

N-Channel Enhancement Mode Power MOSFET

Description

The HM3207BD uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in Automotive applications and a wide variety of other applications.

General Features

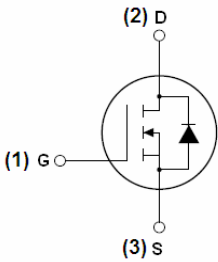
- $V_{DSS}=70V, I_D=180A$
 $R_{DS(ON)} < 4m\Omega @ V_{GS}=10V$
- Good stability and uniformity with high E_{AS}
- Special process technology for high ESD capability
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Application

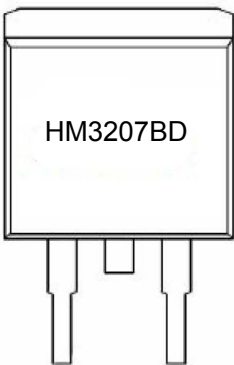
- Automotive applications
- Hard switched and high frequency circuits
- Uninterruptible power supply

100% UIS TESTED!

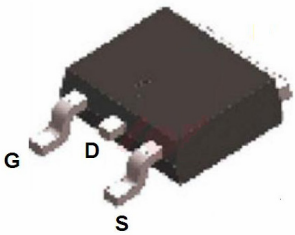
100% ΔV_{ds} TESTED!



Schematic diagram



Marking and pin Assignment



TO-263-2L top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
HM3207BD	HM3207BD	TO-263-2L			

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DSS}	70	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	180	A
Drain Current-Continuous($T_C=100^\circ C$)	$I_D(100^\circ C)$	150	A
Pulsed Drain Current	I_{DM}	720	A
Maximum Power Dissipation	P_D	310	W
Derating factor		2.07	W/°C

Single pulse avalanche energy (Note 4)	E_{AS}	2200	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 1)	$R_{\theta JC}$	0.48	°C/W
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Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

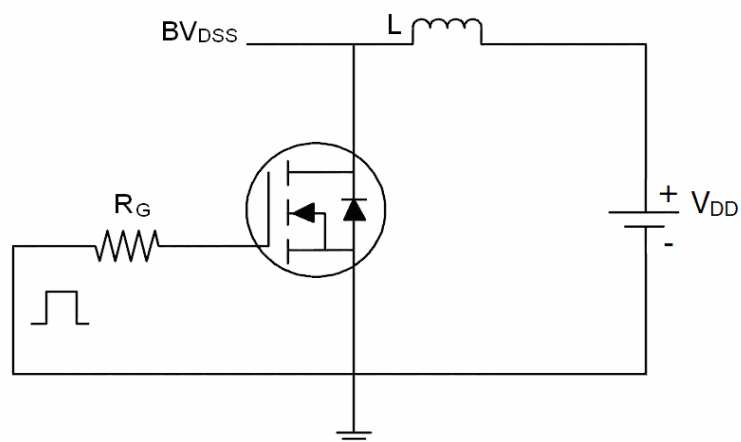
Parameter		Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V I _D =250μA	70			V
Zero Gate Voltage Drain Current		I _{DSS}	V _{DS} =70V,V _{GS} =0V			1	μA
Gate-Body Leakage Current		I _{GSS}	V _{GS} =±20V,V _{DS} =0V			±200	nA
On Characteristics							
Gate Threshold Voltage		V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	2	3	4	V
Drain-Source On-State Resistance	25℃	R _{DS(ON)}	V _{GS} =10V, I _D =40A		2.7	4	mΩ
	125℃				4.7	6.5	mΩ
Forward Transconductance		g _{FS}	V _{DS} =25V,I _D =40A	100	165		S
Dynamic Characteristics							
Input Capacitance		C _{iss}	V _{DS} =25V,V _{GS} =0V, F=1.0MHz		11000		PF
Output Capacitance		C _{oss}			914		PF
Reverse Transfer Capacitance		C _{rss}			695		PF
Switching Characteristics							
Turn-on Delay Time		t _{d(on)}	V _{DD} =30V,I _D =2A,R _L =15Ω V _{GS} =10V,R _G =2.5Ω		23		nS
Turn-on Rise Time		t _r			190		nS
Turn-Off Delay Time		t _{d(off)}			130		nS
Turn-Off Fall Time		t _f			120		nS
Total Gate Charge		Q _g	ID=30A,VDD=30V,VGS=10V	-	250		nC
Gate-Source Charge		Q _{gs}		-	48		nC
Gate-Drain Charge		Q _{gd}		-	98		nC
Drain-Source Diode Characteristics							
Diode Forward Voltage		V _{SD}	V _{GS} =0V,I _S =40A			1.2	V
Reverse Recovery Time		t _{rr}	TJ = 25℃, IF = 40A		63		nS
Reverse Recovery Charge		Q _{rr}	di/dt = 100A/μs(Note2)		98		nC
Forward Turn-On Time		t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

