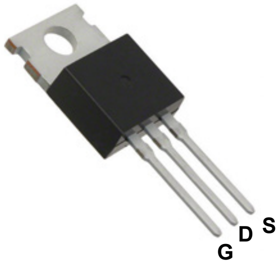
GSFH0970

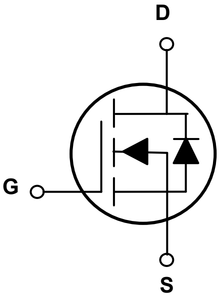
100V N-Channel MOSFET

Main Product Characteristics

BV_{DSS}	100V
$R_{DS(ON)}$	3.5mΩ
I_D	160A



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 GSFH0970 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 supply and a wide variety of other applications.

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous(T_C=25°C) (Chip Limitation)	I_D	160	A
Drain Current-Continuous(T_C=100°C) (Chip Limitation)		100	A
Drain Current-Pulsed[1]	I_{DM}	640	A
Single Pulse Avalanche Energy[2]	E_{AS}	280	mJ
Single Pulse Avalanche Current[2]	I_{AS}	75	A
Power Dissipation(T_C=25°C)	P_D	208	W
Power Dissipation-Derate Above 25°C		1.66	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.6	°C/W
Storage Temperature Range	T_{STG}	-50 To +150	°C
Operating Junction Temperature Range	T_J	-50 To +150	°C

Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	100	-	-	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=1mA	-	0.05	-	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=100V , V_{GS}=0V, T_J=25°C	-	-	1	μA
		V_{DS}=80V , V_{GS}=0V, T_J=125°C	-	-	10	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
On Characteristics						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	2.8	3.5	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.5	2.5	3.5	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		-	-5	-	mV/°C
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=3A	-	15	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[3,4]	Q_g	V_{DS}=80V, I_D=10A, V_{GS}=10V	-	295	450	nC
Gate-Source Charge[3,4]	Q_{gs}		-	70	140	
Gate-Drain Charge[3,4]	Q_{gd}		-	75	150	
Turn-On Delay Time[3,4]	$t_{d(on)}$	V_{DD}=50V, R_G=6Ω V_{GS}=10V, I_D=1A	-	66.2	120	nS
Rise Time[3,4]	t_r		-	79.6	160	
Turn-Off Delay Time[3,4]	$t_{d(off)}$		-	242	480	
Fall Time[3,4]	t_f		-	103	200	
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, F=1MHz	-	17800	26000	pF
Output Capacitance	C_{oss}		-	980	1900	
Reverse Transfer Capacitance	C_{rss}		-	78	150	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	1.8	3.6	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	160	A
Pulsed Source Current	I_{SM}		-	-	320	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=1A, T_J=25°C	-	-	1	V
Reverse Recovery Time	T_{rr}	V_{GS}=0V, I_S=10A, d_i/d_t=100A/μs, T_J=25°C	-	64	-	nS
Reverse Recovery Charge	Q_{rr}		-	150	-	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V,V_{GS}=10V,L=0.1mH,I_{AS}=75A.,R_G=25Ω Starting T_J=25°C
3. The data tested by pulsed , pulse width≦ 300us , duty cycle≦2%.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

