



### 3KP Series

#### Description

The 3KP 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 5.0 volts to 250 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

- Excellent clamping capability.
- Repetition rate (duty cycle): 0.01%.
- Color band denoted cathode except bidirectional.
- 3000W Peak Pulse power capability at 10×1000μs waveform.
- Fast response time: typically less than 1.0ps from 0V to V<sub>BR</sub> min.
- High temperature soldering: 260°C/10s at terminals.

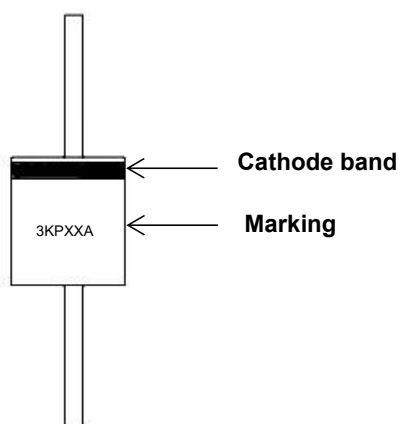
Package:P600

- Case Material: "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Polarity: Color band denotes cathode except bi-directional models
- Terminal Connections: See Diagram Below
- Marking Information: See Below

#### Applications

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

#### Marking Information





## Electrical characteristics ( $T_A=25^{\circ}\text{C}$ )

Part Number		Marking		$V_R$	$I_R@V_R$	$V_{BR}@I_T$		$I_T$	$V_C@I_{PP}$	$I_{PP}^{\textcircled{1}}$
Uni-Polar	Bi-Polar	Uni	Bi	V	$\mu\text{A}$	min(V)	max(V)	mA	max(V)	A
3KP5.0A	3KP5.0CA	3KP5.0A	3KP5.0CA	5.0	500	6.40	7.00	10	9.2	<b>326.1</b>
3KP6.0A	3KP6.0CA	3KP6.0A	3KP6.0CA	6.0	300	6.67	7.37	10	10.3	<b>291.3</b>
3KP6.5A	3KP6.5CA	3KP6.5A	3KP6.5CA	6.5	250	7.22	7.98	10	11.2	<b>267.9</b>
3KP7.0A	3KP7.0CA	3KP7.0A	3KP7.0CA	7.0	200	7.78	8.60	10	12.0	<b>250.0</b>
3KP7.5A	3KP7.5CA	3KP7.5A	3KP7.5CA	7.5	150	8.33	9.21	1	12.9	<b>232.6</b>
3KP8.0A	3KP8.0CA	3KP8.0A	3KP8.0CA	8.0	100	8.89	9.83	1	13.6	<b>220.6</b>
3KP8.5A	3KP8.5CA	3KP8.5A	3KP8.5CA	8.5	50	9.44	10.40	1	14.4	<b>208.3</b>
3KP9.0A	3KP9.0CA	3KP9.0A	3KP9.0CA	9.0	20	10.00	11.10	1	15.4	<b>194.8</b>
3KP10A	3KP10CA	3KP10A	3KP10CA	10.0	5	11.10	12.30	1	17.0	<b>176.5</b>
3KP11A	3KP11CA	3KP11A	3KP11CA	11.0	5	12.20	13.50	1	18.2	<b>164.8</b>
3KP12A	3KP12CA	3KP12A	3KP12CA	12.0	2	13.30	14.70	1	19.9	<b>150.8</b>
3KP13A	3KP13CA	3KP13A	3KP13CA	13.0	2	14.40	15.90	1	21.5	<b>139.5</b>
3KP14A	3KP14CA	3KP14A	3KP14CA	14.0	1	15.60	17.20	1	23.2	<b>129.3</b>
3KP15A	3KP15CA	3KP15A	3KP15CA	15.0	1	16.70	18.50	1	24.4	<b>123</b>
3KP16A	3KP16CA	3KP16A	3KP16CA	16.0	1	17.80	19.70	1	26.0	<b>115</b>
3KP17A	3KP17CA	3KP17A	3KP17CA	17.0	1	18.90	20.90	1	27.6	<b>108.7</b>
3KP18A	3KP18CA	3KP18A	3KP18CA	18.0	1	20.00	22.10	1	29.2	<b>102.7</b>
3KP20A	3KP20CA	3KP20A	3KP20CA	20.0	1	22.20	24.50	1	32.4	<b>92.6</b>
3KP22A	3KP22CA	3KP22A	3KP22CA	22.0	1	24.40	26.90	1	35.5	<b>84.5</b>
3KP24A	3KP24CA	3KP24A	3KP24CA	24.0	1	26.70	29.50	1	38.9	<b>77.1</b>
3KP26A	3KP26CA	3KP26A	3KP26CA	26.0	1	28.90	31.90	1	42.1	<b>71.3</b>
3KP28A	3KP28CA	3KP28A	3KP28CA	28.0	1	31.10	34.40	1	45.4	<b>66.1</b>
3KP30A	3KP30CA	3KP30A	3KP30CA	30.0	1	33.30	36.80	1	48.4	<b>62.0</b>
3KP33A	3KP33CA	3KP33A	3KP33CA	33.0	1	36.70	40.60	1	53.3	<b>56.3</b>
3KP36A	3KP36CA	3KP36A	3KP36CA	36.0	1	40.00	44.20	1	58.1	<b>51.6</b>
3KP40A	3KP40CA	3KP40A	3KP40CA	40.0	1	44.40	49.10	1	64.5	<b>46.5</b>
3KP43A	3KP43CA	3KP43A	3KP43CA	43.0	1	47.80	52.80	1	69.4	<b>43.2</b>
3KP45A	3KP45CA	3KP45A	3KP45CA	45.0	1	50.00	55.30	1	72.7	<b>41.3</b>
3KP48A	3KP48CA	3KP48A	3KP48CA	48.0	1	53.30	58.90	1	77.4	<b>38.8</b>
3KP51A	3KP51CA	3KP51A	3KP51CA	51.0	1	56.70	62.70	1	82.4	<b>36.4</b>



