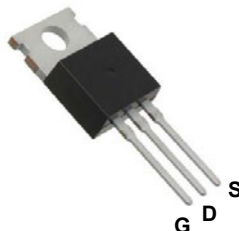
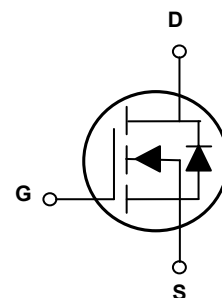


Main Product Characteristics

$V_{(BR)DSS}$	500V
$R_{DS(ON)}$	0.19Ω (Typ.)
I_D	20A



TO-220



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Low on-resistance
- Fast switching and reverse body recovery



Description

The GSFH5020 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 ($T_C=25^{\circ}C$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DSS}	500	V
Gate-Source Voltage	V_{GSS}	±30	V
Continuous Drain Current @ Steady-State, $T_C=25^{\circ}C$ ¹	I_D	20	A
Continuous Drain Current @ Steady-State, $T_C=100^{\circ}C$		13	A
Pulsed Drain Current ²	I_{DM}	80	A
Single Pulsed Avalanche Energy ³	E_{AS}	1596	mJ
Power Dissipation, $T_A=25^{\circ}C$	P_D	252	W
Linear Derating Factor, $T_A=25^{\circ}C$		2.02	W/°C
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.49	°C/W
Junction to Ambient (PCB Mounted, Steady-State) ⁴	$R_{\theta JA}$	50	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
On/Off Characteristic						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	500	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=500V, V_{GS}=0V$	-	-	1	uA
		$T_J=125^\circ\text{C}$	-	-	50	
Gate-Source Forward Leakage	I_{GSS}	$V_{GS}=\pm 30V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.1	3	3.9	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=10A$	-	0.19	0.26	Ω
Gate Resistance	R_g	$f=1.0\text{MHz}$	-	5.6	-	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1.0\text{MHz}$	-	2687	-	pF
Output Capacitance	C_{oss}		-	355	-	pF
Reverse Transfer Capacitance	C_{rss}		-	10.5	-	pF
Total Gate Charge	Q_g	$V_{DS}=400V, I_D=20A, V_{GS}=10V$	-	49.5	-	nC
Gate-Source Charge	Q_{gs}		-	14.3	-	nC
Gate-Drain ("Miller") Charge	Q_{gd}		-	16.4	-	nC
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=250V, I_D=20A, R_G=10\Omega, V_{GS}=10V$	-	27.2	-	nS
Rise Time	t_r		-	47.5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	78.2	-	nS
Fall Time	t_f		-	41.1	-	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.	-	-	20	A
Source Pulse Current (Body Diode)	I_{SM}		-	-	80	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=20A$	-	-	1.4	V
Reverse Recovery Time	t_{rr}	$T_J=25^\circ\text{C}, I_F=20A, dI_F/dt=100A/\mu S$	-	570	-	nS
Reverse Recovery Charge	Q_{rr}		-	5.4	-	μC

Notes:

1. Pulse test: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
2. Repetitive rating: Pulse width limited by max. junction temperature.
3. $L=30\text{mH}, I_{AS}=9.9A, V_{DD}=50V, T_J=25^\circ\text{C}$.
4. Device mounted on FR-4PCB, 1 inch x 0.85 inch x 0.062 inch.

