1200V, 2 OHM, BIDIRECTIONAL SiC CURRENT LIMITING DEVICE WITH STANDARD SHORT-CIRCUIT CAPABILITIES

FEATURES

- ▲ Low Saturation/Nominal current ratio.
- ▲ Bidirectional current limiting operation.
- ▲ Excellent current clamping capabilities (almost flat I-V curve) in forward and reverse modes.
- ▲ Breakdown voltage above 1200V in forward and reverse modes.
- ▲ Short-circuit capability above 250µs @ 600V, 80µs @ 1200V.
- ▲ Negative temperature coefficient of I_{SAT}.
- ▲ Improved reliability due to monolithic solution.

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 KE12LSB200 is a 1.2 kV, 2 Ohm bidirectional Silicon Carbide (SiC) Current Limiting Device designed to clamp current in forward or reverse direction at a typical value of 2.5A.
Its elevated ruggedness makes it an ideal device to limit the current through a load when in a fault condition, before the fault disappears or a circuit breaker (mechanical or electronic) may react.

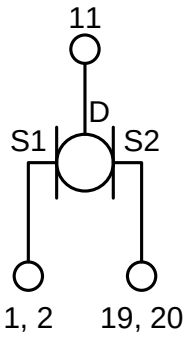
APPLICATIONS

- ▲ Lightning protection
- ▲ Short-circuit / overcurrent protection
- ▲ Overvoltage / surge protection
- ▲ Capacitor pre-charging
- ▲ 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

KEY PERFORMANCE

Parameter	Value
On resistance R_{ON} (one device)	2.0 Ohm
Saturation Current I_{SAT}	4A
Pinch-off Voltage V_P	±10 V

PACKAGING

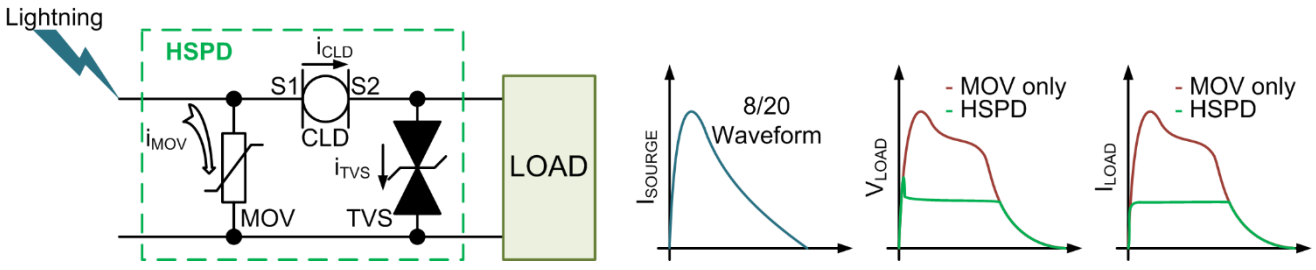


QUICK ORDERING INFORMATION

Part Number	Package	Marking
KE12LSB200S20	SO-20	KE12LSB200

Other packages and packaging configurations possible upon request.

TYPICAL APPLICATION



ABSOLUTE MAXIMUM RATINGS

Unless otherwise stated, specification applies for T_C=25°C.

Parameter	Symbol	Values			Unit	Note/Test Condition
		Min	Typ	Max		
Saturation current	I_{DS-SAT}			4.0	A	V_{DS} = 20V
Pulsed forward maximum voltage	V_{DS-MAX}			1200	V	(Single pulse, t_{pulse} = 10µs)
Pulsed reverse Maximum voltage	V_{SD-MAX}			5	V	(Single pulse, t_{pulse} =10µs)
Pulsed reverse Maximum	I_{SD-MAX}			4	A	V_{SD} = 5V
Short-circuit time	t_{SC}	100	500	1000	µs	V_{DS} = 600V, capacitive discharge

ELECTRICAL CHARACTERISTICS

Unless otherwise stated, specification applies for -55°C<T_j<175°C.

Parameter	Symbol	Values			Unit	Note/Test Condition
		Min	Typ	Max		
On-resistance	R_{ON}	1	2	4	Ohm	25°C, one device
Continuous max. DC current	$I_{NOM\ Max}$	0.4	0.5	1	A	25°C
Saturation current	I_{SAT}	1	2.5	4	A	25°C
Operating temperature	T_{OPT}	-55	25	175	°C	
Storage temperature	T_{STJ}	-55	25	175	°C	

THERMAL CHARACTERISTICS

Parameter	Symbol	Values			Unit	Note/Test Condition
		Min	Typ	Max		
Junction-pins Thermal Resistance	R_{TH-JP}		22	3	°C/W	
Junction-ambient Thermal Resistance	R_{TH-JA}		95			2oz Cu, 50mm² Cu area, 1.5mm FR4

TYPICAL PERFORMANCE

Unless otherwise stated, measurements performed at 25°C.

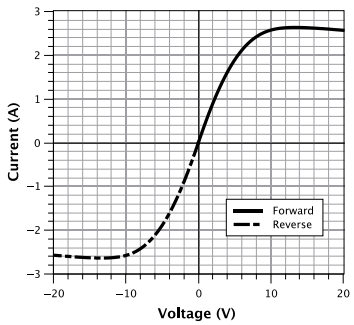


Fig 1. Pulsed IV characteristics (t_P=400µs) in forward (V_{DS}>0) and reverse (V_{DS}<0) modes. Devices connected in bidirectional (tail to tail) mode.

