

N-Channel Enhancement Mode Power MOSFET

Description

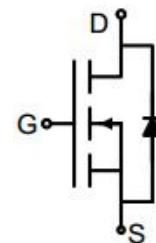
The GT015N10TL uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

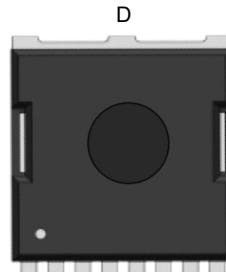
- V_{DS} 100V
- I_D (at $V_{GS} = 10V$) 365A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 1.4mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



G₁ S₂ S₃ S₄ S₅ S₆ S₇ S₈

TOLL-8L

Ordering Information

Device	Package	Marking	Packaging
GT015N10TL	TOLL-8L	GT015N10	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 $T_C = 25^\circ\text{C}$	I_D	365	A
$T_C = 100^\circ\text{C}$		231	
Pulsed Drain Current (note1)	I_{DM}	1460	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	395	W
Single pulse avalanche energy (note2)	E_{AS}	961	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	°C

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	40	°C/W
Maximum Junction-to-Case	R_{thJC}	0.32	°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	$V_{(\text{BR})\text{DSS}}$	$V_{GS} = 0V, I_D = 250\mu\text{A}$	100	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 100V, V_{GS} = 0V$	--	--	1	μA
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	2.2	2.9	3.8	V
Drain-Source On-Resistance	$R_{DS(\text{on})}$	$V_{GS} = 10V, I_D = 90\text{A}$	--	1.15	1.4	$\text{m}\Omega$
Forward Transconductance	g_{FS}	$V_{GS} = 5V, I_D = 90\text{A}$	--	108	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 50V,$ $f = 0.8\text{MHz}$	--	15000	--	pF
Output Capacitance	C_{oss}		--	2000	--	
Reverse Transfer Capacitance	C_{rss}		--	360	--	
Total Gate Charge	Q_g	$V_{DD} = 50V,$ $I_D = 90\text{A},$ $V_{GS} = 10V$	--	260	--	nC
Gate-Source Charge	Q_{gs}		--	75	--	
Gate-Drain Charge	Q_{gd}		--	76	--	
Turn-on Delay Time	$t_{d(\text{on})}$	$V_{DD} = 50V,$ $I_D = 90\text{A},$ $R_G = 6\Omega$	--	52	--	ns
Turn-on Rise Time	t_r		--	35	--	
Turn-off Delay Time	$t_{d(\text{off})}$		--	144	--	
Turn-off Fall Time	t_f		--	49	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ\text{C}$	--	--	365	A
Body Diode Voltage	V_{SD}	$T_J = 25^\circ\text{C}, I_{SD} = 90\text{A}, V_{GS} = 0V$	--	--	1.2	V
Reverse Recovery Charge	Q_{rr}	$I_F = 90\text{A}, V_{GS} = 0V$ $di/dt=100\text{A}/\mu\text{s}$	--	200	--	nC
Reverse Recovery Time	T_{rr}		--	92	--	ns

Notes

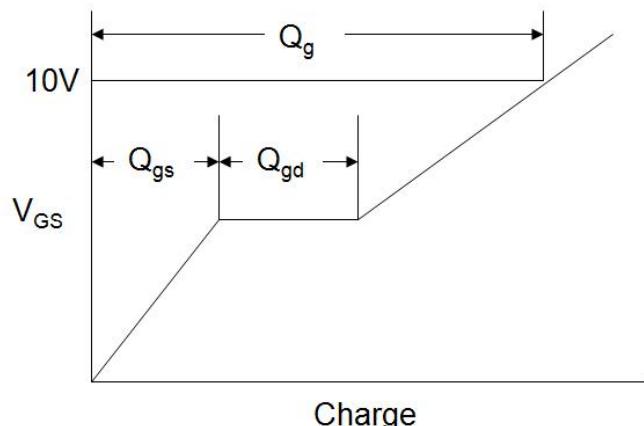
1. Repetitive Rating: Pulse width limited by maximum junction temperature

