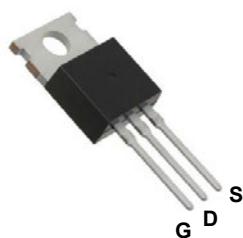
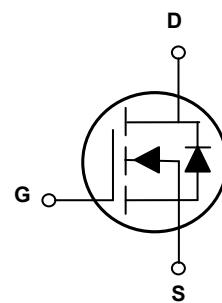


Main Product Characteristics

$V_{(BR)DSS}$	100V
$R_{DS(ON)}$	44mΩ (Max.)
I_D	33A



TO-220



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Q_off < 100nA @ $V_\text{GS} = -2V$ & $T_\text{C} = 25^\circ\text{C}$
- Q_ch < 100nA @ $V_\text{GS} = 0V$, $T_\text{C} = 25^\circ\text{C}$
- Fast switching and reverse body recovery



Description

The GSFH540 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 ($T_\text{C}=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DSS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current @ Steady-State, $T_\text{C}=25^\circ\text{C}$	I_D	33	A
Continuous Drain Current @ Steady-State, $T_\text{C}=100^\circ\text{C}$		23	A
Pulsed Drain Current	I_{DM}	110	A
Single Pulsed Avalanche Energy ¹	E_{AS}	695	mJ
Power Dissipation, $T_\text{C}=25^\circ\text{C}$	P_D	130	W
		0.87	W/ $^\circ\text{C}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.15	$^\circ\text{C}/\text{W}$
Junction to Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +175	$^\circ\text{C}$

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
On/Off Characteristic						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	100	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=\text{Rated } BV_{\text{DSS}}, V_{\text{GS}}=0\text{V}$	-	-	25	μA
		$V_{\text{DS}}=0.8 \times \text{Rated } BV_{\text{DSS}}, V_{\text{GS}}=0\text{V}$	-	-	250	
Gate-Source Forward Leakage	I_{GSS}	$V_{\text{GS}}=\pm 20\text{V}$	-	-	± 100	nA
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}}=V_{\text{GS}}, I_D=250\mu\text{A}$	2	-	4	V
Static Drain-Source On-Resistance	$R_{\text{DS}(\text{on})}$	$V_{\text{GS}}=10\text{V}, I_D=16\text{A}$	-	34	44	$\text{m}\Omega$
Gate Resistance	R_g	$f=1.0\text{MHz}$	-	3.4	-	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{\text{DS}}=25\text{V}, V_{\text{GS}}=0\text{V}, f=1.0\text{MHz}$	-	1239	-	pF
Output Capacitance	C_{oss}		-	247	-	pF
Reverse Transfer Capacitance	C_{rss}		-	44	-	pF
Total Gate Charge ^{2,3}	Q_g	$V_{\text{DS}}=80\text{V}, I_D=16\text{A}, V_{\text{GS}}=10\text{V}$	-	37	-	nC
Gate-Source Charge ^{2,3}	Q_{gs}		-	6	-	nC
Gate-Drain ("Miller") Charge ^{2,3}	Q_{gd}		-	17	-	nC
Switching Characteristics						
Turn-On Delay Time ^{2,3}	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=50\text{V}, I_D=16\text{A}, R_G=5.1\Omega, V_{\text{GS}}=10\text{V}$	-	10	-	nS
Rise Time ^{2,3}	t_r		-	44	-	nS
Turn-Off Delay Time ^{2,3}	$t_{\text{d}(\text{off})}$		-	46	-	nS
Fall Time ^{2,3}	t_f		-	13	-	nS
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	33	A
Diode Pulse Current	I_{SM}	-	-	110	A	
Diode Forward Voltage	V_{SD}	$V_{\text{GS}}=0\text{V}, I_S=16\text{A}$	-	-	1.2	V
Reverse Recovery Time ²	t_{rr}	$V_{\text{GS}}=0\text{V}, I_S=16\text{A}, dI_F/dt=100\text{A}/\mu\text{s}$	-	98	-	nS
Reverse Recovery Charge ²	Q_{rr}		-	0.4	-	nC

Notes:

1. $L=1.5\text{mH}, I_{AS}=22.5\text{A}, R_G=25\Omega$, starting temperature $T_J=25^\circ\text{C}$.
2. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
3. Essentially Independent of Operating Temperature.