Typical Electrical and Thermal Characteristic Curves

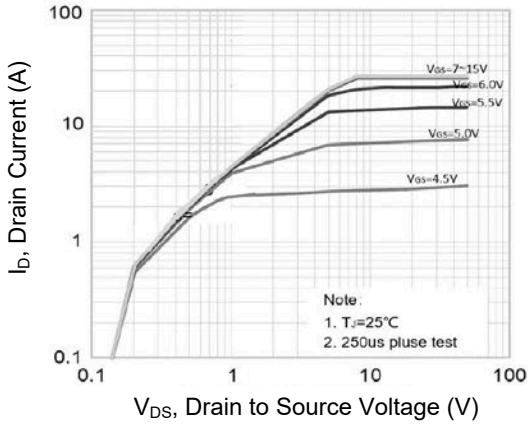


Figure 1. Typical Output Characteristics

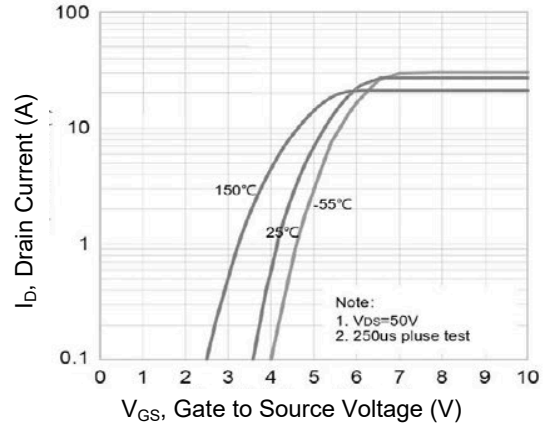


Figure 2. Transfer Characteristics

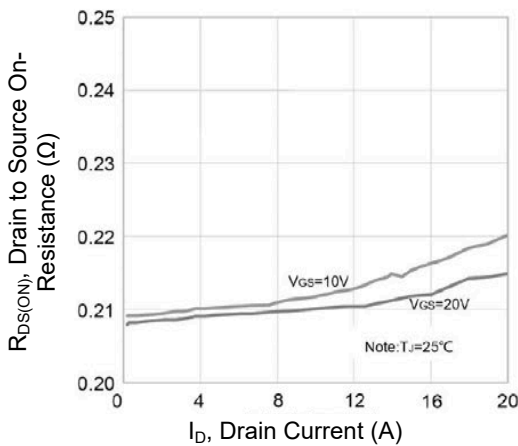


Figure 3. $R_{DS(ON)}$ vs. Drain Current

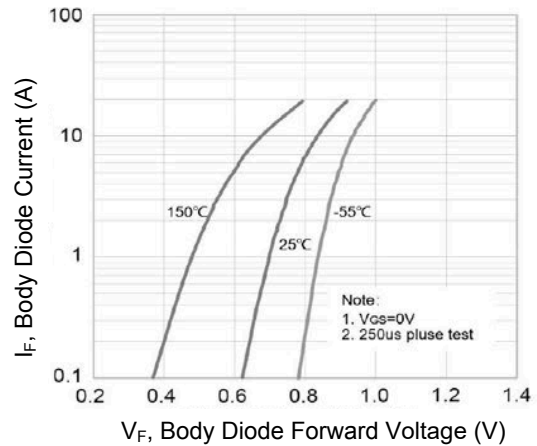


Figure 4. Body Diode Characteristics

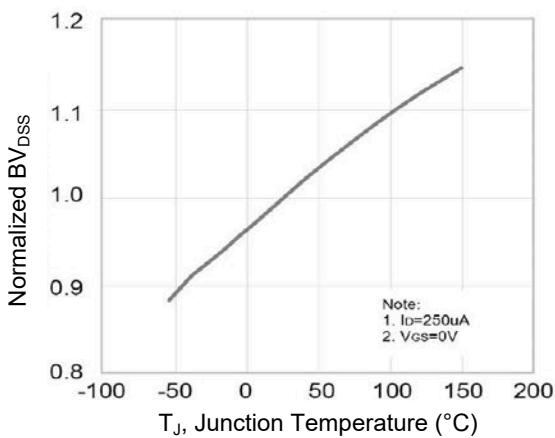


Figure 5. Normalized BV_{DSS} vs. Junction Temperature

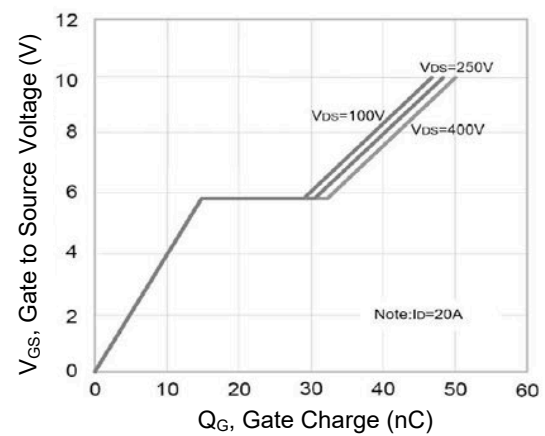


Figure 6. Gate Charge

Typical Electrical and Thermal Characteristic Curves

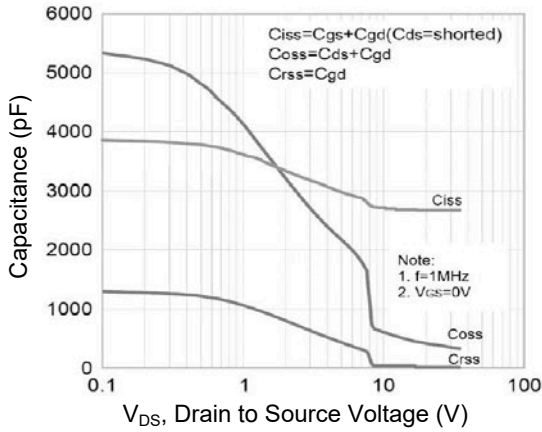


Figure 7. Capacitance Characteristics

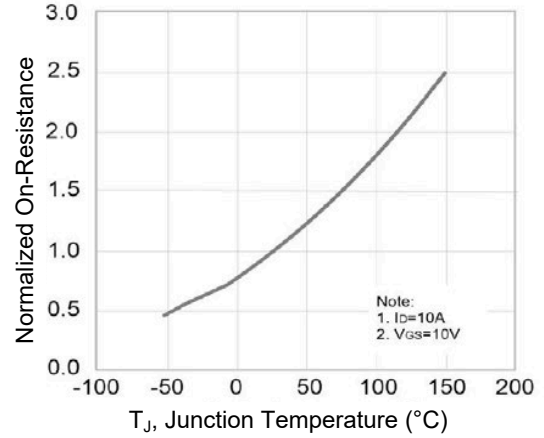


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

