

FH3510BS2

N-Channel Enhancement Mode MOSFET

Description

The FH3510BS2 uses deep trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

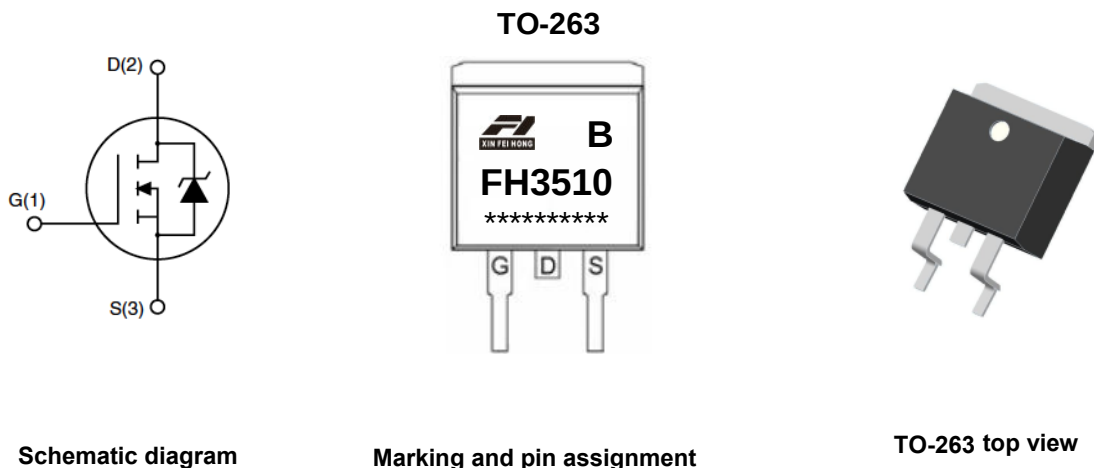
- High Power and current handling capability
- Lead free product is acquired

General Features

- $V_{DS} = 100V$, $I_D = 148A$
- $R_{DS(ON)}$ (Typ) : $3.0m\Omega$ @ $V_{GS} = 10V$

Application

- Battery management
- Motor control and drive
- UPS (uninterruptible power supply)



Schematic diagram

Marking and pin assignment

TO-263 top view

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	148	A
Drain Current-Continuous (TC=100°C)	$I_D(TC=100^\circ C)$	93	A
Pulsed Drain Current (Note 1)	I_{DM}	453	A
Maximum Power Dissipation	P_D	188	W
Single Pulse Avalanche Energy (L=0.5mH)	E_{AS}	440	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	0.54	°C/W
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Electrical Characteristics (TC=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.7	3.3	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=30A$	-	3	3.7	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=30A$	-	100	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V,$ $F=1.0MHz$	-	7880	-	pF
Output Capacitance	C_{oss}		-	940	-	pF
Reverse Transfer Capacitance (Note 4)	C_{rss}		-	40	-	pF
Gate Resistance	R_g	$V_{DS}=0V, V_{GS}=0V, F=1.0MHz$	-	1.3	-	Ω
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=50V, I_D=30A,$ $V_{GS}=10V, R_G=3\Omega$	-	28	-	nS
Turn-on Rise Time	t_r		-	37	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	80	-	nS
Turn-Off Fall Time	t_f		-	45	-	nS
Total Gate Charge	Q_g	$V_{DS}=50V, I_D=30A,$ $V_{GS}=10V$	-	122	-	nC
Gate-Source Charge	Q_{gs}		-	52	-	nC
Gate-Drain Charge	Q_{gd}		-	49	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=10A$	-	-	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F=30A, dI/dt=100A/\mu s$	-	55	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	460	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to product.

