

## 80V N-Ch Power MOSFET

### Feature

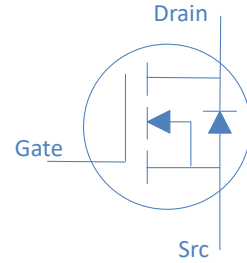
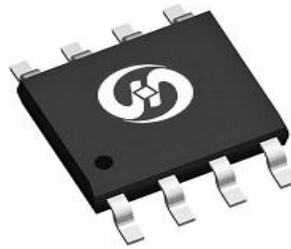
- ◇ High Speed Power Switching
- ◇ Enhanced Body diode dv/dt capability
- ◇ Enhanced Avalanche Ruggedness
- ◇ 100% UIS Tested, 100% Rg Tested
- ◇ Lead Free, Halogen Free

$V_{DS}$	80	V
$R_{DS(on),typ}$	5.0	mΩ
$I_D$ (Silicon Limited)	17	A

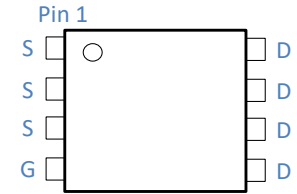
### Application

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

SOIC-8



Part Number	Package	Marking
HGS059N08A	SOIC-8	GS059N08A



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

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current (Silicon Limited)	$I_D$	$T_C=25^{\circ}\text{C}$	17	A
		$T_C=100^{\circ}\text{C}$	11	
Drain to Source Voltage	$V_{DS}$	-	80	V
Gate to Source Voltage	$V_{GS}$	-	$\pm 20$	V
Pulsed Drain Current	$I_{DM}$	-	160	A
Avalanche Energy, Single Pulse	$E_{AS}$	$L=0.1\text{mH}, T_C=25^{\circ}\text{C}$	45	mJ
Power Dissipation	$P_D$	$T_C=25^{\circ}\text{C}$	3.1	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	$R_{\theta JL}$	25	$^{\circ}\text{C}/\text{W}$
Thermal Resistance Junction-Ambient ( $t \leq 10\text{s}$ )	$R_{\theta JA}$	40	$^{\circ}\text{C}/\text{W}$
Thermal Resistance Junction-Ambient (steady state)		75	$^{\circ}\text{C}/\text{W}$

**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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	80	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	3.0	4.0	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS}=0V, V_{DS}=80V, T_j=25^\circ\text{C}$	-	-	1	$\mu A$
		$V_{GS}=0V, V_{DS}=80V, T_j=100^\circ\text{C}$	-	-	100	
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	5	5.9	$m\Omega$
Transconductance	$g_{fs}$	$V_{DS}=5V, I_D=20A$	-	50	-	S
Gate Resistance	$R_G$	$V_{GS}=0V, V_{DS}$ Open, $f=1\text{MHz}$	-	1.1	-	$\Omega$

**Dynamic Characteristics**

Input Capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=40V, f=1\text{MHz}$	-	2449	-	$\mu F$
Output Capacitance	$C_{oss}$		-	502	-	
Reverse Transfer Capacitance	$C_{rss}$		-	19.0	-	
Total Gate Charge	$Q_g(10V)$	$V_{DD}=40V, I_D=20A, V_{GS}=10V$	-	42	-	nC
Gate to Source Charge	$Q_{gs}$		-	8	-	
Gate to Drain (Miller) Charge	$Q_{gd}$		-	12	-	
Turn on Delay Time	$t_{d(on)}$	$V_{DD}=40V, I_D=20A, V_{GS}=10V,$ $R_G=10\Omega,$	-	11	-	ns
Rise time	$t_r$		-	7	-	
Turn off Delay Time	$t_{d(off)}$		-	34	-	
Fall Time	$t_f$		-	9	-	

**Reverse Diode Characteristics**

Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_F=20A$	-	0.9	1.2	V
Reverse Recovery Time	$t_{rr}$	$V_R=40V, I_F=20A, di_F/dt=400A/\mu s$	-	35	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	122	-	nC

