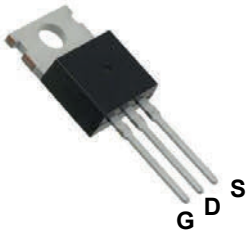
GOOD-ARK SEMICONDUCTOR

GSFH49020

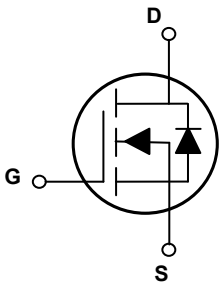
200V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	200V
$R_{DS(ON)}$	49mΩ (max.)
I_D	24A



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

RoHS Compliant

Description

The GSFH49020 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°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°C)[1]	I_D	24	A
Continuous Drain Current, @ Steady-State (T_C=100°C)		15	A
Pulsed Drain Current[2]	I_{DM}	96	A
Power Dissipation (T_C=25°C)	P_D	150	W
Linear Derating Factor (T_C=25°C)		1.2	W/°C
Single Pulse Avalanche Energy[3]	E_{AS}	29	mJ
Junction-to-Case	$R_{\theta Jc}$	0.83	°C/W
Junction-to-Ambient (PCB Mounted, Steady-State)[4]	$R_{\theta JA}$	62.5	°C/W
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +150	°C

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Electrical Characteristics (T_C=25°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=250μA	200	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=200V, V_{GS}=0V	-	-	1	μA
		T_J=125°C	-	-	20	
Gate-to-Source Forward Leakage	I_{GSS}	V_{GS}=20V	-	-	100	nA
		V_{GS}=-20V	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=22A	-	41.6	49	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2.1	3	3.9	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{lss}	V_{GS}=0V, V_{DS}=100V F=1MHz	-	1223	-	pF
Output Capacitance	C_{oss}		-	94	-	
Reverse Transfer Capacitance	C_{rss}		-	6.8	-	
Total Gate Charge	Q_g	I_D=12A, V_{DS}=100V, V_{GS}=10V	-	20.5	-	nC
Gate-to-Source Charge	Q_{gs}		-	8.6	-	
Gate-to-Drain ("Miller") Charge	Q_{gd}		-	4.8	-	
Turn-on Delay Time	$t_{d(on)}$	V_{GS}=10V, V_{DS}=100V, I_D=12A, R_{GEN}=6Ω	-	11.5	-	nS
Rise Time	t_r		-	26.3	-	
Turn-Off Delay Time	$t_{d(off)}$		-	34.5	-	
Fall Time	t_f		-	22.6	-	
Gate Resistance	R_g	F=1MHz		1.8		Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	24	A
Pulsed Source Current (Body Diode)	I_{SM}		-	-	96	A
Diode Forward Voltage	V_{SD}	I_S=24A, V_{GS}=0V	-	1	1.2	V
Reverse Recovery Time	T_{rr}	T_J=25°C, I_F=24A, di/dt=100A/μs	-	83	-	ns
Reverse Recovery Charge	Q_{rr}		-	0.3	-	uc

Note:

1. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. L=0.1mH, V_{DD}=80V, I_{AS}=24A, T_J=25°C.
4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Typical Electrical and Thermal Characteristic Curves

