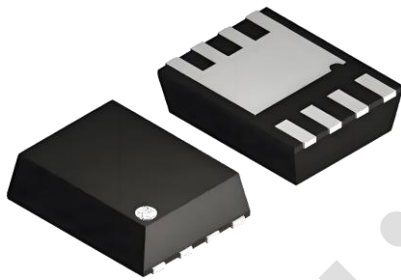


Description
30V N-CHANNEL ENHANCEMENT MODE POWER MOSFET
Features

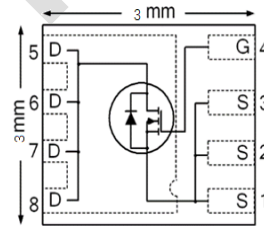
- Device Rating $V_{DS} = 30V$, $I_D = 139A$
- $R_{DS(ON)} = 3.0m\Omega$ (typ.) @ $V_{GS} = 10V$, $I_D = 30A$
- Proprietary High Density Trench Technology
- RoHS Compliant & Halogen-Free

Application

- High performance DC/DC
- SR
- Motor Driving
- BMS

Package


DFN 3*3-8L
JFG139N30K


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

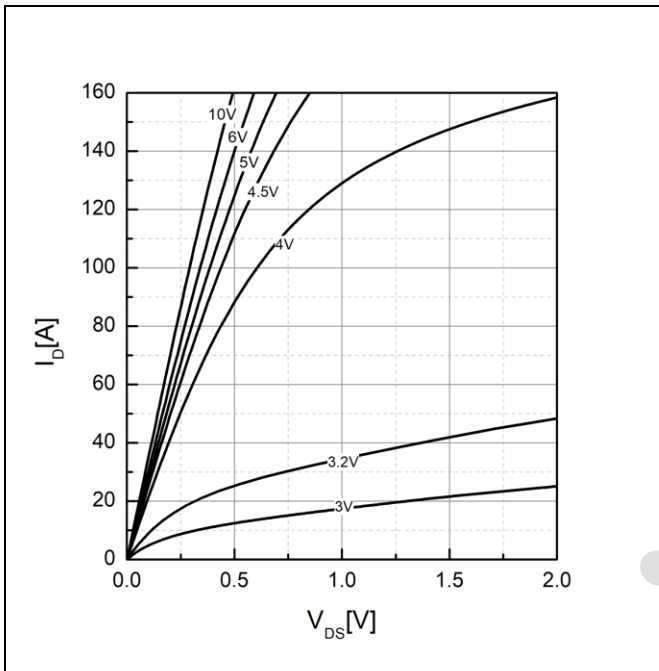
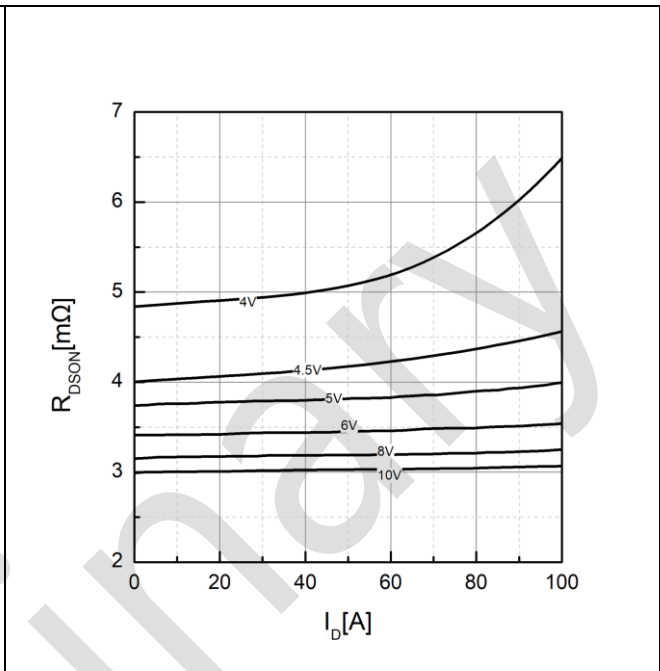
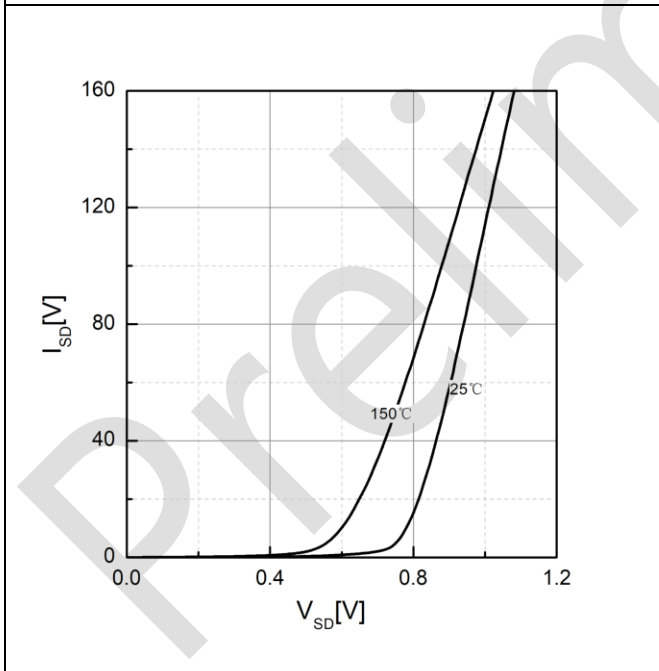
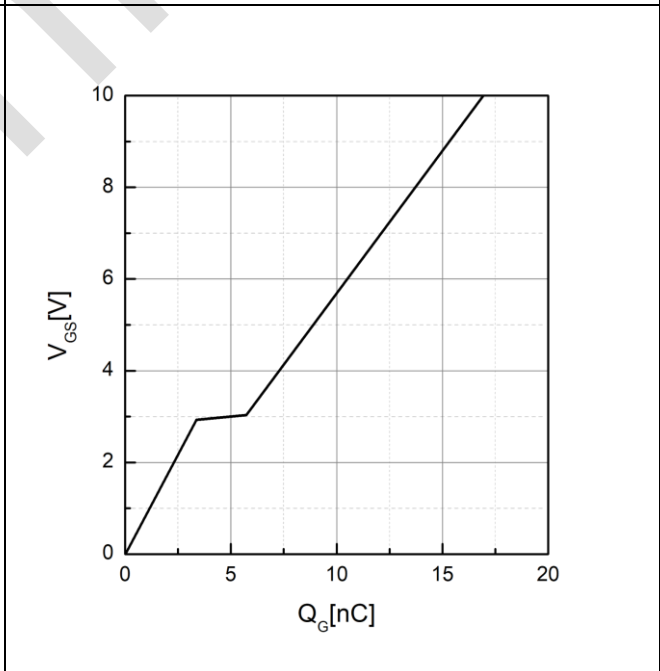
Symbol	Parameter	Max.	Units	
V_{DS}	Drain-Source Voltage	30	V	
V_{GS}	Gate-Source Voltage	± 20	V	
I_D	Continuous Drain Current, $V_{GS} @ 10V$ ^{note1}	$T_C = 25^\circ C$	139	A
		$T_C = 100^\circ C$	88	A
I_{DM}	Pulsed Drain Current ^{note2}	556	A	
P_D	Power Dissipation ^{note4}	$T_C = 25^\circ C$	104	W
	Power Dissipation	$T_A = 25^\circ C$	2.08	W
E_{AS}	Single Pulsed Avalanche Energy ^{note3}	73	mJ	
$R_{\theta JC}$	Thermal Resistance, Junction to Case ^{note1}	1.2	$^\circ C/W$	
$R_{\theta JA}$	Junction to Ambient (mounted on 1 inch square PCB)	60	$^\circ C/W$	
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ C$	

