N-Channel Enhancement Mode Power MOSFET

Description

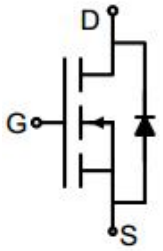
The GT023N10M uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

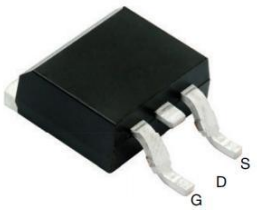
- V_{DS} 100V
- I_D (at V_{GS} = 10V) 226A
- $R_{DS(ON)}$ (at V_{GS} = 10V) < 2.7mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



TO-263

Ordering Information

Device	Package	Marking	Packaging
GT023N10M	TO-263	GT023N10	800pcs/Reel

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Continuous Drain Current	T_C = 25ºC	I_D	226	A
	T_C = 100ºC		143	
Pulsed Drain Current (note1)		I_{DM}	904	A
Gate-Source Voltage		V_{GS}	±20	V
Power Dissipation		P_D	265	W
Single pulse avalanche energy （note2）		E_{AS}	600	mJ
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 To 150	ºC

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62	ºC/W
Thermal Resistance, Junction-to-Case	R_{thJC}	0.47	ºC/W

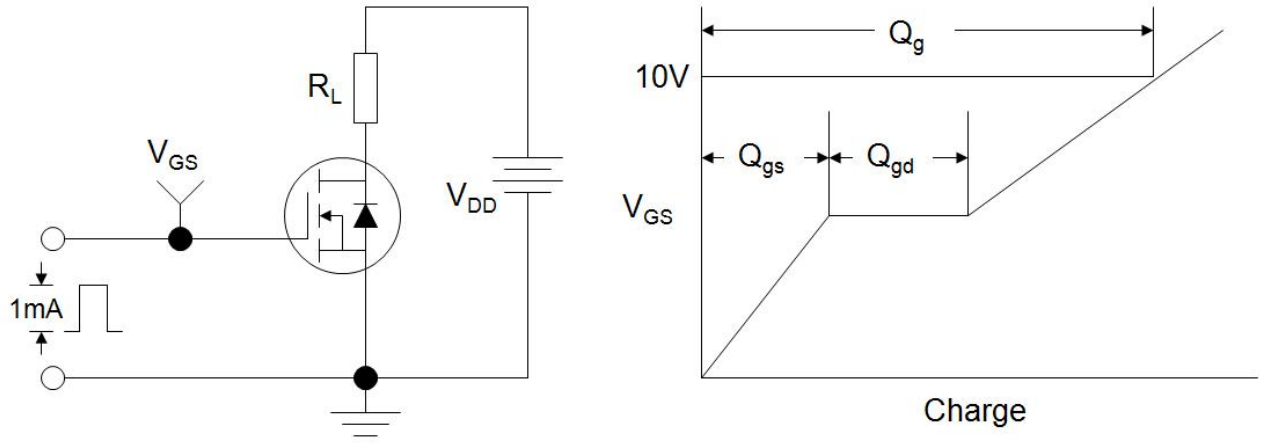
Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	100	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100V, 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	2.0	3.0	4.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 60A	--	2.2	2.7	mΩ
Forward Transconductance	g_{FS}	V_{GS} = 5V, I_D = 60A	--	129	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 50V, f = 0.3MHz	--	8148	--	pF
Output Capacitance	C_{oss}		--	3042	--	
Reverse Transfer Capacitance	C_{rss}		--	25	--	
Total Gate Charge	Q_g	V_{DD} = 50V, I_D = 60A, V_{GS} = 10V	--	137	--	nC
Gate-Source Charge	Q_{gs}		--	40	--	
Gate-Drain Charge	Q_{gd}		--	34	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 50V, I_D = 60A, R_G = 5Ω	--	24	--	ns
Turn-on Rise Time	t_r		--	30	--	
Turn-off Delay Time	$t_{d(off)}$		--	94	--	
Turn-off Fall Time	t_f		--	74	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	226	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 60A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Qrr	I_F = 60A, V_{GS} = 0V di/dt=100A/us	--	297	--	nC
Reverse Recovery Time	Trr		--	94	--	ns

