N-Channel Enhancement Mode Power MOSFET

Description

The GT070N15TA uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

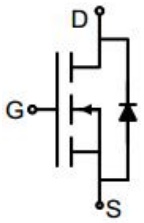
AEC-Q101 Qualified

General Features

- V_{DS} 150V
- I_D (at V_{GS} = 10V) 140A
- $R_{DS(ON)}$ (at V_{GS} = 10V) < 5.8mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram

TO-220

Ordering Information

Device	Package	Marking	Packaging
GT070N15TA	TO-220	GT070N15	50pcs/Tube

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	150	V
Continuous Drain Current	T_C = 25ºC	I_D	140	A
	T_C = 100ºC		89	
Pulsed Drain Current (note1)		I_{DM}	560	A
Gate-Source Voltage		V_{GS}	±20	V
Power Dissipation		P_D	320	W
Single pulse avalanche energy （note2）		E_{AS}	420	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}	55	ºC/W
Thermal Resistance, Junction-to-Case	R_{thJC}	0.39	ºC/W

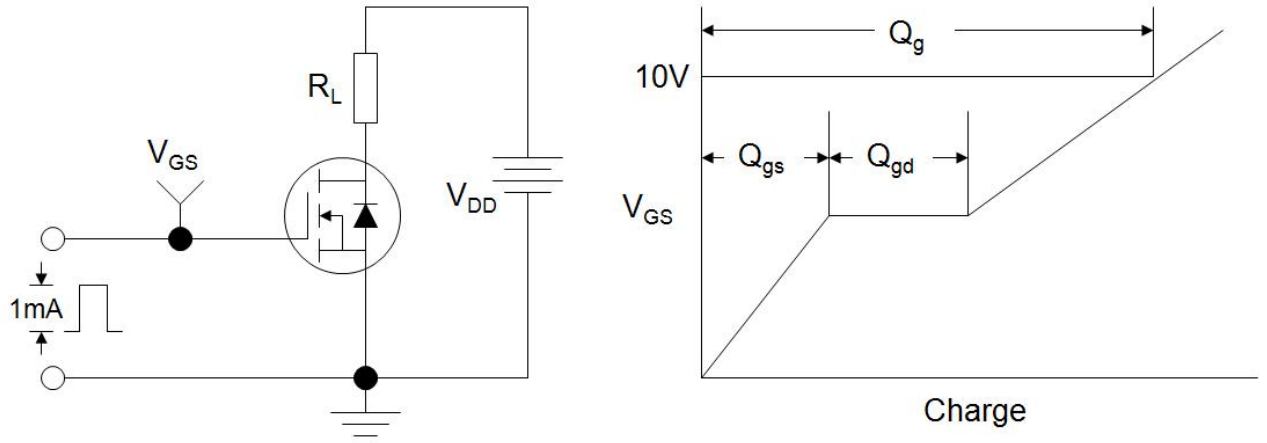
Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	150	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 150V, 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 = 30A	--	4.7	5.8	mΩ
Forward Transconductance	g_{FS}	V_{GS} = 5V, I_D = 30A	--	35	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 75V, f = 0.8MHz	--	5850	--	pF
Output Capacitance	C_{oss}		--	600	--	
Reverse Transfer Capacitance	C_{rss}		--	18	--	
Total Gate Charge	Q_g	V_{DD} = 75V, I_D = 30A, V_{GS} = 10V	--	89	--	nC
Gate-Source Charge	Q_{gs}		--	29	--	
Gate-Drain Charge	Q_{gd}		--	22	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 75V, I_D = 30A, R_G = 4.7Ω	--	17	--	ns
Turn-on Rise Time	t_r		--	70	--	
Turn-off Delay Time	$t_{d(off)}$		--	47	--	
Turn-off Fall Time	t_f		--	15	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	140	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 30A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Qrr	I_F = 30A, V_{GS} = 0V di/dt=100A/us	--	146	--	nC
Reverse Recovery Time	Trr		--	63	--	ns

