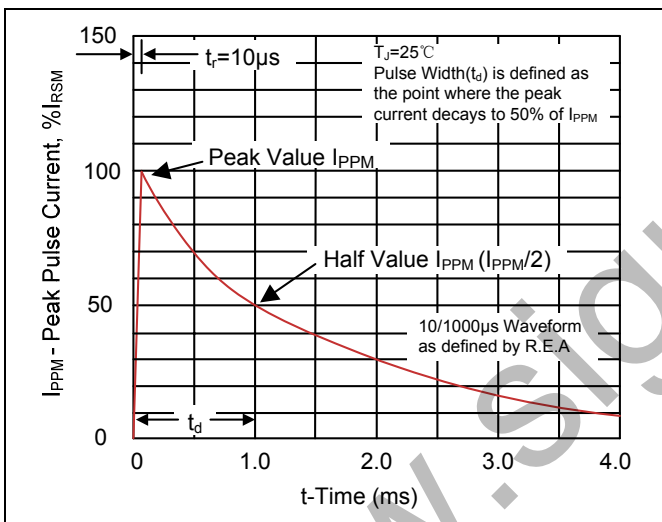
**Figure 1. Peak Pulse Power Rating Curve**



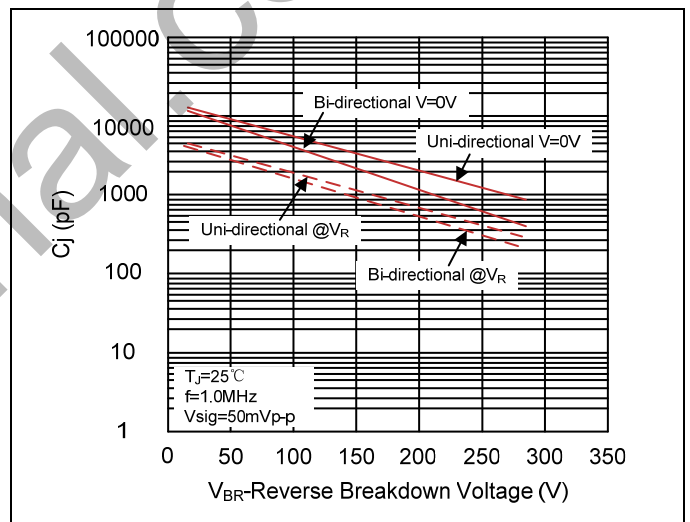
**Figure 2. Pulse Derating Curve**



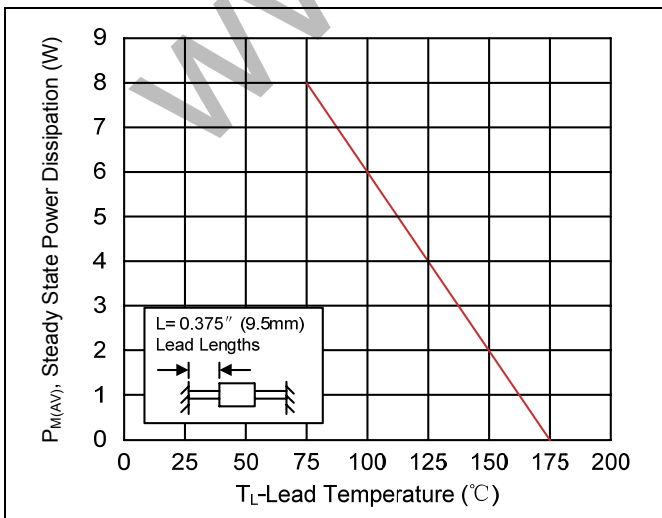
**Figure 3. Pulse Waveform**



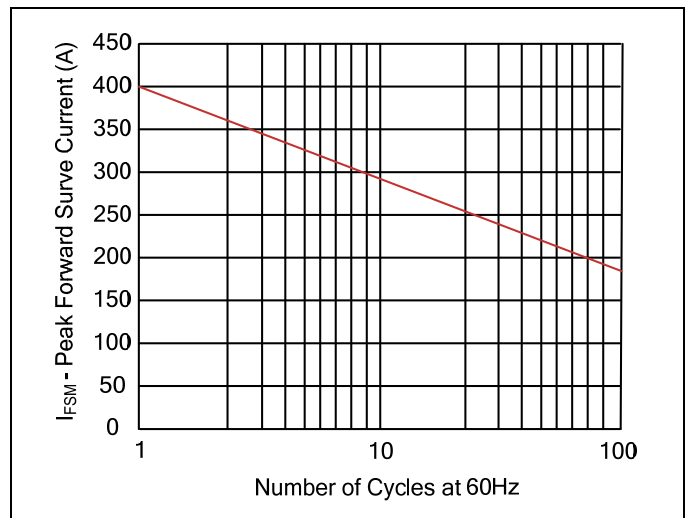
**Figure 4. Typical Junction Capacitance**



