N-Channel Enhancement Mode Power MOSFET

Description

The G020N03T uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

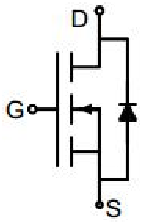
General Features

● V_{DS}		30V
● I_D (at V_{GS} = 10V)		168A
● $R_{DS(ON)}$ (at V_{GS} = 10V)	<	2.3mΩ
● $R_{DS(ON)}$ (at V_{GS} = 4.5V)	<	3.5mΩ

- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram

TO-220

Ordering Information

Device	Package	Marking	Packaging
G020N03T	TO-220	G020N03	50pcs/Tube

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Continuous Drain Current	T_C=25°C	I_D	168	A
	T_C=100°C		124	
Pulsed Drain Current (note1)		I_{DM}	672	A
Gate-Source Voltage		V_{GS}	±20	V
Power Dissipation		P_D	140	W
Single pulse avalanche energy （note2）		E_{AS}	900	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}	50	ºC/W
Maximum Junction-to-Case	R_{thJC}	0.89	ºC/W

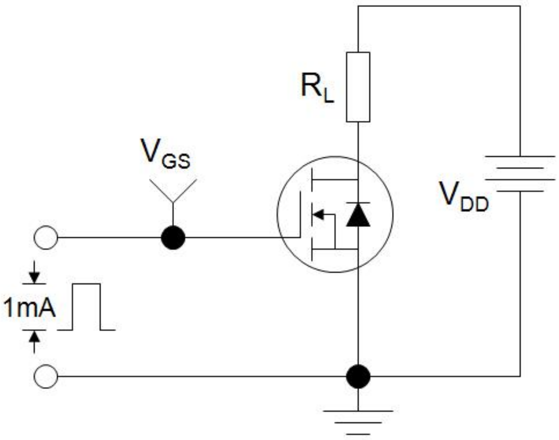
Specifications T_J = 25ºC, unless otherwise noted

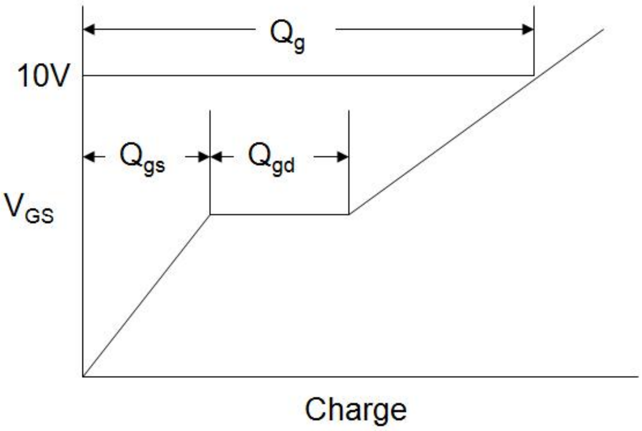
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	30	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V	--	--	1	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.5	2.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 50A	--	1.9	2.3	mΩ
		V_{GS} = 4.5V, I_D = 50A	--	2.8	3.5	
Forward Transconductance	g_{FS}	V_{GS} = 5V, I_D = 50A	--	69	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1.0MHz	--	6005	--	pF
Output Capacitance	C_{oss}		--	995	--	
Reverse Transfer Capacitance	C_{rss}		--	964	--	
Total Gate Charge	Q_g	V_{DD} = 15V, I_D = 50A, V_{GS} = 10V	--	110	--	nC
Gate-Source Charge	Q_{gs}		--	14	--	
Gate-Drain Charge	Q_{gd}		--	26	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 15V, I_D = 50A, R_G = 2.5Ω	--	24	--	ns
Turn-on Rise Time	t_r		--	23	--	
Turn-off Delay Time	$t_{d(off)}$		--	87	--	
Turn-off Fall Time	t_f		--	37	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	168	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 50A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Qrr	I_F = 50A, V_{GS} = 0V di/dt=100A/us	--	114	--	nC
Reverse Recovery Time	Trr		--	57	--	ns

