N-Channel Enhancement Mode Power MOSFET

Description

The G048N04TA uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

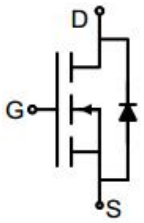
AEC-Q101 Qualified

General Features

- V_{DS} 40V
- I_D (at V_{GS} = 10V) 150A
- $R_{DS(ON)}$ (at V_{GS} = 10V) < 3.3mΩ
- $R_{DS(ON)}$ (at V_{GS} = 4.5V) < 4.5mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



TO-220

Ordering Information

Device	Package	Marking	Packaging
G048N04TA	TO-220	G048N04	50pcs/Tube

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Continuous Drain Current	I_D	150	A
Pulsed Drain Current (note1)	I_{DM}	600	A
Gate-Source Voltage	V_{GS}	±20	V
Power Dissipation	P_D	130	W
Single pulse avalanche energy （note2）	E_{AS}	306	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}	0.96	ºC/W

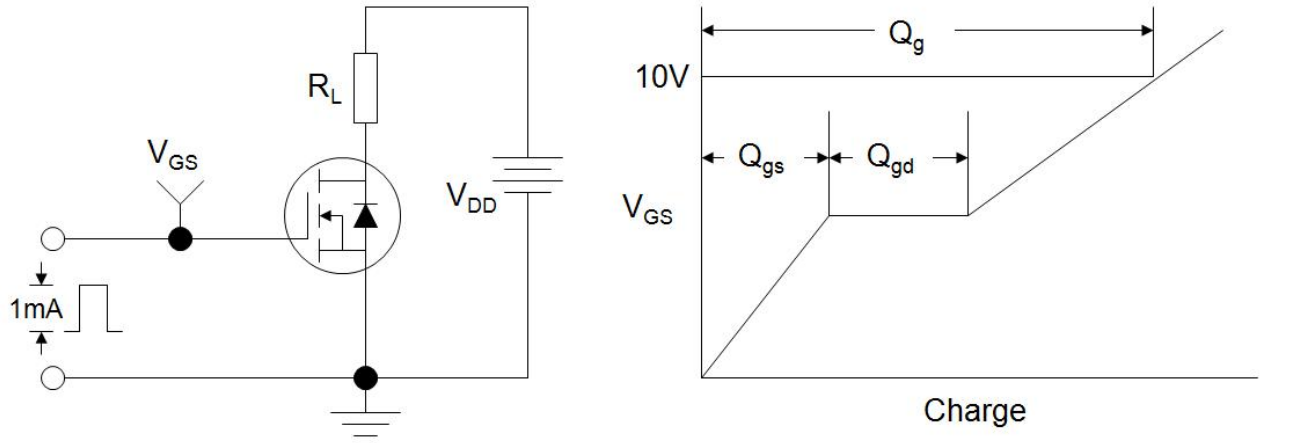
Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	40	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40V, 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	1.7	2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 50A	--	2.6	3.3	mΩ
		V_{GS} = 4.5V, I_D = 50A	--	3.6	4.5	
Forward Transconductance	g_{FS}	V_{GS} = 5V, I_D = 50A	--	70	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 20V, f = 1.0MHz	--	6561	--	pF
Output Capacitance	C_{oss}		--	593	--	
Reverse Transfer Capacitance	C_{rss}		--	548	--	
Total Gate Charge	Q_g	V_{DD} = 20V, I_D = 50A, V_{GS} = 10V	--	117	--	nC
Gate-Source Charge	Q_{gs}		--	18	--	
Gate-Drain Charge	Q_{gd}		--	29	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 20V, I_D = 50A, R_G = 3Ω	--	20	--	ns
Turn-on Rise Time	t_r		--	23	--	
Turn-off Delay Time	$t_{d(off)}$		--	68	--	
Turn-off Fall Time	t_f		--	30	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	150	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	--	59	--	nC
Reverse Recovery Time	Trr		--	55	--	ns

