N-Channel Enhancement Mode Power MOSFET

Description

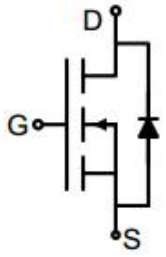
The GT016N10TL uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

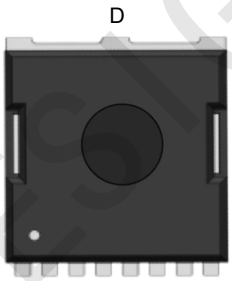
- V_{DS} 100V
- I_D (at V_{GS} = 10V) 362A
- $R_{DS(ON)}$ (at V_{GS} = 10V) < 1.6mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



TOLL-8L

Ordering Information

Device	Package	Marking	Packaging
GT016N10TL	TOLL-8L	GT016N10	2000pcs/Reel

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	362	A
	T_C = 100ºC		229	
Pulsed Drain Current (note1)		I_{DM}	1448	A
Gate-Source Voltage		V_{GS}	±20	V
Power Dissipation		P_D	380	W
Single pulse avalanche energy （note2）		E_{AS}	812	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}	40	ºC/W
Thermal Resistance, Junction-to-Case	R_{thJC}	0.33	ºC/W

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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 = 15A	--	1.35	1.6	mΩ
Forward Transconductance	g_{FS}	V_{GS} = 5V, I_D = 15A	--	83	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 50V, f = 0.5MHz	--	9200	--	pF
Output Capacitance	C_{oss}		--	3700	--	
Reverse Transfer Capacitance	C_{rss}		--	100	--	
Total Gate Charge	Q_g	V_{DD} = 50V, I_D = 15A, V_{GS} = 10V	--	165	--	nC
Gate-Source Charge	Q_{gs}		--	33	--	
Gate-Drain Charge	Q_{gd}		--	48	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 50V, I_D = 15A, R_G = 4.5Ω	--	29	--	ns
Turn-on Rise Time	t_r		--	64	--	
Turn-off Delay Time	$t_{d(off)}$		--	120	--	
Turn-off Fall Time	t_f		--	106	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	362	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 15A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Qrr	I_F = 15A, V_{GS} = 0V di/dt=100A/us	--	166	--	nC
Reverse Recovery Time	Trr		--	91	--	ns