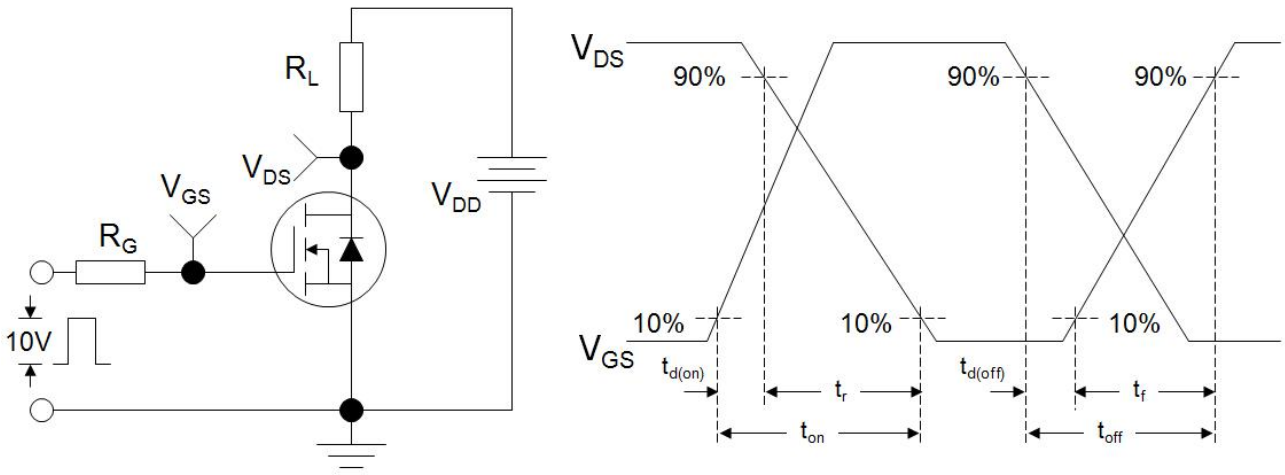
Notes

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 1156mJ when the device is tested until failure
3. Identical low side and high side switch with identical R_G

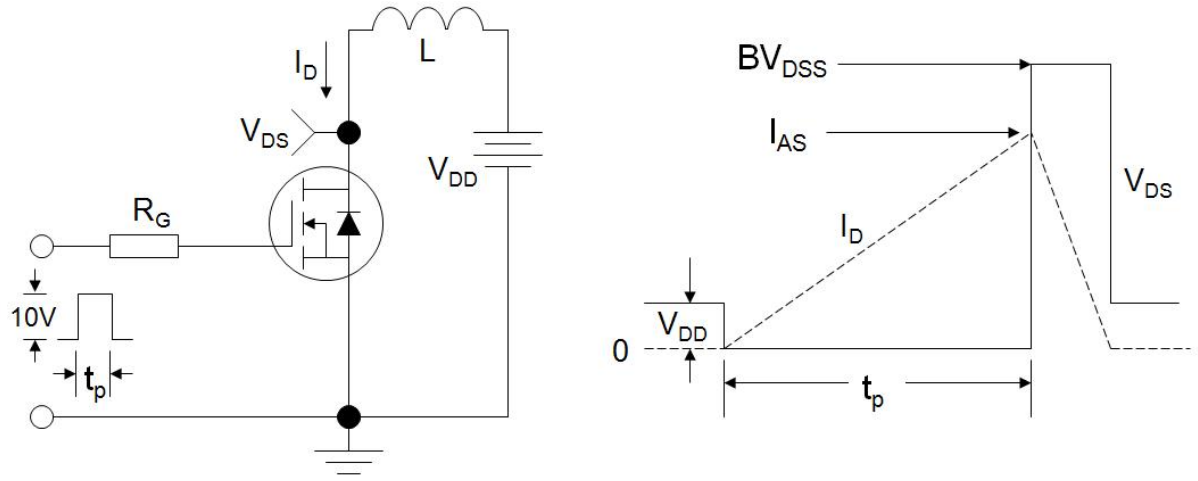
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

