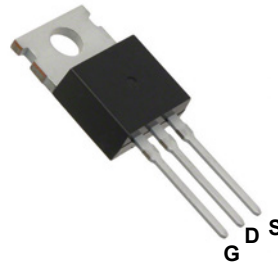
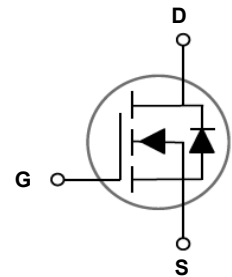


### Main Product Characteristics

$V_{DS}$	100V
$R_{DS(ON)}$	7.2m $\Omega$
$I_D$	90A



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 GSGH1090 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<sub>C</sub>=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	±20	V
Drain Current-Continuous	$I_D$	90	A
Drain Current-Continuous(T <sub>C</sub> =100°C)		65	A
Drain Current-Pulsed	$I_{DM}$	360	A
Maximum Power Dissipation	$P_D$	125	W
Derating Factor		0.83	W/°C
Single Pulse Avalanche Energy <sup>5</sup>	$E_{AS}$	380	mJ
Thermal Resistance, Junction-to-Case <sup>2</sup>	$R_{\theta JC}$	1.2	°C/W
Operating Junction Temperature Range	$T_J$	-55 To +175	°C
Storage Temperature Range	$T_{STG}$	-55 To +175	°C

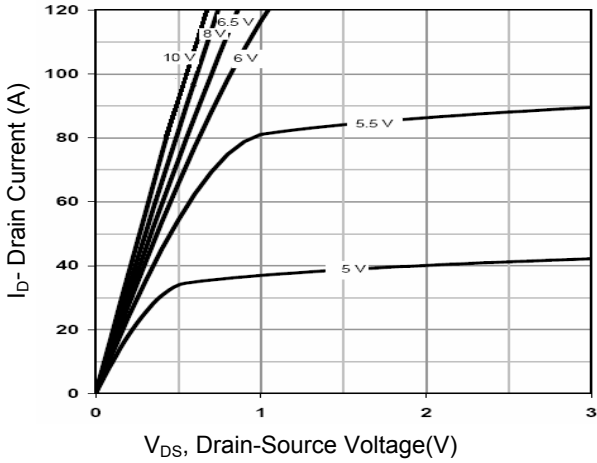
**Electrical Characteristics** ( $T_C=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics<sup>3</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=45A$	-	6.8	7.2	$m\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=45A$	-	60	-	S
<b>Dynamic Characteristics<sup>4</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=50V, V_{GS}=0V, F=1MHz$	-	3600	-	pF
Output Capacitance	$C_{oss}$		-	335	-	
Reverse Transfer Capacitance	$C_{rss}$		-	19.5	-	
<b>Switching Characteristics<sup>4</sup></b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=50V, R_G=3\Omega, V_{GS}=10V, I_D=45A$	-	17	-	nS
Turn-On Rise Time	$t_r$		-	11	-	
Turn-Off Delay Time	$t_{d(off)}$		-	36	-	
Turn-Off Fall Time	$t_f$		-	9	-	
Total Gate Charge	$Q_g$	$V_{DS}=50V, I_D=45A, V_{GS}=10V$	-	60	-	nC
Gate-Source Charge	$Q_{gs}$		-	20	-	
Gate-Drain Charge	$Q_{gd}$		-	15	-	
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>3</sup>	$V_{SD}$	$V_{GS}=0V, I_S=45A$	-	-	1.2	V
Diode Forward Current <sup>2</sup>	$I_S$		-	-	90	A
Reverse Recovery Time	$t_{rr}$	$T_J=25^\circ\text{C}, I_F=45A, di/dt=100A/\mu s^3$	-	62	-	nS
Reverse Recovery Charge	$Q_{rr}$		-	109	-	nC

