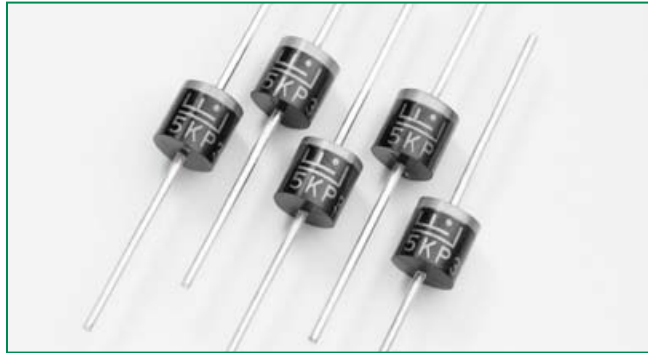



### HF 5KP Automotive Series



#### Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E128662/E230531

#### Maximum Ratings and Thermal Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10x1000µs test waveform (Fig.1) (Note 1)	P <sub>PPM</sub>	5000	W
Steady State Power Dissipation on infinite heat sink at T <sub>L</sub> =75°C (Fig. 5)	P <sub>D</sub>	8.0	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave Unidirectional only (Note 2)	I <sub>FSM</sub>	400	A
Maximum Instantaneous Forward Voltage at 100A for Unidirectional only.	V <sub>F</sub>	3.5	V
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to 175	°C
Typical Thermal Resistance Junction to Lead	R <sub>θJL</sub>	8.0	°C/W
Typical Thermal Resistance Junction to Ambient	R <sub>θJA</sub>	40	°C/W

#### Notes:

1. Non-repetitive current pulse, per Fig. 3 and derated above T<sub>A</sub> = 25°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 5KP Automotive Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.


#### Features

- Halogen-Free
- RoHS compliant
- Typical maximum temperature coefficient  
 $\Delta V_{BR} = 0.1\% \times V_{BR} @ 25^\circ\text{C} \times \Delta T$
- Glass passivated chip junction in P600 package
- 5000W peak pulse capability at 10x1000µs waveform, repetition rate (duty cycles):0.01%
- Fast response time: typically less than 1.0ps from 0 Volts to BV min
- Excellent clamping capability
- Low incremental surge resistance
- Typical I<sub>R</sub> less than 2µA above 12V
- High temperature soldering guaranteed: 260°C/40 seconds / 0.375", (9.5mm) lead length, 5 lbs., (2.3kg) tension
- Plastic package has Underwriters Laboratory Flammability classification 94V-O
- Matte Tin Lead-free plated

#### Applications

TVS devices are ideal for the protection of I/O interfaces, V<sub>CC</sub> bus and other vulnerable circuits used in telecom, computer, industrial and consumer electronic applications.

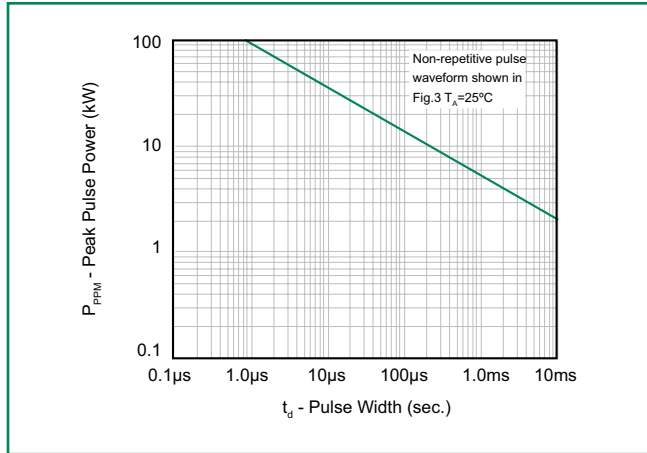
### Electrical Characteristics

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 Clamping Voltage $V_C$ @ $I_{PP}$ (V)	Maximum Peak Pulse Current $I_{PP}$ (A)	Maximum Reverse Leakage $I_R$ @ $V_R$ ( $\mu$ A)	Agency Approval 
			MIN	MAX					
5KP12AAUTO	5KP12CAAUTO	12.0	13.30	14.70	5	19.9	256.3	2	X
5KP13AAUTO	5KP13CAAUTO	13.0	14.40	15.90	5	21.5	237.2	2	X
5KP14AAUTO	5KP14CAAUTO	14.0	15.60	17.20	5	23.2	219.8	2	X
5KP15AAUTO	5KP15CAAUTO	15.0	16.70	18.50	5	24.4	209.0	2	X
5KP16AAUTO	5KP16CAAUTO	16.0	17.80	19.70	5	26.0	196.2	2	X
5KP17AAUTO	5KP17CAAUTO	17.0	18.90	20.90	5	27.6	184.8	2	X
5KP18AAUTO	5KP18CAAUTO	18.0	20.00	22.10	5	29.2	174.7	2	X
5KP20AAUTO	5KP20CAAUTO	20.0	22.20	24.50	5	32.4	157.4	2	X
5KP22AAUTO	5KP22CAAUTO	22.0	24.00	26.90	5	35.5	143.7	2	X
5KP24AAUTO	5KP24CAAUTO	24.0	26.70	29.50	5	38.9	131.1	2	X
5KP26AAUTO	5KP26CAAUTO	26.0	28.90	31.90	5	42.1	121.1	2	X
5KP28AAUTO	5KP28CAAUTO	28.0	31.10	34.40	5	45.4	112.3	2	X
5KP30AAUTO	5KP30CAAUTO	30.0	33.30	36.80	5	48.4	105.4	2	X
5KP33AAUTO	5KP33CAAUTO	33.0	36.70	40.60	5	53.3	95.7	2	X
5KP36AAUTO	5KP36CAAUTO	36.0	40.00	44.20	5	58.1	87.8	2	X
5KP40AAUTO	5KP40CAAUTO	40.0	44.40	49.10	5	64.5	79.1	2	X

