N-Channel Enhancement Mode Power MOSFET

Description

The GT023N10TA uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

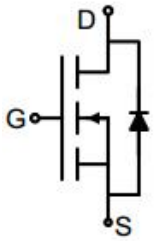
AEC-Q101 Qualified

General Features

- V_{DS} 100V
- I_D (at V_{GS} = 10V) 248A
- $R_{DS(ON)}$ (at V_{GS} = 10V) < 2.7mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



TO-220

Ordering Information

Device	Package	Marking	Packaging
GT023N10TA	TO-220	GT023N10	50pcs/Tube

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Continuous Drain Current	T_C = 25ºC	I_D	248	A
	T_C = 100ºC		178	
Pulsed Drain Current (note1)		I_{DM}	992	A
Gate-Source Voltage		V_{GS}	±20	V
Power Dissipation		P_D	300	W
Single pulse avalanche energy （note2）		E_{AS}	600	mJ
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 To 175	ºC

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62	ºC/W
Maximum Junction-to-Case	R_{thJC}	0.5	ºC/W

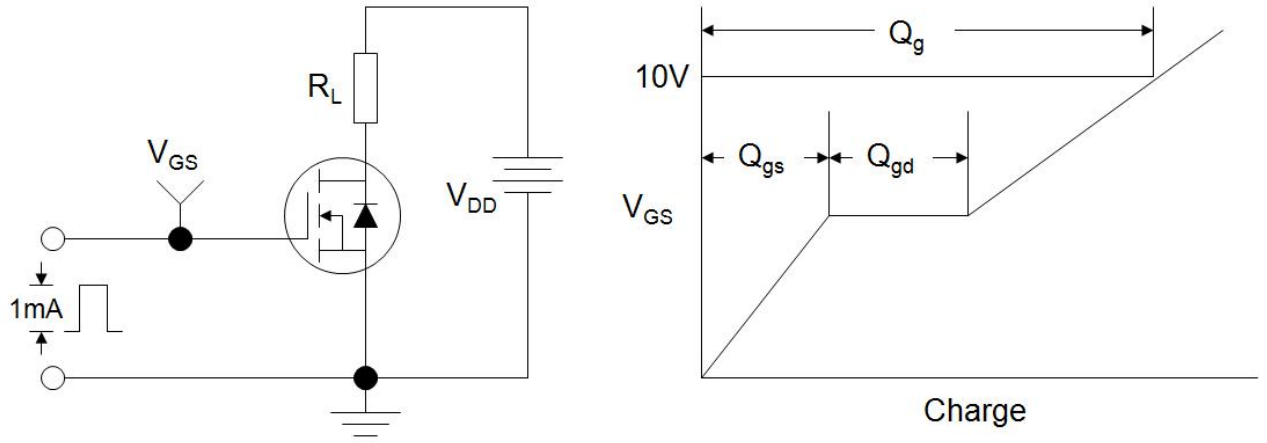
Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	100	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100V, 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 = 80A	--	2.3	2.7	mΩ
Forward Transconductance	g_{FS}	V_{GS} = 5V, I_D = 80A	--	125	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 50V, f = 0.3MHz	--	8139	--	pF
Output Capacitance	C_{oss}		--	2544	--	
Reverse Transfer Capacitance	C_{rss}		--	29	--	
Total Gate Charge	Q_g	V_{DD} = 50V, I_D = 80A, V_{GS} = 10V	--	121	--	nC
Gate-Source Charge	Q_{gs}		--	36	--	
Gate-Drain Charge	Q_{gd}		--	26	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 50V, I_D = 80A, R_G = 5Ω	--	24	--	ns
Turn-on Rise Time	t_r		--	30	--	
Turn-off Delay Time	$t_{d(off)}$		--	94	--	
Turn-off Fall Time	t_f		--	74	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	248	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 80A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Qrr	I_F = 80A, V_{GS} = 0V di/dt=100A/us	--	297	--	nC
Reverse Recovery Time	Trr		--	94	--	ns

