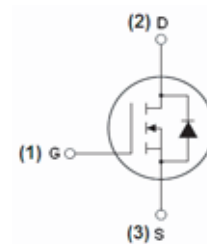


N-Channel Super Trench Power MOSFET

Description

The RM130N100HD uses **Super Trench** technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(on)}$ and Q_g . This device is ideal for high-frequency switching and synchronous rectification.



Schematic diagram

General Features

- $V_{DS} = 100V, I_D = 130A$
 $R_{DS(on)} < 5.4m\Omega @ V_{GS} = 10V$
- Excellent gate charge x $R_{DS(on)}$ product
- Very low on-resistance $R_{DS(on)}$
- Pb-free lead plating
- 100% UIS tested

Application

- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification
- Halogen-free



TO-263-2L top view

100% UIS TESTED!
Δ 100% Vds TESTED!

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
130N100	RM130N100HD	TO-263-2L	-	-	-

Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_a = 25^\circ C$)	I_D	130	A
Continuous Drain Current ($T_a = 100^\circ C$)	I_D	84	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	440	A
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	225	mJ
Power Dissipation	P_D	192	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.65	$^\circ C/W$
Junction Temperature	T_J	150	$^\circ C$
Storage Temperature	T_{STG}	-55~ +150	$^\circ C$

Electrical Characteristics (T_c=25°C unless otherwise noted)

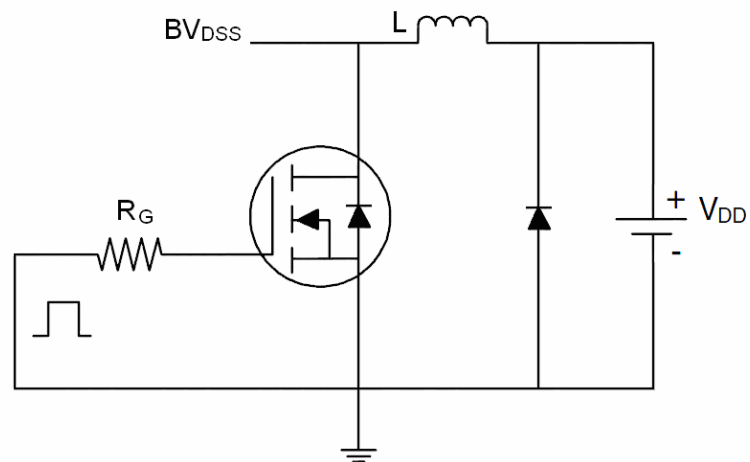
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	100	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 100V, V _{GS} = 0V	-	-	1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage ⁽³⁾	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2	3	4	V
Drain-source on-resistance ⁽³⁾	R _{DS(on)}	V _{GS} = 10V, I _D = 20A	-	4.5	5.4	mΩ
Gate Resistance	R _G	f = 1MHz	-	3.5	-	Ω
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} = 50V, V _{GS} = 0V, f = 1MHz	-	3244	-	pF
Output Capacitance	C _{oss}		-	1075	-	
Reverse Transfer Capacitance	C _{rss}		-	52	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} = 50V, R _L = 2.5Ω V _{GS} = 10V, R _G = 6Ω	-	22	-	ns
Turn-on rise time	t _r		-	36	-	
Turn-off delay time	t _{d(off)}		-	49	-	
Turn-off fall time	t _f		-	31	-	
Total Gate Charge	Q _g	V _{DS} = 50V, I _D = 20A, V _{GS} = 10V	-	51	-	nC
Gate-Source Charge	Q _{gs}		-	15	-	
Gate-Drain Charge	Q _{gd}		-	13	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽³⁾	V _{DS}	V _{GS} = 0V, I _S = 20A	-	-	1.2	V
Diode Forward current ⁽⁴⁾	I _S		-	-	120	A
Reverse recovery time	T _{rr}	I _S = 15A, V _{GS} = 0V, dI _F /dt = 100A/us		58		ns
Reverse recovery charge	Q _{rr}	I _S = 15A, V _{GS} = 0V, dI _F /dt = 100A/us		90		nC