Fig 1. Typical Output Characteristics

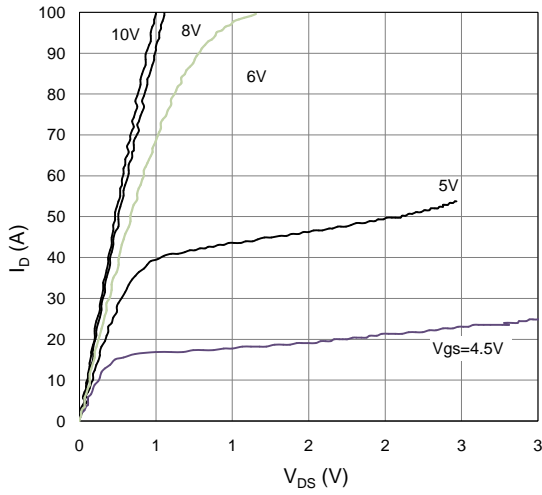


Figure 2. On-Resistance vs. Gate-Source Voltage

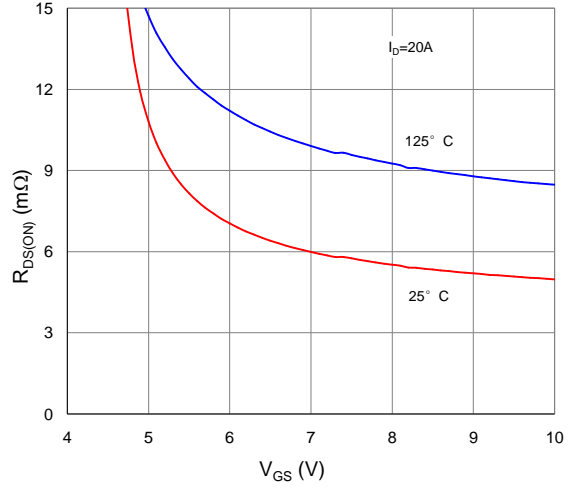


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

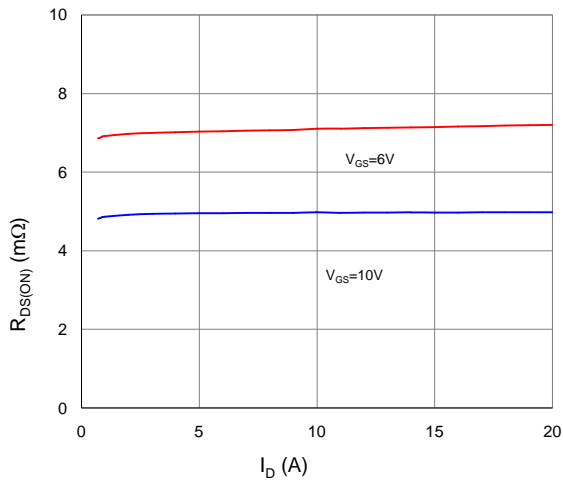


Figure 4. Normalized On-Resistance vs. Junction Temperature