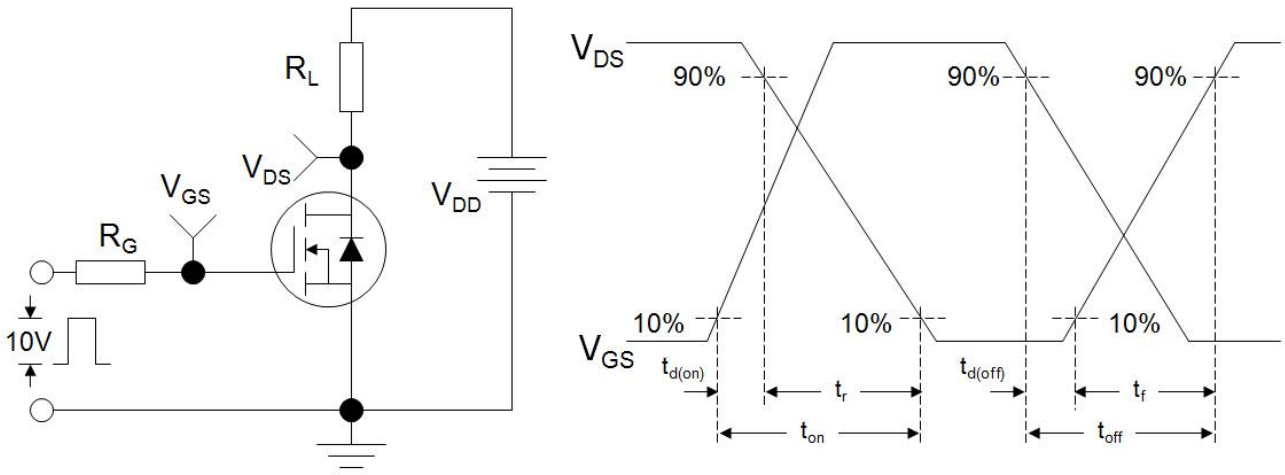
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : Tj=25℃ ,VDD=50V,VGS=10V,L=0.5mH,Rg=25Ω
   The table shows the minimum avalanche energy, which is 1600mJ when the device is tested until failure
3. Identical low side and high side switch with identical R_G

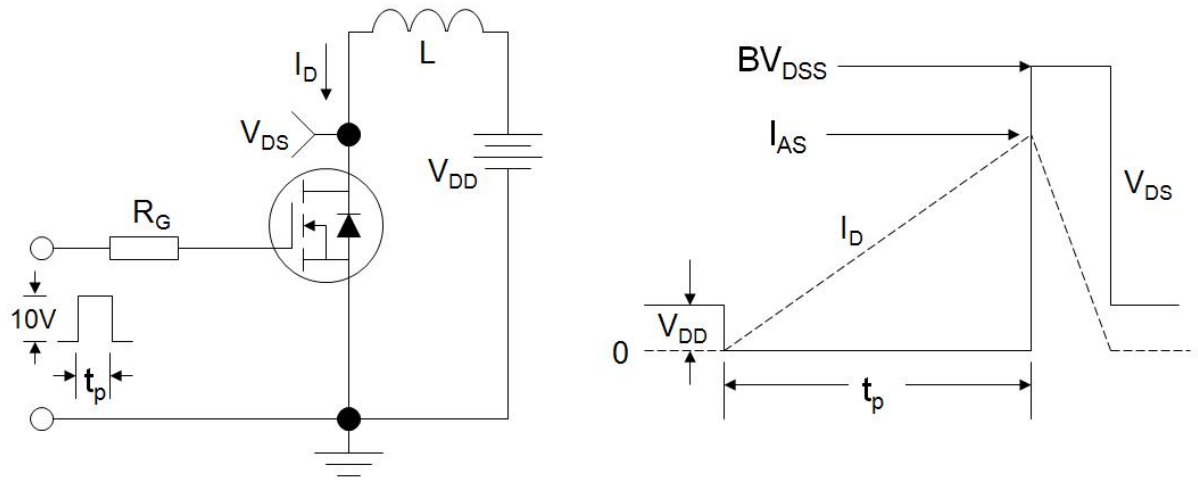
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