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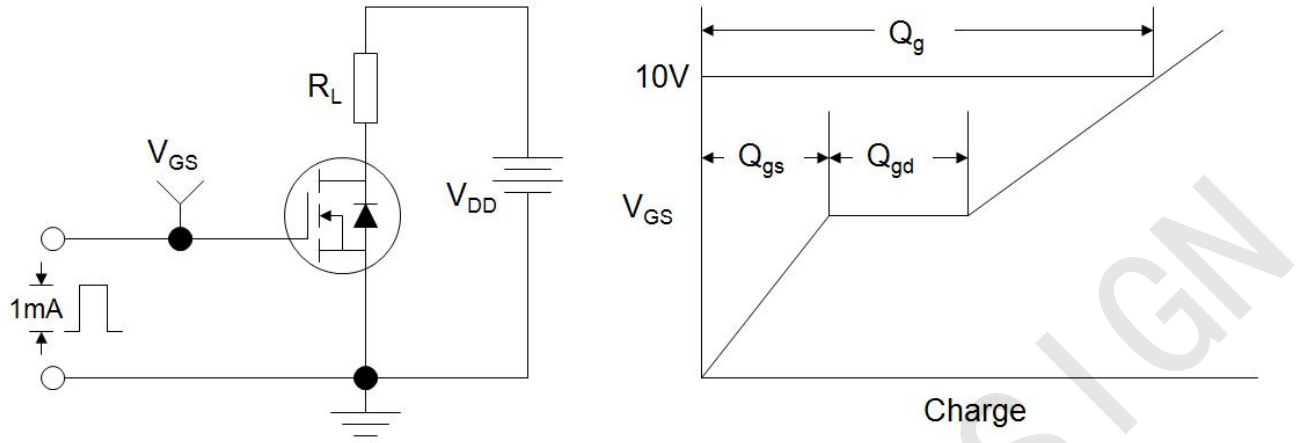
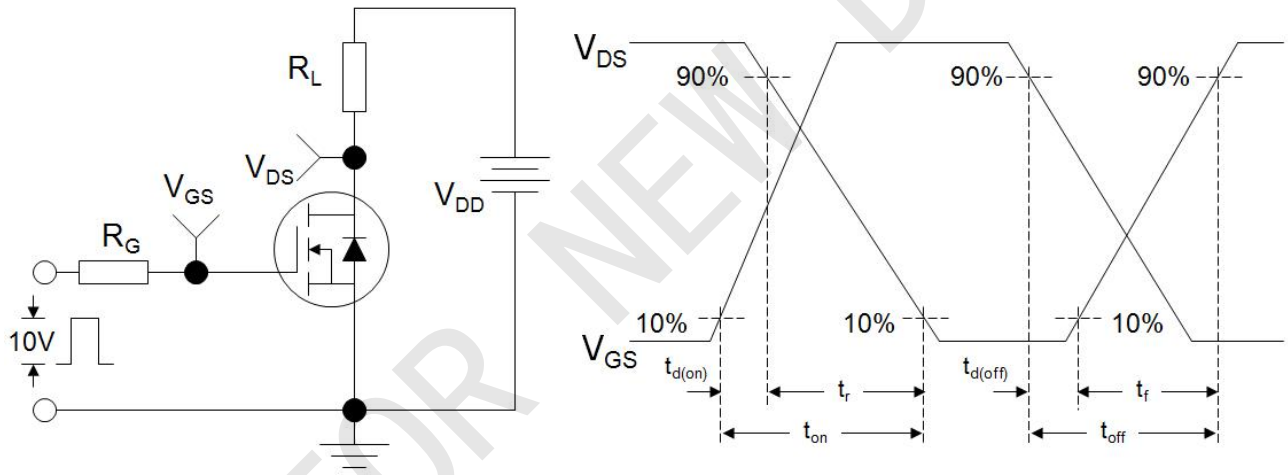
Notes

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 1650mJ when the device is tested until failure
3. Identical low side and high side switch with identical R_G

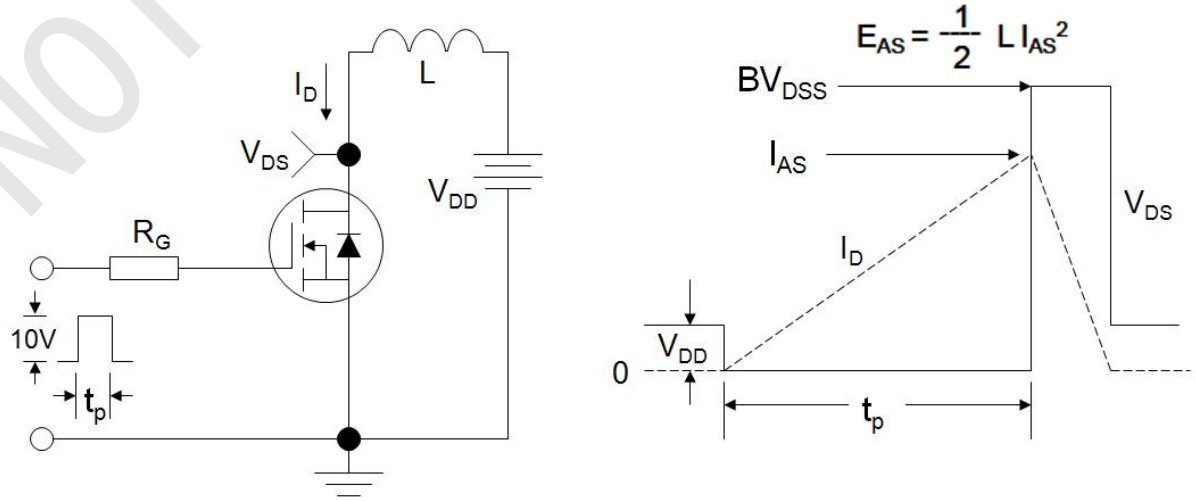
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



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Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

