

N-Channel Enhancement Mode Power MOSFET

Description

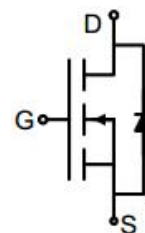
The GT023N10TL uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

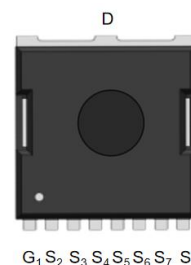
- V_{DS} 100V
- I_D (at $V_{GS} = 10V$) 330A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 1.9m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



TOLL-8L

Ordering Information

Device	Package	Marking	Packaging
GT023N10TL	TOLL-8L	GT023N10	2000pcs/Reel

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Continuous Drain Current	$T_C = 25^\circ\text{C}$	330	A
	$T_C = 100^\circ\text{C}$	237	
Pulsed Drain Current (note1)	I_{DM}	1320	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	395	W
Single pulse avalanche energy (note2)	E_{AS}	600	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 175	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62	$^\circ\text{C/W}$
Maximum Junction-to-Case	R_{thJC}	0.32	$^\circ\text{C/W}$

Specifications T _J = 25°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	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	--	1.6	1.9	mΩ
Forward Transconductance	g _{FS}	V _{GS} = 5V, I _D = 80A	--	139	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 50V, f = 0.3MHz	--	8747	--	pF
Output Capacitance	C _{oss}		--	2718	--	
Reverse Transfer Capacitance	C _{rss}		--	32	--	
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 = 25°C	--	--	330	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 80A, V _{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = 80A, V _{GS} = 0V di/dt=100A/us	--	297	--	nC
Reverse Recovery Time	T _{rr}		--	94	--	ns

Notes

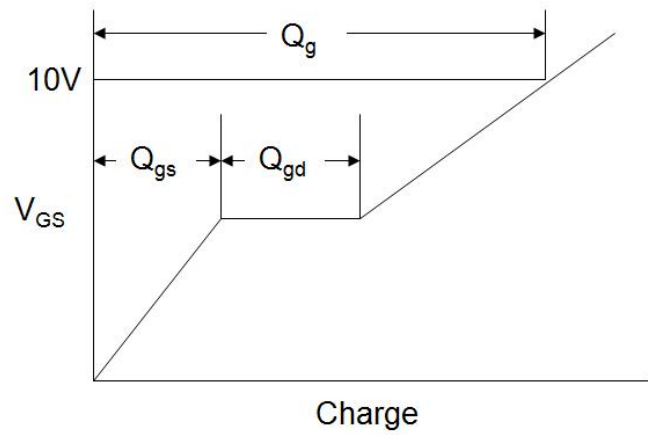
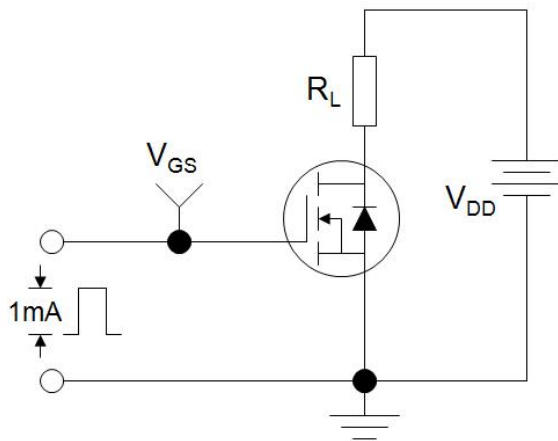
1. Repetitive Rating: Pulse width limited by maximum junction temperature