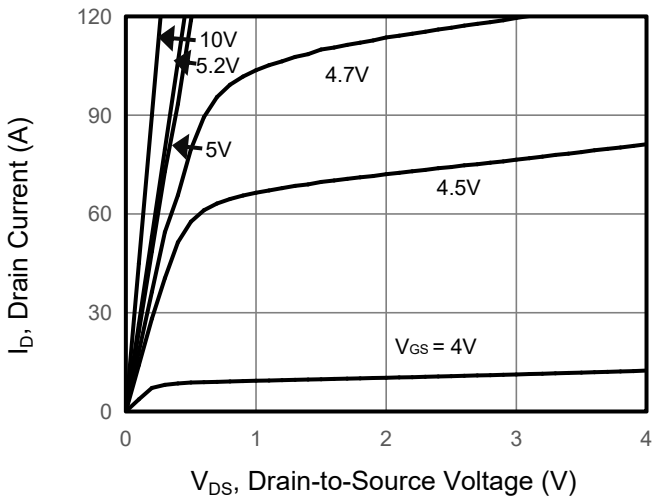


Figure 2. Transfer Characteristics

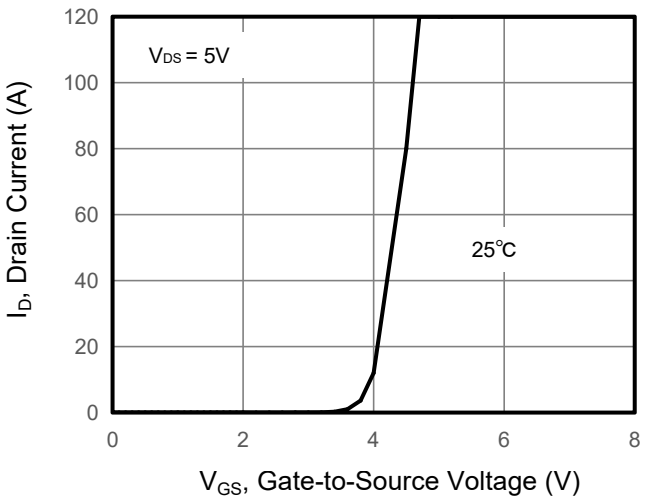


Figure 3. Drain Source On Resistance

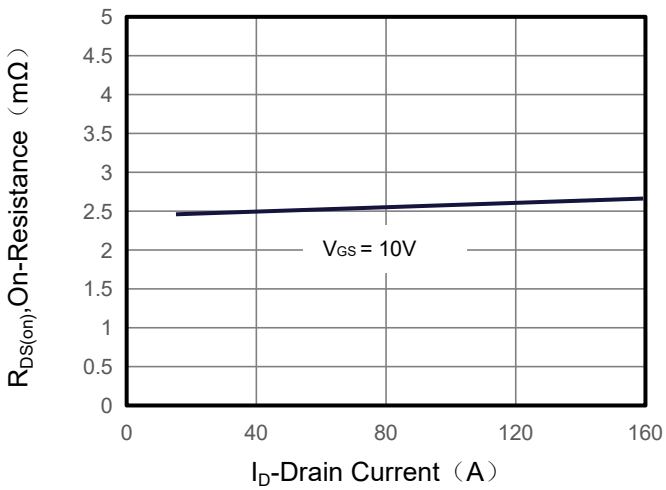


