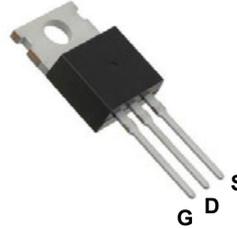
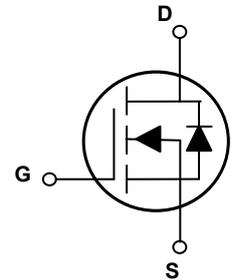


### Main Product Characteristics

$V_{(BR)DSS}$	800V
$R_{DS(ON)}$	0.90 $\Omega$ (max.)
$I_D$	6A



TO-220



Schematic Diagram

### Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



### Description

The GSFH80R900 utilizes the latest techniques to achieve ultra low on-resistance and low gate charge. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supplies and a wide variety of other applications.

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

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{DS}$	800	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Drain Current-Continuous, at Steady-State, ( $T_C=25^\circ\text{C}$ )	$I_D$	6	A
Drain Current-Continuous, at Steady-State, ( $T_C=100^\circ\text{C}$ )		3.8	
Drain Current-Pulsed	$I_{DM}$	24	A
Single Pulse Avalanche Energy <sup>1</sup>	$E_{AS}$	214	mJ
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	80	W
		0.64	W/ $^\circ\text{C}$
Body Diode Reverse Voltage Slope <sup>2</sup>	$dv/dt$	50	V/ns
MOS $dv/dt$ Ruggedness <sup>3</sup>	$dv/dt$	100	V/ns
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.56	$^\circ\text{C}/\text{W}$
Operating Junction Temperature Range	$T_J$	-55 To +150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55 To +150	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On / Off Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	800	-	-	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=800V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=30V$	-	-	100	nA
		$V_{DS}=0V, V_{GS}=-30V$	-	-	-100	
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=3A$	-	0.75	0.9	$\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2	-	4	V
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>4,5</sup>	$Q_g$	$V_{DD}=640V, I_D=6A, V_{GS}=10V$	-	17	-	nC
Gate-Source Charge <sup>4,5</sup>	$Q_{gs}$		-	5	-	
Gate-Drain ("Miller") Charge <sup>4,5</sup>	$Q_{gd}$		-	7.6	-	
Turn-On Delay Time <sup>4,5</sup>	$t_{d(on)}$	$V_{DD}=400V, R_G=25\Omega, V_{GS}=10V, I_D=6A$	-	14	-	nS
Rise Time <sup>4,5</sup>	$t_r$		-	34	-	
Turn-Off Delay Time <sup>4,5</sup>	$t_{d(off)}$		-	44	-	
Fall Time <sup>4,5</sup>	$t_f$		-	26	-	
Input Capacitance	$C_{iss}$	$V_{DS}=100V, V_{GS}=0V, F=1MHz$	-	568	-	pF
Output Capacitance	$C_{oss}$		-	22	-	
Reverse Transfer Capacitance	$C_{rss}$		-	0.95	-	
Gate Resistance	$R_g$	$F=1MHz$	-	7.6	-	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current (Body Diode)	$I_S$	$T_C=25^\circ\text{C}$ , MOSFET symbol showing the integral reverse p-n junction diode.	-	-	6	A
Pulsed Source Current	$I_{SM}$		-	-	24	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=6A$	-	1.1	1.4	V
Reverse Recovery Time <sup>2</sup>	$t_{rr}$	$V_{DD}=50V, I_F=6A, dI_F/dt=100A/\mu s$	-	348	-	nS
Reverse Recovery Charge <sup>2</sup>	$Q_{rr}$		-	2.7	-	$\mu C$

Note:

- $L=79mH, I_{AS}=2.2A, V_{DD}=100V, R_g=25\Omega$ , starting temperature  $T_J=25^\circ\text{C}$ .
- $V_{DS}=0-400V, I_{SD}\leq I_S, T_J=25^\circ\text{C}$ .
- $V_{DS}=0-480V$ .
- Pulse Test: Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
- Essentially independent of operating temperature.

