

P-Channel Enhancement Mode Power MOSFET

Description

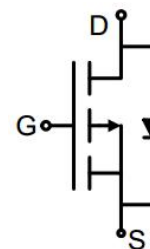
The GT090P08M uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

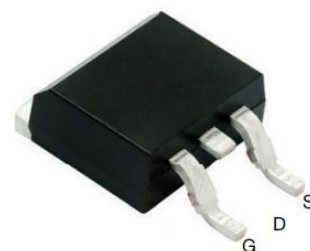
- V_{DS} -80V
- I_D (at $V_{GS} = -10V$) -178A
- $R_{DS(ON)}$ (at $V_{GS} = -10V$) < 9m Ω
- $R_{DS(ON)}$ (at $V_{GS} = -4.5V$) < 10m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



TO-263

Ordering Information

Device	Package	Marking	Packaging
GT090P08M	TO-263	GT090P08	800pcs/Reel

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-80	V
Continuous Drain Current	I_D	-178	A
		-113	
Pulsed Drain Current (note1)	I_{DM}	-712	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	490	W
Single pulse avalanche energy (note2)	E_{AS}	930	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	60	$^\circ\text{C/W}$
Maximum Junction-to-Case	R_{thJC}	0.26	$^\circ\text{C/W}$

Specifications T _J = 25°C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-80	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -80V, V _{GS} = 0V	--	--	-1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-1.0	-1.5	-2.5	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = -10V, I _D = -40A	--	7.5	9	mΩ
		V _{GS} = -4.5V, I _D = -40A	--	8.5	10	
Forward Transconductance	g _{FS}	V _{DS} = -5V, I _D = -40A	--	84	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = -40V, f = 1.0MHz	--	11170	--	pF
Output Capacitance	C _{oss}		--	930	--	
Reverse Transfer Capacitance	C _{rss}		--	435	--	
Total Gate Charge	Q _g	V _{DD} = -40V, I _D = -40A, V _{GS} = -10V	--	173	--	nC
Gate-Source Charge	Q _{gs}		--	34	--	
Gate-Drain Charge	Q _{gd}		--	18	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = -40V, I _D = -40A, R _G = 3Ω	--	36	--	ns
Turn-on Rise Time	t _r		--	40	--	
Turn-off Delay Time	t _{d(off)}		--	110	--	
Turn-off Fall Time	t _f		--	70	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	-178	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = -40A, V _{GS} = 0V	--	--	-1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = -40A, V _{GS} = 0V di/dt=-100A/us	--	78	--	nC
Reverse Recovery Time	T _{rr}		--	142	--	ns

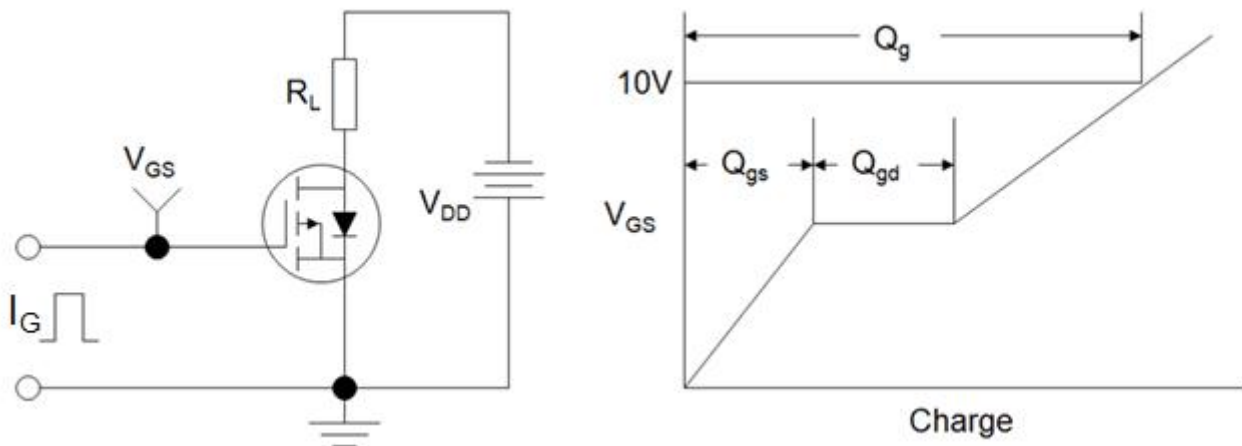
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : $T_J = 25^\circ\text{C}$, $V_{DD} = -50V$, $V_{GS} = -10V$, $L = 0.5mH$, $R_g = 25\Omega$