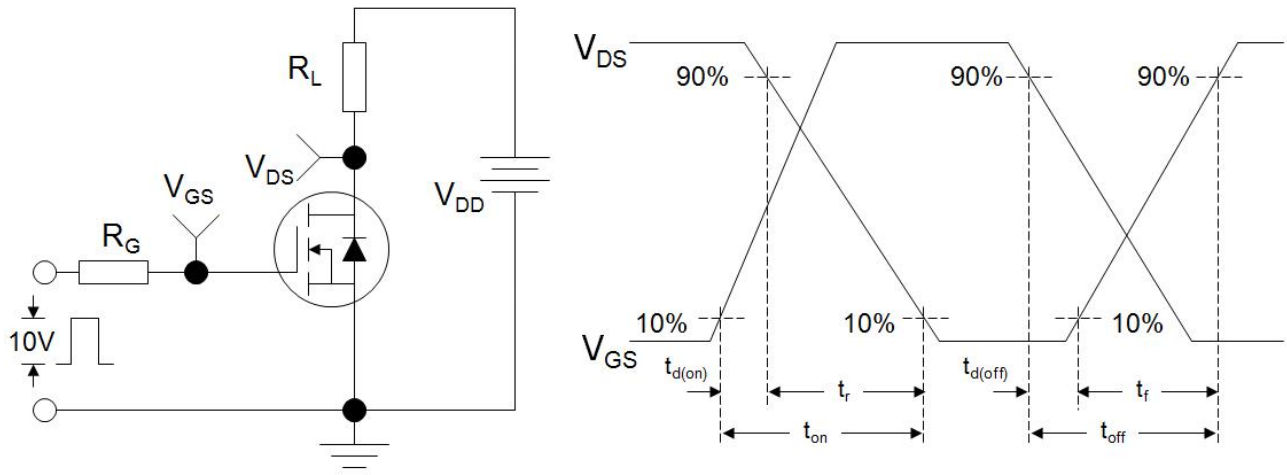
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : Tj=25℃ ,VDD=40V,VGS=10V,L=0.5mH,Rg=25Ω
   The table shows the minimum avalanche energy, which is 840mJ when the device is tested until failure
3. Identical low side and high side switch with identical R_G

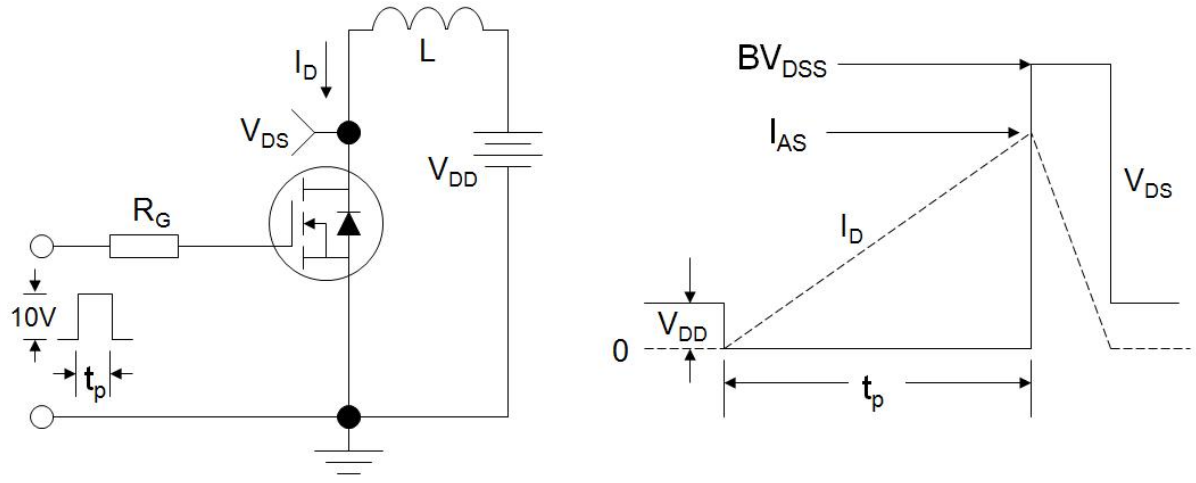
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

