

N-Channel Enhancement Mode Power MOSFET

Description

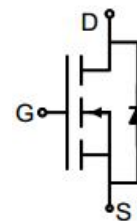
This advanced MOSFET family has optimized on-state resistance, and also provides superior switching performance and higher avalanche energy strength. This device family is suitable for high efficiency switch mode power supplies.

General Features

- V_{DS} 200V
- I_D (at $V_{GS} = 10V$) 18A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 190m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



TO-220

Ordering Information

Device	Package	Marking	Packaging
G18N20T	TO-220	G18N20	50pcs/Tube

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	200	V
Continuous Drain Current	I_D	18	A
		11.5	
Pulsed Drain Current (note1)	I_{DM}	72	A
Gate-Source Voltage	V_{GS}	± 30	V
Power Dissipation	P_D	110	W
Single pulse avalanche energy (note2)	E_{AS}	9	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}	62.5	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	R_{thJC}	1.14	$^\circ\text{C/W}$

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 = 250μA	200	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 200V, V _{GS} = 0V	--	--	1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±30V	--	--	±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2.0	2.8	4.0	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 8A	--	160	190	mΩ
Forward Transconductance	g _{FS}	V _{GS} = 5V, I _D = 8A	--	6	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 100V, f = 1.0MHz	--	1120	--	pF
Output Capacitance	C _{oss}		--	80	--	
Reverse Transfer Capacitance	C _{rss}		--	4	--	
Total Gate Charge	Q _g	V _{DD} = 100V, I _D = 8A, V _{GS} = 5V	--	31	--	nC
Gate-Source Charge	Q _{gs}		--	6	--	
Gate-Drain Charge	Q _{gd}		--	15	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 100V, I _D = 8A, R _G = 4.6Ω	--	9	--	ns
Turn-on Rise Time	t _r		--	7	--	
Turn-off Delay Time	t _{d(off)}		--	39	--	
Turn-off Fall Time	t _f		--	13	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	18	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 8A, V _{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = 8A, V _{GS} = 0V di/dt=100A/us	--	1.3	--	μC
Reverse Recovery Time	T _{rr}		--	189	--	ns

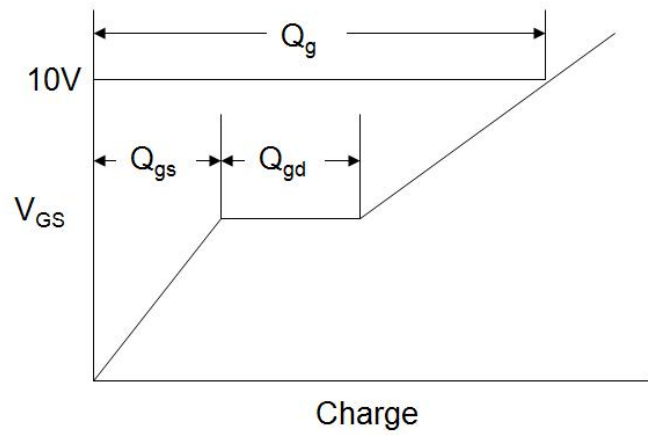
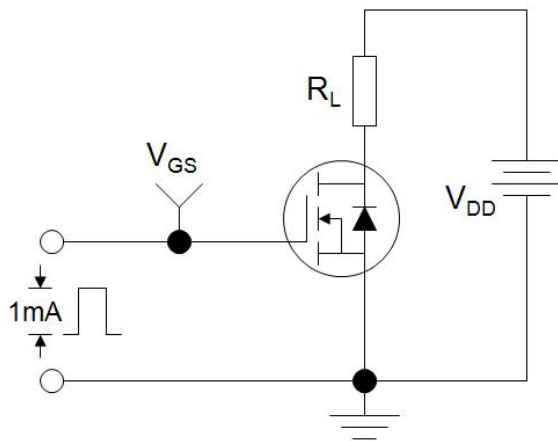
Notes