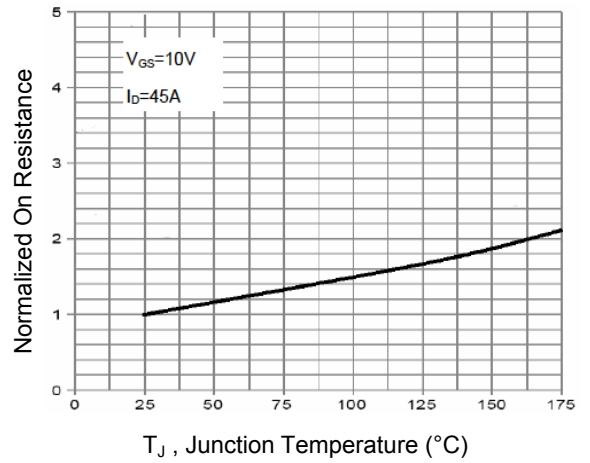
Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design.
5. EAS condition :  $T_J=25^\circ\text{C}, V_{DD}=50V, V_G=10V, L=0.5mH, R_G=25\Omega$

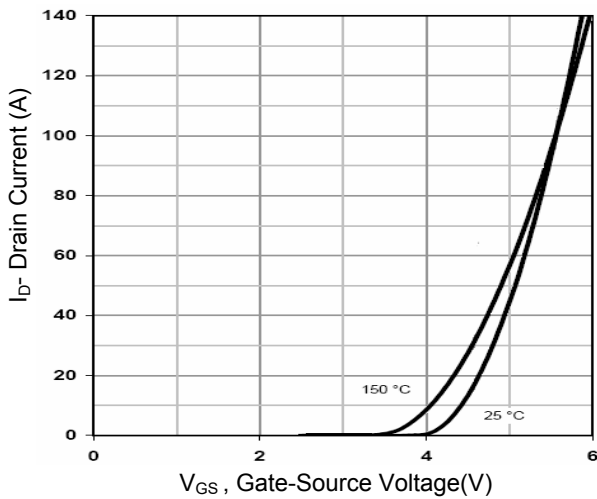
**Typical Electrical and Thermal Characteristic Curves**



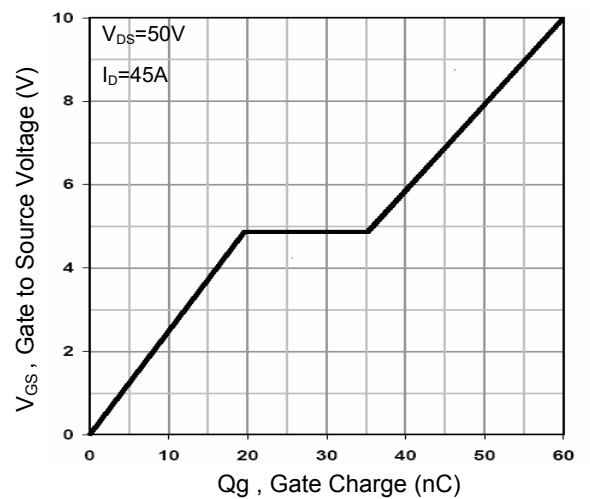
**Figure 1. Output Characteristics**



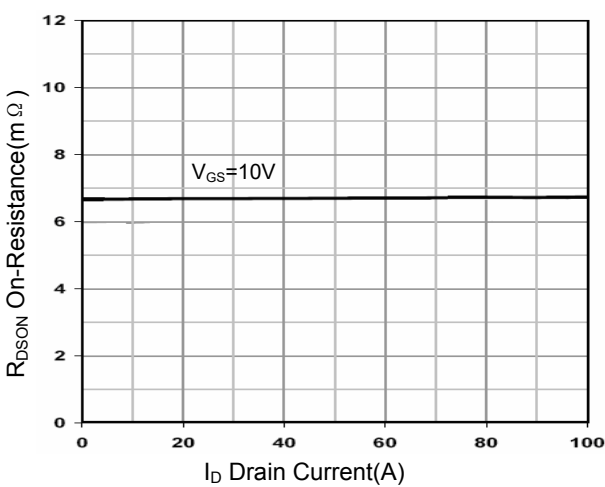
**Figure 2.  $R_{DSON}$ -Junction Temperature**