Figure 4. Gate Charge

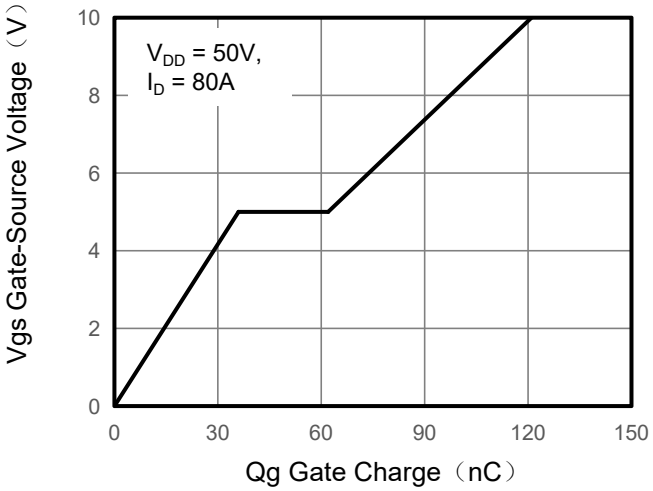


Figure 5. Capacitance

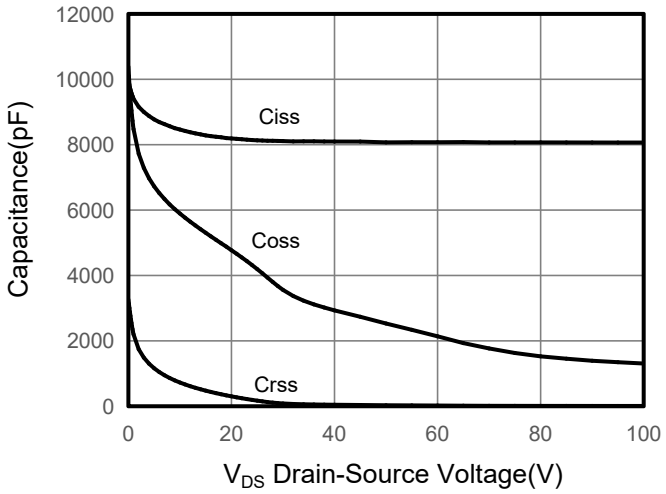
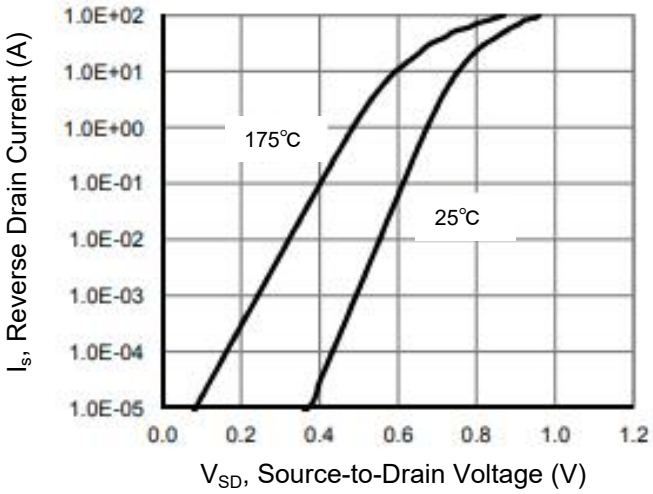


