

1200V, 600 mOHM, SiC CURRENT LIMITING DEVICE WITH STANDARD SHORT-CIRCUIT CAPABILITIES

FEATURES

- ▲ Low Saturation/Nominal current ratio.
- ▲ Excellent current clamping capabilities (almost flat I-V curve).
- ▲ Breakdown voltage above 1200V in forward mode.
- ▲ Short-circuit capability above 250 μ s @ 600V, 80 μ s @ 1200V.
- ▲ Negative temperature coefficient of I_{DS} .
- ▲ Reverse conduction (internal body diode).

ADVANTAGES AND BENEFITS

- ▲ Allows huge reduction (7x to 10x) in footprint and weight compared to standard TVS-only or MOV-only protections.
- ▲ Optimal load protection by ensuring the fault current through the load is close to its nominal current (reduced induced fault stress).
- ▲ For long lasting faults, the current decreases over time due to self-heating, thus increasing the level of protection.

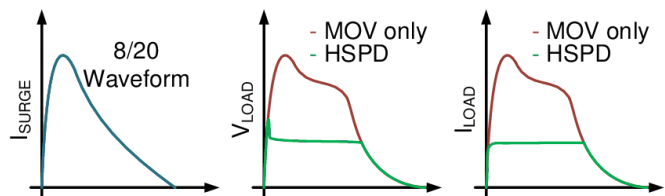
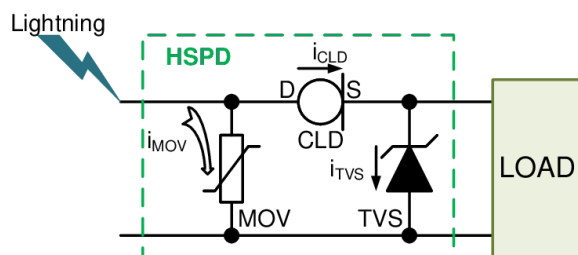
DESCRIPTION

The KE12LS060 is a 600 m Ω Current Limiting Device designed to clamp the forward current at a maximum of 15A and able to sustain surge transients up to 1200V. In reverse mode, the KE12LS060 behaves as a constant resistor. Its elevated ruggedness makes it an ideal device to limit the current through a load in continuous as well as in fault conditions.

APPLICATIONS

- ▲ Lightning protection
- ▲ Short-circuit / overcurrent protection
- ▲ Overvoltage / surge protection
- ▲ Capacitor pre-charging
- ▲ Resettable fuse
- ▲ Battery protections
- ▲ DC general purpose protection applications
- ▲ Unidirectional current limitation in AC or DC links
- ▲ Photovoltaic power plant protection
- ▲ Constant-current regulation for battery charging or LED driving

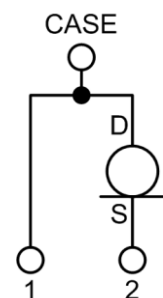
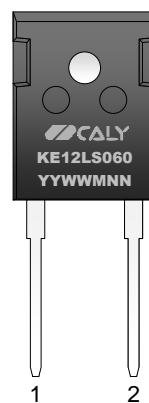
TYPICAL APPLICATION



KEY PERFORMANCE

Parameter	Value
ON-state Resistance R_{ON}	0.6 Ohm
Nominal Saturation Current $I_{SAT\ NOM}$	10 A
Knee Voltage V_{KNEE}	10 V

PACKAGING



QUICK ORDERING INFORMATION

Part Number	Package	Marking
KE12LS060B	Bare die	
KE12LS060SB	SMB (DO214AA)	KE12LS060
KE12LS060T47	TO-247-2	KE12LS060

Other packages and packaging configurations possible upon request.

ABSOLUTE MAXIMUM RATINGS

Unless otherwise stated, specification applies for $T_{CASE}=25^{\circ}C$.

Parameter	Symbol	Values	Unit	Note/Test Condition
Maximum Forward Voltage	$V_{DS\ MAX}$	1200	V	Single pulse, $t_{pulse} = 100\mu s$
Maximum Reverse Voltage	$V_{SD\ MAX}$	5	V	Single pulse, $t_{pulse} = 200\mu s$
Maximum DC Forward Voltage	$V_{DS\ MAX\ DC}$	12	V	TO-247 package
Short-circuit time	$t_{SC\ 600V}$	300	μs	$V_{DS} = 600V$