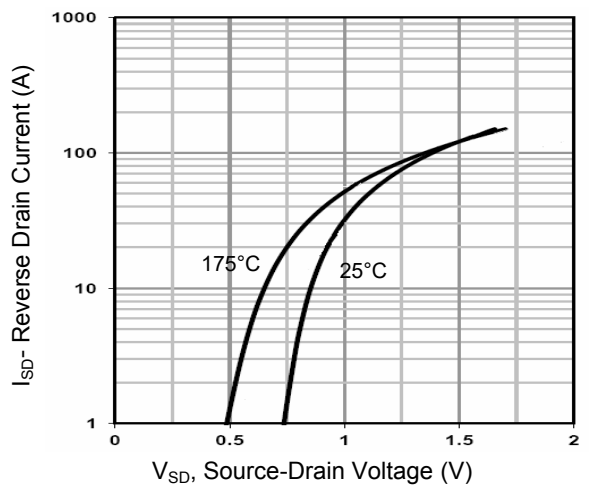
**Figure 3. Transfer Characteristics**



**Figure 4. Gate Charge**



**Figure 5.  $R_{DSON}$  - Drain Current**



**Figure 6. Source-Drain Diode Forward**

## Typical Electrical and Thermal Characteristic Curves

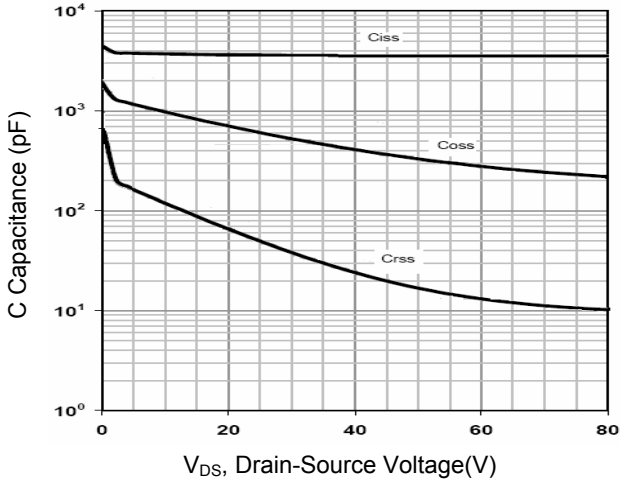


Figure 7. Capacitance Characteristics

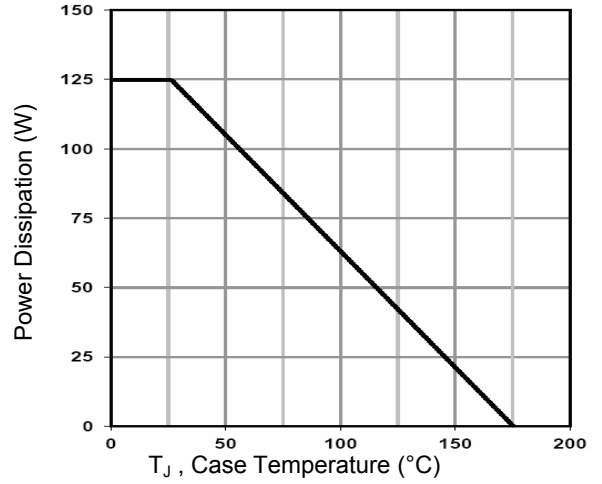


Figure 8. Power De-rating

