



20KP Series 20000W Transient Voltage Suppressor

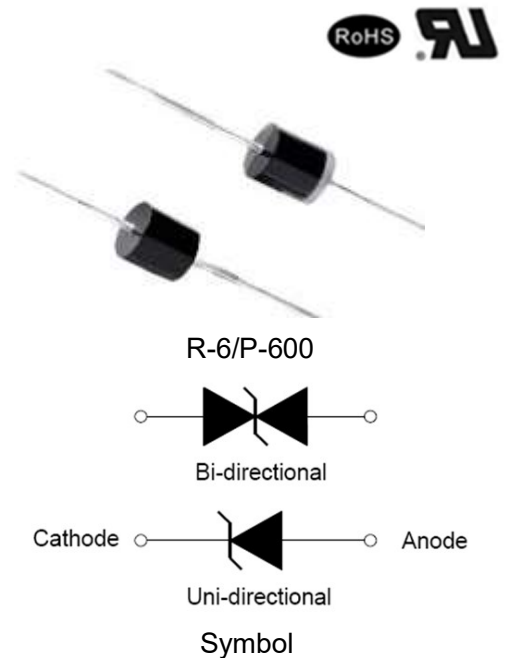
Rev.2.6

DESCRIPTION:

The 20KP series of high current uni/bi-directional transient suppressors are designed for A.C. line protection and high power DC bus clamping applications. These devices offer uni/bi-directional port protection from 26 volts to 300 volts. They provide a clamping voltage lower than the avalanche voltage. Therefore, any voltage rise due to increased current conduction is contained to a minimum, providing the best possible protection level. They can also be connected in series and/or parallel to create very high capacity protection solutions.

FEATURES:

- ✧ Low incremental surge resistance.
- ✧ Excellent clamping capability.
- ✧ Typical I_R less than $2\mu A$ above 40V.
- ✧ Color band denoted cathode except bidirectional.
- ✧ High temperature soldering: $265^\circ C/10s$ at terminals.
- ✧ Plastic package has under writers laboratory flammability 94V-0.
- ✧ 20000W peak pulse power capability at 10/1000 μs waveform.
- ✧ Meets MSL level 1, per J-STD-020, LF maximum peak of $260^\circ C$.
- ✧ Terminal: solder plated, solderable per J-STD-002.
- ✧ Fast response time: typically less than 1.0ps from 0V to V_{BR} min.
- ✧ UL 497B item recognized. (File No.:E480698).
- ✧ IEC61000-4-2 (ESD) $\pm 30kV$ (air), $\pm 30kV$ (contact).



ABSOLUTE MAXIMUM RATINGS($T_A=25^\circ C$, RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak pulse power dissipation at 10/1000 μs waveform	P_{PP}	20000	W
Steady state power dissipation at $T_L=75^\circ C$	$P_{M(AV)}$	8.0	W
Operating junction and storage temperature range	T_J, T_{STG}	-55 to +175	$^\circ C$
Peak forward surge current, 8.3ms single half sine-wave for unidirectional only	I_{FSM}	400	A

ABSOLUTE MAXIMUM RATINGS($T_A=25^{\circ}\text{C}$, RH=45%-75%, unless otherwise noted, continued)

Parameter	Symbol	Value	Unit
Typical thermal resistance junction to lead	$R_{\theta JL}$	8.0	$^{\circ}\text{C}/\text{W}$
Typical thermal resistance junction to ambient	$R_{\theta JA}$	40	$^{\circ}\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS($T_A=25^{\circ}\text{C}$)

