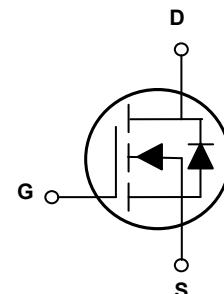
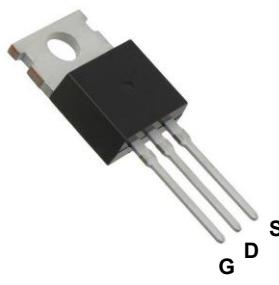


Main Product Characteristics

BV_{DSS}	60V
$R_{DS(ON)}$	9.7mΩ (max)
I_D	60A



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 GSFH9R706 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 ($T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous ($T_C=25^\circ\text{C}$) ¹	I_D	60	A
Drain Current-Continuous ($T_C=100^\circ\text{C}$)		42.5	
Drain Current-Pulsed ²	I_{DM}	240	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	60	W
Linear Derating Factor ($T_C=25^\circ\text{C}$)		0.48	W/ $^\circ\text{C}$
Avalanche Energy, Single Pulsed ³	E_{AS}	81	mJ
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.08	$^\circ\text{C}/\text{W}$
Junction-to-Ambient (PCB Mounted, Steady-State) ⁴	$R_{\theta JA}$	55	$^\circ\text{C}/\text{W}$
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 ($T_A=25^\circ C$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V, T_J=25^\circ C$	-	-	1	μA
		$V_{DS}=60V, V_{GS}=0V, T_J=125^\circ C$	-	-	20	μA
Gate-Source Forward Leakage	I_{GSS}	$V_{GS}=\pm 20V$	-	-	± 100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=13A$	-	8	9.7	$m\Omega$
		$V_{GS}=4.5V, I_D=11A$	-	11	14	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.7	2.5	V
Forward Transconductance	g_{fs}	$V_{DS}=10V, I_D=6A$	-	12	-	S
Dynamic and Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS}=48V, I_D=13A$ $V_{GS}=10V$	-	18	-	nC
Gate-Source Charge	Q_{gs}		-	5.6	-	
Gate-Drain Charge	Q_{gd}		-	2.7	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=30V, R_G=3\Omega$ $V_{GS}=10V, I_D=13A$	-	8.5	-	nS
Rise Time	t_r		-	52	-	
Turn-Off Delay Time	$t_{d(off)}$		-	18	-	
Fall Time	t_f		-	8.9	-	
Input Capacitance	C_{iss}	$V_{DS}=30V, V_{GS}=0V, F=1MHz$	-	1064	2200	pF
Output Capacitance	C_{oss}		-	434	870	
Reverse Transfer Capacitance	C_{rss}		-	26	54	
Gate Resistance	R_g	$F=1MHz$	-	1.7	3	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current (Body Diode)	I_s	MOSFET symbol showing the integral reverse p-n junction diode	-	-	75	A
Pulsed Source Current (Body Diode)	I_{SM}		-	-	300	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_s=13A$	-	1	1.2	V
Reverse Recovery Time	t_{rr}	$I_F=13A$ $dI/dt=100A/\mu s$ $T_J=25^\circ C$	-	54	-	nS
Reverse Recovery Charge	Q_{rr}		-	0.052	-	μC

Note:

1. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
2. Repetitive rating: Pulsed width limited by maximum junction temperature.
3. $L=0.5mH, R_G=10\Omega, V_{DD}=50V$, starting $T_J=25^\circ C$.
4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Typical Electrical and Thermal Characteristic Curves