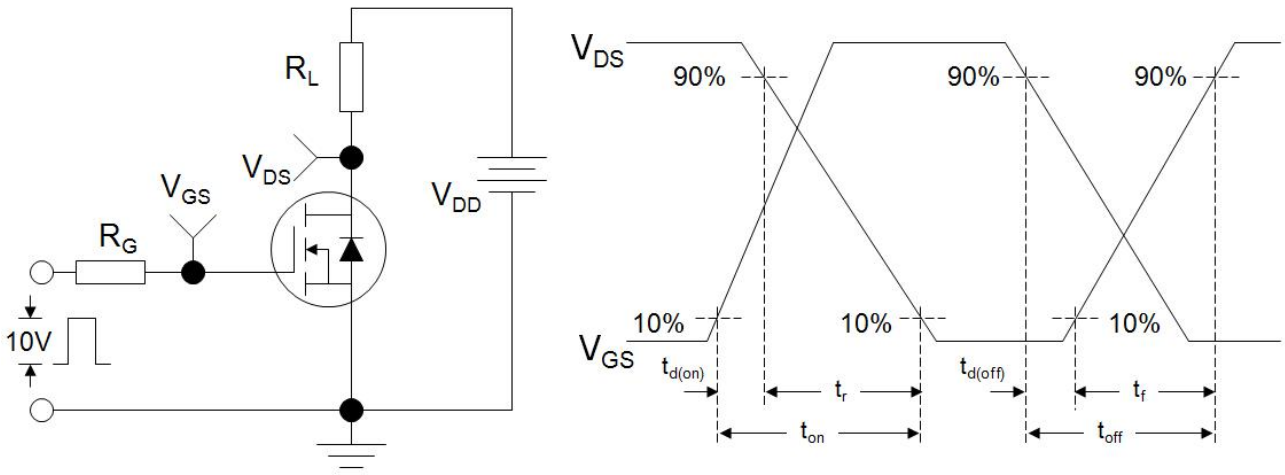
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : Tj=25℃ ,VDD=50V,VGS=10V,L=0.5mH,Rg=25Ω
   The table shows the minimum avalanche energy, which is 1600mJ when the device is tested until failure
3. Identical low side and high side switch with identical R_G

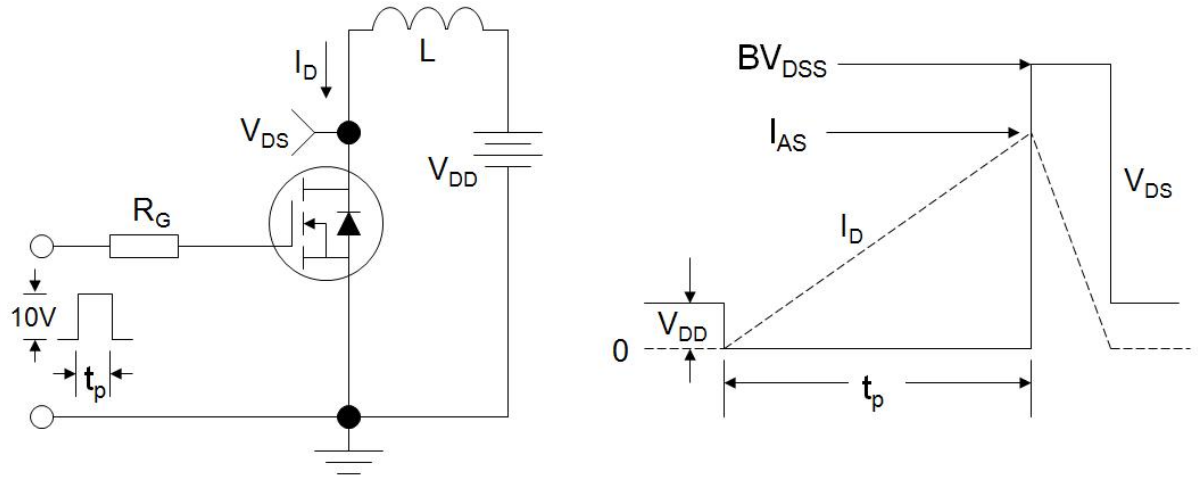
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

