

N-Channel Enhancement Mode Power MOSFET

Description

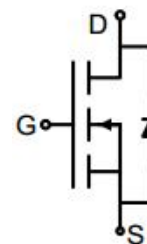
The GT020N10M uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

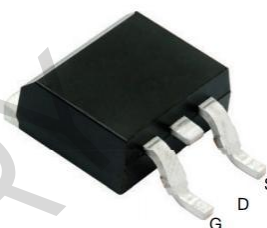
- V_{DS} 100V
- I_D (at $V_{GS} = 10V$) 250A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 2m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



TO-263

Ordering Information

Device	Package	Marking	Packaging
GT020N10M	TO-263	GT020N10	2000pcs/Reel

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Continuous Drain Current	I_D	250	A
		158	
Pulsed Drain Current (note1)	I_{DM}	1000	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	278	W
Single pulse avalanche energy (note2)	E_{AS}	650	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}	40	$^\circ\text{C/W}$
Maximum Junction-to-Case	R_{thJC}	0.45	$^\circ\text{C/W}$

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

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	100	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 100V, V_{GS} = 0V$	--	--	1	μA
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.3	2.8	3.7	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 100A$	--	1.7	2.0	m Ω
Forward Transconductance	g_{FS}	$V_{GS} = 5V, I_D = 100A$	--	94	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 50V,$ $f = 0.8MHz$	--	10600	--	pF
Output Capacitance	C_{oss}		--	1370	--	
Reverse Transfer Capacitance	C_{rss}		--	370	--	
Total Gate Charge	Q_g	$V_{DD} = 50V,$ $I_D = 100A,$ $V_{GS} = 10V$	--	160	--	nC
Gate-Source Charge	Q_{gs}		--	53	--	
Gate-Drain Charge	Q_{gd}		--	60	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 50V,$ $I_D = 100A,$ $R_G = 6\Omega$	--	57	--	ns
Turn-on Rise Time	t_r		--	124	--	
Turn-off Delay Time	$t_{d(off)}$		--	116	--	
Turn-off Fall Time	t_f		--	47	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ C$	--	--	250	A
Body Diode Voltage	V_{SD}	$T_J = 25^\circ C, I_{SD} = 100A, V_{GS} = 0V$	--	--	1.2	V
Reverse Recovery Charge	Q_{rr}	$I_F = 100A, V_{GS} = 0V$ $di/dt=100A/us$	--	139	--	nC
Reverse Recovery Time	T_{rr}		--	64	--	ns

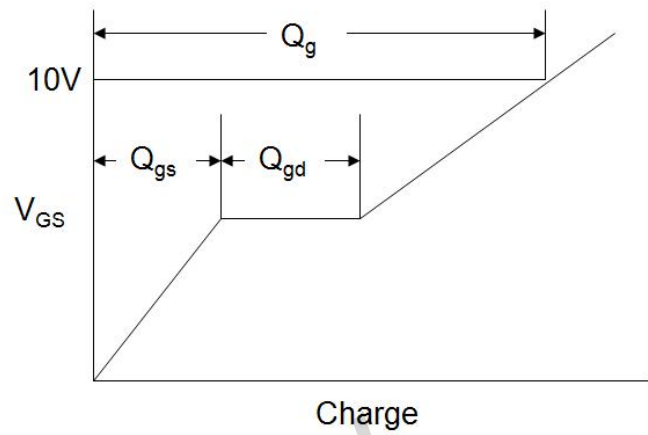
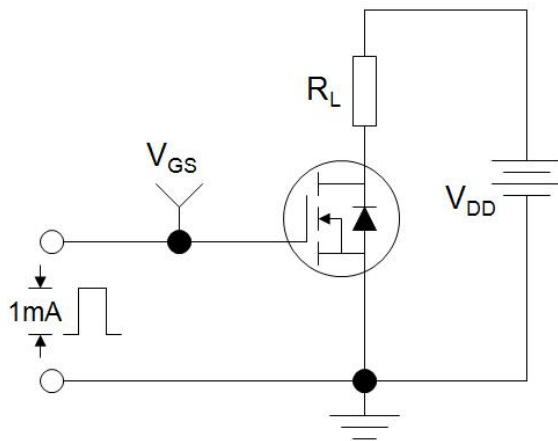
Notes