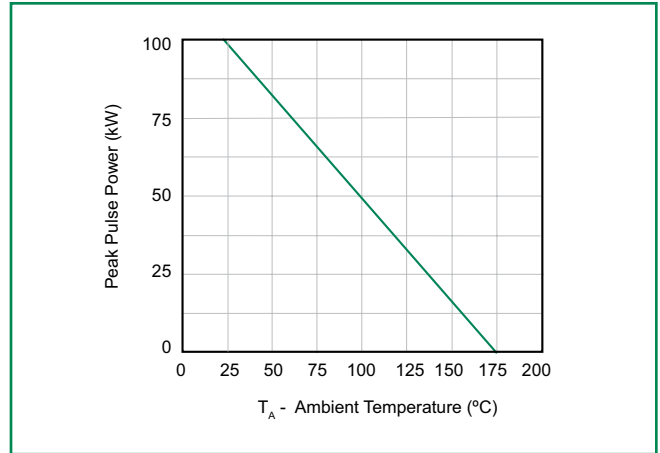
For parts without A, the  $V_{BR}$  is  $\pm 10\%$  and  $V_C$  is 5% higher than with A parts

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

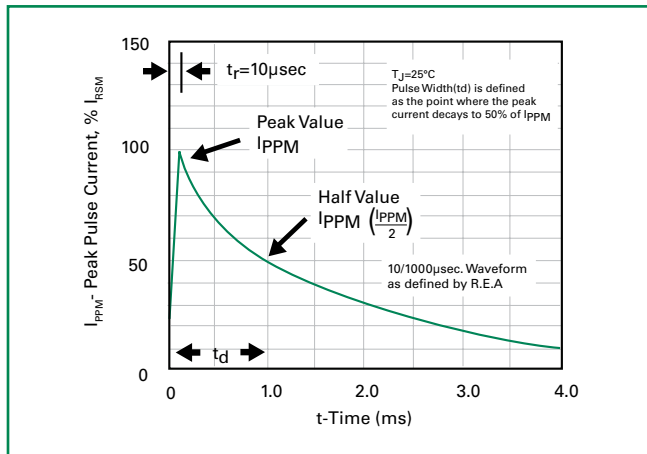
**Figure 1 - Peak Pulse Power Rating Curve**