Typical Electrical and Thermal Characteristics

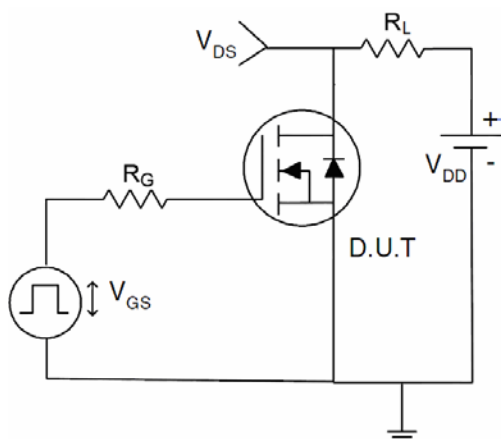


Figure 1 Switching Test Circuit

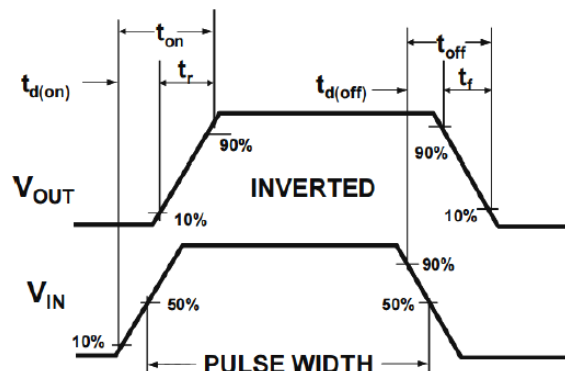


Figure 2 Switching Waveform

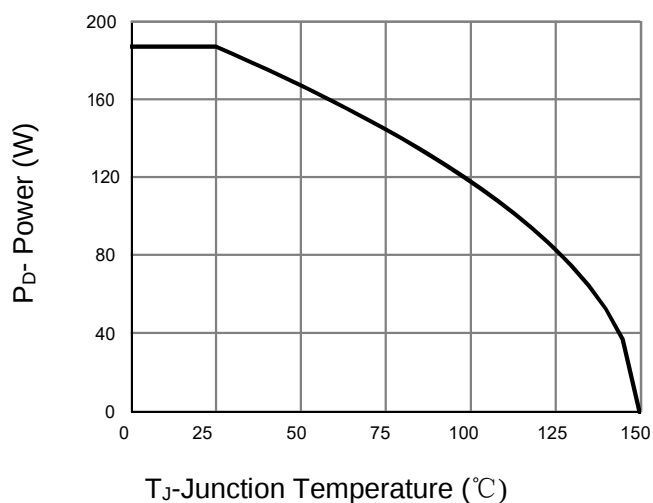


Figure 3 Power De-rating