ELECTRICAL CHARACTERISTICS

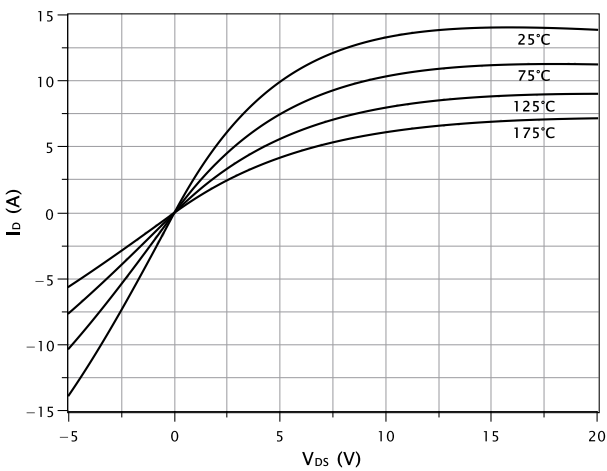
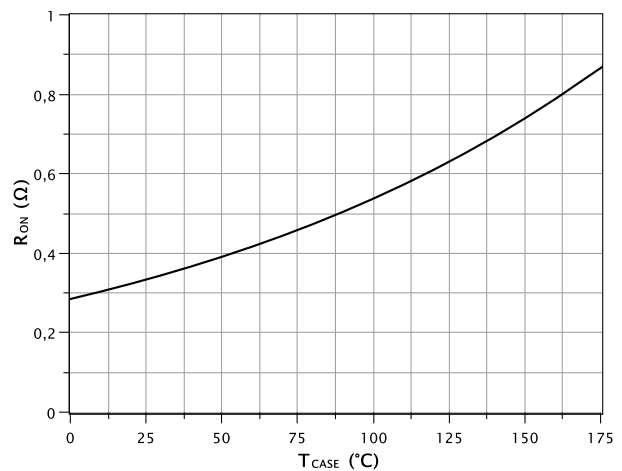
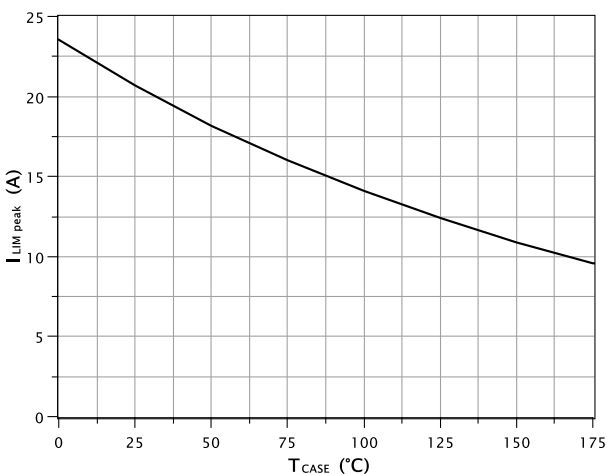
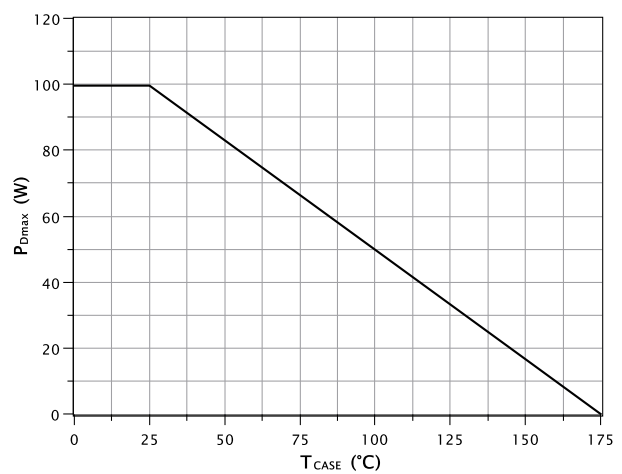
 Unless otherwise stated, specification applies for $T_{CASE}=25^{\circ}C$.

Parameter	Symbol	Values			Unit	Note/Test Condition
		Min	Typ	Max		
ON-state-Resistance	R_{ON}		0.35		Ohm	$T_J=25^{\circ}C$
			0.75			$T_J=150^{\circ}C$
Maximum recommended Operating DC current	I_{DC}	-7		+7	A	TO-247 package
Limiting Current	$I_{LIM\ 1\mu s}$	15	20	25	A	$t_{pulse} = 1\mu s, V_{DS} = 600V, T_{CASE}=25^{\circ}C$
	$I_{LIM\ 10\mu s}$	5	7	9	A	$t_{pulse} = 10\mu s, V_{DS} = 600V, T_{CASE}=25^{\circ}C$
	$I_{LIM\ 100\mu s}$	2	4	6	A	$t_{pulse} = 100\mu s, V_{DS} = 600V, T_{CASE}=25^{\circ}C$
Operating Junction Temperature	T_J	-55		+175	$^{\circ}C$	TO-247 package.
Storage Temperature	T_{STG}	-55		+175	$^{\circ}C$	

THERMAL CHARACTERISTICS

Parameter	Symbol	Values			Unit	Note/Test Condition
		Min	Typ	Max		
Junction-Case Thermal Resistance	R_{THJC}	1.0	1.3	2.0	$^{\circ}C/W$	TO-247 package

TYPICAL PERFORMANCE

 Unless otherwise stated, measurements performed at $T_{CASE}=25^{\circ}C$.