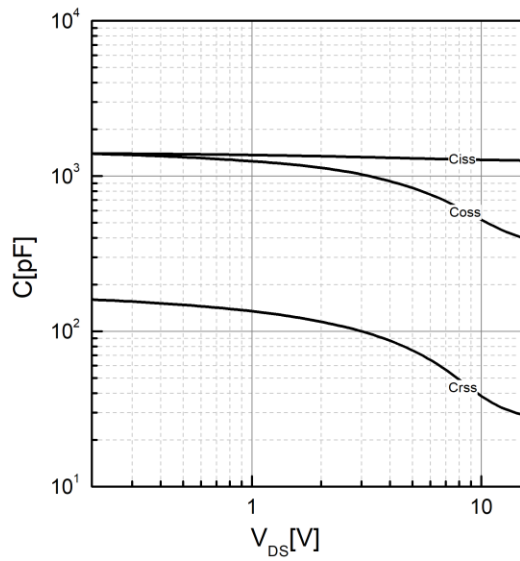
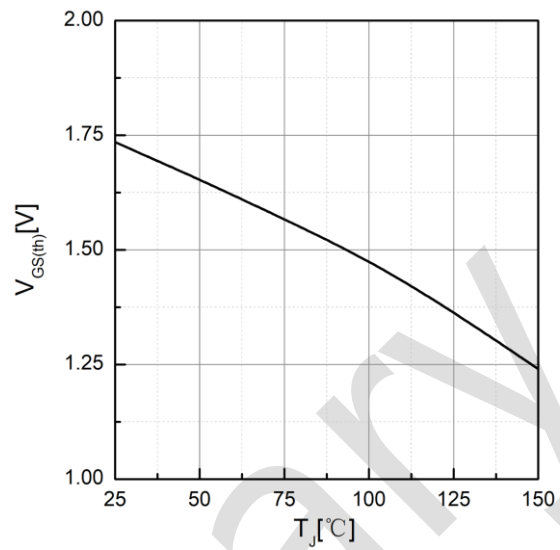
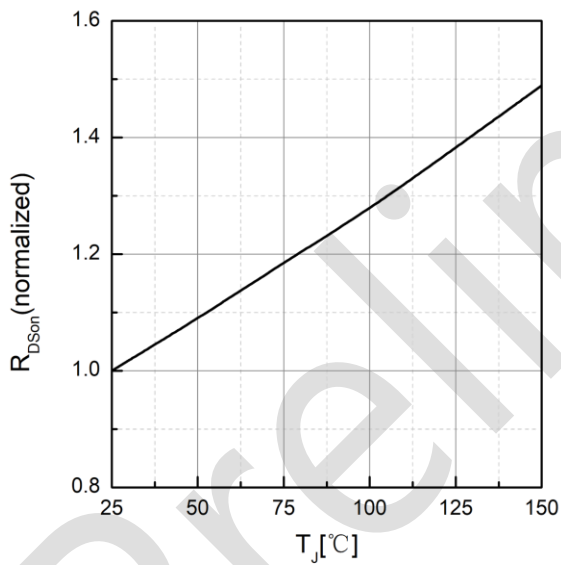
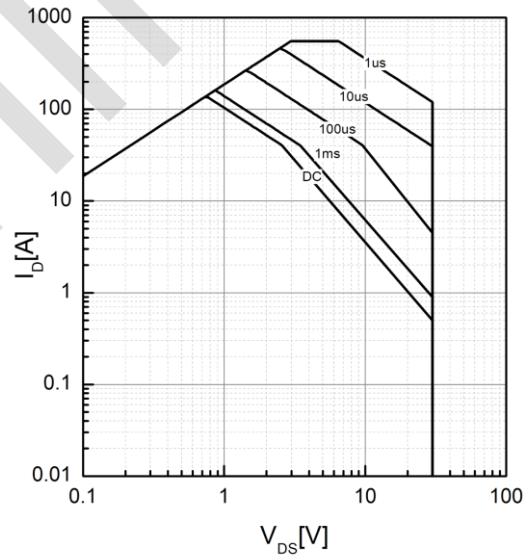
Electrical Characteristics $T_C=25^\circ C$ unless otherwise specified