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

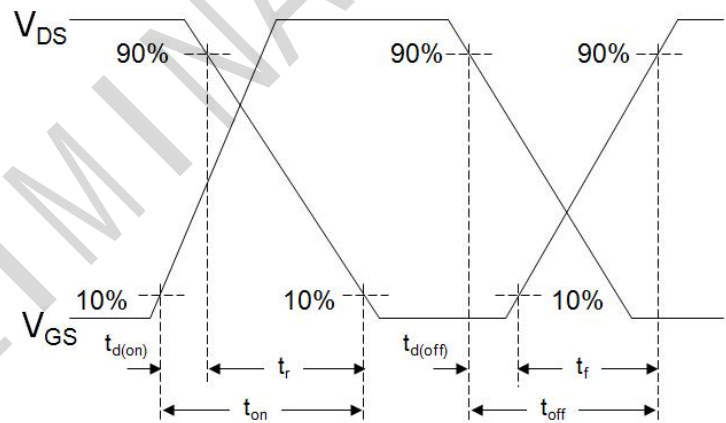
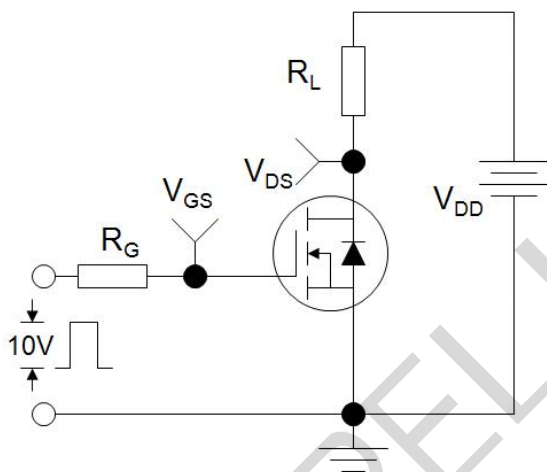
The table shows the minimum avalanche energy, which is 1806mJ when the device is tested until failure

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

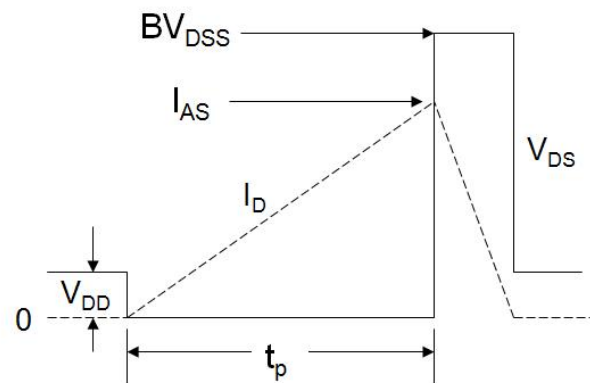
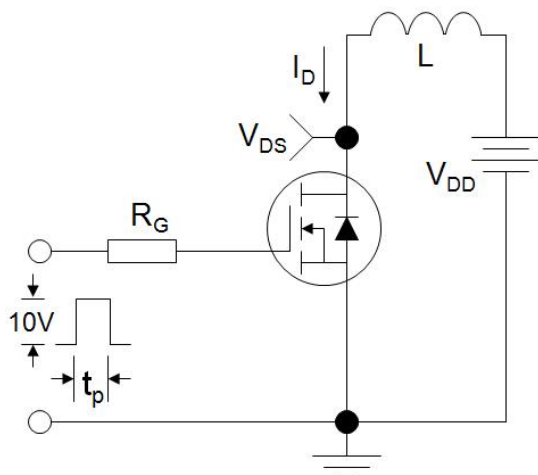
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