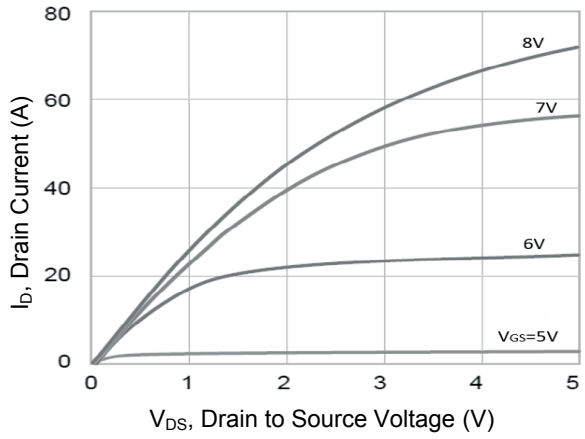


Figure 1. Output Characteristics

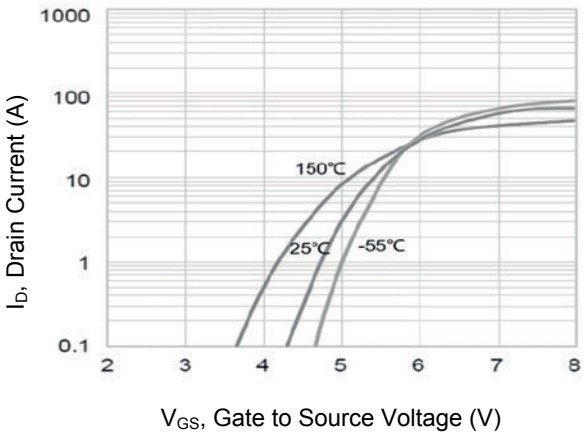


Figure 2. Transfer Characteristics

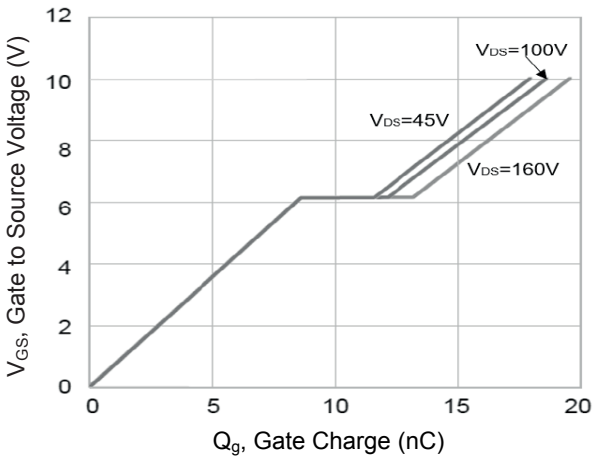


Figure 3. Gate Charge

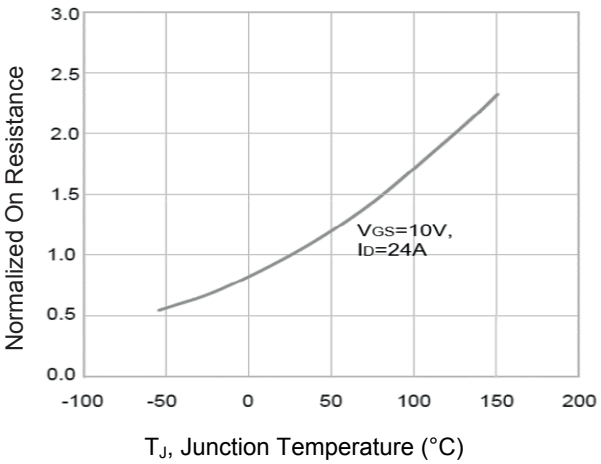


Figure 4. Normalized R_{DSON} vs. Junction Temperature

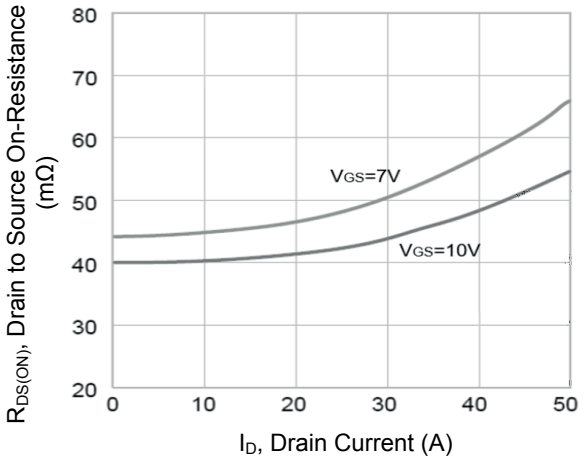


Figure 5. On-Resistance vs. Drain Current

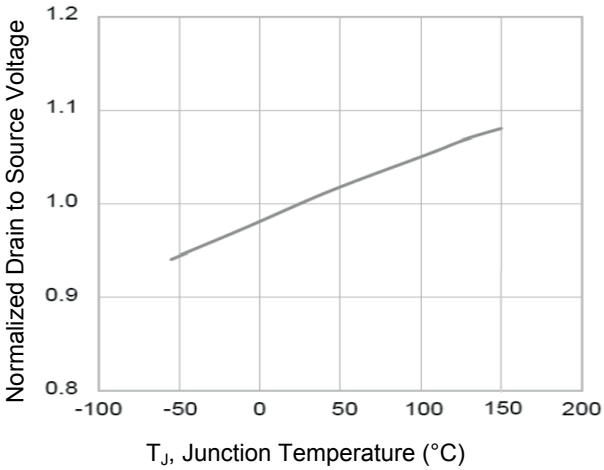


