

N-Channel Enhancement Mode Power MOSFET

Description

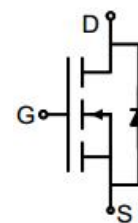
The GT070N15T uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

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

Application

- Power switch
- DC/DC converters



Schematic diagram



TO-220

Ordering Information

Device	Package	Marking	Packaging
GT070N15T	TO-220	GT070N15	50pcs/Tube

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	150	V
Continuous Drain Current	I_D	140	A
		89	
Pulsed Drain Current (note1)	I_{DM}	560	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	258	W
Single pulse avalanche energy (note2)	E_{AS}	420	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}	55	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	R_{thJC}	0.48	$^\circ\text{C/W}$

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	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 = 25°C	--	--	140	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 30A, V _{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = 30A, V _{GS} = 0V di/dt=100A/us	--	146	--	nC
Reverse Recovery Time	T _{rr}		--	63	--	ns

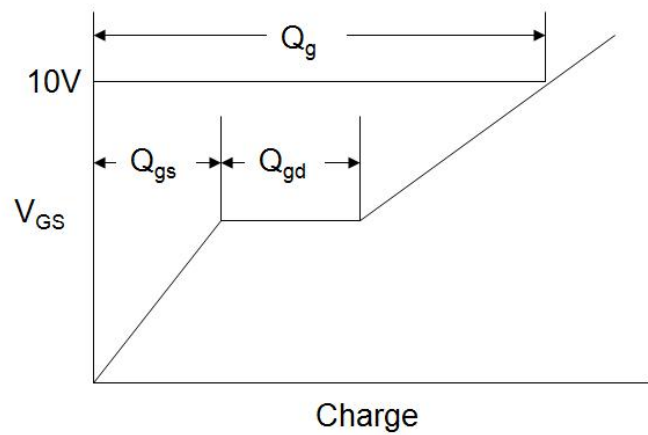
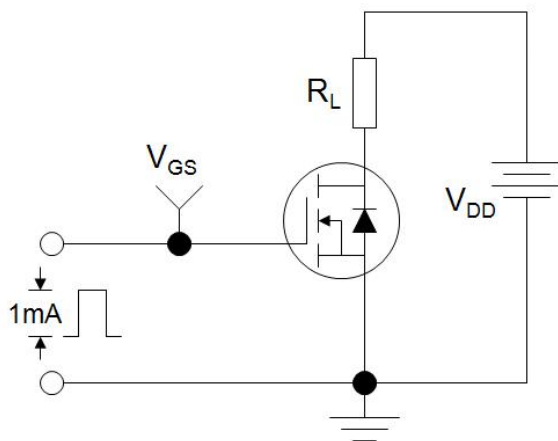
Notes

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

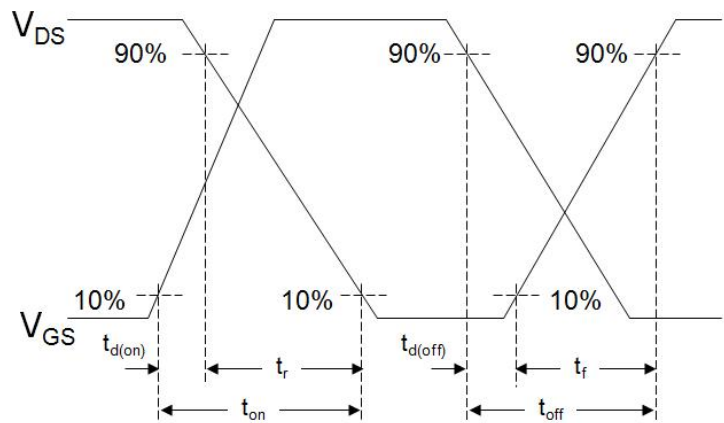
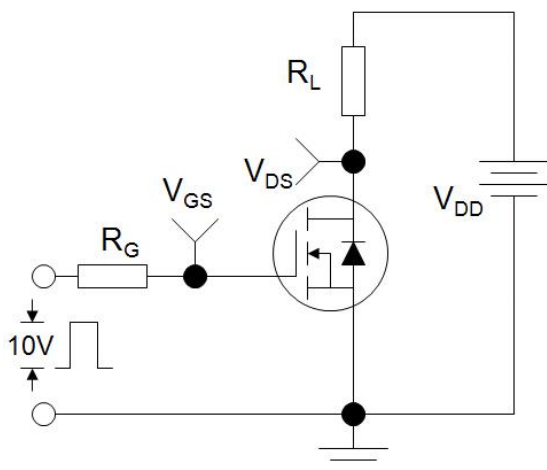
The table shows the minimum avalanche energy, which is 1156mJ when the device is tested until failure