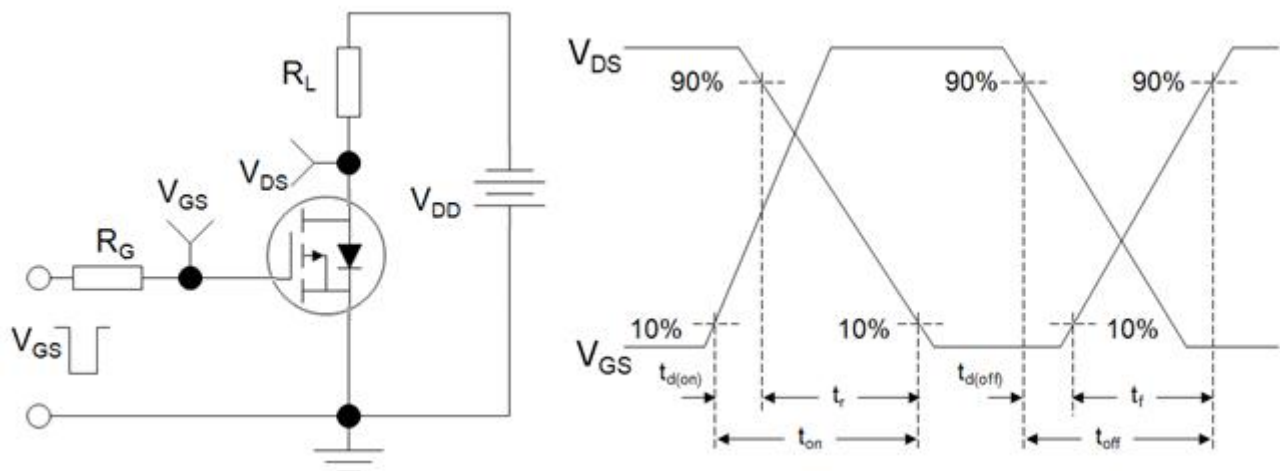
The table shows the minimum avalanche energy, which is 2550mJ when the device is tested until failure

3. Identical low side and high side switch with identical R_G

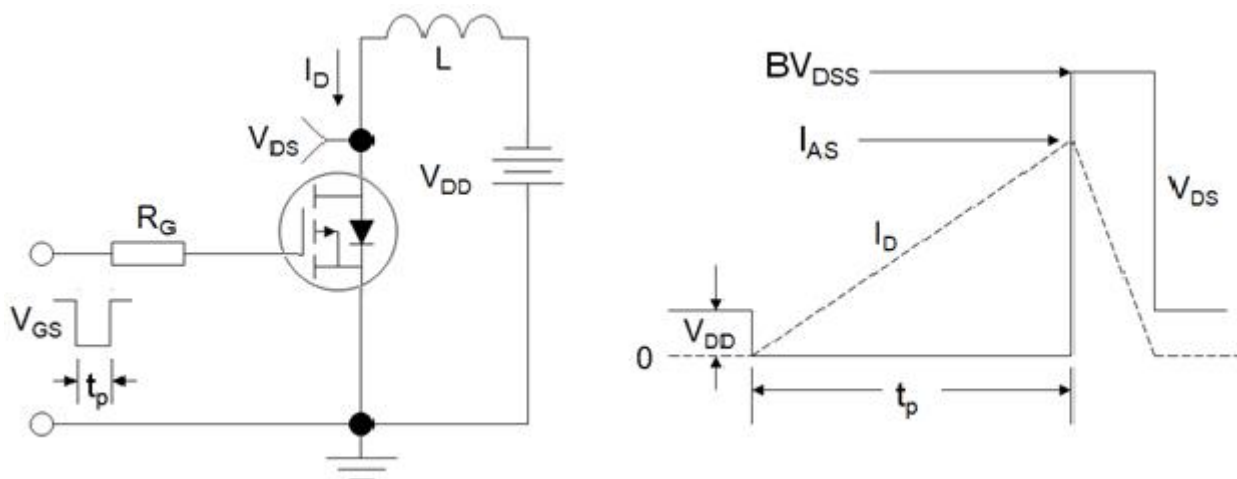
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