Part Number		V_R	$I_R@V_R$	$V_{BR}@I_T$		I_T	$V_C@I_{PP}$	I_{PP}°
Uni-Polar	Bi-Polar	V	max(μA)	min(V)	max(V)	mA	max(V)	A
20KP26A	20KP26CA	26.0	2000	29.04	32.42	50	44.7	451.9
20KP28A	20KP28CA	28.0	1000	31.28	34.92	50	48.0	420.8
20KP30A	20KP30CA	30.0	250	33.51	37.41	5	51.5	392.2
20KP33A	20KP33CA	33.0	50	36.70	41.42	5	53.3	375.2
20KP36A	20KP36CA	36.0	20	40.20	44.88	5	61.5	328.5
20KP40A	20KP40CA	40.0	15	44.70	49.90	5	67.8	297.9
20KP44A	20KP44CA	44.0	2	49.10	54.81	5	72.7	277.9
20KP48A	20KP48CA	48.0	2	53.60	59.83	5	79.4	254.4
20KP52A	20KP52CA	52.0	2	58.10	64.86	5	85.8	235.4
20KP56A	20KP56CA	56.0	2	62.60	69.88	5	92.6	218.1
20KP60A	20KP60CA	60.0	2	67.00	74.79	5	97.6	207.0
20KP64A	20KP64CA	64.0	2	71.50	79.82	5	104.0	194.2
20KP68A	20KP68CA	68.0	2	76.00	84.84	5	110.0	183.6
20KP72A	20KP72CA	72.0	2	80.40	89.75	5	116.0	174.1
20KP80A	20KP80CA	80.0	2	89.40	99.80	5	130.0	155.4
20KP88A	20KP88CA	88.0	2	98.30	109.73	5	142.0	142.3
20KP96A	20KP96CA	96.0	2	107.20	119.67	5	155.0	130.3
20KP104A	20KP104CA	104.0	2	116.20	129.72	5	168.0	120.2
20KP112A	20KP112CA	112.0	2	125.10	139.65	5	182.0	111.0
20KP120A	20KP120CA	120.0	2	134.00	149.59	5	194.0	104.1
20KP132A	20KP132CA	132.0	2	147.40	164.54	5	213.0	94.8
20KP144A	20KP144CA	144.0	2	160.80	179.50	5	232.0	87.1
20KP160A	20KP160CA	160.0	2	178.70	199.49	5	258.0	78.3
20KP172A	20KP172CA	172.0	2	192.10	214.44	5	277.0	72.9

ELECTRICAL CHARACTERISTICS($T_A=25^{\circ}\text{C}$, continued)

Part Number		V_R	$I_R@V_R$	$V_{BR}@I_T$		I_T	$V_C@I_{PP}$	I_{PP}°
Uni-Polar	Bi-Polar	V	max(μA)	min(V)	max(V)	mA	max(V)	A
20KP180A	20KP180CA	180.0	2	201.10	224.49	5	291.0	69.4
20KP192A	20KP192CA	192.0	2	214.50	239.45	5	309.0	65.4
20KP204A	20KP204CA	204.0	2	227.90	254.41	5	329.0	61.4
20KP216A	20KP216CA	216.0	2	241.30	269.37	5	348.0	58.0
20KP232A	20KP232CA	232.0	2	259.10	289.24	5	374.0	54.0
20KP240A	20KP240CA	240.0	2	268.10	299.28	5	387.0	52.2
20KP256A	20KP256CA	256.0	2	286.00	319.27	5	412.0	49.0
20KP280A	20KP280CA	280.0	2	312.80	349.18	5	451.0	44.8
20KP300A	20KP300CA	300.0	2	335.10	374.08	5	483.0	41.8

① Surge waveform: 10/1000 μs

V_R : Stand-off voltage -- Maximum voltage that can be applied

V_{BR} : Breakdown voltage

V_C : Clamping voltage -- Peak voltage measured across the suppressor at a specified I_{PP}

I_R : Reverse leakage current

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

FIG.1:V- I curve characteristics (Uni-directional)

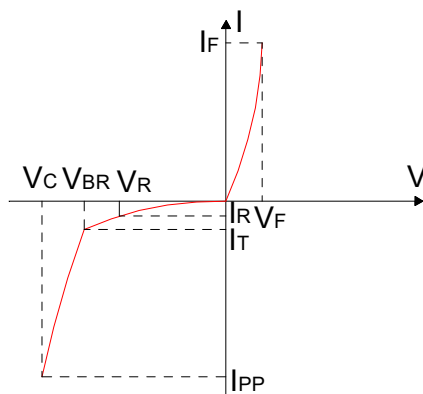


FIG.2:V- I curve characteristics (Bi-directional)

