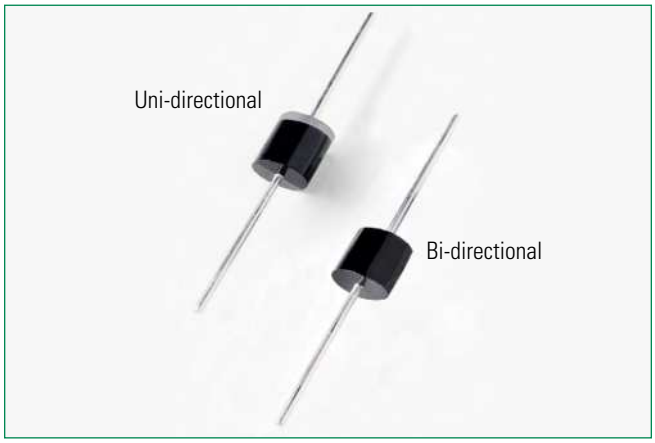
20KPA Series
Axial Leaded – 20000W



Web Resources

Download ECAD models, order samples, and find technical recources at www.littelfuse.com

Agency Approvals

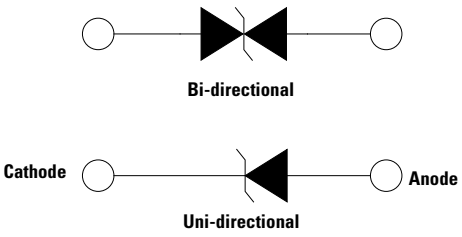
Agency	Agnecy File Number
	E230531

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

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10/1000µs Test Waveform (Fig.2)(Note 1)	P_{PPM}	20	kW
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 (Note 2)	I_{FSM}	400	A
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	°C
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	8.0	°C/W
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	40	°C/W

Notes:
1. Non-repetitive current pulse , per Fig. 4 and derated above T_J (initial) =25°C per Fig. 3.
2. Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.

Functional Diagram



Descriptions

The 20KPA Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features & Benefits

- 20kW peak pulse capability at 10/1000µs waveform, repetition rate (duty cycles):0.01%
- Glass passivated chip junction in P600 package
- Fast response time: typically less than 1.0ps from 0 Volts to BV min
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c pass Class 1 and 2
- IEC-61000-4-2 ESD 30kV(Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Low dynamic resistance
- Typical I_R less than 2µA when V_{BR} min>49V
- V_{BR} @ T_J= V_{BR}@25°C x (1+αT x (T_J - 25))(αT:Temperature Coefficient, typical value is 0.1%)
- UL Recognized compound meeting flammability rating V-0
- Halogen free and RoHSb compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)
- Recognized to UL 497B as an Isolated Loop Circuit Protector

Applications

TVS componants are ideal for the protection of I/O interfaces, V_{CC} bus and other vulnerable circuits used in telecom, computer, industrial and consumer electronic applications.