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

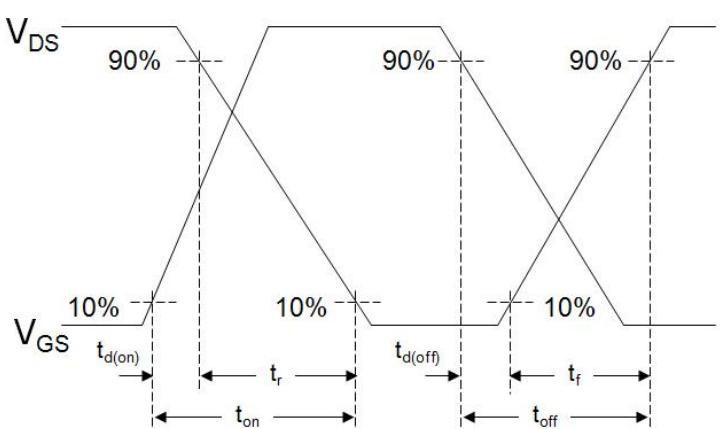
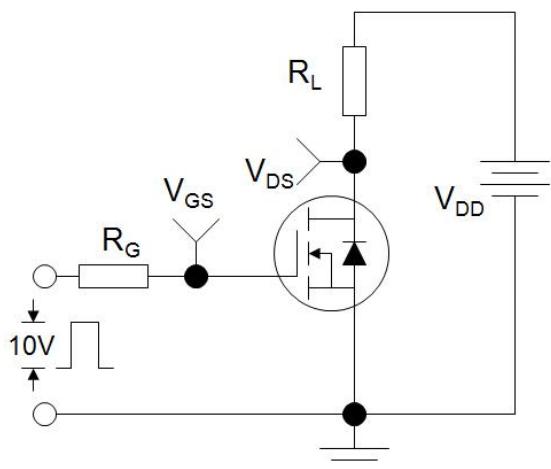
The table shows the minimum avalanche energy, which is 2652mJ when the device is tested until failure

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

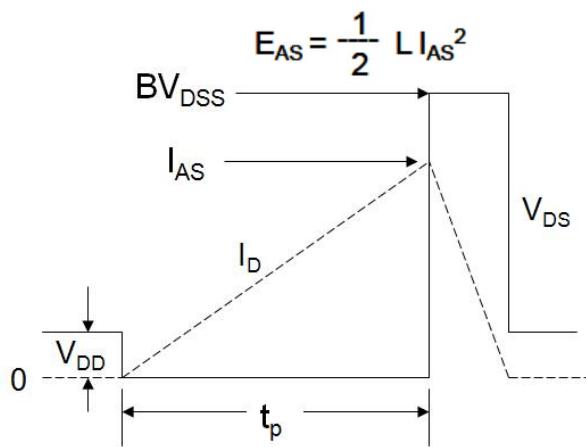
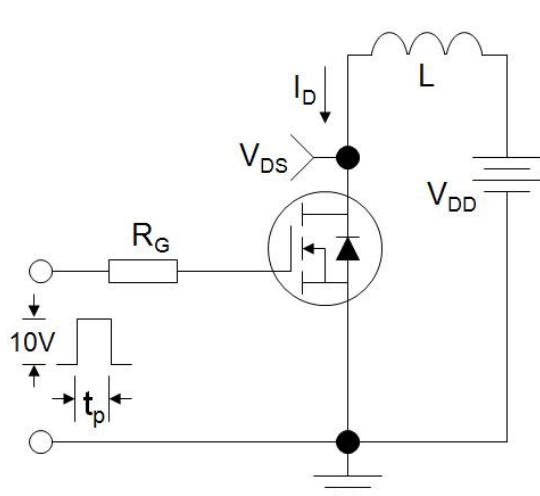
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