**Figure 5. Steady State Power Dissipation Derating Curve**

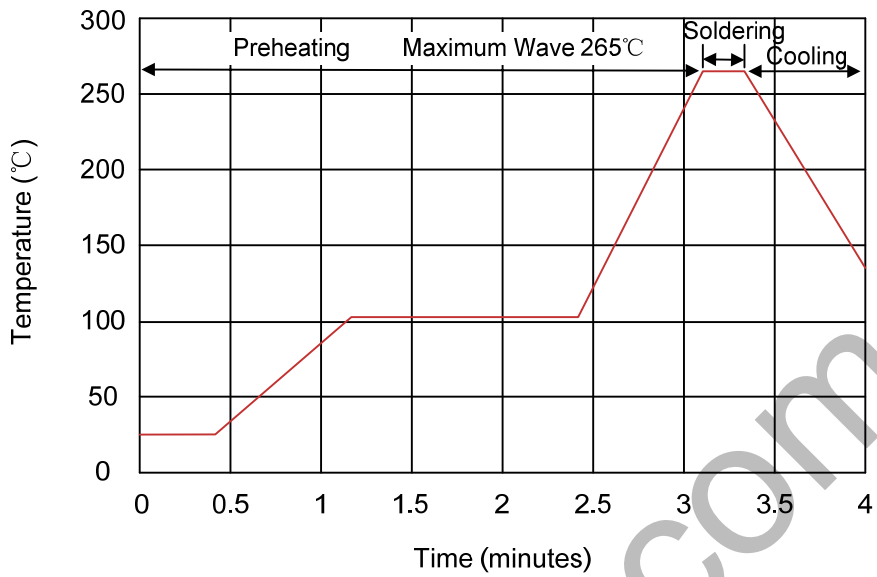


**Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional Only**



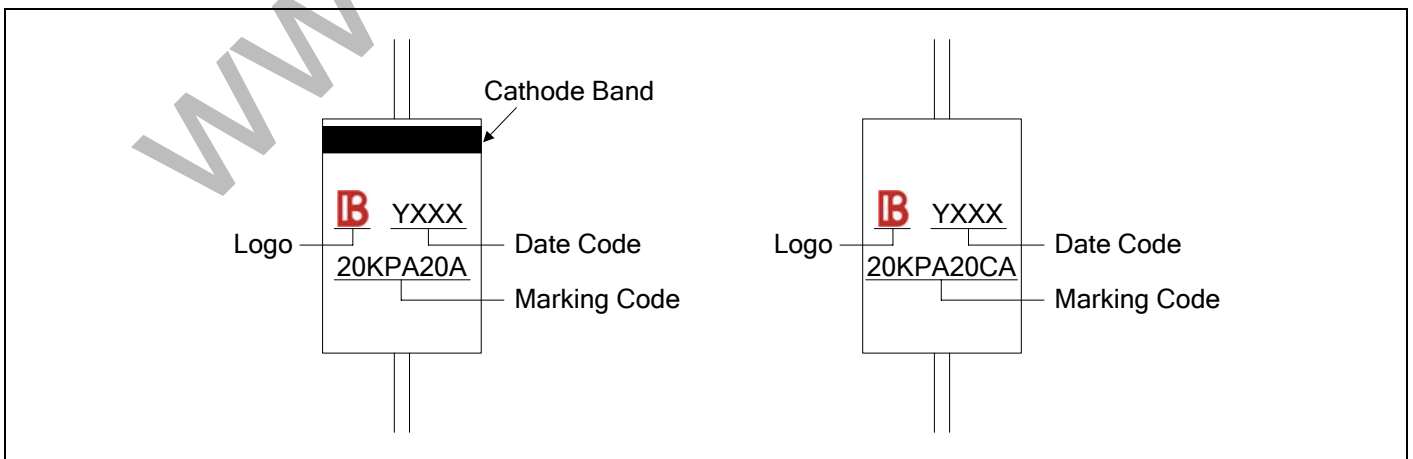
**Recommended Soldering Conditions**

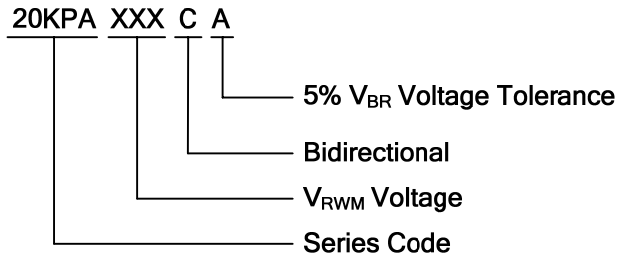
Wave Soldering



Item	Conditions
Peak Temperature	265°C
Dipping Time	10 seconds
Soldering	1 time

**Marking Code**





**Packaging**

Tape		Symbol	Dimension (mm)
		A	10.0±0.5
		B	53.0±1.0
		Z	1.2Max.
		T	6.0±0.4
		E	0.8Max.
		L1-L2	1.0Max.
		Box	
		W	75.0±5.0
		H	114.0±5.0
		Quantity: 300PCS	
Reel		D	330.0±3.0
		D0	16.4±2.0
		D1	86.0±2.0
		W1	76.0±3.0
		Quantity: 800PCS	