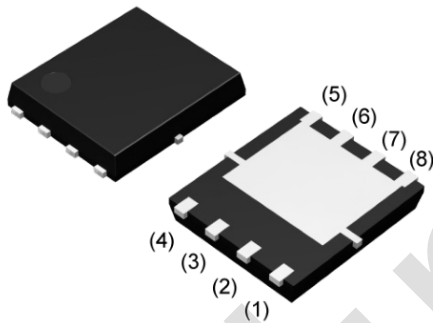


Description
30V N-CHANNEL ENHANCEMENT MODE POWER MOSFET
Features

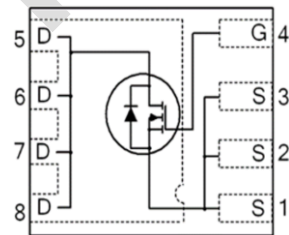
- Device Rating $V_{DS} = 30V$, $I_D = 242A$
- $R_{DS(ON)} = 1.8m\Omega$ (typ.) @ $V_{GS} = 10V$, $I_D = 30A$
- SGT Technology
- RoHS Compliant & Halogen-Free
- 100% avalanche test
- Qualified according to JEDEC for target applications

Application

- High frequency synchronous rectifiers
- Brushless DC motor control
- Battery protection
- High performance buck converters

