

N-Channel Enhancement Mode Power MOSFET

Description

The GT030N08T 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 $V_{GS} = 10V$) 155A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 3.3m Ω
- $R_{DS(ON)}$ (at $V_{GS} = 4.5V$) < 3.9m Ω
- 100% Avalanche Tested
- RoHS Compliant
- Epoxy Meets UL 94 V-0 Flammability Rating

Application

- Power switch
- DC/DC converters



Schematic diagram



TO-220

Ordering Information

Device	Package	Marking	Packaging
GT030N08T	TO-220	GT030N08	50pcs/Tube

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	$T_C = 25^\circ\text{C}$	155	A
	$T_C = 100^\circ\text{C}$	98	
Pulsed Drain Current (note1)	I_{DM}	620	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	140	W
Single pulse avalanche energy (note2)	E_{AS}	272	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}	50	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	R_{thJC}	0.9	$^\circ\text{C/W}$

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	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	80	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 80V, V_{GS} = 0V$	--	--	1	μA
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.5	3.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	--	2.7	3.3	m Ω
		$V_{GS} = 4.5V, I_D = 15A$	--	3.2	3.9	
Forward Transconductance	g_{FS}	$V_{GS} = 5V, I_D = 20A$	--	72	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 40V,$ $f = 1.0MHz$	--	5100	--	pF
Output Capacitance	C_{oss}		--	900	--	
Reverse Transfer Capacitance	C_{rss}		--	32	--	
Total Gate Charge	Q_g	$V_{DD} = 40V,$ $I_D = 20A,$ $V_{GS} = 10V$	--	115	--	nC
Gate-Source Charge	Q_{gs}		--	15	--	
Gate-Drain Charge	Q_{gd}		--	25	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 40V,$ $I_D = 20A,$ $R_G = 1.6\Omega$	--	24	--	ns
Turn-on Rise Time	t_r		--	14	--	
Turn-off Delay Time	$t_{d(off)}$		--	50	--	
Turn-off Fall Time	t_f		--	16	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ C$	--	--	155	A
Body Diode Voltage	V_{SD}	$T_J = 25^\circ C, I_{SD} = 20A, V_{GS} = 0V$	--	--	1.2	V
Reverse Recovery Charge	Q_{rr}	$I_F = 20A, V_{GS} = 0V$ $di/dt=100A/us$	--	130	--	nC
Reverse Recovery Time	T_{rr}		--	66	--	ns

Notes

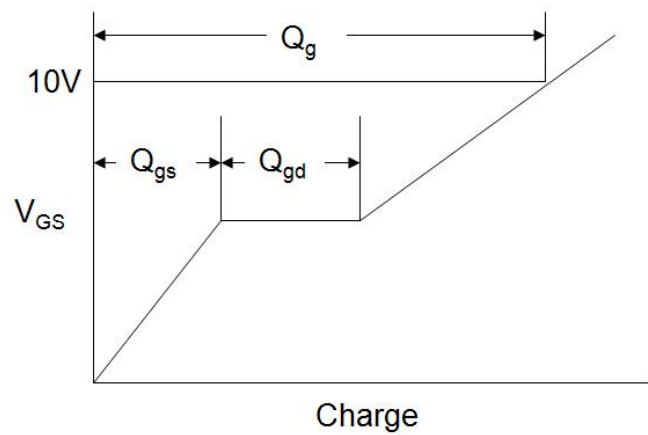
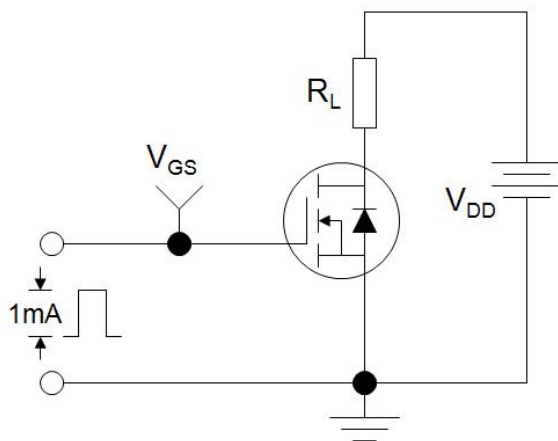
1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. EAS condition : $T_J = 25^\circ\text{C}$, $V_{DD} = 50V$, $V_{GS} = 10V$, $L = 0.5mH$, $R_G = 25\Omega$

