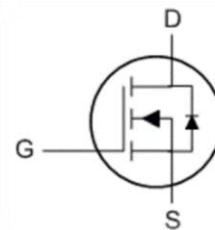
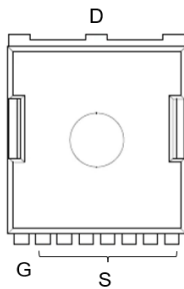


**Description**
**100V N-CHANNEL ENHANCEMENT MODE POWER MOSFET**
**Features**

- Device Rating  $V_{DS} = 100V$ ,  $I_D = 367A$
- $R_{DS(ON)} = 1.1m\Omega$  (typ.) @  $V_{GS} = 10V$ ,  $I_D = 150A$
- Advanced Split Gate Trench Device Design
- RoHS Compliant & Halogen-Free
- Qualified according to JEDEC for target applications
- 100% Avalanche Test

**Application**

- Battery Protection
- Telecom and Server Power Supply
- Brushless DC Motor Control
- DC-DC Converters
- High Performance Synchronous Rectification
- Load Switch and eFuse

**Package**


**TOLL**  
**JFG367N100Q**

**Absolute Maximum Ratings**  $T_J = 25^\circ C$  unless otherwise specified

Symbol	Parameter	Value	Units	
$V_{DS}$	Drain-Source Voltage	100	V	
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V	
$I_D$	Continuous Drain Current, $V_{GS} @ 10V$ <sup>note1</sup>	$T_C = 25^\circ C$	367	A
		$T_C = 100^\circ C$	232	A
$I_{DM}$	Pulsed Drain Current <sup>note2</sup>	1471	A	
$P_D$	Power Dissipation <sup>note4</sup>	$T_C = 25^\circ C$	312	W
	Power Dissipation	$T_A = 25^\circ C$	3.12	W
$E_{AS}$	Single Pulsed Avalanche Energy <sup>note3</sup>	1440	mJ	
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^\circ C$	

**Thermal characteristics**

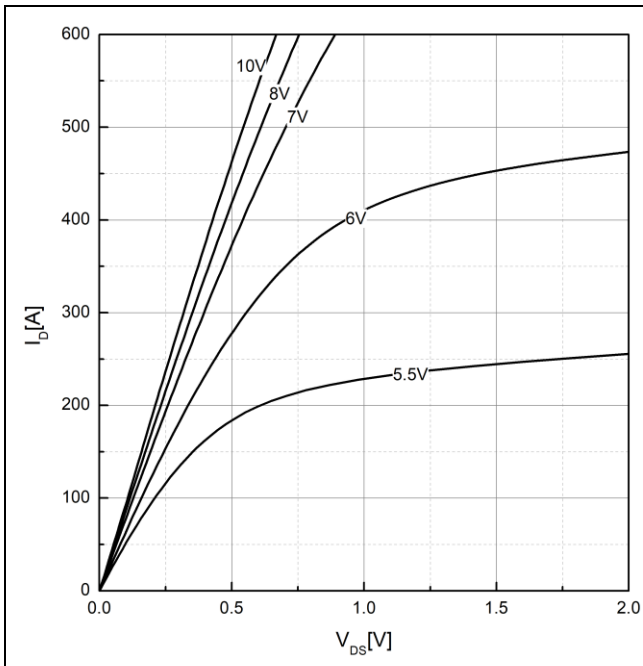
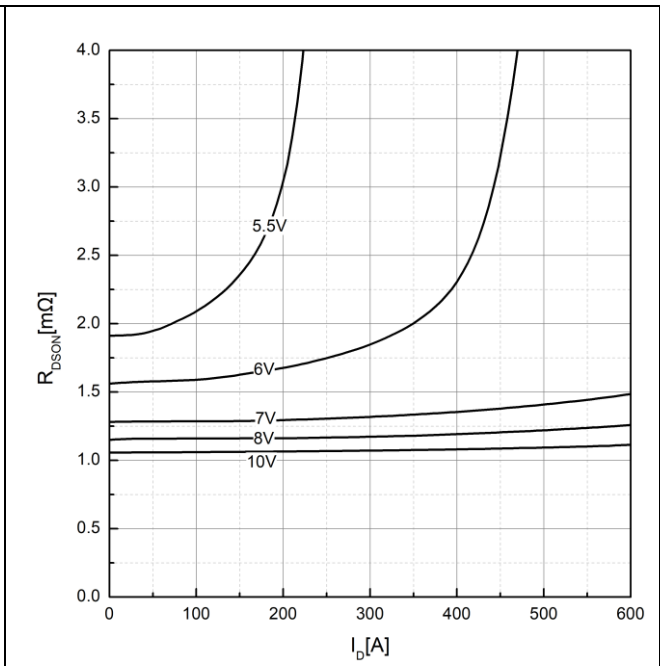
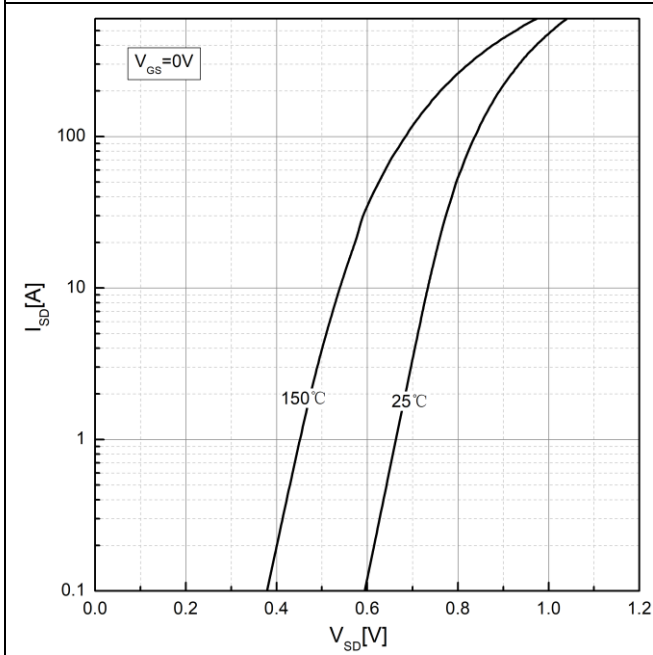
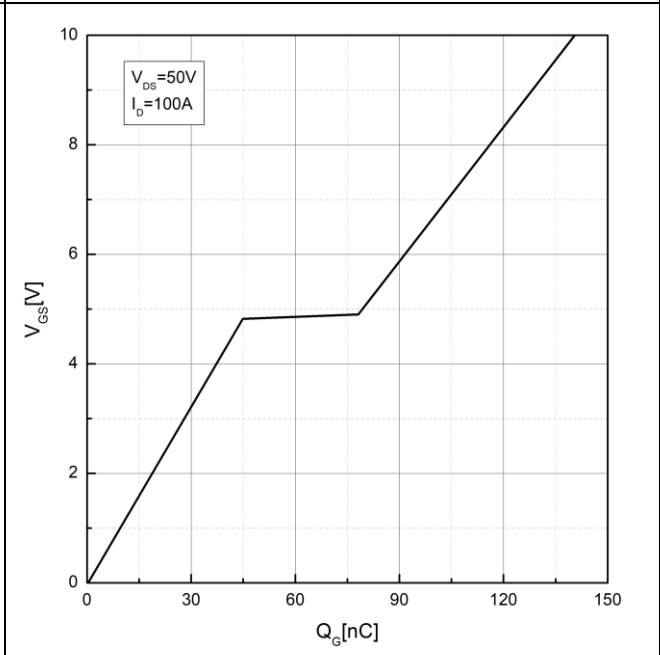
Symbol	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case <sup>note1</sup>	-	0.4	-	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient (mounted on 1 inch square PCB)	-	-	40	$^\circ C/W$