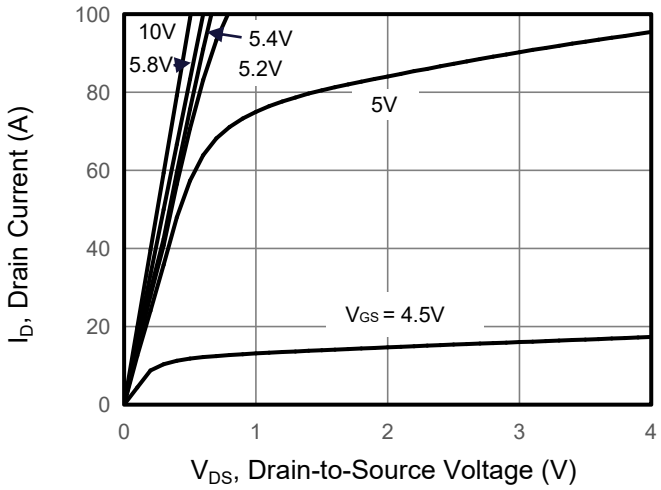


Figure 2. Transfer Characteristics

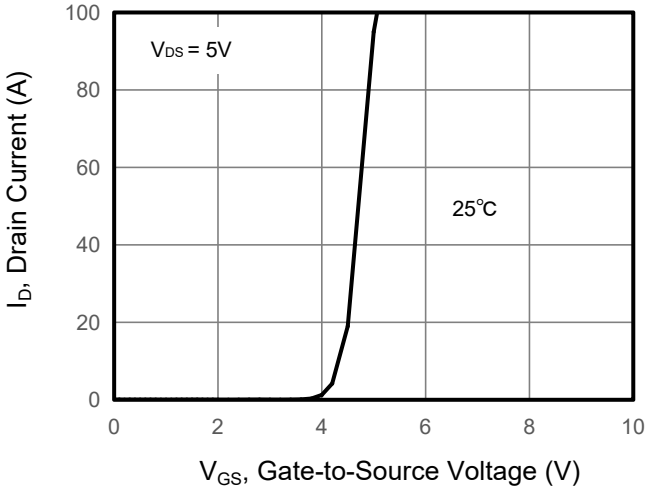


Figure 3. Drain Source On Resistance

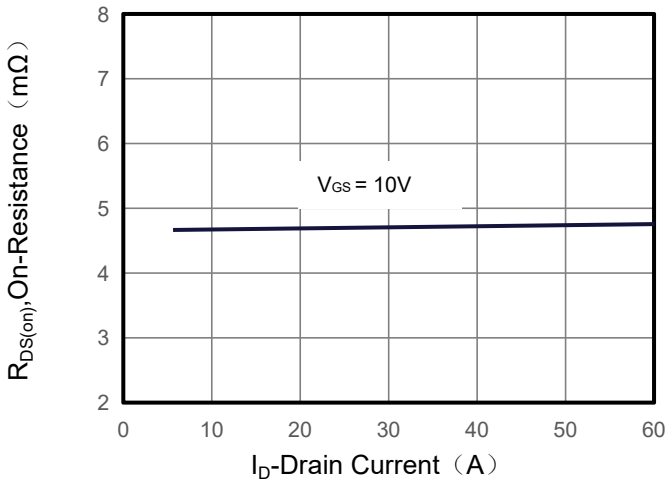


Figure 4. Gate Charge

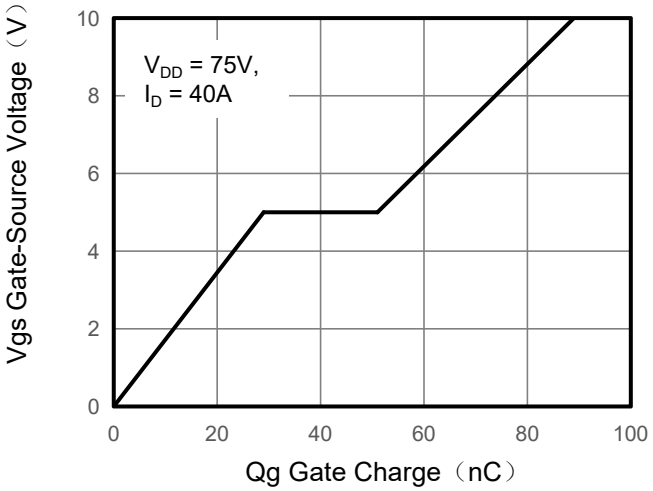


Figure 5. Capacitance

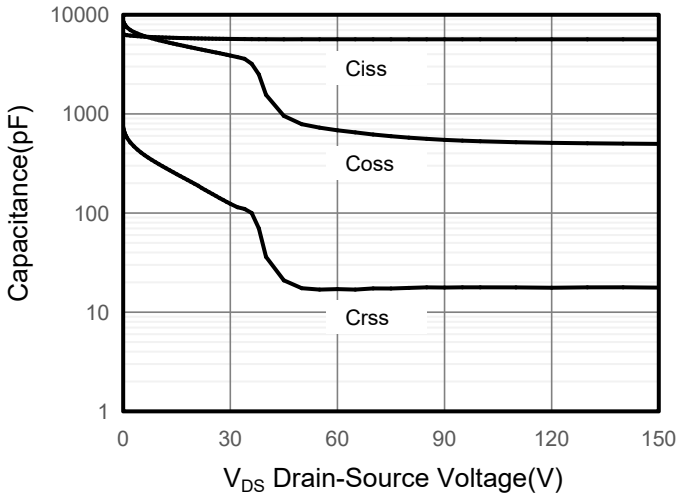
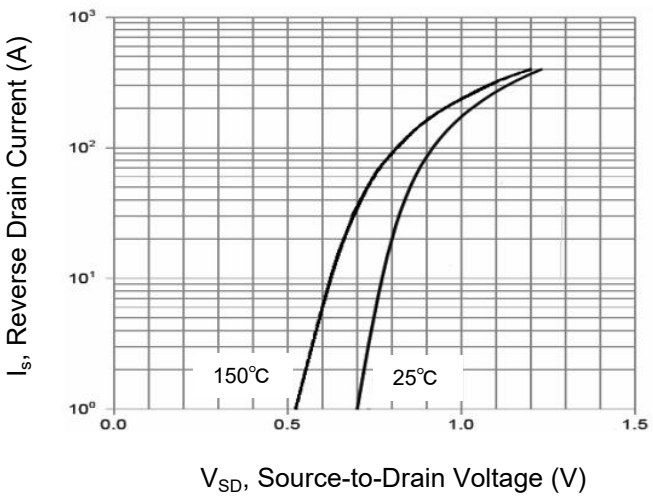


