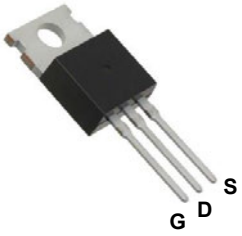
GOOD-ARK SEMICONDUCTOR

GSFH10120

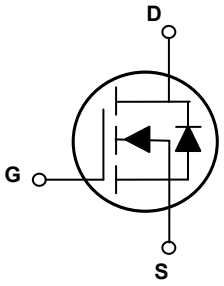
100V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	100V
$R_{DS(ON)}$	4.4mΩ (max.)
I_D	180A



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 GSFH10120 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}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous, at Steady-State, (T_C=25°C)[1]	I_D	180	A
Drain Current-Continuous, at Steady-State, (T_C=100°C)[1]		130	
Drain Current-Pulsed[2]	I_{DM}	720	A
Single Pulse Avalanche Energy[3]	E_{AS}	780	mJ
Power Dissipation (T_C=25°C)	P_D	208	W
Linear Derating Factor (T_C=25°C)		1.7	°C/W
Junction-to-Ambient (PCB Mounted, Steady-State)[4]	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.6	°C/W
Operating Junction Temperature Range	T_J	-55 To +150	°C
Storage Temperature Range	T_{STG}	-55 To +150	°C

Electrical Characteristics (T_A=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250uA	100	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=100V, V_{GS}=0V	-	-	1	μA
		T_J=125°C	-	-	50	
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=20V	-	-	100	nA
		V_{DS}=0V, V_{GS}=-20V	-	-	-100	
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=50A	-	3.6	4.4	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250uA	2.2	3	3.9	V
Dynamic and Switching Characteristics						
Total Gate Charge	Q_g	V_{DS}=50V, I_D=20A, V_{GS}=10V	-	152	-	nC
Gate-Source Charge	Q_{gs}		-	45.5	-	
Gate-Drain ("Miller") Charge	Q_{gd}		-	45.2	-	
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=50V, R_{GEN}=3Ω, V_{GS}=10V, R_L=1Ω	-	40	-	nS
Rise Time	t_r		-	66	-	
Turn-Off Delay Time	$t_{d(off)}$		-	101	-	
Fall Time	t_f		-	41	-	
Input Capacitance	C_{iss}	V_{DS}=50V, V_{GS}=0V, F=1MHz	-	8402	-	pF
Output Capacitance	C_{oss}		-	890	-	
Reverse Transfer Capacitance	C_{rss}		-	34	-	
Gate Resistance	R_g	F=1MHz	-	1.8	-	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	180	A
Pulsed Source Current (Body Diode)	I_{SM}		-	-	720	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=50A	-	1	1.2	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=50A, di/dt=100A/μs	-	82	-	ns
Reverse Recovery Charge	Q_{rr}		-	0.24	-	uc

Note:

1. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%.
2. Repetitive rating: Pulsed width limited by maximum junction temperature.
3. L=0.5mH, V_{DD}=80V, 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