Figure 6. Source-Drain Diode Forward



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

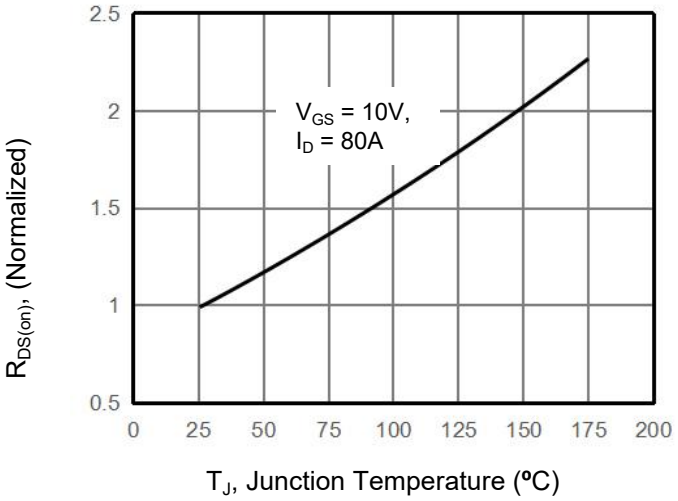


Figure 8. Safe Operation Area

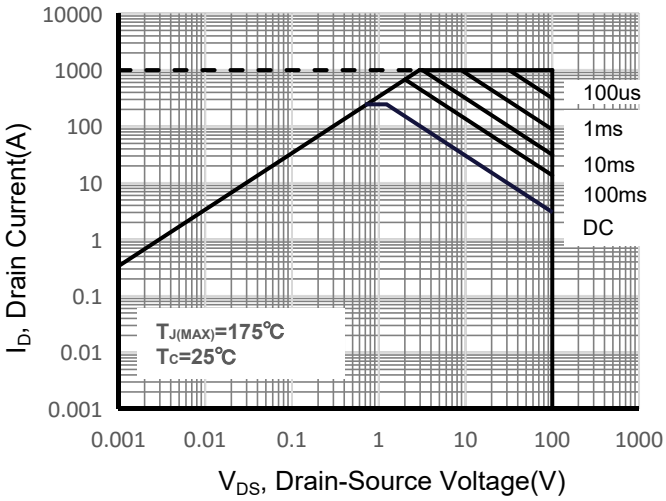