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

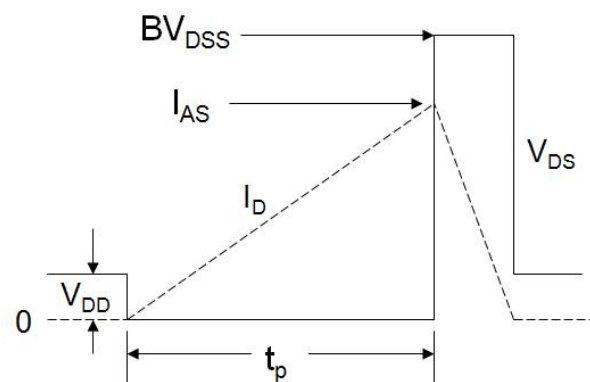
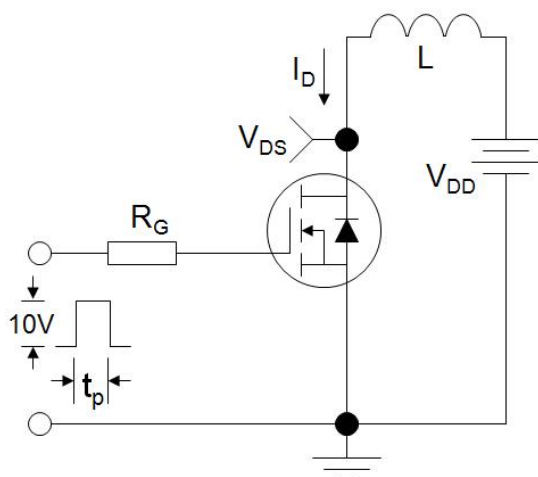
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