Notes:

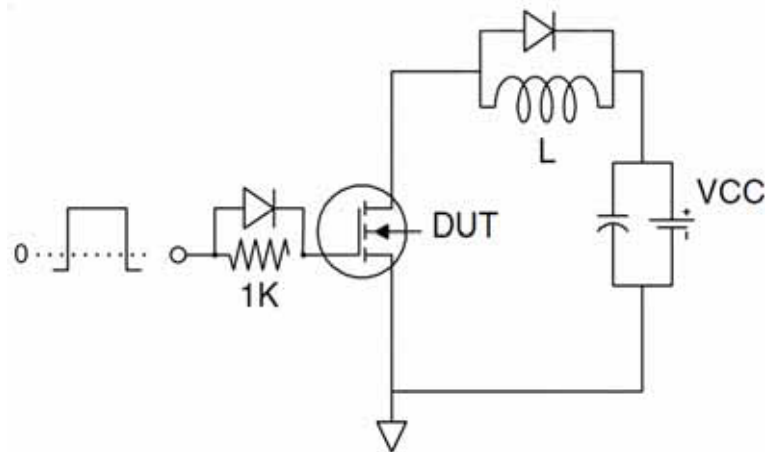
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: T_J = 25°C, V_{DD} = 50V, R_G = 25 Ω, L = 0.5mH
3. Pulse Test: pulse width ≤ 300μs, duty cycle ≤ 2%
4. Surface Mounted on FR4 Board, t ≤ 10 sec

Test Circuit

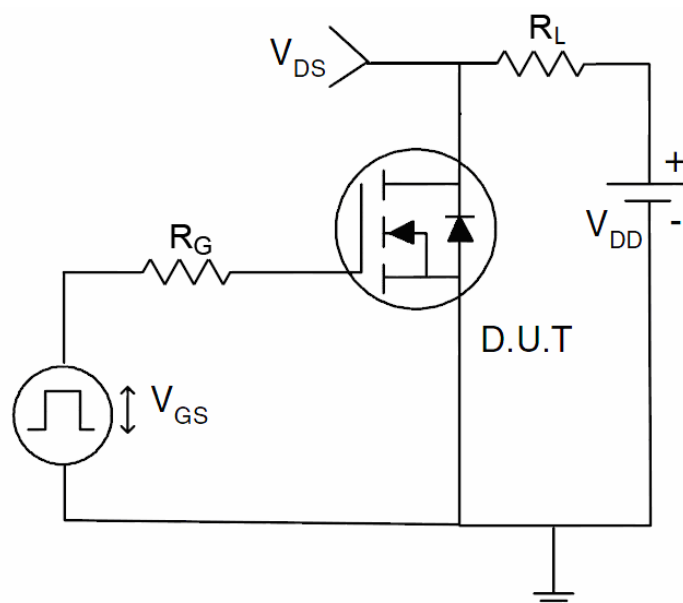
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



RATING AND CHARACTERISTICS CURVES (RM130N100HD)

