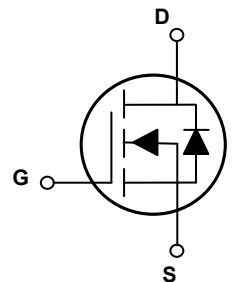


Main Product Characteristics

$V_{(BR)DSS}$	650V
$R_{DS(ON)}$	0.78Ω (typ.)
I_D	5A



TO-251



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 GSFG65R900 utilizes the latest techniques to achieve high cell density and low on-resistance. 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 ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Parameter.	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-to-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current, @ Steady-State ($T_C=25^{\circ}\text{C}$)	I_D	5	A
Continuous Drain Current, @ Steady-State ($T_C=100^{\circ}\text{C}$)		3.2	A
Pulsed Drain Current	I_{DM}	20	A
Power Dissipation ($T_C=25^{\circ}\text{C}$)	P_D	42	W
		0.34	W/ $^{\circ}\text{C}$
Single Pulse Avalanche Energy ¹	E_{AS}	214	mJ
Single Pulse Avalanche Current	I_{AS}	2.8	A
Body Diode Reverse Voltage Slope ²	dv/dt	15	V/ns
MOS dv/dt Ruggedness ³	dv/dt	50	V/ns
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.0	$^{\circ}\text{C/W}$
Junction-to-Case	$R_{\theta JC}$	2.97	$^{\circ}\text{C/W}$
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +150	$^{\circ}\text{C}$
Soldering Temperature	T_{sld}	260	$^{\circ}\text{C}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	650	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V, T_J=25^\circ\text{C}$	-	-	1.0	μA
		$V_{DS}=650V, V_{GS}=0V, T_J=125^\circ\text{C}$	-	1.5	-	μA
Gate-to-Source Forward Leakage	I_{GSS}	$V_{DS}=0V, V_{GS}=30V$	-	-	100	nA
		$V_{DS}=0V, V_{GS}=-30V$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=2.5A$	-	0.78	0.90	Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=100V, F=1MHz$	-	300	-	pF
Output Capacitance	C_{oss}		-	20	-	
Reverse Transfer Capacitance	C_{rss}		-	2.4	-	
Total Gate Charge ^{4,5}	Q_g	$I_D=5A, V_{DD}=520V, V_{GS}=10V$	-	13	-	nC
Gate-to-Source Charge ^{4,5}	Q_{gs}		-	3.0	-	
Gate-to-Drain ("Miller") Charge ^{4,5}	Q_{gd}		-	6.8	-	
Gate Plateau ^{4,5}	$V_{plateau}$		-	6.5	-	V
Turn-on Delay Time ^{4,5}	$t_{d(on)}$	$V_{DD}=325V, V_{GS}=10V, R_G=24\Omega, I_D=5A$	-	8.7	-	nS
Rise Time ^{4,5}	t_r		-	25	-	
Turn-Off Delay Time ^{4,5}	$t_{d(off)}$		-	30	-	
Fall Time ^{4,5}	t_f		-	23	-	
Gate Resistance	R_g	$F=1MHz$	-	7.2	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	$T_C=25^\circ\text{C}$, MOSFET symbol showing the integral reverse p-n junction diode.	-	-	5	A
Diode Pulse Current	$I_{S, pulse}$		-	-	20	A
Diode Forward Voltage	V_{SD}	$I_S=5A, V_{GS}=0V$	-	-	1.4	V
Reverse Recovery Time ⁴	T_{rr}	$I_S=5A, V_{GS}=0V, dI_F/dt=100A/\mu s$	-	334	-	nS
Reverse Recovery Charge ⁴	Q_{rr}		-	2.2	-	μC

Notes:

1. $L=79mH, V_{DD}=100V, R_G=25\Omega$, starting temperature $T_J=25^\circ\text{C}$.
2. $V_{DS}=0-400V, I_{SD}\leq I_S, T_J=25^\circ\text{C}$.
3. $V_{DS}=0-480V$.
4. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
5. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