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

Figure 1. Output Characteristics

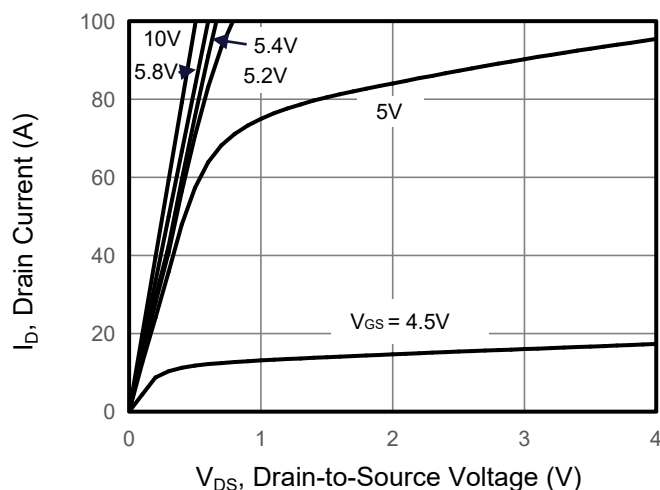


Figure 2. Transfer Characteristics

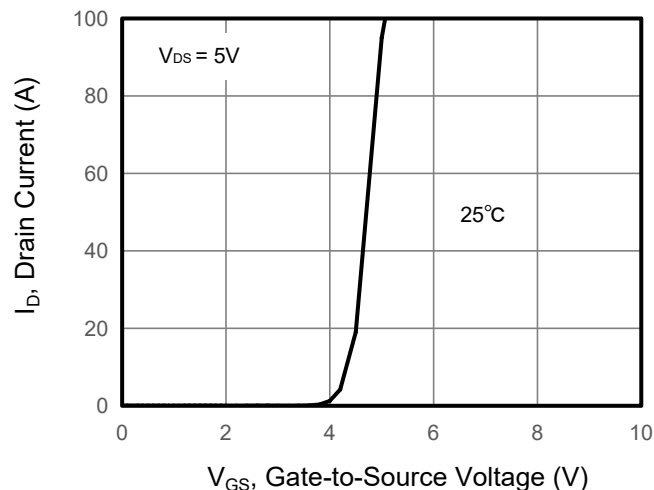


Figure 3. Drain Source On Resistance

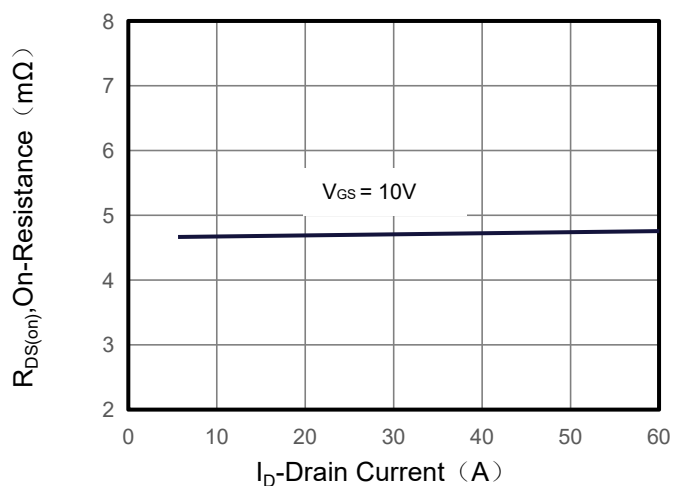


Figure 4. Gate Charge

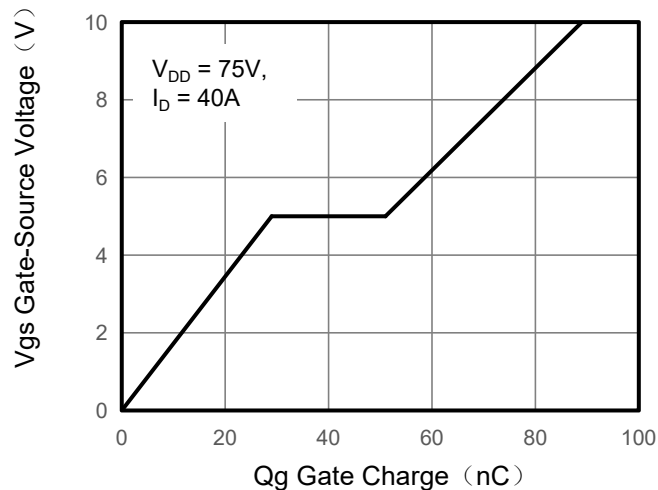


Figure 5. Capacitance

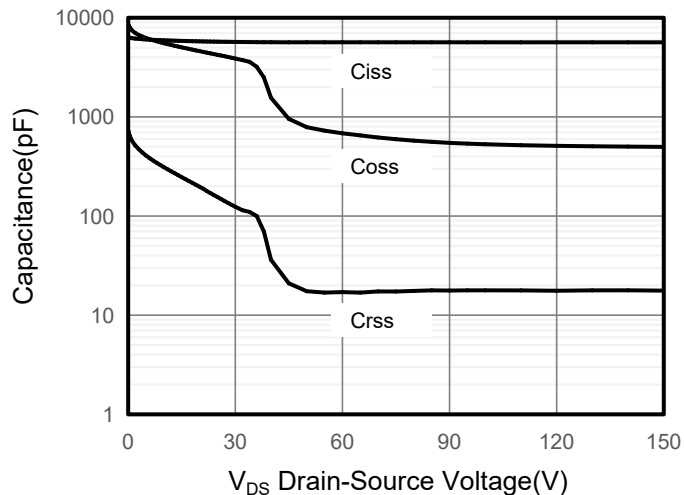
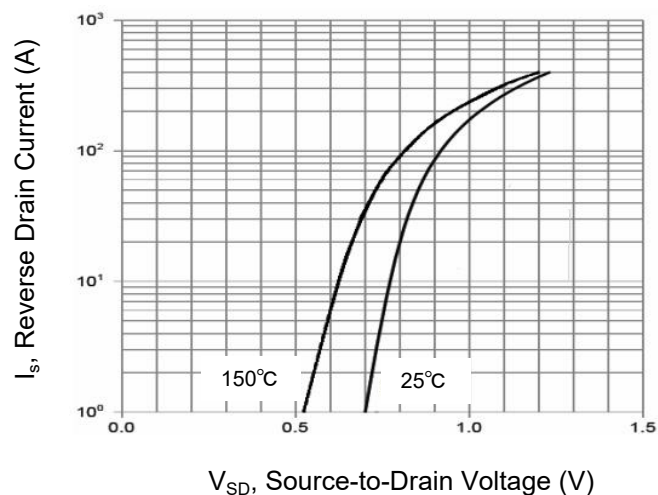