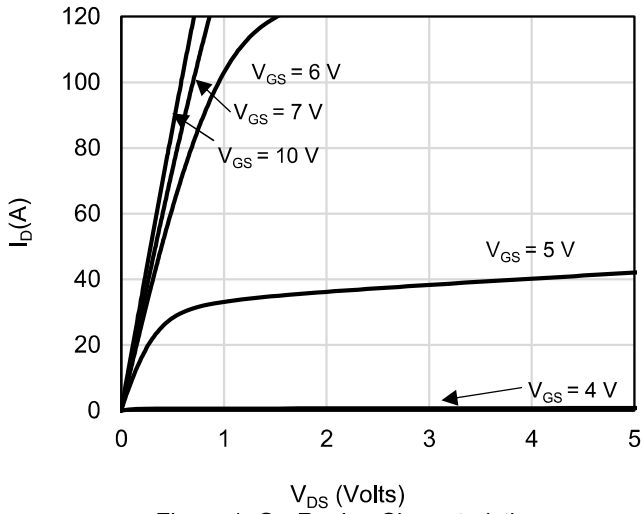


Figure 1: On-Region Characteristics

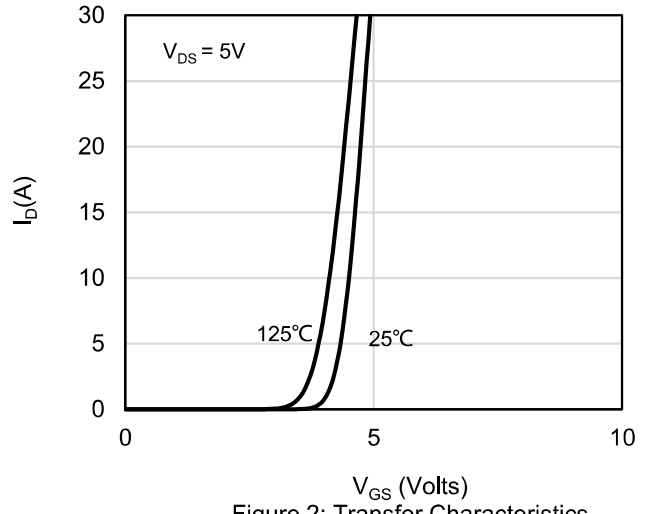


Figure 2: Transfer Characteristics

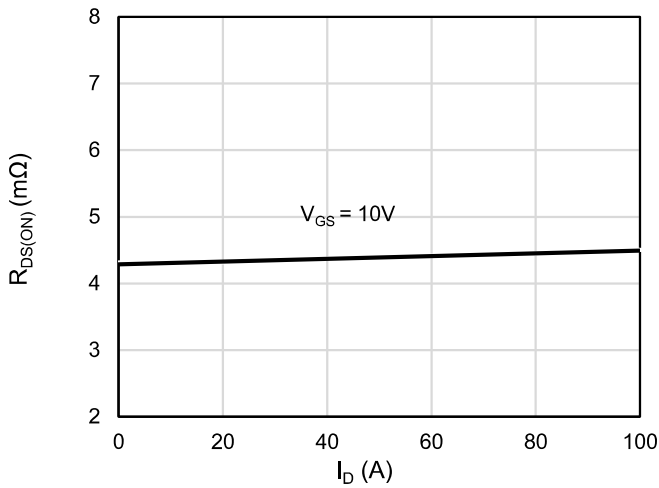


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

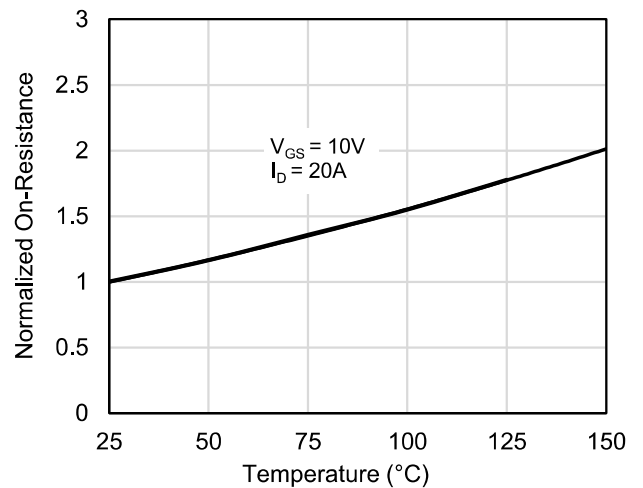