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

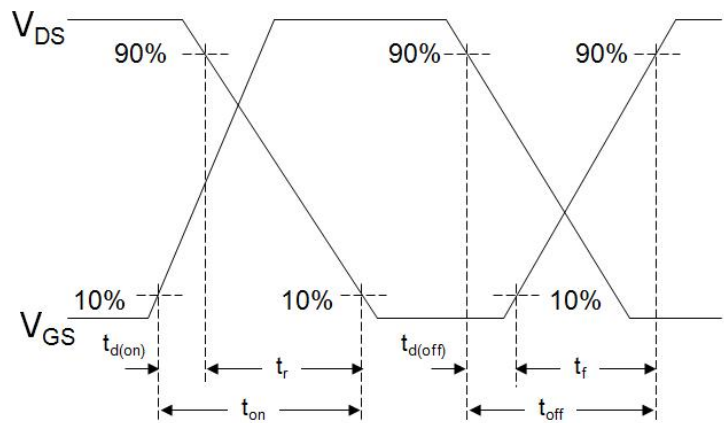
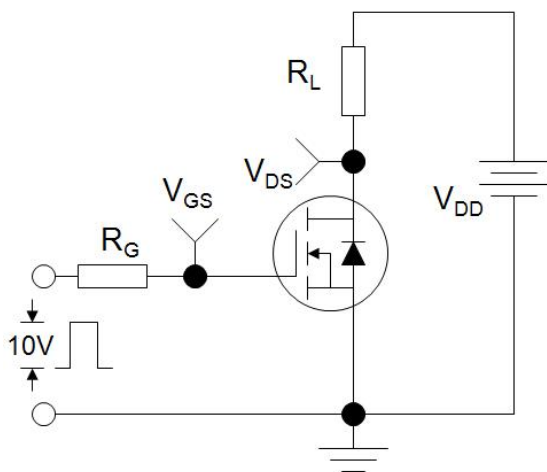
The table shows the minimum avalanche energy, which is 25mJ when the device is tested until failure

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

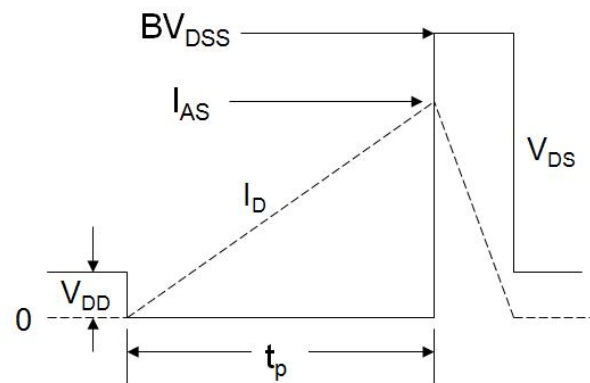
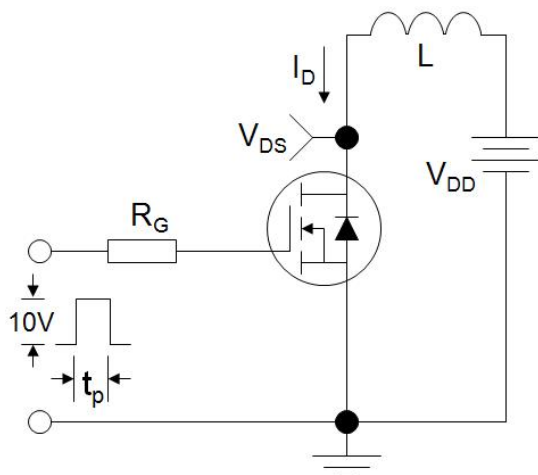
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



