

**60V N-Ch Power MOSFET**
**Feature**

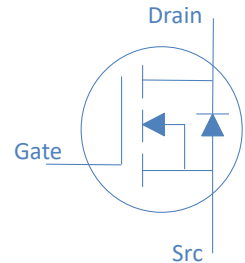
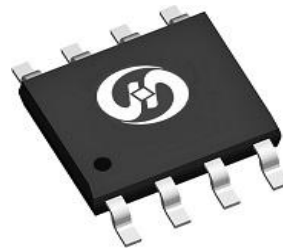
- ◇ High Speed Power Switching, Logic Level
- ◇ Enhanced Body diode dv/dt capability
- ◇ Enhanced Avalanche Ruggedness
- ◇ 100% UIS Tested, 100% Rg Tested
- ◇ Lead Free, Halogen Free



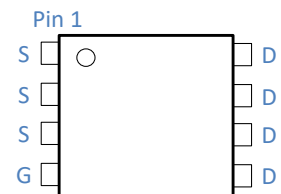
$V_{DS}$		60	V
$R_{DS(on),typ}$	$V_{GS}=10V$	8.8	$m\Omega$
$R_{DS(on),typ}$	$V_{GS}=4.5V$	12.4	$m\Omega$
$I_D$		12.8	A

**Application**

- ◇ Synchronous Rectification in SMPS
- ◇ Hard Switching and High Speed Circuit
- ◇ DC/DC in Telecoms and Industrial

**SOIC-8**


Part Number	Package	Marking
HGS098N06SL	SOIC-8	GS098N06SL


**Absolute Maximum Ratings at  $T_j=25^\circ\text{C}$  (unless otherwise specified)**

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	12.8	A
		$T_C=100^\circ\text{C}$	8.1	
Drain to Source Voltage	$V_{DS}$	-	60	V
Gate to Source Voltage	$V_{GS}$	-	$\pm 20$	V
Pulsed Drain Current	$I_{DM}$	-	40	A
Avalanche Energy, Single Pulse	$E_{AS}$	$L=0.4\text{mH}, T_C=25^\circ\text{C}$	20	mJ
Power Dissipation	$P_D$	$T_C=25^\circ\text{C}$	3.4	W
Operating and Storage Temperature	$T_J, T_{stg}$	-	-55 to 150	$^\circ\text{C}$

**Absolute Maximum Ratings**

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Lead	$R_{\theta JL}$	21	$^\circ\text{C/W}$
Thermal Resistance Junction-Ambient ( $t \leq 10\text{s}$ )	$R_{\theta JA}$	37	$^\circ\text{C/W}$
Thermal Resistance Junction-Ambient (steady state)		69	$^\circ\text{C/W}$

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

Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.9	2.4	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS}=0V, V_{DS}=60V, T_J=25^\circ\text{C}$	-	-	1	$\mu A$
		$V_{GS}=0V, V_{DS}=60V, T_J=100^\circ\text{C}$	-	-	100	
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=12A$	-	8.8	9.8	$m\Omega$
		$V_{GS}=4.5V, I_D=10A$	-	12.4	14	
Transconductance	$g_{fs}$	$V_{DS}=5V, I_D=12A$	-	25	-	S
Gate Resistance	$R_G$	$V_{GS}=0V, V_{DS}$ Open, $f=1\text{MHz}$	-	1.5	-	$\Omega$

**Dynamic Characteristics**

Input Capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=30V, f=1\text{MHz}$	-	1040	-	pF
Output Capacitance	$C_{oss}$		-	318	-	
Reverse Transfer Capacitance	$C_{rss}$		-	15	-	
Total Gate Charge	$Q_g(10V)$	$V_{DD}=30V, I_D=10A, V_{GS}=10V$	-	18.5	-	nC
Total Gate Charge	$Q_g(4.5V)$		-	9	-	
Gate to Source Charge	$Q_{gs}$		-	4.5	-	
Gate to Drain (Miller) Charge	$Q_{gd}$		-	3.5	-	
Turn on Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=10A, V_{GS}=10V, R_G=10\Omega,$	-	6	-	ns
Rise time	$t_r$		-	3	-	
Turn off Delay Time	$t_{d(off)}$		-	25	-	
Fall Time	$t_f$		-	3	-	