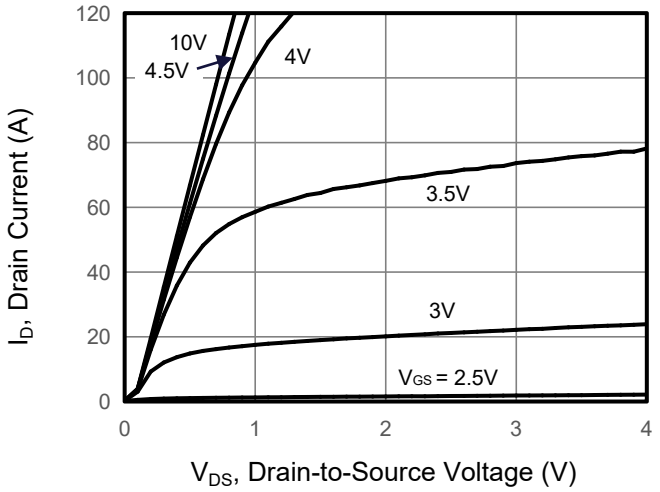


Figure 2. Transfer Characteristics

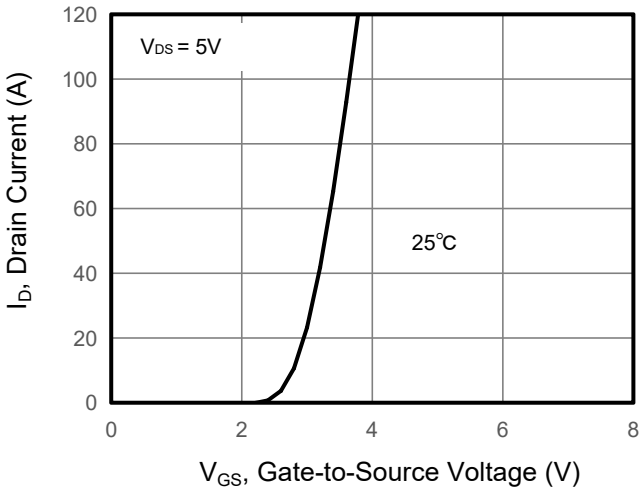


Figure 3. Drain Source On Resistance

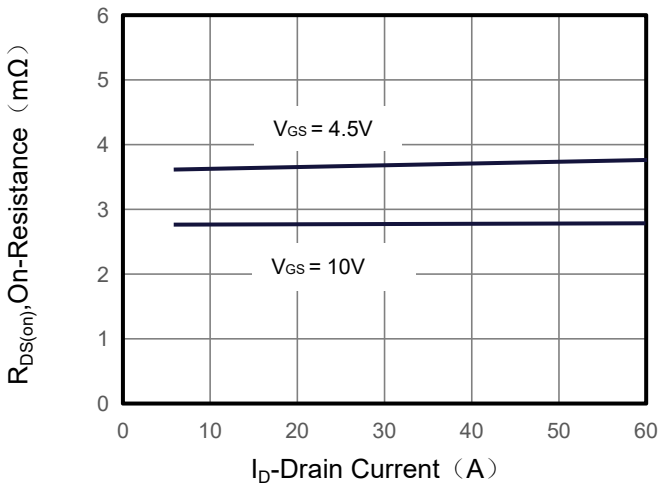