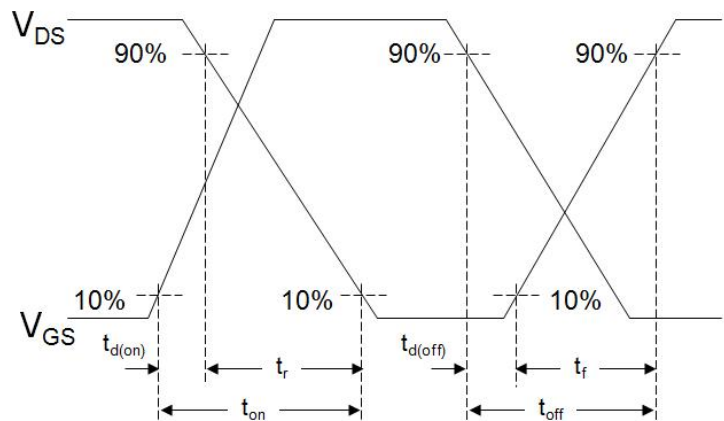
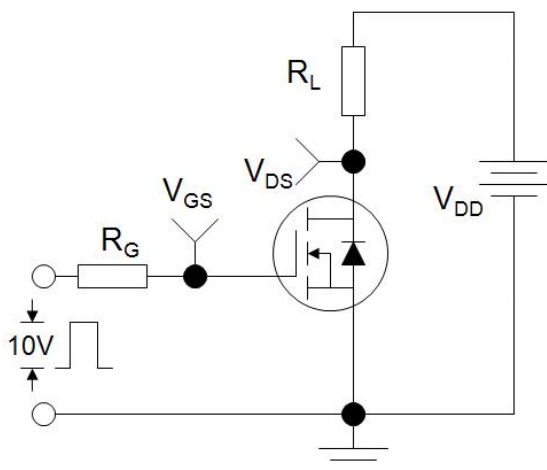
The table shows the minimum avalanche energy, which is 756mJ when the device is tested until failure

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

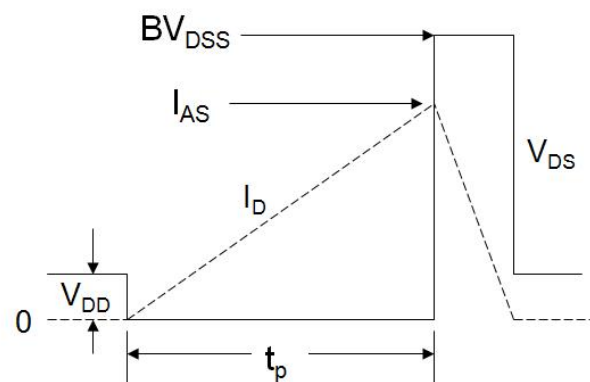
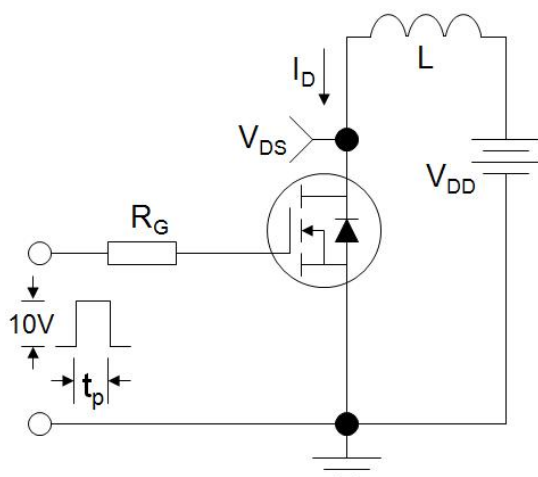
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



