1200V, 2 OHM, 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 250µs @ 600V, 80µs @ 1200V.
- ▲ Negative temperature coefficient of I_{SAT}.
- ▲ 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 KE12LS200 is a 1.2 kV, 2 Ohm Current Limiting Device designed to clamp the forward current at a maximum of 2.5A. In reverse mode, the KE12LS200 behaves mostly as a constant resistor.
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.

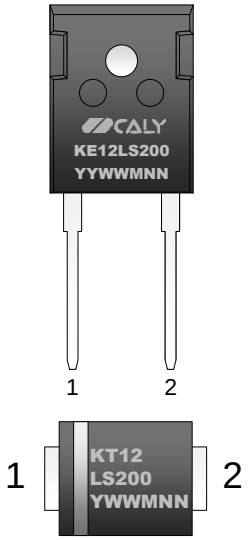
APPLICATIONS

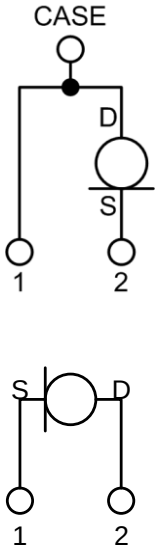
- ▲ Lightning protection
- ▲ Short-circuit / overcurrent protection
- ▲ Overvoltage / surge protection
- ▲ Capacitor pre-charging
- ▲ Battery protections
- ▲ DC general purpose protection applications
- ▲ Unidirectional current limitation in AC or DC links
- ▲ Photovoltaic power plant protection
- ▲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

KEY PERFORMANCE

Parameter	Value
On resistance R_{ON}	2.0 Ohm
Saturation Current I_{SAT}	2.5 A
Pinch-off Voltage V_P	10 V

PACKAGING



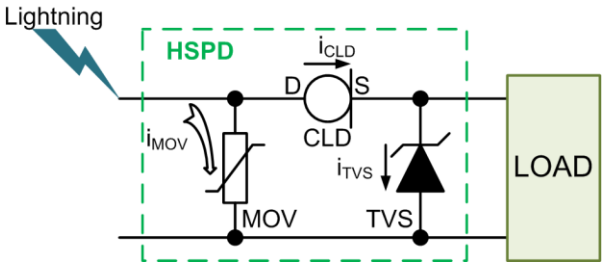


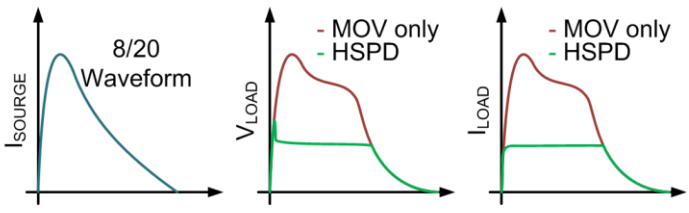
QUICK ORDERING INFORMATION

Part Number	Package	Marking
KE12LS200B	Bare die	
KE12LS200S	SMB (DO214AA)	KE12LS200
KE12LS200T	2-ld TO247	KE12LS200

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 Min	Values Typ	Values Max	Unit	Note/Test Condition
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

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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
Continuous max. DC current	$I_{NOM\ Max}$	0.4	0.5	1	A	
Saturation current	I_{SAT}	1	2.5	4	A	25°C
Operating temperature	T_{OPT}	-50	25	250	°C	(Depending on packaging technology)
Storage temperature	T_{STJ}	-50	25	175	°C	

THERMAL CHARACTERISTICS

Parameter	Symbol	Values			Unit	Note/Test Condition
		Min	Typ	Max		
Junction-case Thermal Resistance	R_{TH-JC}			3	°C/W	TO-247

TYPICAL PERFORMANCE

Unless otherwise stated, measurements performed at 25°C.

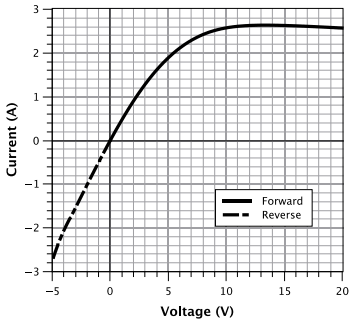

Fig 1. Pulsed IV characteristics (t_P=400µs) in forward (V_{DS}>0) and reverse (V_{DS}<0) modes.

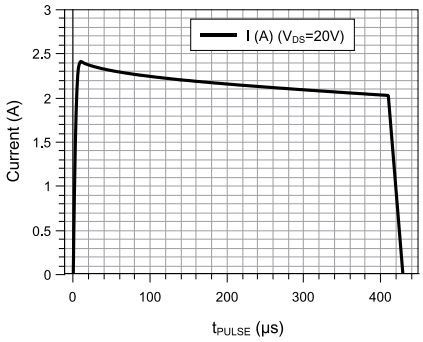

Fig 2. Current waveform (20V / 400µs forward pulse voltage).

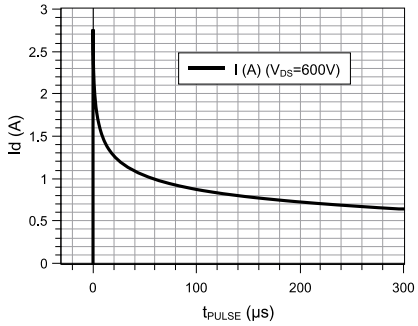

Fig 3. CLD current waveform (600V/300us short-circuit).