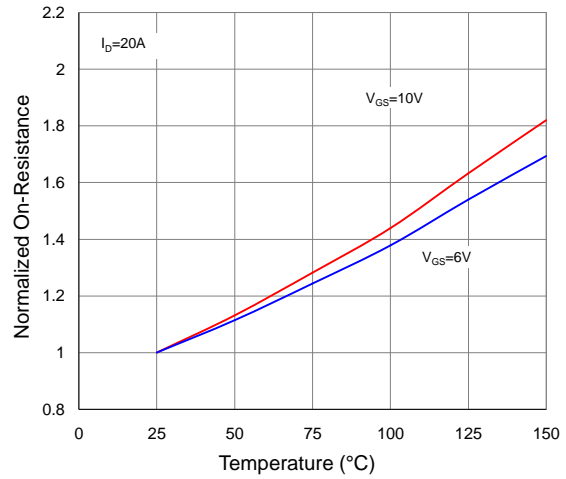


Figure 5. Typical Transfer Characteristics

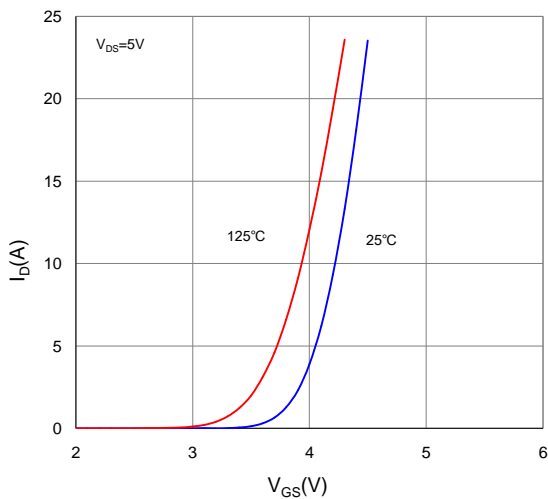


Figure 6. Typical Source-Drain Diode Forward Voltage

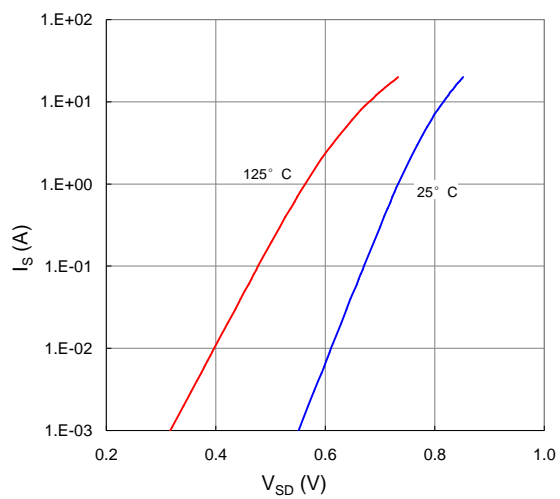


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

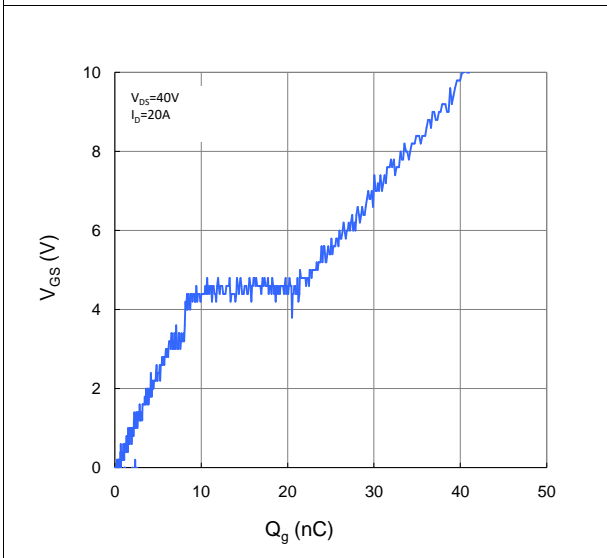


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