**Reverse Diode Characteristics**

Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_F=10A$	-	0.9	1.2	V
Reverse Recovery Time	$t_{rr}$	$V_R=30V, I_F=10A, di_F/dt=300A/\mu s$	-	25	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	33	-	nC

Fig 1. Typical Output Characteristics

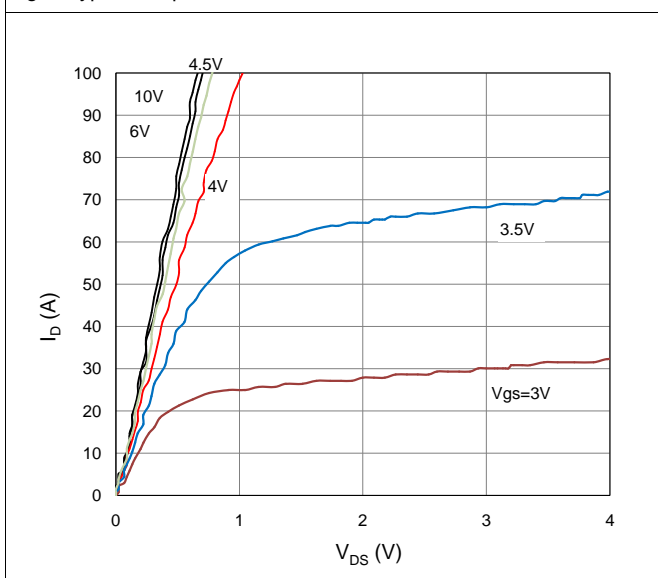