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

Figure 1. Output Characteristics

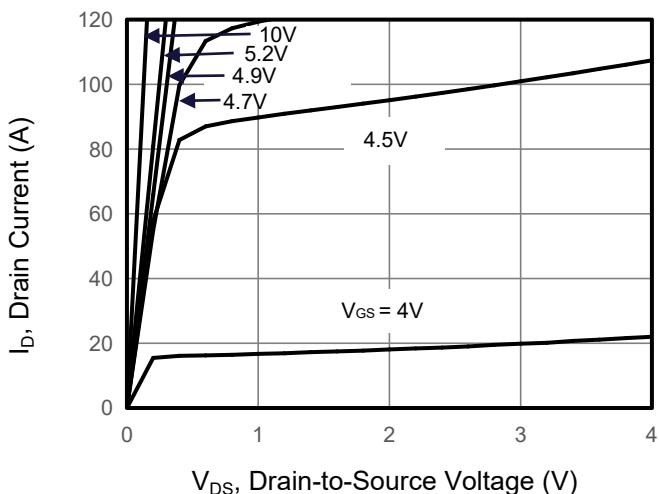


Figure 2. Transfer Characteristics

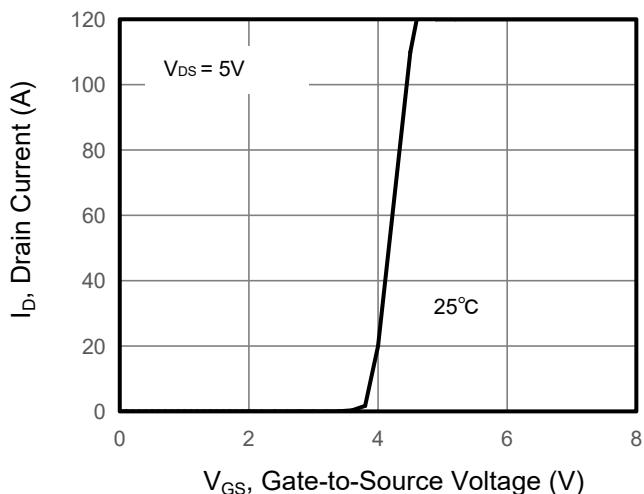


Figure 3. Drain Source On Resistance

