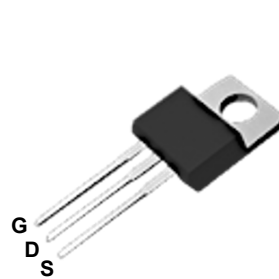
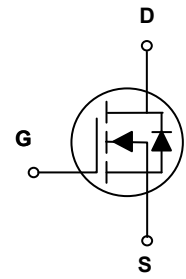


Main Product Characteristics

$V_{(BR)DSS}$	200V
$R_{DS(ON)}$	16m Ω (Max.)
I_D	82A



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 GSFH16020 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	Max.	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, @ Steady-State ($T_C=25^{\circ}\text{C}$) ¹	I_D	82	A
Continuous Drain Current, @ Steady-State ($T_C=100^{\circ}\text{C}$) ¹		58	A
Pulsed Drain Current ($T_C=25^{\circ}\text{C}$) ²	I_{DM}	328	A
Power Dissipation ($T_C=25^{\circ}\text{C}$)	P_D	288	W
Power Dissipation ($T_C=100^{\circ}\text{C}$)		144	W
Single Pulse Avalanche Energy ³	E_{AS}	922	mJ
Single Pulse Current	I_{AS}	55	A
Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State) ⁴	$R_{\theta JA}$	35	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.52	$^{\circ}\text{C/W}$
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +175	$^{\circ}\text{C}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	200	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=200V, V_{GS}=0V, T_J=25^\circ\text{C}$	-	-	1.0	μA
		$V_{DS}=160V, V_{GS}=0V, T_J=125^\circ\text{C}$	-	-	100	
Gate-to-Source Forward Leakage	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.3	3.4	4.8	V
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=20A$	-	13.5	16	m Ω
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=100V, f=1\text{MHz}$	-	2052	-	pF
Output Capacitance	C_{oss}		-	297	-	
Reverse Transfer Capacitance	C_{rss}		-	12	-	
Total Gate Charge	Q_g	$I_D=20A, V_{DD}=100V, V_{GS}=10V$	-	32	-	nC
Total Gate Charge	Q_g	$I_D=20A, V_{DD}=100V, V_{GS}=6V$	-	20	-	
Gate-to-Source Charge	Q_{gs}	$I_D=20A, V_{DD}=100V, V_{GS}=10V$	-	9.7	-	
Gate-to-Drain ("Miller") Charge	Q_{gd}		-	7.8	-	
Gate-to-Plateau	$V_{plateau}$		-	5.2	-	V
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=60V, V_{GS}=10V, R_G=3.0\Omega, I_D=20A$	-	14	-	nS
Rise Time	t_r		-	16	-	
Turn-Off Delay Time	$t_{d(off)}$		-	27	-	
Fall Time	t_f		-	12	-	
Gate Resistance	R_g	$f=1\text{MHz}$	-	2.5	-	Ω
Drain-Source Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	82	A
Diode Forward Voltage	V_{SD}	$I_S=10A, V_{GS}=0V$	-	0.9	1.4	V
Reverse Recovery Time	t_{rr}	$I_F=20A, dI_F/dt=100A/\mu s, T_J=25^\circ\text{C}$	-	120	-	nS
Reverse Recovery Charge	Q_{rr}		-	523	-	nC

Notes:

1. This current is chip limited, which is calculated based on $R_{\theta JC}$.
2. This current is calculated on single pulse with 10 μs pulse & duty cycle=1%.
3. Defined by design, not subject to production test, E_{AS} condition: $T_J=25^\circ\text{C}, V_{DD}=100V, V_{GS}=10V, L=0.1\text{mH}$.
4. Device mounted on FR-4 substrate PC board with 2oz copper in 1 inch square cooling area.