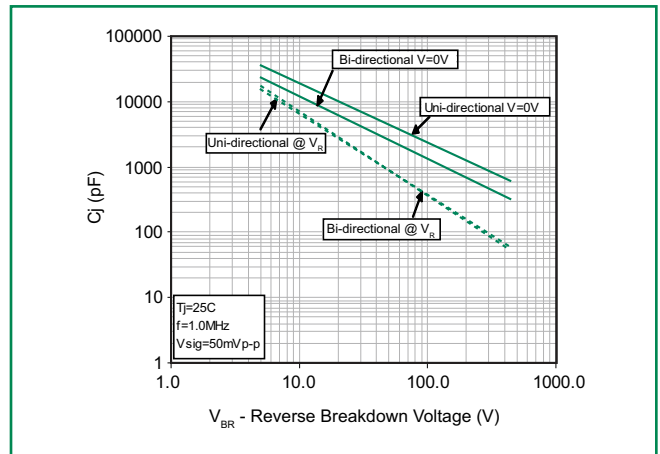
**Figure 2 - Pulse Derating Curve**



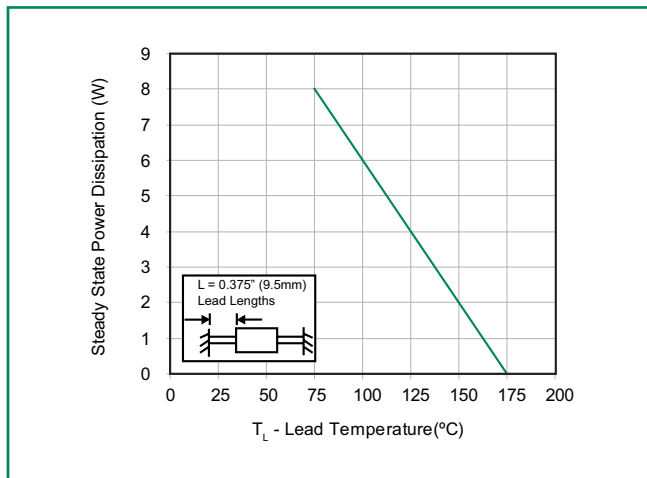
**Figure 3 - Pulse Waveform**



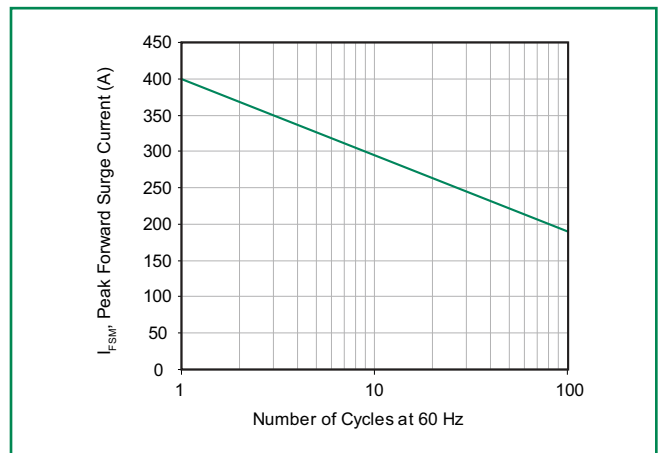
**Figure 4 - Typical Junction Capacitance**



**Figure 5 - Steady State Power Derating Curve**



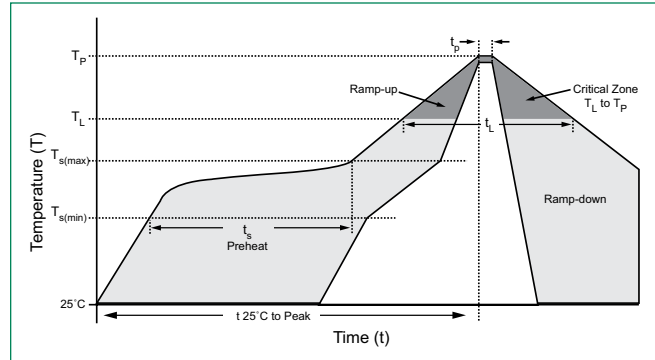
**Figure 6 - Maximum Non-Repetitive Peak Forward Surge Current**



5KP Automotive Series

### 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) ( $t_s$ )	60 – 150 seconds
Peak Temperature ( $T_p$ )		260 <sup>+0/-5</sup> °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 ( $T_p$ )		8 minutes Max.
Do not exceed		280°C



### Flow/Wave Soldering (Solder Dipping)

<b>Peak Temperature :</b>	265°C
<b>Dipping Time :</b>	10 seconds
<b>Soldering :</b>	1 time

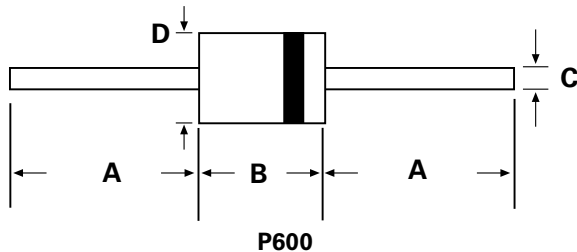
### Physical Specifications

<b>Weight</b>	0.07oz., 2.1g
<b>Case</b>	P600 molded plastic body over passivated junction.
<b>Polarity</b>	Color band denotes the cathode except Bipolar.
<b>Terminal</b>	Matte Tin axial leads, solderable per JESD22-B102D.

### Environmental Specifications

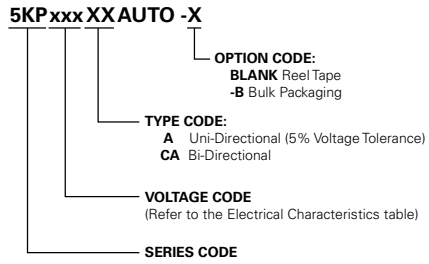
<b>Temperature Cycle</b>	JESD22-A104
<b>Pressure Cooker</b>	JESD 22-A102
<b>High Temp. Storage</b>	JESD22-A103
<b>HTRB</b>	JESD22-A108
<b>Thermal Shock</b>	JESD22-A106

### Dimensions

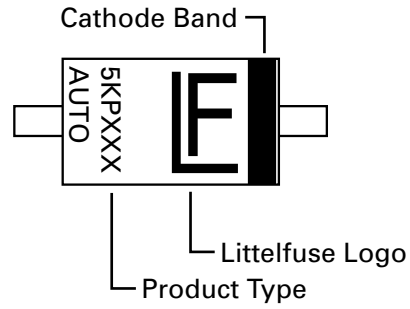


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.340	0.360	8.60	9.10
C	0.048	0.052	1.22	1.32
D	0.340	0.360	8.60	9.10

### Part Numbering System



### Part Marking System



### Packaging

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
5KPxxxXXAUTO	P600	800	Tape & Reel	EIA STD RS-296E
5KPxxxXXAUTO-B	P600	500	BULK	Littelfuse Concord Packing Spec. DM-0016

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