Figure 6. Source-Drain Diode Forward



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

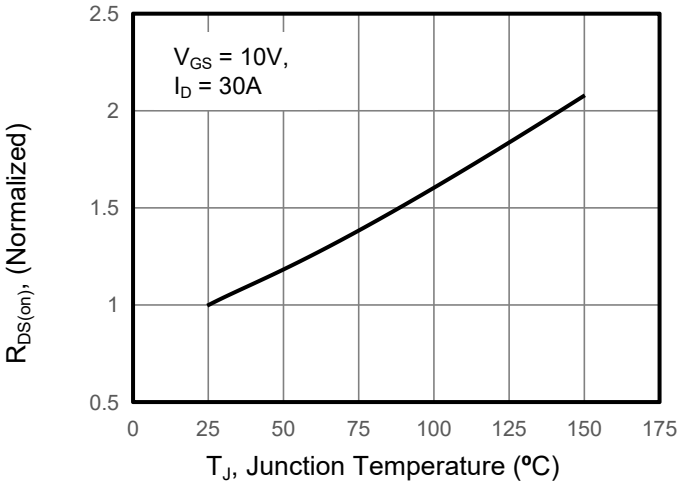


Figure 8. Safe Operation Area

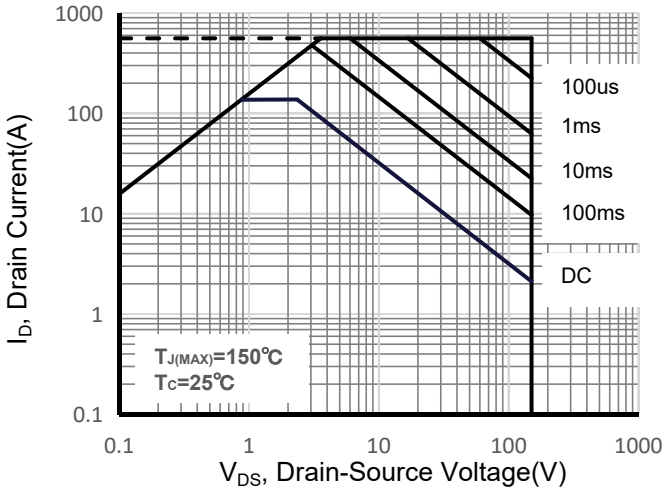