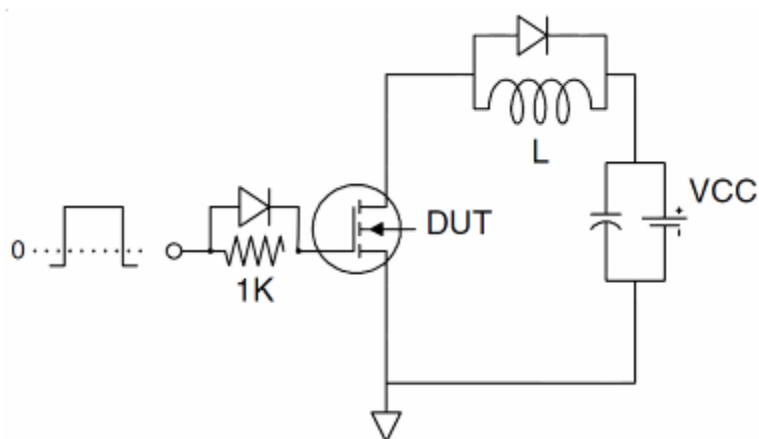
1. Surface Mounted on FR4 Board, $t \leq 10$ sec.
2. Pulse Test: Pulse Width $\leq 400\mu s$, Duty Cycle $\leq 2\%$.
3. EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=37.5V, V_G=10V, L=2mH, R_g=25\Omega, I_{AS}=37A$

Test circuit

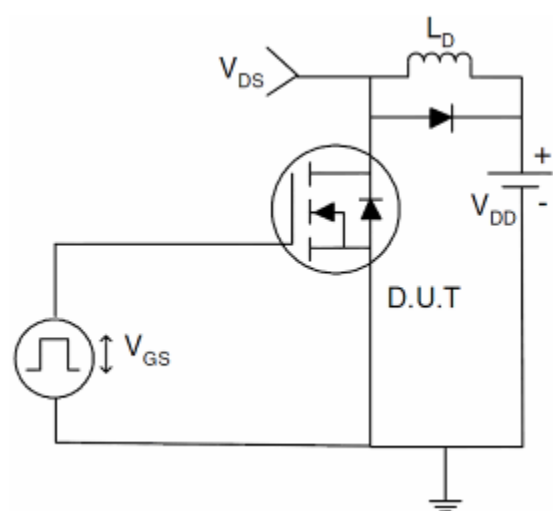
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics