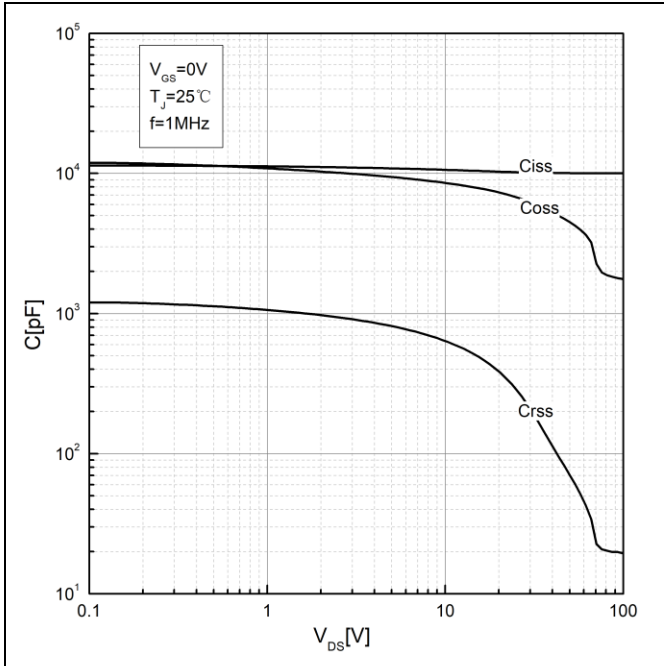
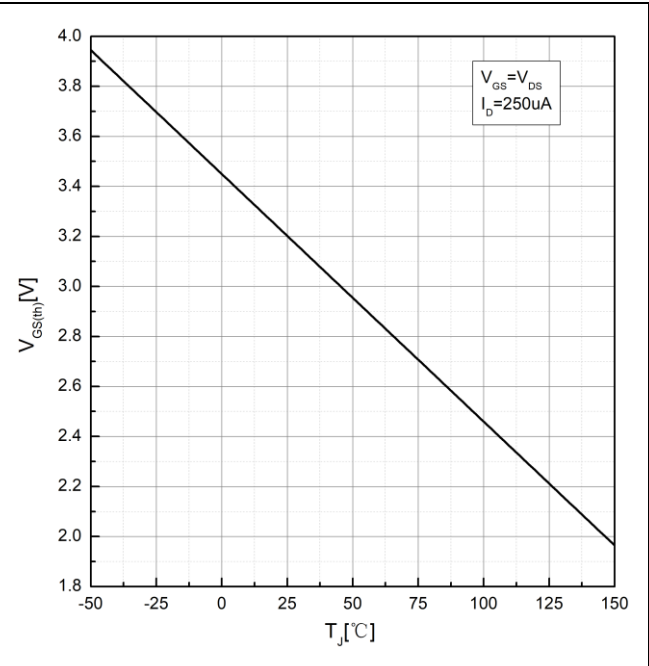
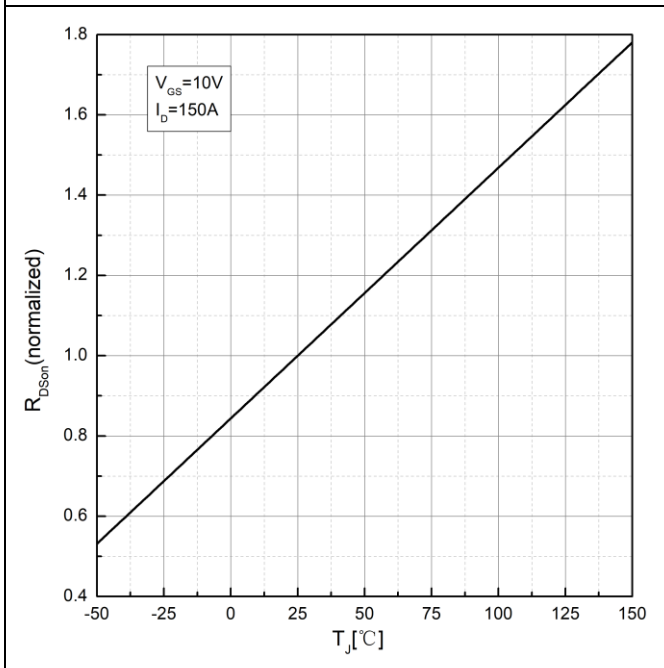
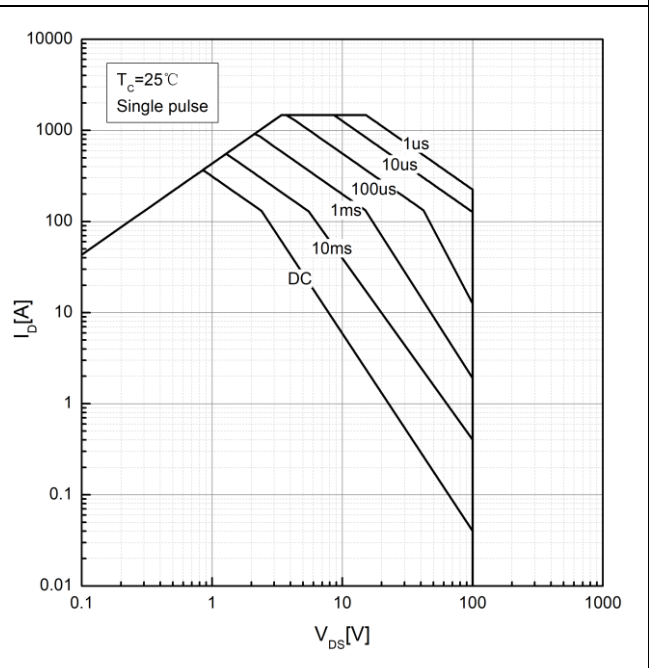
**Electrical Characteristics**  $T_J=25^{\circ}\text{C}$  unless otherwise specified