Fig 1. Pulsed IV curve ($t_{pulse}=200\mu s$) in forward ($V_{DS}>0V$) and reverse ($V_{DS}<0V$) modes, for different T_{CASE} .

Fig 2. ON-state resistance evolution with case temperature at $I_{DC} = 100mA$.

Fig 3. Peak limiting current evolution with case temperature ($t_{pulse} = 10\mu s, V_{DS} = 20V$).

Fig 4. DC Power dissipation derating curve (TO-247 package).

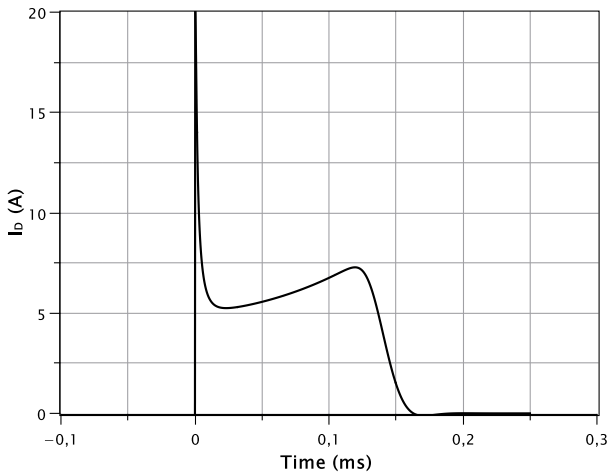


Fig 5. Typical 1.2/50µs, 1000V/500A CLD current response.

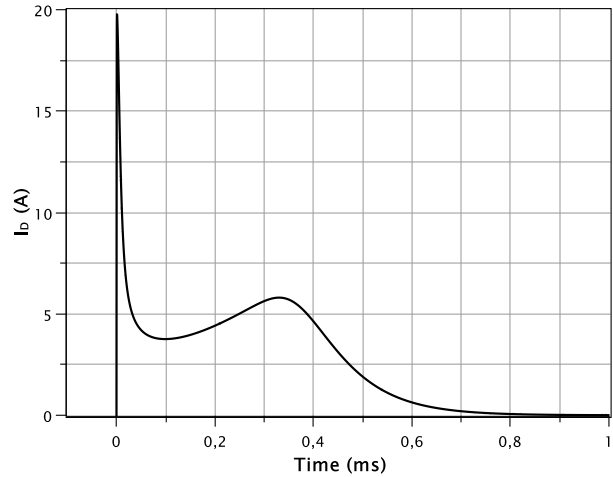


Fig 6. Typical 40/120µs, 750V/750A CLD current response.

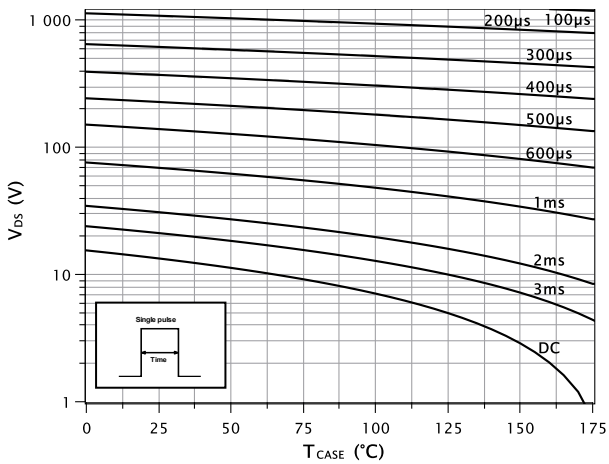


Fig 7. Safe Operating Area for square pulse (TO-247 package).