Figure 2. On-Resistance vs. Gate-Source Voltage

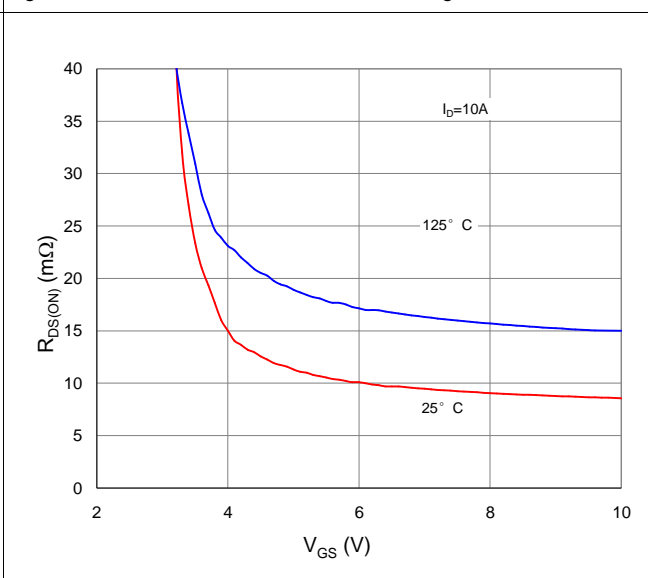


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

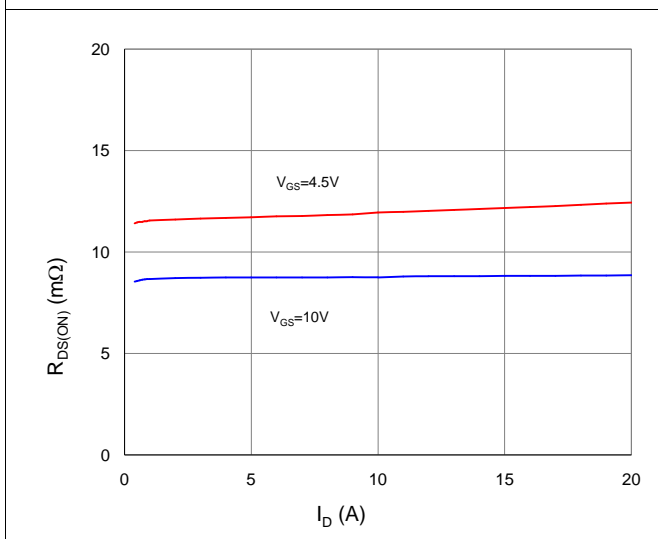


Figure 4. Normalized On-Resistance vs. Junction Temperature

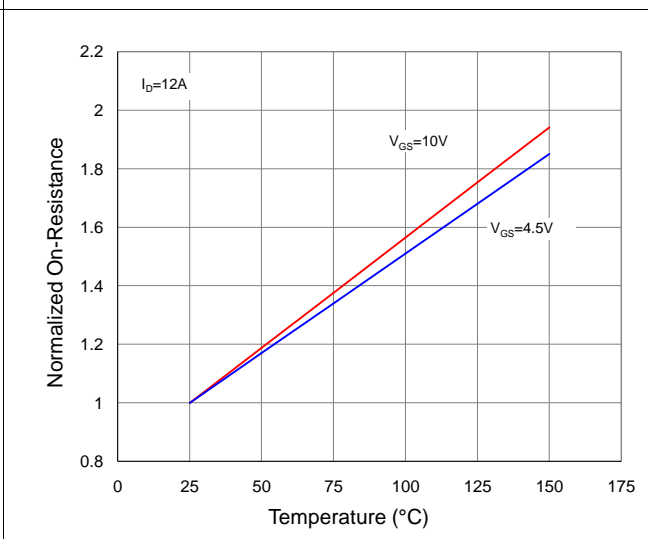