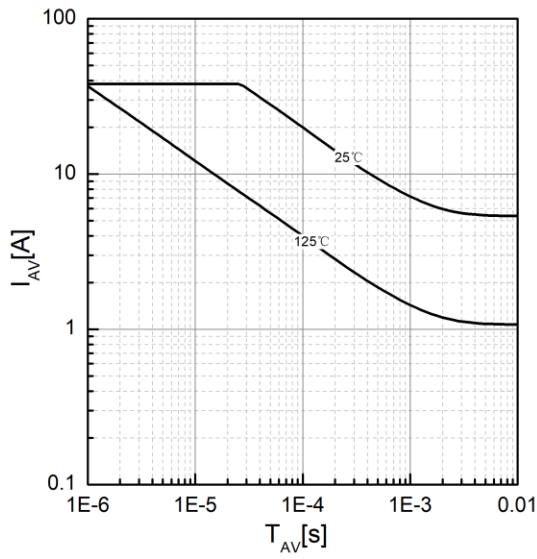
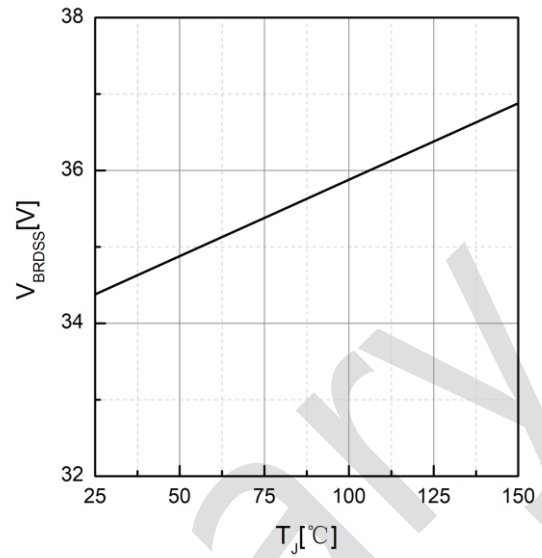
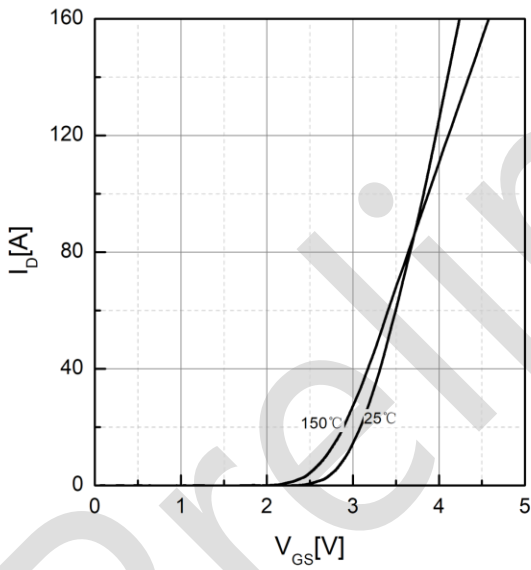
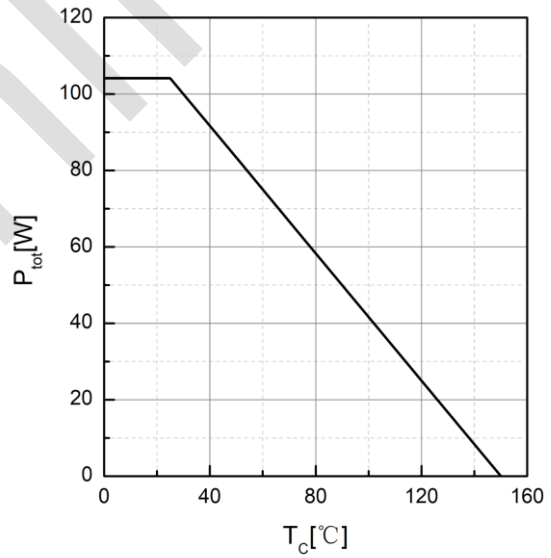
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	30	-	-	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =30V, V _{GS} = 0V, T _C = 25°C	-	-	1	μA
		V _{DS} =30V, V _{GS} = 0V, T _C = 55°C	-	-	10	μA
I _{GSS}	Gate-Source Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-100	-	100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1	-	2.5	V
R _{DS(on)}	Static Drain-Source On-Resistance <small>note2</small>	V _{GS} = 10V, I _D =30A	-	3.0	3.6	mΩ
R _{DS(on)}	Static Drain-Source On-Resistance <small>note2</small>	V _{GS} = 4.5V, I _D =30A	-	4.1	5.0	mΩ
g _{FS}	Forward Transconductance	V _{DS} = 1V, I _D =30A	-	88	-	S
Dynamic Characteristics						
R _g	Gate Resistance		-	3.8	-	Ω
C _{iss}	Input Capacitance	V _{DS} = 15V, V _{GS} = 0V, f = 1MHz	-	1260	-	pF