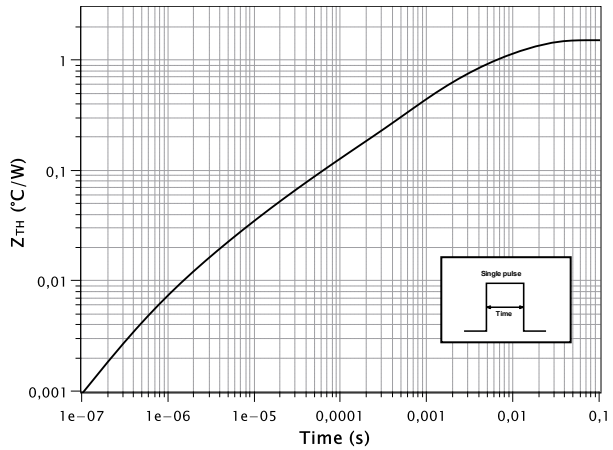


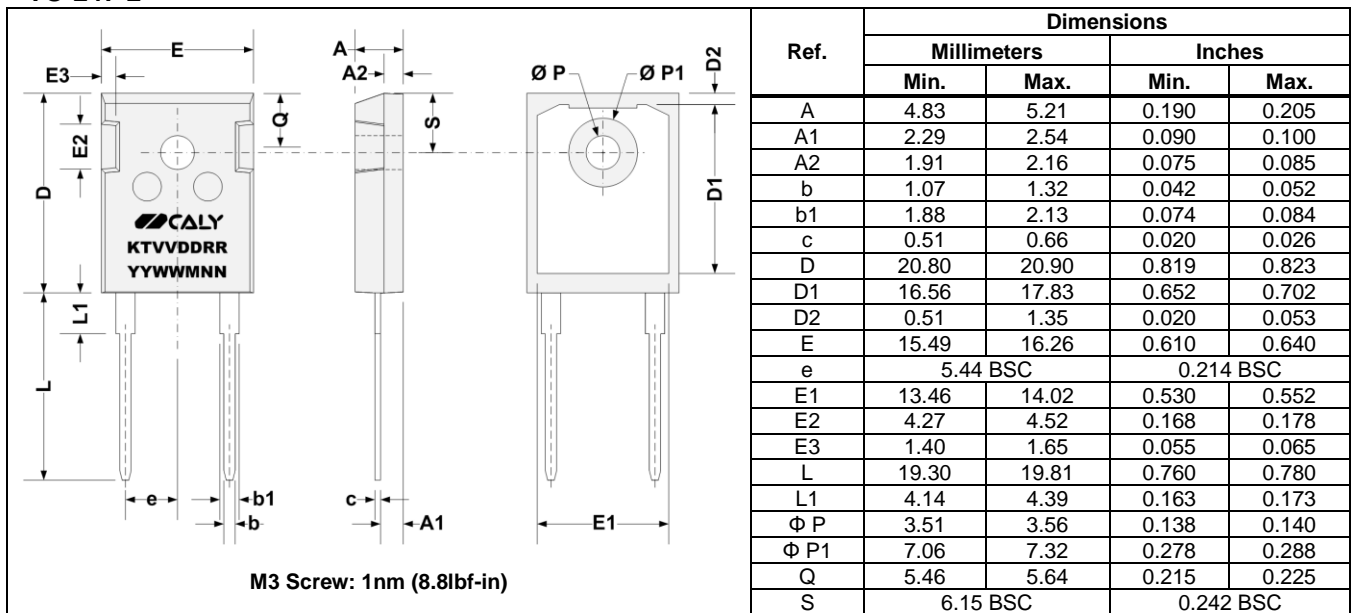
Fig 8. Typical transient thermal impedance (TO-247 package).

DETAILED ORDERING INFORMATION

<u>K</u> ↓ Source K = CALY Technologies	<u>E</u> ↓ Temperature range: E = -55°C to +175°C	<u>12</u> ↓ Rated Voltage: 12 = 1200V	<u>LS</u> ↓ Device / Type LS = Current Limiting Device	<u>060</u> ↓ Rated Resistance: 060 = 600 mOhm	<u>T47</u> ↓ Package: T47 = TO247
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Part Number	Temperature Range	Package	Pin Count	Marking
KE12LS060B	-55°C to +210°C	Bare die		
KE12LS060SB	-55°C to +175°C	SMB (DO214AA)	2	KE12LS060
KE12LS060T47	-55°C to +175°C	TO-247-2	2	KE12LS060

Other packages, packaging configurations and finishing materials possible upon request. MOQ may apply.

PACKAGE OUTLINES
TO-247-2

Unique Lot Assembly Code

YY	Last two digits of assembly year (e.g. 16 = 2016).
WW	Assembly week (01 to 52).
M	Assembly location code.
NN	Assembly lot code (01 to 99).

REVISION HISTORY

Revision	Date	Description
1A	2016-Nov-29	First issue
1B	2018-Aug-08	Amended links in Contact Us Section

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