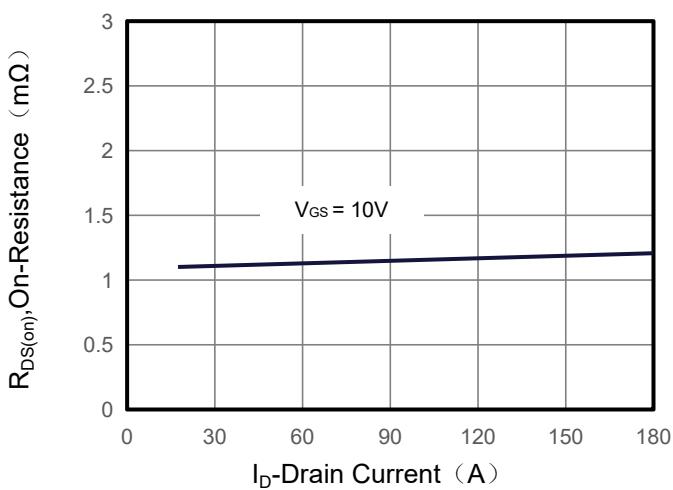


Figure 4. Gate Charge

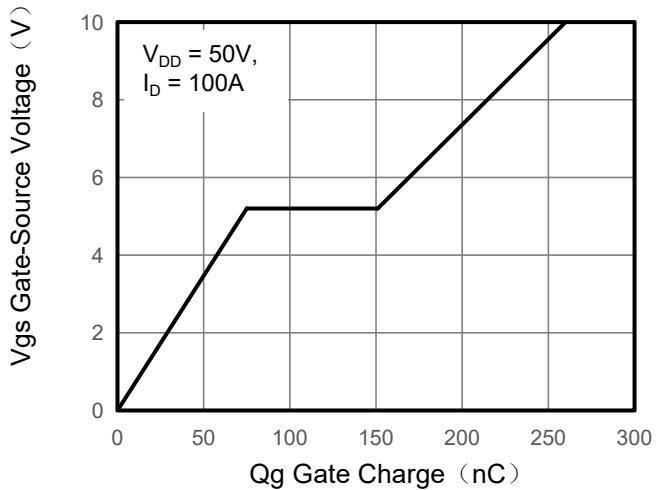


Figure 5. Capacitance

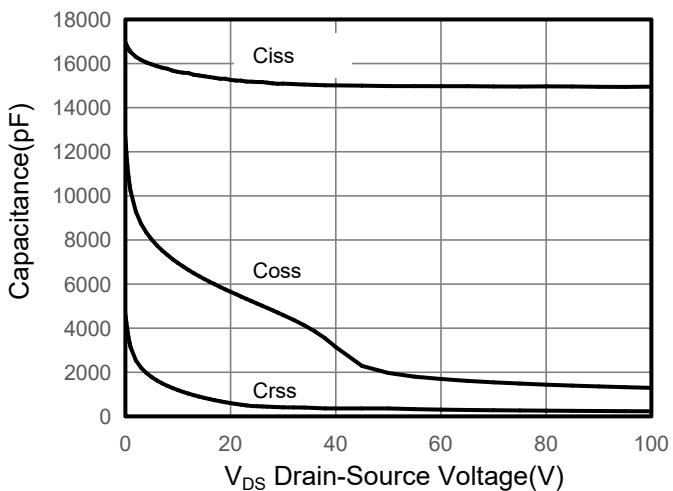
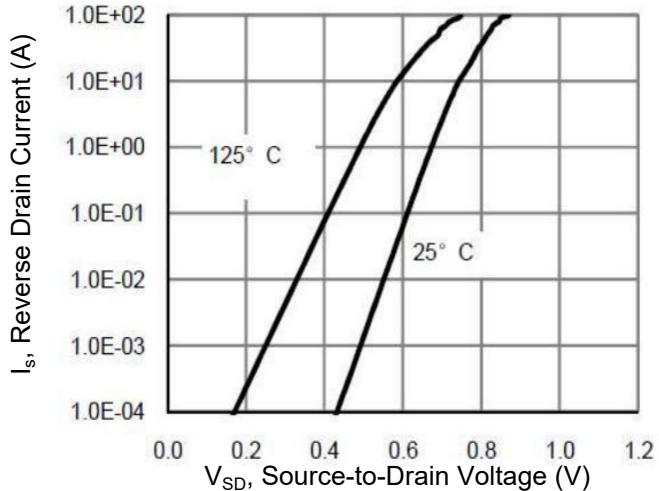