### Typical Electrical and Thermal Characteristic Curves

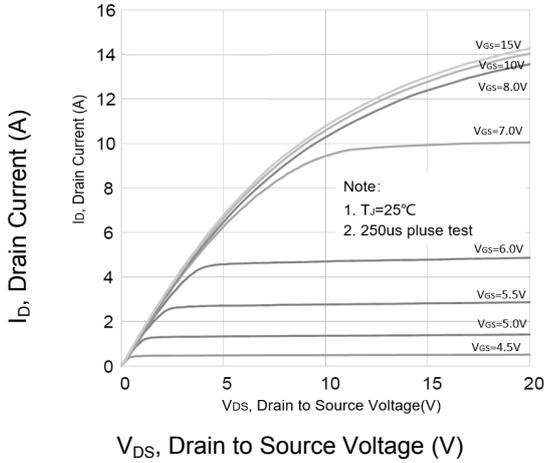


Figure 1. Typical Output Characteristics

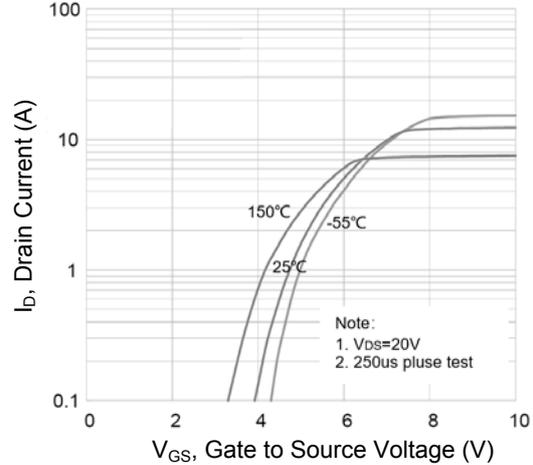


Figure 2. Typical Transfer Characteristics

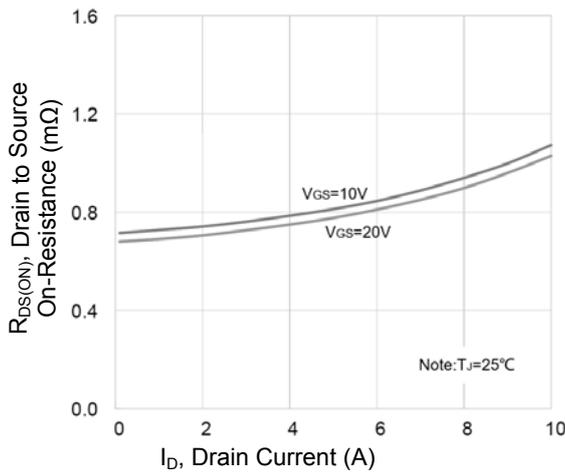


Figure 3. On Resistance vs. Drain Current

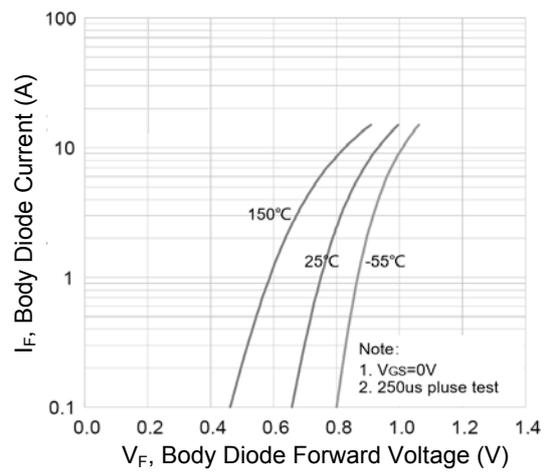


Figure 4. Body Diode Characteristics

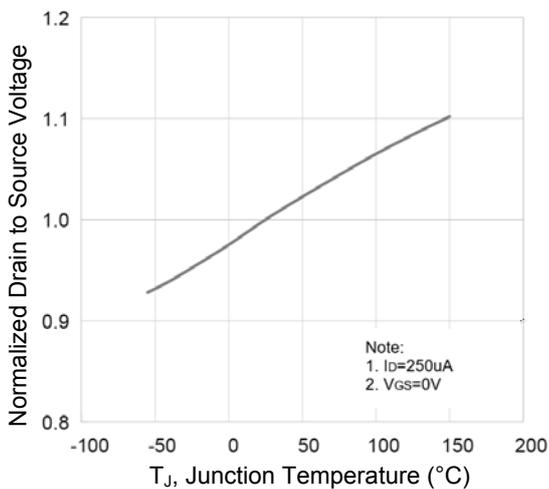


Figure 5. Normalized  $BV_{DSS}$  vs. Junction Temperature

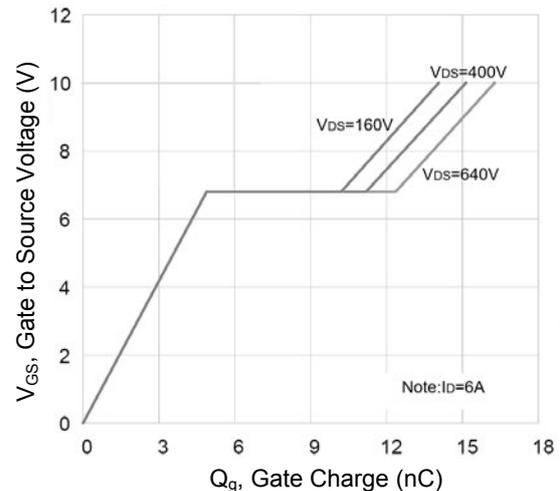
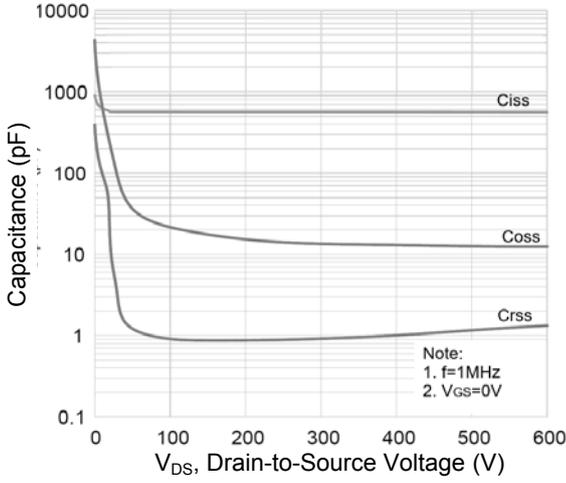
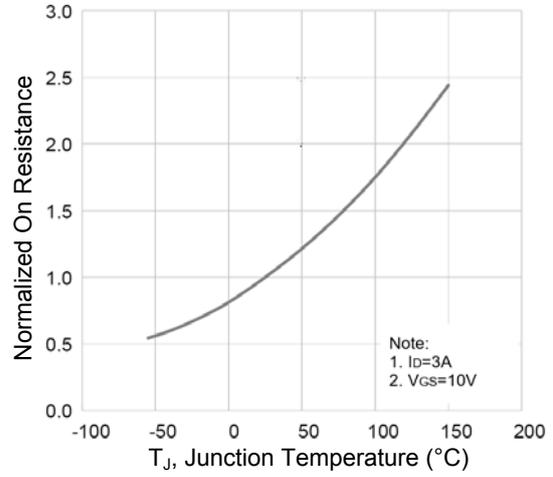


Figure 6. Gate Charge Characteristics

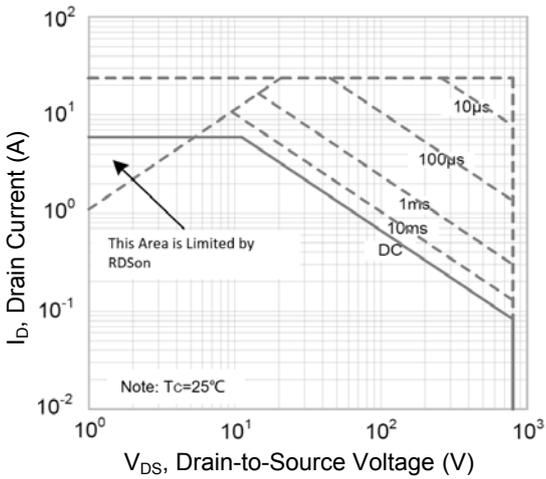