Package


DFN 5*6-8L
JFG242N30L


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

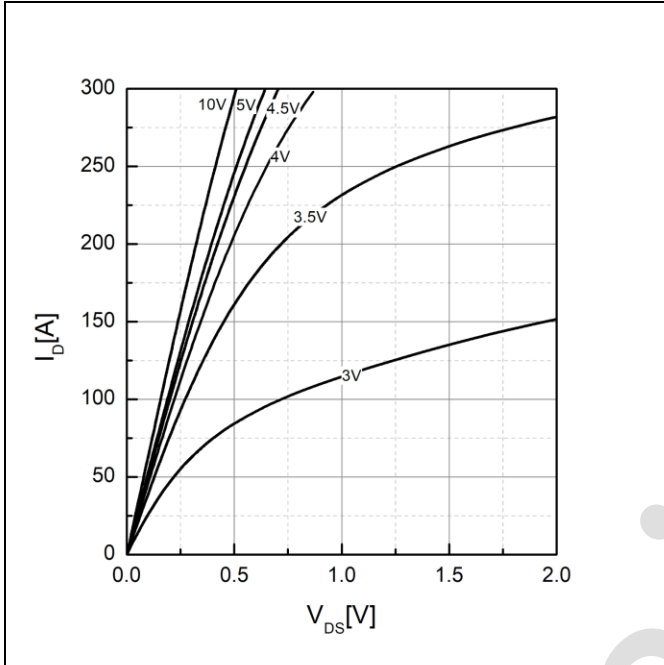
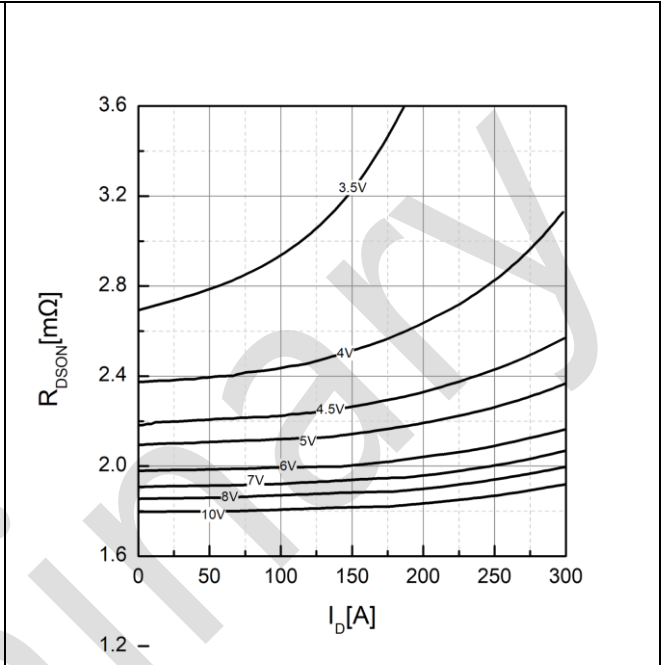
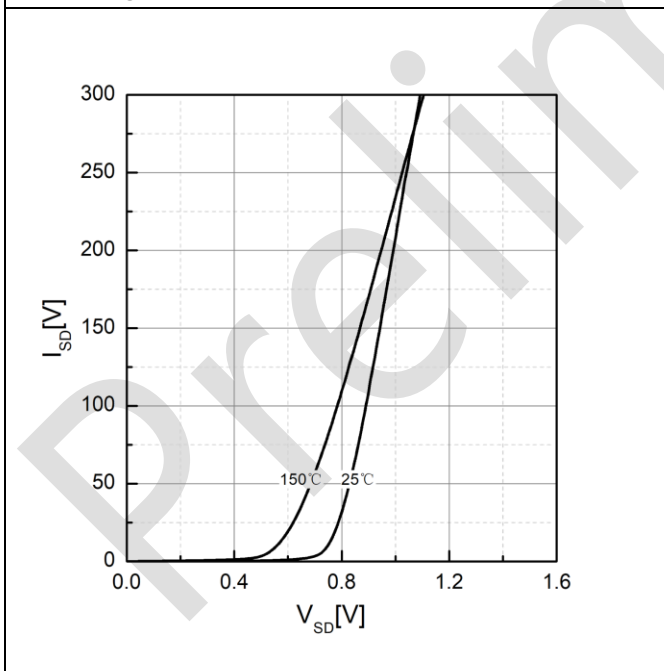
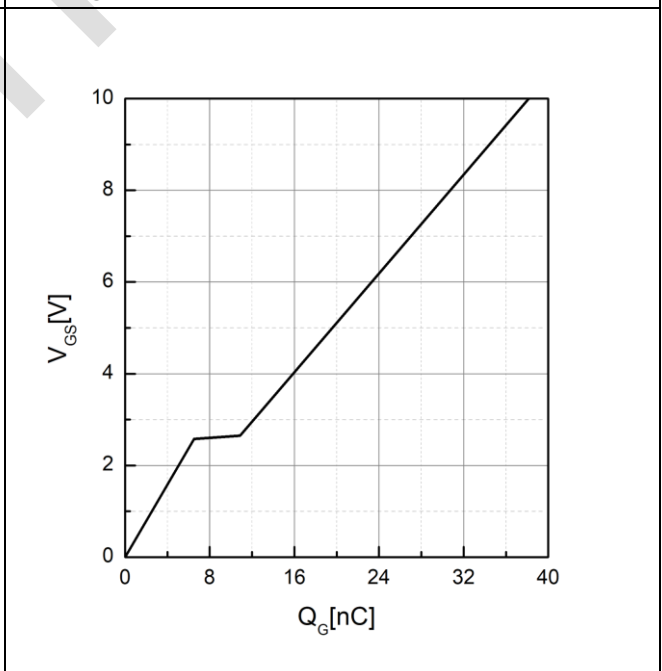
Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current, $V_{GS} @ 10V$ ^{note1}	$T_C = 25^\circ C$	242 A
		$T_C = 100^\circ C$	153 A
I_{DM}	Pulsed Drain Current ^{note2}	491	A
P_D	Power Dissipation ^{note4}	$T_C = 25^\circ C$	192 W
	Power Dissipation	$T_A = 25^\circ C$	2.5 W
E_{AS}	Single Pulsed Avalanche Energy ^{note3}	171	mJ
$R_{\theta JC}$	Thermal Resistance, Junction to Case bottom ^{note1}	0.65	$^\circ C/W$
$R_{\theta JA}$	Junction to Ambient (mounted on 1 inch square PCB)	50	$^\circ C/W$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ C$