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

Figure 1. Output Characteristics

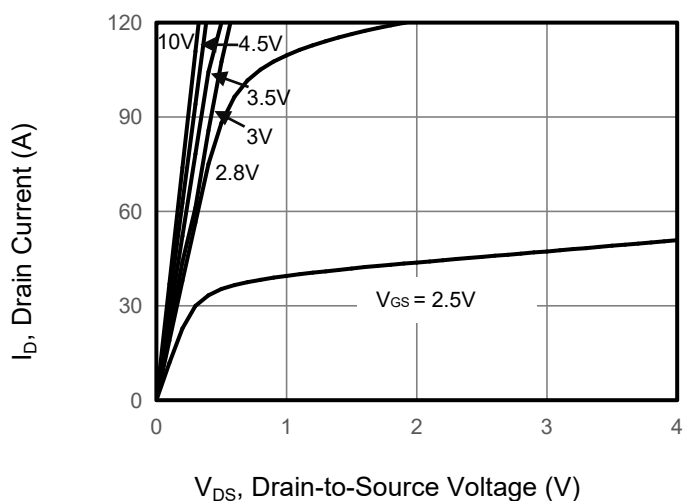


Figure 2. Transfer Characteristics

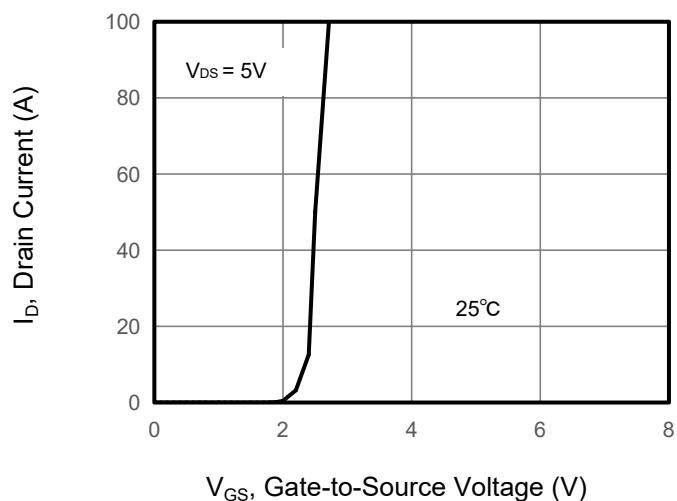


Figure 3. Drain Source On Resistance