### Typical Electrical and Thermal Characteristic Curves



**Figure 7. Capacitance Characteristics**

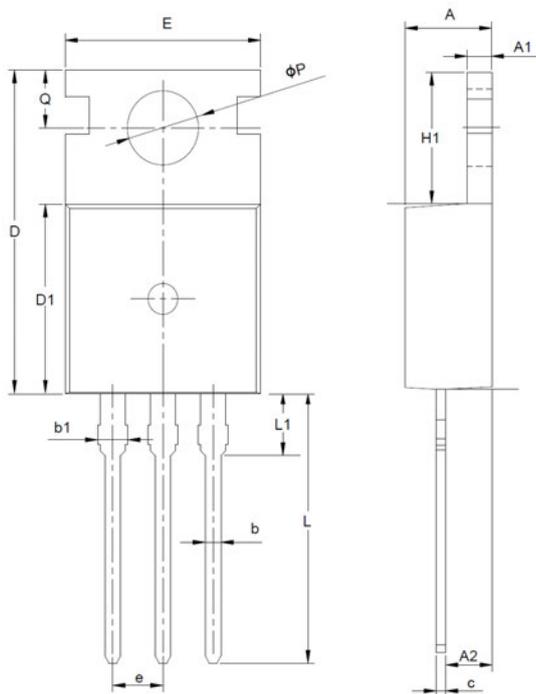


**Figure 8. Normalized  $R_{DS(ON)}$  vs. Junction Temperature**



**Figure 9. Safe Operation Area**

## Package Outline Dimensions (TO-220)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.300	4.700	0.169	0.185
A1	1.000	1.500	0.039	0.059
A2	1.800	2.800	0.071	0.110
b	0.600	1.000	0.024	0.039
b1	1.000	1.600	0.039	0.063
c	0.300	0.700	0.012	0.028
D	15.100	16.100	0.594	0.634
D1	8.100	10.000	0.319	0.394
E	9.600	10.400	0.378	0.409
e	2.540 BSC		0.100 BSC	
H1	6.100	7.000	0.240	0.276
L	12.600	13.600	0.496	0.535
L1	-	3.950	-	0.156
$\phi P$	3.400	3.900	0.134	0.154
Q	2.600	3.200	0.102	0.126