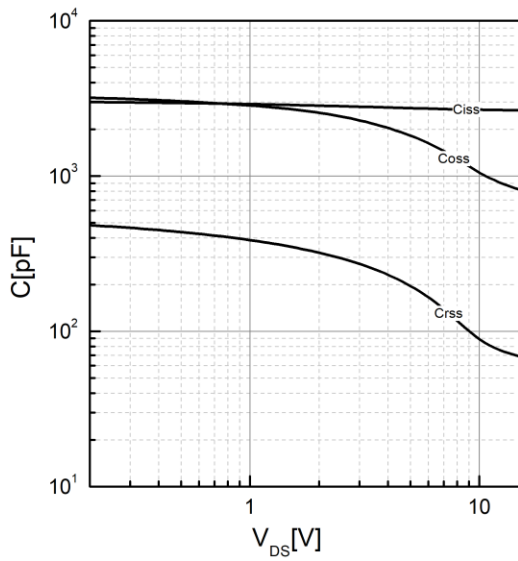
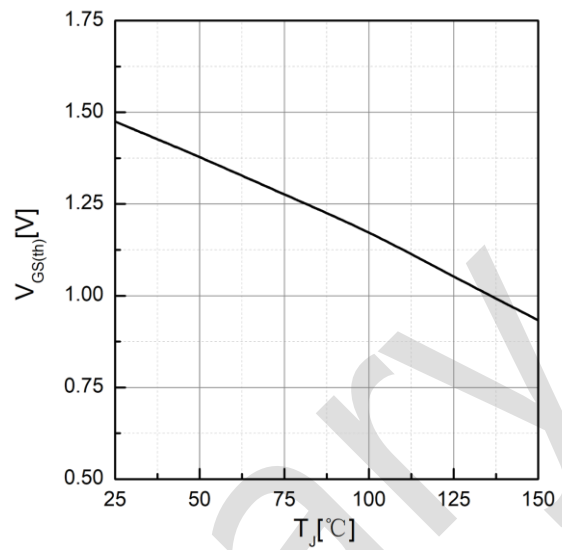
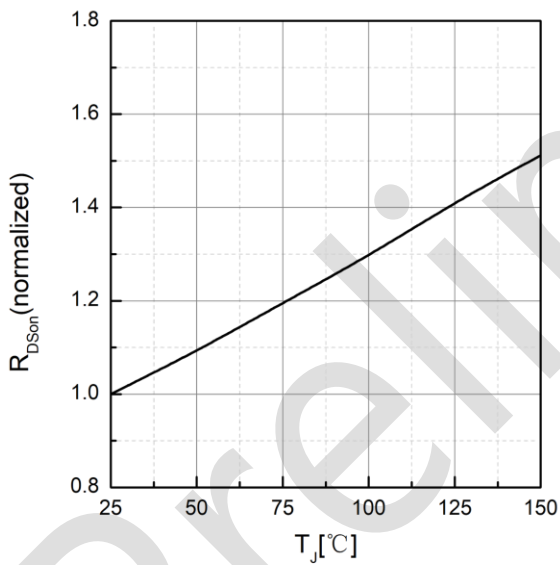
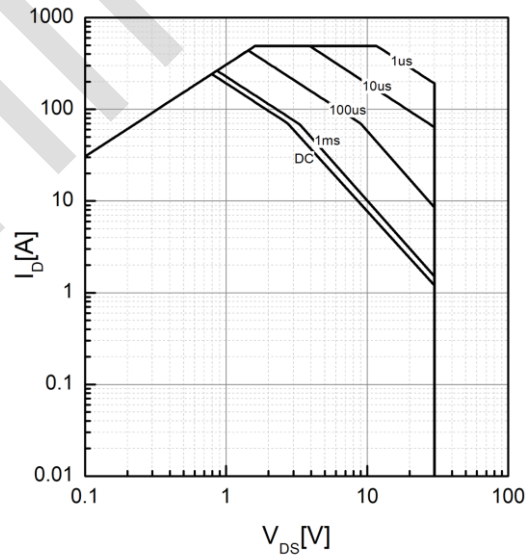
Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise specified