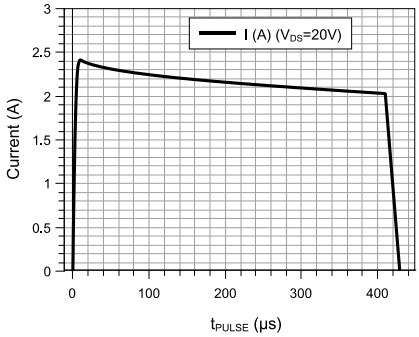


Fig 2. Current waveform (20V / 400µs forward pulse voltage). Devices connected in bidirectional (tail to tail) mode.

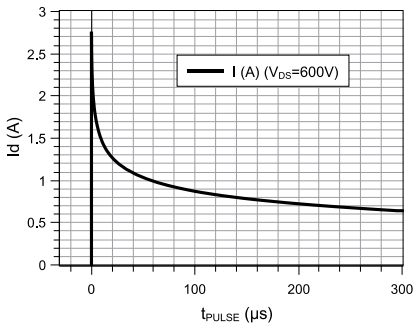


Fig 3. CLD current waveform (600V/100µs short-circuit). Devices connected in bidirectional (tail to tail) mode.

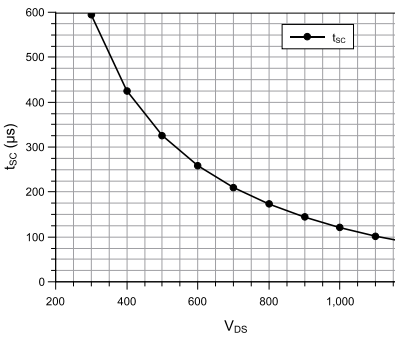


Fig 4. Critical short-circuit time as function of DC bus voltage.

DETAILED ORDERING INFORMATION

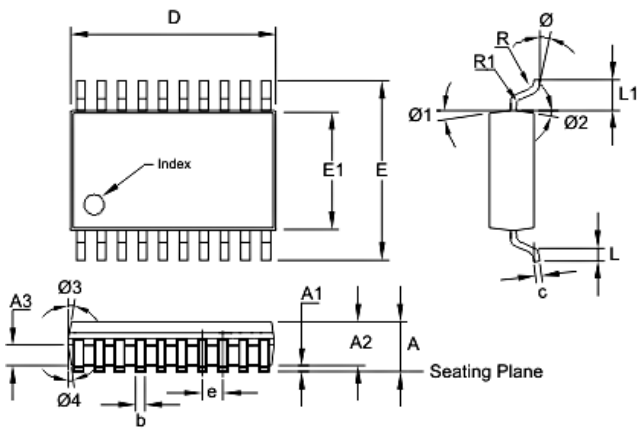
K	E	12	LSB	200	S20
Source K = CALY Technologies	Temperature range: E = -55°C to +175°C	Rated Voltage: 12 = 1200V	Device / Type LSB = Bidirectional Current Limiting Device	Rated Resistance: 200 = 2 2 Ohm	Package: S20 = SO-20

Part Number	Temperature Range	Package	Pin Count	Marking
KE12LSB200S20	-55°C to +175°C	SO-20	20	KE12LSB200

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

PACKAGE OUTLINE

TO247-3



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.35	2.65	0.093	0.104
A1	0.10	0.30	0.004	0.012
A2	2.05	2.55	0.081	0.100
A3	0.90	1.10	0.035	0.043
b	0.35	0.49	0.014	0.019
c	0.23	0.32	0.009	0.013
D	12.60	12.80	0.496	0.504
E	10.00	10.60	0.394	0.417
E1	7.40	7.60	0.291	0.299
e	1.27 BSC		0.050 BSC	
L	0.50	1.27	0.020	0.050
L1	1.35 REF		0.053 REF	
R/R1	0.07	-	0.003	-
Ø	0	8	0.000	0.315
Ø1	10	14	0.394	0.551
Ø2	6	10	0.236	0.394
Ø3	9	14	0.354	0.551
Ø4	6	10	0.236	0.394

REVISION HISTORY

Revision	Date	Description
1A	2018-Aug-10	First issue

IMPORTANT NOTICE & DISCLAIMER

Information in this document supersedes and replaces all information previously supplied. Information in this document is provided solely in connection with CALY Technologies products.
The information contained herein is believed to be reliable. CALY Technologies makes no warranties regarding the information contained herein. CALY Technologies assumes no responsibility or liability whatsoever for any of the information contained herein. CALY Technologies assumes no responsibility or liability whatsoever for the use of the information contained herein. The information contained herein is provided "AS IS, WHERE IS" and with all faults, and the entire risk associated with such information is entirely with the user. CALY Technologies reserves the right to make changes, corrections, modifications or improvements to this document and the information herein without notice. Customers should obtain and verify the latest relevant information before placing orders for CALY Technologies products. The information contained herein or any use of such information does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other intellectual property rights, whether with regard to such information itself or anything described by such information.
Unless expressly approved in writing by an authorized representative of CALY Technologies, CALY Technologies products are not designed, authorized or warranted for use in military, aircraft, space, life-saving, or life-sustaining applications, nor in products or systems where failure or malfunction may result in personal injury, death, or property or environmental damage.
General Sales Terms & Conditions apply.

CONTACT US

For more information on CALY Technologies' products, technical support or ordering:

Website: caly-technologies.com
Email: sales@caly-technologies.com
info@caly-technologies.com

CALY Technologies SAS
CS52132
56 Bd Niels Bohr, Bat CEI2
69603 Villeurbanne Cedex
France