C _{oss}	Output Capacitance		-	401	-	pF
C _{rss}	Reverse Transfer Capacitance		-	29	-	pF
Q _g	Total Gate Charge	V _{DS} =15V, I _D = 30A, V _{GS} = 10V	-	17.5	-	nC
Q _{gs}	Gate-Source Charge		-	3.5	-	nC
Q _{gd}	Gate-Drain("Miller") Charge		-	2.5	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 15V, I _D = 30A, R _G = 1Ω, V _{GS} = 10V	-	7	-	ns
t _r	Turn-On Rise Time		-	4	-	ns
t _{d(off)}	Turn-Off Delay Time		-	45	-	ns
t _f	Turn-Off Fall Time		-	5	-	ns
Source-Drain Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Diode Forward Current <small>note1,5</small>		-	-	86	A
I _{SM}	Maximum Pulsed Diode Forward Current <small>note2,5</small>		-	-	556	A
t _{rr}	Reverse Recovery Time	T _J = 25°C, I _S = 30A, V _{GS} = 0V di/dt = 100A/μs	-	40	-	ns
Q _{rr}	Reverse Recovery Charge		-	20	-	nC
V _{SD} <small>note2</small>	Source to Drain Diode Forward Voltage	T _J = 25°C, I _S = 30A, V _{GS} = 0V	-	0.84	-	V