Notes

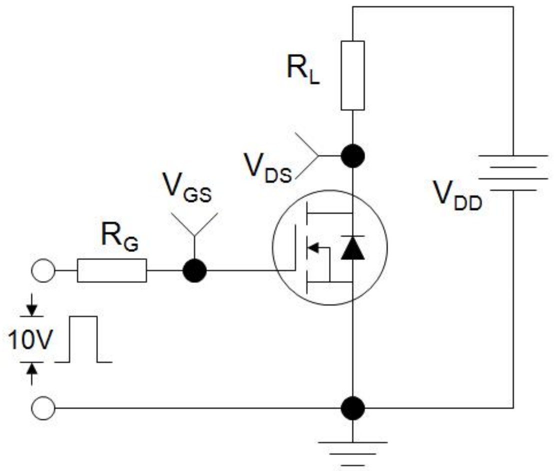
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : Tj=25℃ ,VDD=24V,VGS=10V,L=0.5mH,Rg=25Ω
3. Identical low side and high side switch with identical R_G

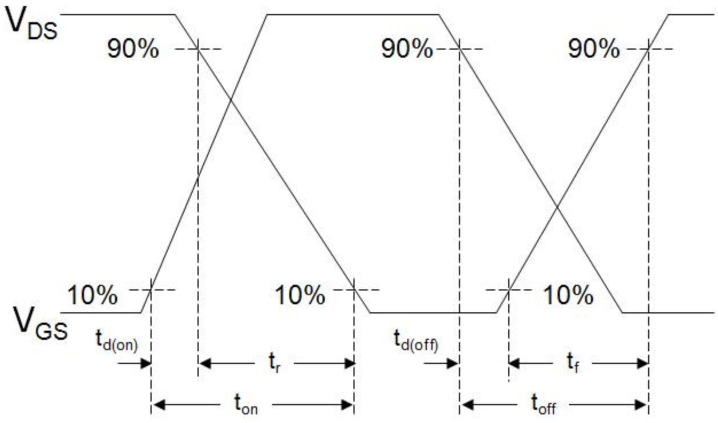
Gate Charge Test Circuit



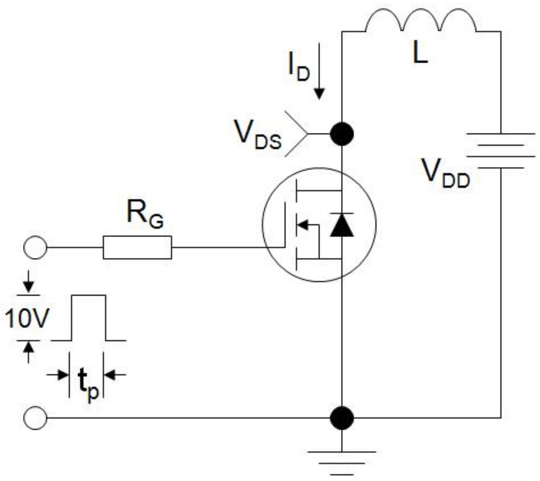


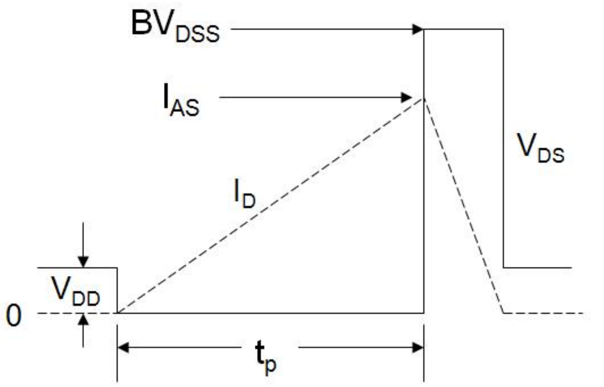
Switch Time Test Circuit





EAS Test Circuit





Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

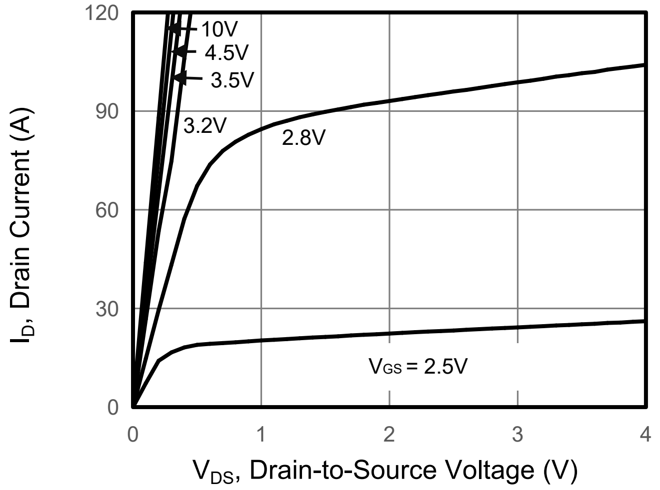


Figure 2. Transfer Characteristics

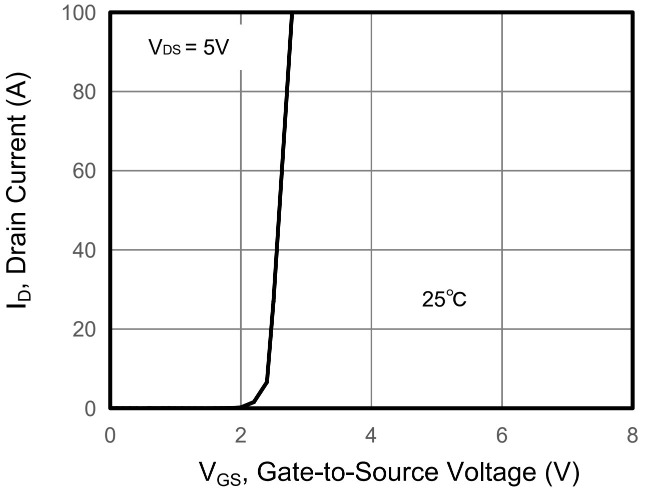


Figure 3. Drain Source On Resistance

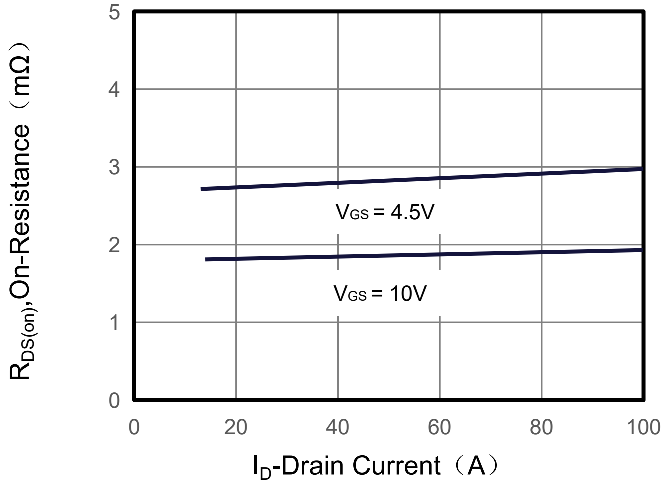


Figure 4. Gate Charge

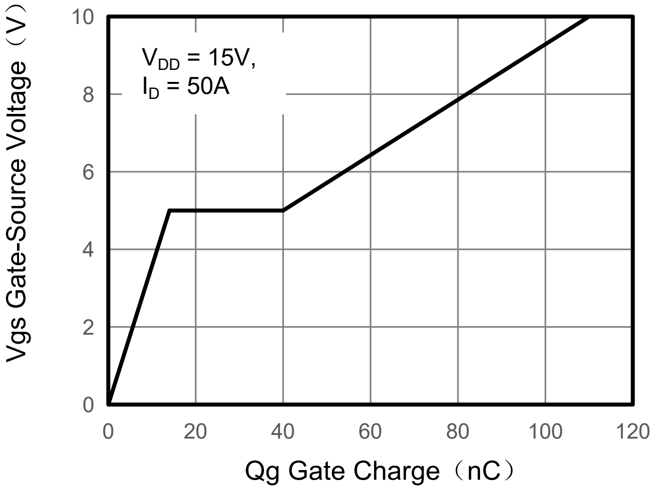


Figure 5. Capacitance

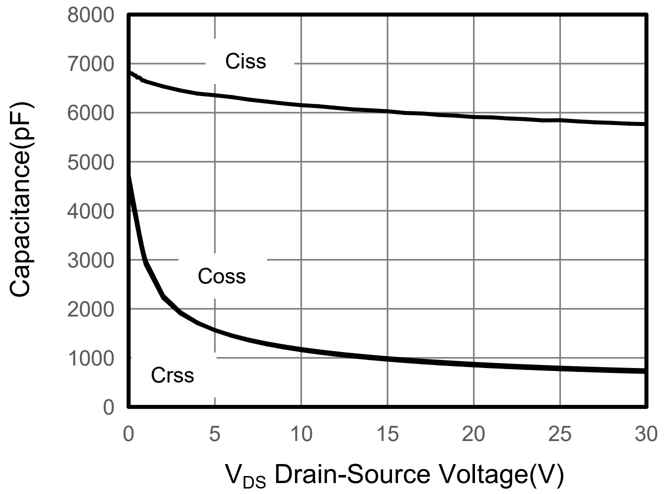
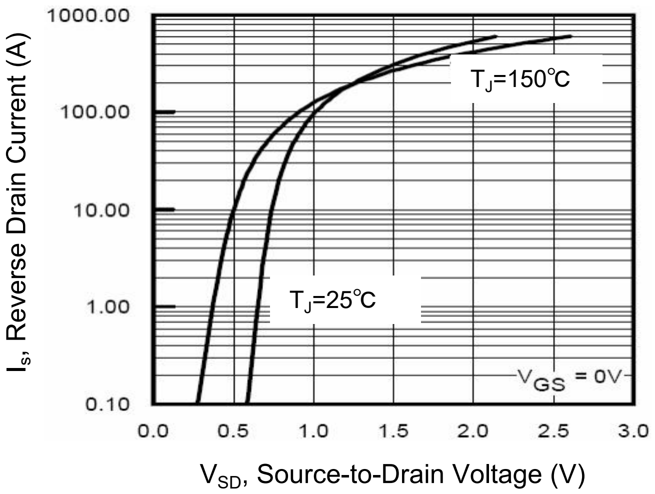