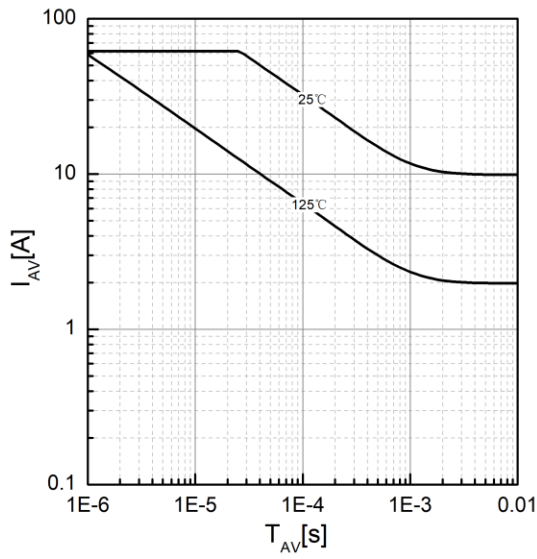
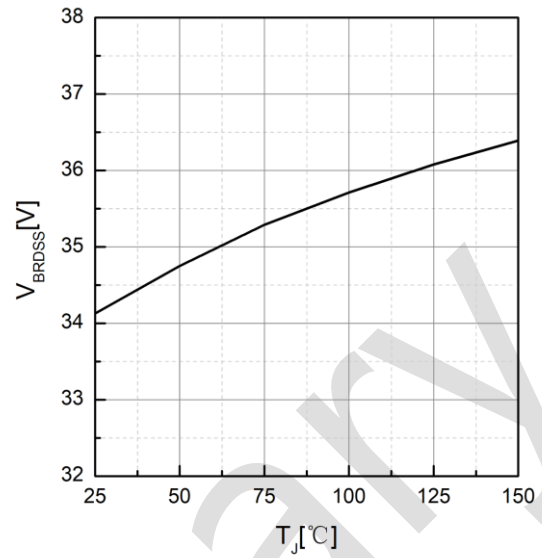
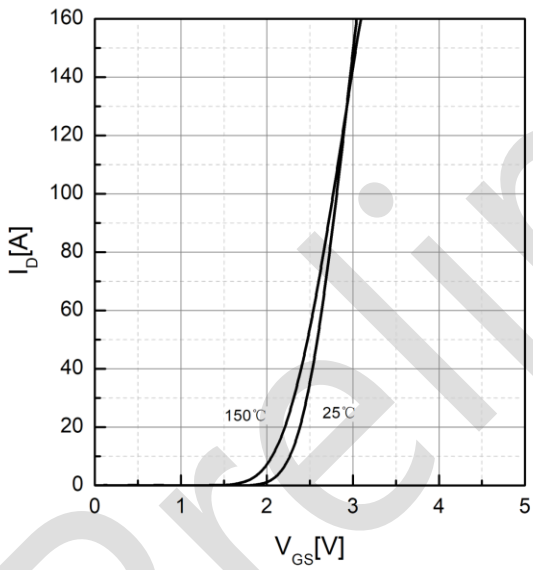
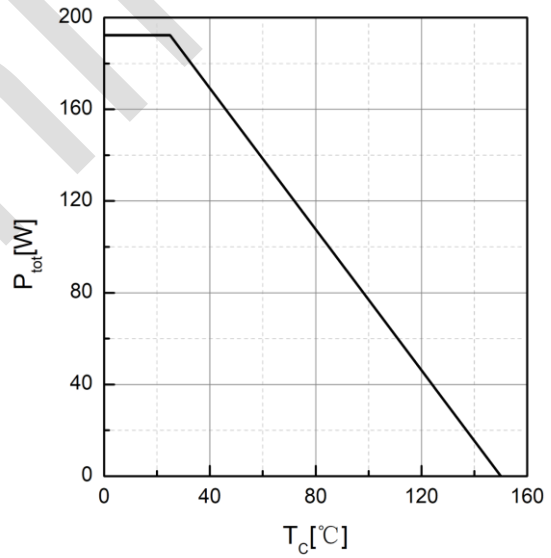
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}= 0V, T_C = 25^\circ\text{C}$	-	-	1	μA
		$V_{DS}=30V, V_{GS}= 0V, T_C = 55^\circ\text{C}$	-	-	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$	-100	-	100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.2	-	2.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance <small>note2</small>	$V_{GS} = 10V, I_D = 30A$	-	1.8	2.2	m Ω
$R_{DS(on)}$	Static Drain-Source On-Resistance <small>note2</small>	$V_{GS} = 4.5V, I_D = 30A$	-	2.2	2.7	m Ω
g_{FS}	Forward Transconductance	$V_{DS} = 1V, I_D = 30A$	-	150	-	S
Dynamic Characteristics						
R_g	Gate Resistance		-	0.4	-	Ω
C_{iss}	Input Capacitance	$V_{DS} = 15V, V_{GS} = 0V,$ $f = 1\text{MHz}$	-	2650	-	pF
C_{oss}	Output Capacitance		-	815	-	pF
C_{rSS}	Reverse Transfer Capacitance		-	68	-	pF
Q_g	Total Gate Charge	$V_{DS}=15V, I_D=30A, V_{GS} = 4.5V$	-	18	-	nC
Q_g	Total Gate Charge	$V_{DS} = 15V, I_D = 30A,$ $V_{GS} = 10V$	-	38	-	nC
Q_{gs}	Gate-Source Charge		-	6.5	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	4.3	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 15V, I_D = 30A,$ $R_G = 8\Omega, V_{GS} = 10V$	-	12	-	ns
t_r	Turn-On Rise Time		-	18	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	22	-	ns
t_f	Turn-Off Fall Time		-	3	-	ns
Source-Drain Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Diode Forward Current <small>note1,5</small>		-	-	160	A
I_{SM}	Maximum Pulsed Diode Forward Current <small>note2,5</small>		-	-	491	A
t_{rr}	Reverse Recovery Time	$T_J = 25^\circ\text{C}, I_S = 30A,$ $di/dt = 400A/\mu s$	-	42	-	ns
Q_{rr}	Reverse Recovery Charge		-	42	-	nC
V_{SD} <small>note2</small>	Source to Drain Diode Forward Voltage	$T_J = 25^\circ\text{C}, I_S = 30A, V_{GS} = 0V$	-	0.80	-	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 $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 3.The EAS data shows Max. rating. The test condition is $L=0.1\text{mH}, I_D=62A$.
- 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, $T_J=25^\circ\text{C}$