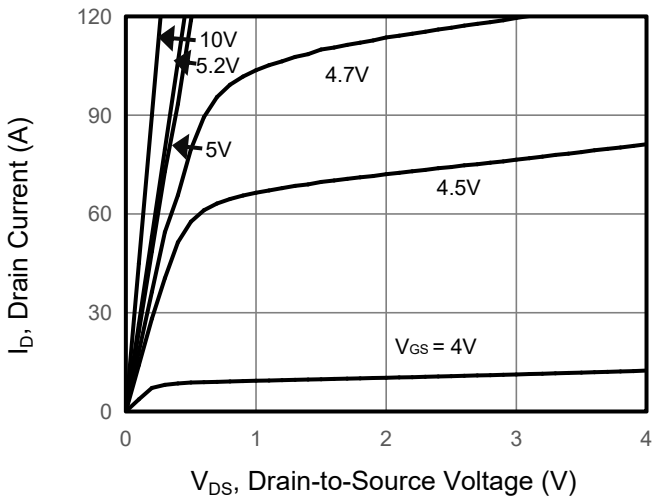


Figure 2. Transfer Characteristics

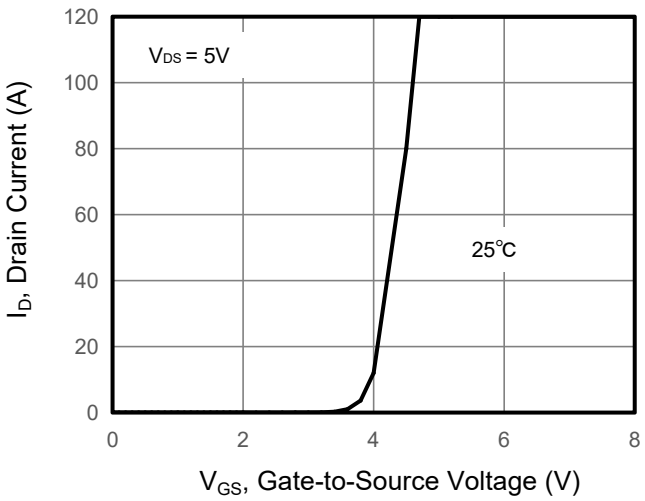


Figure 3. Drain Source On Resistance

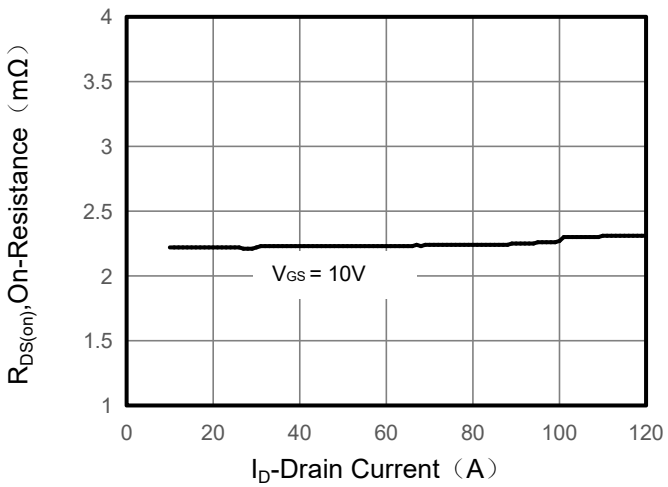