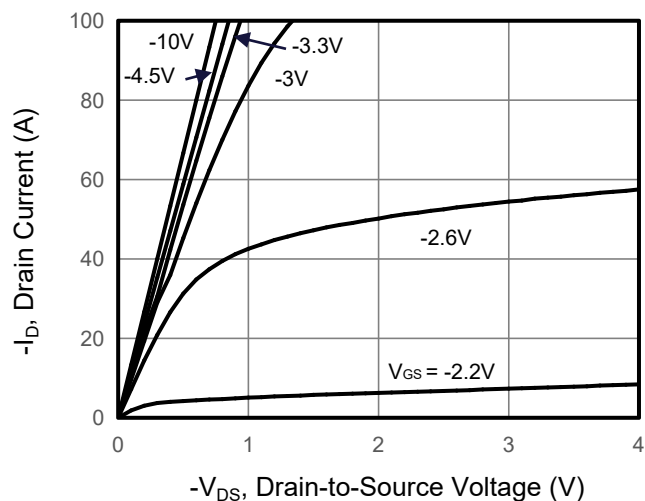


Figure 2. Transfer Characteristics

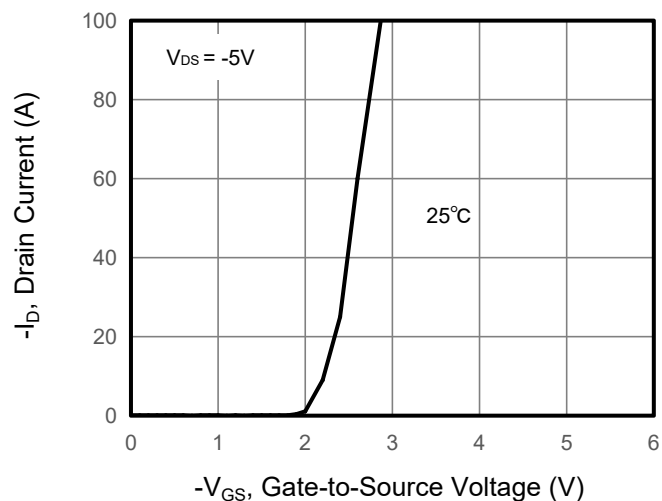


Figure 3. Drain Source On Resistance

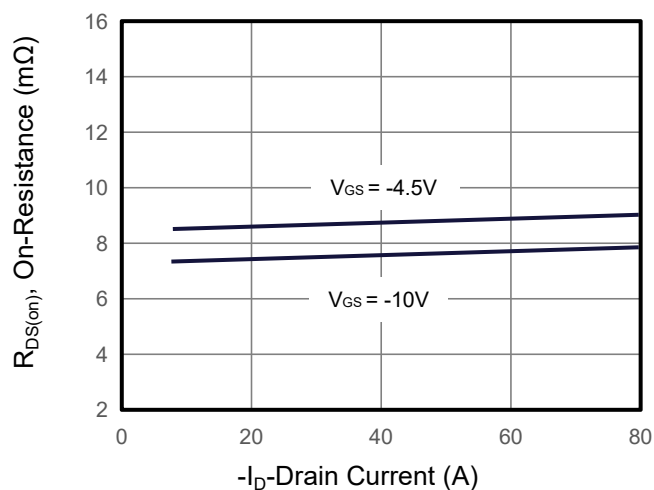


