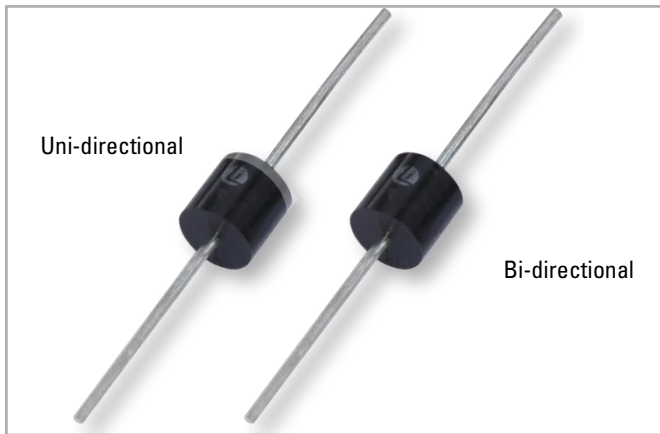


20KP Series

Axial Leaded – 20000W



Additional Information



Resources



Accessories



Samples

Maximum Ratings and Thermal Characteristics

($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10/1000 μs Waveform(Fig.1) (Note 1)-Single Die Parts	P_{PPM}	20000	W
Power Dissipation on Infinite Heat Sink at $T_L=75^{\circ}\text{C}$	P_D	8	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 2)	I_{FSM}	400	A
Operating Temperature Range	T_J	-55 to 150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 to 150	$^{\circ}\text{C}$
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	8	$^{\circ}\text{C}/\text{W}$
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	40	$^{\circ}\text{C}/\text{W}$

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above T_J (initial) $=25^{\circ}\text{C}$ per Fig.2.
2. Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.

Description

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

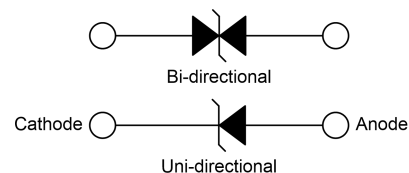
Features

- 20000W peak pulse power capability at 10/1000 μs 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 V_B min
- Excellent clamping capability
- Typical failure mode is a short circuit
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ESD protection of data lines in accordance with IEC 61000-4-2, 30kV(Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Low incremental surge resistance
- Typical I_R less than 2 μA when $V_R > 40\text{V}$
- High temperature to reflow soldering guaranteed: 260 $^{\circ}\text{C}/20\sim 40\text{sec.}/0.375''(9.5\text{mm})$ lead length, 5 lbs., (2.3kg) tension
- $V_B @ T_J = V_B @ 25^{\circ}\text{C} \times (1 + \alpha T \times (T_J - 25))$ (αT : Temperature Coefficient, typical value is 0.1%)
- Matte tin lead-free plated
- Halogen free and RoHS 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)