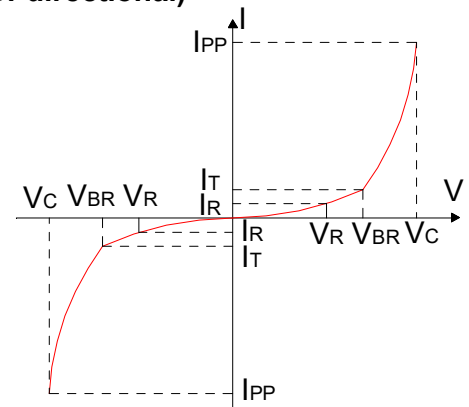


FIG.3: Pulse waveform

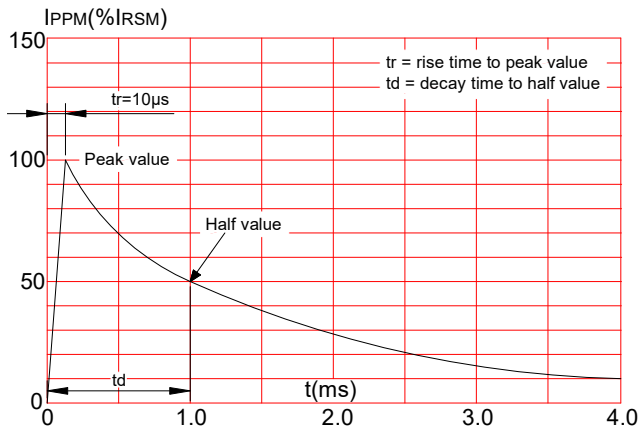
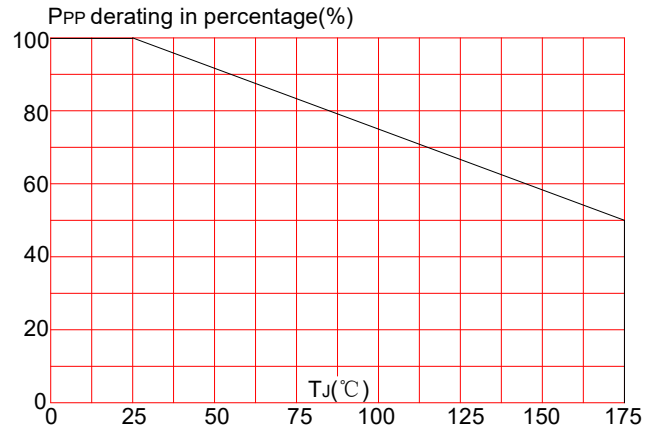
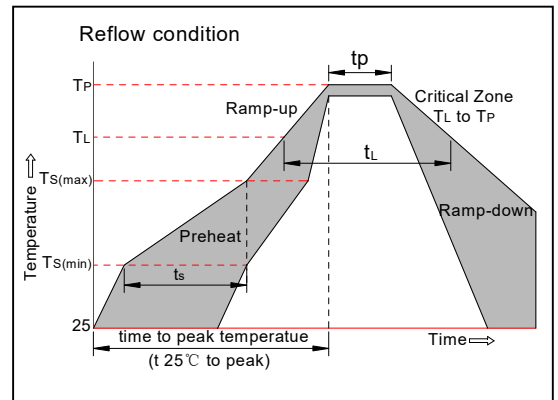