Figure 4: On-Resistance vs. Junction Temperature

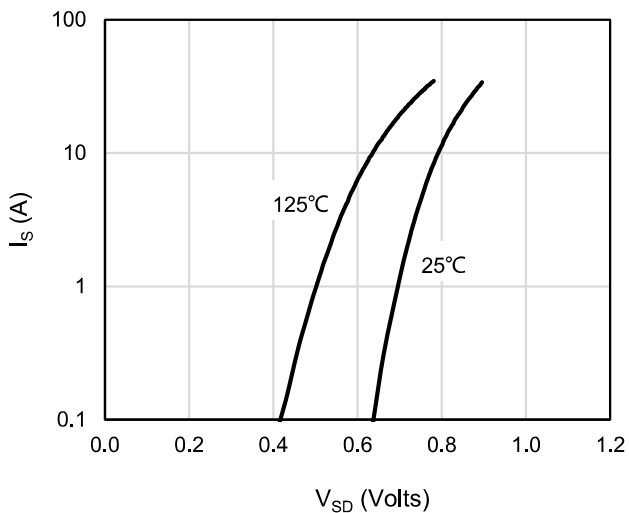


Figure 7: Body-Diode Characteristics

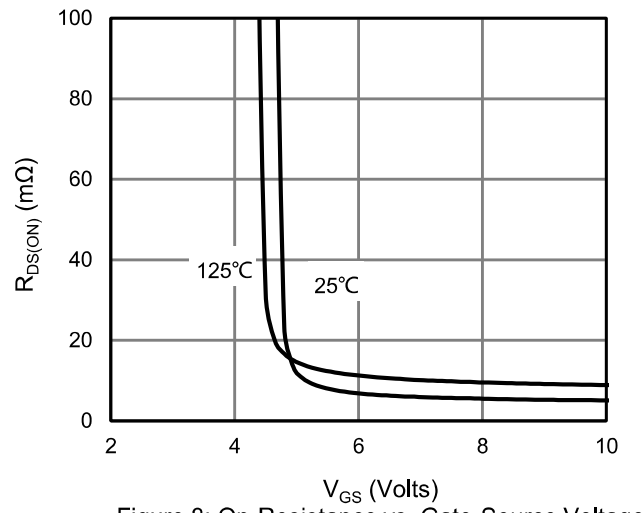


Figure 8: On-Resistance vs. Gate-Source Voltage

RATING AND CHARACTERISTICS CURVES (RM130N100HD)