Figure 9. Maximum Continuous Drain Current vs Case Temperature

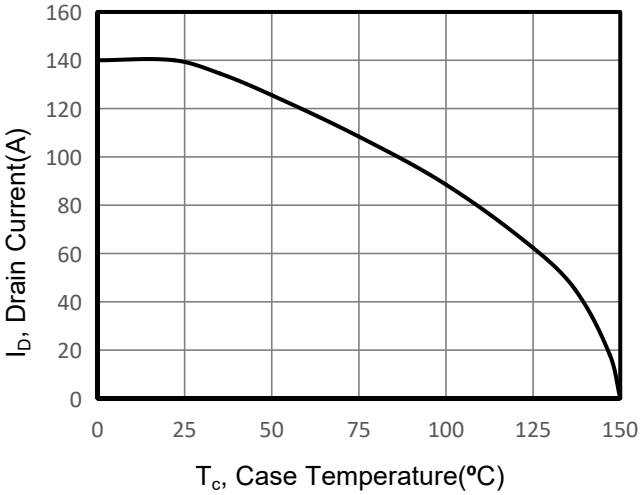
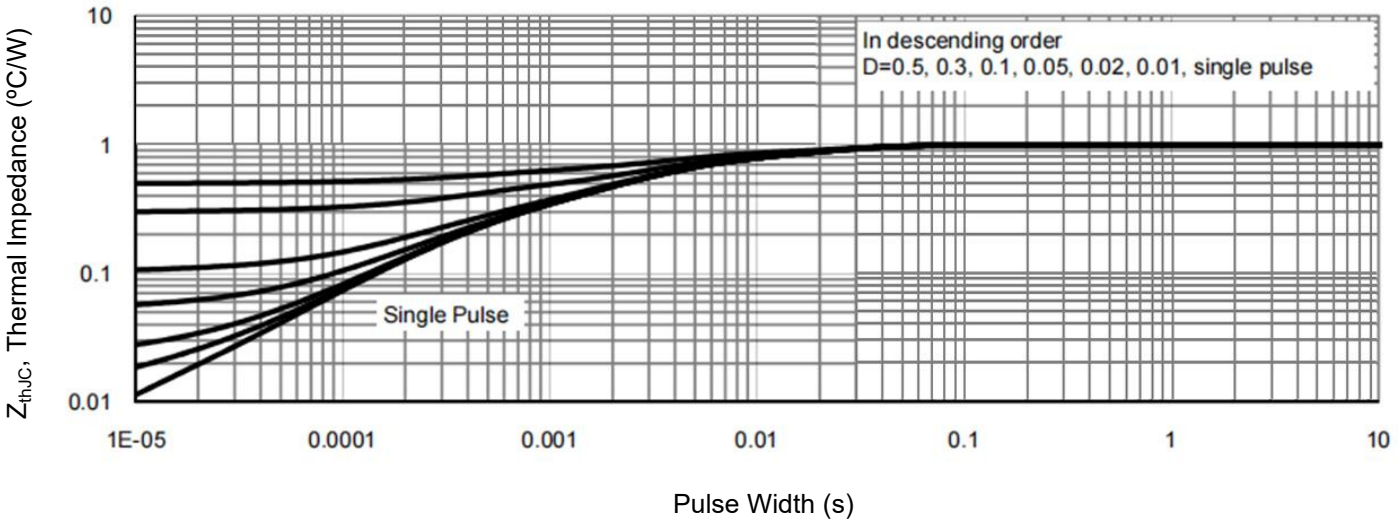
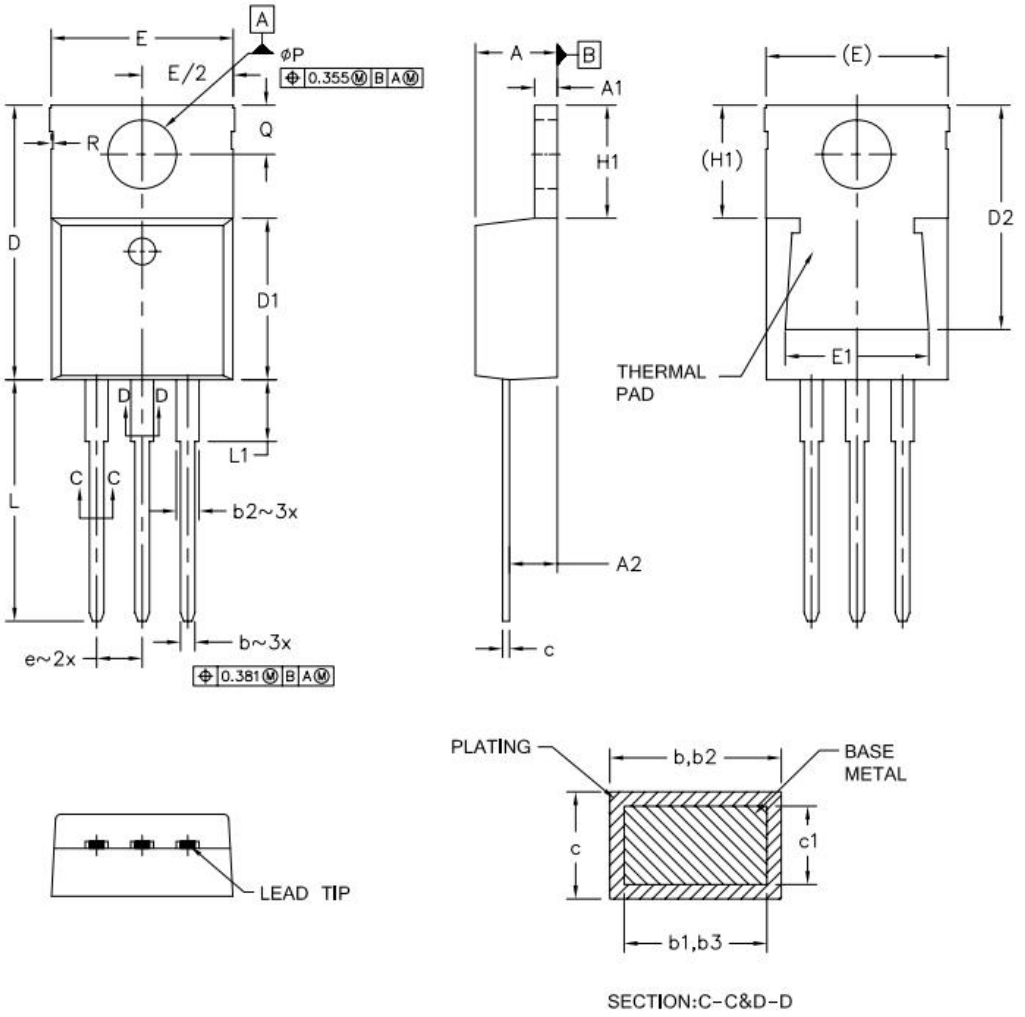