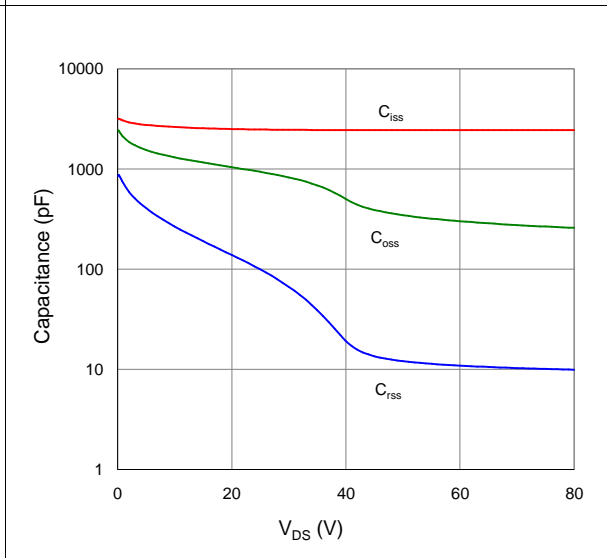


Figure 9. Maximum Safe Operating Area

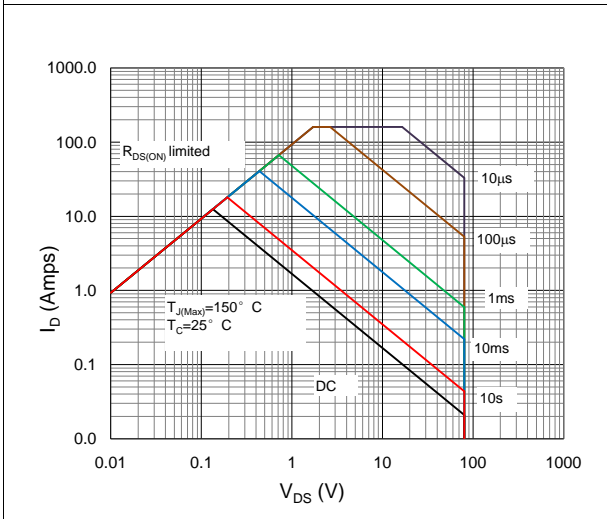


Figure 10. Maximum Drain Current vs. Case Temperature

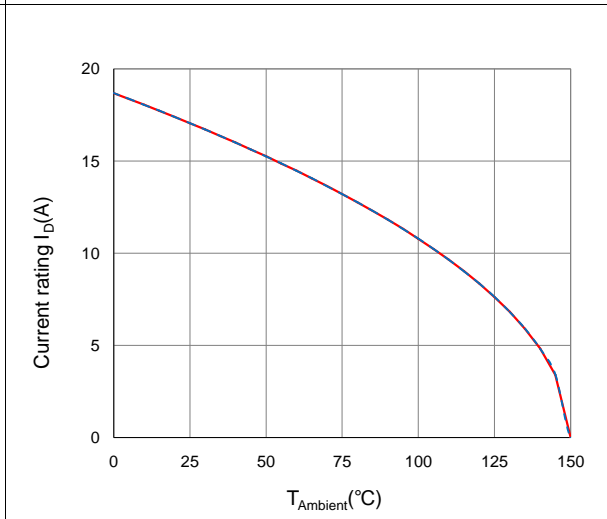
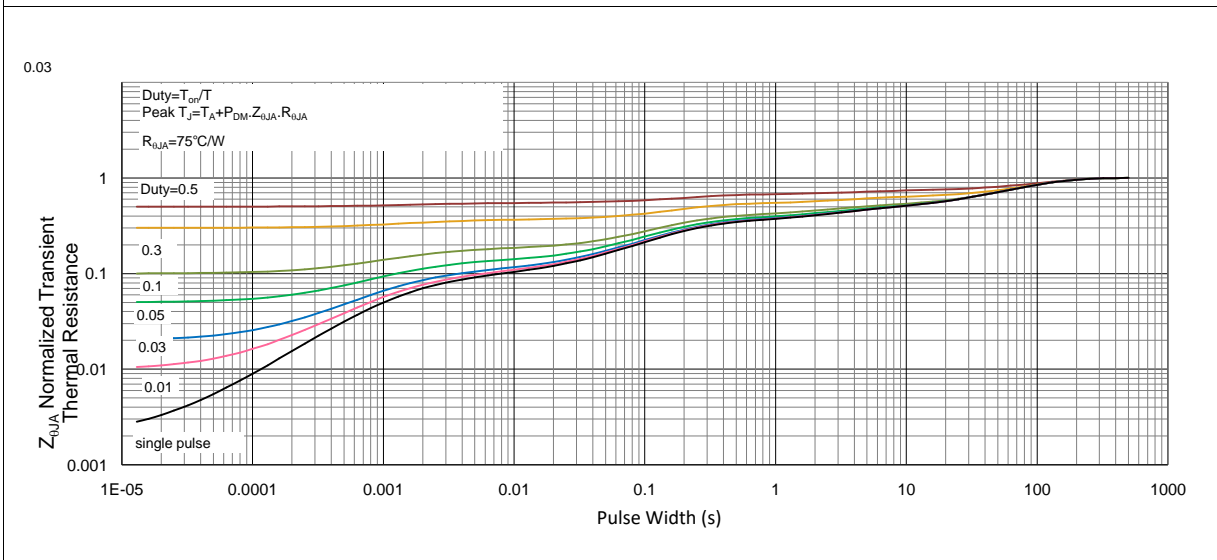
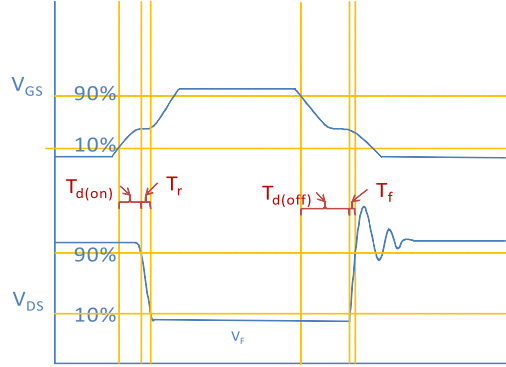
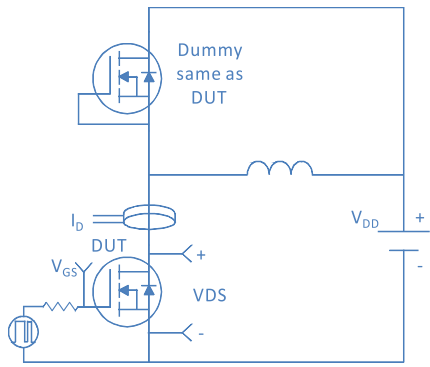