Figure 4. Gate Charge

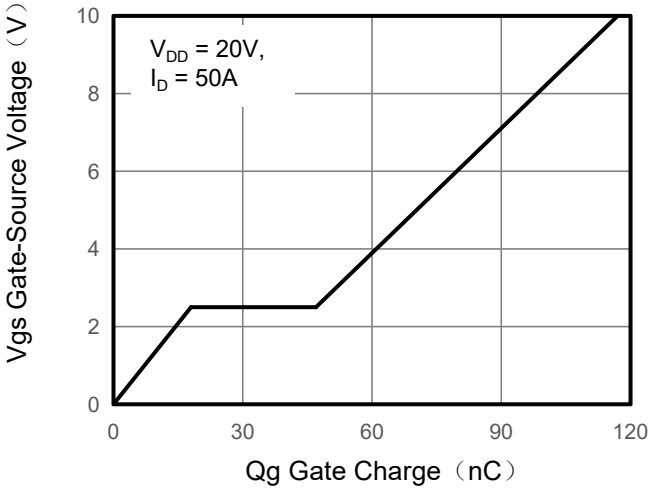


Figure 5. Capacitance

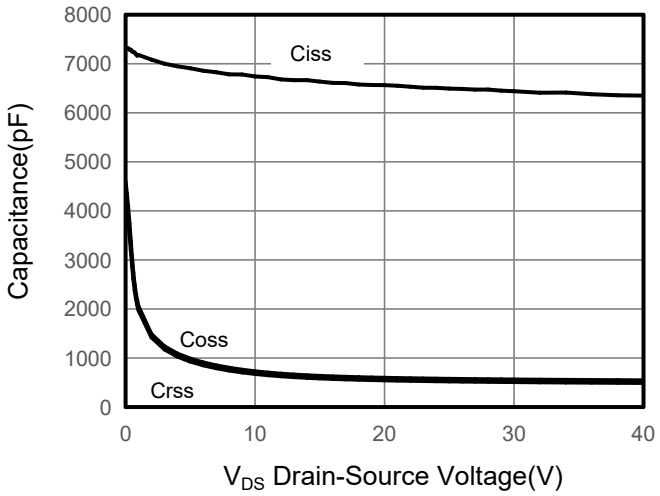
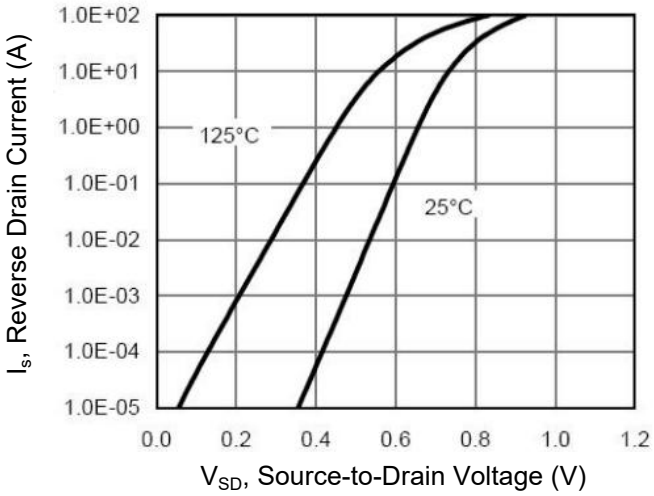