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

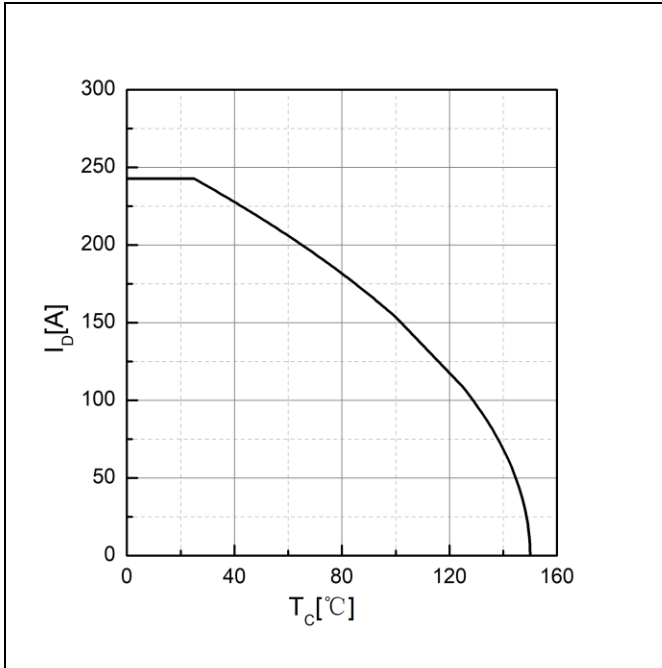


Figure 13. Drain current

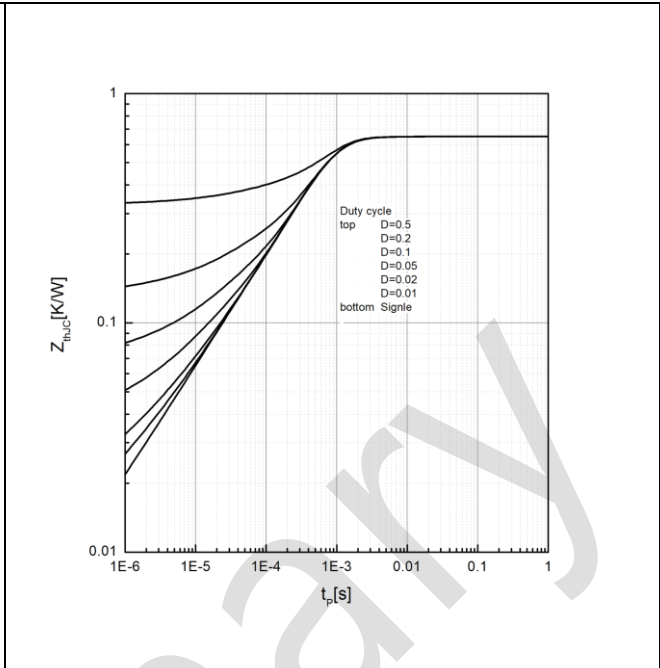


Figure 14. Effective Transient Thermal Impedance

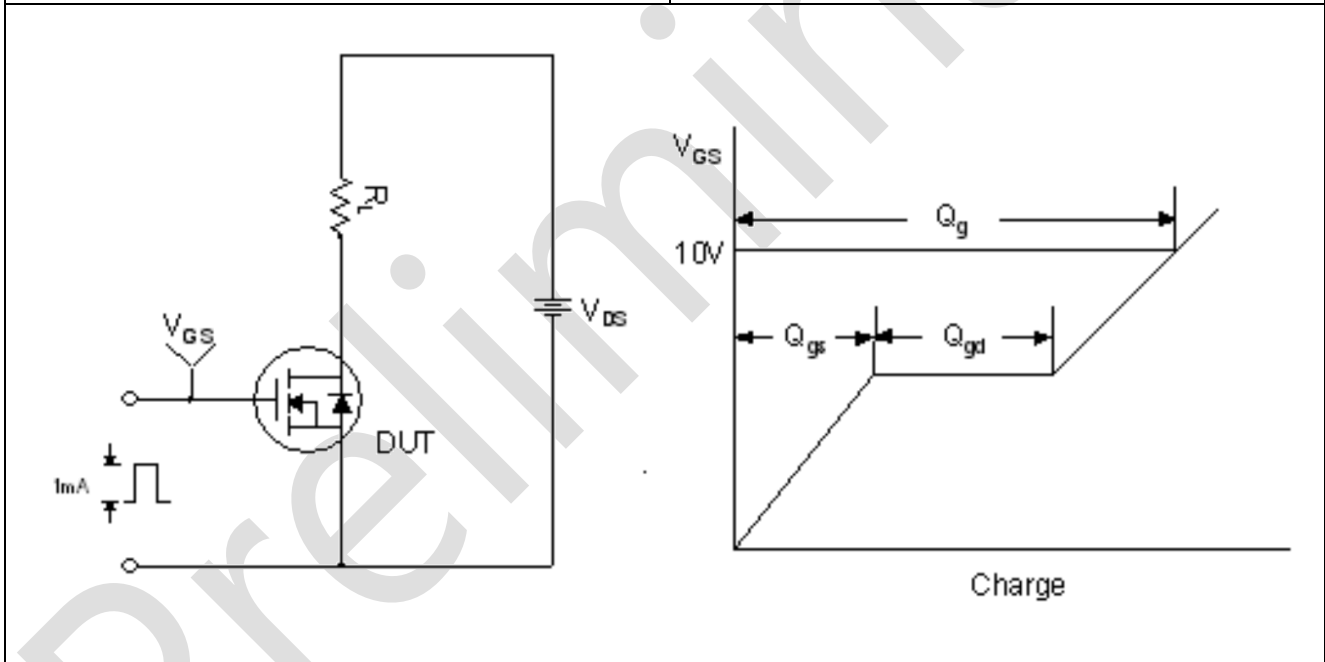


Figure 15. Gate Charge Test Circuit & Waveform