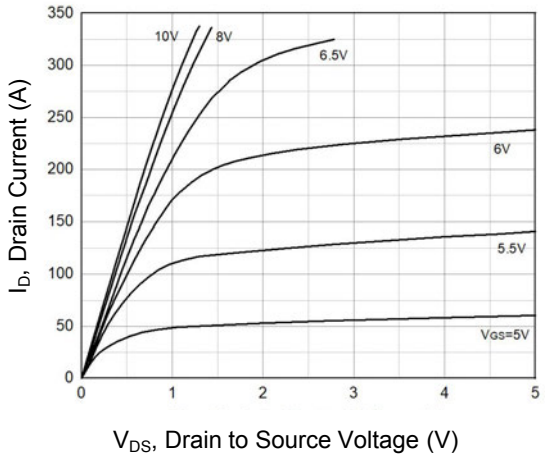


Figure 1. Typical Output Characteristics

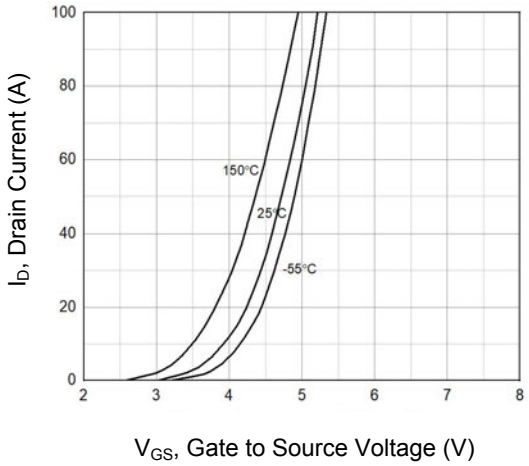


Figure 2. Typical Transfer Characteristics

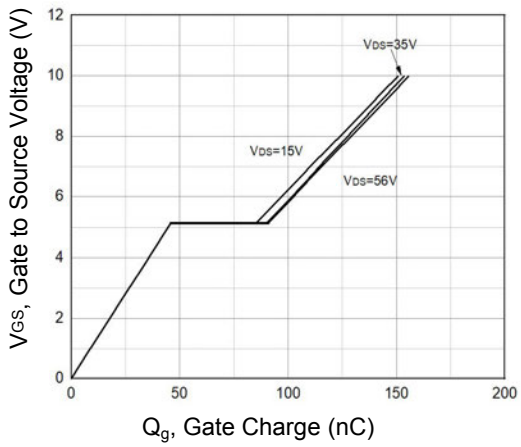


Figure 3. Gate Charge Characteristics

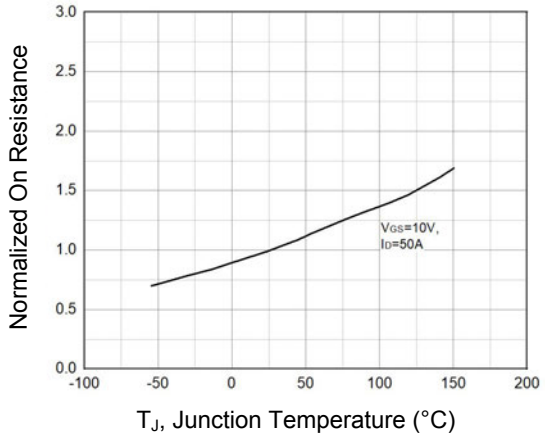


Figure 4. Normalized On-Resistance vs. Junction Temperature

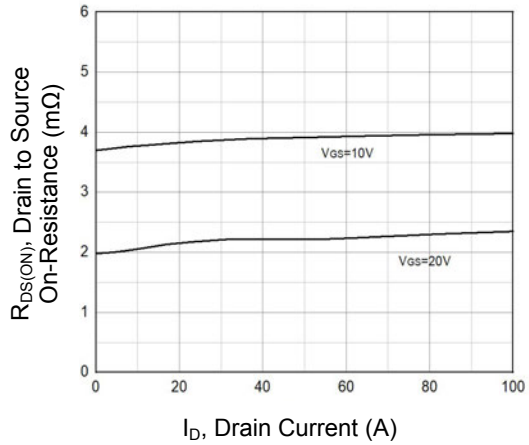


Figure 5. On Resistance vs. Drain Current

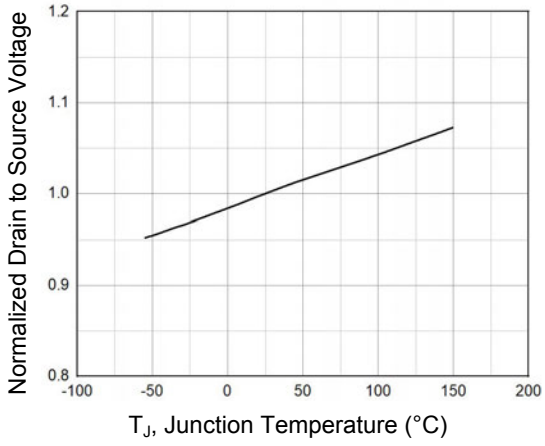


Figure 6. Normalized BV_{DSS} vs. Junction Temperature