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

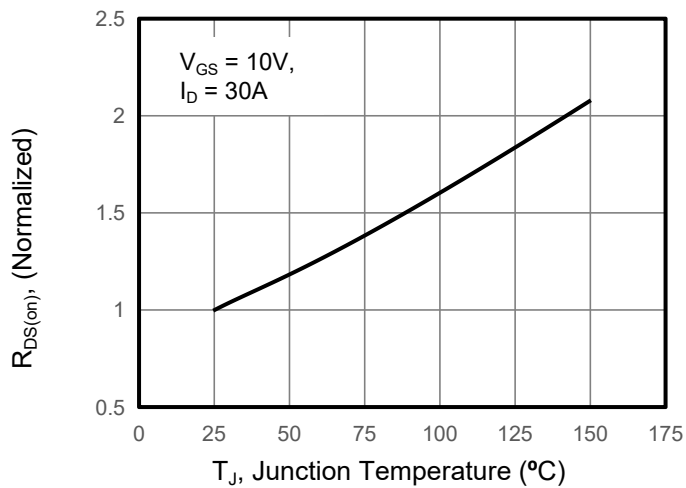


Figure 8. Safe Operation Area

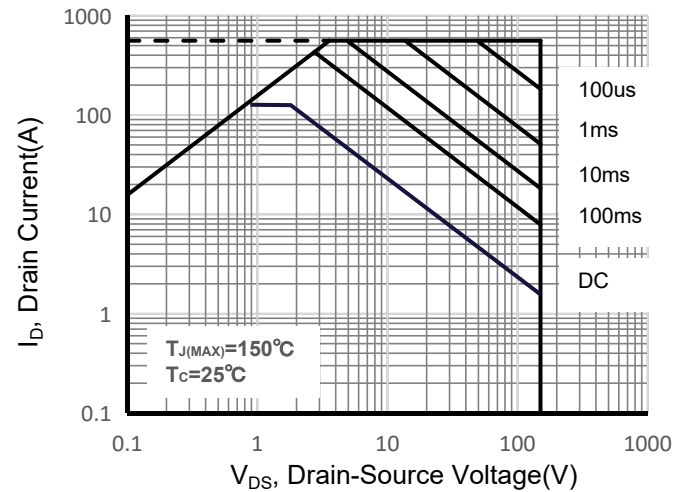


Figure 9. Maximum Continuous Drain Current vs Case Temperature

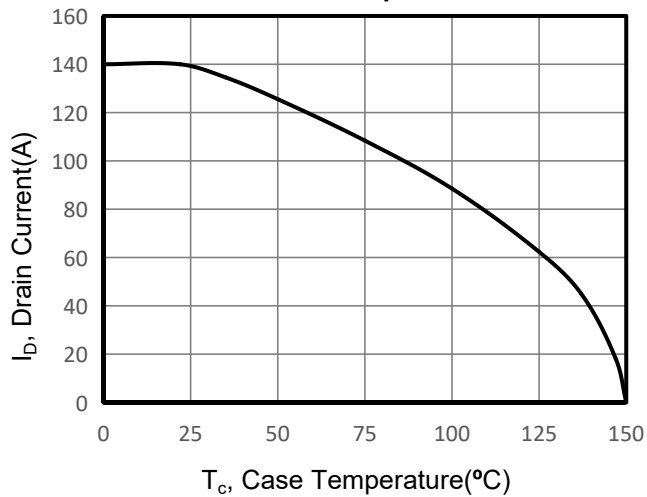