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

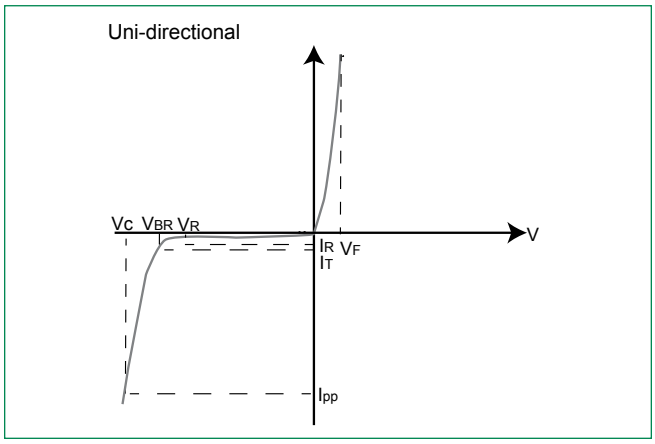
Part Number (Uni)	Part Number (Bi)	Reverse Stand off Voltage V_R (Volts)	Breakdown Voltage V_{BR} (Volts) @ I_T		Test Current I_T (mA)	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage I_R @ V_R (μ A)	Maximum Clamping Voltage V_C @ I_{PP} (V)	Agency Recognition
			Min.	Max.					
20KPA20A	20KPA20CA	20	22.34	24.57	50	548.9	5000	36.8	X
20KPA24A	20KPA24CA	24	26.81	29.49	50	490.3	5000	41.2	X
20KPA26A	20KPA26CA	26	29.04	31.94	50	451.9	2000	44.7	X
20KPA28A	20KPA28CA	28	31.28	34.41	50	420.8	1000	48.0	X
20KPA30A	20KPA30CA	30	33.51	36.86	5	392.2	250	51.5	X
20KPA32A	20KPA32CA	32	35.74	39.31	5	372.0	150	54.3	X
20KPA34A	20KPA34CA	34	38.00	41.80	5	351.3	50	57.5	X
20KPA36A	20KPA36CA	36	40.20	44.22	5	328.5	20	61.5	X
20KPA40A	20KPA40CA	40	44.70	49.17	5	297.9	15	67.8	X
20KPA44A	20KPA44CA	44	49.10	54.01	5	277.9	2	72.7	X
20KPA48A	20KPA48CA	48	53.60	58.96	5	254.4	2	79.4	X
20KPA52A	20KPA52CA	52	58.10	63.91	5	235.4	2	85.8	X
20KPA56A	20KPA56CA	56	62.60	68.86	5	218.1	2	92.6	X
20KPA60A	20KPA60CA	60	67.00	73.70	5	207.0	2	97.6	X
20KPA64A	20KPA64CA	64	71.50	78.65	5	194.2	2	104.0	X
20KPA68A	20KPA68CA	68	76.00	83.60	5	183.6	2	110.0	X
20KPA72A	20KPA72CA	72	80.40	88.44	5	174.1	2	116.0	X
20KPA80A	20KPA80CA	80	89.40	98.34	5	155.4	2	130.0	X
20KPA88A	20KPA88CA	88	98.30	108.13	5	142.3	2	142.0	X
20KPA96A	20KPA96CA	96	107.20	117.92	5	130.3	2	155.0	X
20KPA104A	20KPA104CA	104	116.20	127.82	5	120.2	2	168.0	X
20KPA112A	20KPA112CA	112	125.10	137.61	5	111.0	2	182.0	X
20KPA120A	20KPA120CA	120	134.00	147.40	5	104.1	2	194.0	X
20KPA132A	20KPA132CA	132	147.40	162.14	5	94.8	2	213.0	X
20KPA144A	20KPA144CA	144	160.80	176.88	5	87.1	2	232.0	X
20KPA160A	20KPA160CA	160	178.70	196.57	5	78.3	2	258.0	X
20KPA172A	20KPA172CA	172	192.10	211.31	5	72.9	2	277.0	X
20KPA180A	20KPA180CA	180	201.10	221.21	5	69.4	2	291.0	X
20KPA192A	20KPA192CA	192	214.50	235.95	5	65.4	2	309.0	X
20KPA204A	20KPA204CA	204	227.90	250.69	5	61.4	2	329.0	X
20KPA216A	20KPA216CA	216	241.30	265.43	5	58.0	2	348.0	X
20KPA232A	20KPA232CA	232	259.10	285.01	5	54.0	2	374.0	X
20KPA240A	20KPA240CA	240	268.10	294.91	5	52.2	2	387.0	X
20KPA256A	20KPA256CA	256	286.00	314.60	5	49.0	2	412.0	X
20KPA280A	20KPA280CA	280	312.80	344.08	5	44.8	2	451.0	X
20KPA300A	20KPA300CA	300	335.10	368.61	5	41.8	2	483.0	X

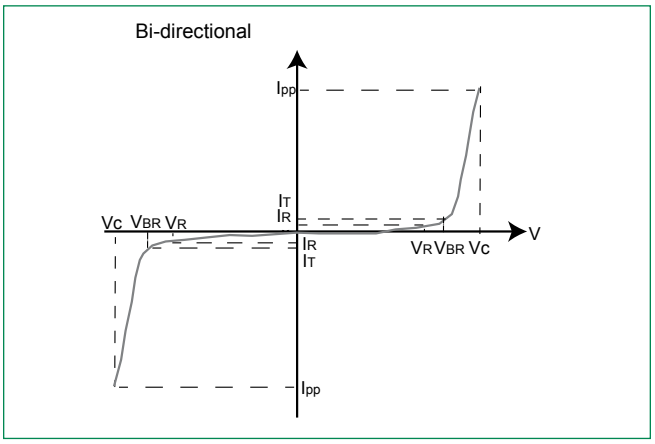
For bidirectional type having V_{RWM} of 40 volts and less, the I_D limit is double.
For parts without A , the V_{BR} is ± 10% and V_C is 5% higher than with A parts, the parts without A are currently available, but not recommended for new designs. The parts with A are preferred.