Figure 6. Source-Drain Diode Forward



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

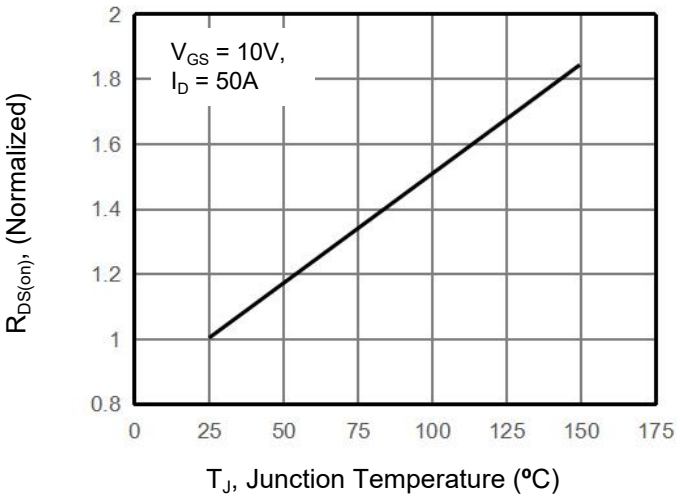


Figure 8. Safe Operation Area

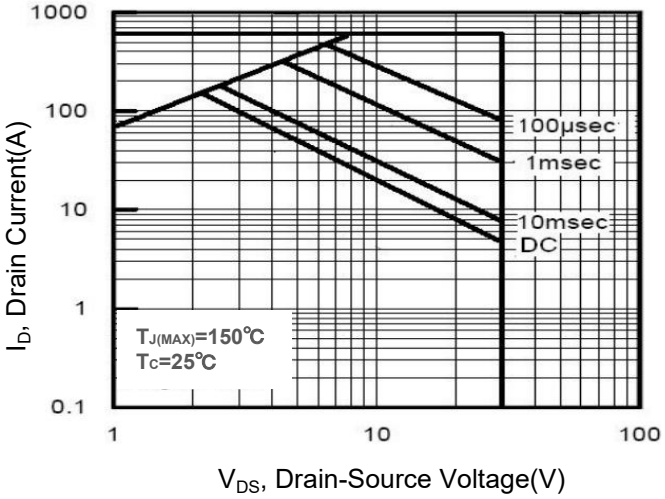
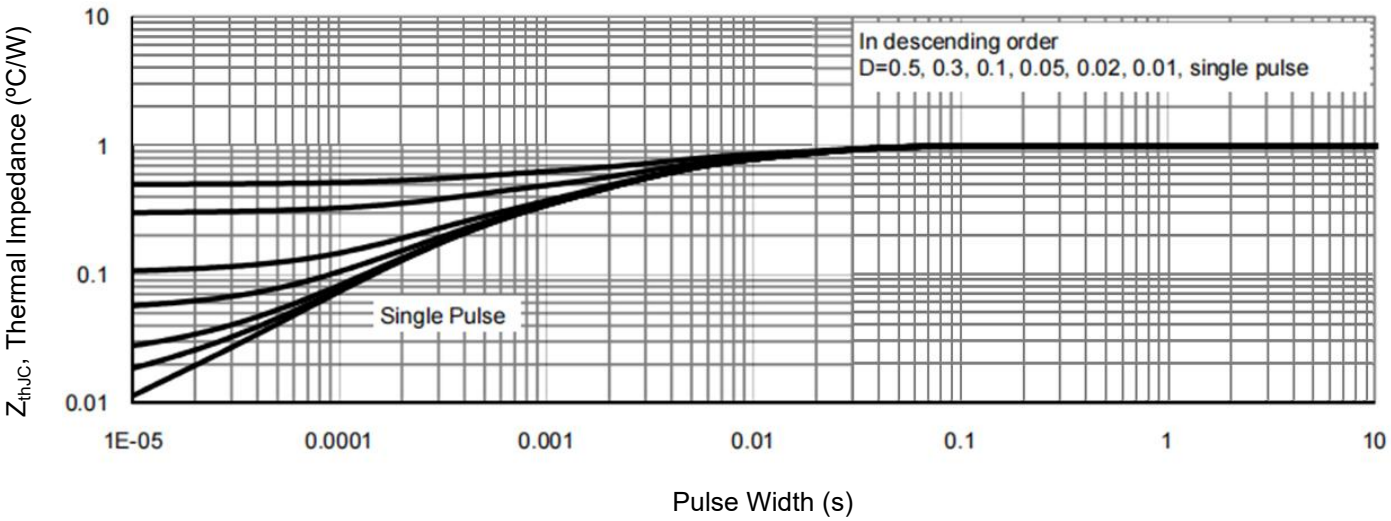
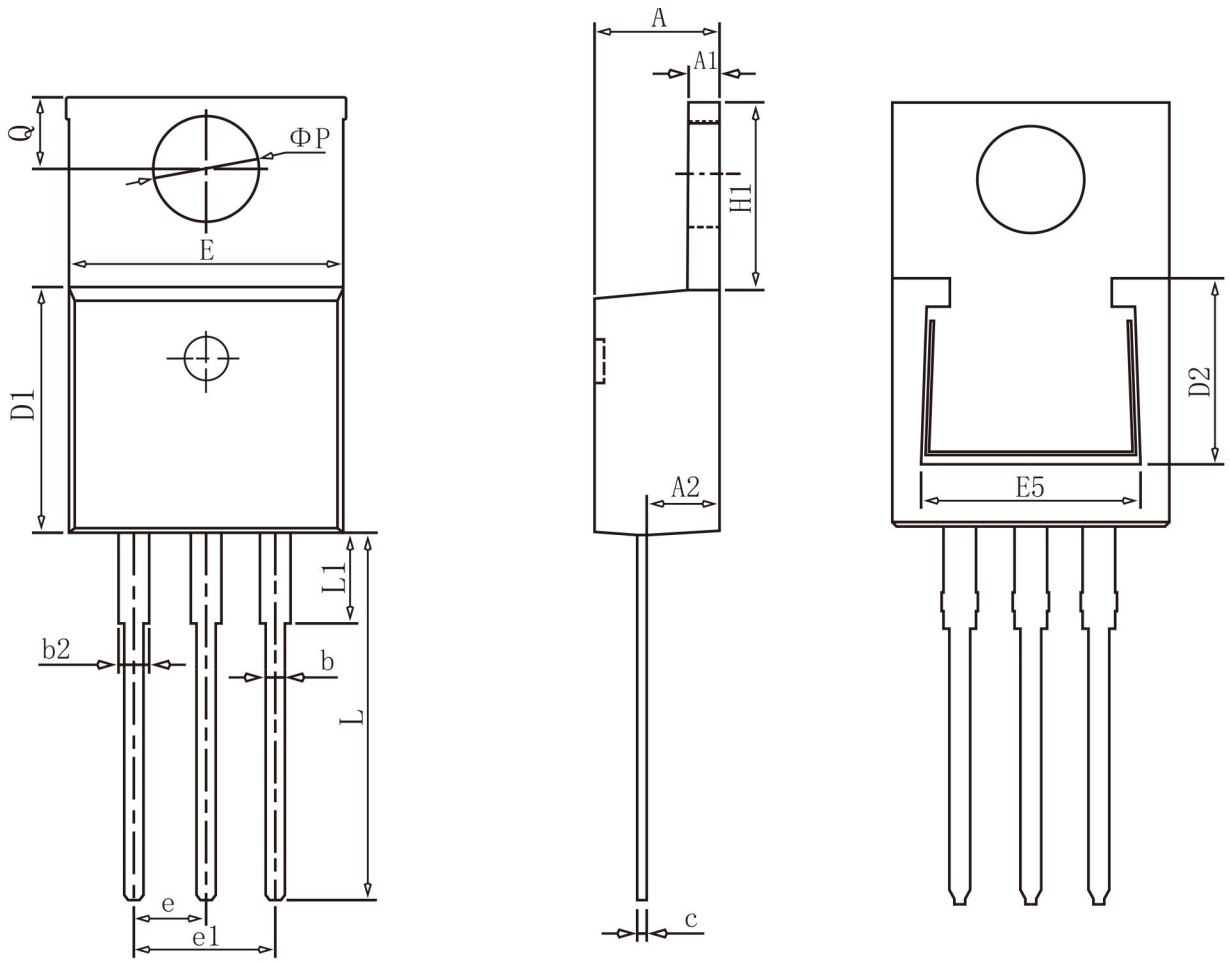


Figure 9. Normalized Maximum Transient Thermal Impedance



TO-220 Package Information



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
b	0.75	0.81	0.96
b2	1.22	1.27	1.47
c	0.30	0.38	0.48
D1	8.50	8.70	8.90
D2	5.20	–	–
E	9.86	10.16	10.36
E5	7.06	–	–
e	2.54BSC		
e1	5.08BSC		
H1	6.10	6.30	6.50
L	13.10	13.40	13.70
L1	–	3.75	4.10
ΦP	3.70	3.84	3.99
Q	2.54	2.74	2.94