Figure 9. Maximum Continuous Drain Current vs Case Temperature

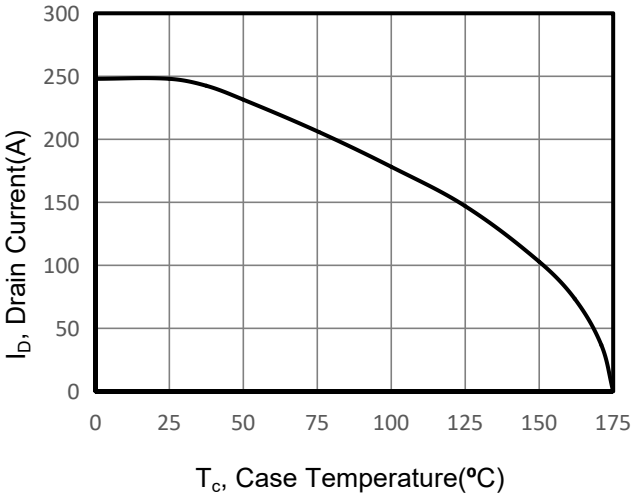
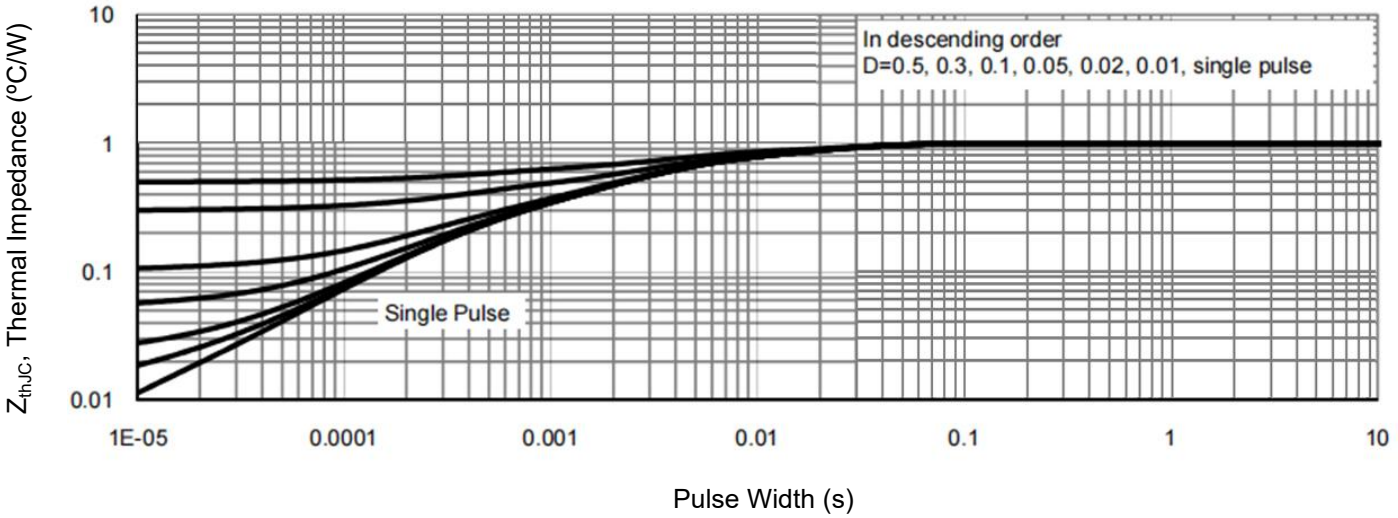
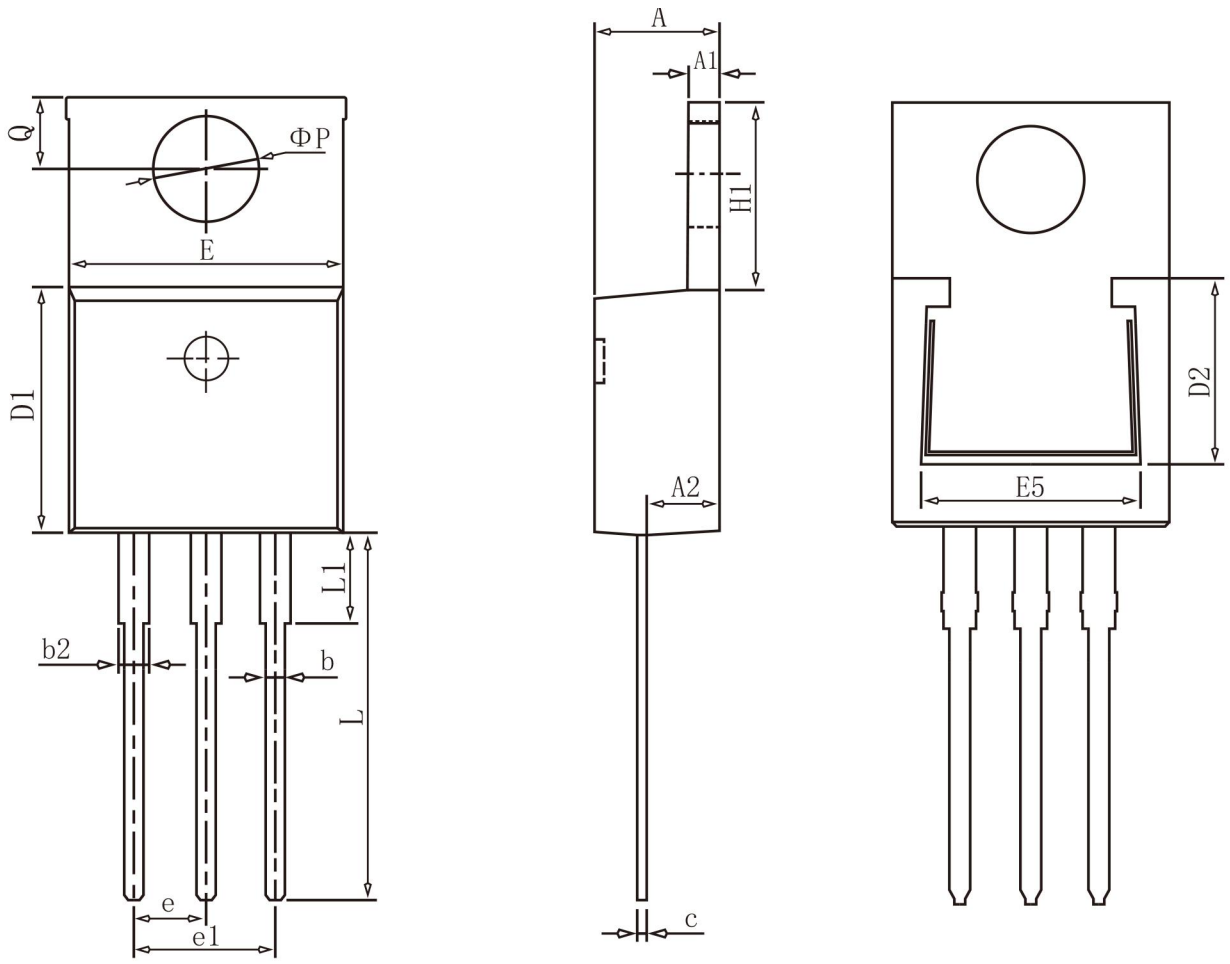