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20KPA Series
Axial Leaded – 20000W

I-V Curve Characteristics





I_{PP} x V_C P_{PPM} Peak Pulse Power Dissipation -- Max power dissipation
V_R Stand-off Voltage -- Maximum voltage that can be applied to the TVS without operation
V_{BR} Breakdown Voltage -- Maximum voltage that flows though the TVS at a specified test current (I_T)
V_C Clamping Voltage -- Peak voltage measured across the TVS at a specified Ippm (peak impulse current)
I_R Reverse Leakage Current -- Current measured at V_R
V_F Forward Voltage Drop for Uni-directional

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

Figure 1 - TVS Transients Clamping Waveform

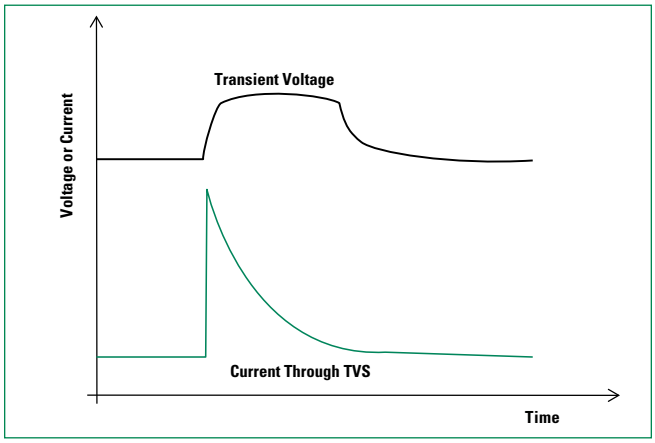
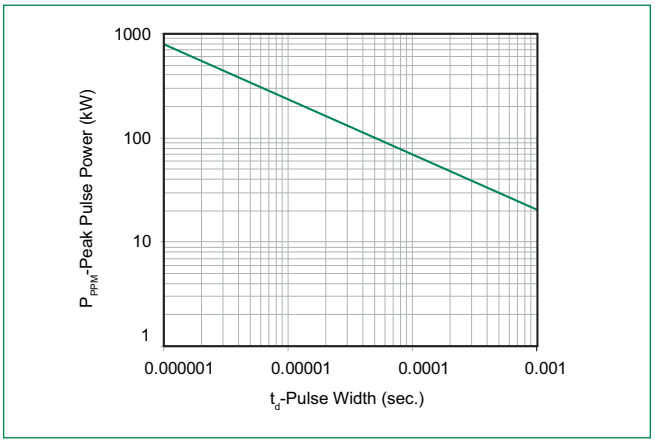


Figure 2 - Typical Peak Pulse Power Rating Curve



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20KPA Series
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Ratings and Characteristic Curves (T_A=25°C unless otherwise noted) (Continued)