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

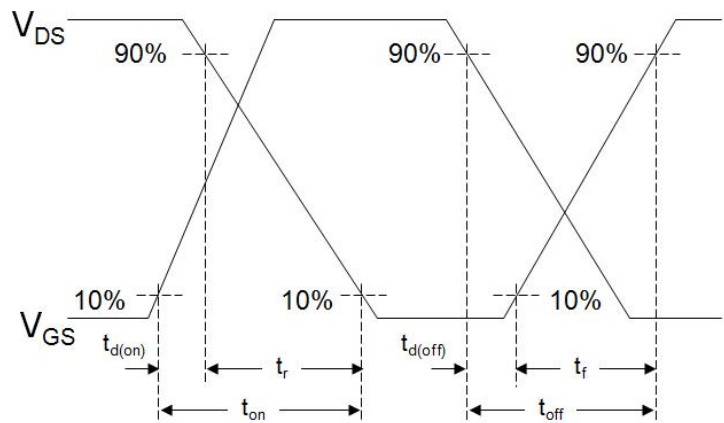
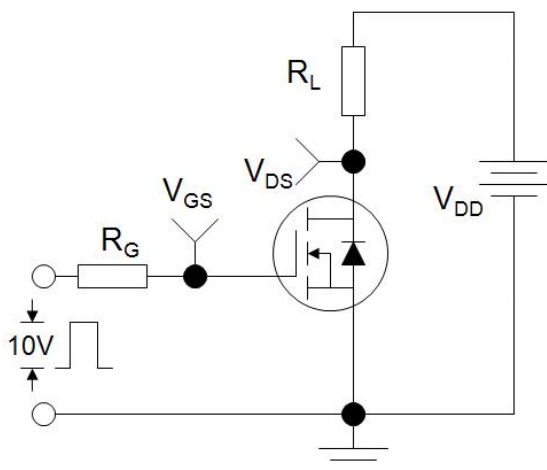
The table shows the minimum avalanche energy, which is 1600mJ when the device is tested until failure

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

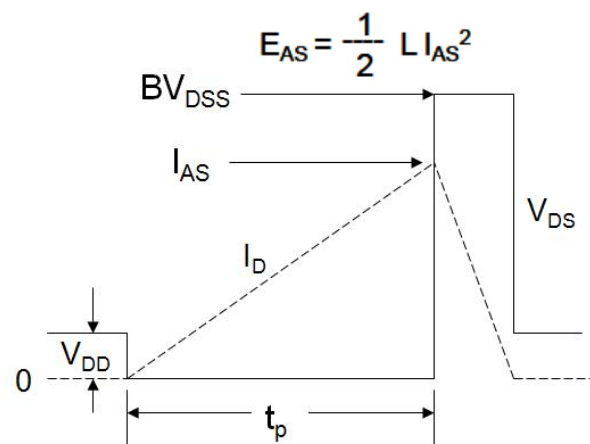
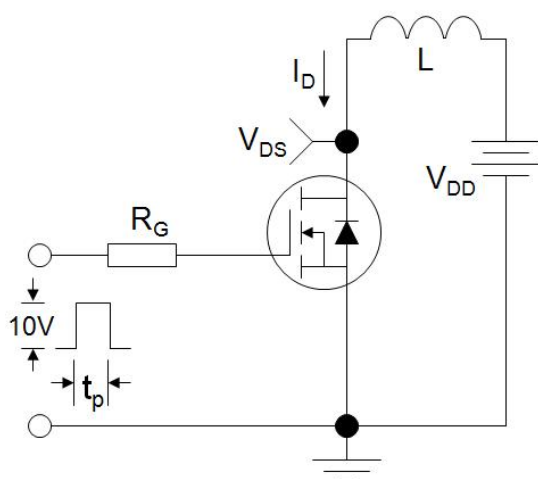
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