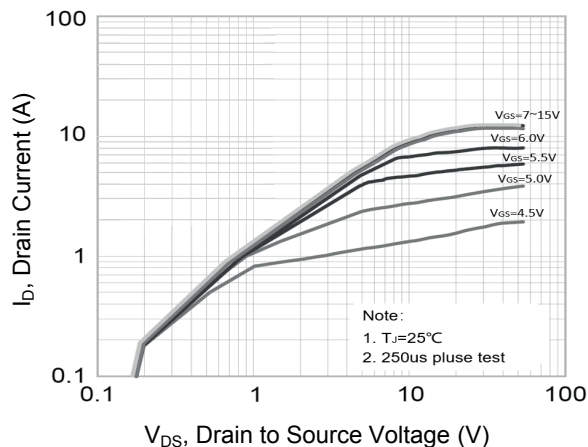


Figure 1. Typical Output Characteristics

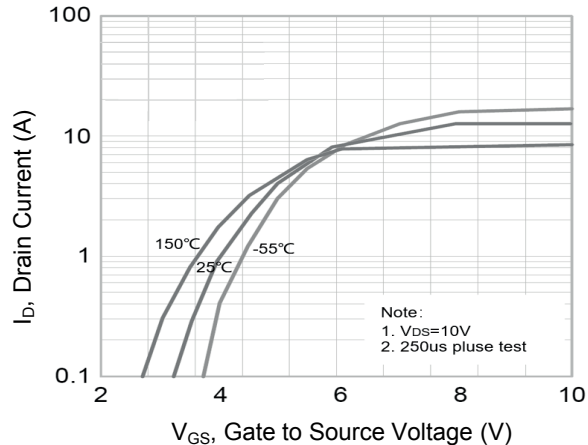


Figure 2. Transfer Characteristics

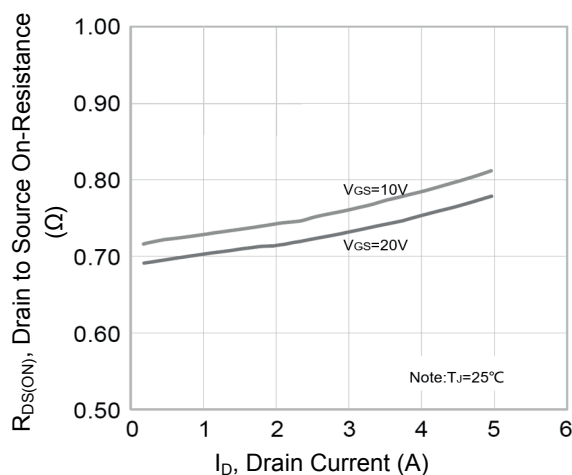


Figure 3. $R_{DS(ON)}$ vs. Drain Current

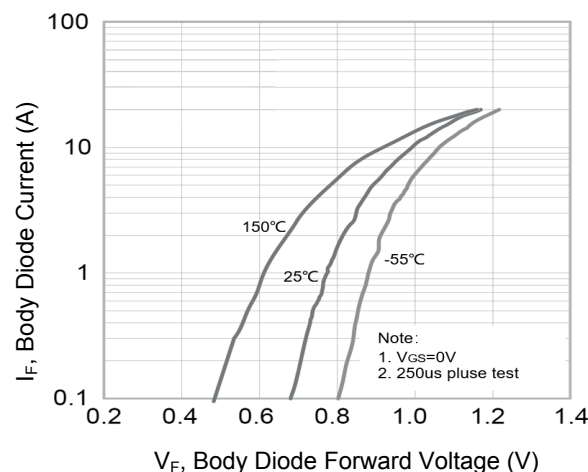


Figure 4. Body Diode Characteristics

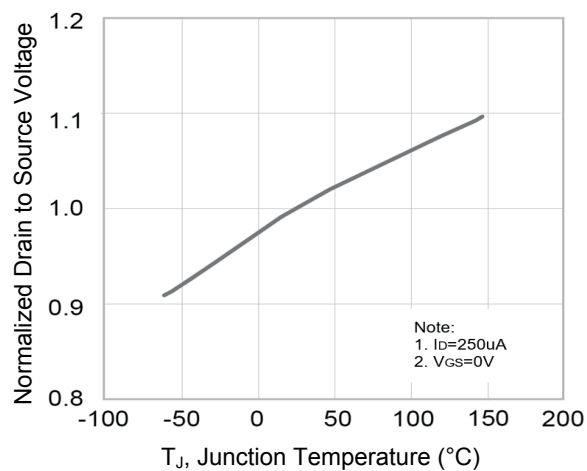


Figure 5. Normalized BV_{DS} vs. T_J

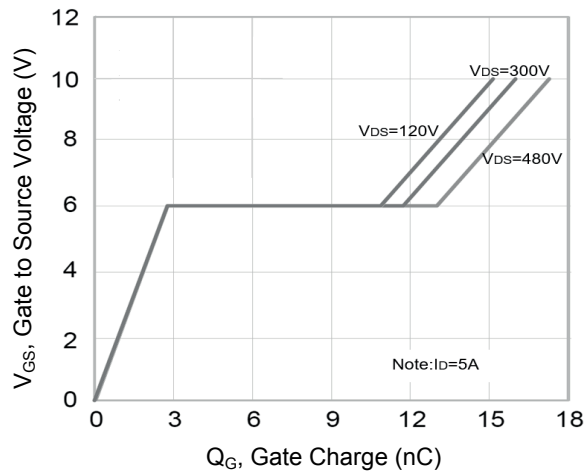


Figure 6. Gate Charge Characteristics

Typical Electrical and Thermal Characteristic Curves

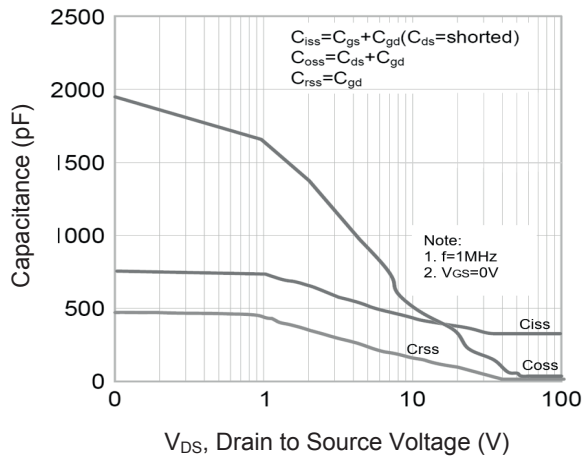


Figure 7. Capacitance Characteristics

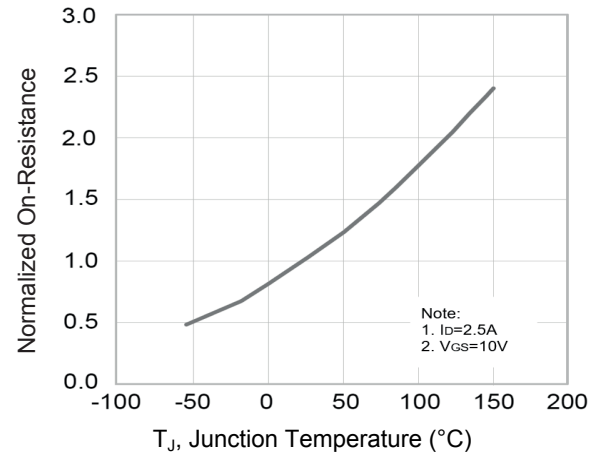