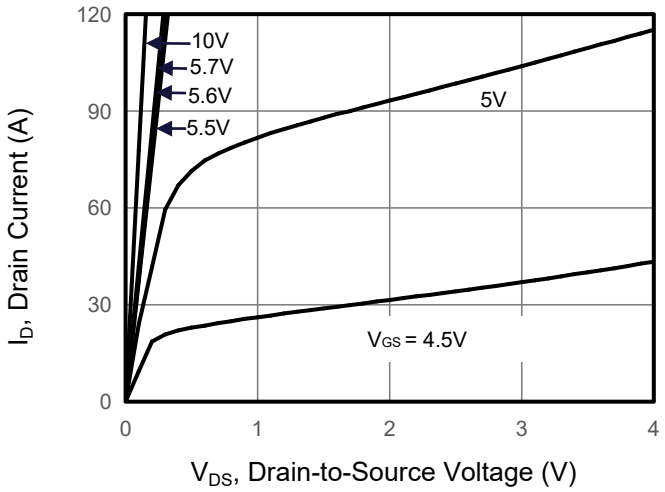

Figure 2. Transfer Characteristics

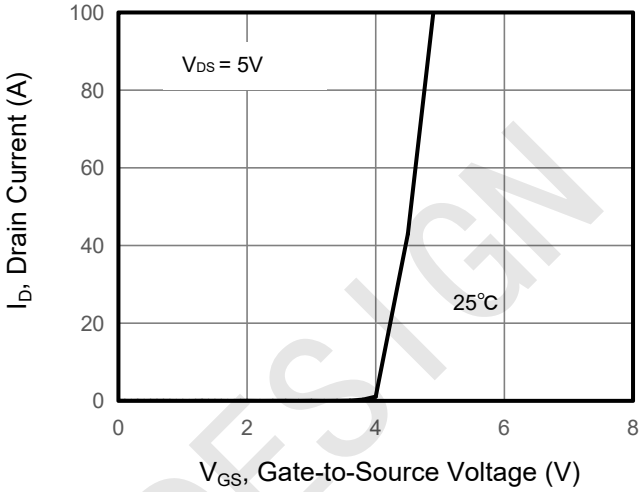

Figure 3. Drain Source On Resistance

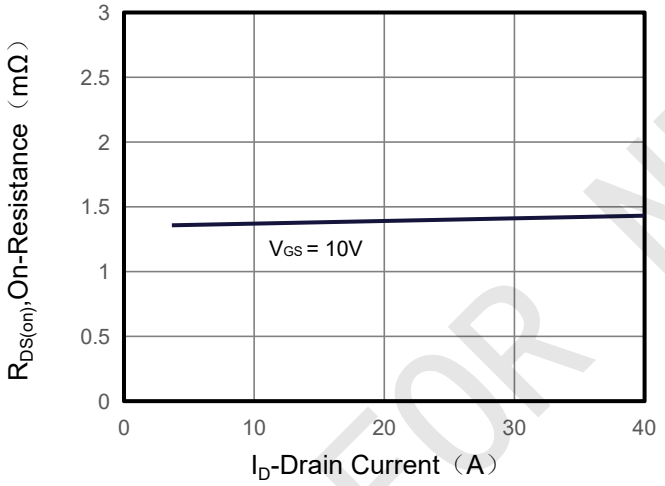

Figure 4. Gate Charge

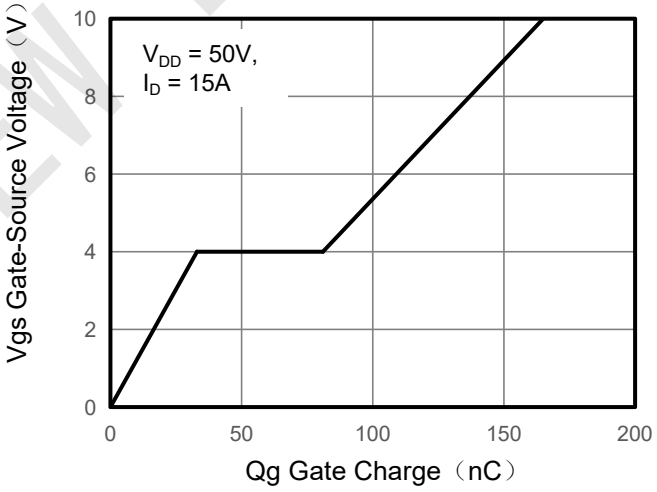