Typical Electrical and Thermal Characteristic Curves

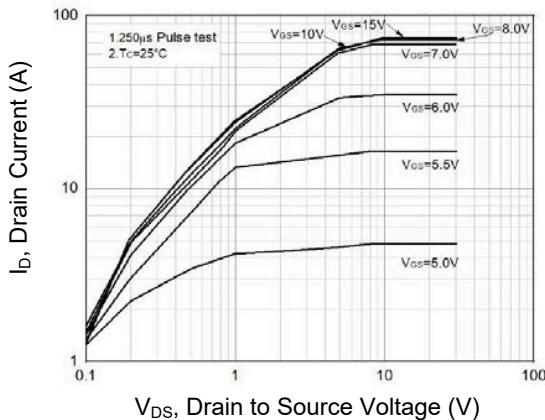


Figure 1. Output Characteristics

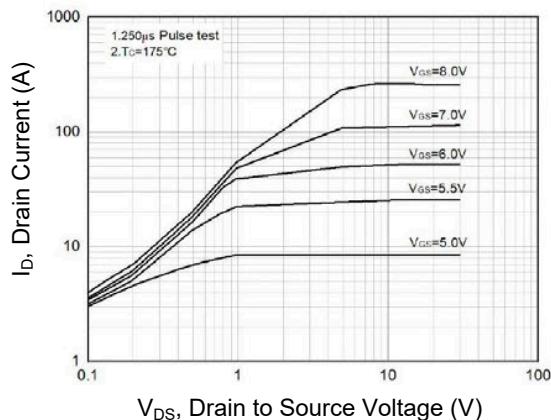


Figure 2. Output Characteristics

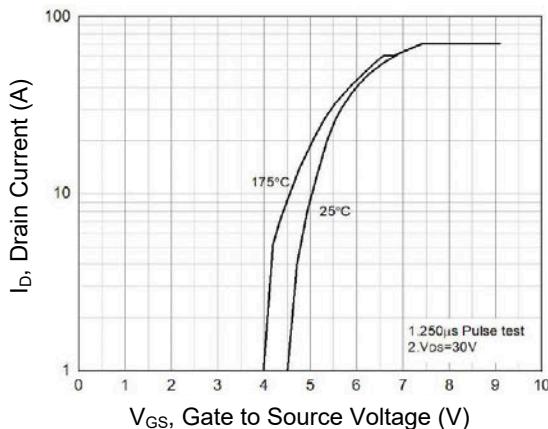


Figure 3. Transfer Characteristics

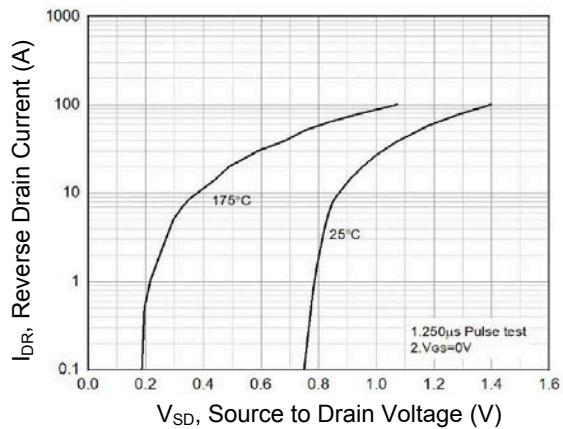


Figure 4. Body Diode Characteristics

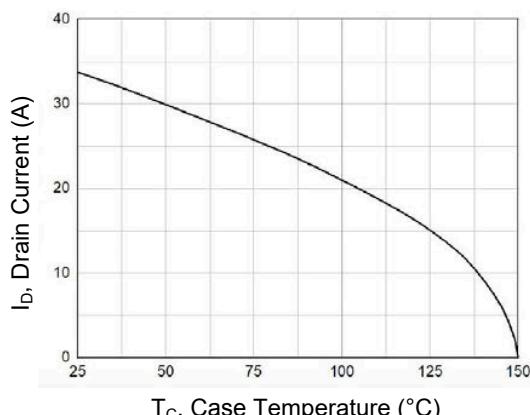


Figure 5. Drain Current vs. T_c

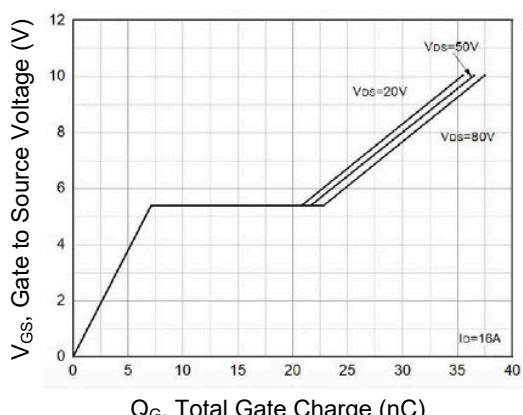


Figure 6. Gate Charge

Typical Electrical and Thermal Characteristic Curves