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

Figure 1. Output Characteristics

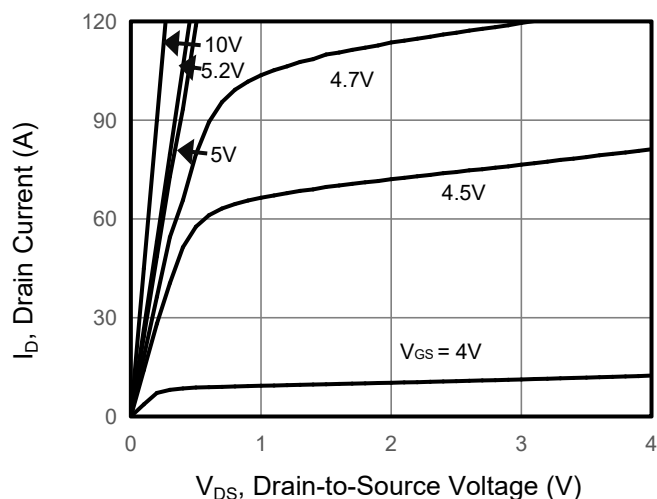


Figure 2. Transfer Characteristics

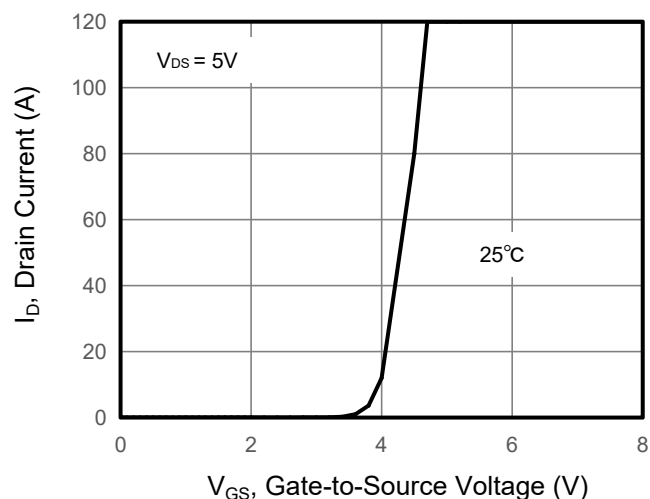


Figure 3. Drain Source On Resistance