Figure 5. Capacitance

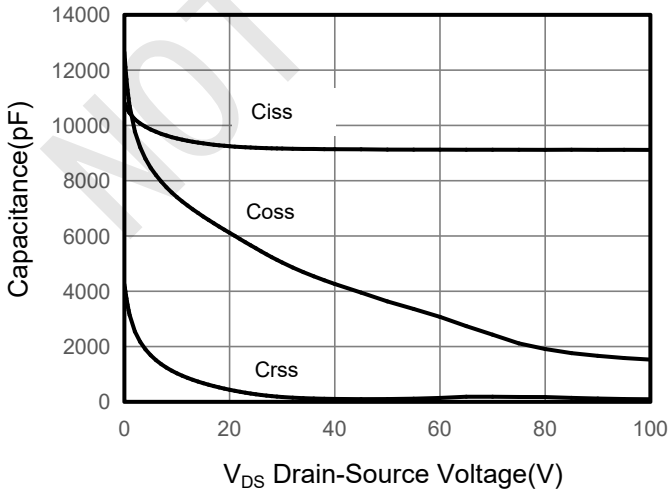

Figure 6. Source-Drain Diode Forward

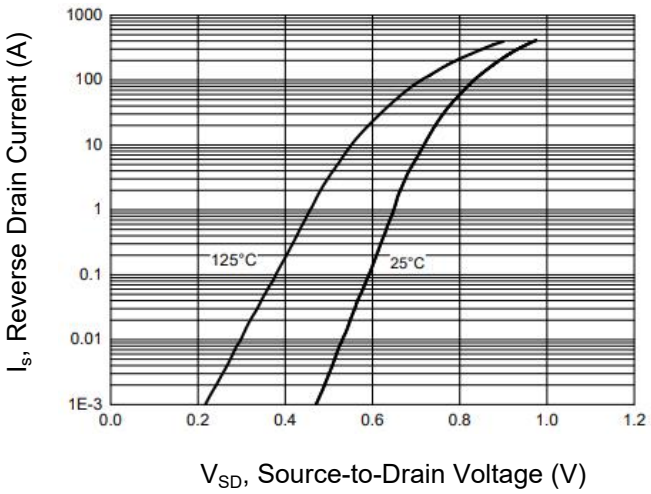

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Figure 7. Drain-Source On-Resistance