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

Figure 1. Output Characteristics

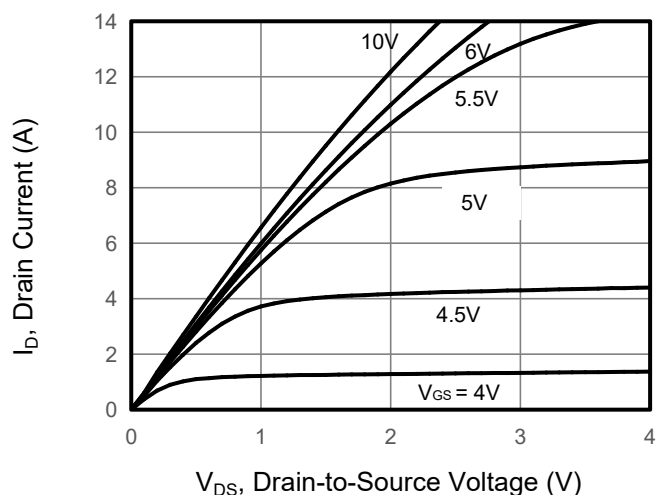


Figure 2. Transfer Characteristics

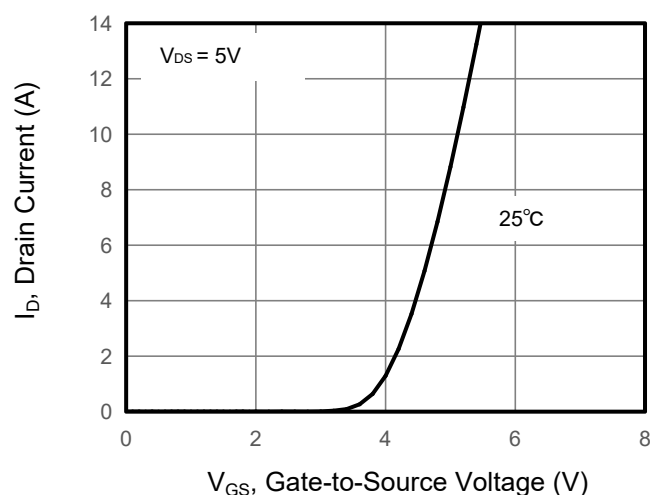


Figure 3. Drain Source On Resistance