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

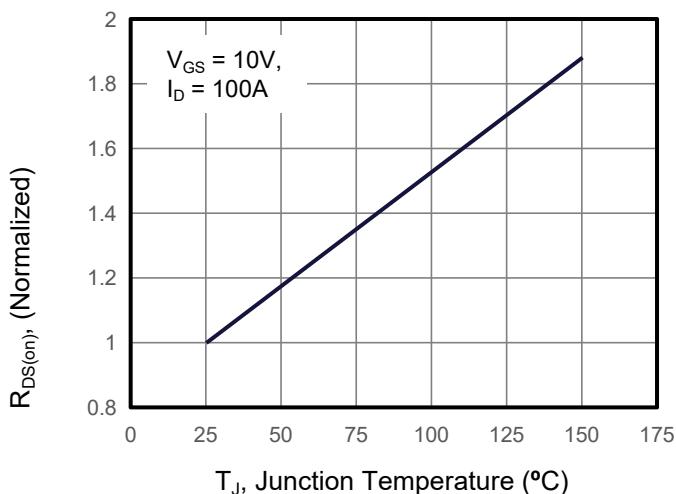


Figure 8. Safe Operation Area

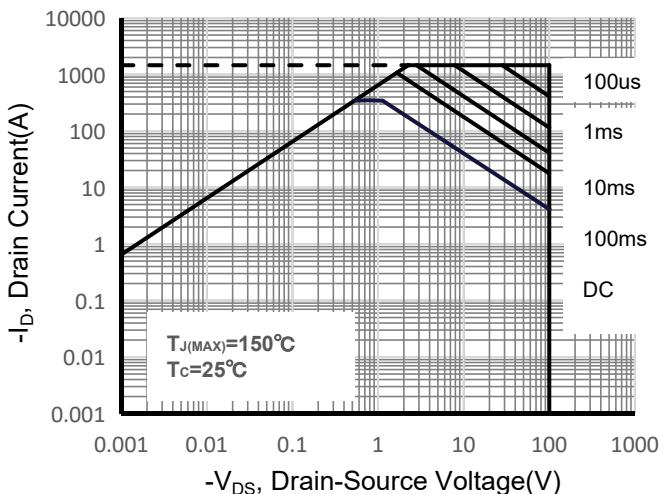