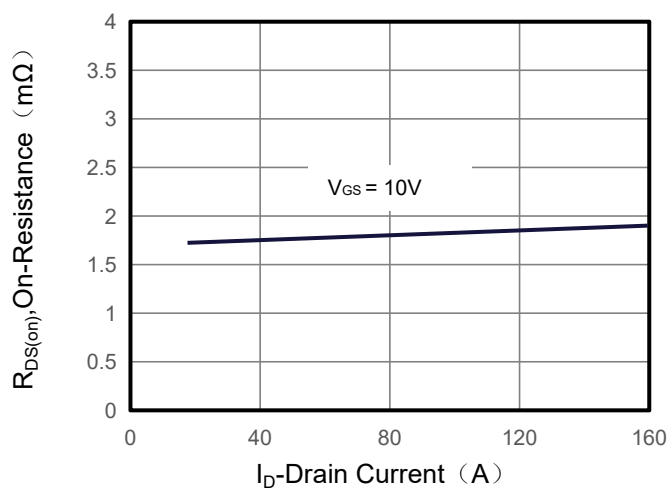


Figure 4. Gate Charge

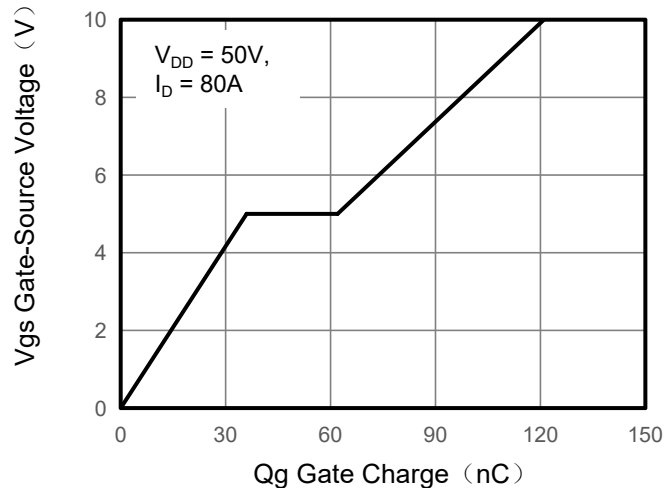


Figure 5. Capacitance

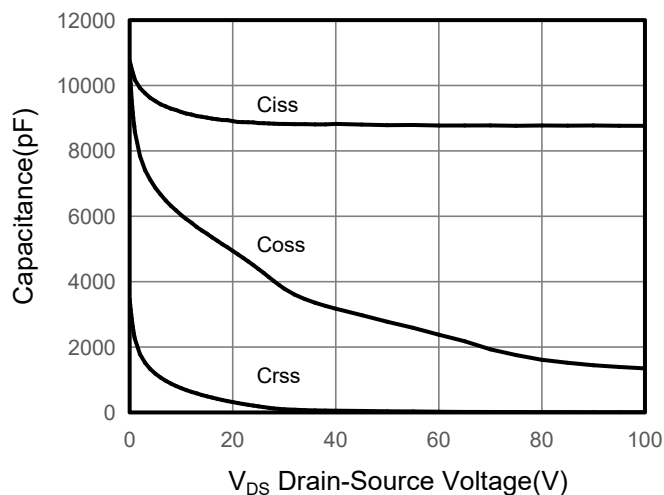
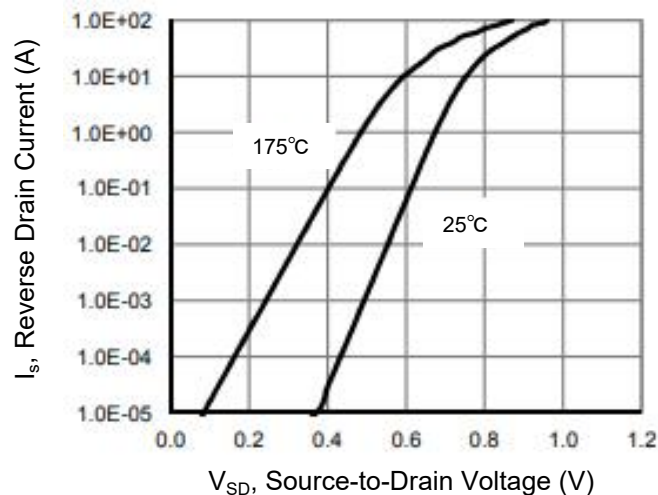