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

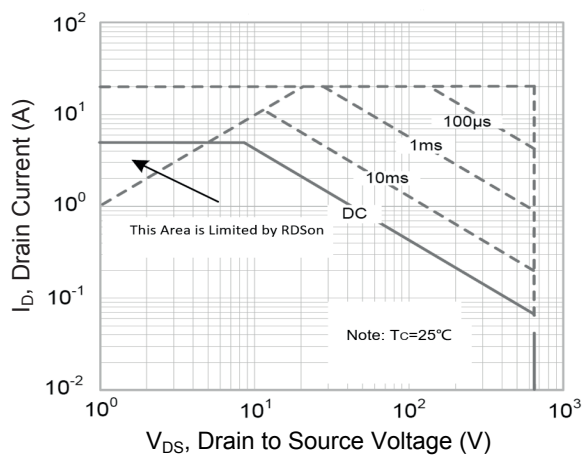
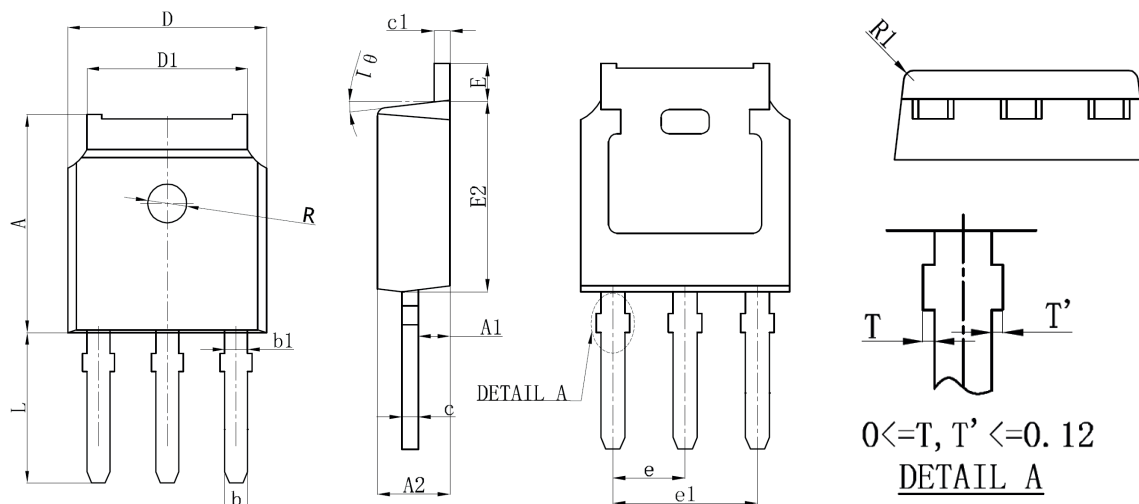


Figure 9. Safe Operation Area

Package Outline Dimensions (TO-251)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	7.05	7.15	0.278	0.281
A1	0.96	1.06	0.038	0.042
A2	2.25	2.35	0.089	0.093
b	0.76 REF		0.030 REF	
b1	1.00 REF		0.039 REF	
c	0.51 REF		0.020 REF	
c1	0.51 REF		0.020 REF	
D	6.55	6.65	0.258	0.262
D1	5.22	5.42	0.206	0.213
E	0.95	1.05	0.037	0.041
E2	6.05	6.15	0.238	0.242
e	2.29 BSC		0.090 BSC	
e1	4.57 REF		0.180 REF	
L	4.80	5.20	0.189	0.205
θ1	7° REF		7° REF	
R	1.30 REF		0.051 REF	
R1	0.25 REF		0.010 REF	