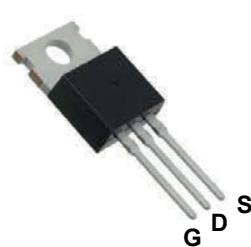
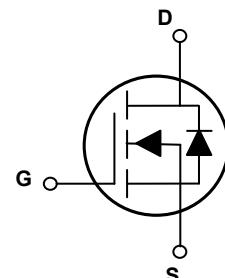


Main Product Characteristics

$V_{(BR)DSS}$	200V
$R_{DS(ON)}$	10.7mΩ (max.)
I_D	88A



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 GSFH10020 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 ($T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Parameter.	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, @ Steady-State ($T_C=25^\circ\text{C}$)	I_D	88	A
Continuous Drain Current, @ Steady-State ($T_C=100^\circ\text{C}$)		63	A
Pulsed Drain Current ($T_C=25^\circ\text{C}$) ¹	I_{DM}	352	A
Power Dissipation ($T_C=25^\circ\text{C}$) ²	P_D	278	W
Single Pulse Avalanche Energy	E_{AS}	600	mJ
Single Pulse Avalanche Current	I_{AS}	49	A
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction-to-Case	$R_{\theta JC}$	0.45	$^\circ\text{C}/\text{W}$
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +150	$^\circ\text{C}$
Soldering Temperature (SMD)	T_{sold}	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	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	200	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=200\text{V}, V_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	-	-	1.0	μA
		$V_{\text{DS}}=200\text{V}, V_{\text{GS}}=0\text{V}, T_J=125^\circ\text{C}$	-	10	-	
Gate-to-Source Forward Leakage	I_{GSS}	$V_{\text{DS}}=0\text{V}, V_{\text{GS}}=20\text{V}$	-	-	100	nA
		$V_{\text{DS}}=0\text{V}, V_{\text{GS}}=-20\text{V}$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_D=88\text{A}$	-	9.4	10.7	$\text{m}\Omega$
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}}=V_{\text{GS}}, I_D=250\mu\text{A}$	2.0	-	4.0	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	$V_{\text{GS}}=0\text{V}, V_{\text{DS}}=100\text{V}, F=1\text{MHz}$	-	4720	-	pF
Output Capacitance	C_{oss}		-	430	-	
Reverse Transfer Capacitance	C_{rss}		-	11	-	
Total Gate Charge ^{3,4}	Q_g	$I_D=44\text{A}, V_{\text{DD}}=100\text{V}, V_{\text{GS}}=10\text{V}$	-	64	-	nC
Gate-to-Source Charge ^{3,4}	Q_{gs}		-	28	-	
Gate-to-Drain ("Miller") Charge ^{3,4}	Q_{gd}		-	7.9	-	
Gate Plateau ^{3,4}	V_{plateau}		-	5.3	-	V
Turn-on Delay Time ^{3,4}	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=100\text{V}, V_{\text{GS}}=10\text{V}, R_G=1.6\Omega, I_D=44\text{A}$	-	22	-	nS
Rise Time ^{3,4}	t_r		-	40	-	
Turn-Off Delay Time ^{3,4}	$t_{\text{d}(\text{off})}$		-	66	-	
Fall Time ^{3,4}	t_f		-	18	-	
Gate Resistance	R_g	$F=1\text{MHz}$	-	4.9	-	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.	-	-	88	A
Diode Pulse Current	$I_{\text{S, pulse}}$		-	-	352	A
Diode Forward Voltage	V_{SD}	$I_S=88\text{A}, V_{\text{GS}}=0\text{V}$	-	-	1.4	V
Reverse Recovery Time ³	T_{rr}	$I_S=44\text{A}, V_{\text{GS}}=0\text{V}, \frac{dI_F}{dt}=100\text{A/us}$	-	130	-	nS
Reverse Recovery Charge ³	Q_{rr}		-	0.7	-	μC

Note:

1. Pulse time 5 μs .
2. The dissipated power value will change with the temperature. When it is greater than 25°C, the dissipated power will decrease by 2.22W/°C for every 1 degree of temperature rise.
3. Pulse test : pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