Figure 9. Maximum Continuous Drain Current vs Case Temperature

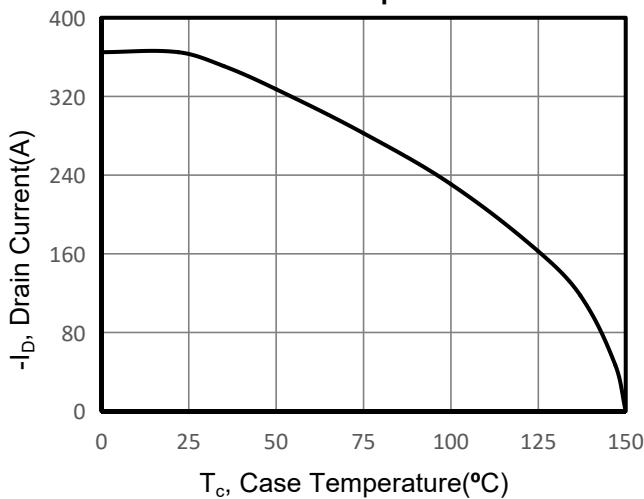
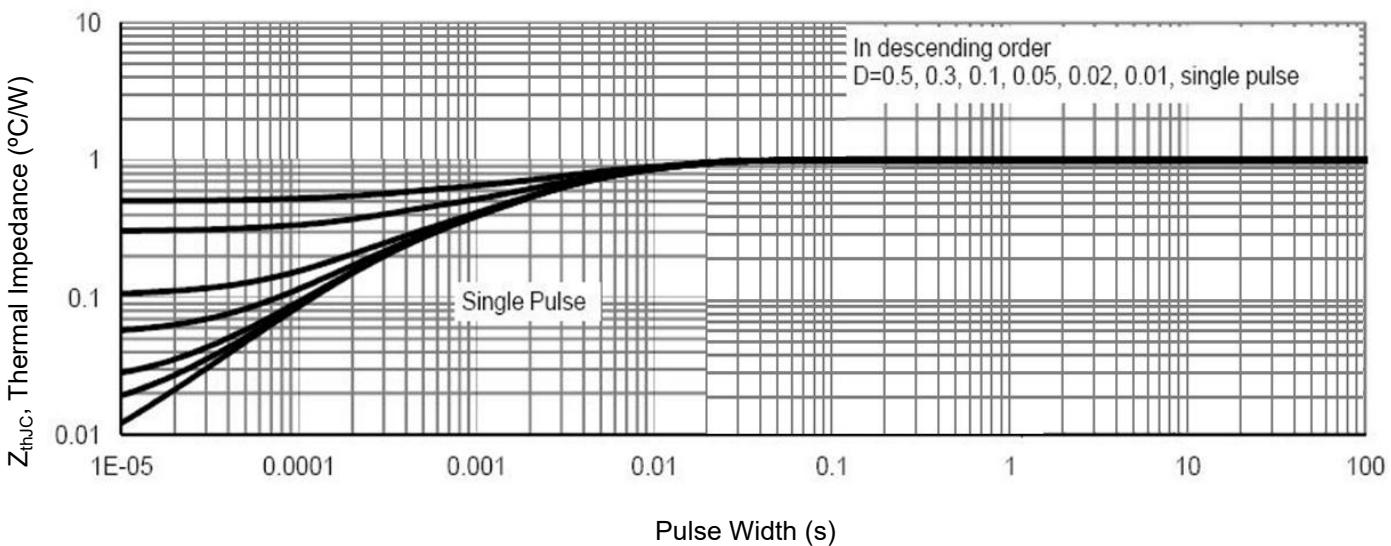
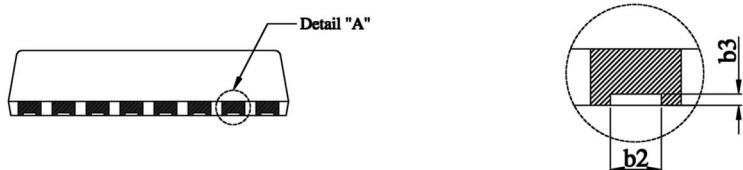
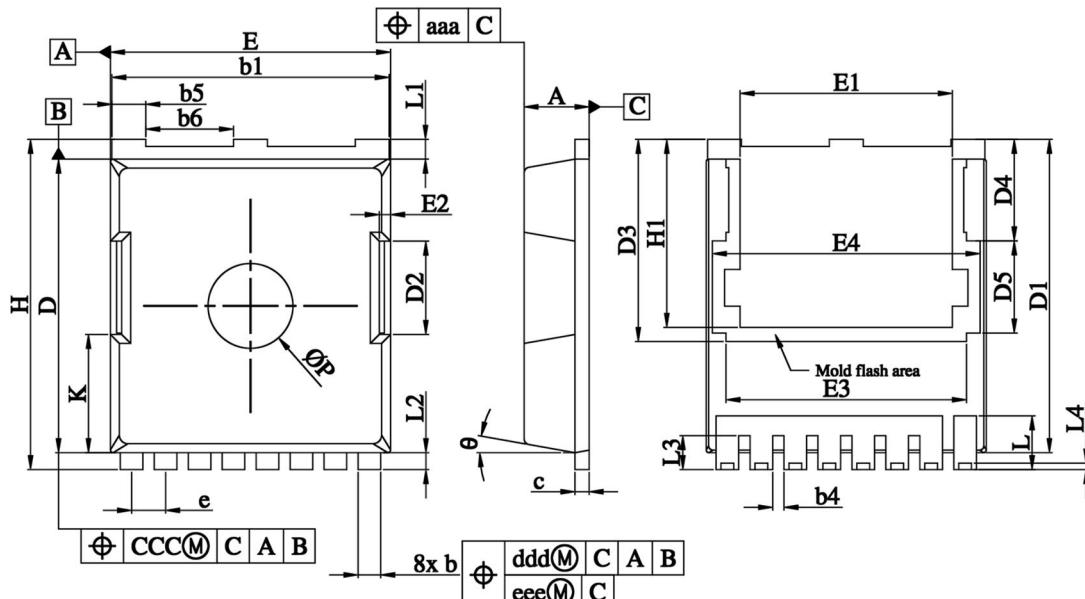