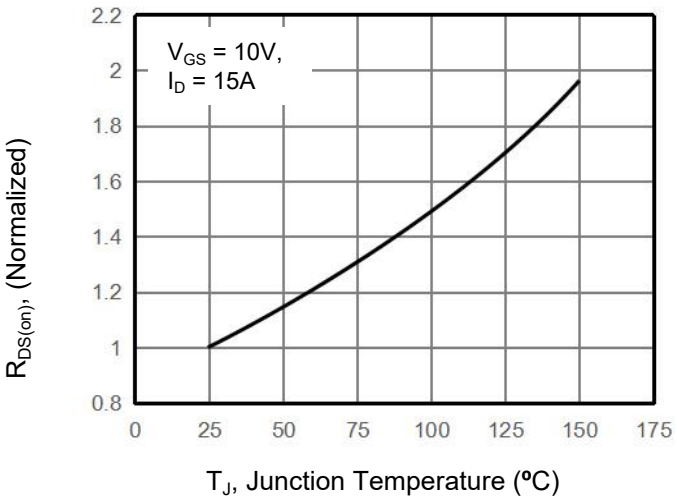


Figure 8. Safe Operation Area

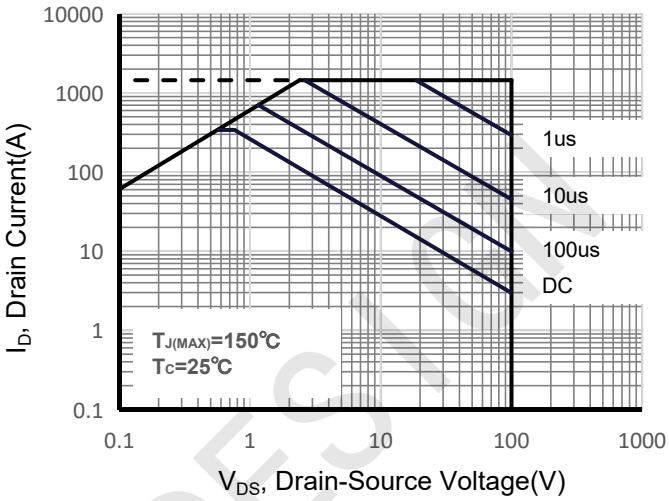


Figure 9. Maximum Continuous Drain Current vs Case Temperature

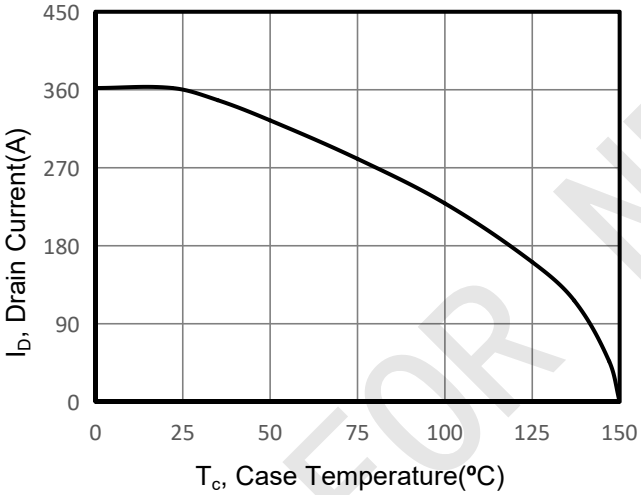
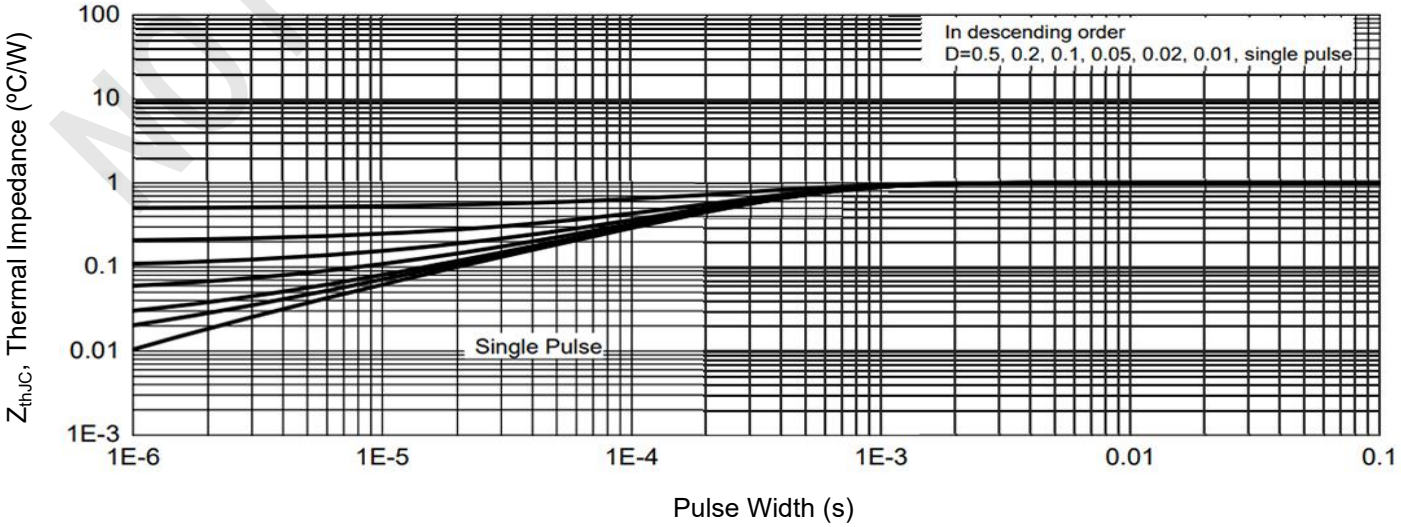


