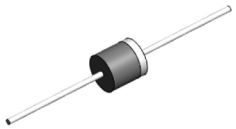
12KPE

Automotive grade 12000 W Transient voltage suppressor



Applications

- Automotive chassis and safety systems
- Advanced driver assistance systems (ADAS)
- Communication and infotainment systems
- Network systems and body electronics
- Power Train controls
- xEV and battery systems

Product features

- Automotive grade (AEC-Q101 qualified)
- Excellent clamping capability
- High reliability application
- 12000 W peak pulse power capability at 10/1000 µs waveform
- Typical I_R less than 5 µA above 22 V
- Fast response time: typically less than 1.0 ps from 0 V to V_{BR} minimum
- Plastic package meets UL 94 V-0 flammability rating
- Terminal: tin plated, solderable per J-STD-002
- UL 497B recognized.
  File No. : E198449 Guide QVGQ2

Environmental compliance and general specifications

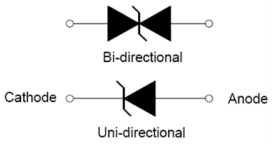
- ISO16750-2 P5A: 12 V system (87 V/0.5 Ω/400 ms)
- ISO16750-2 P5A: 24 V system (174 V/2 Ω/350 ms)
- AEC-Q101 qualified

Ordering part number

12KPE 20 C A H

- Family name
- V_R voltage ("-" indicates decimal point)
- Bi-/Uni-Directional (Blank=Uni, C=Bi)
- Voltage tolerance
- High reliability application

PIN configuration



Powering Business Worldwide

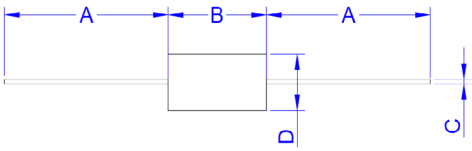
Absolute maximum ratings

(+25 °C, RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Storage operating junction temperature range	T_{STG}/ T_J	-55 to +175	°C
Steady state power dissipation at T_L= +75 °C	$P_{M(AV)}$	8	W
Peak pulse power dissipation on 10/1000 µs waveform	P_{PP}	12000	W
Maximum instantaneous forward voltage at 100 A for unidirectional	V_F	5	V
Peak forward surge current, 8.3 ms single half sine wave[1]	I_{FSM}	600	A
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

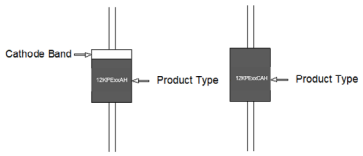
1. Measured on 8.3 ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle = 4 per minute maximum

Mechanical parameters, pad layout- mm/inches



	Millimeters		Inches	
Dimension	**Minimum**	**Maximum**	**Minimum**	**Maximum**
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

Part marking



Packaging information

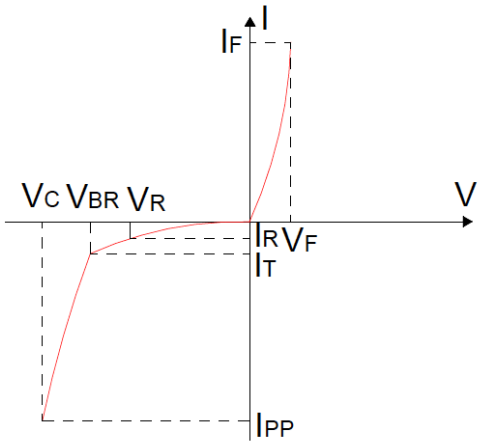
300 parts per box

Electrical specifications (+25 °C)