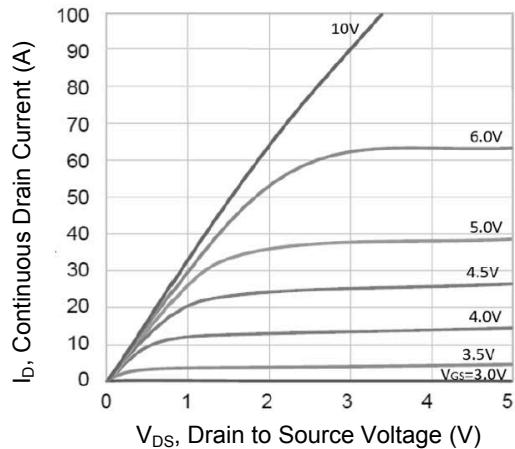


Figure 1. Typical Output Characteristics

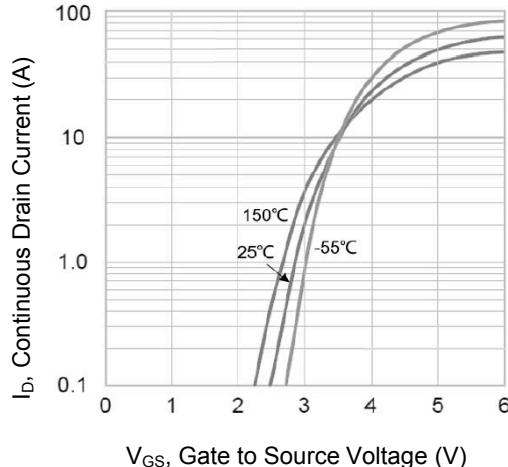


Figure 2. Typical Transfer Characteristics

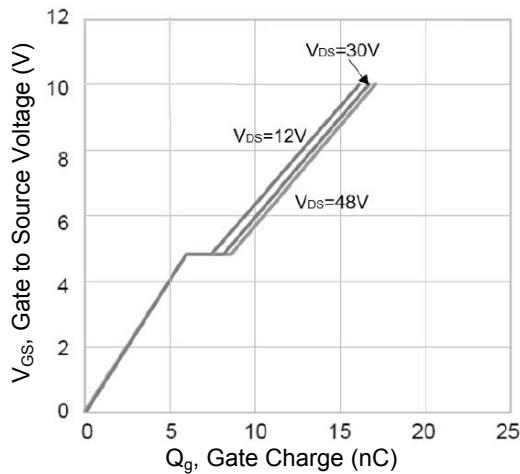


Figure 3. Gate Charge Characteristics

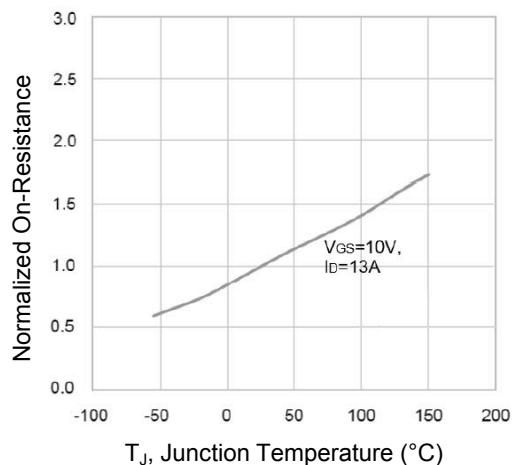


Figure 4. Normalized $R_{DS(on)}$ vs. T_J

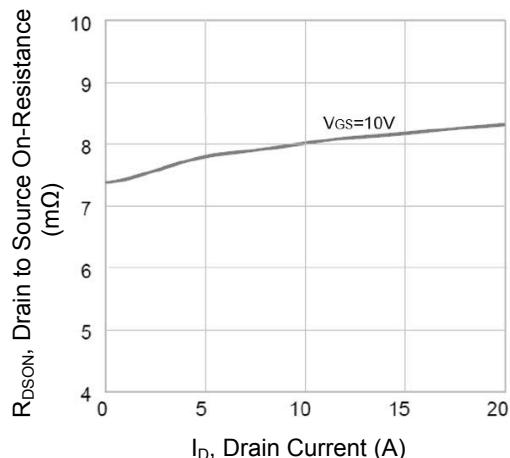


Figure 5. On Resistance vs. Drain Current

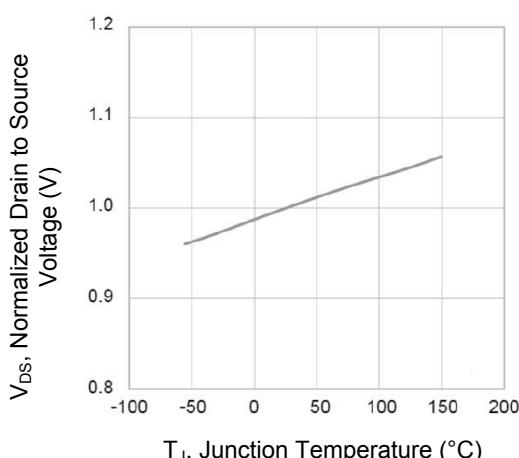