Figure 10. Normalized Maximum Transient Thermal Impedance



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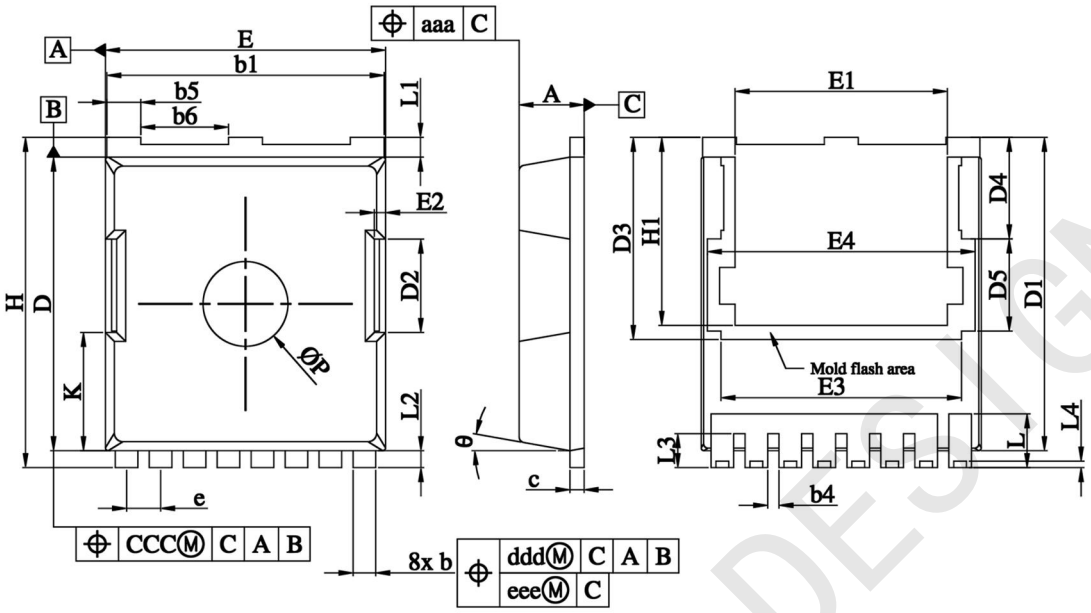

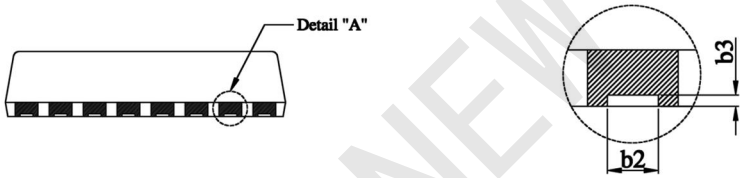

SYMBOL	COMMON MILLIMETER			SYMBOL	COMMON MILLIMETER		
	MIN.	NOMINAL	MAX.		MIN.	NOMINAL	MAX.
A	2.20	2.30	2.40	E2	0.30	0.40	0.50
b	0.70	0.80	0.90	E3		8.50	
b1	9.70	9.80	9.90	E4		9.46	
b2	0.36	0.45	0.55	H	11.50	11.68	11.85
b3	0.05	0.100	/	H1	6.55	6.65	6.75
b4	0.30	0.40	0.50	K	4.08	4.18	4.28
b5	1.10	1.20	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				