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

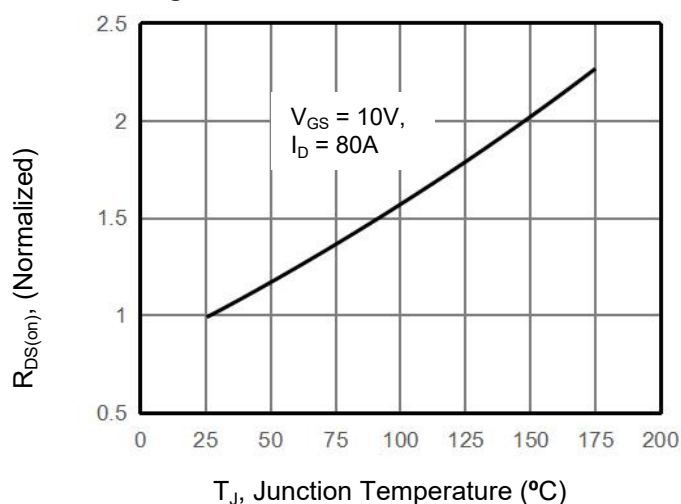


Figure 8. Safe Operation Area

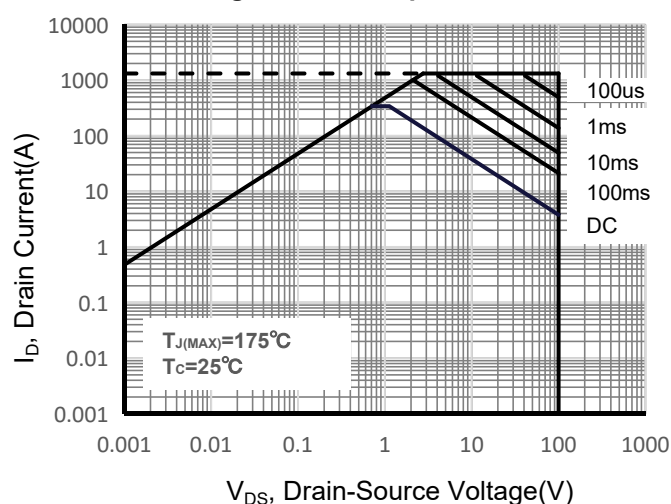