Figure 10. Normalized Maximum Transient Thermal Impedance



TOLL-8L Package Information



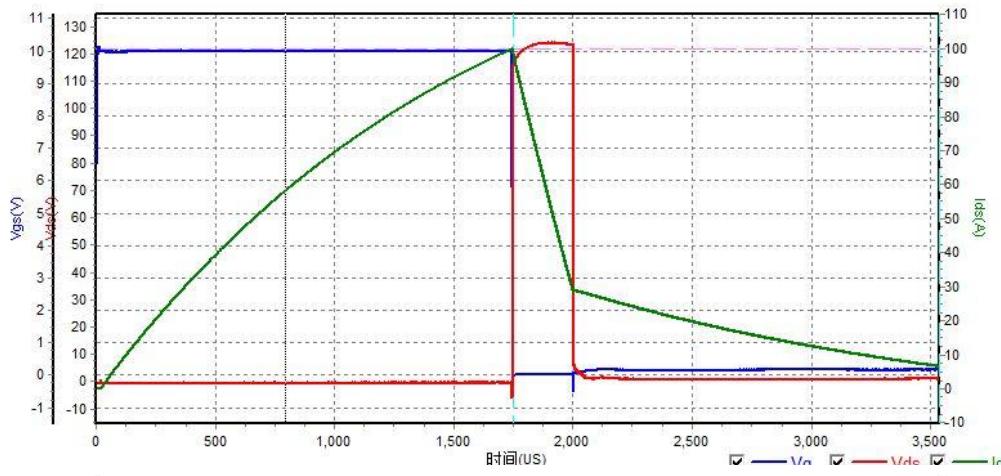
SYMBOL	COMMON			SYMBOL	COMMON			
	MILLIMETER				MILLIMETER			
	MIN.	NOMINAL	MAX.		MIN.	NOMINAL	MAX.	
A	2.20	2.30	2.40	E2	0.30	0.40	0.50	
b	0.70	0.80	0.90	E3		8.50		
b1	9.70	9.80	9.90	E4		9.46		
b2	0.36	0.45	0.55	H	11.50	11.68	11.85	
b3	0.05	0.100	/	H1	6.55	6.65	6.75	
b4	0.30	0.40	0.50	K	4.08	4.18	4.28	
b5	1.10	1.20	1.30	L	1.60	1.90	2.10	
b6	3.00	3.10	3.20	L1	0.50	0.70	0.90	
c	0.40	0.50	0.60	L2	0.50	0.60	0.70	
D	10.28	10.38	10.55	L3	1.00	1.20	1.30	
D1	10.98	11.08	11.18	L4	0.13	0.23	0.33	
D2	3.20	3.30	3.40	P	2.85	3.00	3.15	
D3	7.15			θ	10° REF			
D4	3.59			aaa	0.20			
D5	3.26			ccc	0.20			
e	1.10	1.20	1.30	ddd	0.25			
E	9.80	9.90	10.00	eee	0.20			
E1	7.40	7.50	7.60					

Avalanche Current Graph

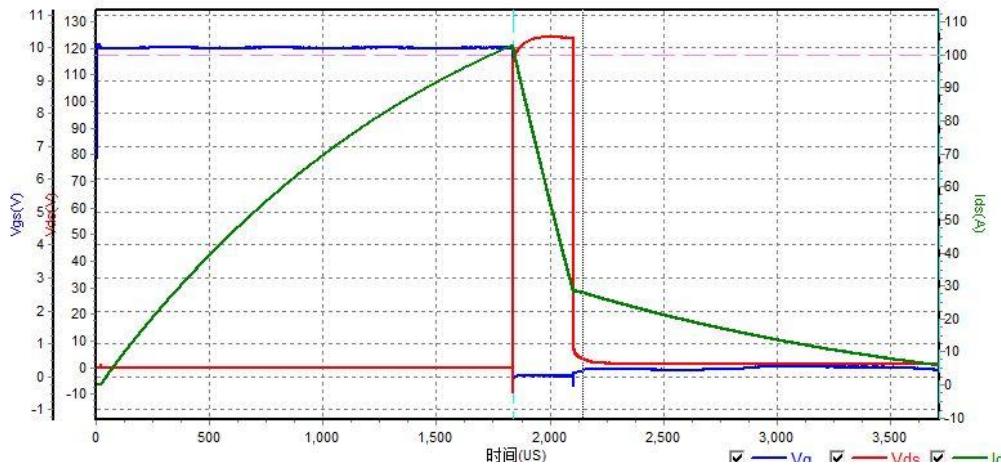
RPTI Condition:L=0.500mH,Vd=50.00V,Vg=10.00V,Vgr=0.00V,rg=25ohm

	IAS		IAS		IAS
#1	95.946A	#2	99.633A	#3	99.176A
	97.221A		100.647A		100.764A
	98.513A		101.232A		100.982A
	98.917A		101.926A		101.885A
	FAIL		FAIL		FAIL

#1



#2



#3

