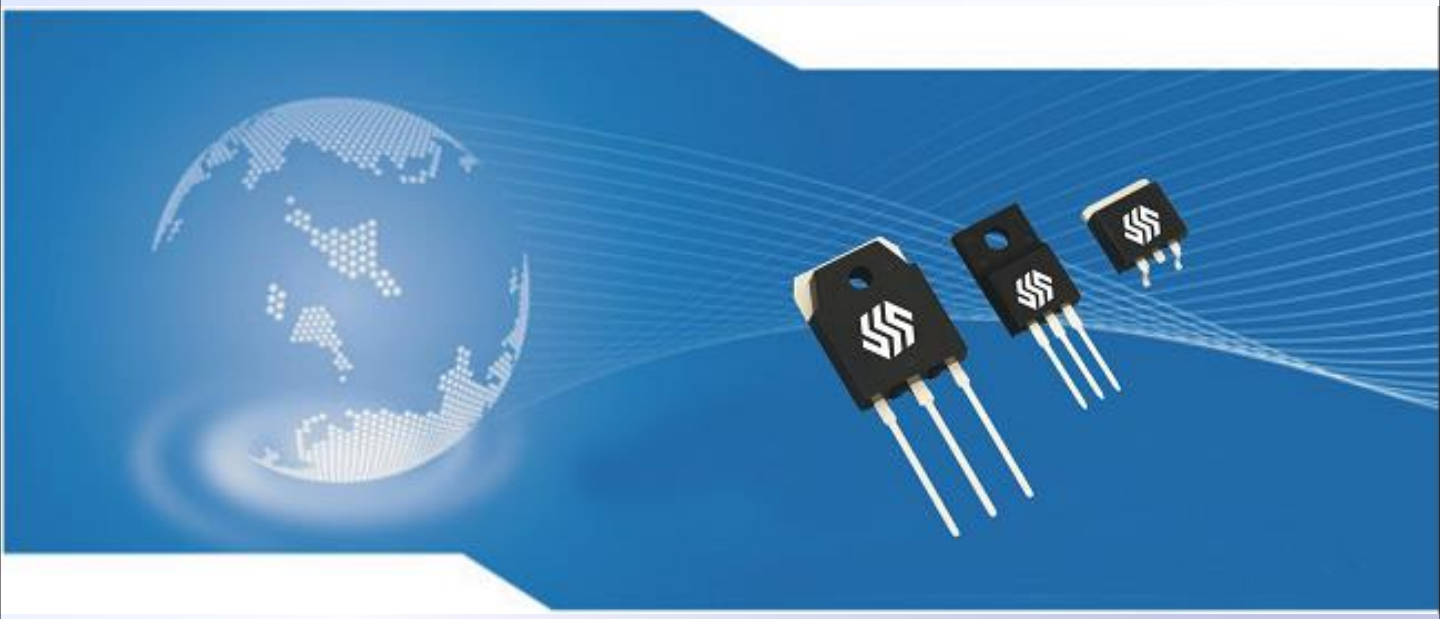
SUPER-SEMI



SUPER-MOSFET

Super Gate Metal Oxide Semiconductor Field Effect Transistor

100V Super Gate Power Transistor
SG*100N08L

Rev. 1.0
Jul. 2016

www.supersemi.com.cn

SGO100N08L
100V N-Channel MOSFET

Description

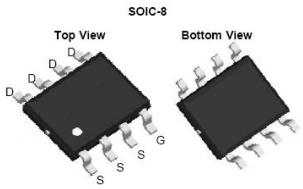
The SG-MOSFET uses trench MOSFET technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of RDS(ON), Ciss and Coss. This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

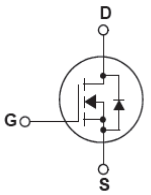
Features

- VDS 100V
- ID (at Vgs=10V) 14A
- RDS(on) (at Vgs=10V) <8.2mΩ
  (at Vgs=4.5V) <10.5mΩ

- Excellent Avalanche Performance

SGO100N08L





Absolute Maximum Ratings

Symbol	Parameter	SGO100N08L	Unit
V_{DS}	Drain-Source Voltage	100	V
I_D	Drain Current -Continuous (TA = 25℃) -Continuous (TA = 70℃)	14* 11*	A
I_{DM}	Drain Current - Pulsed (Note 1)	56*	A
V_{GS}	Gate-Source voltage	±20	V
I_{AS}	Avalanche Current, single pulse (Note 1)	38	A
E_{AS}	Avalanche Energy, single pulse, L=0.5mH (Note 1)	720	mJ
P_D	Power Dissipation - TA = 25℃ (Note 2) - TA = 70℃	3.1 2.0	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	℃

* Drain current limited by maximum junction temperature.