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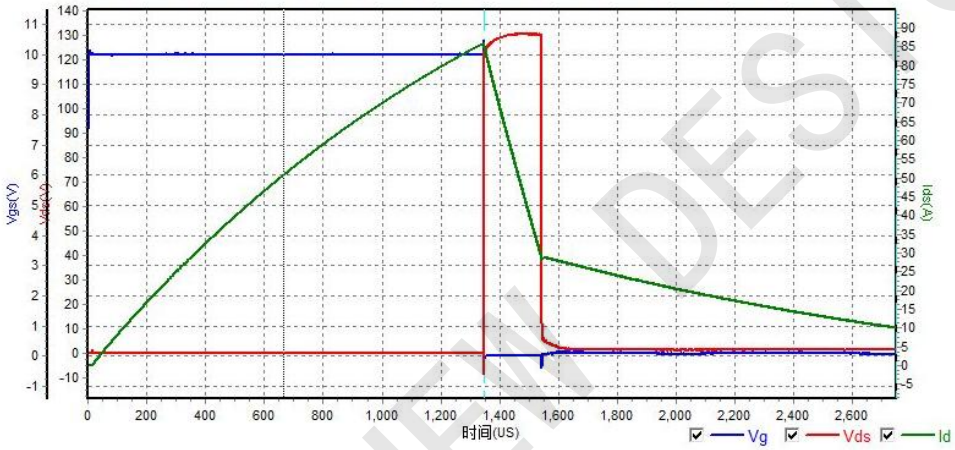
Avalanche Current Graph

RPTI Condition:L=0.500mH,Vd=50.00V,Vg=10.00V,Vgr=0.00V,rg=25ohm					
#1	IAS	#2	IAS	#3	IAS
	81.361A		82.988A		83.641A
	82.124A		84.357A		84.386A
	83.446A		84.883A		85.013A
	84.009A		85.934A		86.048A
	FAIL		FAIL		FAIL

#1



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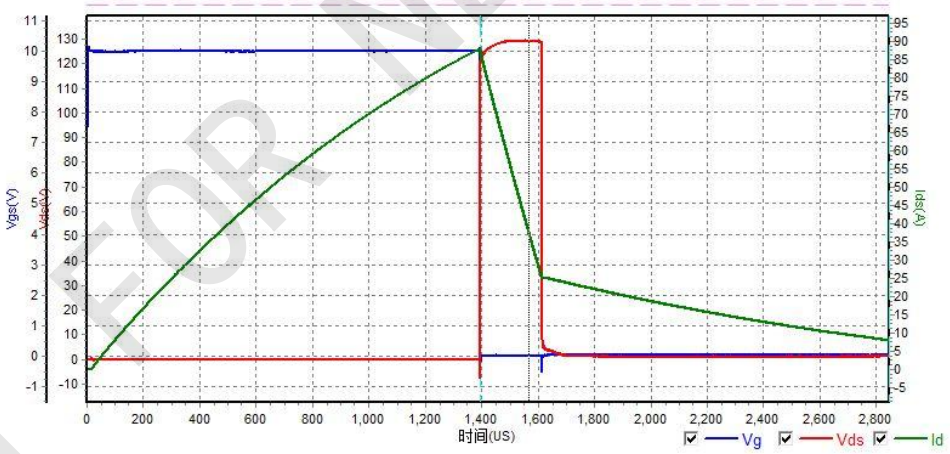

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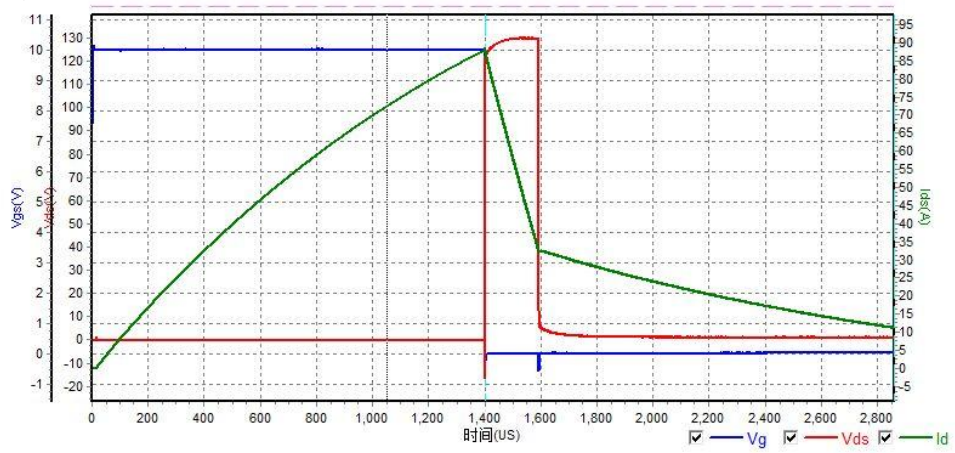

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