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

Figure 1. Output Characteristics

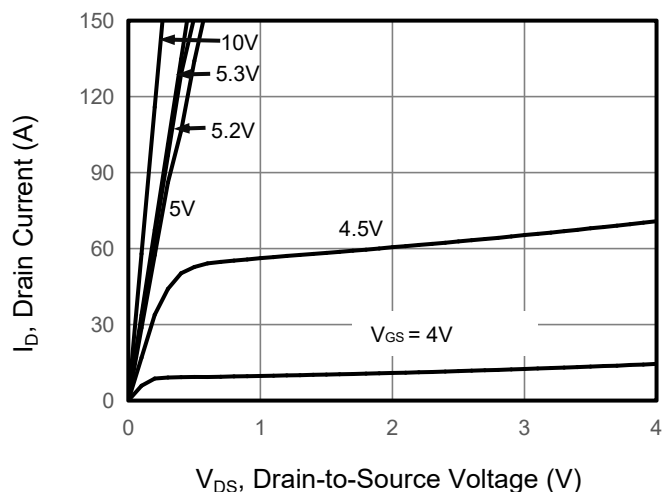


Figure 2. Transfer Characteristics

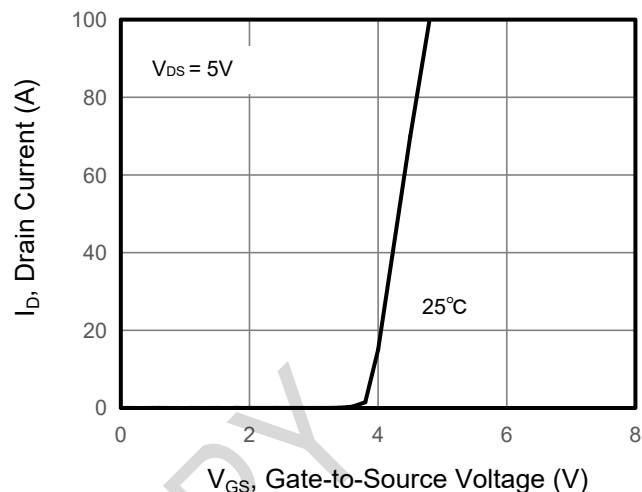


Figure 3. Drain Source On Resistance