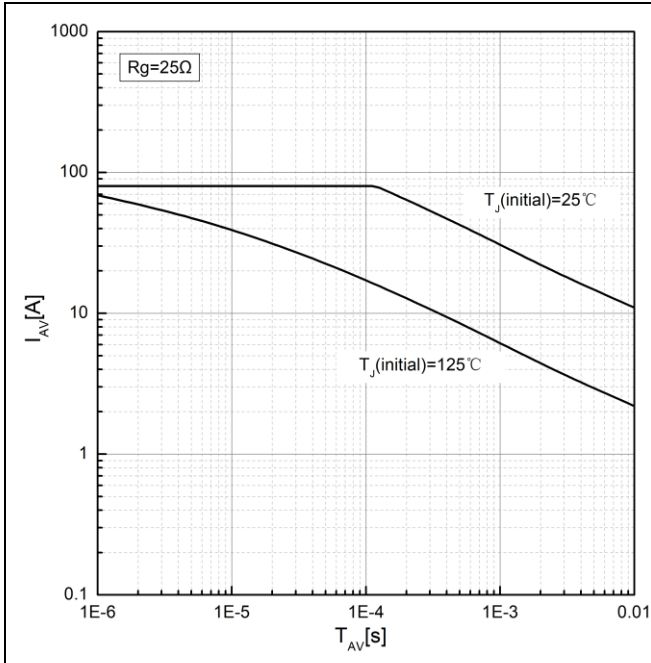
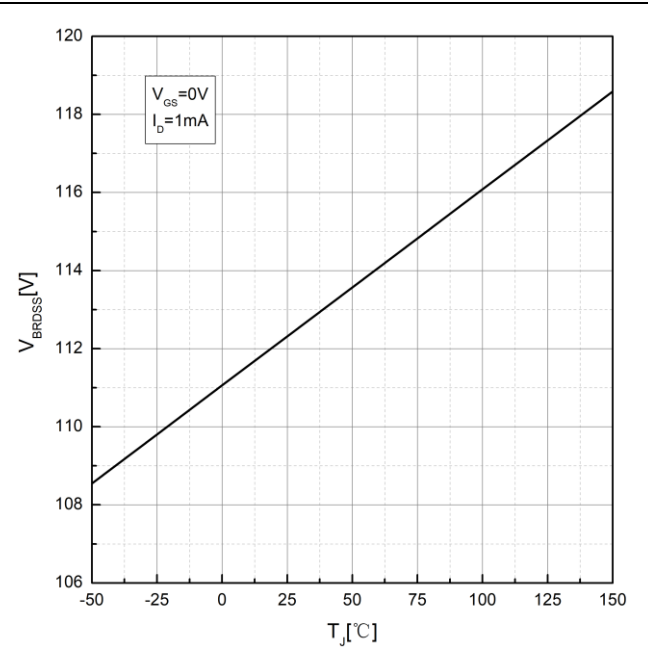
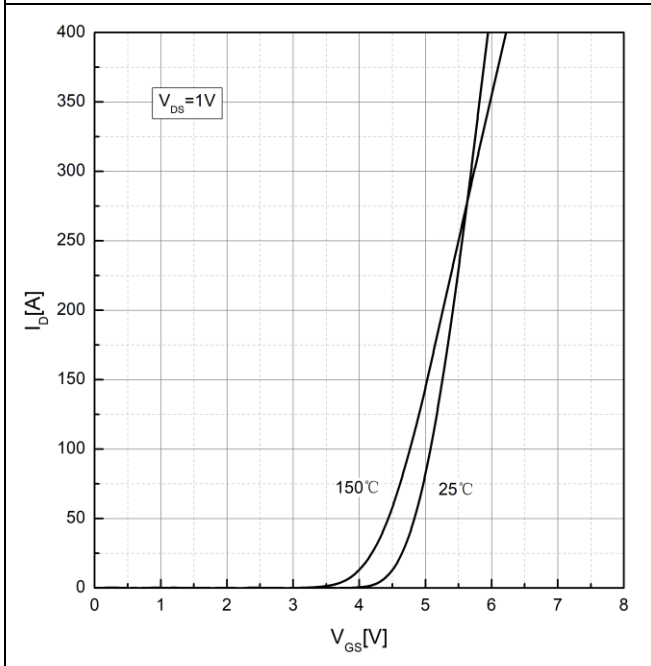
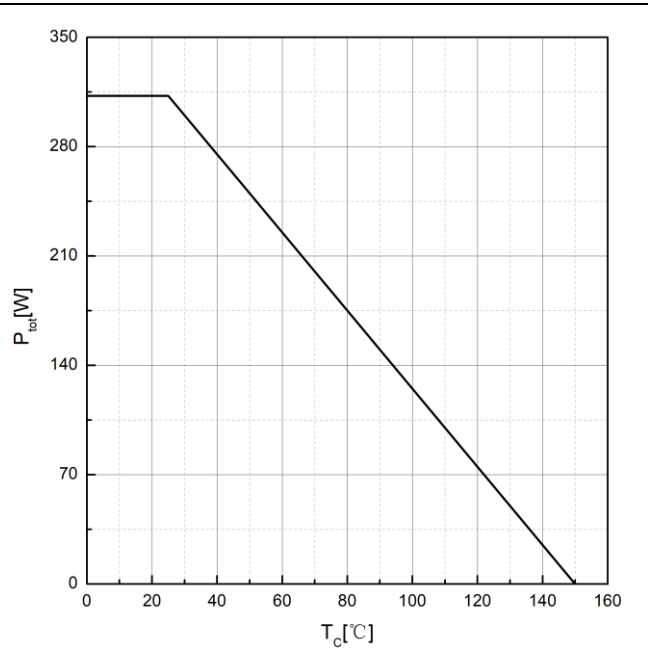
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units	
<b>Off Characteristic</b>							
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	100	-	-	V	
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=100V, V_{GS}= 0V, T_J =25^{\circ}\text{C}$	-	-	1	$\mu A$	
		$V_{DS}=100V, V_{GS}= 0V, T_J =125^{\circ}\text{C}$	-	-	100	$\mu A$	
$I_{GSS}$	Gate-Source Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$	-100	-	100	nA	
<b>On Characteristics</b>							
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3.0	4	V	
$R_{DS(on)}$	Static Drain-Source On-Resistance <small>note2</small>	$V_{GS} = 10V, I_D =150A$	-	1.1	1.4	m $\Omega$	
		$V_{GS} = 6V, I_D =75A$	-	1.6	2.0	m $\Omega$	
$g_{FS}$	Forward Transconductance	$V_{DS} = 1V, I_D =150A$	-	312	-	S	
<b>Dynamic Characteristics</b>							
$R_g$	Gate Resistance	$f=1.0\text{MHz}$	-	0.4	-	$\Omega$	
$C_{iss}$	Input Capacitance	$V_{DS} = 50V, V_{GS} = 0V,$ $f = 1.0\text{MHz}$	-	10043	-	pF	