Figure 10. Normalized Maximum Transient Thermal Impedance



TO-220 Package Information



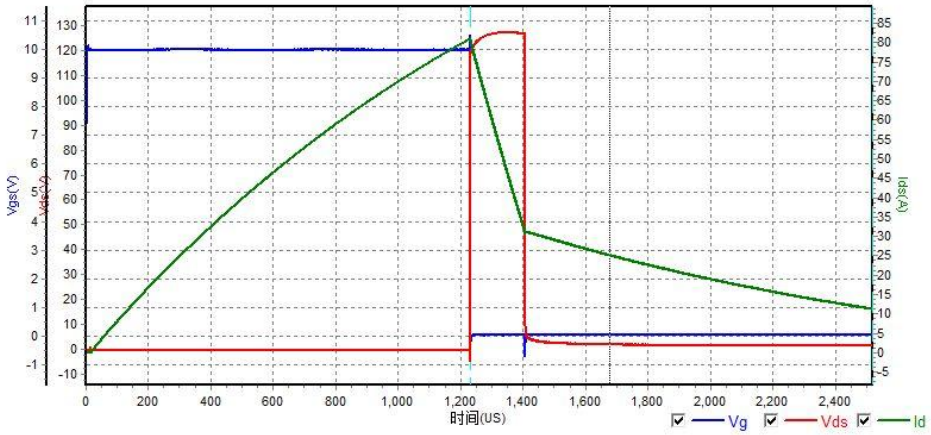
COMMON DIMENSIONS

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

Avalanche Current Graph

RPTI Condition:L=0.500mH,Vd=50.00V,Vg=10.00V,Vgr=0.00V,rg=25ohm					
#1	IAS	#2	IAS	#3	IAS
	76.911A		76.848A		77.567A
	78.092A		77.936A		77.946A
	78.911A		78.915A		79.401A
	80.054A		79.867A		80.094A
	FAIL		FAIL		FAIL

#1



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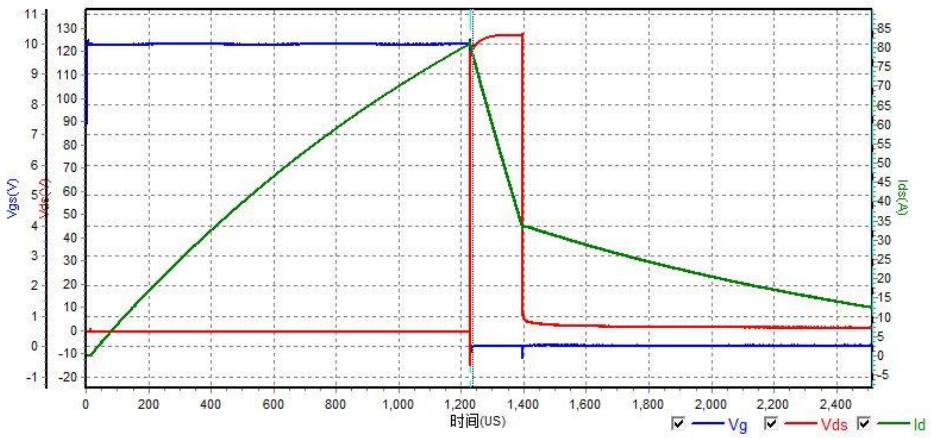

#3