Figure 4. Gate Charge

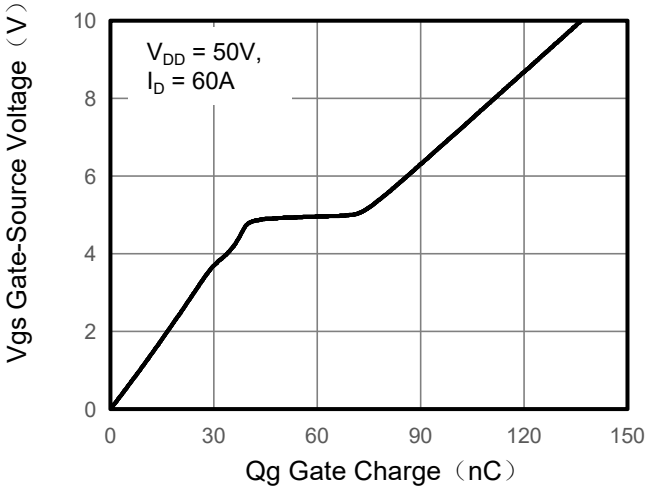


Figure 5. Capacitance

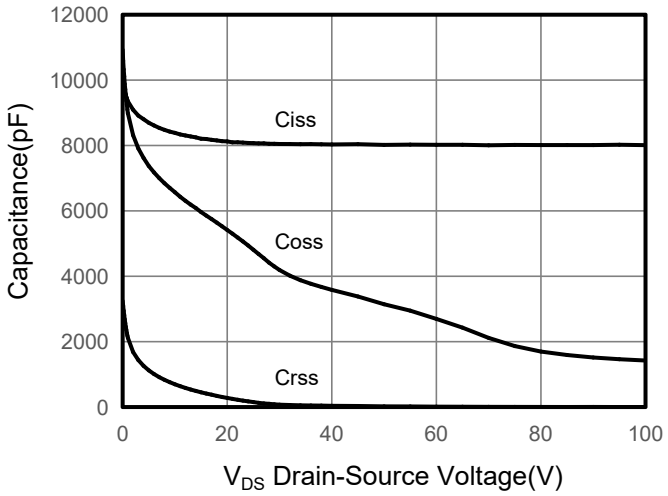
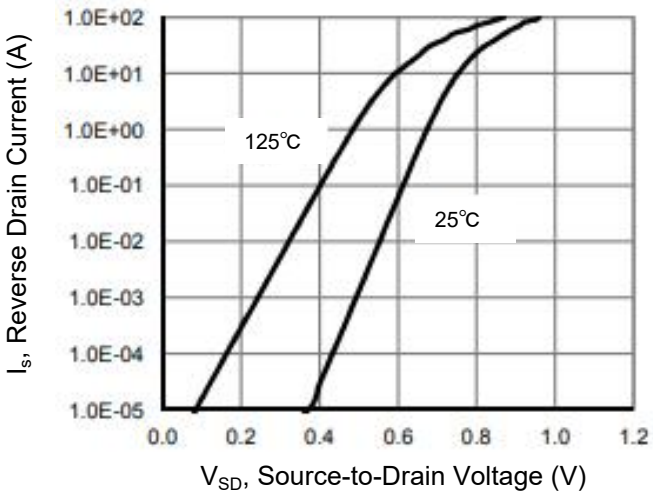