$C_{oss}$	Output Capacitance		-	4487	-	pF	
$C_{rss}$	Reverse Transfer Capacitance		-	70	-	pF	
$Q_g$	Total Gate Charge	$V_{DS} =50V, I_D = 100A,$ $V_{GS} = 10V$	-	141	-	nC	
$Q_{gs}$	Gate-Source Charge		-	45	-	nC	
$Q_{gd}$	Gate-Drain("Miller") Charge		-	33	-	nC	
<b>Switching Characteristics</b>							
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 50V, I_D = 100A,$ $R_G = 1\Omega, V_{GS} = 10V$	-	39	-	ns	
$t_r$	Turn-On Rise Time		-	37	-	ns	
$t_{d(off)}$	Turn-Off Delay Time		-	45	-	ns	
$t_f$	Turn-Off Fall Time		-	13	-	ns	
<b>Source-Drain Diode Characteristics and Maximum Ratings</b>							
$I_S$	Maximum Continuous Diode Forward Current <small>note1,5</small>		-	-	260	A	
$I_{SM}$	Maximum Pulsed Diode Forward Current <small>note2,5</small>		-	-	1471	A	
$t_{rr}$	Reverse Recovery Time	$T_J = 25^{\circ}\text{C}, I_S = 100A$	-	105	-	ns	
$Q_{rr}$	Reverse Recovery Charge	$V_{GS} = 0V, di/dt = 400A/\mu s$	-	262	-	nC	
$V_{SD}$ <small>note2</small>	Diode Forward Voltage	$I_S = 100A$	$T_J = 25^{\circ}\text{C}$		-	0.84	V
		$V_{GS} = 0V$	$T_J = 125^{\circ}\text{C}$		-	0.71	V