Figure 6. Normalized BV_{DSS} vs. Junction Temperature

Typical Electrical and Thermal Characteristic Curves

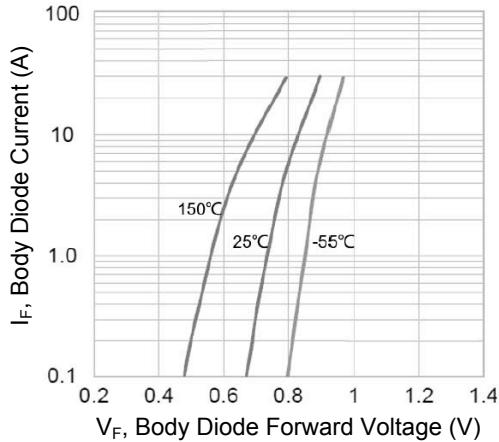


Figure 7. Body Diode Characteristics

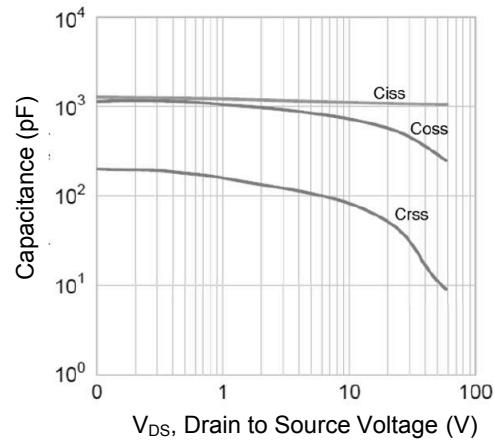


Figure 8. Transfer Characteristics

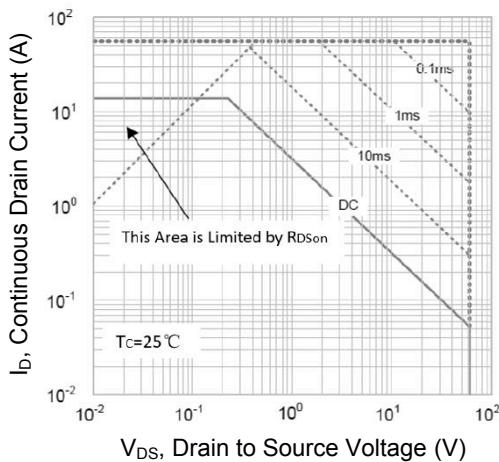
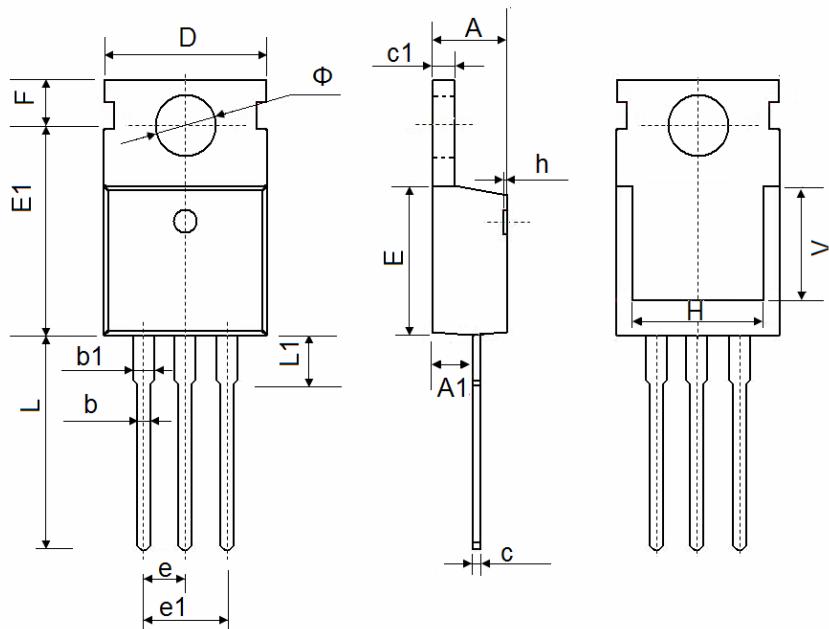


Figure 9. Maximum Safe Operation Area

Package Outline Dimensions TO-220



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF		0.276 REF	
Φ	3.400	3.800	0.134	0.150