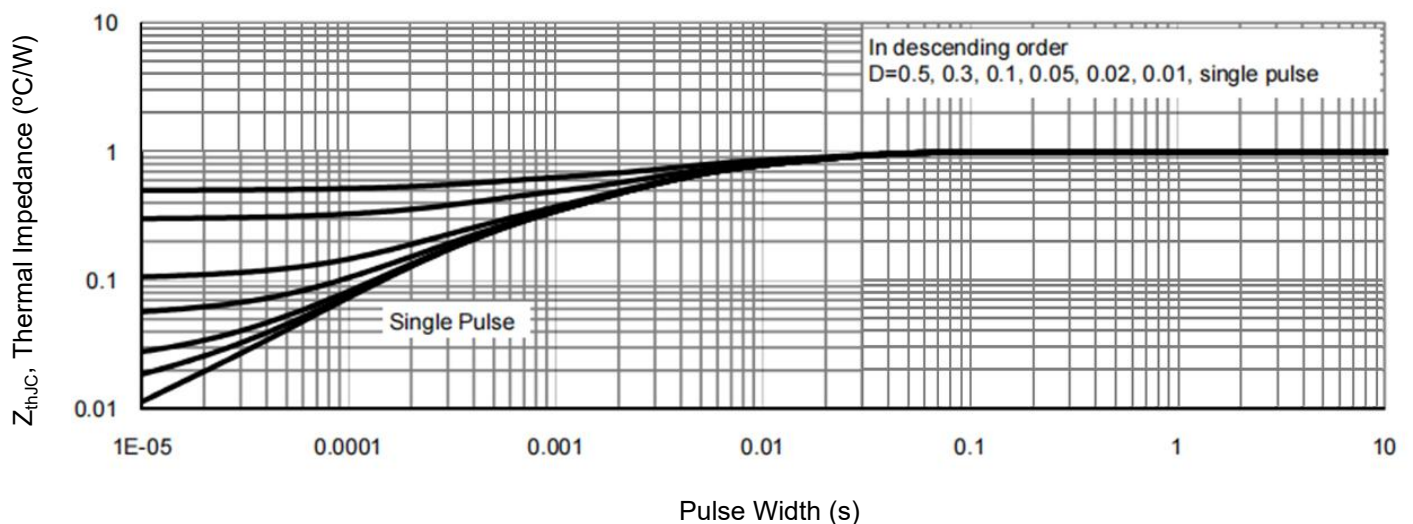
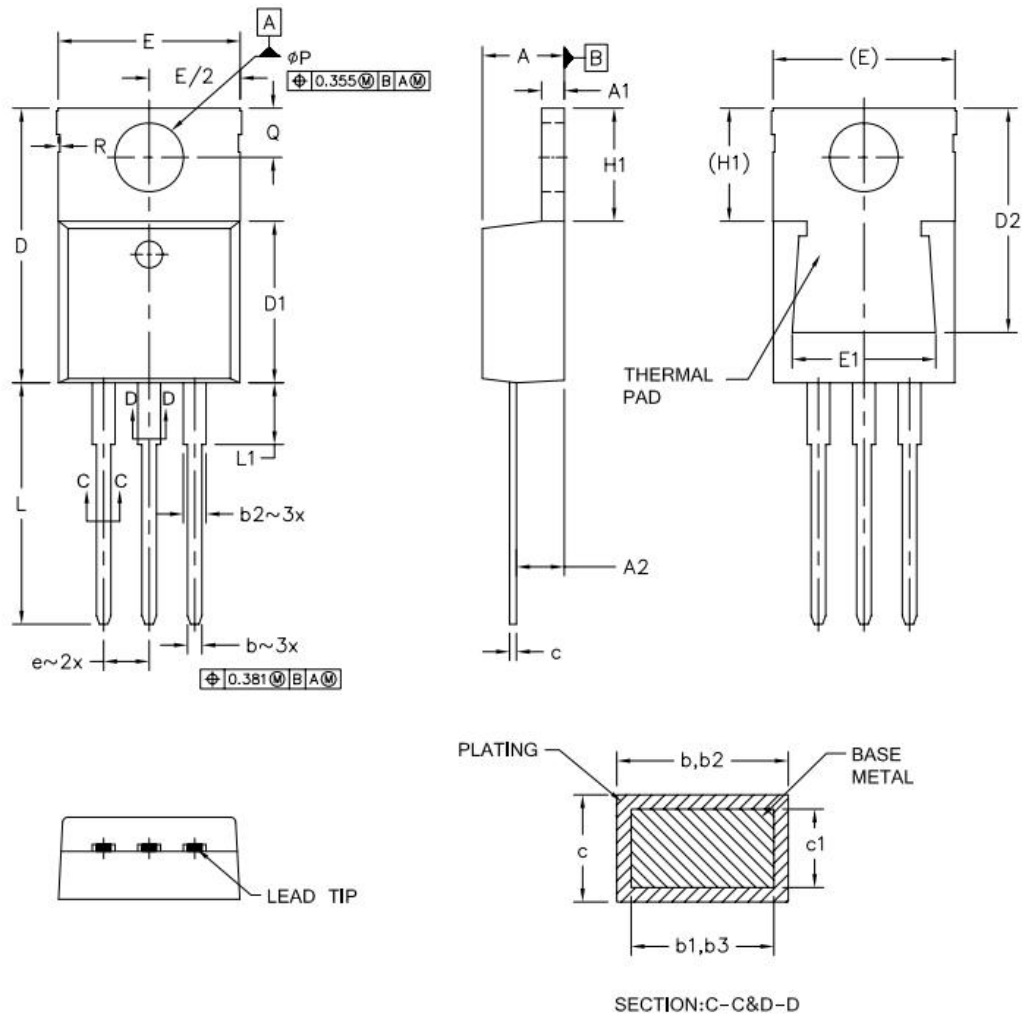


Figure 10. Normalized Maximum Transient Thermal Impedance



TO-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	∅P	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