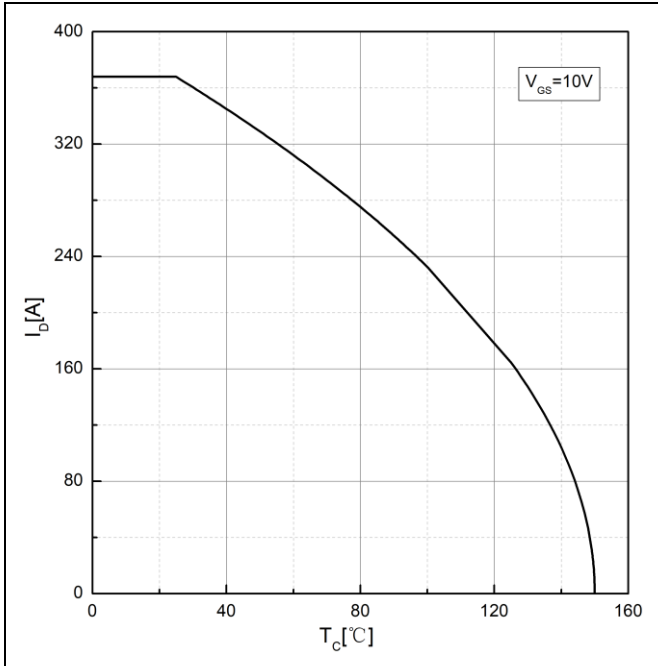
Note :