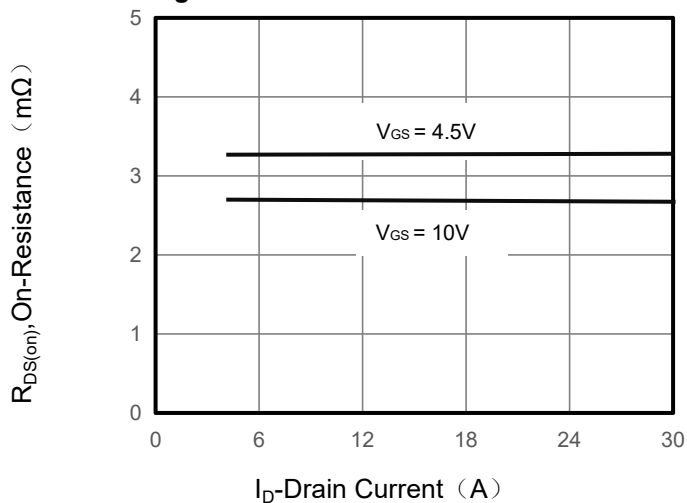


Figure 4. Gate Charge

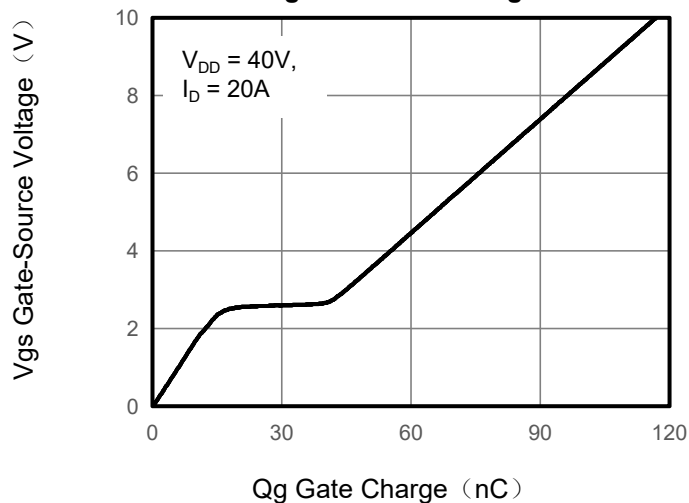


Figure 5. Capacitance

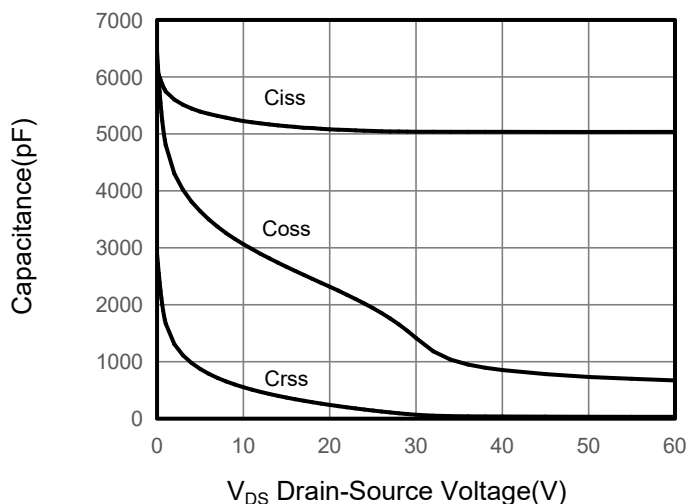
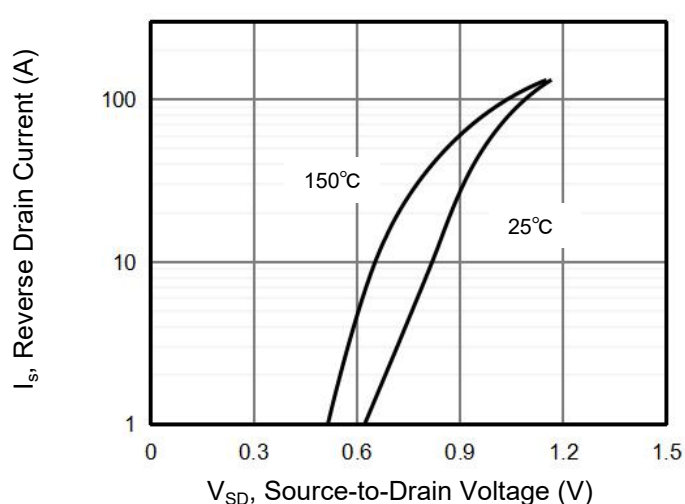