Figure 9. Maximum Continuous Drain Current vs Case Temperature

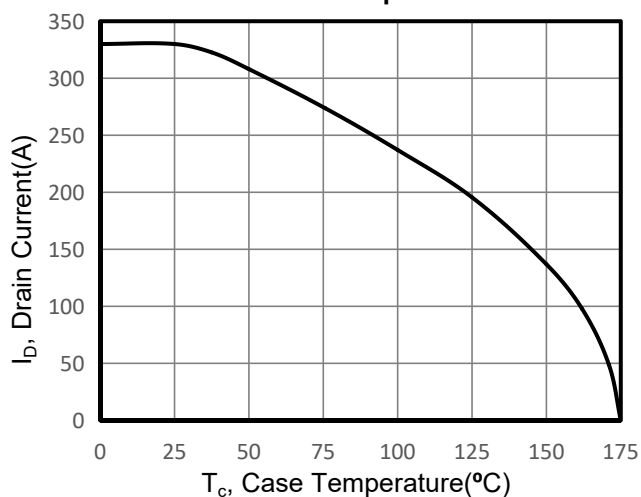
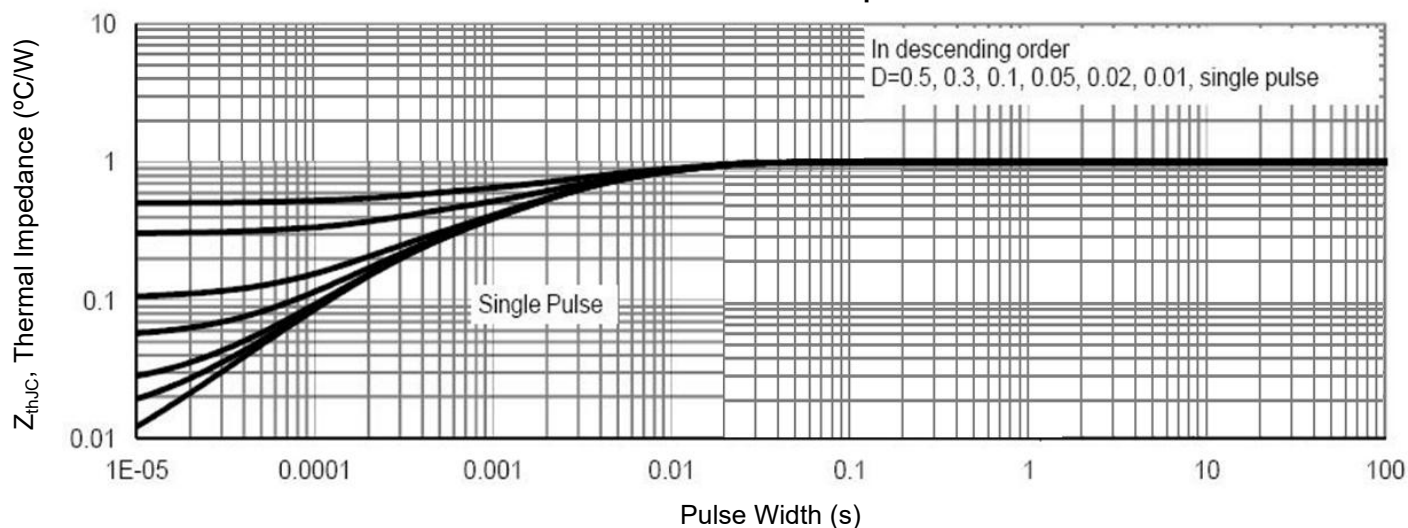
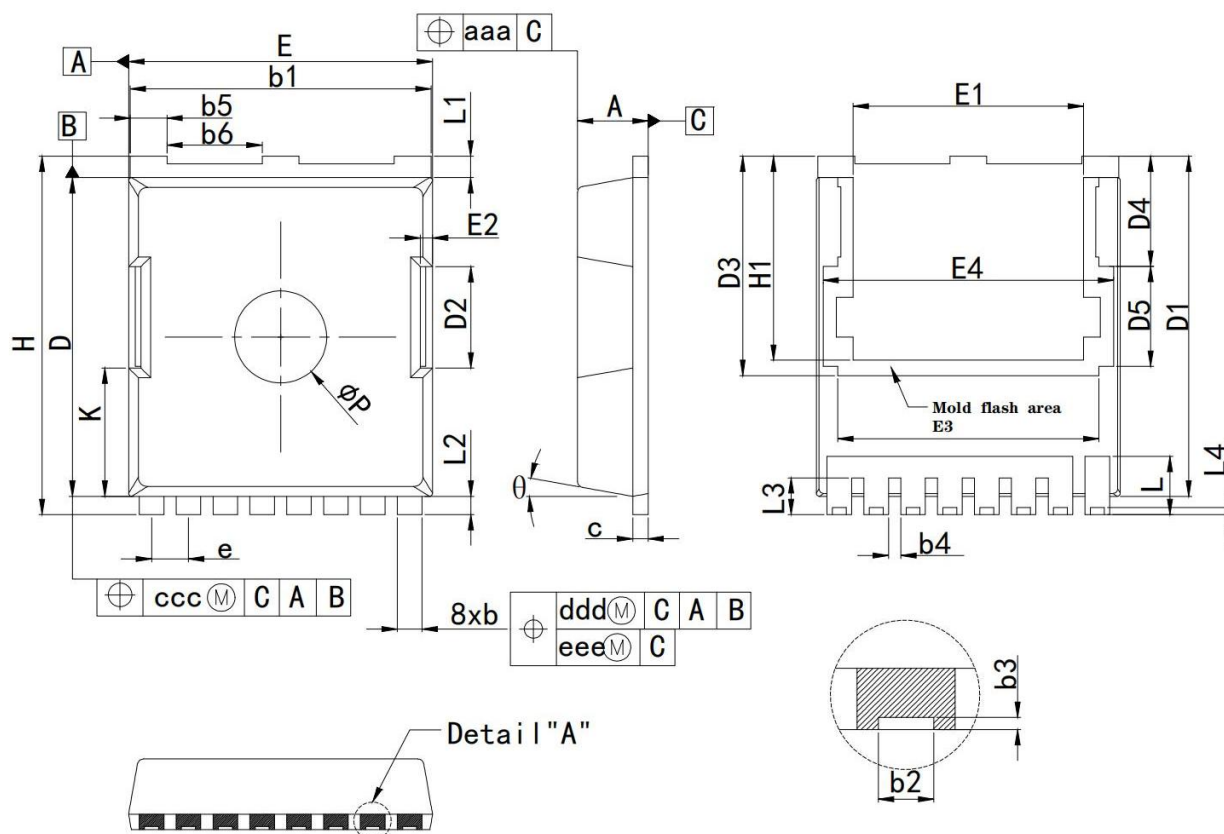