Thermal Characteristics

Symbol	Parameter	SGO100N08L	Unit
$R_{\theta JA}$	Maximum Junction-to-Ambient, t<10s(Note 3)	31(typ.)	℃/W
	Maximum Junction-to-Ambient, Steady-State(Note 3,4)	59(typ.)	℃/W
$R_{\theta JL}$	Maximum Junction-to-Lead, Steady-State	16(typ.)	℃/W

Electrical Characteristics TJ = 25℃ unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA, T_J = 25℃	100	115	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 100V, V_{GS} = 0V -TJ = 55℃	-	- -	1 5	μA μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 20V, V_{DS} = 0V	-	-	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -20V, V_{DS} = 0V	-	-	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1.4	2.0	2.3	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10V, I_D = 14A V_{GS} = 4.5V, I_D = 12A	-	6.8 8.9	8.2 10.5	mΩ
g_{FS}	Forward Transconductance	V_{DS} = 5V, I_D = 12A	-	45	-	S
Rg	Gate resistance	VGS=0V, VDS=0V, f=1MHz	-	1.4	-	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 50V, V_{GS} = 0V, f=1MHz	-	2570	-	pF
C_{oss}	Output Capacitance		-	470	-	pF
C_{rss}	Reverse Transfer Capacitance		-	16	-	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS} = 50V, R_G = 3Ω, I_D = 12A , V_{GS} = 10V (Note 5, 6)	-	10	-	ns
t_r	Turn-On Rise Time		-	6.5	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	31	-	ns
t_f	Turn-Off Fall Time		-	11	-	ns
Q_g(10V)	Total Gate Charge	V_{DS} = 50V, I_D = 12A, V_{GS} = 0~10V (Note 5, 6)	-	39	-	nC
Qg(4.5V)	Total Gate Charge		-	19	-	nC
Q_{gs}	Gate-Source Charge		-	7	-	nC
Q_{gd}	Gate-Drain Charge		-	9.5	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		-	-	4.5	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		-	-	14	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0V, I_S = 1A	-	0.7	1.0	V
trr	Reverse Recovery Time	V_{GS} = 0V, VR=50V, I_S = 12A dIF/dt =500A/μs (Note 5)	-	31	-	ns
Qrr	Reverse Recovery Charge		-	145	-	nC

NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature TJ(MAX)=150°C. Ratings are based on low frequency and duty cycles to keep initial TJ=25°C.
2. The power dissipation PD is based on TJ(MAX)=150°C, using ≤ 10s junction-to-ambient thermal resistance.
3. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with TA =25°C. The value in any given application depends on the user's specific board design.
4. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.
5. Pulse Test: Pulse width ≤ 300us, Duty Cycle ≤ 2%
6. Essentially Independent of Operating Temperature Typical Characteristics