## Electrical characteristics (T<sub>A</sub>=25°C)

Part Number		Marking		V <sub>R</sub>	I <sub>R@V<sub>R</sub></sub>	V <sub>BR@I<sub>T</sub></sub>		I <sub>T</sub>	V <sub>C@I<sub>PP</sub></sub>	I <sub>PP</sub> <sup>①</sup>
Uni-Polar	Bi-Polar	Uni	Bi	V	μA	min(V)	max(V)	mA	max(V)	A
3KP54A	3KP54CA	3KP54A	3KP54CA	54.0	1	60.00	66.30	1	87.1	<b>34.4</b>
3KP58A	3KP58CA	3KP58A	3KP58CA	58.0	1	64.40	71.20	1	93.6	<b>32.1</b>
3KP60A	3KP60CA	3KP60A	3KP60CA	60.0	1	66.70	73.70	1	96.8	<b>31.0</b>
3KP64A	3KP64CA	3KP64A	3KP64CA	64.0	1	71.10	78.60	1	103.0	<b>29.1</b>
3KP70A	3KP70CA	3KP70A	3KP70CA	70.0	1	77.80	86.00	1	113.0	<b>26.5</b>
3KP75A	3KP75CA	3KP75A	3KP75CA	75.0	1	83.30	92.10	1	121.0	<b>24.8</b>
3KP78A	3KP78CA	3KP78A	3KP78CA	78.0	1	86.70	95.80	1	126.0	<b>23.8</b>
3KP85A	3KP85CA	3KP85A	3KP85CA	85.0	1	94.40	104.0	1	137.0	<b>21.9</b>
3KP90A	3KP90CA	3KP90A	3KP90CA	90.0	1	100.0	111.0	1	146.0	<b>20.5</b>
3KP100A	3KP100CA	3KP100A	3KP100CA	100.0	1	100.0	111.0	1	162.0	<b>18.5</b>
3KP110A	3KP110CA	3KP110A	3KP110CA	110.0	1	111.0	123.0	1	177.0	<b>16.9</b>
3KP120A	3KP120CA	3KP120A	3KP120CA	120.0	1	122.0	135.0	1	193.0	<b>15.5</b>
3KP130A	3KP130CA	3KP130A	3KP130CA	130.0	1	133.0	147.0	1	209.0	<b>14.4</b>
3KP150A	3KP150CA	3KP150A	3KP150CA	150.0	1	144.0	159.0	1	243.0	<b>12.3</b>
3KP160A	3KP160CA	3KP160A	3KP160CA	160.0	1	167.0	185.0	1	259.0	<b>11.6</b>
3KP170A	3KP170CA	3KP170A	3KP170CA	170.0	1	178.0	197.0	1	275.0	<b>10.9</b>
3KP180A	3KP180CA	3KP180A	3KP180CA	180.0	1	189.0	209.0	1	292.0	<b>10.3</b>
3KP190A	3KP190CA	3KP190A	3KP190CA	190.0	1	211.0	233.0	1	310.0	<b>9.7</b>
3KP200A	3KP200CA	3KP200A	3KP200CA	200.0	1	224.0	247.0	1	329.2	<b>9.3</b>
3KP210A	3KP210CA	3KP210A	3KP210CA	210.0	1	237.0	263.0	1	349.5	<b>8.8</b>
3KP220A	3KP220CA	3KP220A	3KP220CA	220.0	1	246.0	272.0	1	371.1	<b>8.4</b>
3KP250A	3KP250CA	3KP250A	3KP250CA	250.0	1	277.0	306.0	1	425.0	<b>7.1</b>