Typical Electrical and Thermal Characteristic Curves

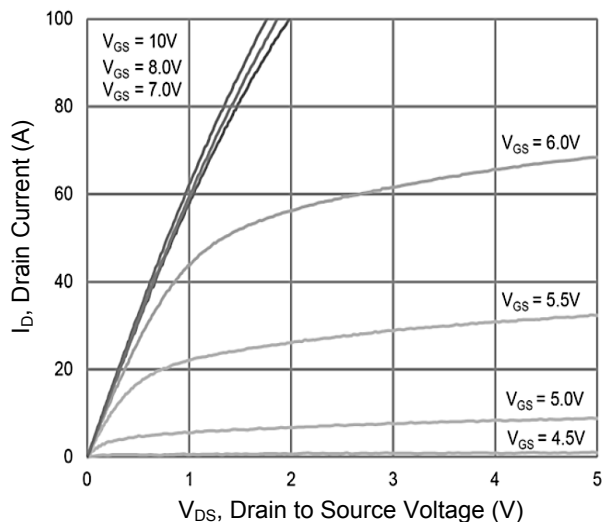


Figure 1. Output Characteristics

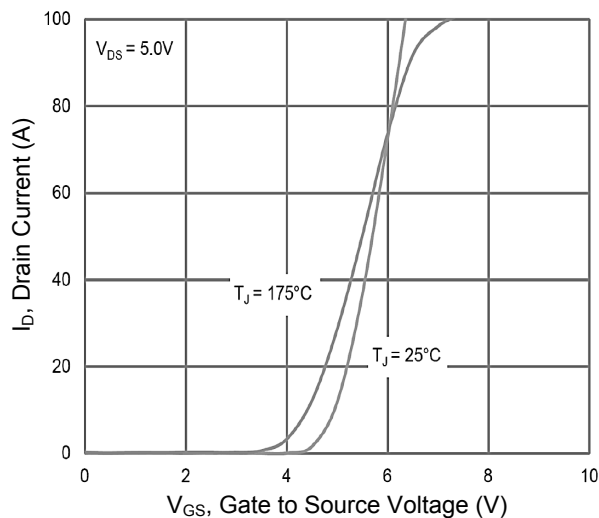


Figure 2. Transfer Characteristics

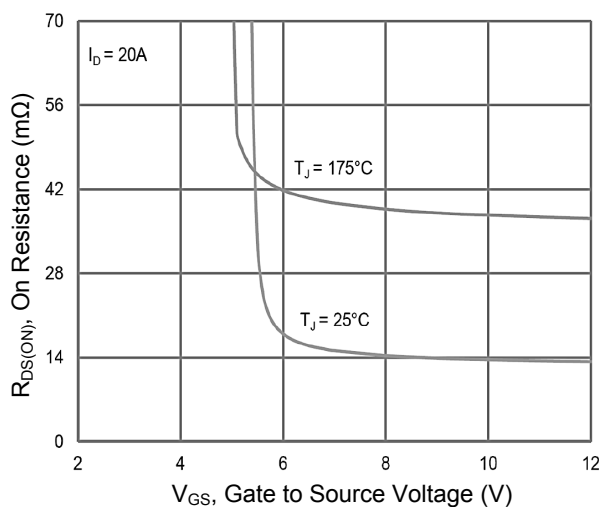


Figure 3. On Resistance vs. Gate to Source Voltage

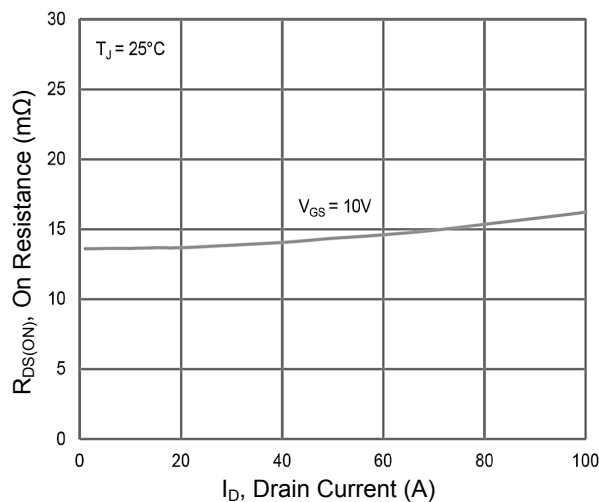