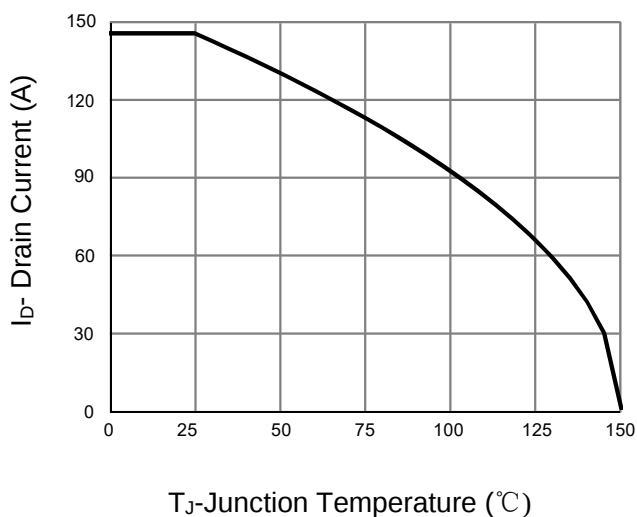


Figure 4 Drain Current

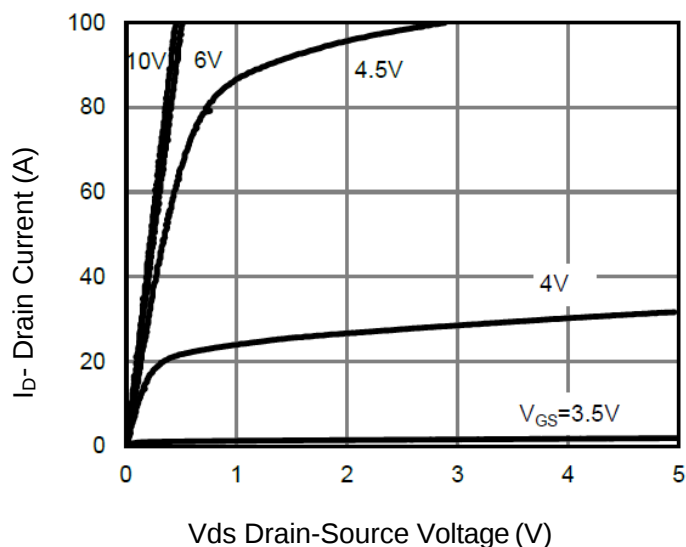


Figure 5 Output Characteristics

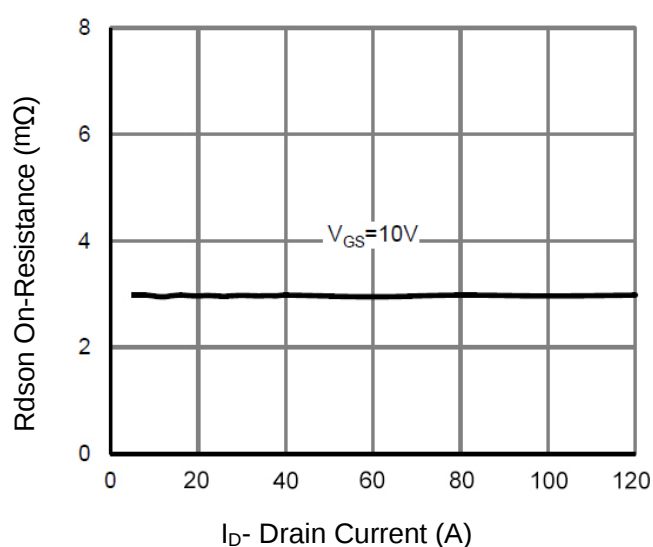


Figure 6 Rdson vs Drain Current

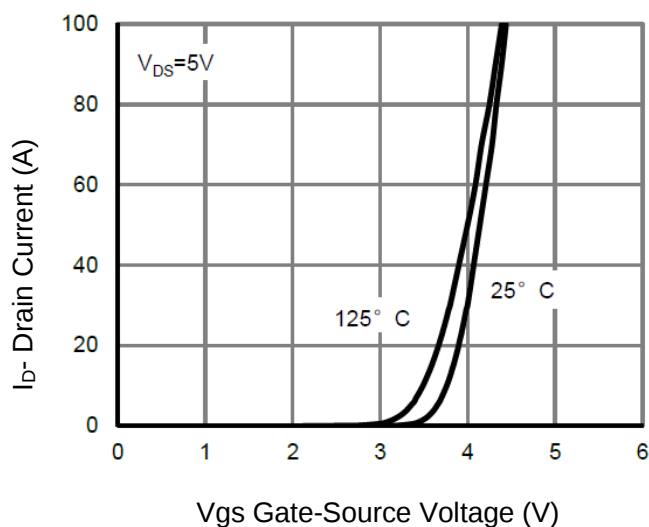


Figure 7 Transfer Characteristics