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

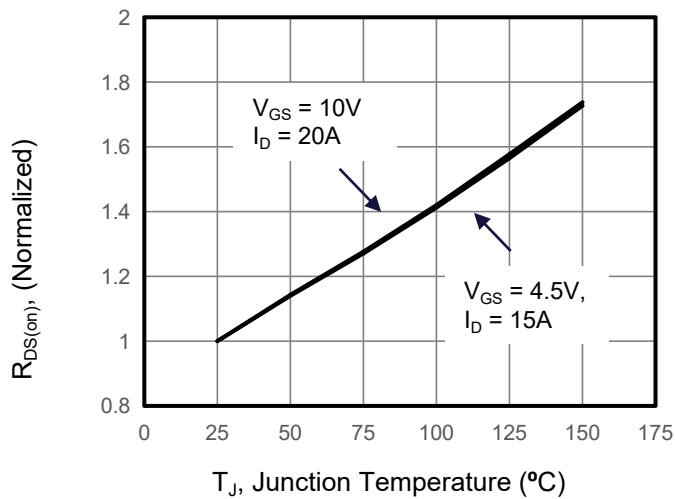


Figure 8. Safe Operation Area

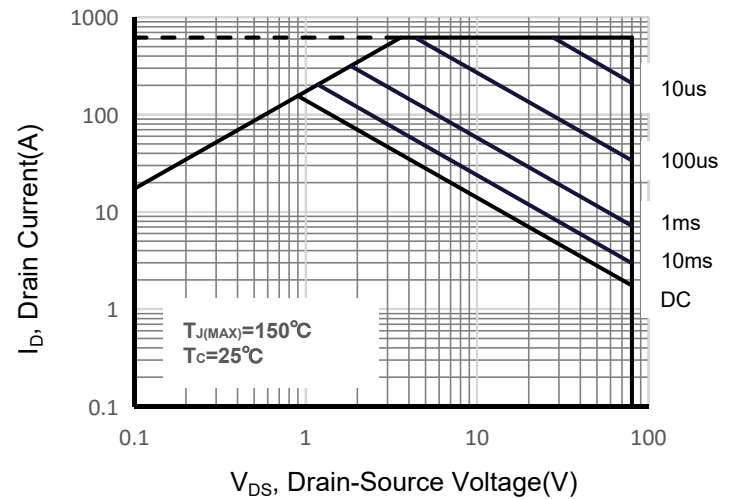


Figure 9. Maximum Continuous Drain Current vs Case Temperature

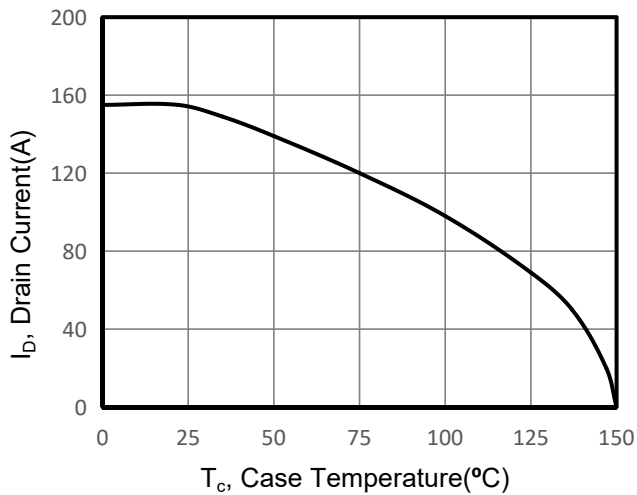
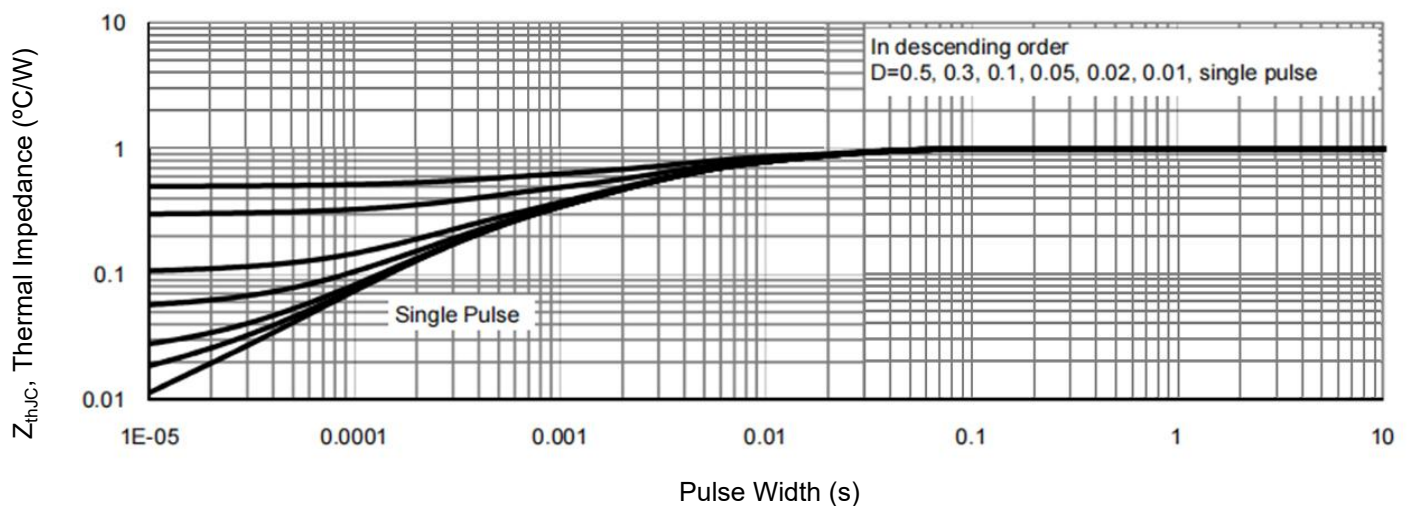