Typical Performance Characteristics

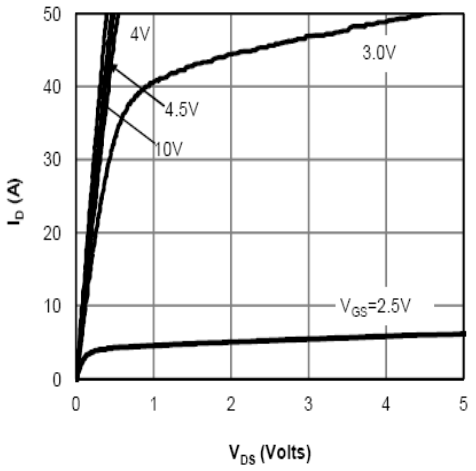


Figure 1: On-Region Characteristics

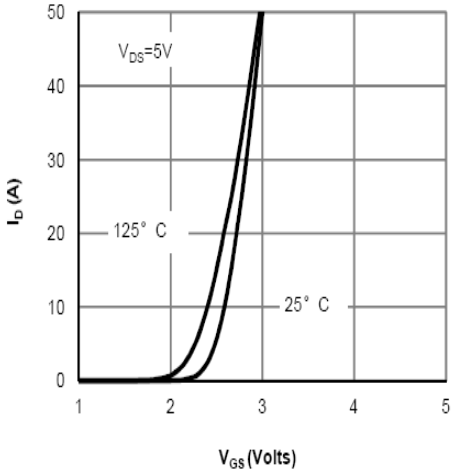


Figure 2: Transfer Characteristics

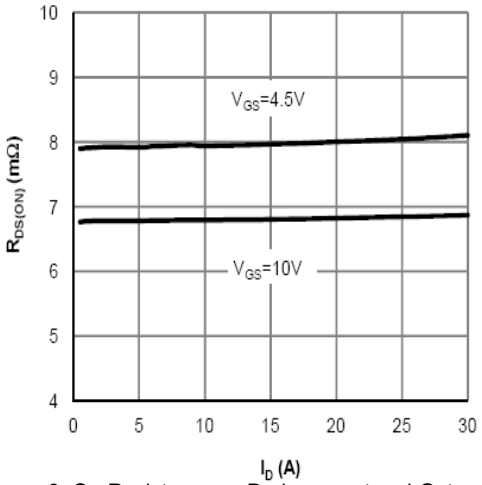


Figure 3: On-Resistance vs Drain current and Gate voltage

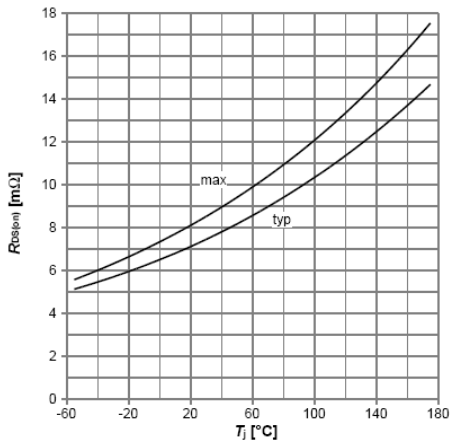