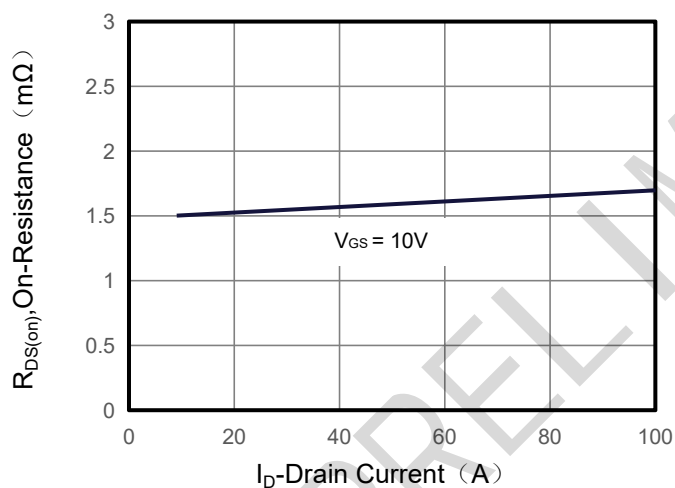


Figure 4. Gate Charge

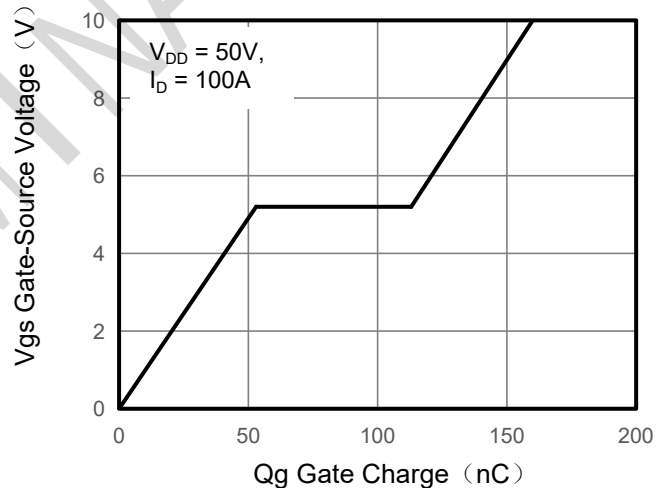


Figure 5. Capacitance

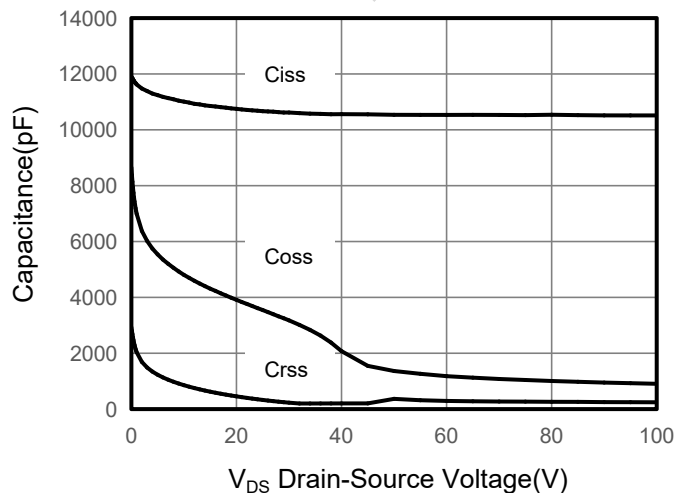
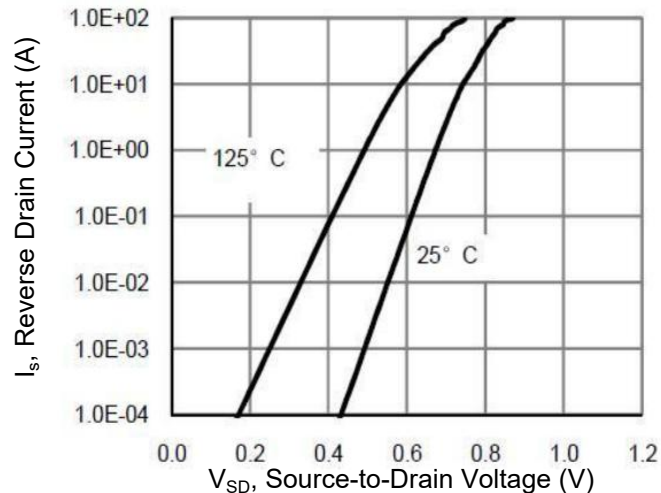