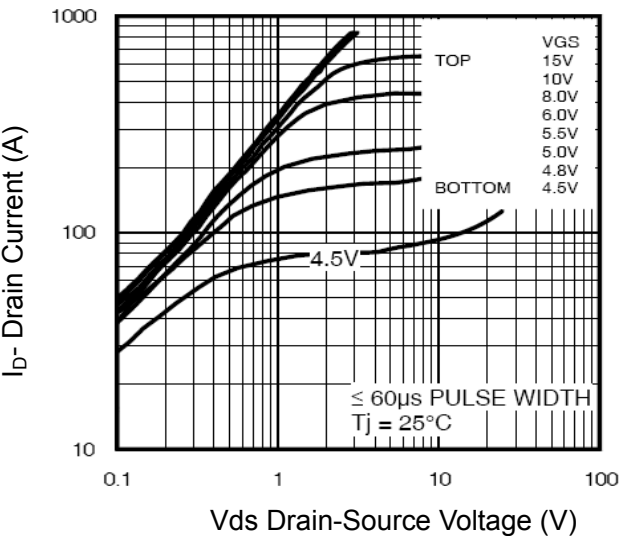


Figure 1 Output Characteristics

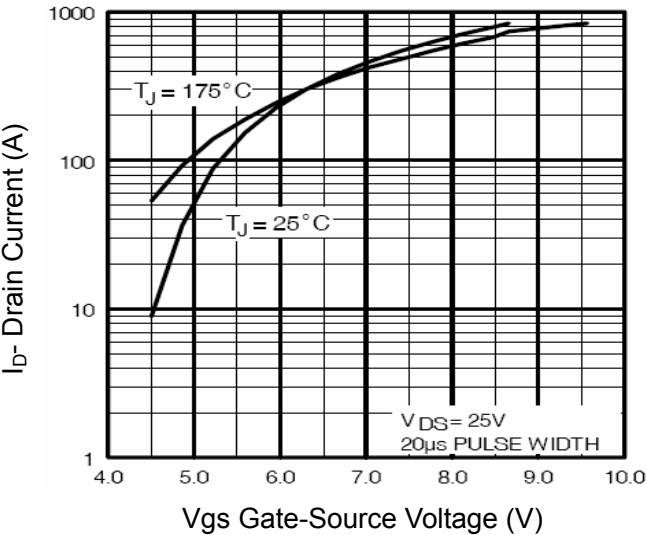


Figure 2 Transfer Characteristics

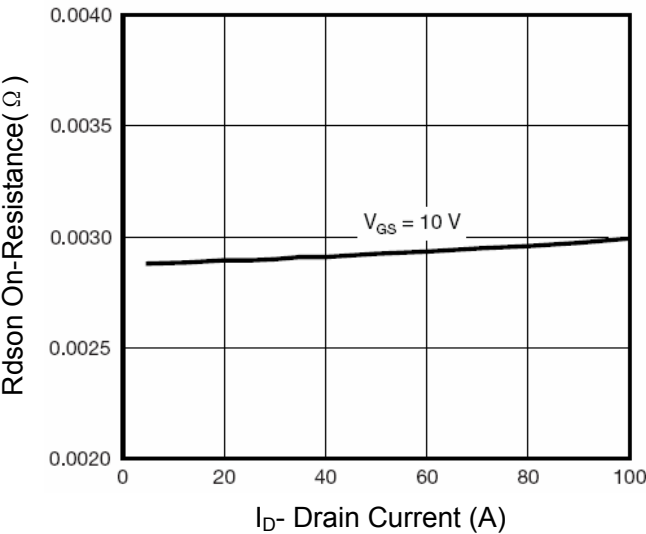


Figure 3 $R_{DS(on)}$ - Drain Current