Figure 4: On-Resistance vs Junction Temperature

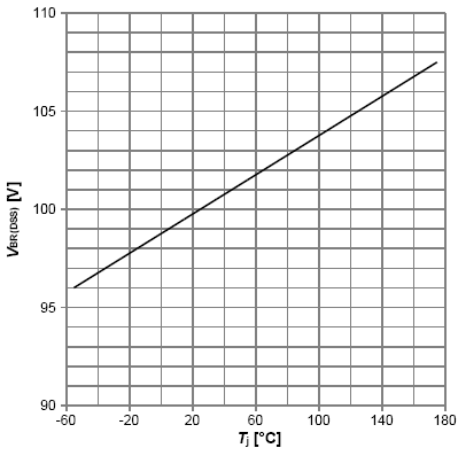


Figure 5: Drain-Source breakdown voltage

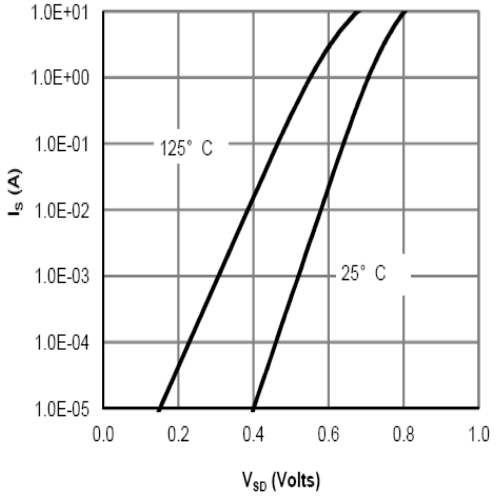


Figure 6: Body-Diode Characteristics

Typical Performance Characteristics

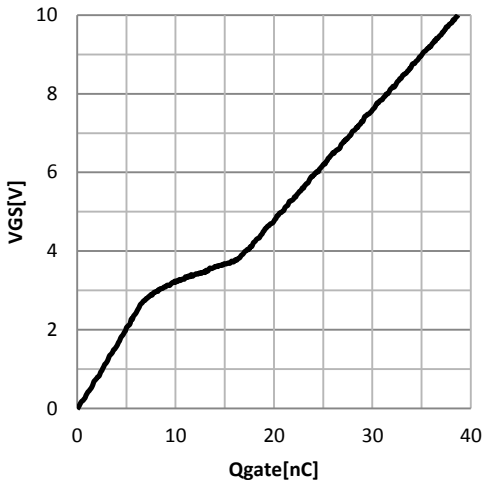


Figure 7: Gate-Charge Characteristics

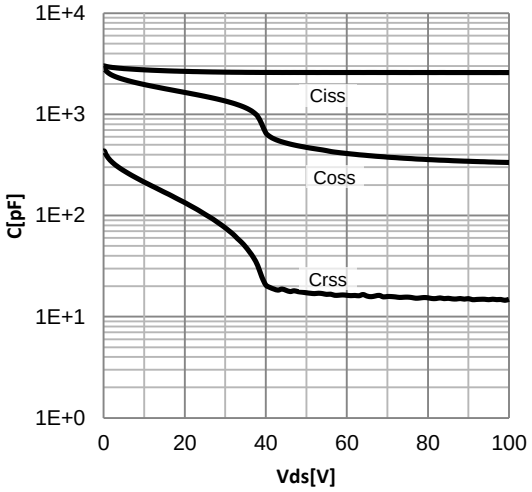