Figure 3 - Typical Peak Pulse Power Derating Curve

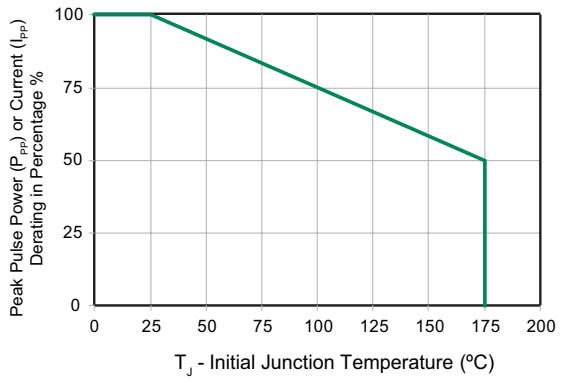


Figure 4 - Pulse Waveform

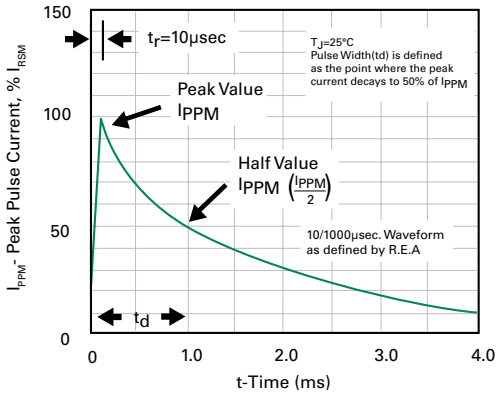


Figure 5 - Typical Junction Capacitance

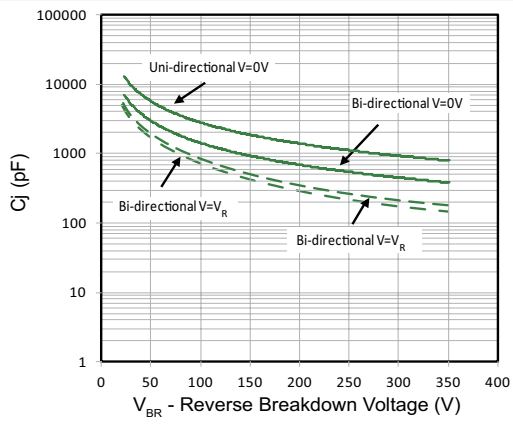


Figure 6 - Typical Transient Thermal Impedance

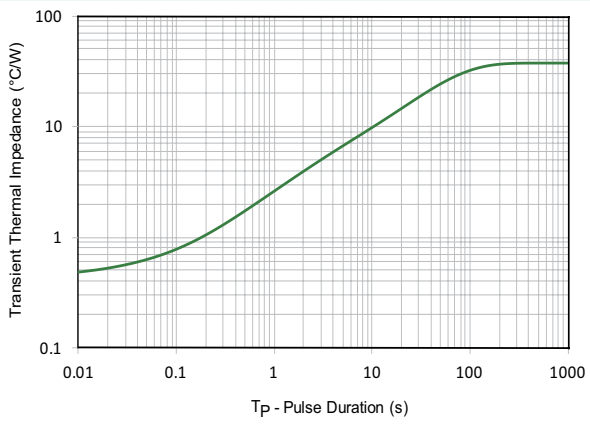


Figure 7 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only

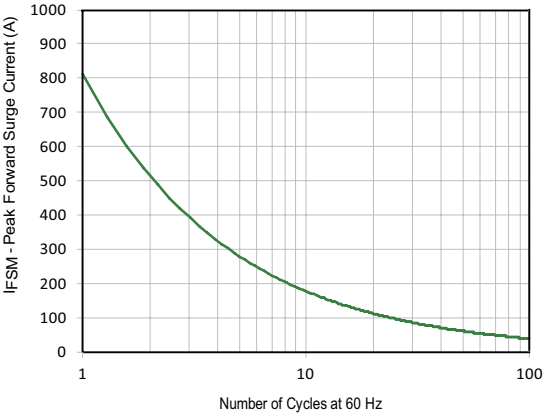
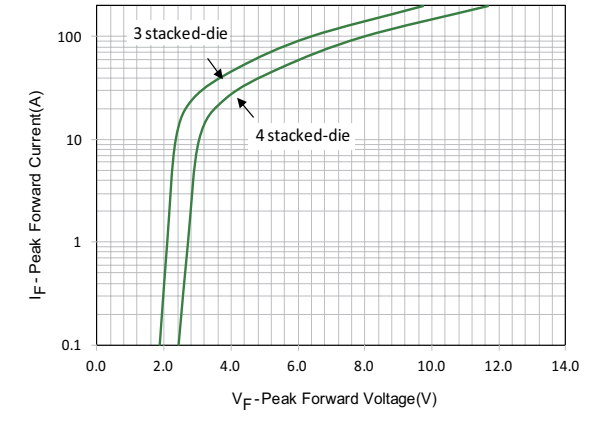


Figure 8 - Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)

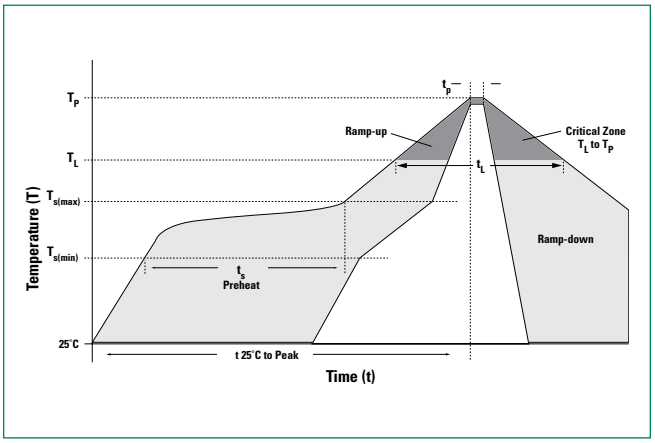


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Soldering Parameter

Reflow Condition		Lead–free assembly
Pre Heat	**- Temperature Min ($T_{s(min)}$)**	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 –120 secs
Average ramp up rate (Liquidus Temp (T_A) to peak		3°C/second max
$T_{S(max)}$ to T_A - Ramp-up Rate		3°C/second max
Reflow	**- Temperature (T_A) (Liquidus)**	217°C
	- Time (min to max) (t_s)	60 – 150 seconds
Peak Temperature (T_P)		$260^{+0/-5}$ °C
Time within 5°C of actual peak Temperature (t_p)		30 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		260°C



Physical Specifications

Weight	0.07oz., 2.5g
Case	P600 molded plastic body over passivated junction.
Polarity	Color band denotes the cathode except Bipolar.
Terminal	Matte Tin axial leads, solderable per JESD22-B102.