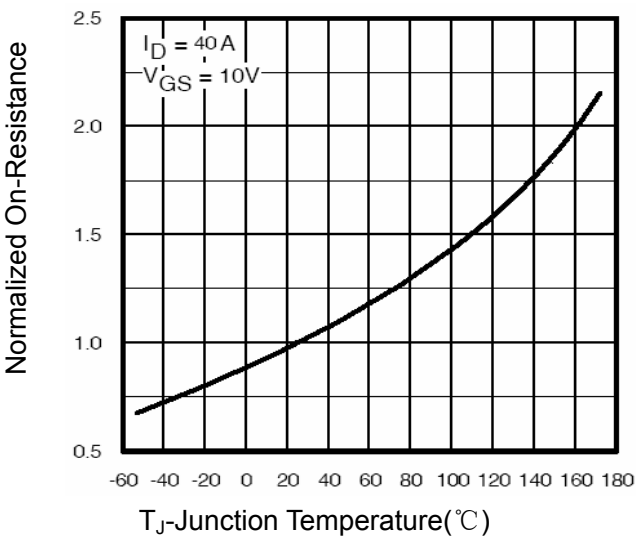


Figure 4 $R_{DS(on)}$ -Junction Temperature

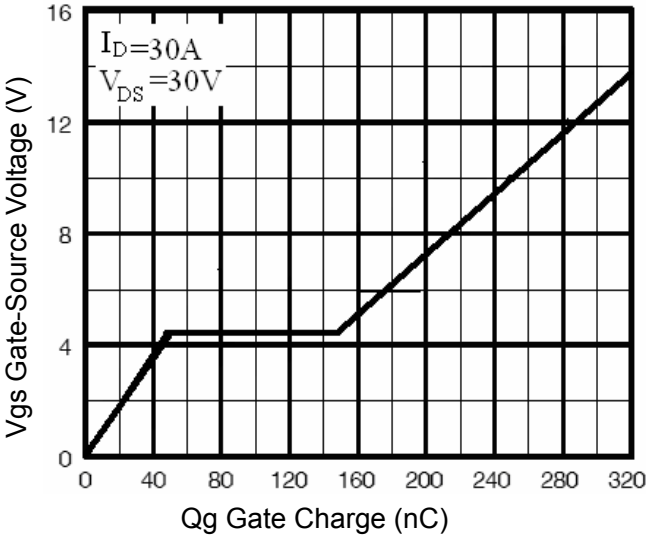


Figure 5 Gate Charge

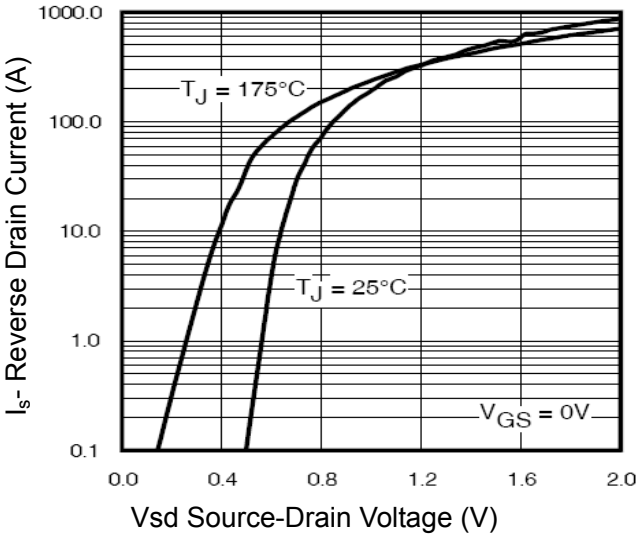


Figure 6 Source- Drain Diode Forward

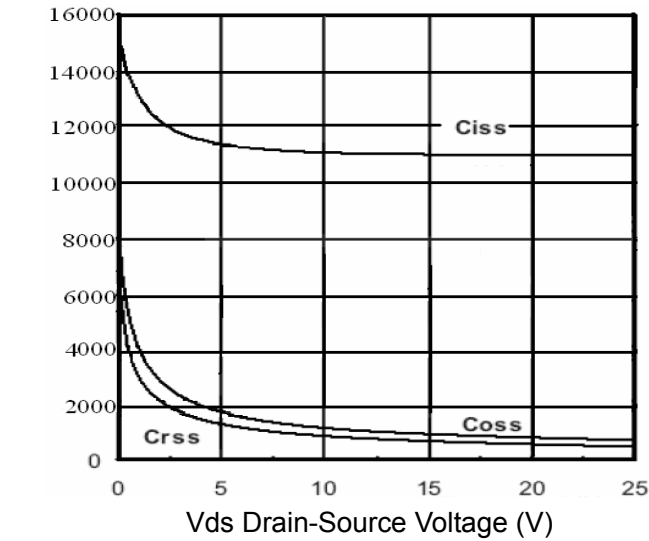