Figure 8: Capacitance Characteristics

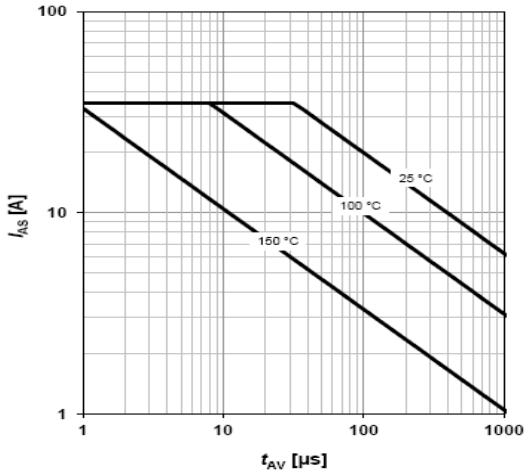


Figure 9: Avalanche Characteristics

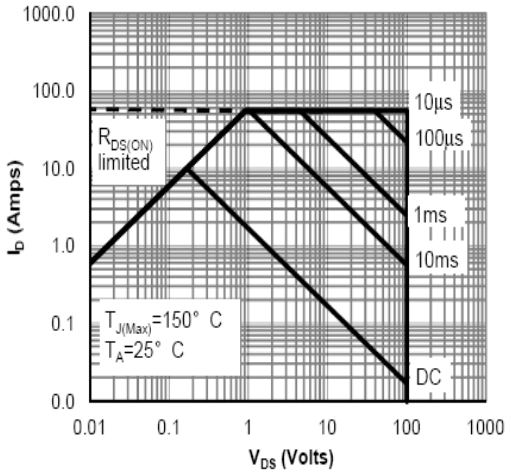


Figure 10: Maximum Forward Biased Safe Operating Area

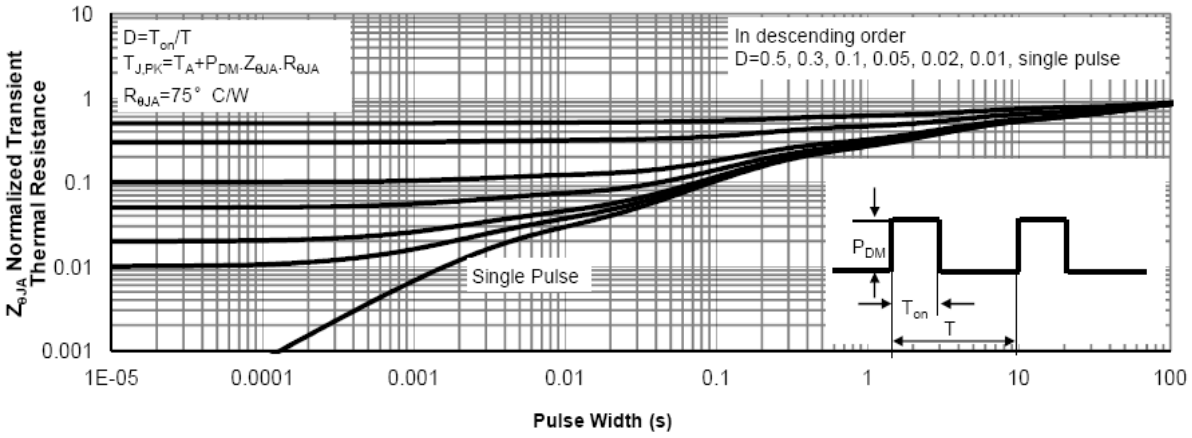
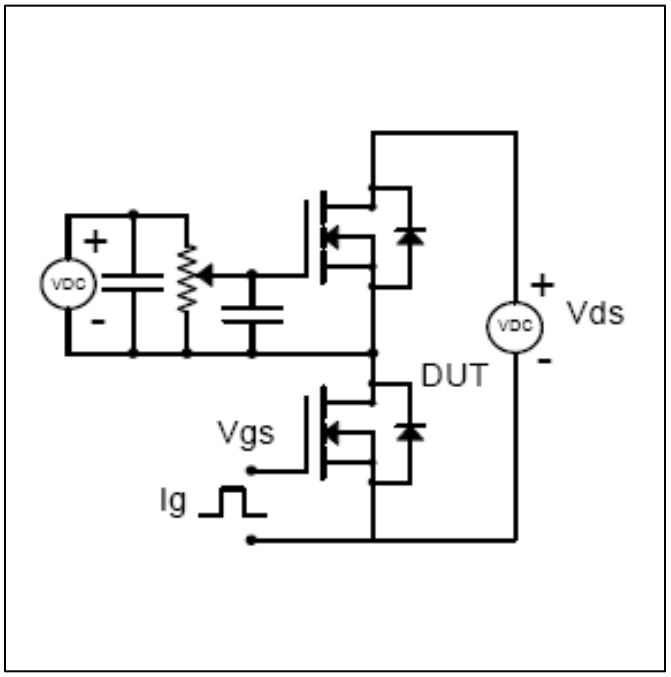
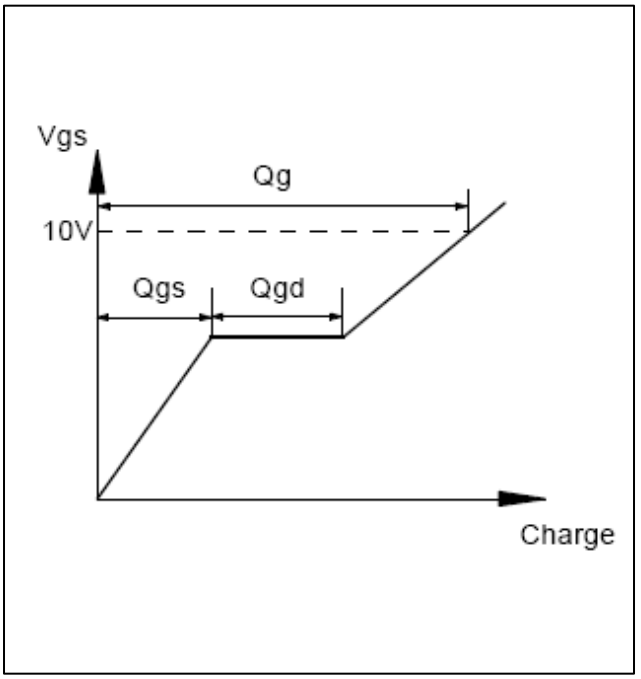