Applications

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

Functional Diagram



20KP Series

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Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Part Number		Reverse Stand-Off Voltage	Breakdown Voltage @ I_T		Test Current	Maximum Clamping Voltage @ I_{PP}	Peak Pulse Current	Reverse Leakage @ V_R
Uni.	Bi.	V_R (V)	$V_{B \text{ Min.}}$ (V)	$V_{B \text{ Max.}}$ (V)	I_T (mA)	V_C (V)	I_{PP} (A)	I_R (μA)
20KP17A	20KP17CA	17.0	18.99	21.22	50	31.0	645.1	5000
20KP20A	20KP20CA	20.0	22.34	24.94	50	36.8	548.9	5000
20KP24A	20KP24CA	24.0	26.81	29.93	50	41.2	490.3	5000
20KP26A	20KP26CA	26.0	29.04	32.42	50	44.7	451.9	2000
20KP28A	20KP28CA	28.0	31.28	34.92	50	48.0	420.8	1000
20KP30A	20KP30CA	30.0	33.51	37.41	5	51.5	392.2	250
20KP32A	20KP32CA	32.0	35.74	39.90	5	54.3	372.0	150
20KP34A	20KP34CA	34.0	38.00	42.42	5	57.5	351.3	50
20KP36A	20KP36CA	36.0	40.20	44.88	5	61.5	328.5	20
20KP40A	20KP40CA	40.0	44.70	49.90	5	67.8	297.9	15
20KP44A	20KP44CA	44.0	49.10	54.81	5	72.7	277.9	2
20KP48A	20KP48CA	48.0	53.60	59.83	5	79.4	254.4	2
20KP52A	20KP52CA	52.0	58.10	64.86	5	85.8	235.4	2
20KP56A	20KP56CA	56.0	62.60	69.88	5	92.6	218.1	2
20KP60A	20KP60CA	60.0	67.00	74.79	5	97.6	207.0	2
20KP64A	20KP64CA	64.0	71.50	79.82	5	104.0	194.2	2
20KP68A	20KP68CA	68.0	76.00	84.84	5	110.0	183.6	2
20KP72A	20KP72CA	72.0	80.40	89.75	5	116.0	174.1	2
20KP80A	20KP80CA	80.0	89.40	99.80	5	130.0	155.4	2
20KP88A	20KP88CA	88.0	98.30	109.73	5	142.0	142.3	2
20KP96A	20KP96CA	96.0	107.20	119.70	5	155.0	130.3	2
20KP104A	20KP104CA	104.0	116.20	129.72	5	168.0	120.2	2
20KP112A	20KP112CA	112.0	125.10	139.70	5	182.0	111.0	2
20KP120A	20KP120CA	120.0	134.00	149.60	5	194.0	104.1	2
20KP132A	20KP132CA	132.0	147.40	164.54	5	213.0	94.8	2
20KP144A	20KP144CA	144.0	160.80	179.50	5	232.0	87.1	2
20KP160A	20KP160CA	160.0	178.70	199.50	5	258.0	78.3	2
20KP172A	20KP172CA	172.0	192.10	214.44	5	277.0	72.9	2
20KP180A	20KP180CA	180.0	201.10	224.50	5	291.0	69.4	2
20KP192A	20KP192CA	192.0	214.50	239.50	5	309.0	65.4	2
20KP204A	20KP204CA	204.0	227.90	254.41	5	329.0	61.4	2
20KP216A	20KP216CA	216.0	241.30	269.40	5	348.0	58.0	2
20KP232A	20KP232CA	232.0	259.10	289.24	5	374.0	54.0	2
20KP240A	20KP240CA	240.0	268.10	299.30	5	387.0	52.2	2
20KP256A	20KP256CA	256.0	286.00	319.30	5	412.0	49.0	2
20KP280A	20KP280CA	280.0	312.80	349.20	5	451.0	44.8	2
20KP300A	20KP300CA	300.0	335.10	374.10	5	483.0	41.8	2

Notes:

For bidirectional type having V_R of 40 volts and less, the I_R limit is double.