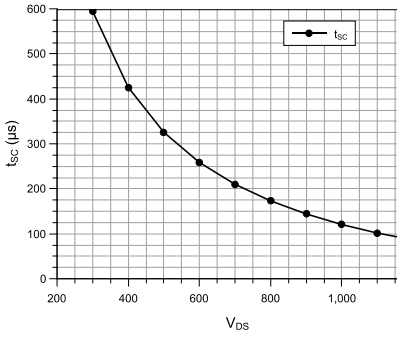

Fig 4. Critical short-circuit time as function of DC bus voltage.

DETAILED ORDERING INFORMATION

K	E	12	LS	200	T
Source K = CALY Technologies	Temperature range: E = -55°C to +175°C	Rated Voltage: 12 = 1200V	Device / Type LS = Current Limiting Device	Rated Resistance: 200 = 2 Ohm	Package: S = SMB T = TO247

Part Number	Temperature Range	Package	Pin Count	Marking
KE12LS200B	-55°C to +175°C			
KE12LS200S	-55°C to +175°C	SMB (DO214AA)	2	KE12LS200
KE12LS200T	-55°C to +175°C	2-ld TO247	2	KE12LS200

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

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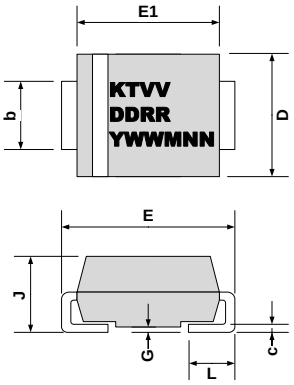
PACKAGE OUTLINES

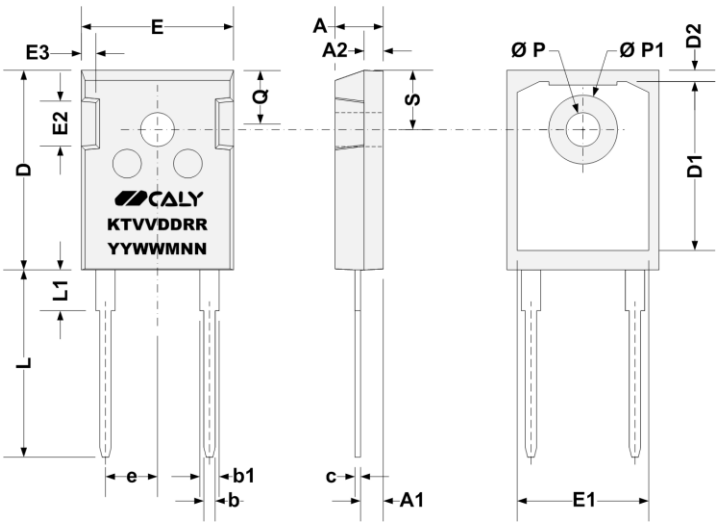
SMB (JEDEC DO-214AA)



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
b	1.95	2.20	0.077	0.087
c	0.15	0.40	0.006	0.016
D	3.30	3.95	0.130	0.156
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
G	0.05	0.20	0.002	0.008
J	1.95	2.65	0.077	0.104
L	0.75	1.50	0.030	0.059

Unique Lot Assembly Code	
Y	Year code: A = 2016, B = 2017, C = 2018, D = 2019, E = 2020, F = 2021...
WW	Assembly week (01 to 52).
M	Assembly location code.
NN	Assembly lot code (01 to 99).

TO247-2

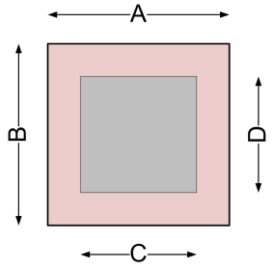


M3 Screw: 1nm (8.8lbf-in)

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	0.190	0.205
A1	2.29	2.54	0.090	0.100
A2	1.91	2.16	0.075	0.085
b	1.07	1.32	0.042	0.052
b1	1.88	2.13	0.074	0.084
c	0.51	0.66	0.020	0.026
D	20.80	20.90	0.819	0.823
D1	16.56	17.83	0.652	0.702
D2	0.51	1.35	0.020	0.053
E	15.49	16.26	0.610	0.640
e	5.44 BSC		0.214 BSC	
E1	13.46	14.02	0.530	0.552
E2	4.27	4.52	0.168	0.178
E3	1.40	1.65	0.055	0.065
L	19.30	19.81	0.760	0.780
L1	4.14	4.39	0.163	0.173
Φ P	3.51	3.56	0.138	0.140
Φ P1	7.06	7.32	0.278	0.288
Q	5.46	5.64	0.215	0.225
S	6.15 BSC		0.242 BSC	

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).

BARE DIE INFORMATION



Ref.	Dimensions	
	Millimeters	Inches
A	2.5	0.984
B	2.5	0.984
C	1.6	0.630
D	1.6	0.630
Top	AlCu0.5%	
Bottom	Ti/Ni/Au	

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REVISION HISTORY

Revision	Date	Description
1A	2016-Nov-29	First issue
2A	2017-Aug-18	Added SMB package. Changed Isat_typ to 2.5A. Changed document template.
2B	2018-Aug-08	Amended links in Contact Us Section

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