Figure 5. Typical Transfer Characteristics

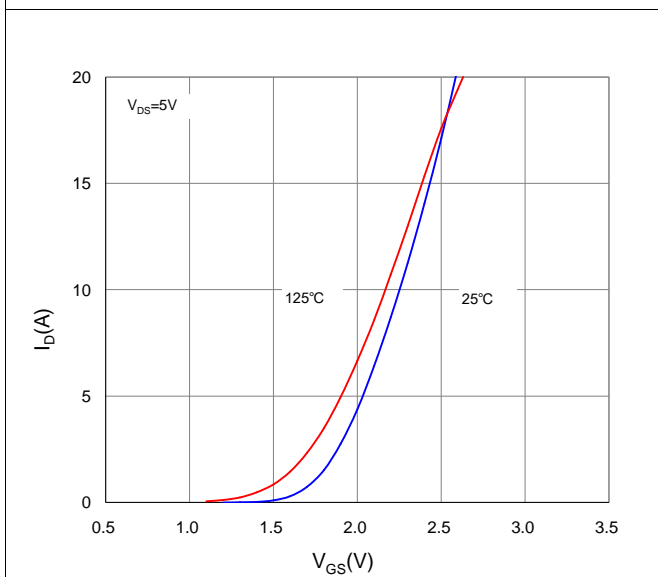


Figure 6. Typical Source-Drain Diode Forward Voltage

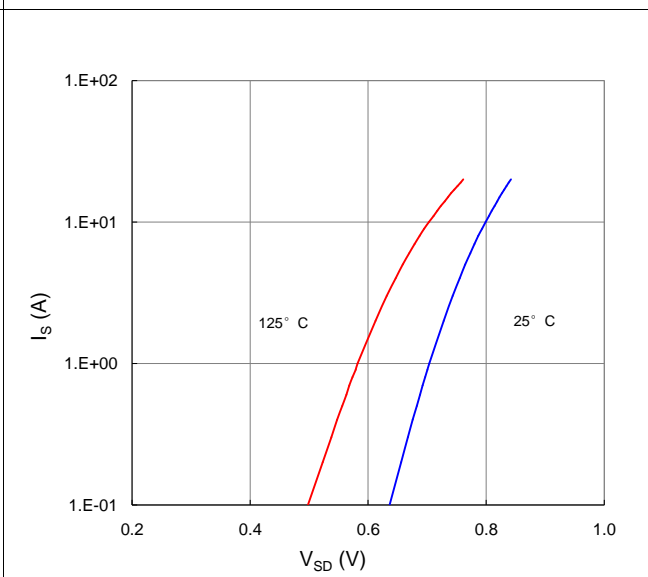


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

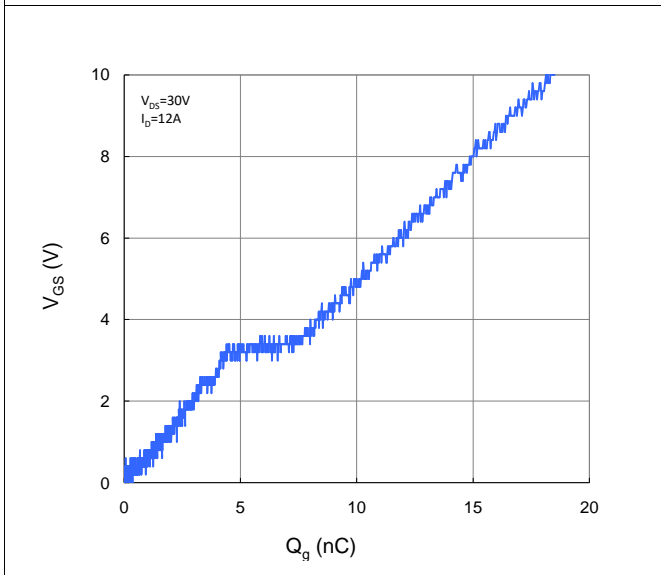


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