Note :

- 1.The data tested by surface mounted on one inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
- 3.The EAS data shows Max. rating. The test condition is L=0.1mH, I_{AS}= 38 A.
- 4.The power dissipation is limited by 150°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°C

Figure 2. Drain-source on resistance , T_J=25°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

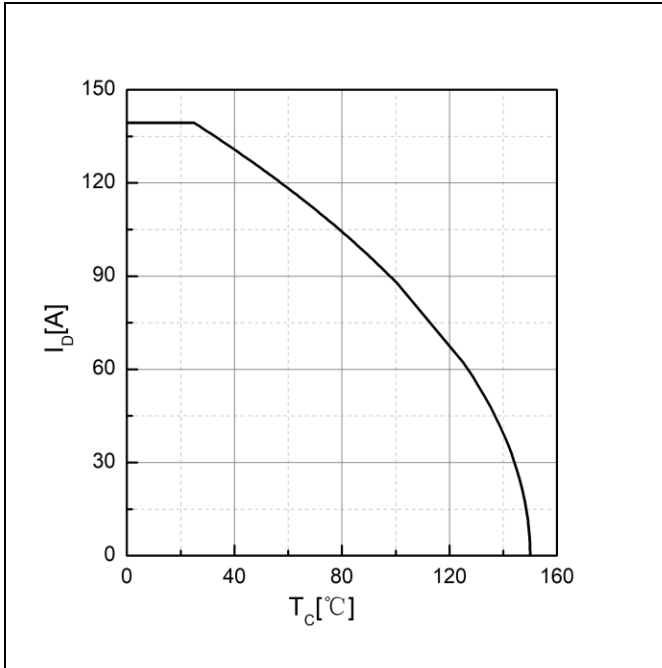


Figure 13. Drain current

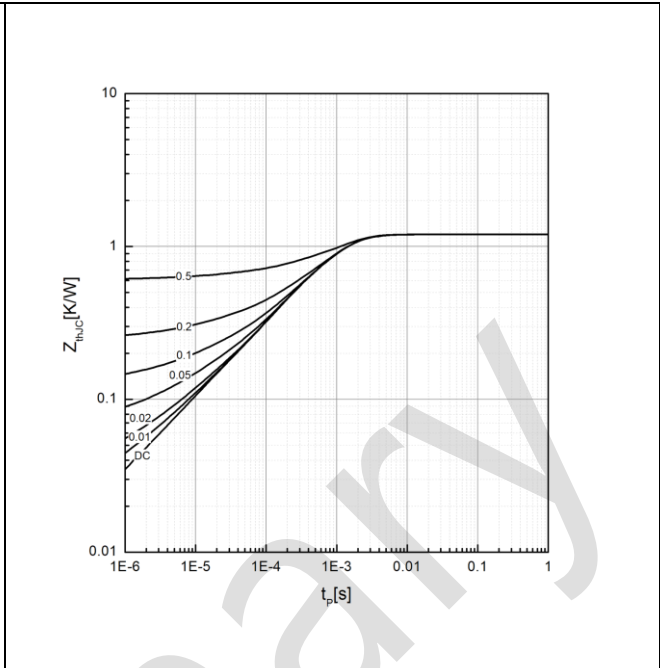


Figure 14. Effective Transient Thermal Impedance

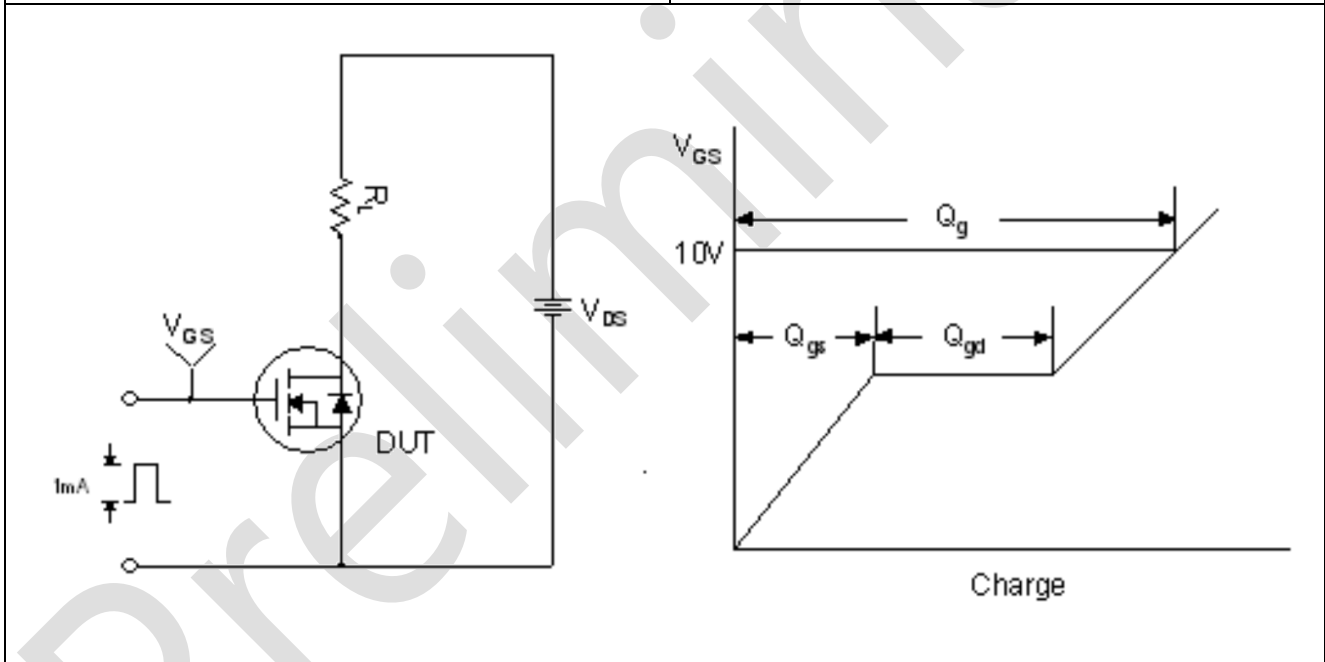


Figure 15. Gate Charge Test Circuit & Waveform

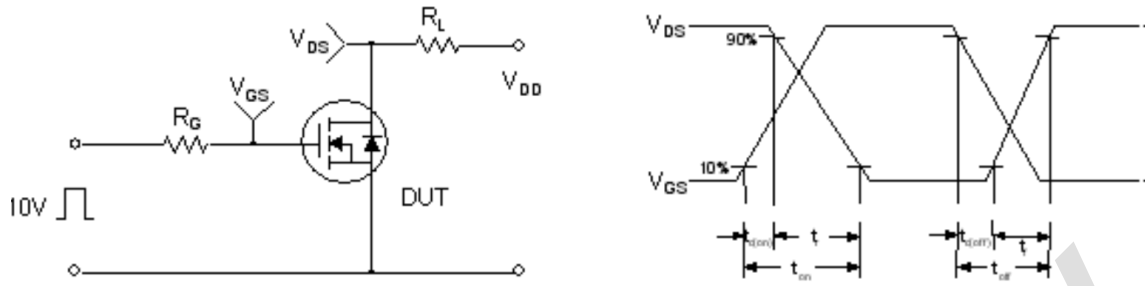