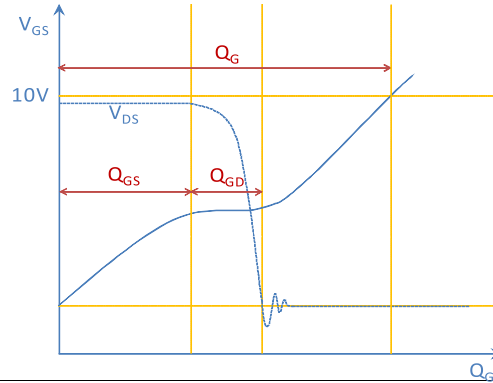
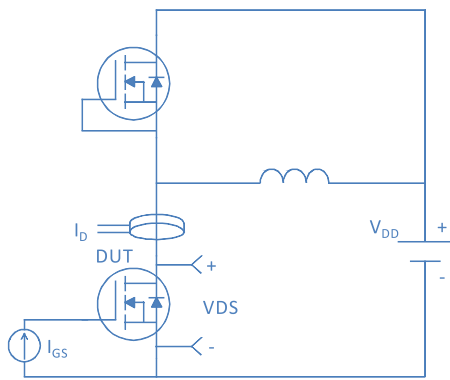
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



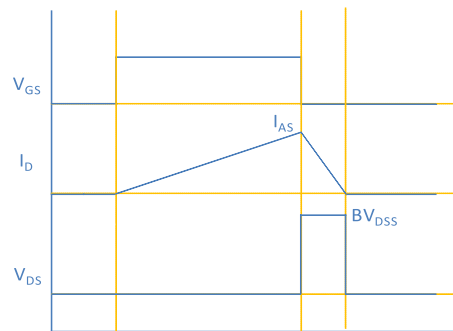
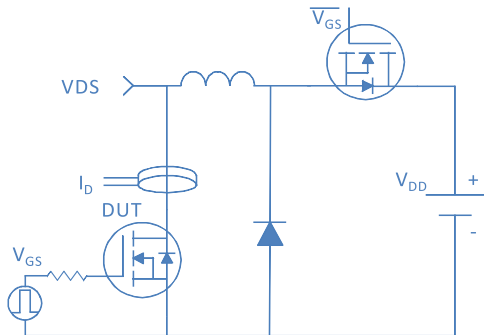
Inductive switching Test



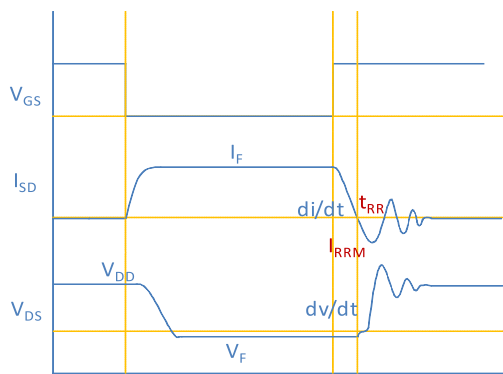
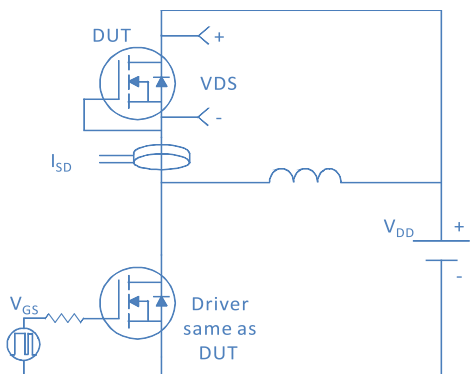
Gate Charge Test



Uclamped Inductive Switching (UIS) Test

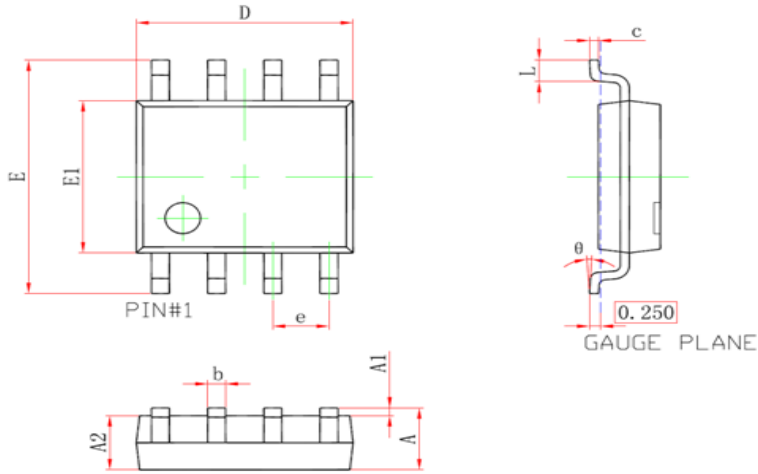


Diode Recovery Test



Package Outline

SOIC-8, 8 leads



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