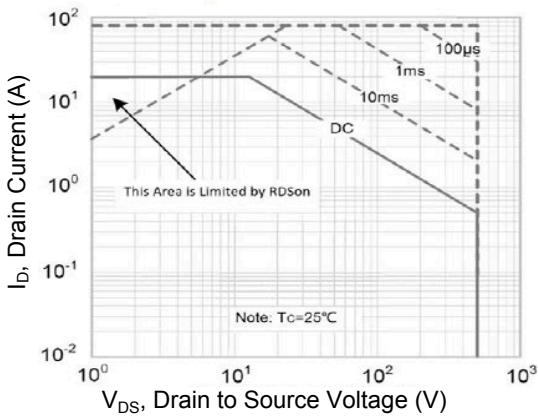
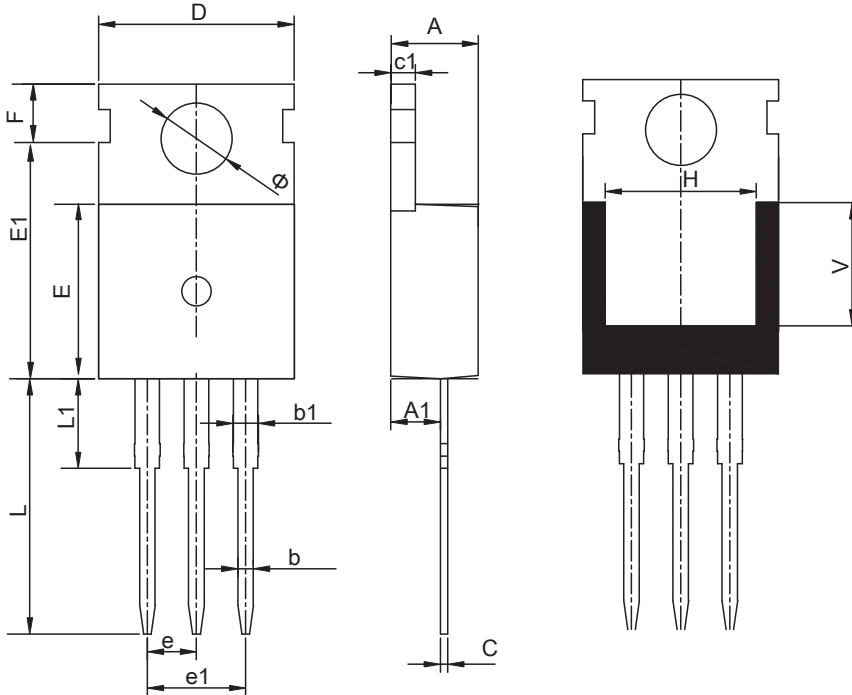


Figure 9. Safe Operation Area

Package Outline Dimensions (TO-220)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.25	2.70	0.089	0.106
b	0.71	0.91	0.028	0.036
b1	1.17	1.37	0.046	0.054
C	0.33	0.65	0.013	0.026
c1	1.20	1.40	0.047	0.055
D	9.91	10.25	0.390	0.404
E	8.95	9.75	0.352	0.384
E1	12.65	13.00	0.498	0.512
e	2.54 TYP		0.100 TYP	
e1	4.98	5.18	0.196	0.204
F	2.65	2.95	0.104	0.116
H	7.90	8.10	0.311	0.319
L	12.90	13.40	0.508	0.528
L1	2.68	3.25	0.106	0.128
V	6.90 REF		0.272 REF	
Φ	3.40	3.80	0.134	0.150

Order Information

Device	Package	Marking	Carrier	Quantity
GSFH5020	TO-220	H20N50	Tube	50pcs / Tube

For more information, please contact us at: inquiry@goodarksemi.com