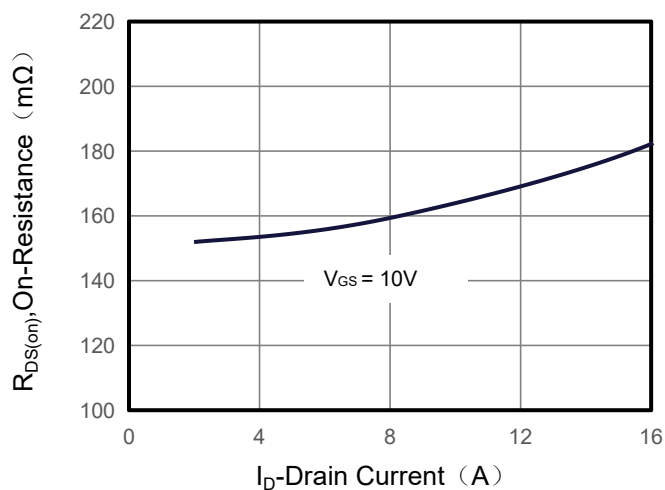


Figure 4. Gate Charge

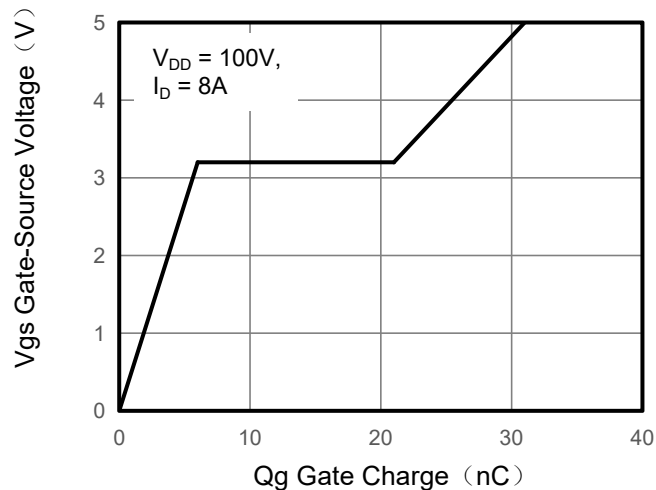


Figure 5. Capacitance

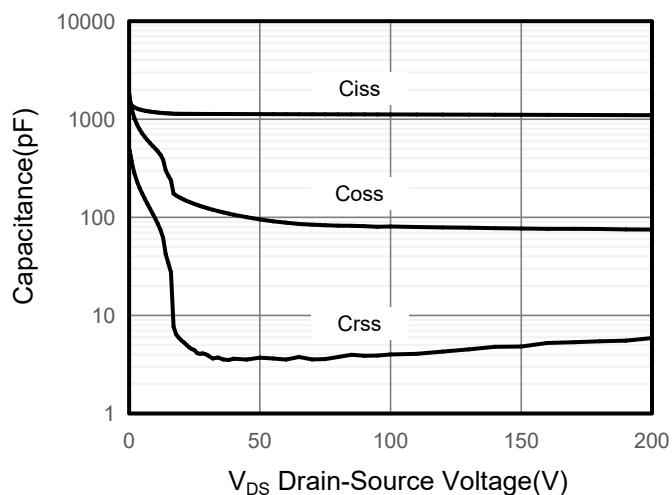
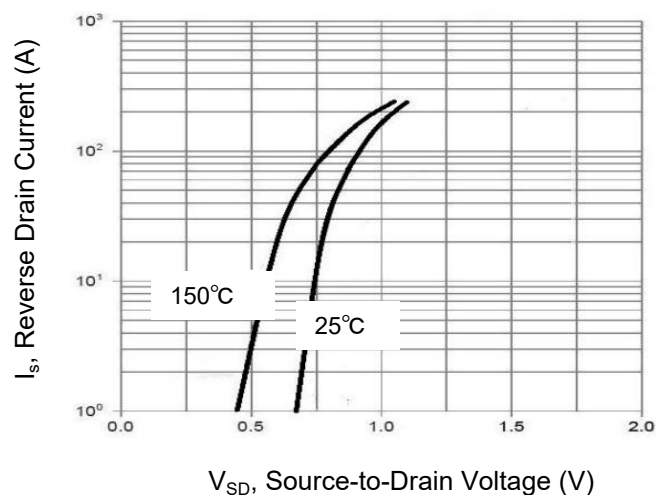