Figure 6. Source-Drain Diode Forward



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

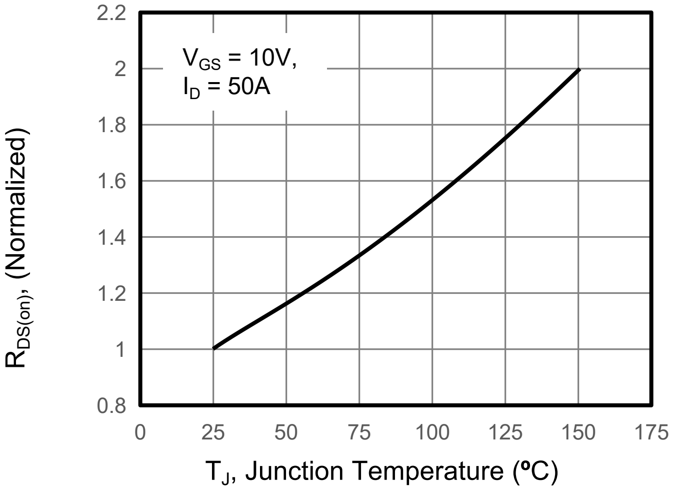


Figure 8. Safe Operation Area

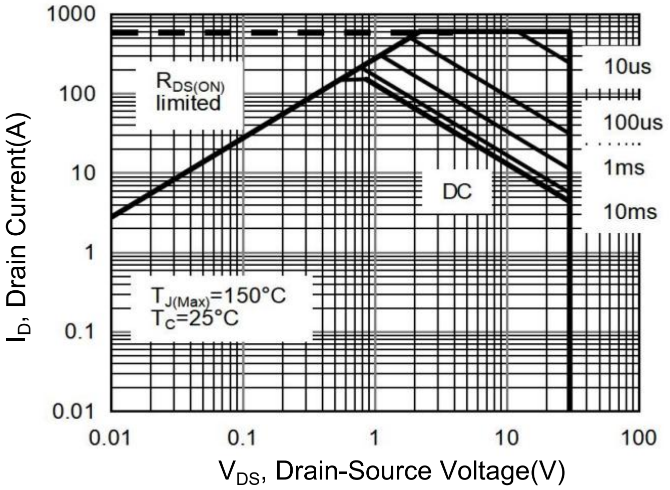


Figure 9. Maximum Continuous Drain Current vs Case Temperature

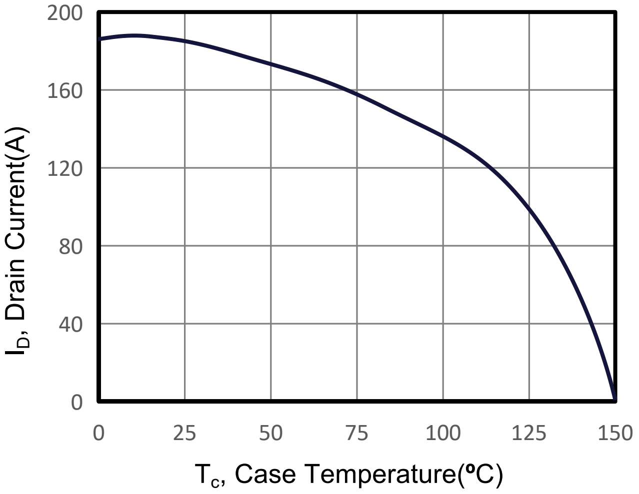