FIG.4: Pulse derating curve



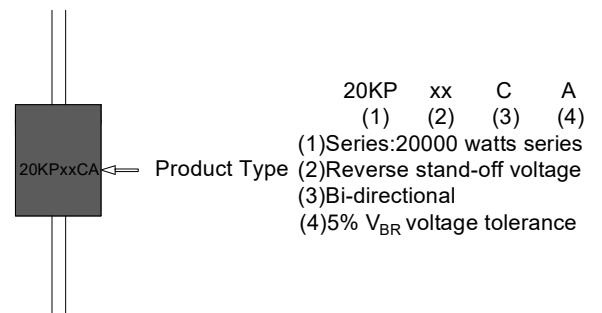
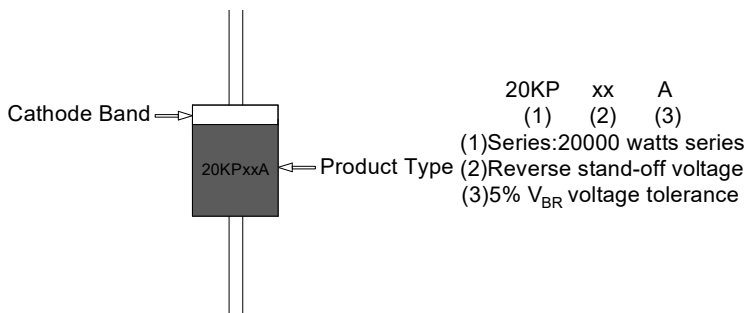
SOLDERING PARAMETERS

Reflow Condition		Pb-Free assembly (see figure at right)
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/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature(T_L)(Liquidus)	+217°C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_p)		20-40secs.
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_p)		8 min. Max
Do not exceed		+260°C

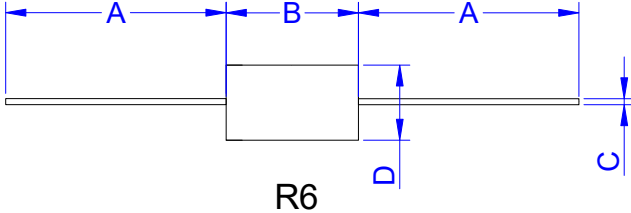


Flow/Wave Soldering(Solder Dipping)	
Peak temperature	265°C
Dipping time	10 sec.
Soldering	1 time

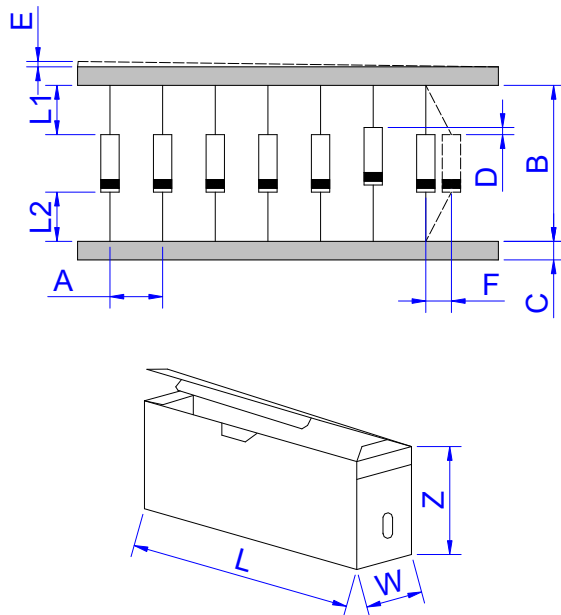
MARKING & ORDERING INFORMATION



PACKAGE MECHANICAL DATA

 <p>R6</p>	Dimensions				
	Ref.	Millimeters		Inches	
		Min.	Max.	Min.	Max.
	A	25.40	-	1.000	-
B	8.60	9.40	0.339	0.370	
C	1.20	1.40	0.047	0.055	
D	8.60	9.10	0.339	0.358	

TAPE AND BOX SPECIFICATION-R-6/P-600



Ref.	Dimensions	
	Millimeters	Inches
A	10.0±0.5	0.394±0.020
B	53.0±1.5	2.087±0.059
C	6.0±0.5	0.236±0.020
D	1.2(MAX)	0.047(MAX)
E	0.8(MAX)	0.031(MAX)
F	1.5(MAX)	0.059(MAX)
L1-L2	1.0(MAX)	0.039(MAX)
W	80±5.0	3.150±0.197
L	250±5.0	9.843±0.197
Z	115±5.0	4.528±0.197

PART No.	UNIT WEIGHT (g/PCS) typ.	PER BOX (PCS)	PER CARTON (PCS)	DESCRIPTION
20KPxxA/CA	3.58	300	3,000	Box


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