Figure 7 Capacitance vs Vds

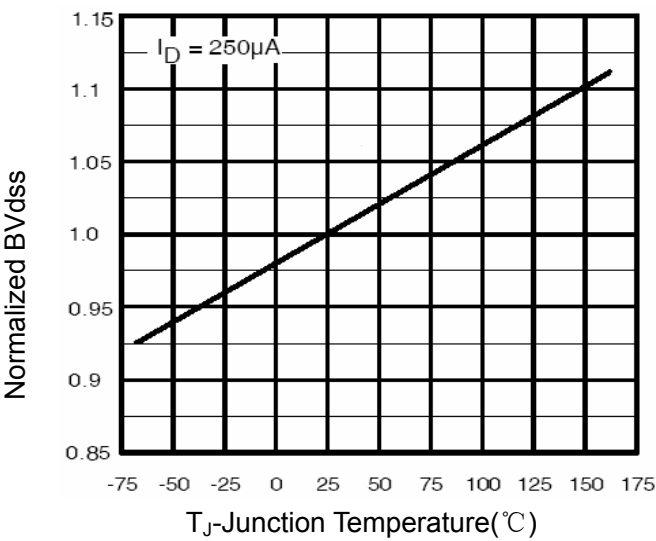


Figure 9 BV_{DSS} vs Junction Temperature

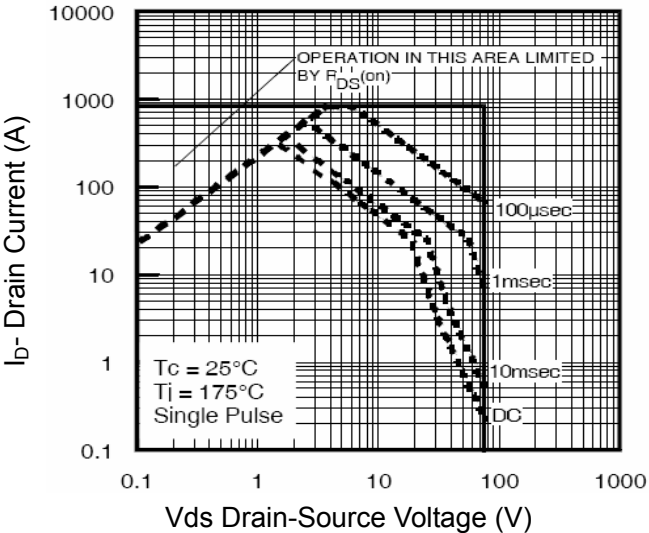


Figure 8 Safe Operation Area

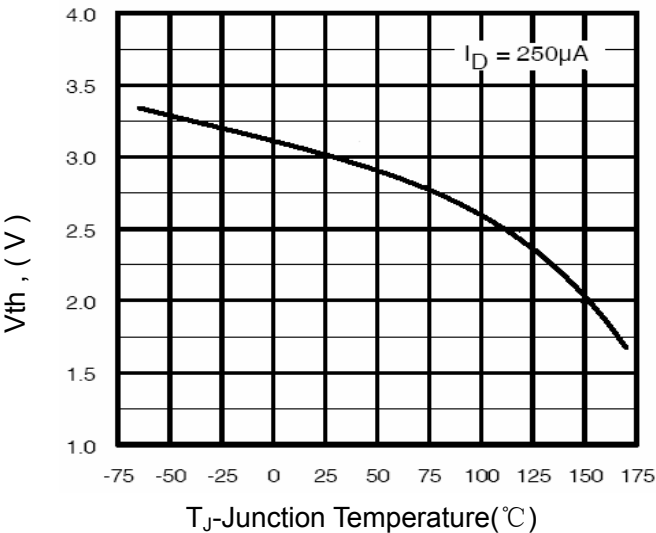