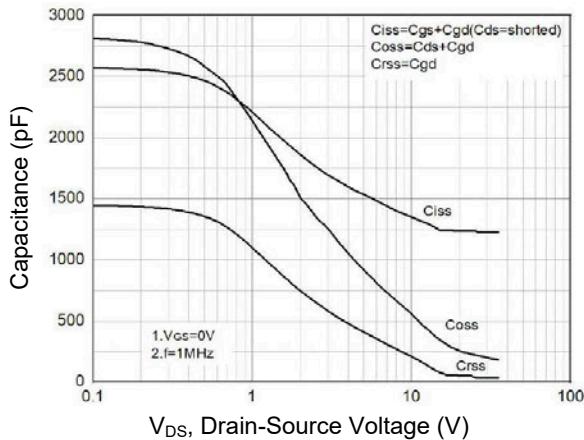


Figure 7. Capacitance Characteristics

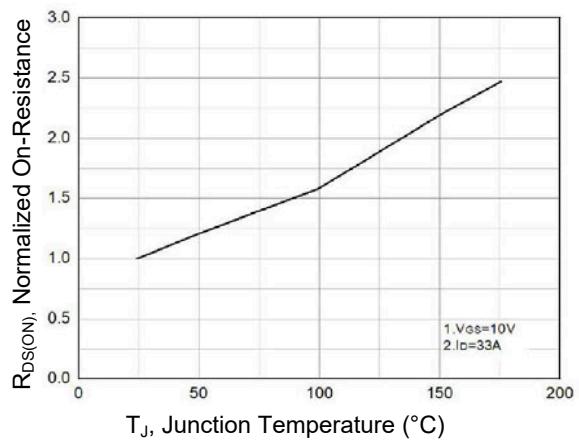


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

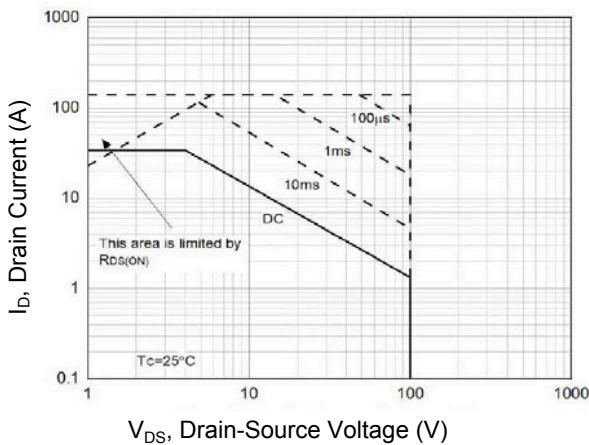
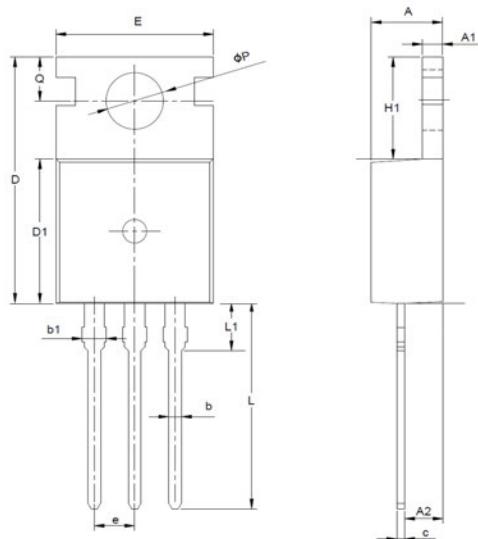


Figure 9. Safe Operation Area

Package Outline Dimensions (TO-220)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	4.300	4.700	0.169	0.186
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	0.410
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
ΦP	3.400	3.900	0.134	0.154
Q	2.600	3.200	0.102	0.126