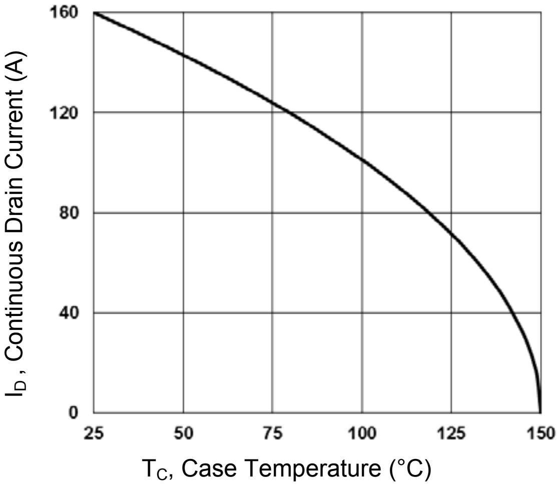


Figure 1. Continuous Drain Current vs. T_C

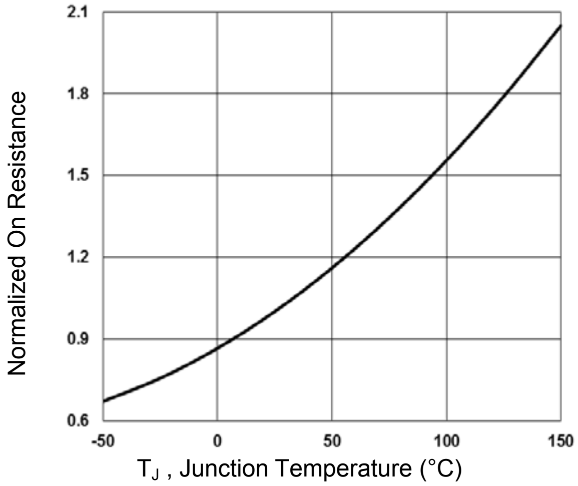


Figure 2. Normalized R_{DSON} vs. T_J

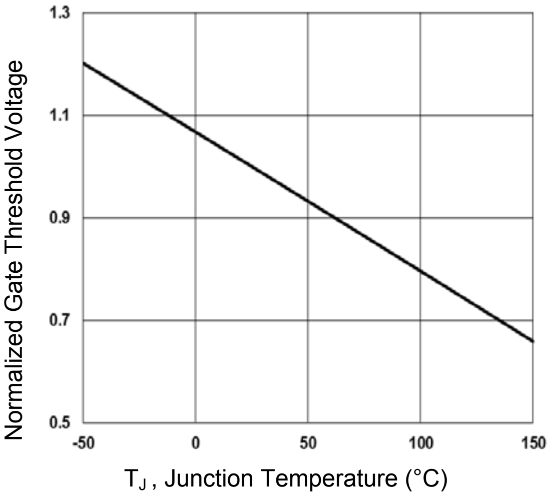


Figure 3. Normalized V_{th} vs. T_J

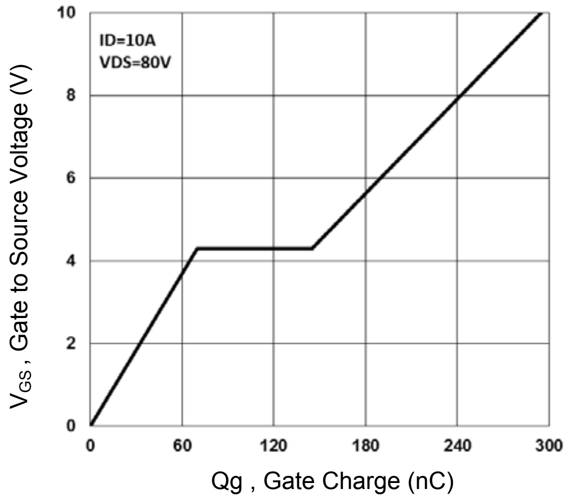


Figure 4. Gate Charge Characteristics

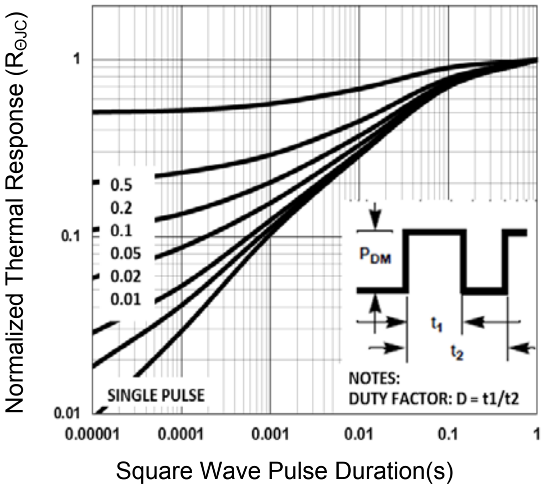


Figure 5. Normalized Transient Impedance

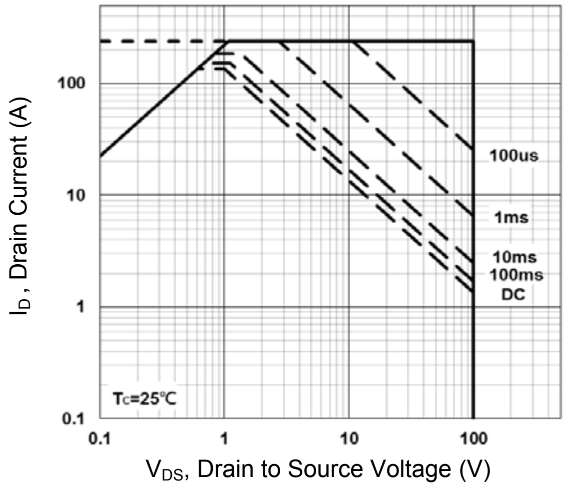
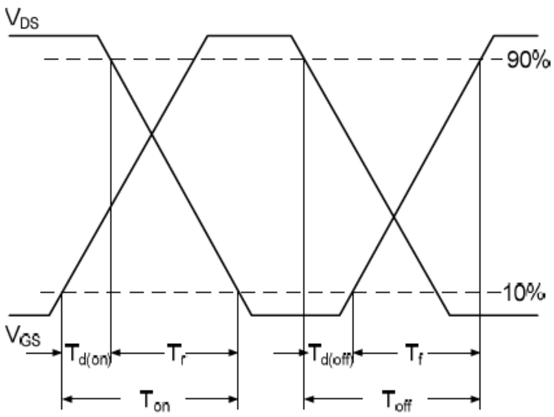
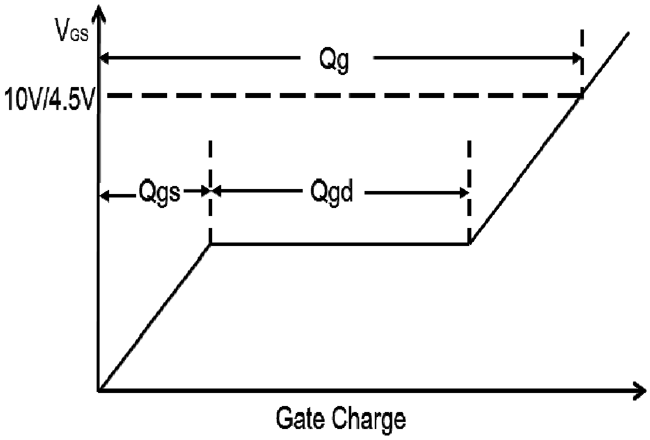


Figure 6. Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

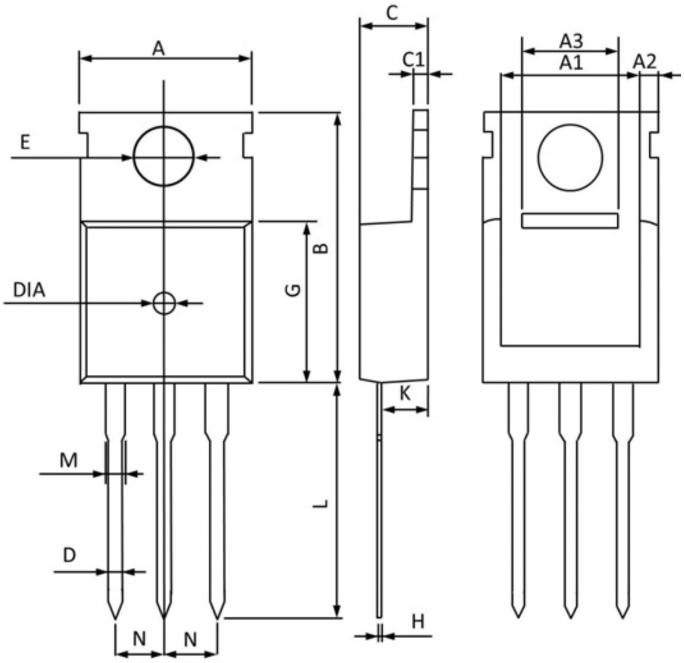


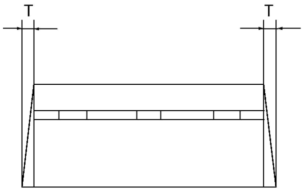
Firgure 7. Switching Time Waveform



Firgure 8. Gate Charge Waveform

Package Outline Dimensions (TO-220)





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	10.300	9.700	0.406	0.382
A1	8.840	8.440	0.348	0.332
A2	1.250	1.050	0.049	0.041
A3	5.300	5.100	0.209	0.201
B	16.200	15.400	0.638	0.606
C	4.680	4.280	0.184	0.169
C1	1.500	1.100	0.059	0.043
D	1.000	0.600	0.039	0.024
E	3.800	3.400	0.150	0.134
G	9.300	8.700	0.366	0.343
H	0.600	0.400	0.024	0.016
K	2.700	2.100	0.106	0.083
L	13.600	12.800	0.535	0.504
M	1.500	1.100	0.059	0.043
N	2.590	2.490	0.102	0.098
T	W0.35		W0.014	
DIA	Φ1.5 TYP.	deep0.2 TYP.	Φ0.059 TYP.	deep0.008 TYP.