Figure 6. Normalized BV_{DSS} Vs. Junction Temperature

Typical Electrical and Thermal Characteristic Curves

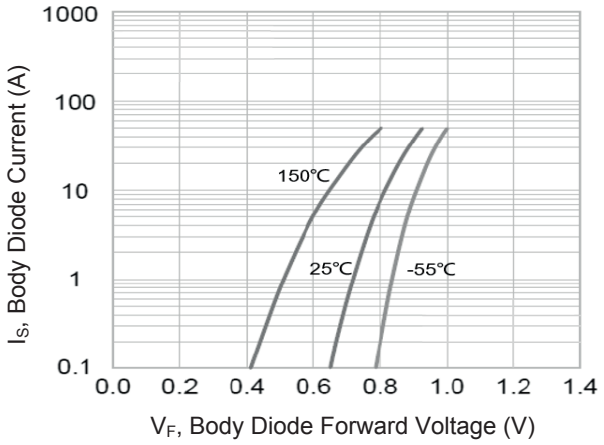


Figure 7. Body Diode Characteristics

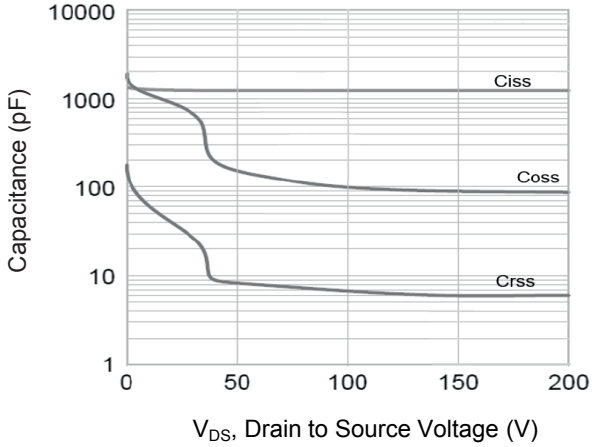


Figure 8. Transfer Characteristics

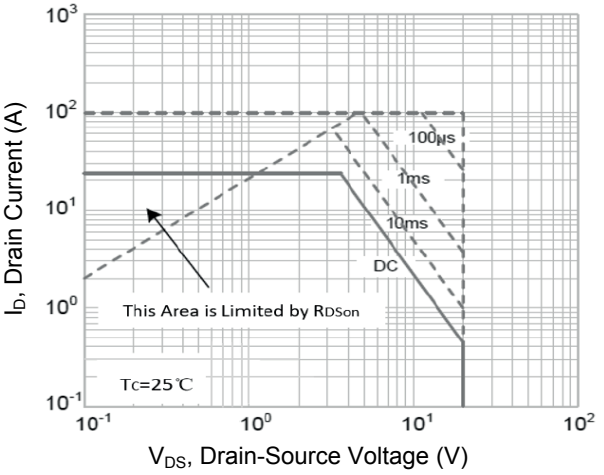
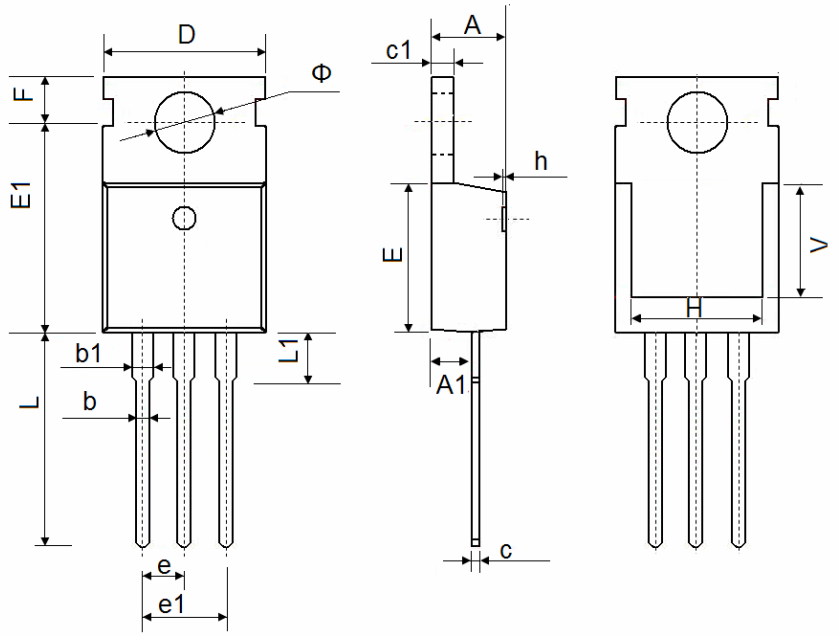


Figure 9. Safe Operation Area

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