① Surge waveform: 10/1000μs

V<sub>R</sub> : Stand-off Voltage -- Maximum voltage that can be applied

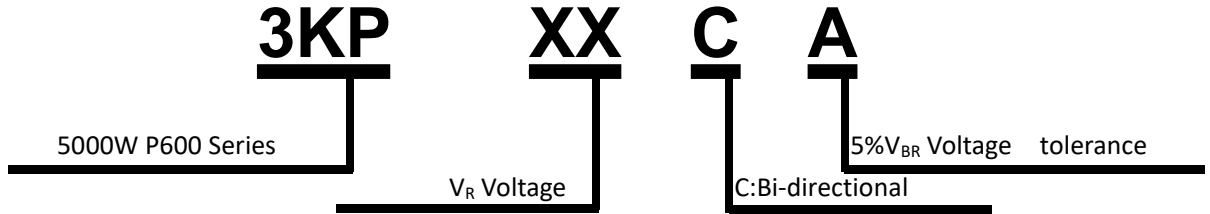
V<sub>BR</sub>: Breakdown Voltage

V<sub>C</sub>: Clamping Voltage -- Peak voltage measured across the suppressor at a specified I<sub>pp</sub>

I<sub>R</sub>: Reverse Leakage Current



Part number code



Absolute maximum ratings ( $T_A=25^\circ\text{C}$ ,  $\text{RH}=45\%-75\%$ , unless otherwise noted)

Parameter	Symbol	Value	Unit
Storage temperature range	$T_{\text{stg}}$	-55 to +150	$^\circ\text{C}$
Operating junction temperature range	$T_j$	-55 to +150	$^\circ\text{C}$
Steady state power dissipation at $T_L=75^\circ\text{C}$	$P_{M(AV)}$	8.0	W
Peak pulse power dissipation on 10/1000 $\mu\text{s}$ waveform	$P_{PP}$	3000	W
Peak forward surge current, 8.3ms single half sine-wave	$I_{FSM}$	250	A

Ratings and V-I characteristics curves ( $T_A=25^\circ\text{C}$ , unless otherwise noted)

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

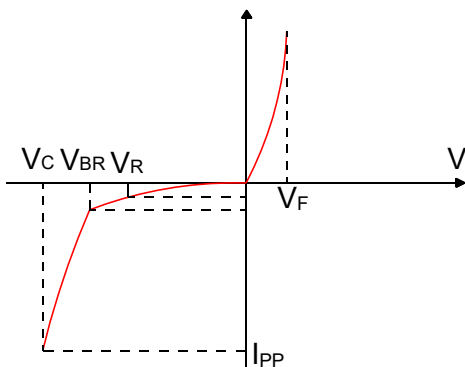
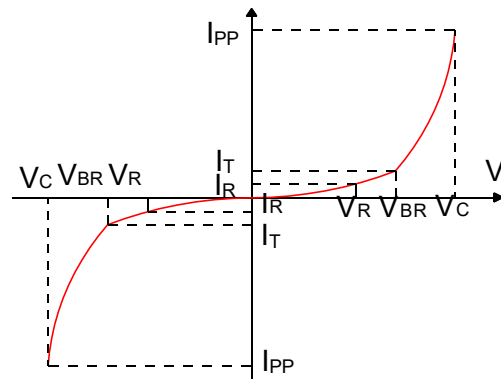
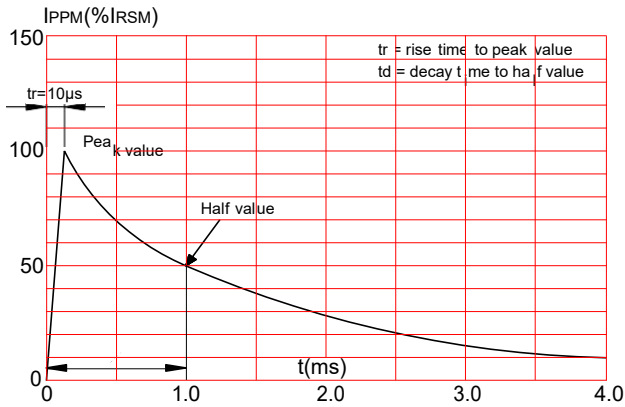