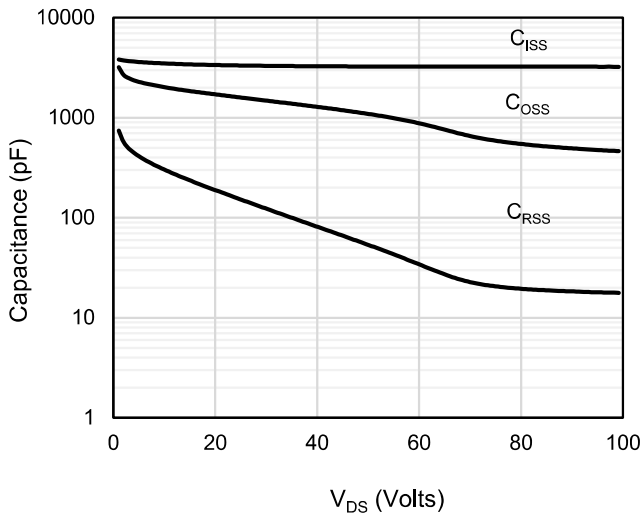


Figure 9: Capacitance Characteristics

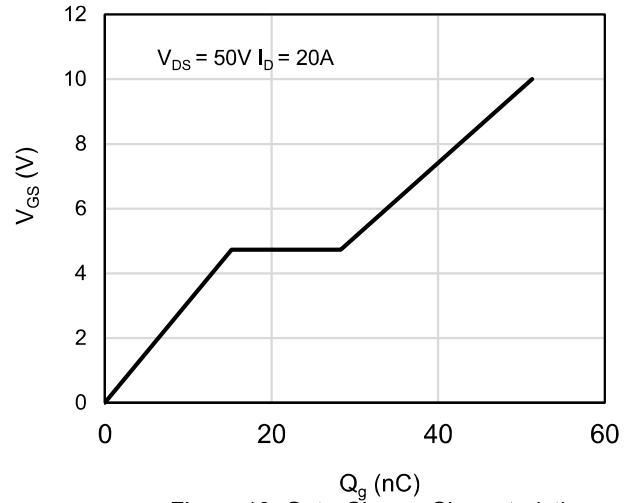


Figure 10: Gate-Charge Characteristics

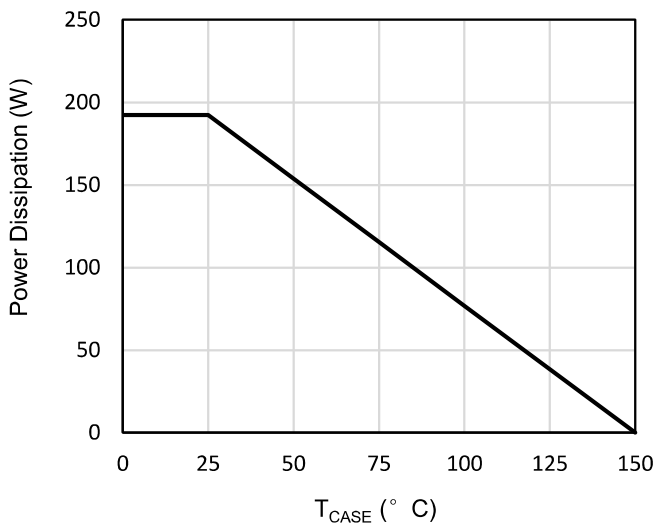


Figure 11: Power De-rating

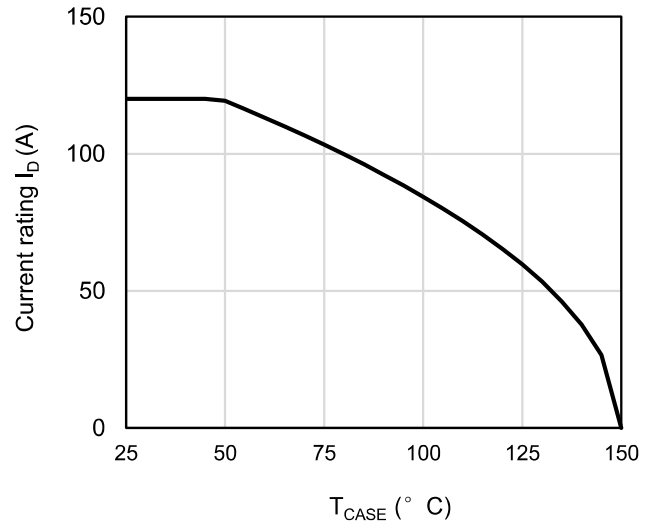


Figure 12: Current De-rating

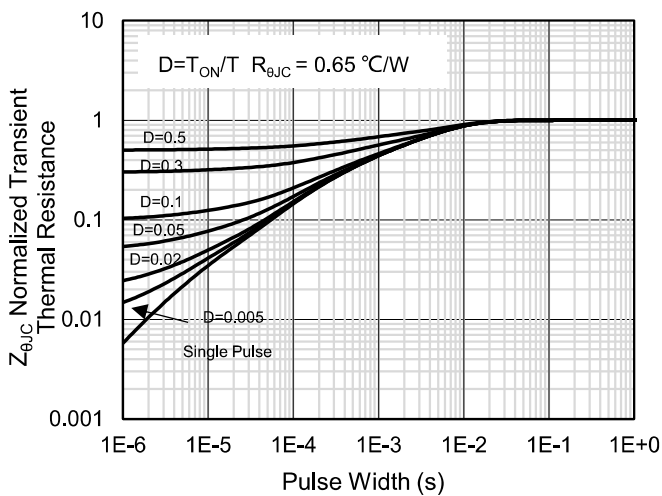


Figure 13: Normalized Maximum Transient Thermal Impedance

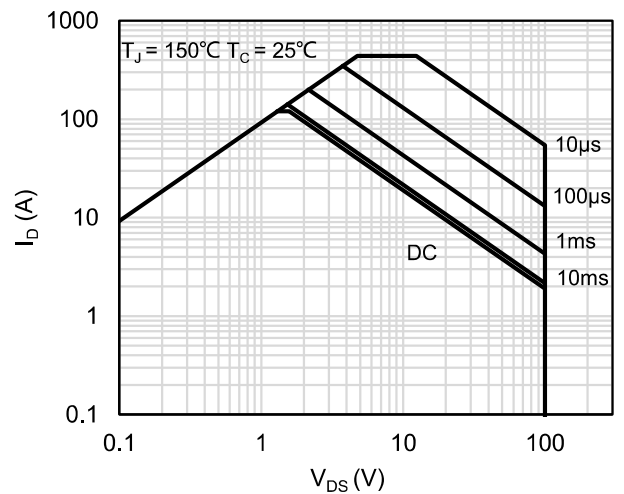