- 1.The data tested by surface mounted on one inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
- 3.The EAS data shows Max. rating. The test condition is  $L=0.5\text{mH}, I_{AS}= 80A$ .
- 4.The power dissipation is limited by  $150^{\circ}\text{C}$  junction temperature.
- 5.The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications, should be limited by total power dissipation.

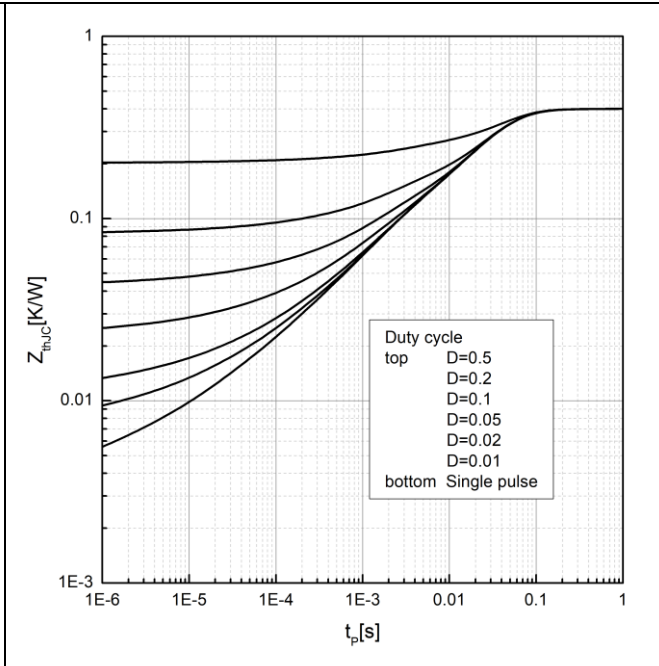
**Typical Performance Characteristics**

**Figure 1. Output Characteristics,  $T_J=25^\circ\text{C}$** 

**Figure 2. Drain-source on resistance ,  $T_J=25^\circ\text{C}$** 

**Figure 3. Forward characteristics of body diode**

**Figure 4. Gate Charge Characteristics**