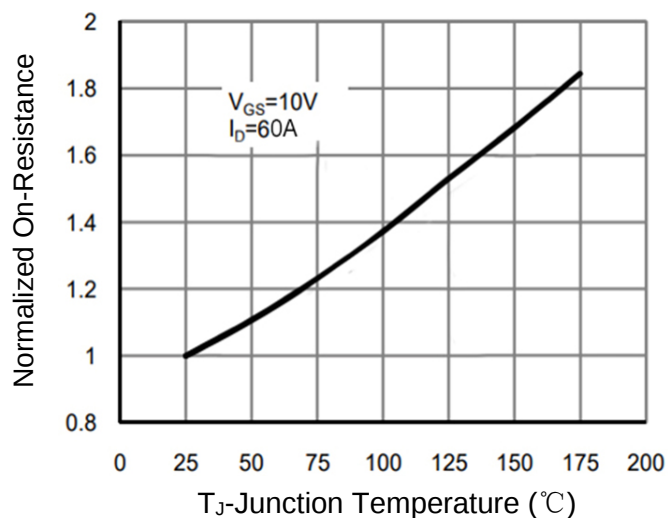


Figure 8 Rdson vs Junction Temperature

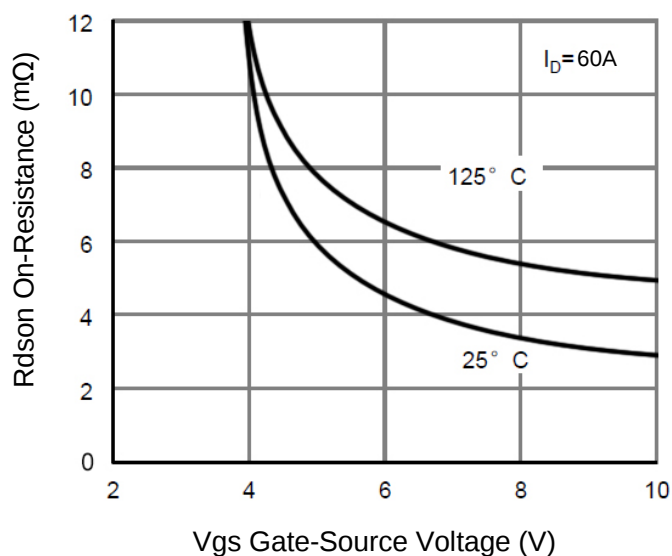
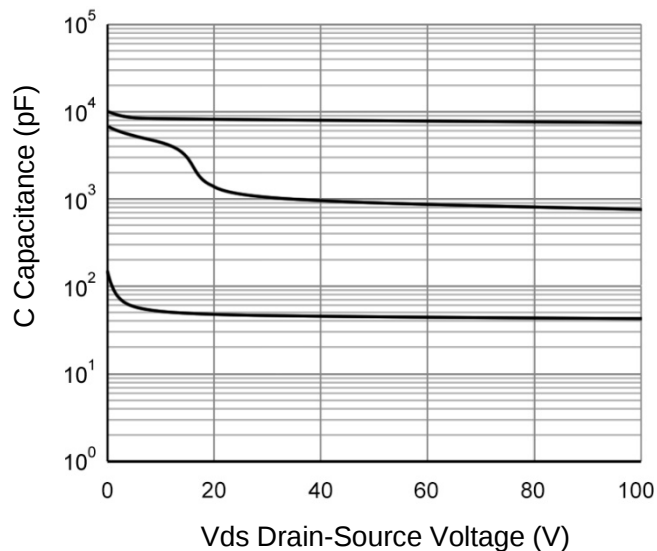
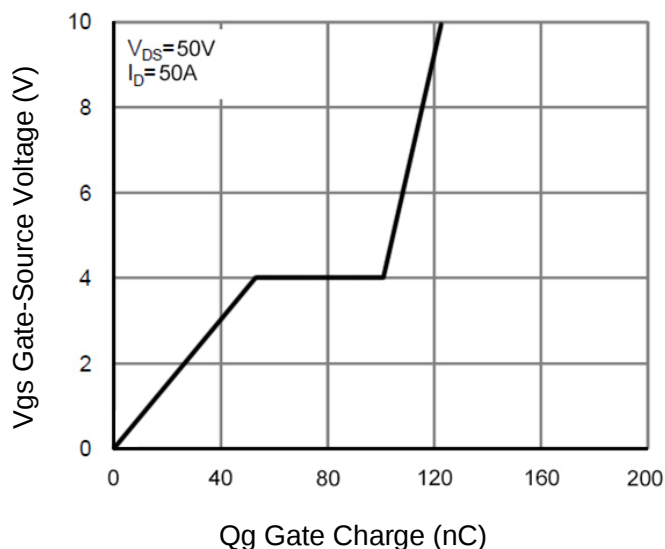
Figure 9 Rdson vs V_{GS}Figure 10 Capacitance vs V_{DS}