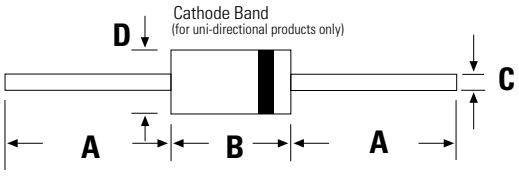
Flow/Wave Soldering (Solder Dipping)

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

Environmental Specifications

High Temp Voltage Blocking (HTRB)	100% DC reverse voltage rated 150oC, 1008 hours JEDEC, JESD22-A-108
Biased Temp & Humidity (H3TRB)	80% breakdown voltage (+85oC) 85% RH, 1008 hours JEDEC, JESD22-A-101
Unbiased Highly Accelerted Stress Test (UHAST)	96 hours at TA = 130 oC/85% RH. JEDEC, JESD22-A-118
Temp Cycling (TC)	-55oC to +150oC, 15 min. dwell, 1000 cycles. JEDEC, JESD22-A-104
Resistance to Solder Heat (RSH)	+260oC, 30 seconds JEDEC, JEDEC JESD22-B-106

Dimensions



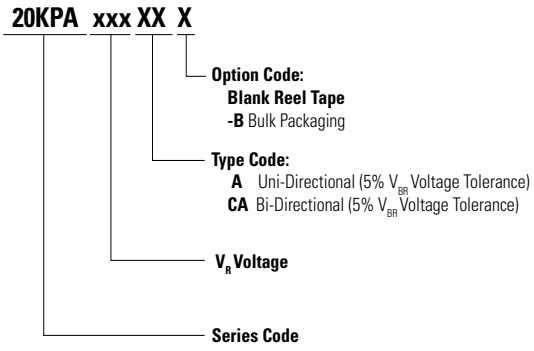
P600

Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.340	0.360	8.60	9.10
C	0.048	0.054	1.22	1.36
D	0.340	0.360	8.60	9.10

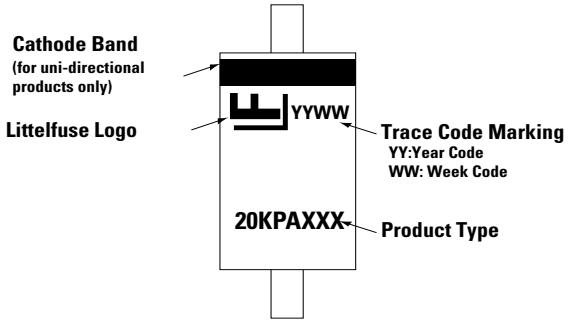
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Part Numbering System



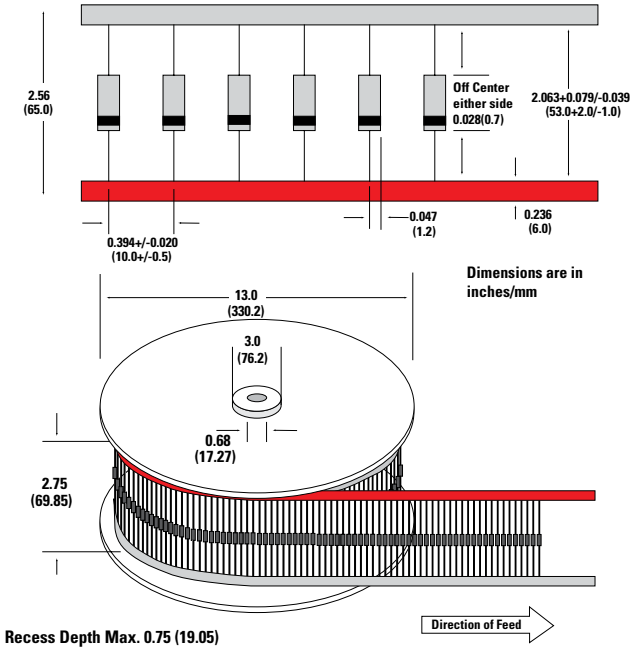
Part Marking System



Packing Options

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
20KPAxxxXX	P600	800	Tape & Reel	EIA STD RS-296
20KPAxxxXX-B	P600	100	Bulk	Littelfuse Spec.

Tape and Reel Specification



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