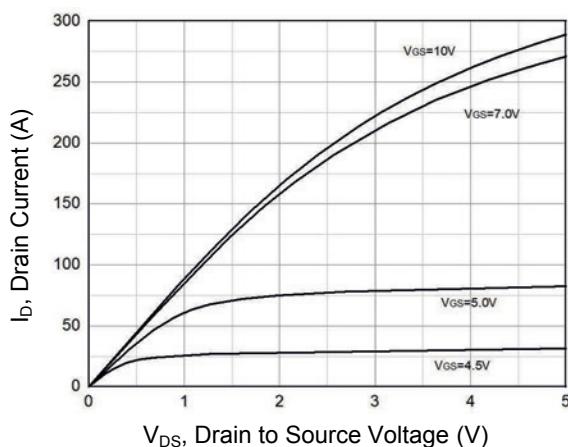


Figure 1. Typical Output Characteristics

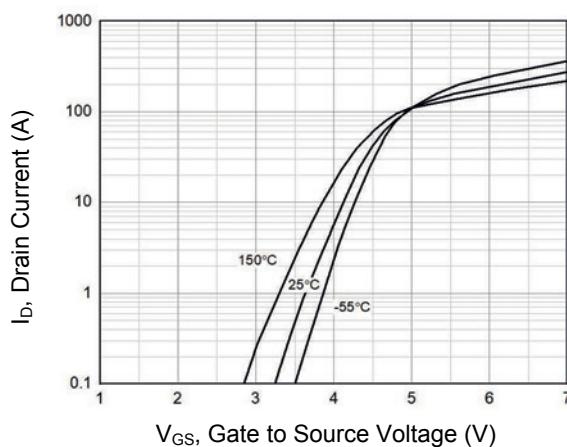


Figure 2. Transfer Characteristics

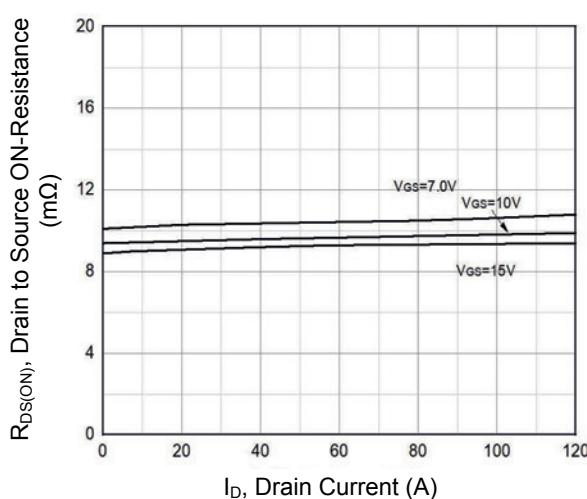


Figure 3. $R_{DS(on)}$ Vs. Drain Current

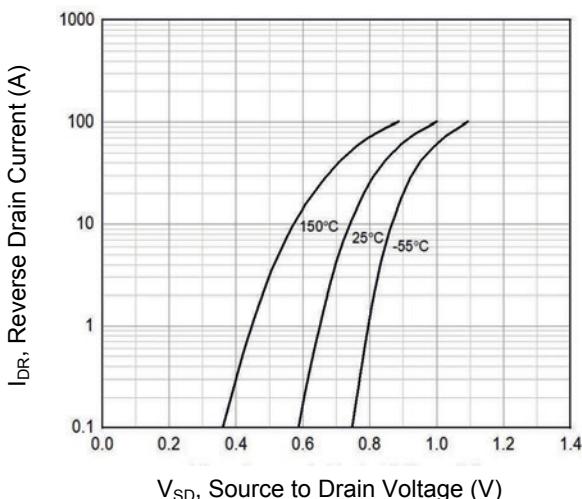


Figure 4. Body Diode Characteristics

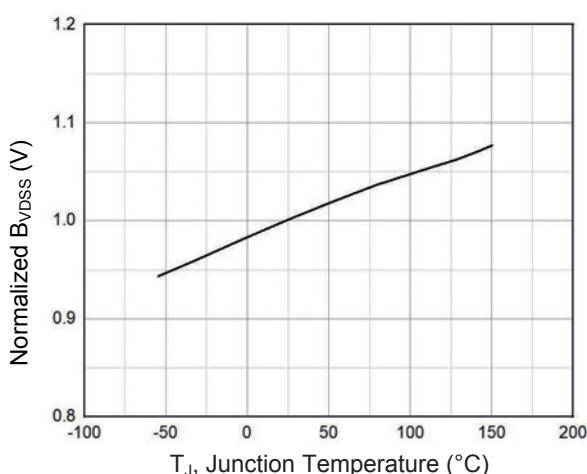


Figure 5. Normalized BV_{dss} vs. T_J

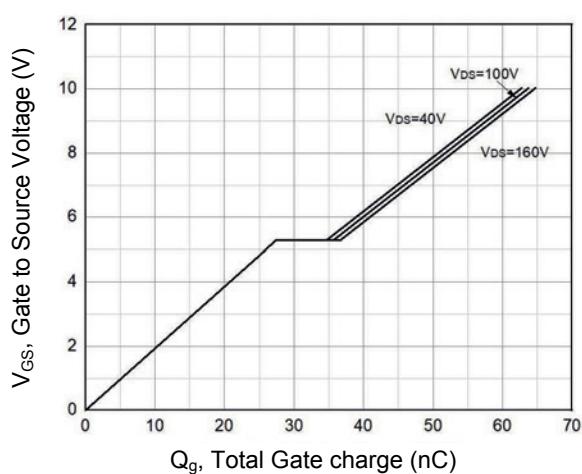


Figure 6. Gate Charge

Typical Electrical and Thermal Characteristic Curves