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

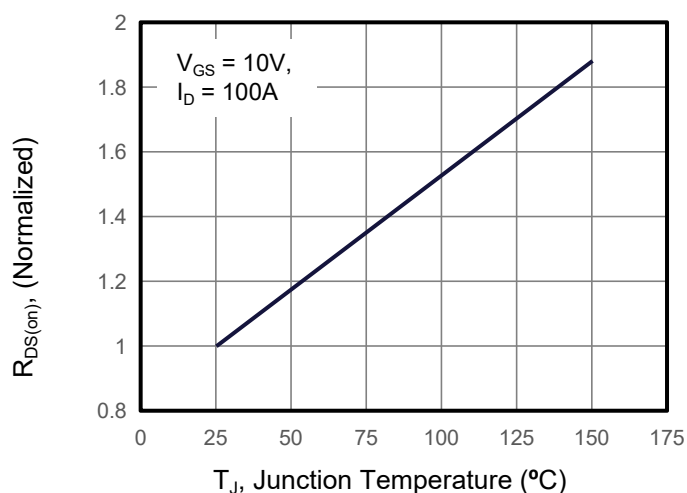


Figure 8. Safe Operation Area

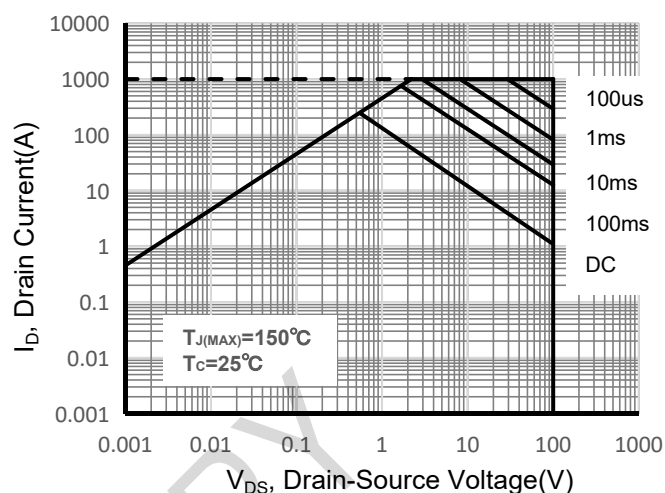


Figure 9. Maximum Continuous Drain Current vs Case Temperature

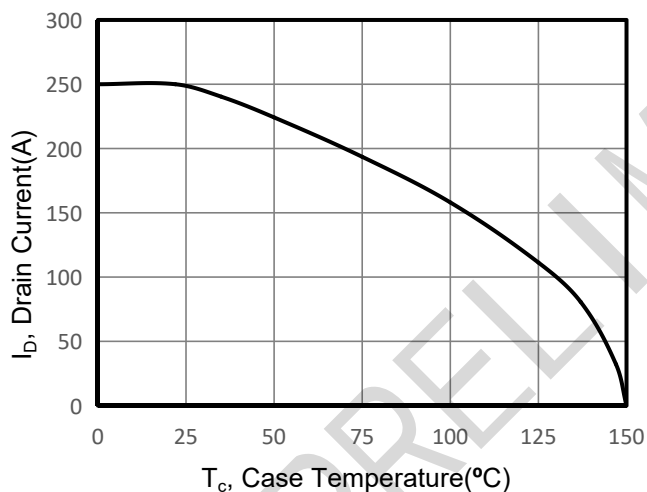
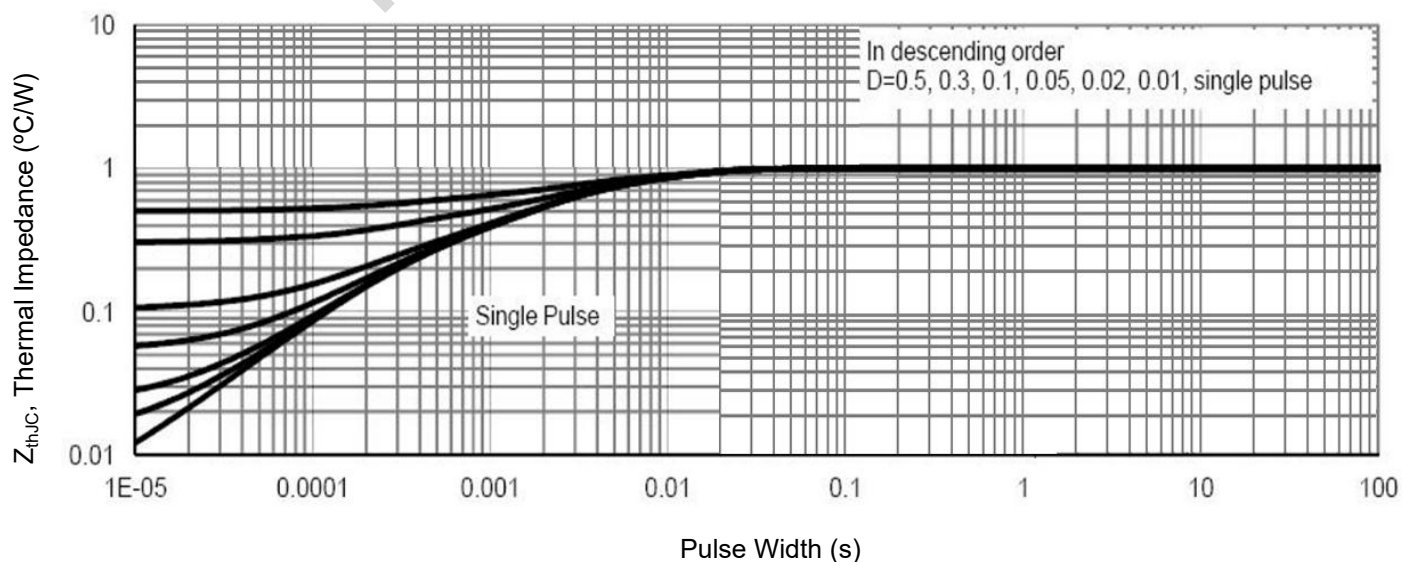
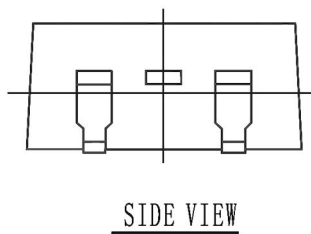
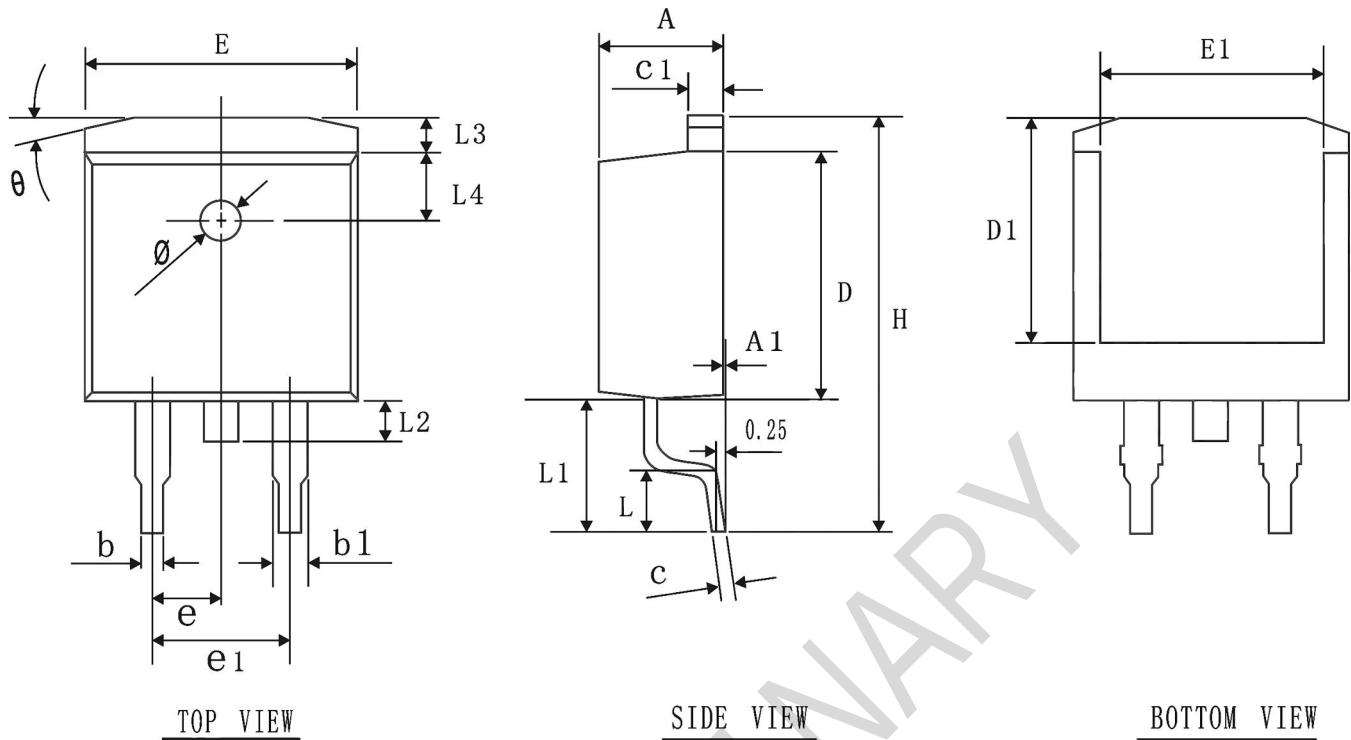


Figure 10. Normalized Maximum Transient Thermal Impedance



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
b1	1.20	1.30	1.40
c	0.40	0.47	0.55
C1	1.25	1.30	1.35
D	9.00	9.10	9.20
D1	8.00	8.10	8.20
H	14.9	15.2	15.5
E	9.80	10.0	10.2
E1	7.85	8.00	8.15
e1	4.93	5.08	5.23
L	2.00	2.20	2.45
L1	4.60	4.80	5.00
L2	1.30	1.50	1.70
L3	1.15	1.25	1.35
L4	2.40	2.50	2.60
$\emptyset$	1.5 REF		
e	2.54 BSC		
θ	13° TYP		