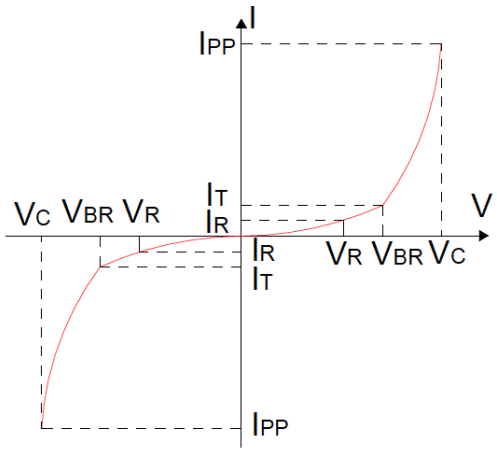
Part number		Marking		V_R	I_R @ V_R	V_{BR} @ I_T		I_T	V_C @ I_{PP}	I_{PP}	UL497B
Uni-polar	Bi-polar	Uni	Bi	(V)	(µA)	min (V)	max (V)	(mA)	max (V)	(A)	Recognized
12KPE20AH	12KPE20CAH	12KPE20AH	12KPE20CAH	20	15	22.2	24.5	5	34.3	349.9	x
12KPE22AH	12KPE22CAH	12KPE22AH	12KPE22CAH	22	10	24.4	26.9	5	37.1	323.5	x
12KPE24AH	12KPE24CAH	12KPE24AH	12KPE24CAH	24	5	26.7	29.5	5	40.7	294.9	x
12KPE26AH	12KPE26CAH	12KPE26AH	12KPE26CAH	26	5	28.9	31.9	5	44	272.8	x
12KPE28AH	12KPE28CAH	12KPE28AH	12KPE28CAH	28	5	31.1	34.4	5	47.5	252.7	x
12KPE30AH	12KPE30CAH	12KPE30AH	12KPE30CAH	30	5	33.3	36.8	5	50.7	236.7	x
12KPE33AH	12KPE33CAH	12KPE33AH	12KPE33CAH	33	5	36.7	40.6	5	54.7	219.4	x
12KPE36AH	12KPE36CAH	12KPE36AH	12KPE36CAH	36	5	40	44.2	5	59.8	200.7	x
12KPE40AH	12KPE40CAH	12KPE40AH	12KPE40CAH	40	5	44.4	49.1	5	65.8	182.4	x
12KPE43AH	12KPE43CAH	12KPE43AH	12KPE43CAH	43	5	47.8	52.8	5	69.8	171.9	x
12KPE48AH	12KPE48CAH	12KPE48AH	12KPE48CAH	48	5	53.6	58.7	5	77.7	154.5	
12KPE58AH	12KPE58CAH	12KPE58AH	12KPE58CAH	58	5	64.4	71.2	5	93.6	128.2	
12KPE64AH	12KPE64CAH	12KPE64AH	12KPE64CAH	64	5	71.1	78.6	5	103	116.5	
12KPE72AH	12KPE72CAH	12KPE72AH	12KPE72CAH	72	5	80	88.5	5	116	103.4	

Ratings and V-I characteristic curves (+25 °C unless otherwise noted)

V- I curve characteristics (Uni-directional)



V- I curve characteristics (Bi-directional)



Surge waveform: 10/1000 µs

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

V_{BR}: Breakdown voltage

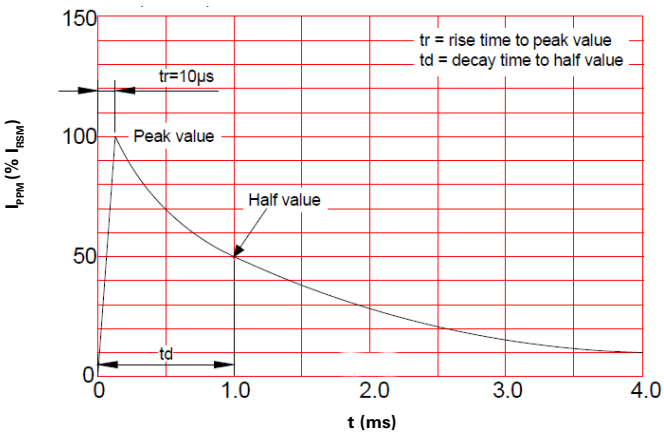
V_C: Clamping voltage – Peak voltage measured across the suppressor at a specified I_{PP}