FIG.2:V- I curve characteristics (Bi-directional)

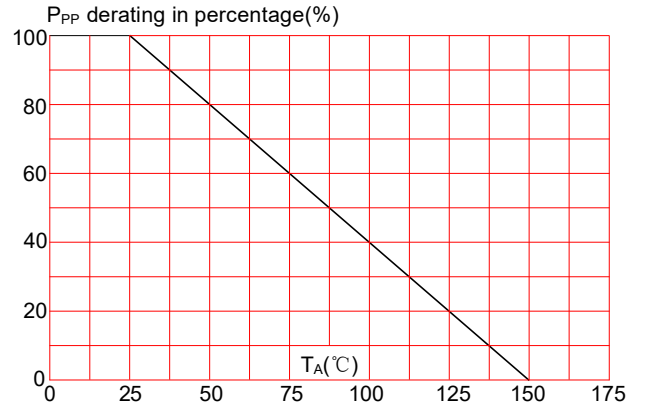




**FIG.3: Pulse waveform**

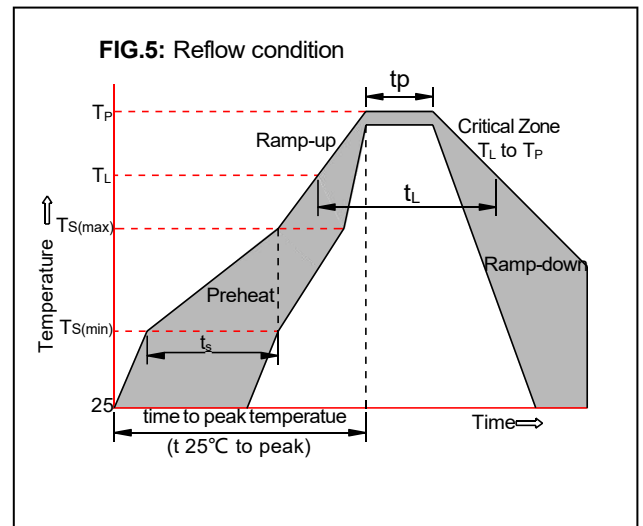


**FIG.4: Pulse derating curve**

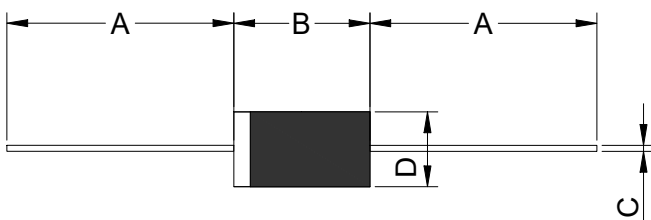


## Soldering Parameters

Reflow Condition		Pb-Free assembly (see as below)
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 (Liquid us Temp ( $T_L$ ) to peak)		3°C/sec. Max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature( $T_L$ )(Liquid us)	+217°C
	-Temperature( $t_L$ )	60-150 secs.
Peak Temp ( $T_p$ )		+260(+0/-5)°C
Time within 5°C of actual Peak Temp ( $t_p$ )		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp ( $T_p$ )		8 min. Max
Do not exceed		+260°C



## Package Mechanical Data



Ref.	Dimension			
	Inches		Millimeters	
	Min	Max	Min	Max
A	1.00	-	25.4	-
B	0.340	0.360	8.60	9.10
C	0.048	0.052	1.22	1.32
D	0.340	0.360	8.60	9.10