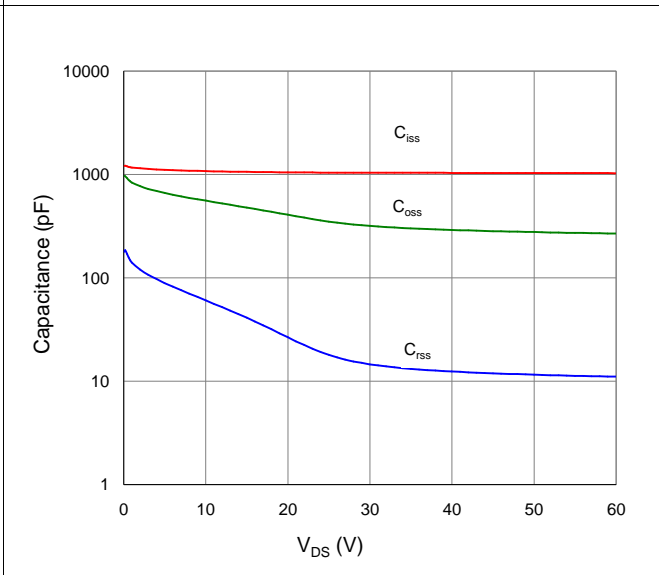


Figure 9. Maximum Safe Operating Area

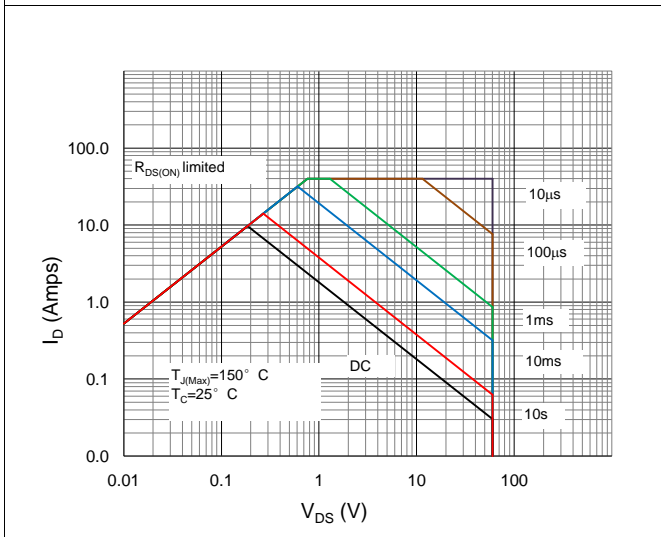


Figure 10. Maximum Drain Current vs. Case Temperature

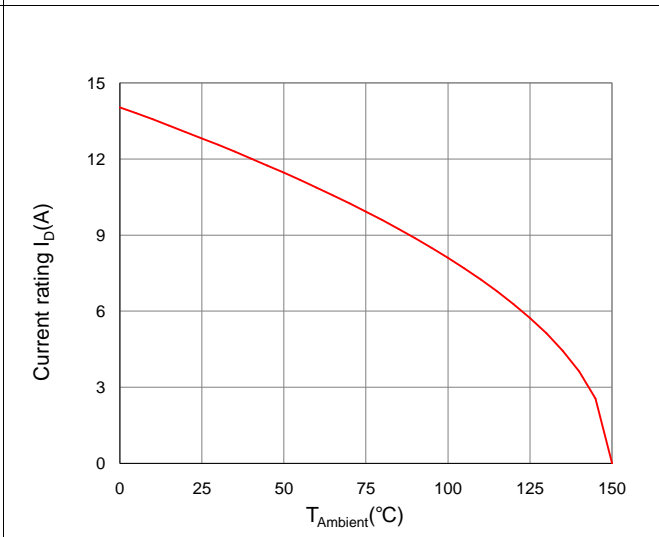
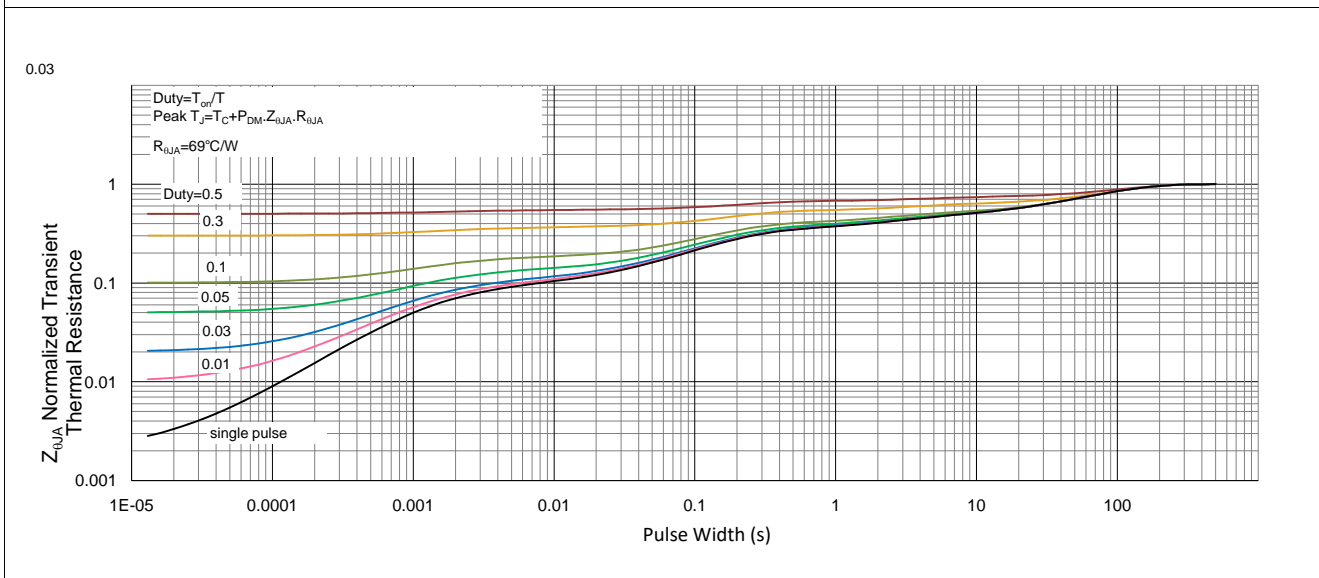
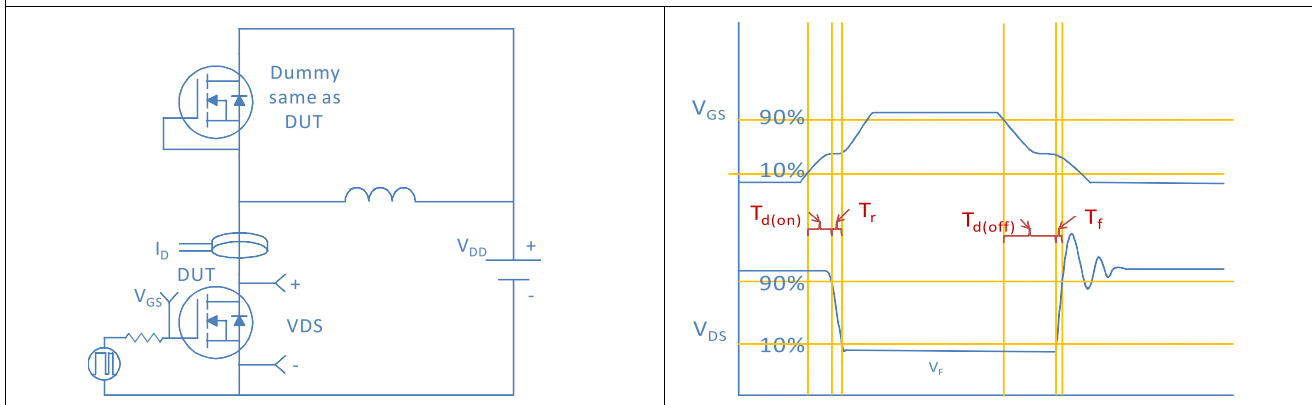