Figure 4. Gate Charge

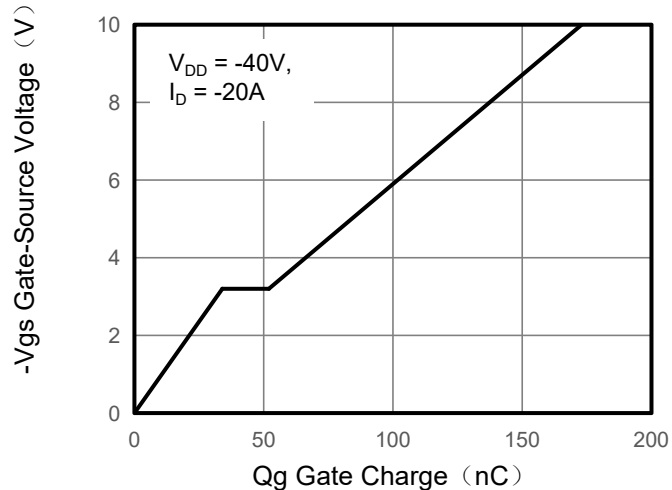


Figure 5. Capacitance

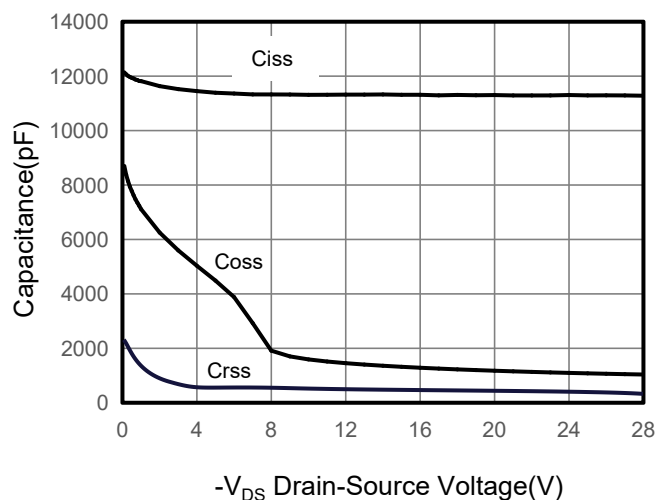
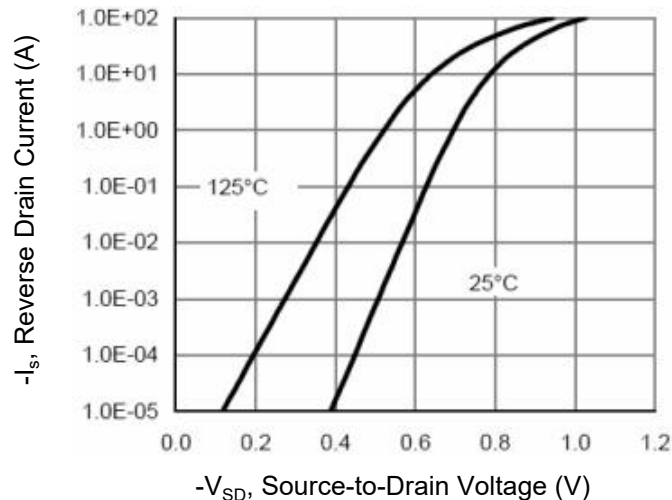