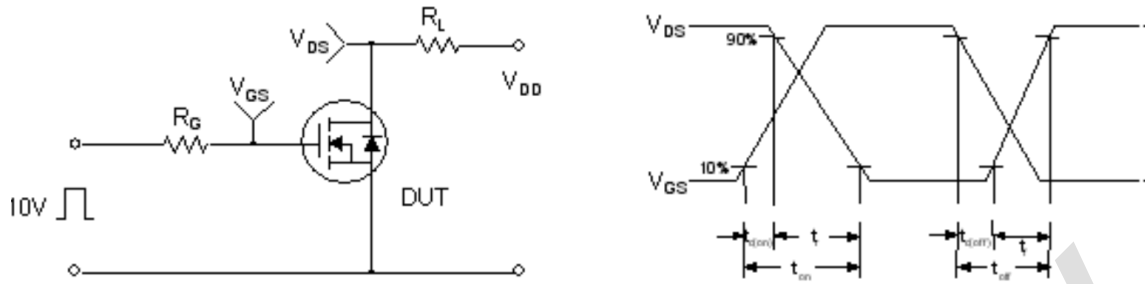


Figure 16. Resistive Switching Test Circuit & Waveforms

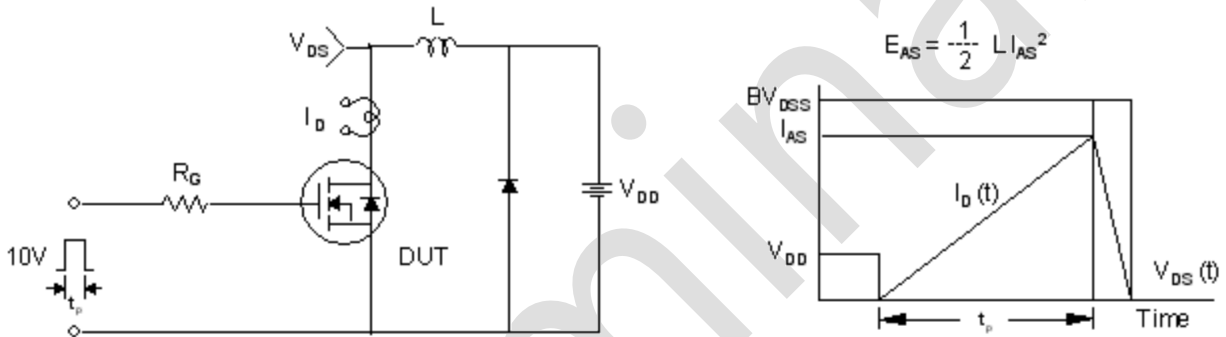


Figure 17. Unclamped Inductive Switching Test Circuit & Waveforms

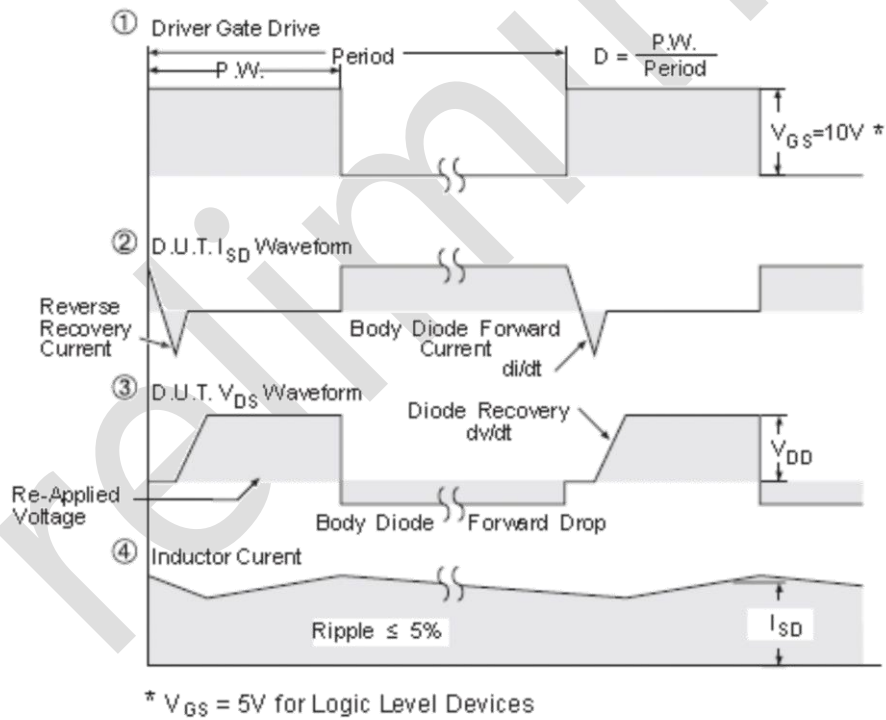
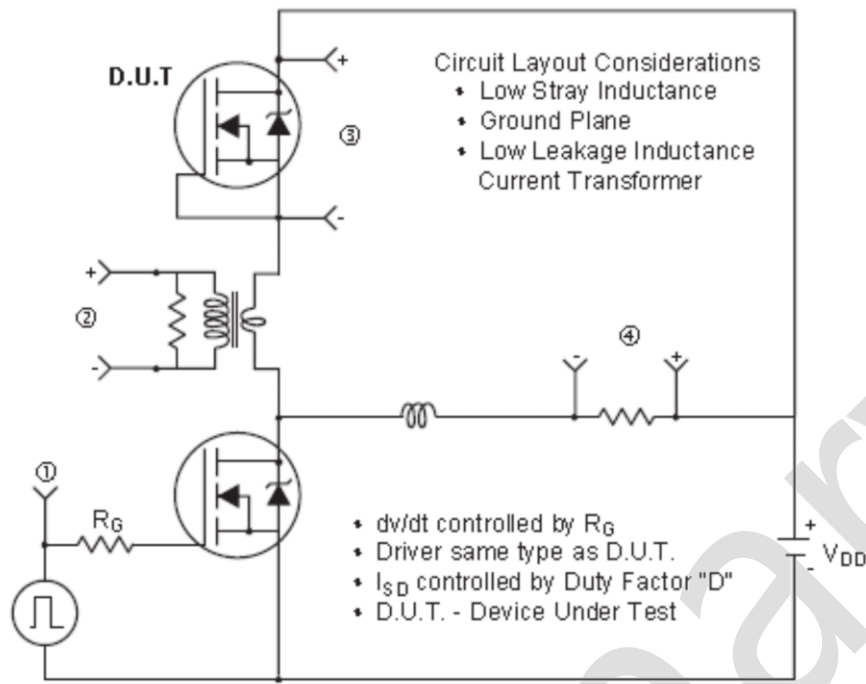