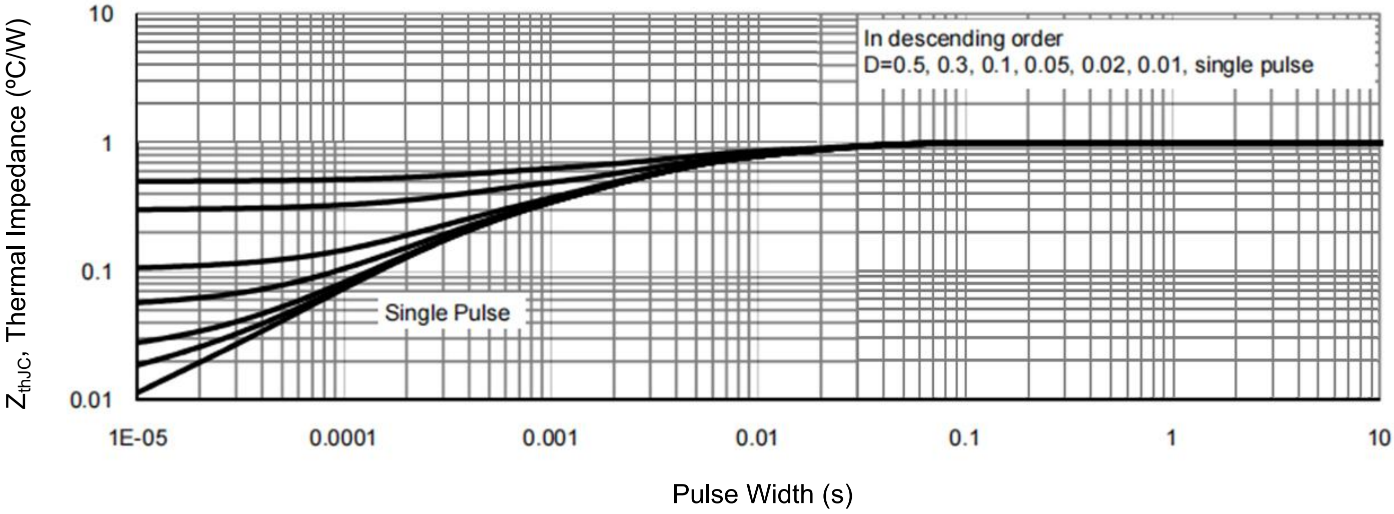
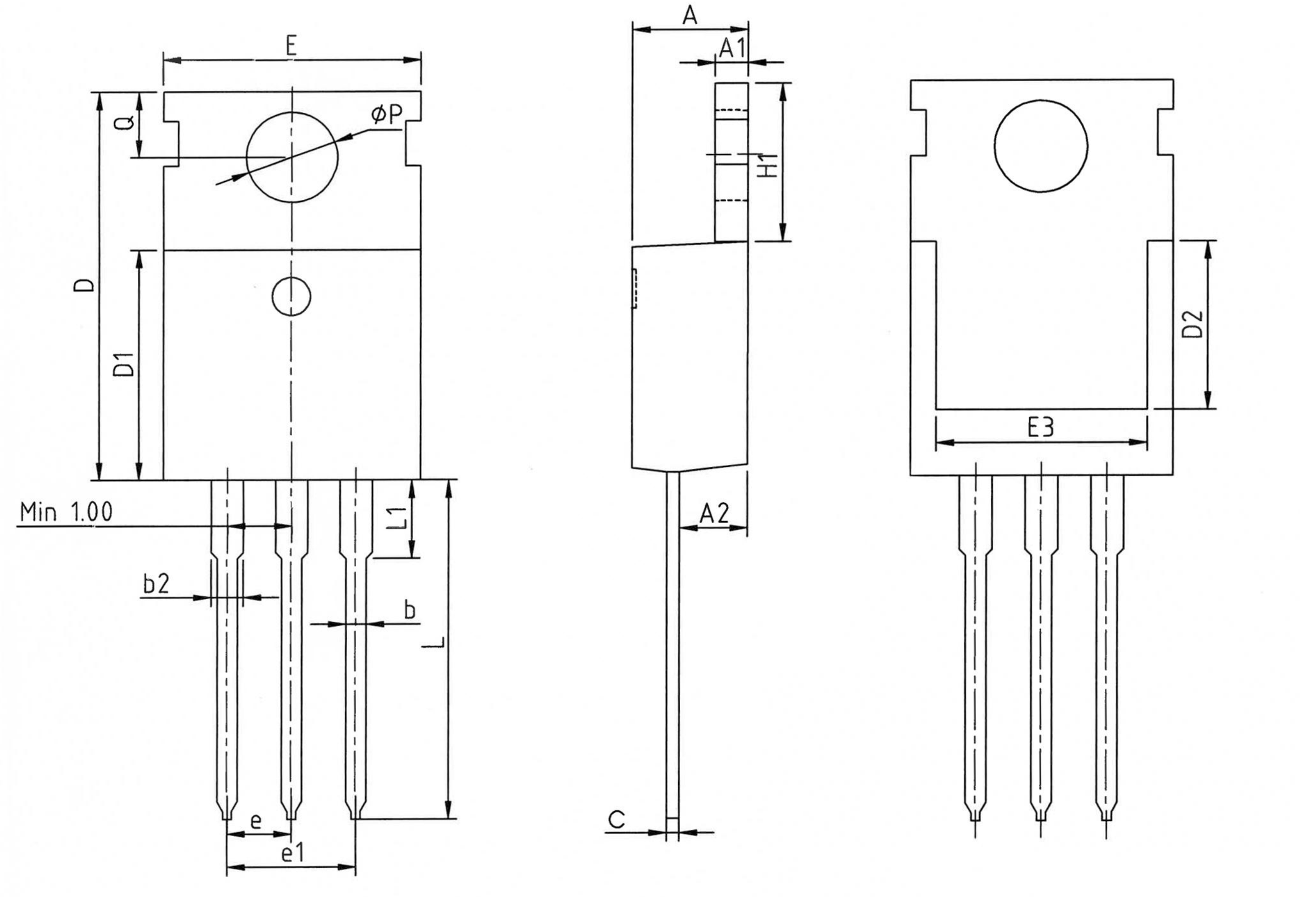


Figure 10. Normalized Maximum Transient Thermal Impedance



TO-220 Package Information



COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX
A	4. 37	4. 57	4. 70
A1	1. 25	1. 30	1. 40
A2	2. 20	2. 40	2. 60
b	0. 70	0. 80	0. 95
b2	1. 17	1. 27	1. 47
c	0. 45	0. 50	0. 60
D	15. 10	15. 60	16. 10
D1	8. 80	9. 10	9. 40
D2	5. 50	6. 30	7. 10
E	9. 70	10. 00	10. 30
E3	7. 00	7. 80	8. 60
e	2. 54 BSC		
e1	5. 08 BSC		
H1	6. 25	6. 50	6. 85
L	12. 75	13. 50	13. 80
L1	-	3. 10	3. 40
ΦP	3. 40	3. 60	3. 80
Q	2. 60	2. 80	3. 00