Figure 4. On Resistance vs. Drain Current

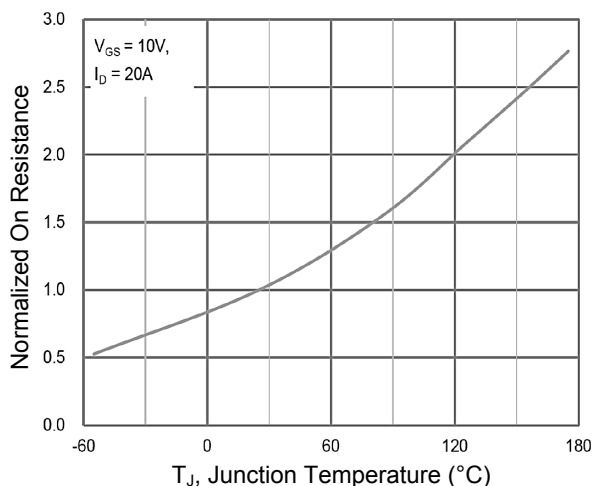


Figure 5. On-Resistance vs. Junction Temperature

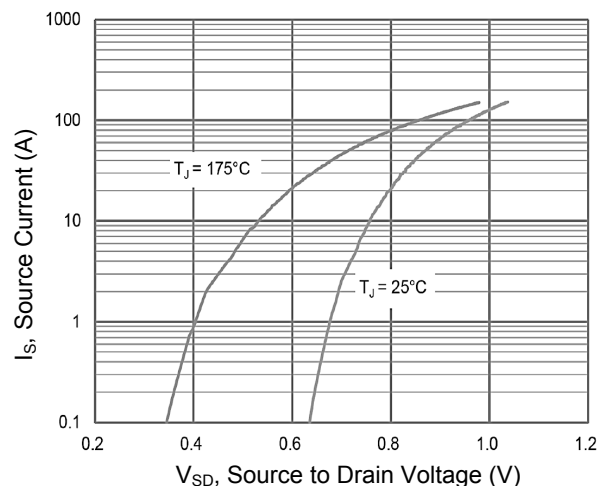


Figure 6. Source Drain Diode Forward Voltage

Typical Electrical and Thermal Characteristic Curves

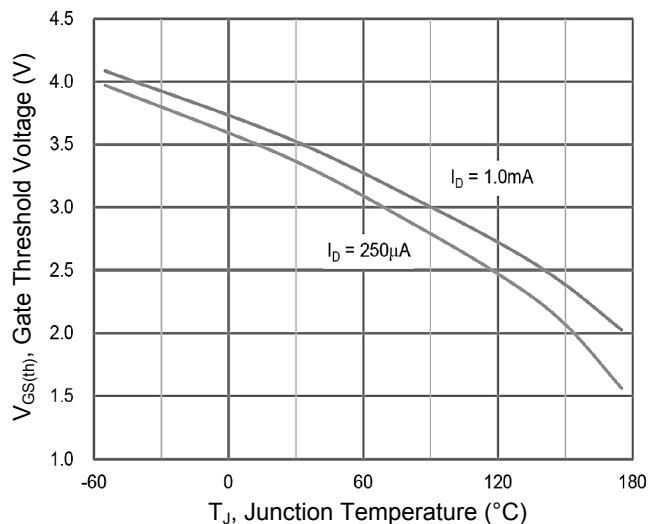


Figure 7. $V_{GS(th)}$ vs. Junction Temperature