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

Figure 1:
Peak Pulse Power Rating Curve

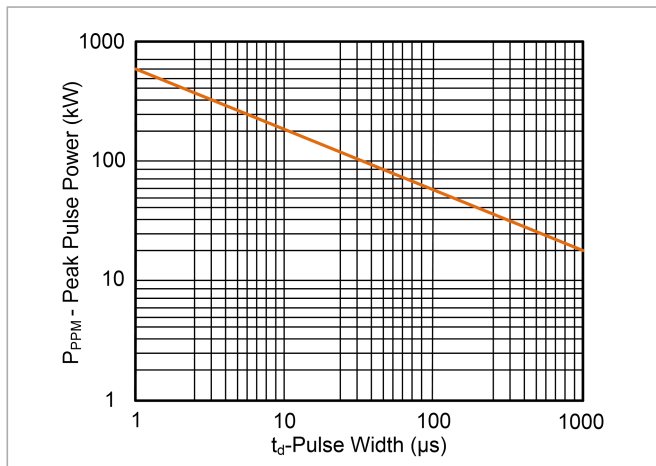


Figure 2:
Pulse Derating Curve

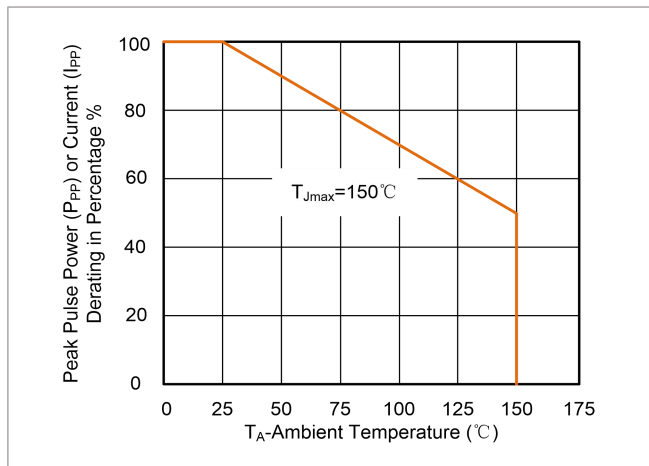


Figure 3:
Pulse Waveform

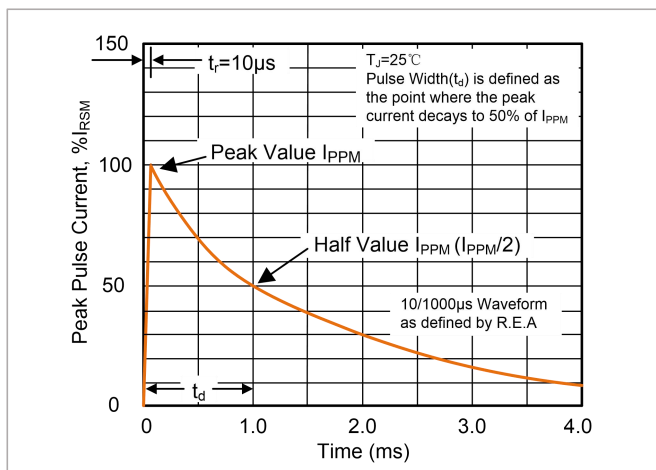


Figure 4:
Typical Junction Capacitance

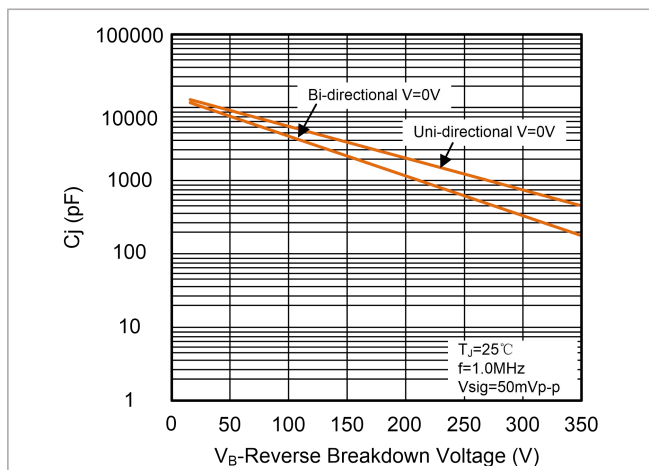


Figure 5:
Steady State Power Dissipation Derating Curve

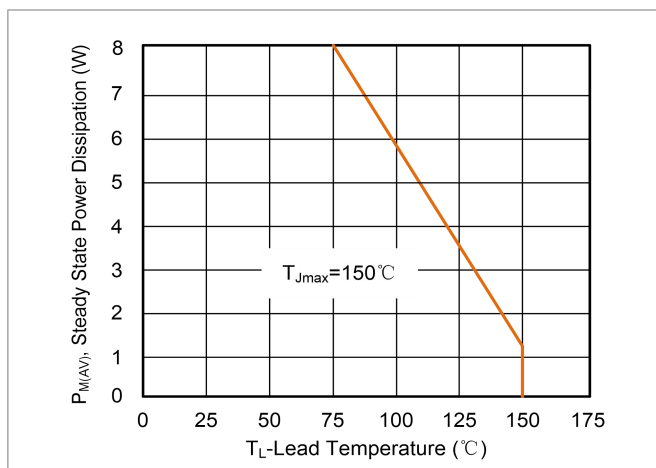
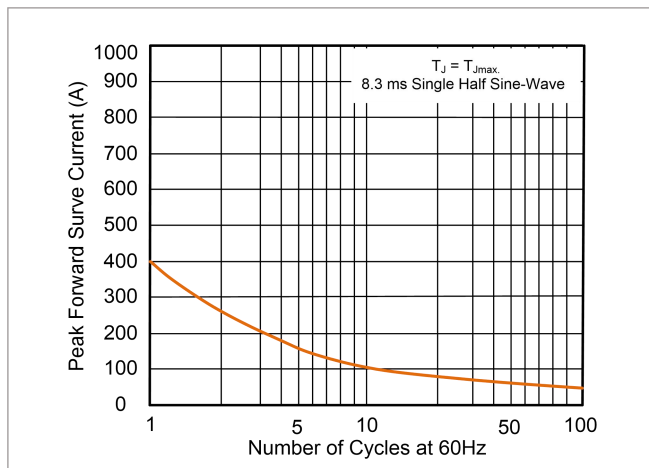


Figure 6:
Maximum Non-Repetitive Forward Surge Current Uni-Directional

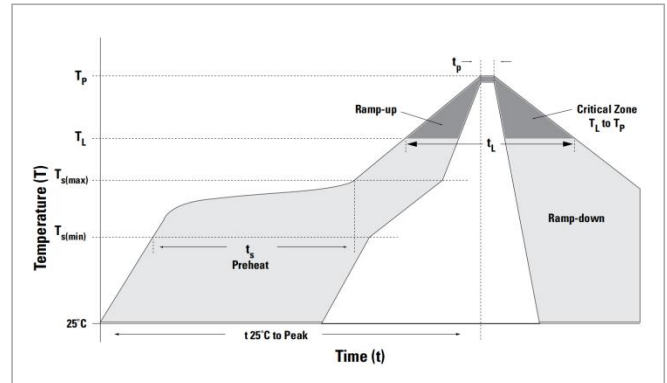


20KP Series