Figure 10 V_{GS(th)} vs Junction Temperature

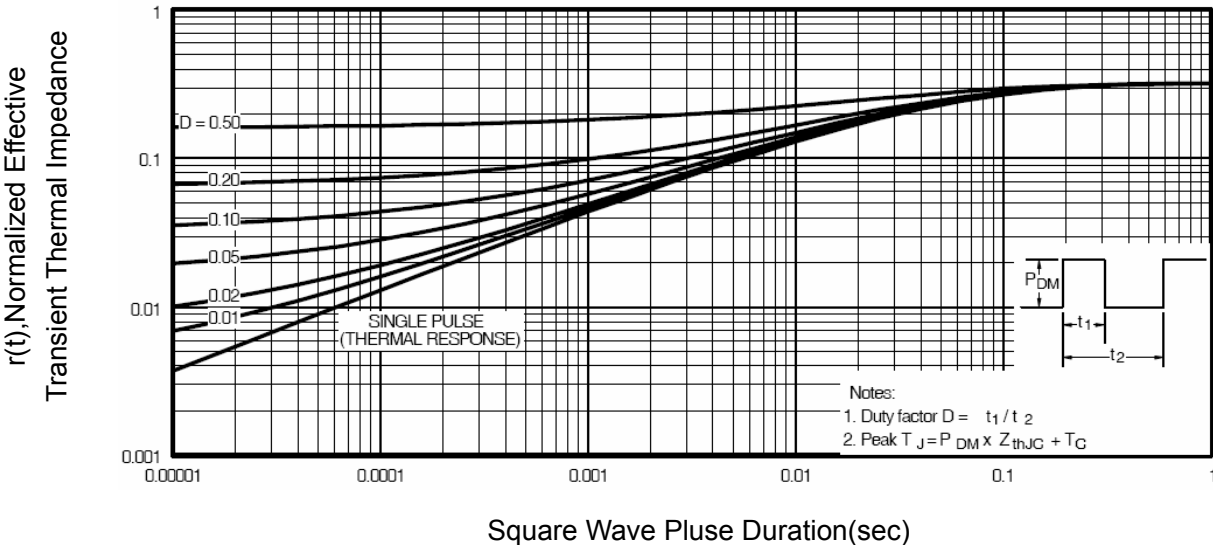
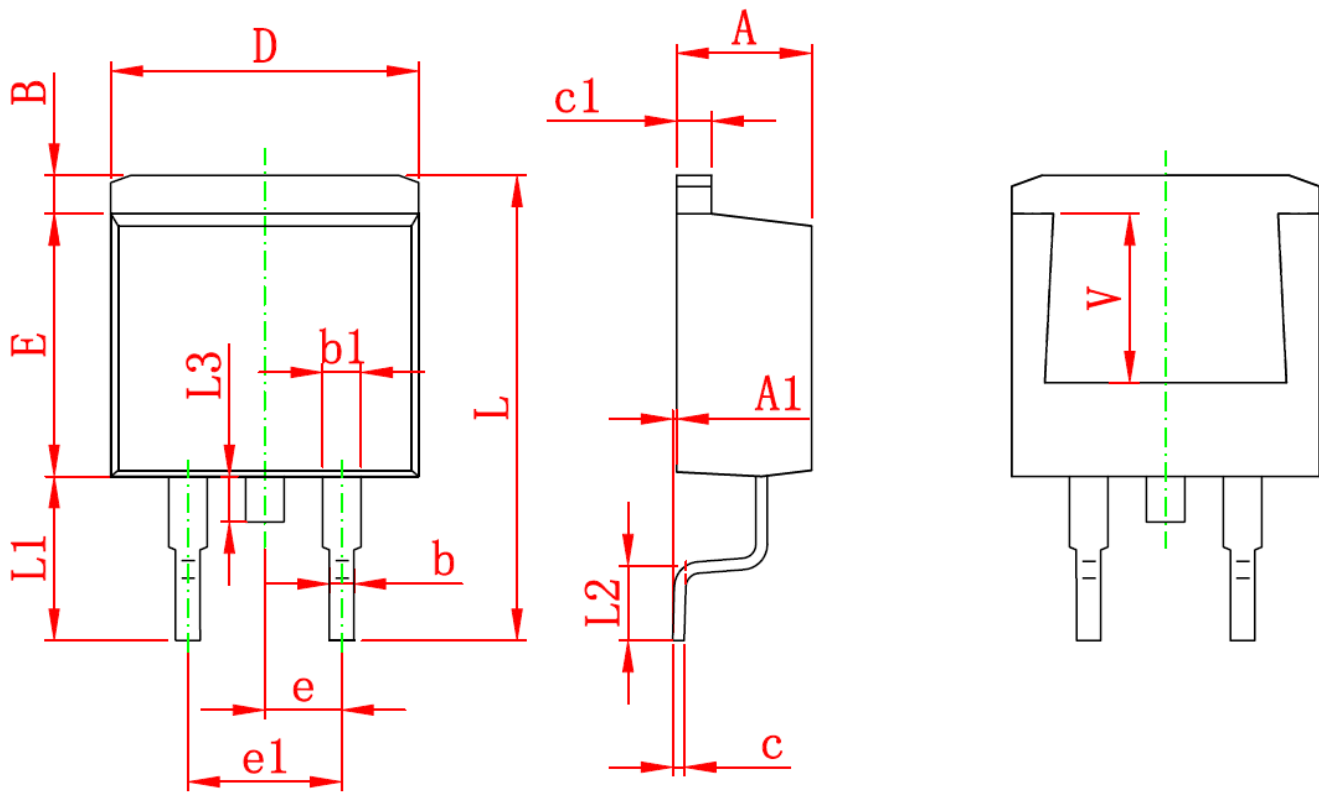


Figure 11 Normalized Maximum Transient Thermal Impedance



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.	