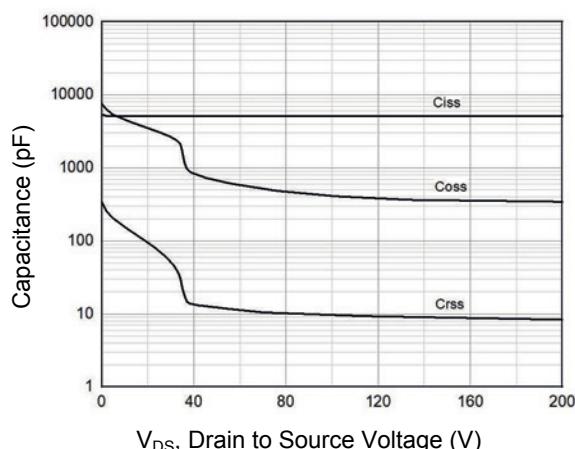


Figure 7. Capacitance Characteristics

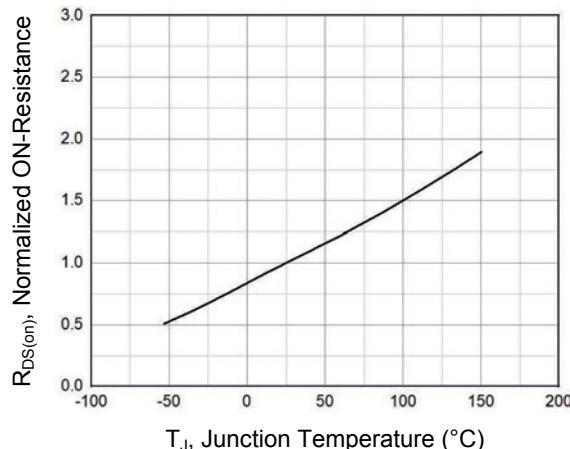


Figure 8. Normalized $R_{DS(on)}$ Vs. T_J

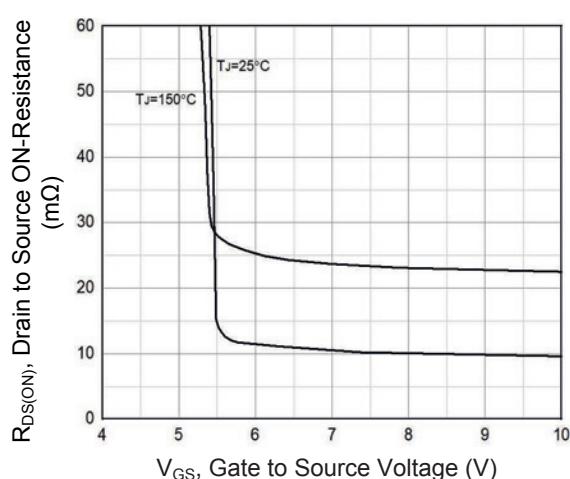


Figure 9. Normalized $R_{DS(on)}$ Vs. V_{GS}

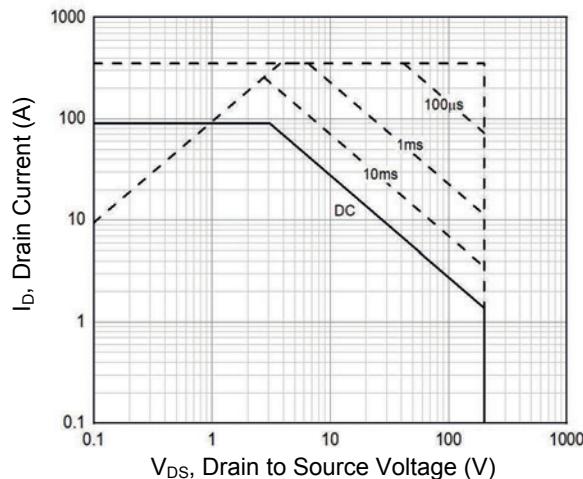


Figure 10. Safe Operation Area

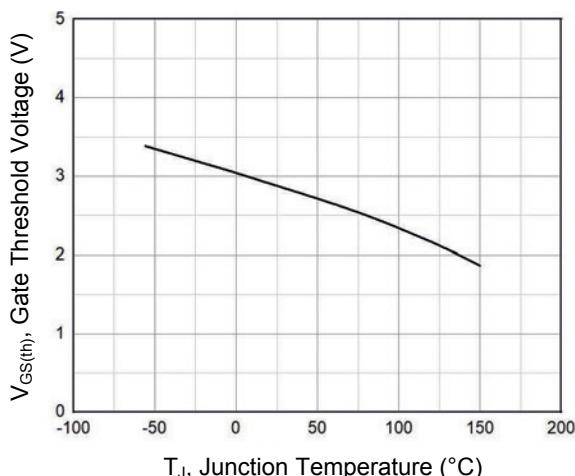


Figure 11. Gate Threshold Voltage Vs. T_J

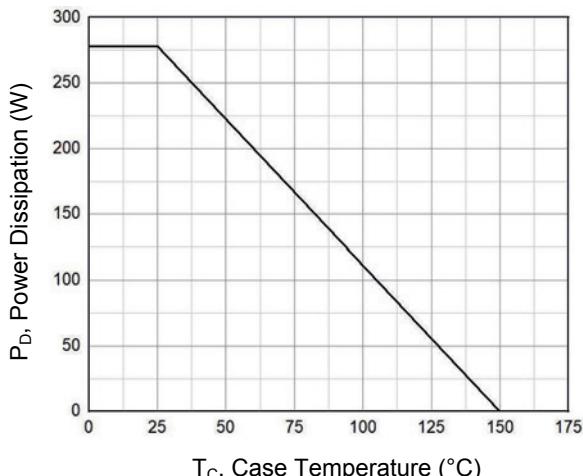
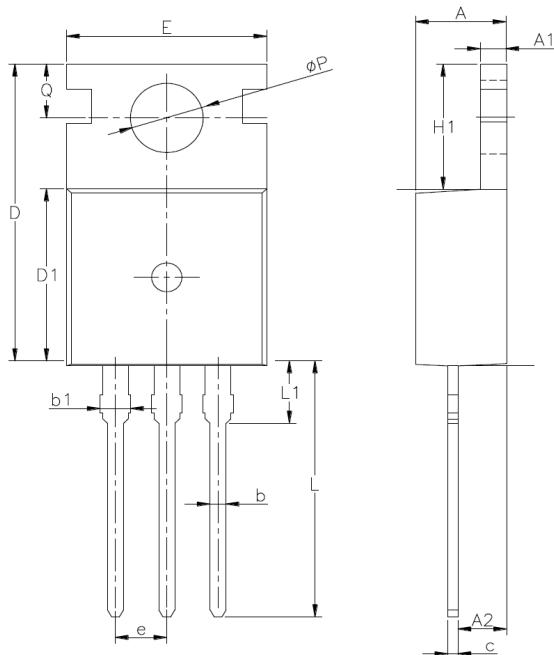


Figure 12. Power Dissipation Vs. T_C

Package Outline Dimensions (TO-220)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.30	4.70	0.169	0.185
A1	1.00	1.50	0.039	0.059
A2	1.80	2.80	0.071	0.110
b	0.60	1.00	0.024	0.039
b1	1.00	1.60	0.039	0.063
c	0.30	0.70	0.012	0.028
D	15.10	16.10	0.594	0.634
D1	8.10	10.00	0.319	0.394
E	9.60	10.40	0.378	0.409
e	2.54 BSC		0.100 BSC	
H1	6.10	7.00	0.240	0.276
L	12.60	13.60	0.496	0.535
L1	-	3.95	-	0.156
ΦP	3.40	3.90	0.134	0.154
Q	2.60	3.20	0.102	0.126