**Figure 5. Capacitance Characteristics**

**Figure 6. Threshold Voltage Vs. Temperature**

**Figure 7. Drain-source on-state resistance**

**Figure 8. Maximum Safe Operating Area**

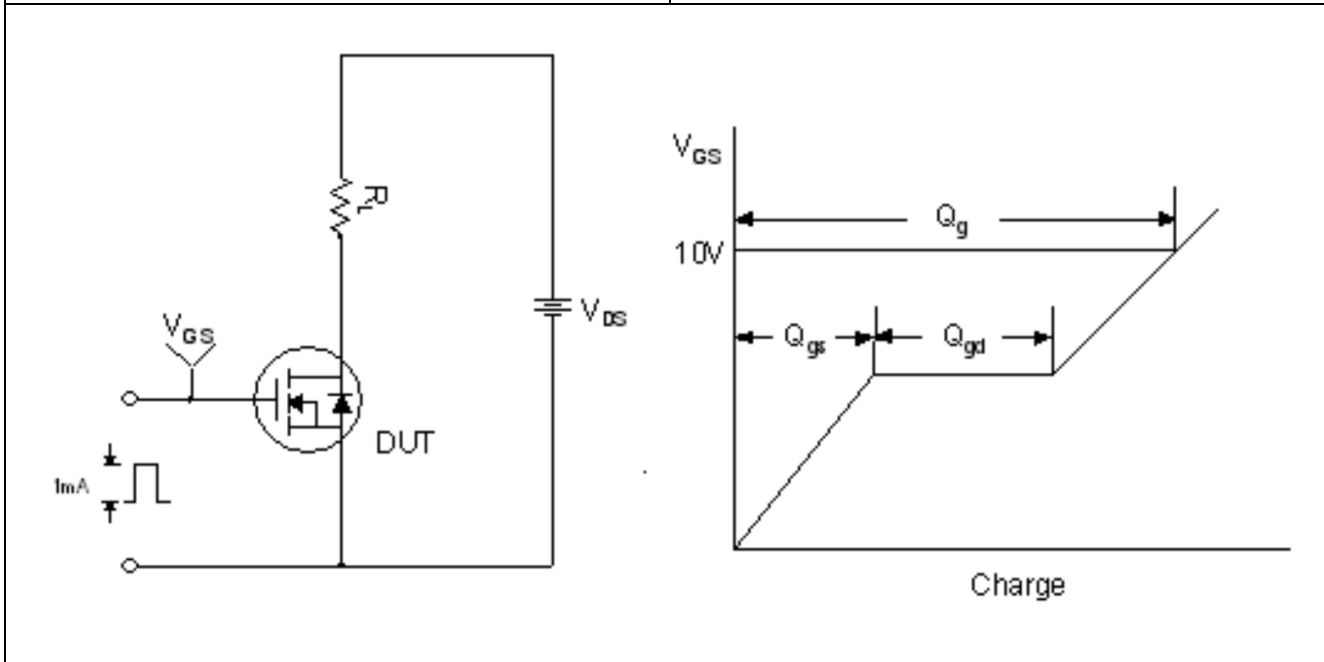

**Figure 9. Avalanche characteristics**

**Figure 10. Drain-source breakdown voltage**

**Figure 11. Transfer characteristics**

**Figure 12. Power dissipation**



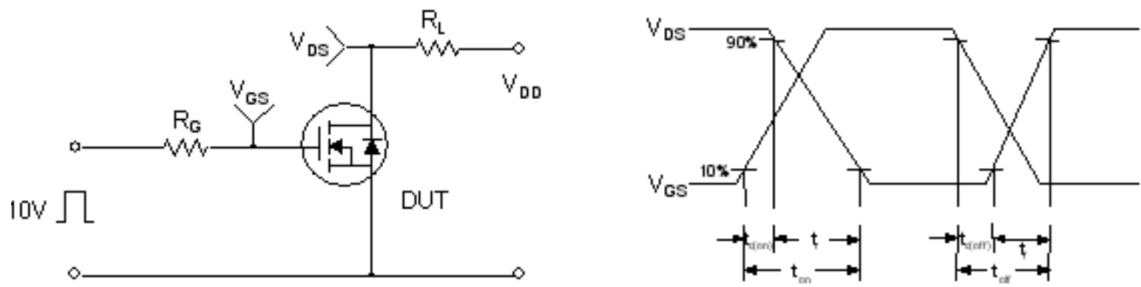
**Figure 13. Drain current**



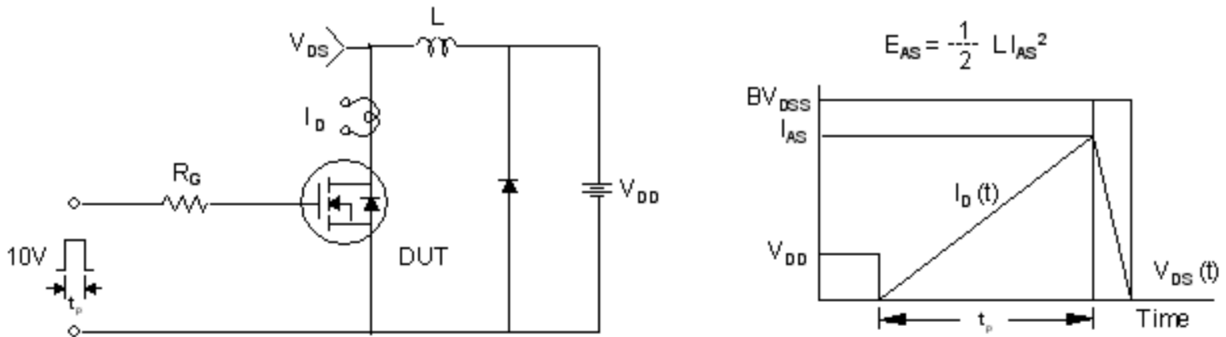
**Figure 14. Effective Transient Thermal Impedance**



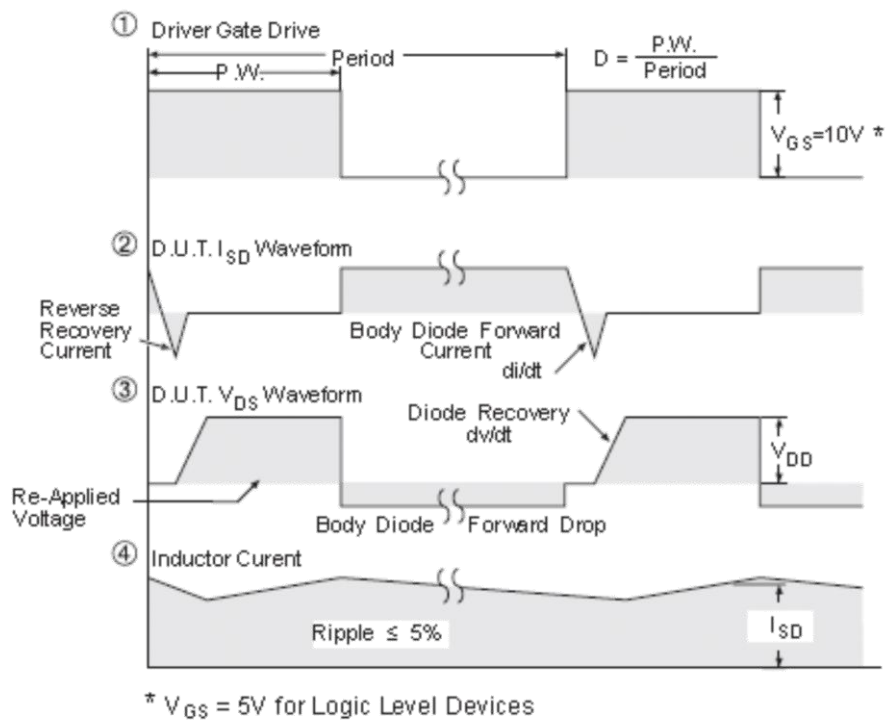
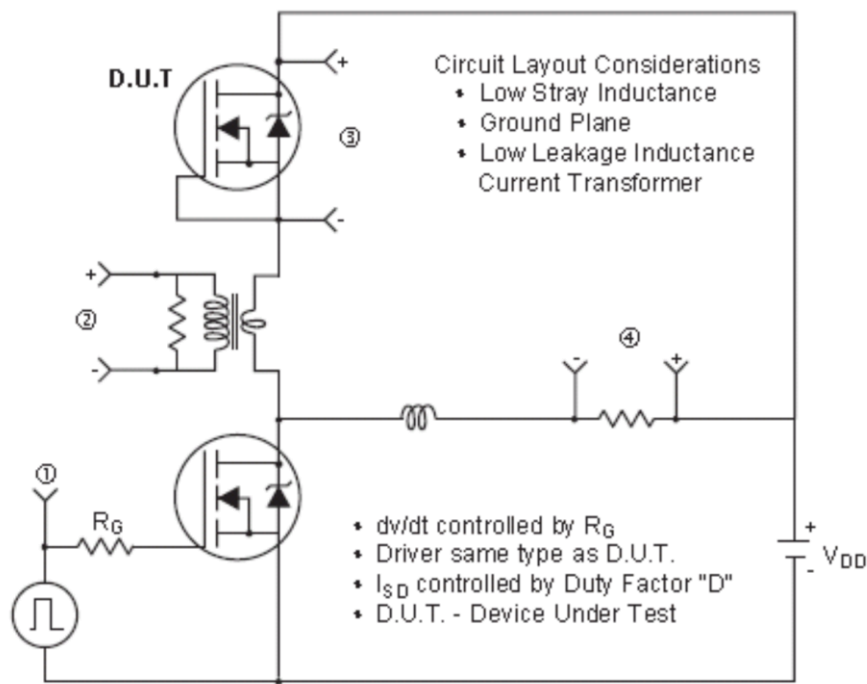
**Figure 15. Gate Charge Test Circuit & Waveform**