Figure 6. Source-Drain Diode Forward



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

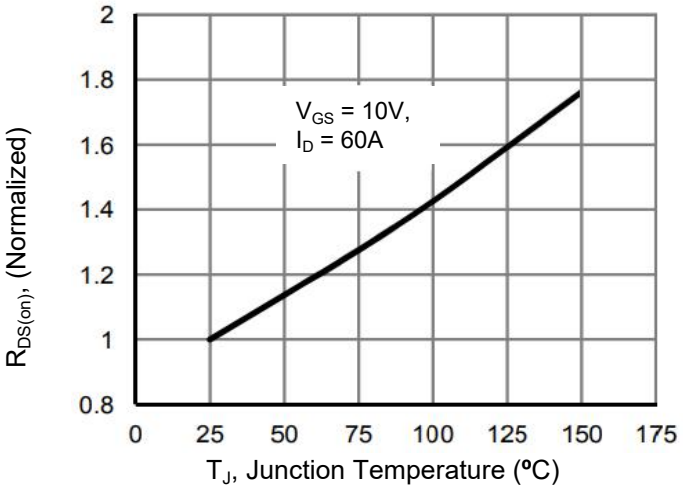


Figure 8. Safe Operation Area

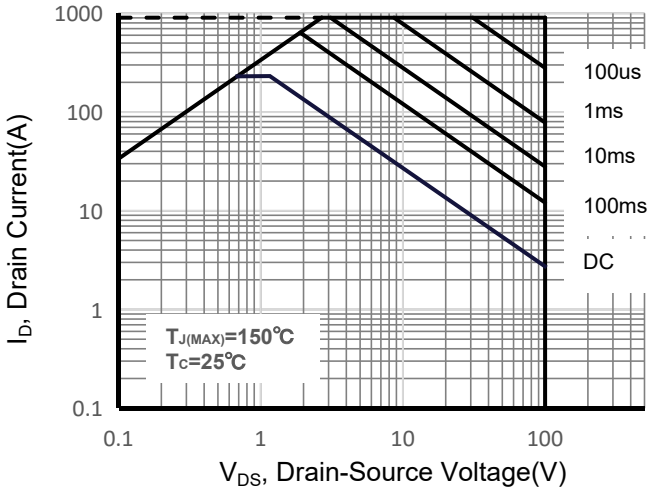


Figure 9. Maximum Continuous Drain Current vs Case Temperature

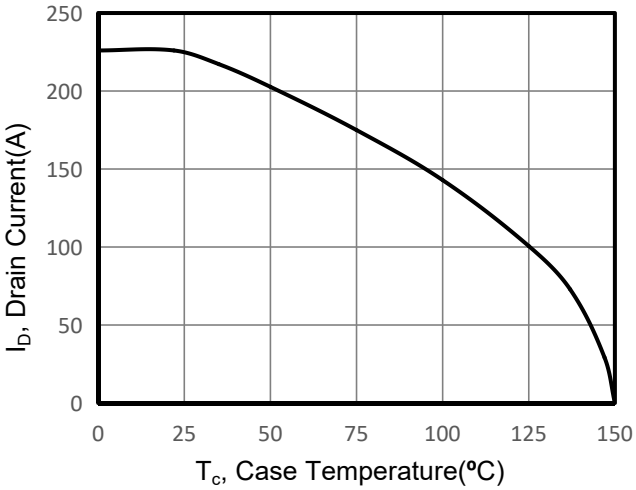
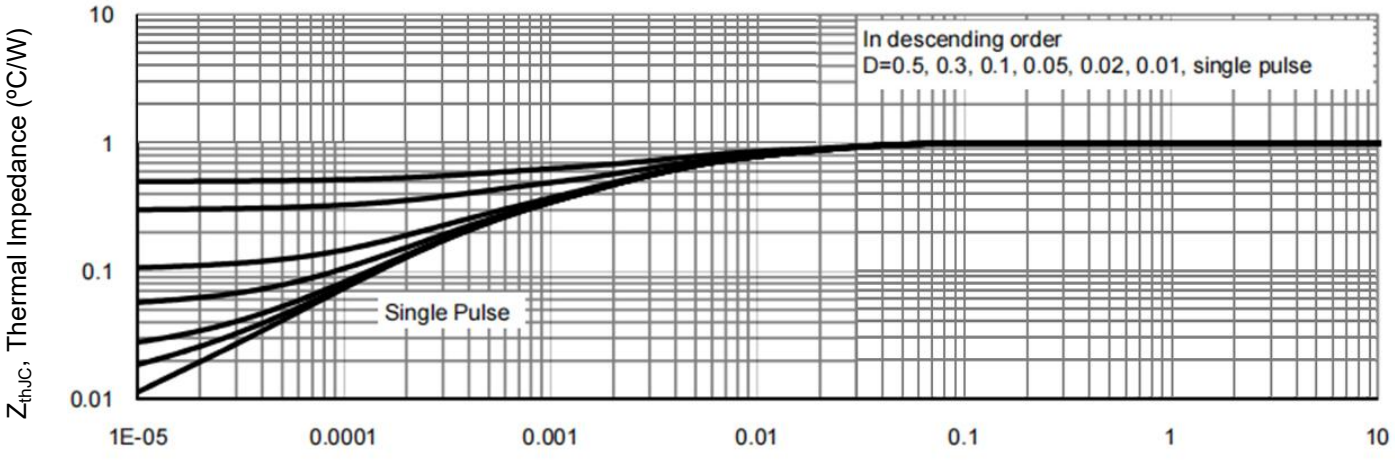
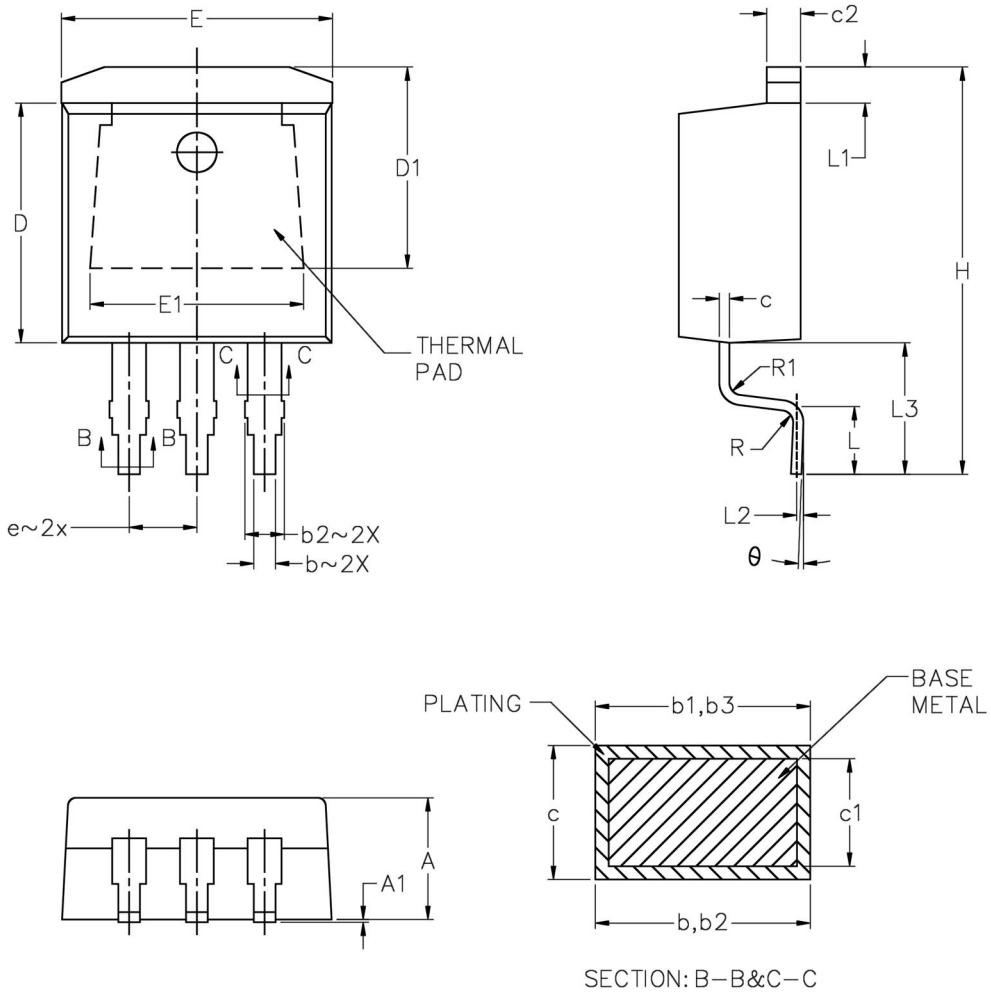


Figure 10. Normalized Maximum Transient Thermal Impedance



TO-263 Package Information



SYMBOLS	COMMON			
	MM		INCH	
	MIN.	MAX.	MIN.	MAX.
A	4.064	4.826	0.160	0.190
A1	0.000	0.254	0.000	0.010
b	0.508	0.991	0.020	0.039
b1	0.508	0.889	0.020	0.035
b2	1.143	1.778	0.045	0.070
b3	1.143	1.727	0.045	0.068
c	0.381	0.737	0.015	0.029
c1	0.381	0.584	0.015	0.023
c2	1.143	1.651	0.045	0.065
D	8.382	9.652	0.330	0.380
D1	6.858	—	0.270	—
E	9.652	10.668	0.380	0.420
E1	6.223	—	0.245	—
e	2.540 BSC.		0.100 BSC.	
H	14.605	15.875	0.575	0.625
L	1.778	2.794	0.070	0.110
L1	—	1.676	—	0.066
L2	0.254 BSC		0.010 BSC	
L3	4.780	5.280	0.188	0.208
R	0.460 TYP		0.018 TYP	
R1	0.460 TYP		0.018 TYP	
θ	0°	8°	0°	8°