Figure 6. Source-Drain Diode Forward



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

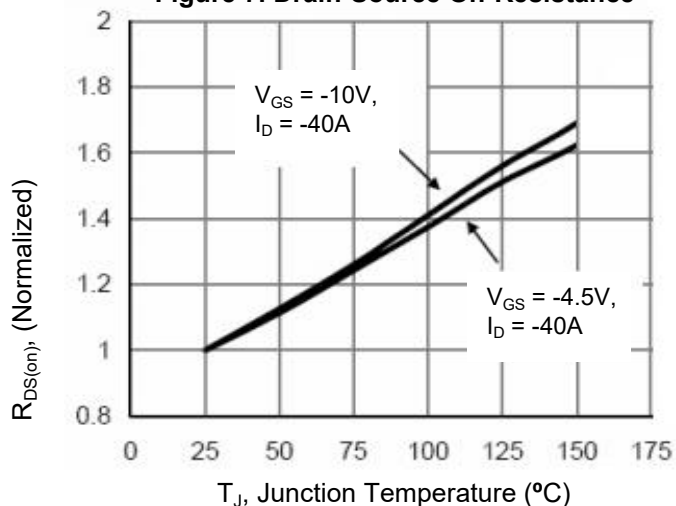


Figure 8. Safe Operation Area

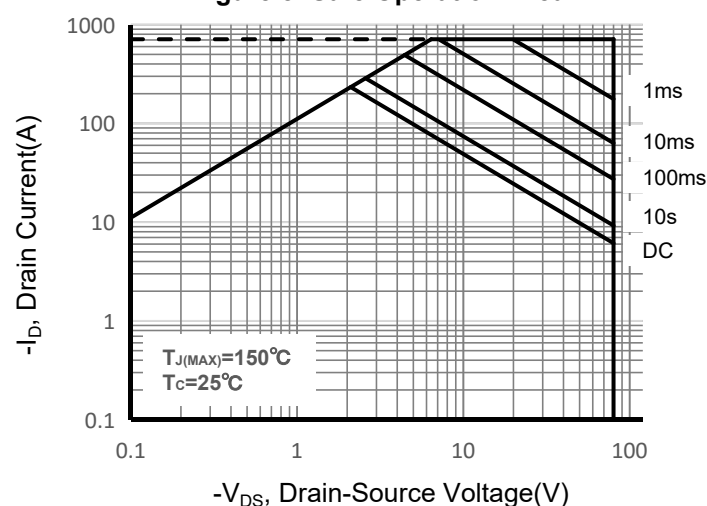


Figure 9. Maximum Continuous Drain Current vs Case Temperature

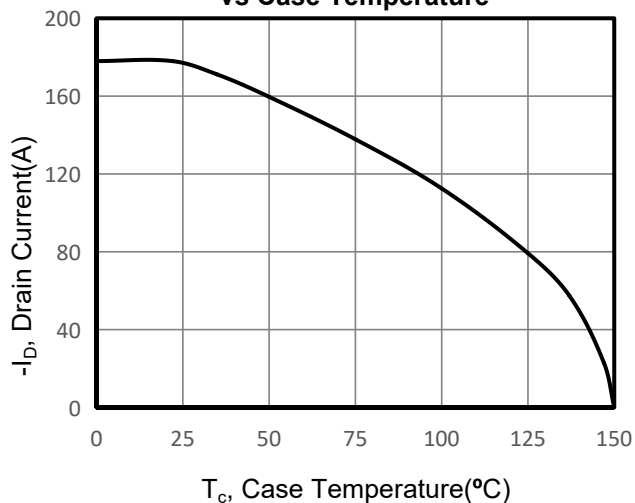
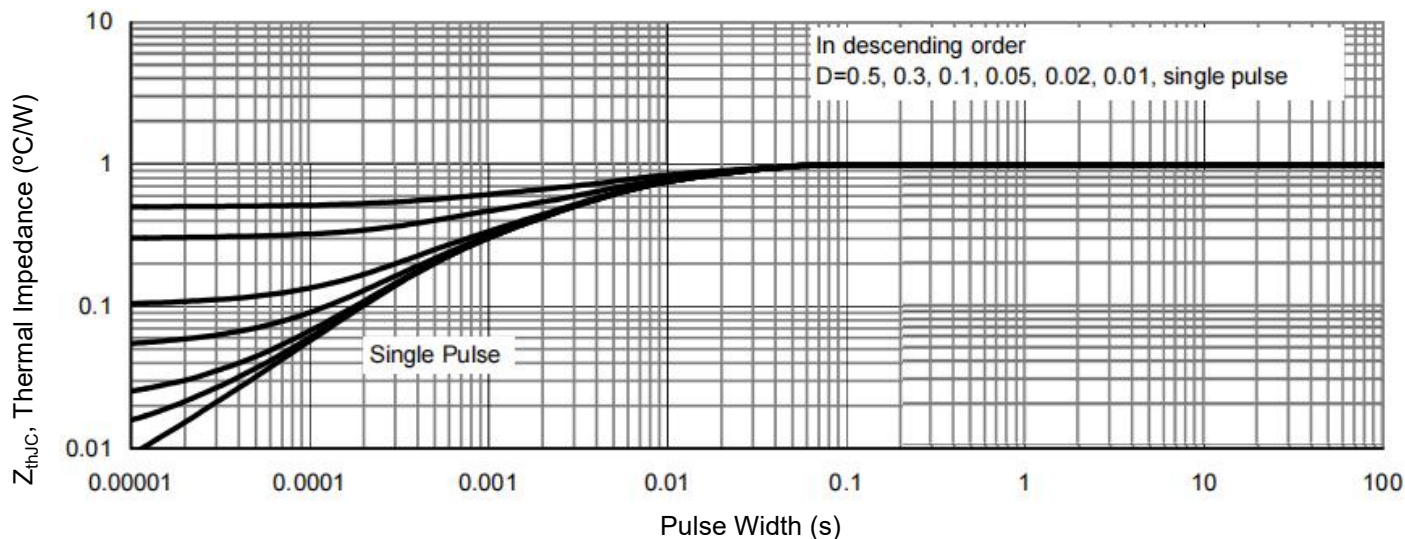
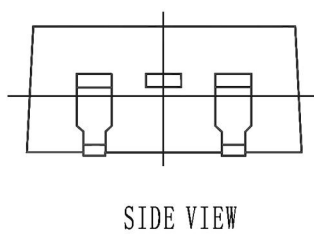
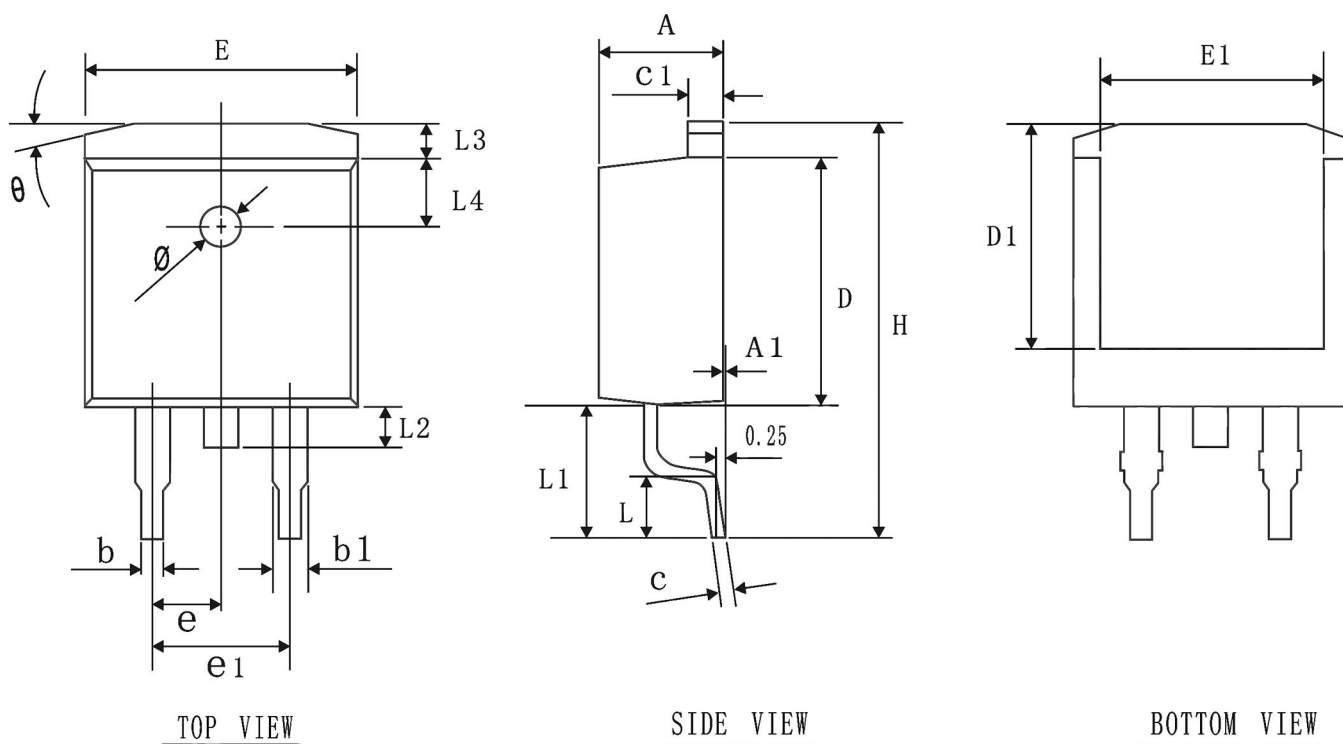


Figure 10. Normalized Maximum Transient Thermal Impedance



TO-263 Package Information



COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	0.00	NA	0.25
b	0.70	0.80	0.90
b 1	1.20	1.30	1.40
c	0.40	0.47	0.55
C 1	1.25	1.30	1.35
D	9.00	9.10	9.20
D 1	8.00	8.10	8.20
H	14.9	15.2	15.5
E	9.80	10.0	10.2
E 1	7.85	8.00	8.15
e 1	4.93	5.08	5.23
L	2.00	2.20	2.45
L 1	4.60	4.80	5.00
L 2	1.30	1.50	1.70
L 3	1.15	1.25	1.35
L 4	2.40	2.50	2.60
$\emptyset$	1.5 REF		
e	2.54 BSC		
θ	13° TYP		