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Soldering Parameters

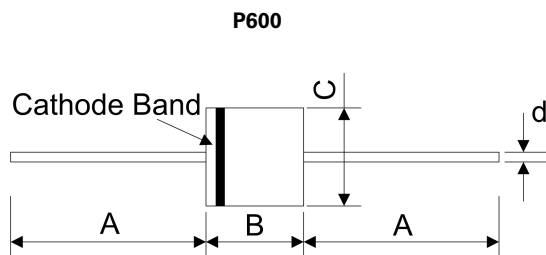
Reflow Condition		Lead-free assembly
Pre Heat	-Temperature Min ($T_{S\ min}$)	150°C
	-Temperature Max ($T_{S\ max}$)	200°C
	-Time (min to max) (t_s)	60 – 180 secs
Average ramp-up rate(Liquidus Temp (T_L) to peak)		3°C/second max.
$T_{S\ (max)}$ to T_L-Ramp-up Rate		3°C/second max.
Reflow	-Temperature (T_L) (Liquidus)	217°C
	-Time (min to max) (t_L)	60-150 seconds
Peak Temperature (T_P)		260°C
Time within 5°C of actual Peak Temperature (t_p)		20-40 seconds
Ramp-down Rate		6°C/second max.
Time 25°C to Peak Temperature		8 minutes max.
Do not exceed		260°C