Figure 11 Gate Charge

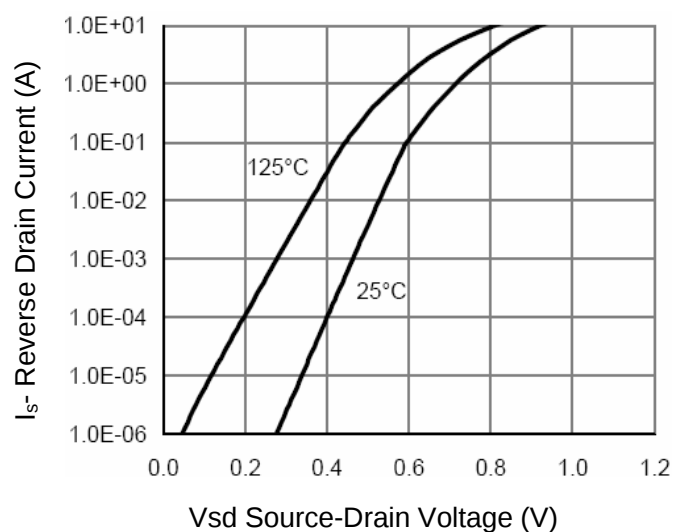


Figure 12 Source- Drain Diode Forward

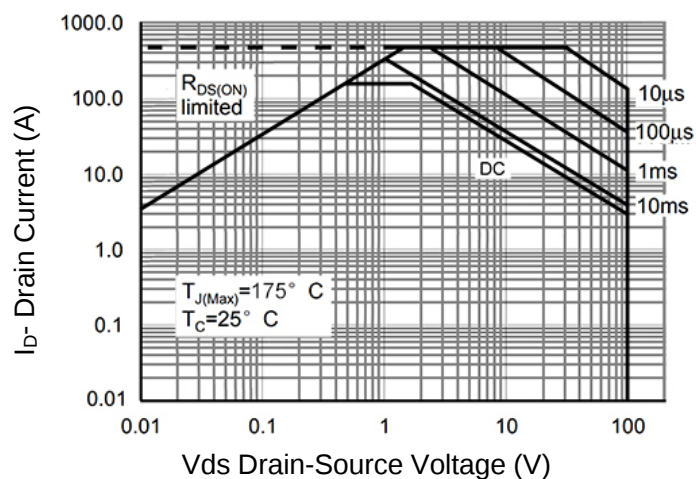


Figure 13 Safe Operation Area

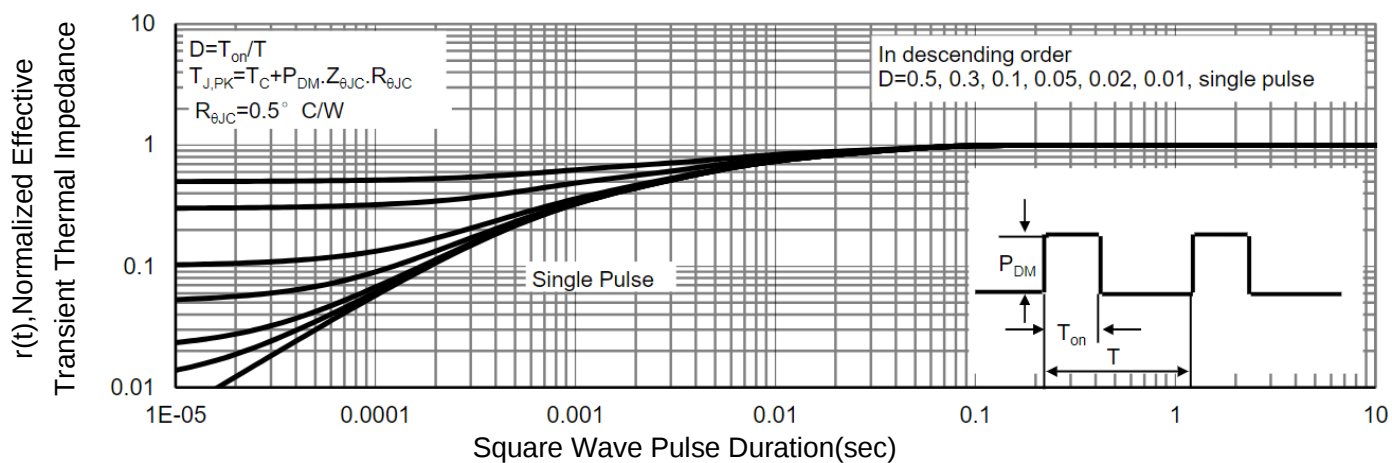