Figure 11: Maximum Transient Thermal Impedance

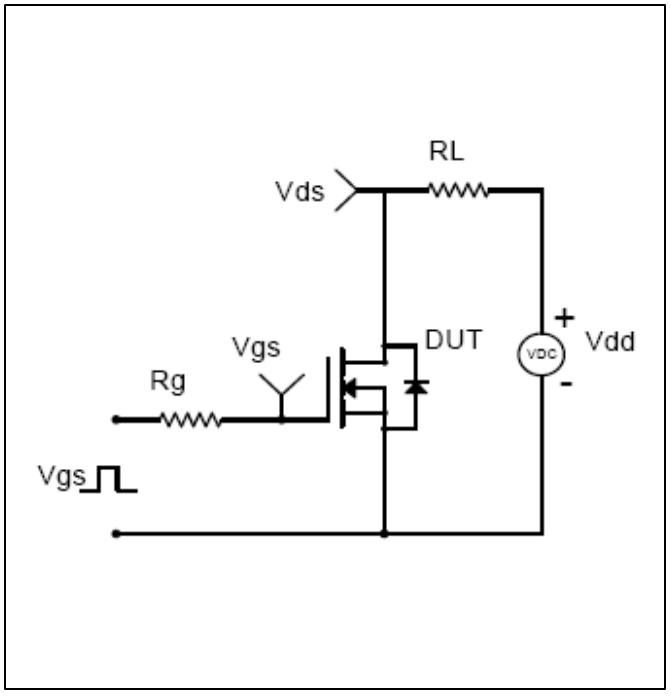
Test circuits

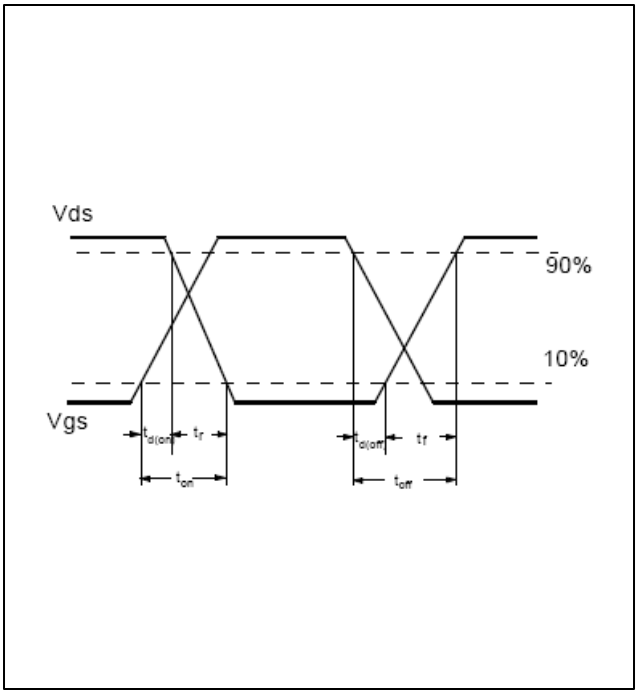
Gate Charge Test Circuit and Waveform





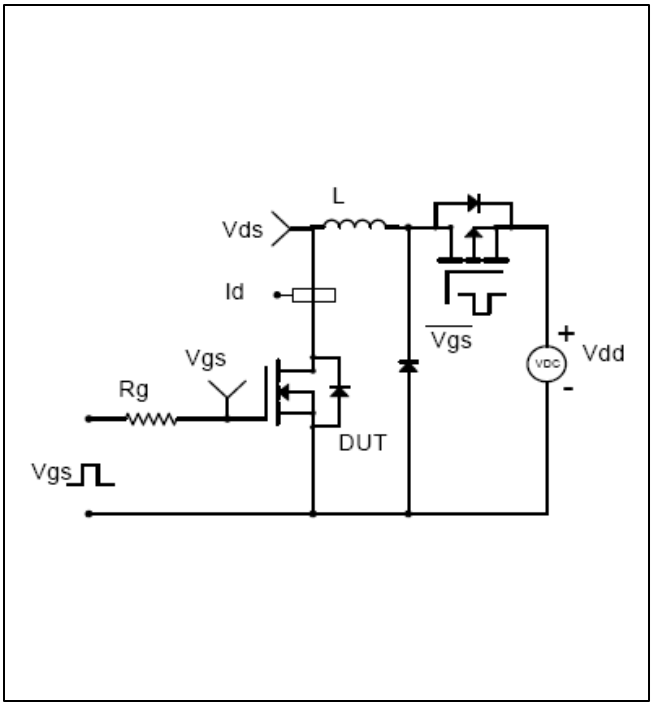
Resistive Switching Test Circuit and Waveforms