Flow/Wave Soldering (Solder Dipping)

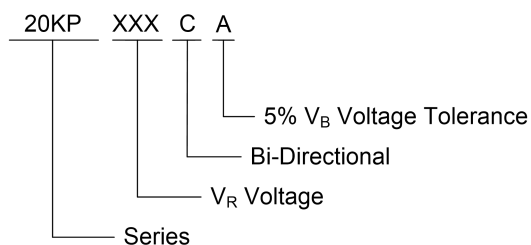
Peak Temperature :	265°C
Dipping Time :	10 seconds (max.)
Soldering :	1 time

Dimensions

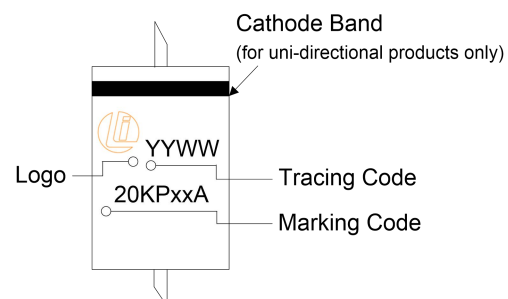


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	25.40	-	1.000	-
B	8.60	9.10	0.340	0.360
C	8.60	9.10	0.340	0.360
d	1.19	1.35	0.047	0.053

Part Numbering System



Part Marking System



20KP Series

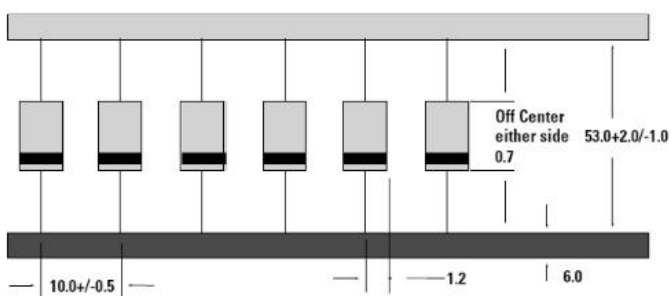
Axial Leaded – 20000W

Packaging

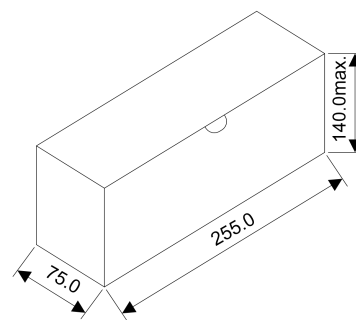
Part number	Component Package	Quantity	Packaging Option	Packaging Specification
20KPxxxXX/L/BOX	P600	300	Tape & Box	EIA STD RS-296
20KPxxxXX/L/TR13	P600	800	Tape & Reel	EIA STD RS-296

Tape/Box/Reel Specification

Tape (Unit: mm)

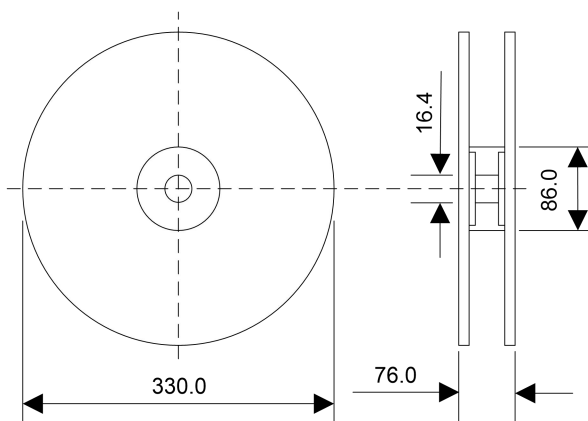


Box (Unit: mm)



Quantity: 300pcs/box

Reel (Unit: mm)



Quantity: 800pcs/reel

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