I_R: Reverse leakage current

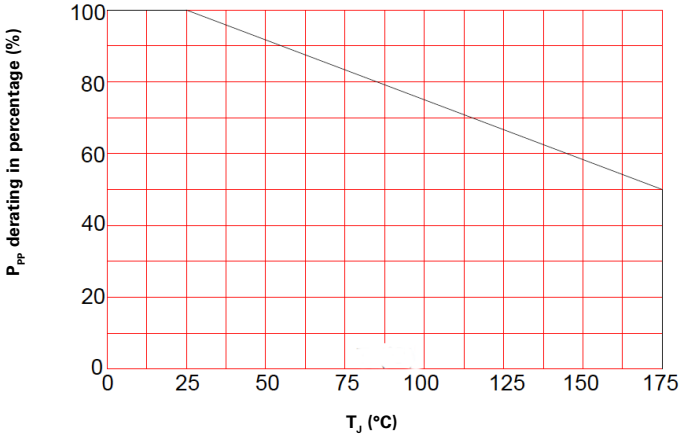
I_T: Test current

V_F: Forward voltage drop for Uni-directional

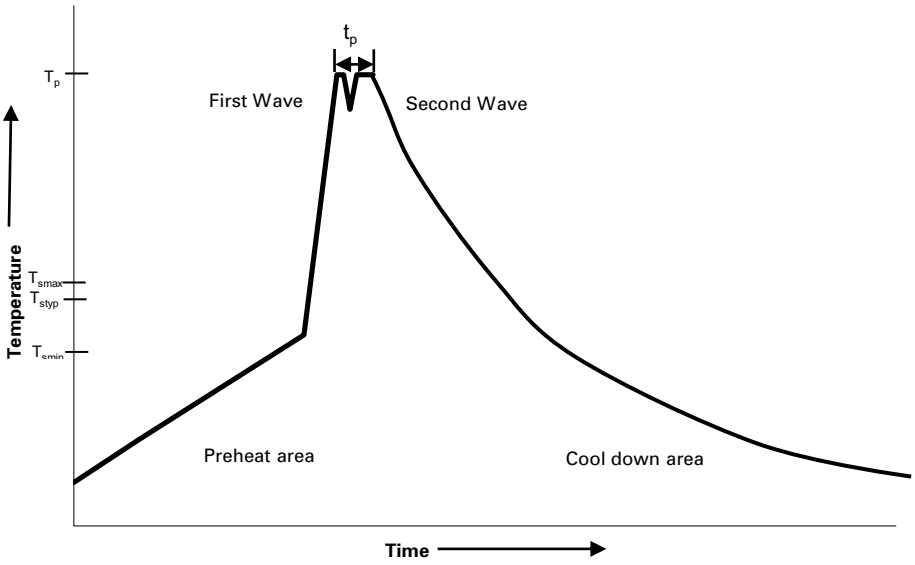
Pulse waveform



Pulse derating curve



Wave solder profile



Reference EN 61760-1:2006

Profile feature		Standard SnPb solder	Lead (Pb) free solder
Preheat	• Temperature min. (T_{smin})	100 °C	100 °C
	• Temperature typ. (T_{styp})	120 °C	120 °C
	• Temperature max. (T_{smax})	130 °C	130 °C
	• Time (T_{smin} to T_{smax}) (t_s)	70 seconds	70 seconds
Δ preheat to max Temperature		150 °C max.	150 °C max.
Peak temperature (Tp)*		235 °C – 260 °C	250 °C – 260 °C
Time at peak temperature (t_p)		10 seconds max 5 seconds max each wave	10 seconds max 5 seconds max each wave
Ramp-down rate		~ 2 K/s min ~3.5 K/s typ ~5 K/s max	~ 2 K/s min ~3.5 K/s typ ~5 K/s max
Time 25 °C to 25 °C		4 minutes	4 minutes

Manual solder

+350 °C (4-5 seconds by soldering iron), generally manual/hand soldering is not recommended

Eaton
Electronics Division
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com/electronics

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