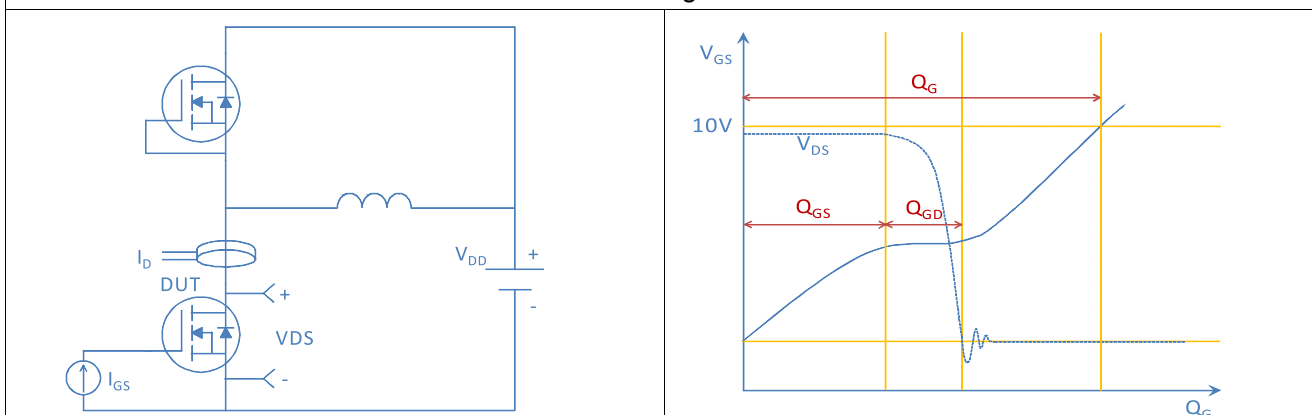
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