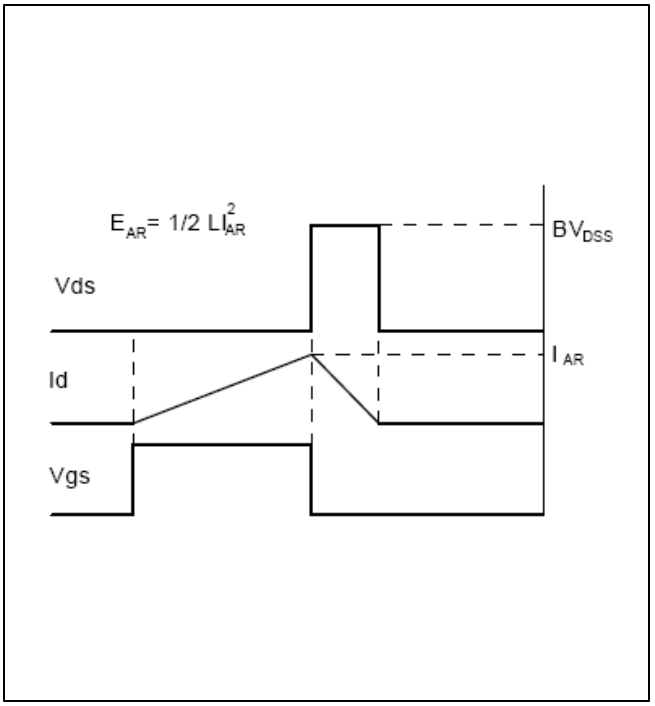




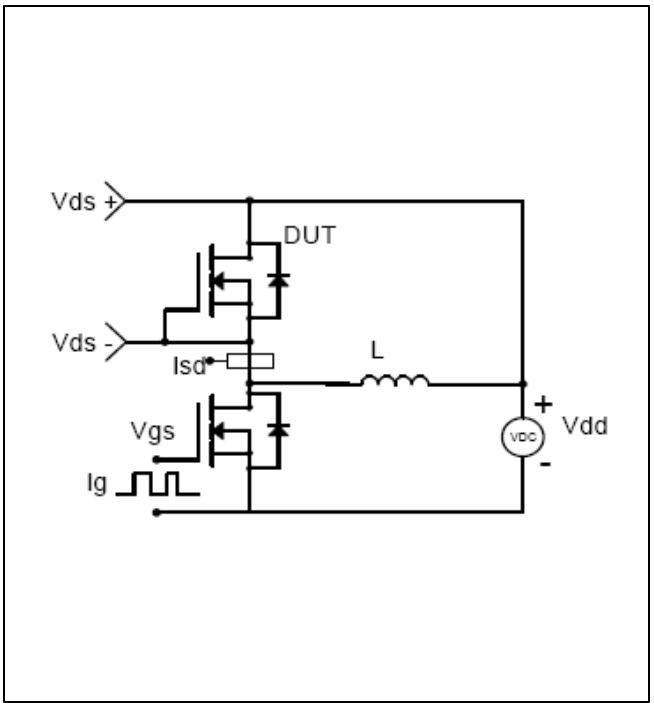
Test circuits

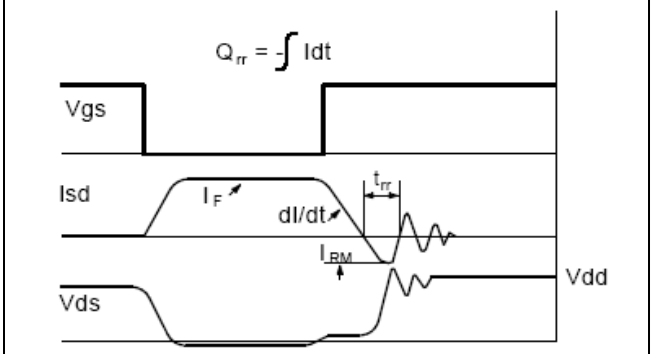
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