Figure 10. Normalized Maximum Transient Thermal Impedance



TO-220 Package Information



SYMBOLS	COMMON				SYMBOLS	COMMON			
	MM		INCH			MM		INCH	
	MIN.	MAX.	MIN.	MAX.		MIN.	MAX.	MIN.	MAX.
A	3.556	4.826	0.140	0.190	D1	8.382	9.017	0.330	0.355
A1	0.508	1.397	0.020	0.055	D2	12.192	12.878	0.480	0.507
A2	2.032	2.921	0.080	0.115	E	9.652	10.668	0.380	0.420
b	0.381	1.016	0.015	0.040	E1	6.858	8.890	0.270	0.350
b1	0.381	0.965	0.015	0.038	e	2.540 BSC.		0.100 BSC.	
b2	1.143	1.778	0.045	0.070	H1	5.842	6.858	0.230	0.270
b3	1.143	1.727	0.045	0.070	L	12.700	14.732	0.500	0.580
c	0.356	0.610	0.014	0.024	L1	——	6.350	——	0.250
c1	0.356	0.559	0.014	0.022	øP	3.810	3.860	0.150	0.151
D	14.224	16.510	0.560	0.650	Q	2.540	3.048	0.100	0.120
D1	8.382	9.017	0.330	0.355	R	0.127 BSC		0.005 BSC	