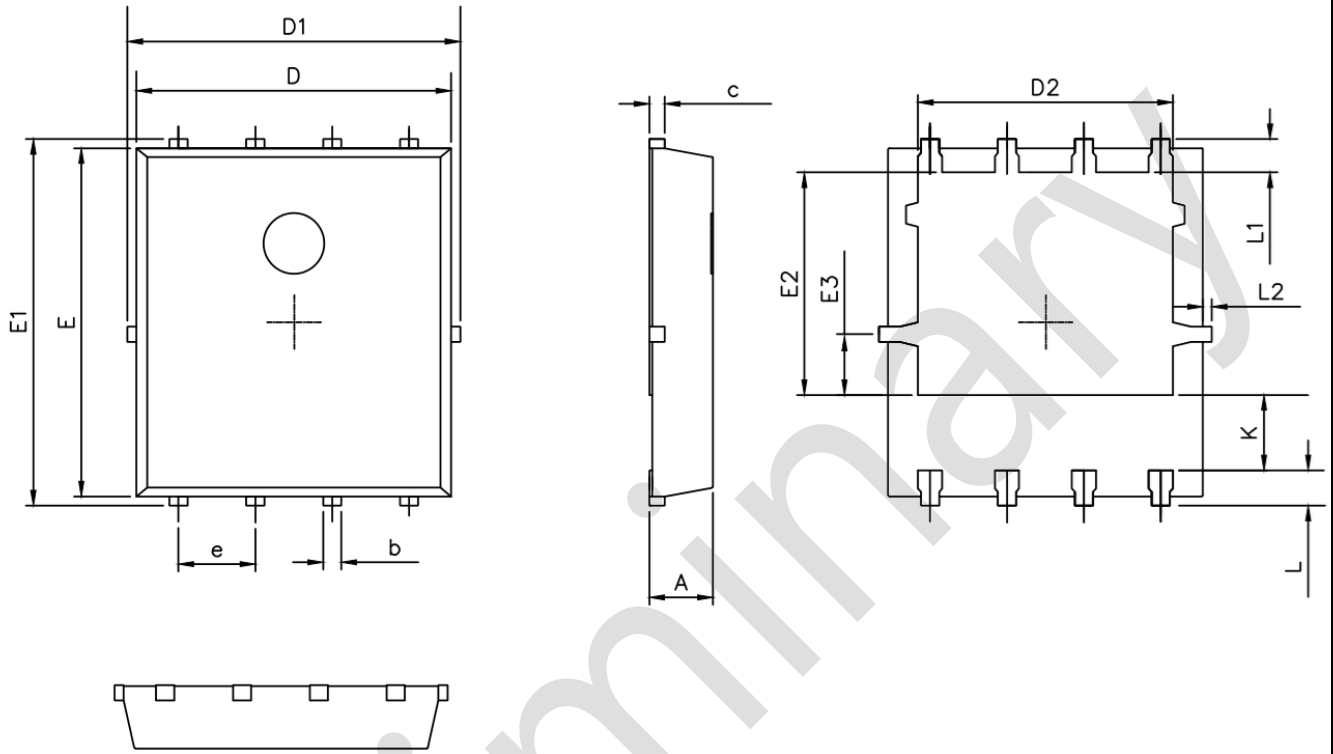


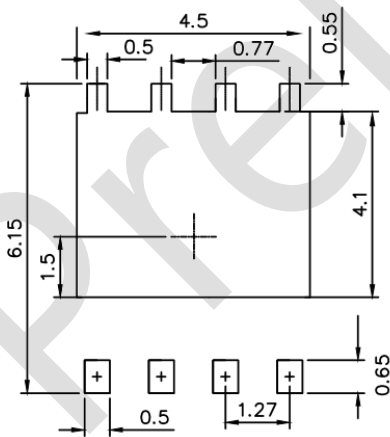
Figure 18. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)

Package outline

DFN5x6 PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



UNIT: mm

	MIN	NOM	MAX
A	0.90	1.00	1.10
b	0.25	0.35	0.50
c	0.10	0.20	0.30
D	4.80	5.00	5.30
D1	4.90	5.10	5.50
D2	3.92	4.02	4.20
E	5.65	5.75	5.85
E1	5.90	6.05	6.20
E2	3.325	3.525	3.775
E3	0.80	0.90	1.00
e		1.27	
L	0.40	0.55	0.70
L1		0.65	
L2	0.00		0.15
K	1.00	1.30	1.50

Figure 19. DFN 5x6 Package outline

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