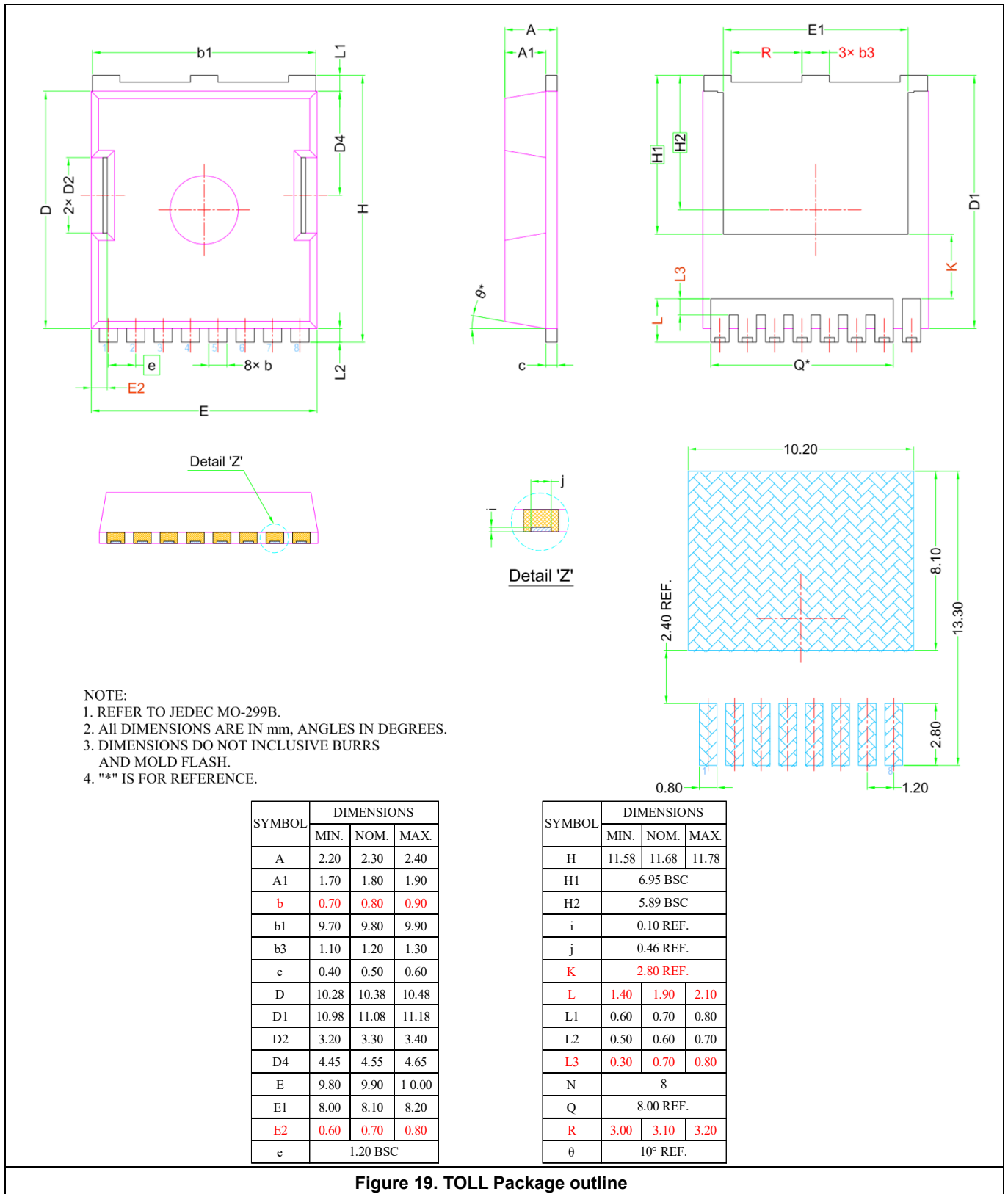
**Figure 16. Resistive Switching Test Circuit & Waveforms**



**Figure 17. Unclamped Inductive Switching Test Circuit & Waveforms**



**Figure 18. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)**

**Package outline**

**Figure 19. TOLL Package outline**

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