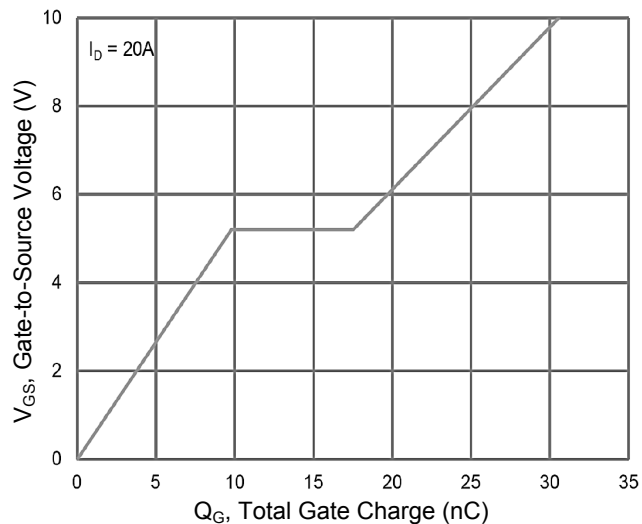


Figure 8. Gate Charge Characteristics

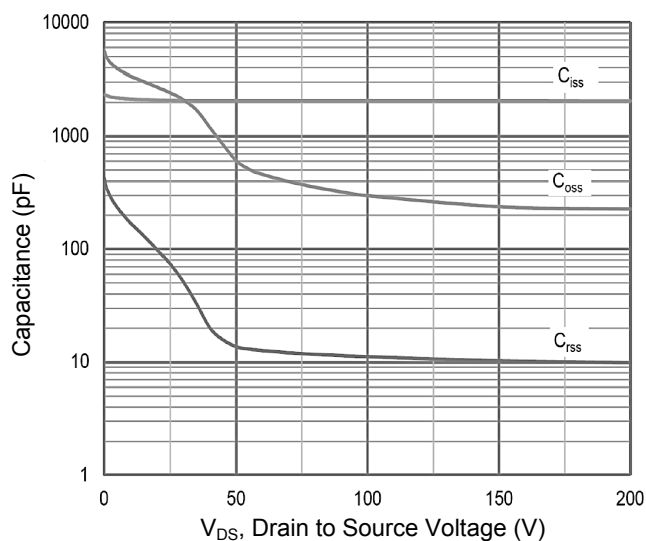


Figure 9. Capacitance Characteristics

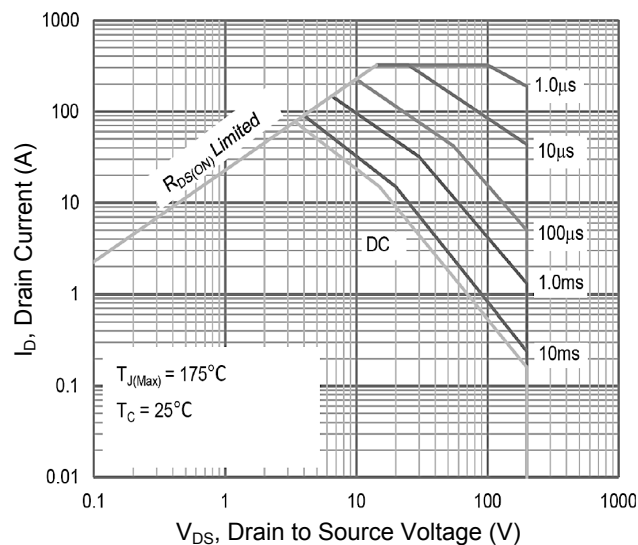
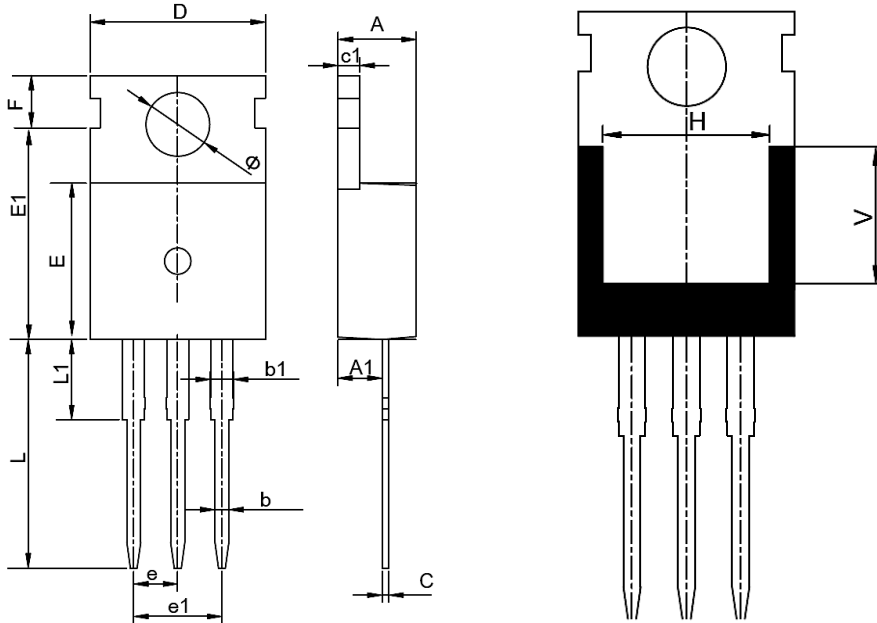


Figure 10. Safe Operating Area

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
GSFH16020	TO-220	H16020	Tube	50 Pcs / Tube