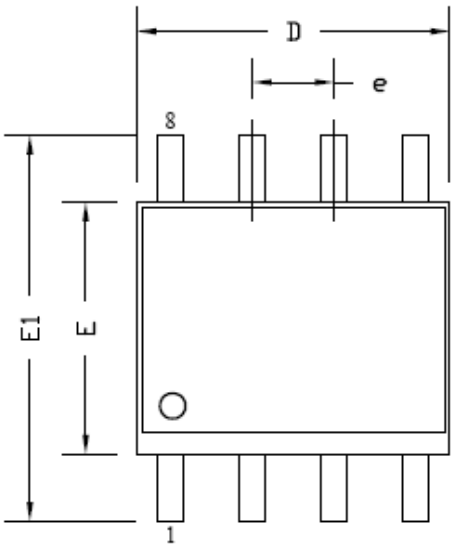
Diode Recovery Test Circuit & Waveforms

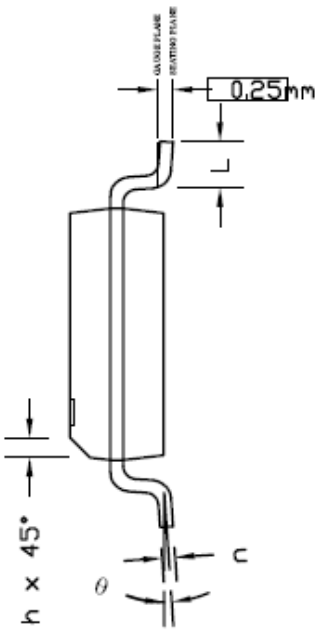


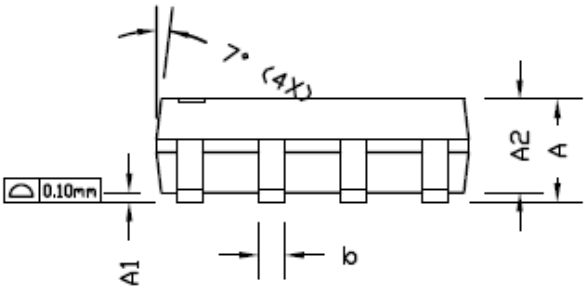


Package Outline

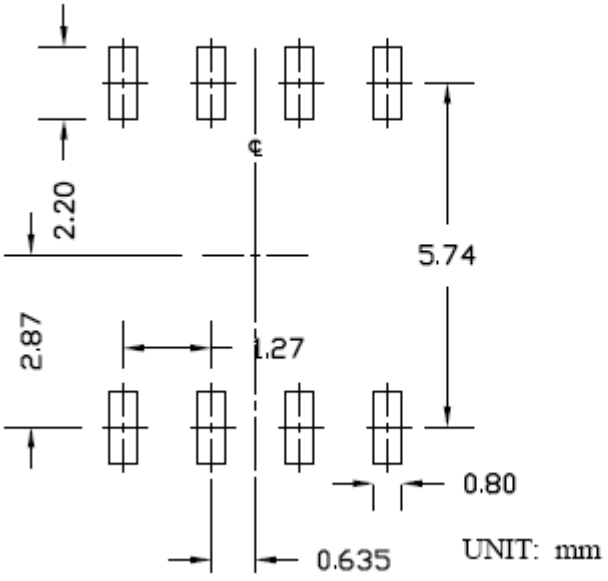
SOIC-8







RECOMMENDED LAND PATTERN



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	1.35	1.65	1.75
A1	0.10	0.15	0.25
A2	1.25	1.50	1.65
b	0.31	0.41	0.51
c	0.17	0.20	0.25
D	4.80	4.90	5.00
E	3.80	3.90	4.00
e	1.27 BSC		
E1	5.80	6.00	6.20
h	0.25	0.30	0.50
L	0.40	0.69	1.27
θ	0°	4°	8°

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