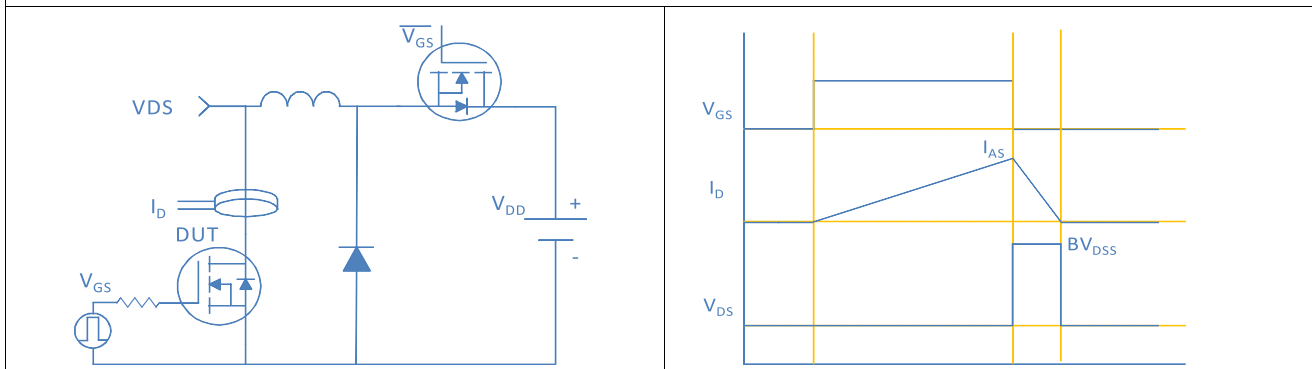
Inductive switching Test



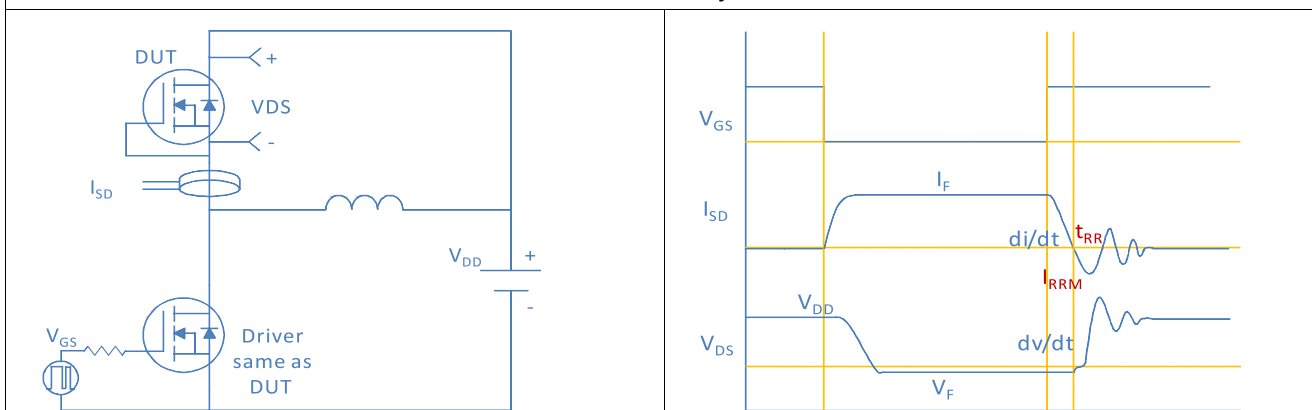
Gate Charge Test



Unclamped Inductive Switching (UIS) Test

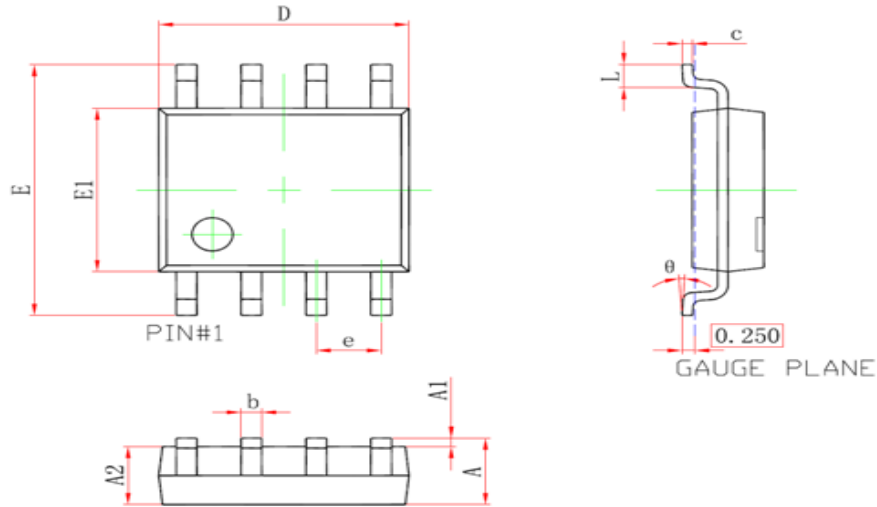


Diode Recovery Test



Package Outline

SOIC-8, 8 leads



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
<b>A</b>	1.350	1.750	0.053	0.069
<b>A1</b>	0.100	0.250	0.004	0.010
<b>A2</b>	1.250	1.650	0.049	0.065
<b>b</b>	0.310	0.510	0.012	0.020
<b>c</b>	0.170	0.250	0.007	0.010
<b>D</b>	4.800	5.000	0.189	0.197
<b>e</b>	1.270 (BSC)		0.050 (SBC)	
<b>E</b>	5.800	6.200	0.228	0.244
<b>E1</b>	3.800	4.000	0.150	0.157
<b>L</b>	0.400	1.270	0.016	0.031
<b><math>\theta</math></b>	0°	8°	0°	8°