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

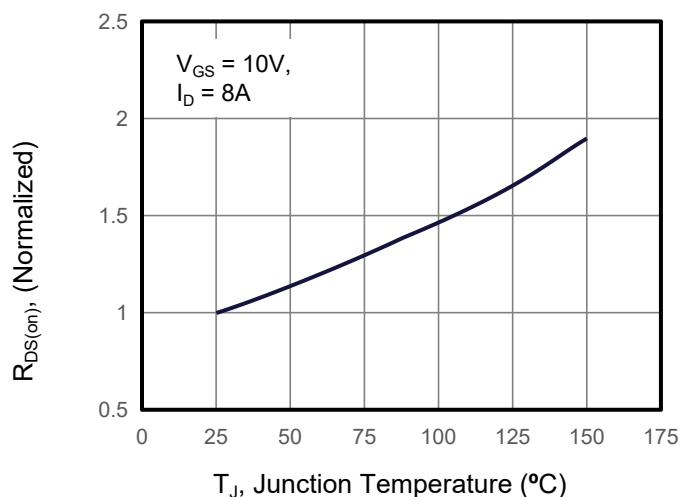


Figure 8. Safe Operation Area

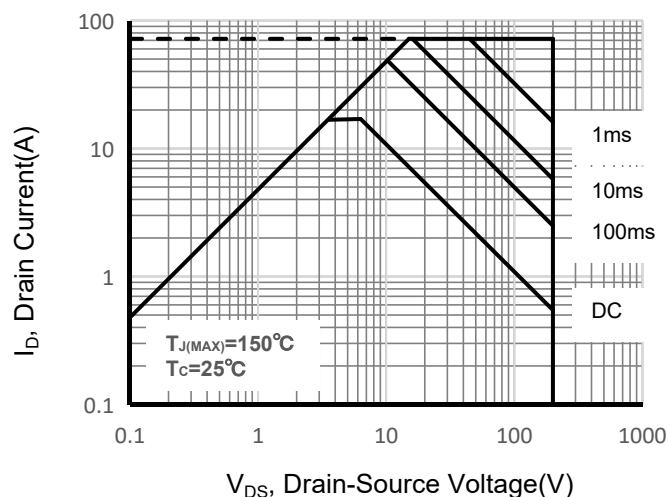


Figure 9. Maximum Continuous Drain Current vs Case Temperature

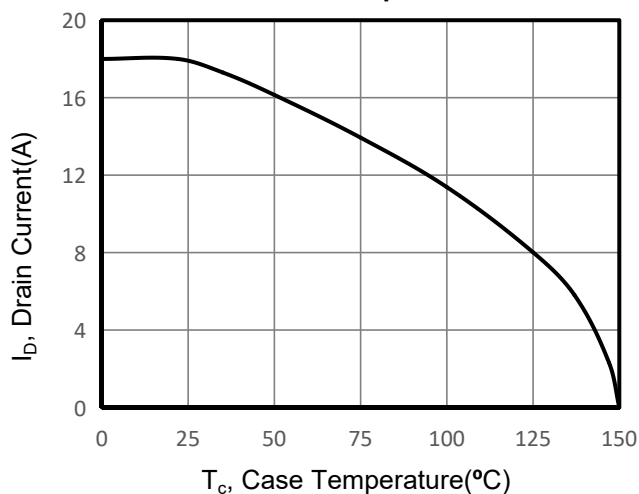
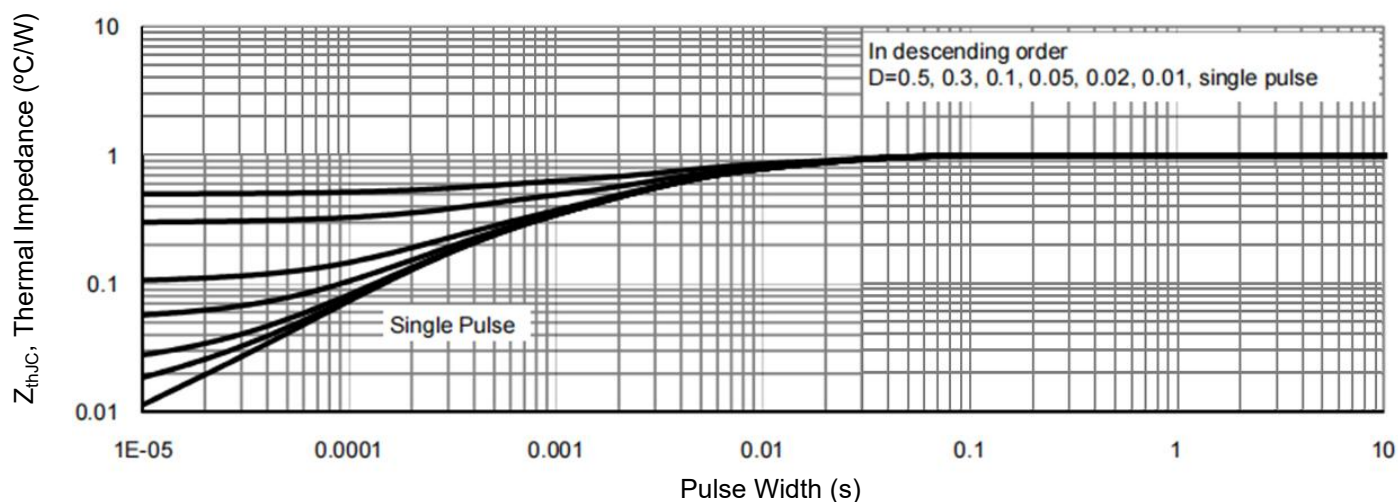
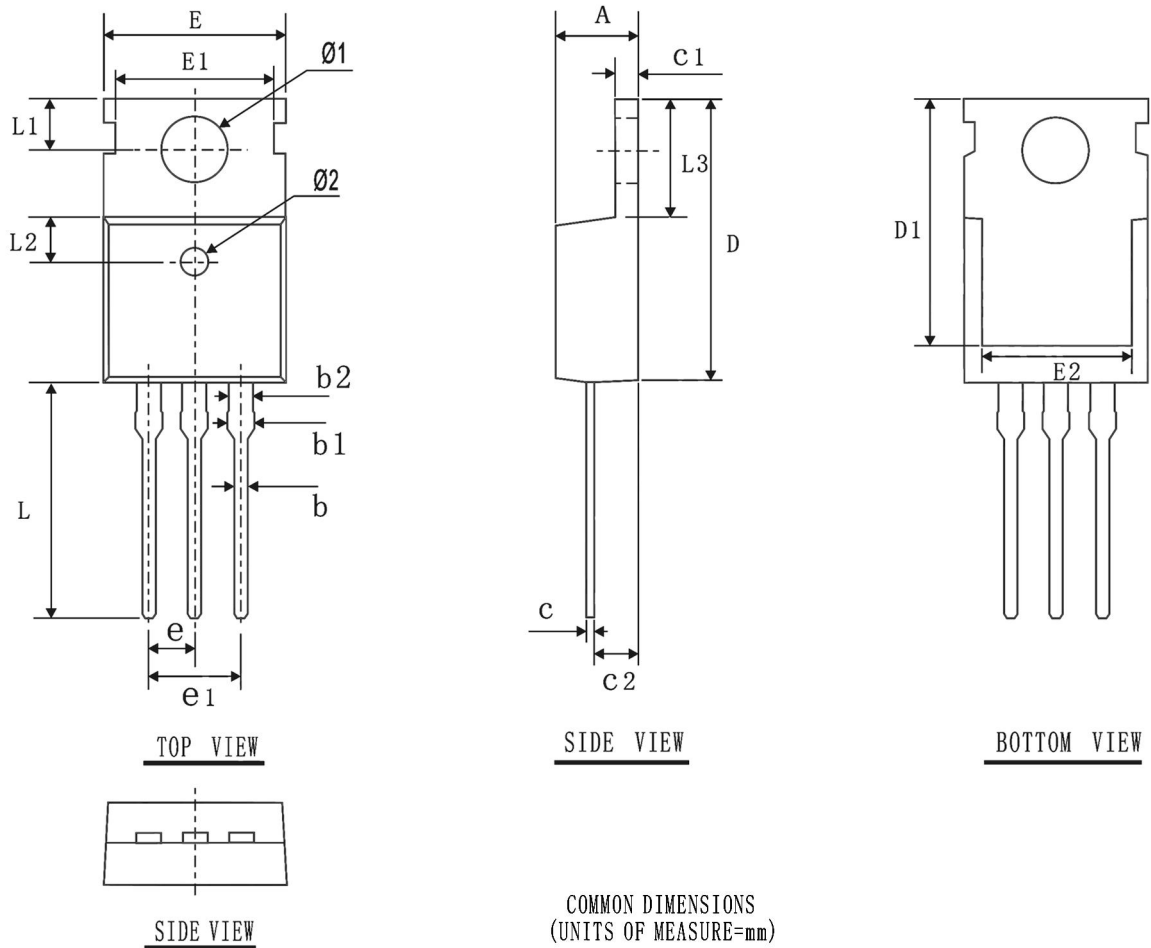


Figure 10. Normalized Maximum Transient Thermal Impedance



TO-220 Package Information



COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	4.30	4.50	4.70
b	0.70	0.80	0.90
b 1	—	—	1.42
b 2	1.17	1.27	1.37
c	0.40	0.50	0.60
c 1	1.25	1.30	1.35
c 2	2.20	2.40	2.60
D	15.45	15.65	15.85
D 1	13.20	13.40	13.60
E	9.80	10.0	10.2
E 1	8.60	8.70	8.80
E 2	7.80	8.00	8.20
e 1	4.88	5.08	5.28
L	12.95	13.15	13.35
L 1	2.70	2.80	2.90
L 2	2.40	2.50	2.60
L 3	6.30	6.50	6.70
Ø1	3.50	3.60	3.70
Ø2	1.35	1.50	1.65
e	2.54BSC		