Typical Electrical and Thermal Characteristic Curves

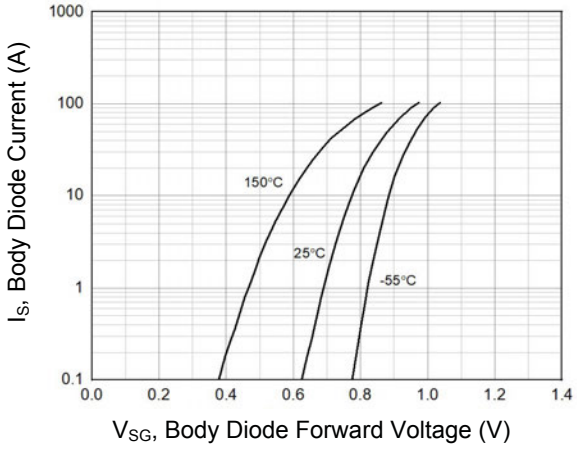


Figure 7. Body Diode Characteristics

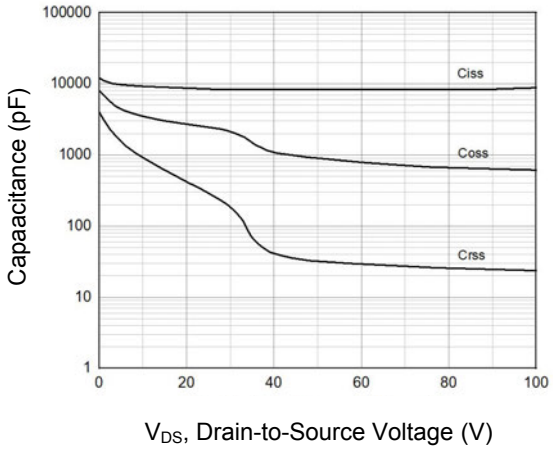


Figure 8. Capacitance Characteristics

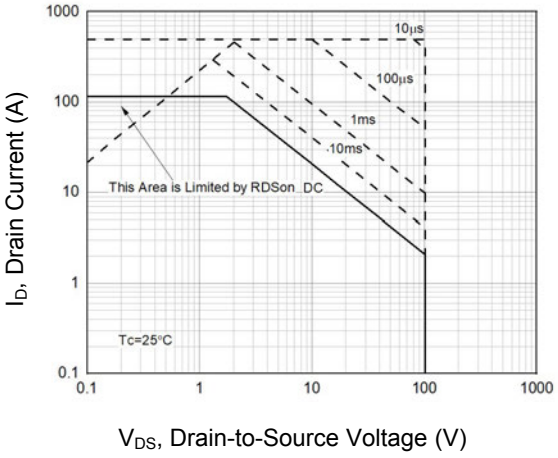
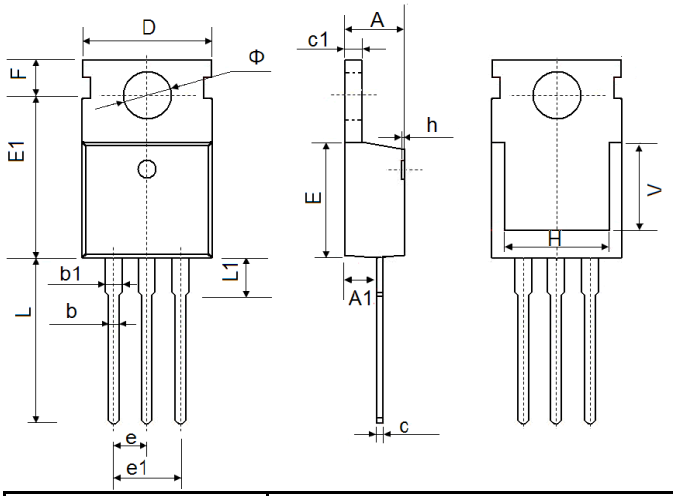


Figure 9. Safe Operation Area

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	8.950	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

Order Information

Device	Package	Marking	Quantity	HSF Status
GSFH10120	TO-220	H4R410	50pcs / Tube	RoHS Compliant