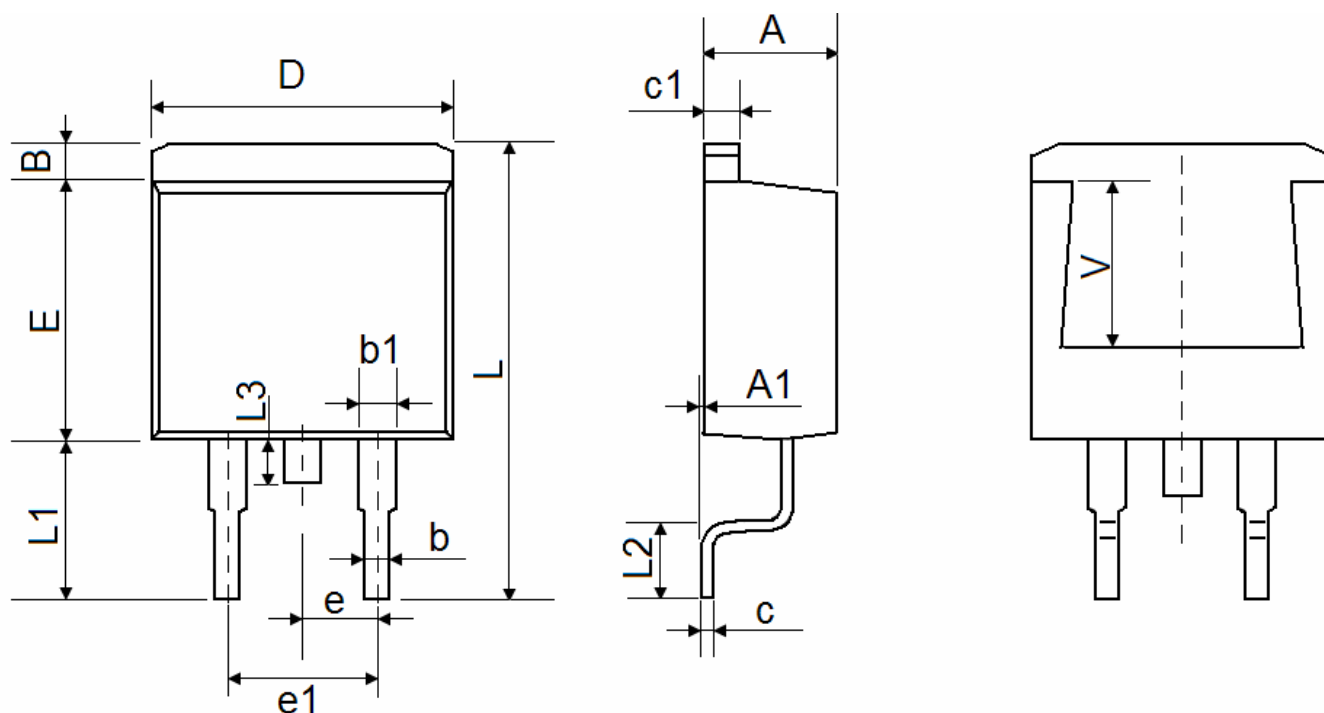


Figure 14 Normalized Maximum Transient Thermal Impedance

Package Information : TO-263



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	