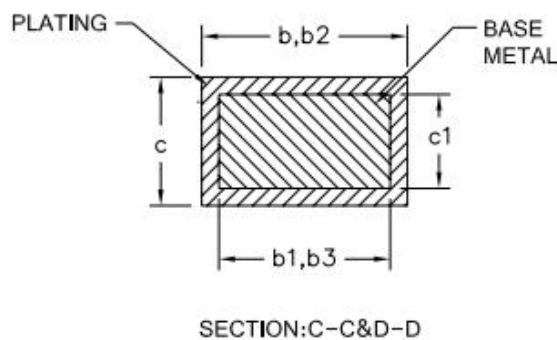
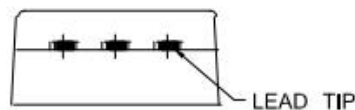
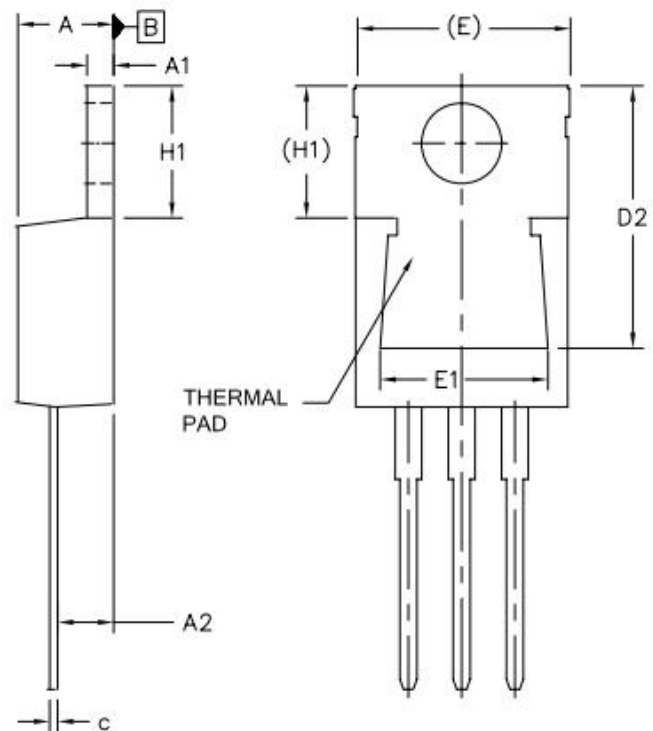
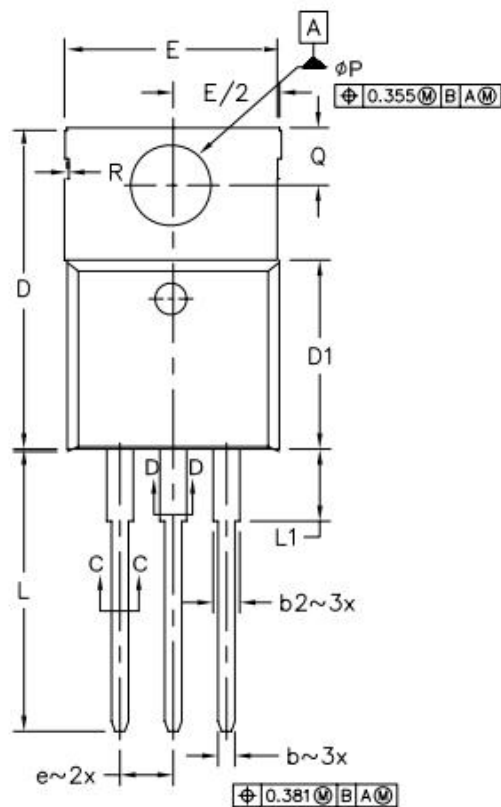


Figure 10. Normalized Maximum Transient Thermal Impedance



TO-220 Package Information



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