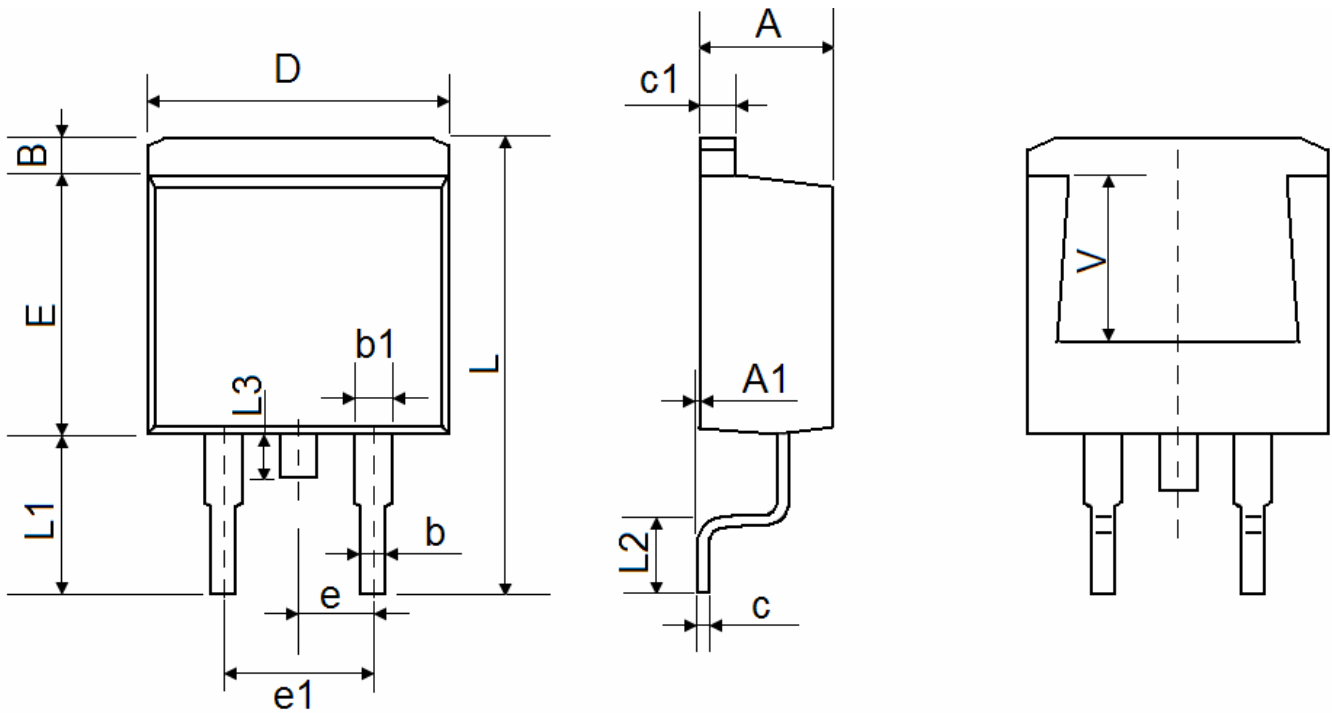


Figure 14: Maximum Forward Biased Safe Operating Area

TO-263-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.170	1.370	0.046	0.054
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
L	15.050	15.450	0.593	0.608
L1	5.080	5.480	0.200	0.216
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
V	5.600 REF		0.220 REF	

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