Figure 16. Resistive Switching Test Circuit & Waveforms

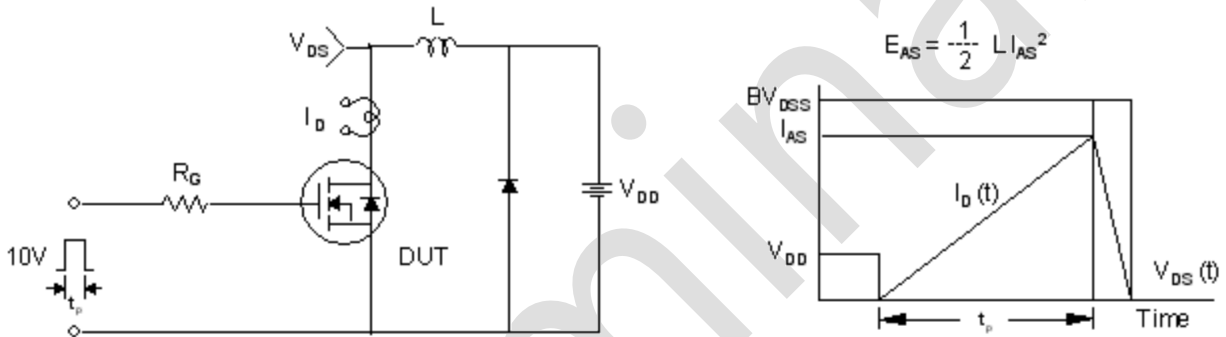


Figure 17. Unclamped Inductive Switching Test Circuit & Waveforms

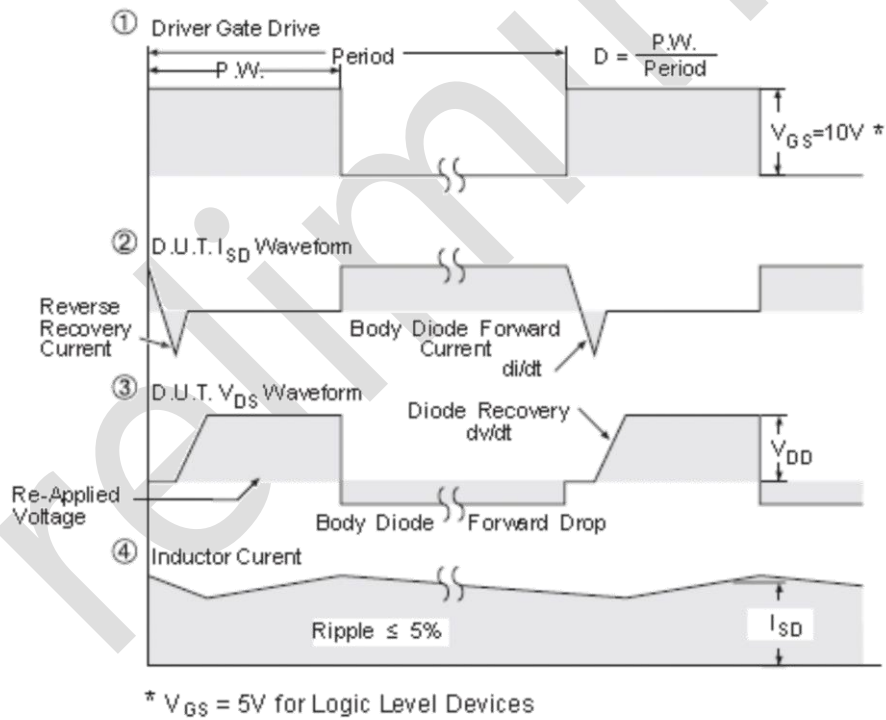
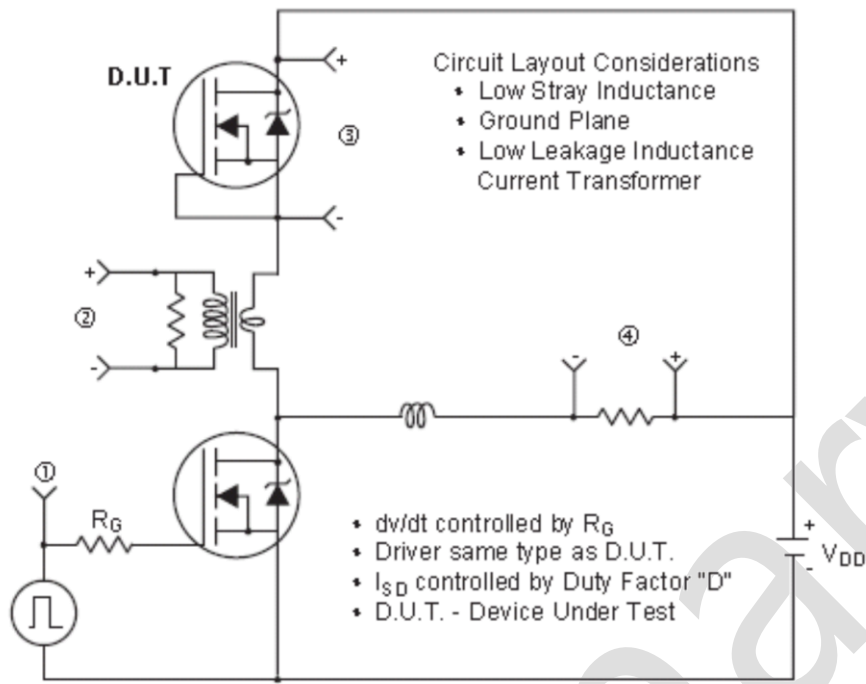


Figure 18. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)

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