Figure 10. Normalized Maximum Transient Thermal Impedance



TOLL-8L Package Information



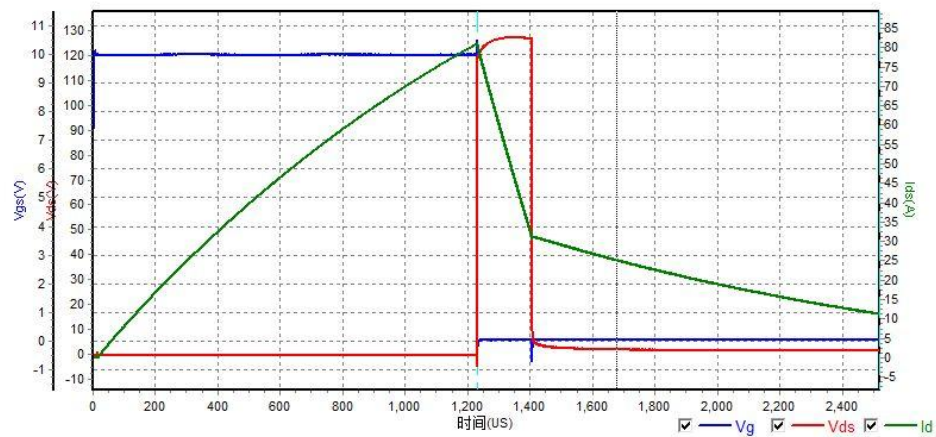
S Y M B O L	COMMON		
	MILLIMETER		
	MIN	NOMINAL	MAX
A	2. 20	2. 30	2. 40
b	0. 70	0. 80	0. 90
b1	9. 70	9. 80	9. 90
b2	0. 36	0. 45	0. 55
b3	0. 05	0. 100	/
b4	0. 30	0. 40	0. 50
b5	1. 10	1. 20	1. 30
b6	3. 00	3. 10	3. 20
c	0. 40	0. 50	0. 60
D	10. 28	10. 38	10. 55
D1	10. 98	11. 08	11. 18
D2	3. 20	3. 30	3. 40
D3		7. 15	
D4		3. 59	
D5		3. 26	
e	1. 10	1. 20	1. 30
E	9. 80	9. 90	10. 00
E1	7. 40	7. 50	7. 60
E2	0. 30	0. 40	0. 50
E3		8. 50	
E4		9. 46	
H	11. 50	11. 68	11. 85
H1	6. 55	6. 65	6. 75
K	4. 08	4. 18	4. 28
L	1. 60	1. 90	2. 10
L1	0. 50	0. 70	0. 90
L2	0. 50	0. 60	0. 70
L3	1. 00	1. 20	1. 30
L4	0. 13	0. 23	0. 33
P	2. 85	3. 00	3. 15
()		10"REF	
aaa		0. 20	
ccc		0. 20	
ddd		0. 25	
eee		0. 20	

Avalanche Current Graph

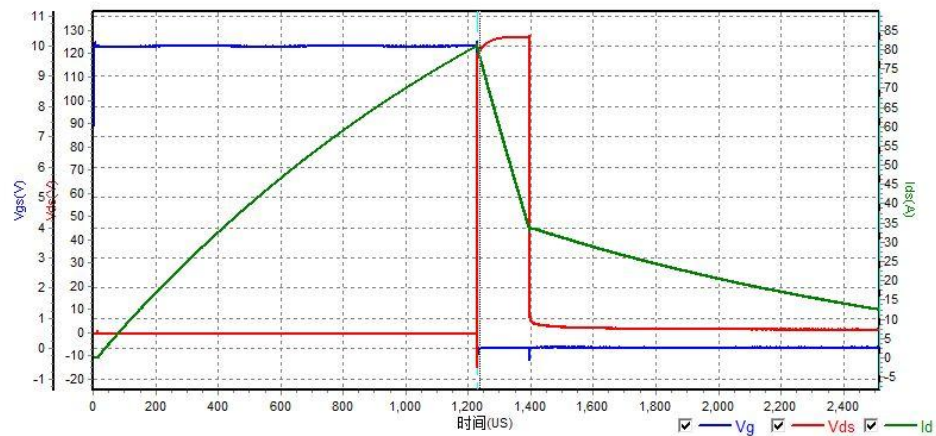
RPTI Condition:L=0.500mH,Vd=50.00V,Vg=10.00V,Vgr=0.00V,rg=25ohm

#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



#2



#3