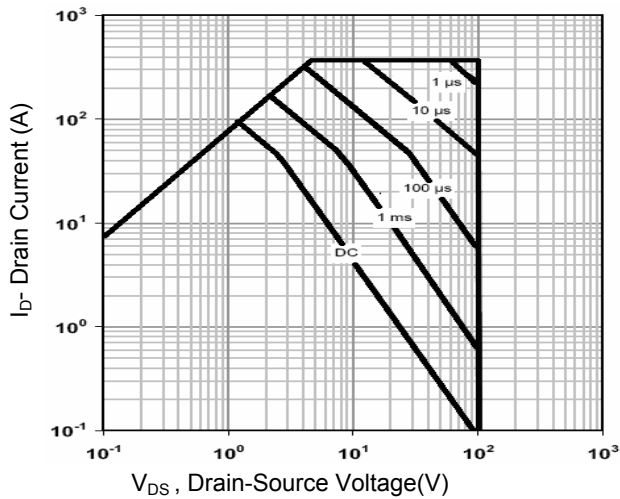


Figure 9. Safe Operation Area

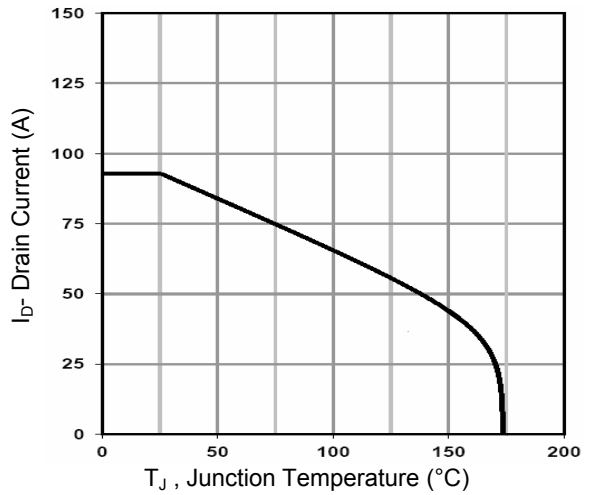


Figure 10. Current De-rating

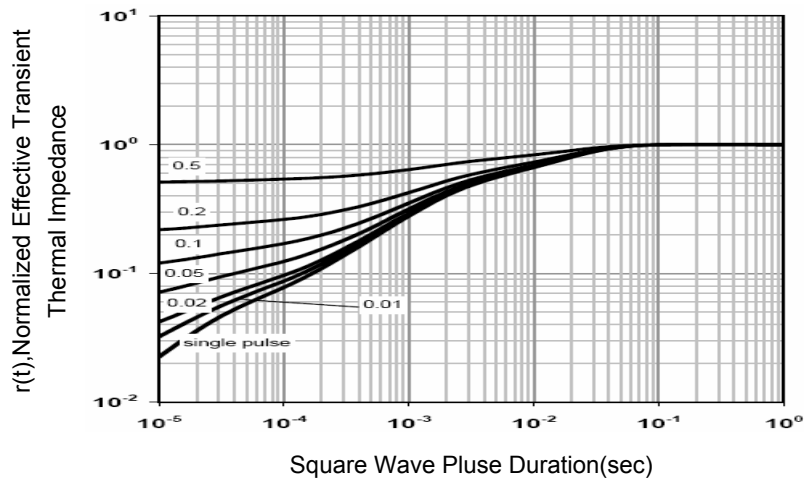
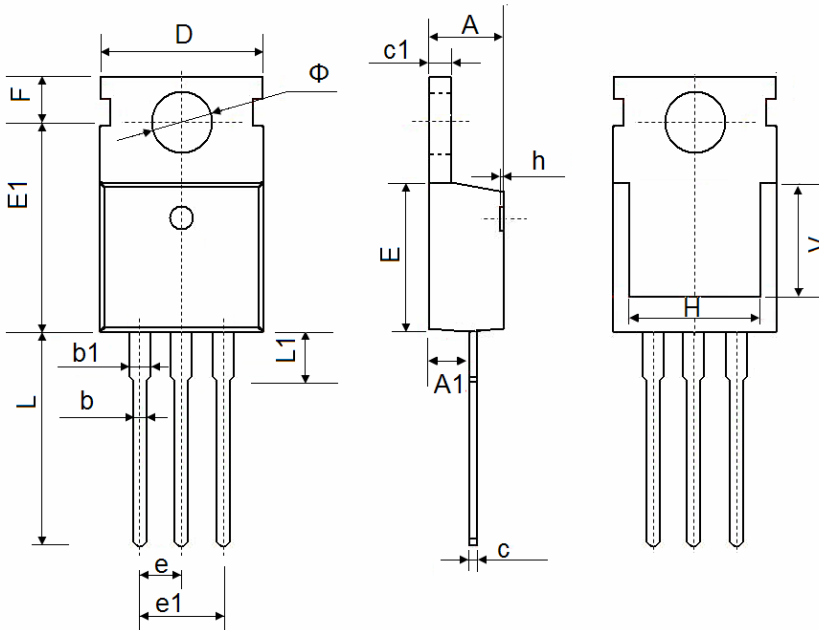


Figure 11. Normalized Maximum Transient Thermal Impedance

**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	8.9500	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