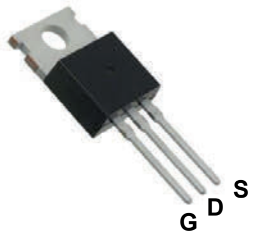
GOOD-ARK
SEMICONDUCTOR

GSFH60R190

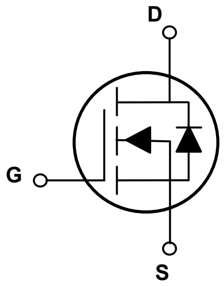
600V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	600V
$R_{DS(ON)}$	0.19Ω (Max.)
I_D	20A



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 GSFH60R190 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	Rating	Unit
Drain-Source Voltage	V_{DS}	600	V
Gate-to-Source Voltage	V_{GS}	±30	V
Continuous Drain Current, @ Steady-State (T_C=25°C)	I_D	20	A
Continuous Drain Current, @ Steady-State (T_C=100°C)		12	A
Pulsed Drain Current	I_{DM}	80	A
Power Dissipation (T_C=25°C)	P_D	66	W
		0.52	W/°C
Single Pulse Avalanche Energy[1]	E_{AS}	967	mJ
Body Diode Reverse Voltage Slope[2]	dv/dt	15	V/ns
MOS dv/dt Ruggedness[3]	dv/dt	50	V/ns
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.5	°C/W
Junction-to-Case	$R_{\theta JC}$	1.90	°C/W
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +150	°C

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	600	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=600V, V_{GS}=0V	-	-	200	nA
Gate-to-Source Forward Leakage	I_{GSS}	V_{DS}=0V, V_{GS}=30V	-	-	100	nA
		V_{DS}=0V, V_{GS}=-30V	-	-	-100	
Static Drain-to-Source On-Resitance	$R_{DS(ON)}$	V_{GS}=10V, I_D=10A, T_J=25°C	-	0.16	0.19	Ω
		V_{GS}=10V, I_D=10A, T_J=125°C	-	0.3	-	Ω
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2.0	-	4.0	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=100V, F=1MHz	-	1174	-	pF
Output Capacitance	C_{oss}		-	67	-	
Reverse Transfer Capacitance	C_{rss}		-	4.0	-	
Total Gate Charge[4,5]	Q_g	I_D=20A, V_{DD}=480V, V_{GS}=10V	-	39	-	nC
Gate-to-Source Charge[4,5]	Q_{gs}		-	9.6	-	
Gate-to-Drain ("Miller") Charge[4,5]	Q_{gd}		-	20	-	
Turn-On Delay Time[4,5]	$t_{d(on)}$	V_{DD}=300V, V_{GS}=10V, R_G=25 Ω, I_D=20A	-	20	-	nS
Rise Time[4,5]	t_r		-	60	-	
Turn-Off Delay Time[4,5]	$t_{d(off)}$		-	105	-	
Fall Time[4,5]	t_f		-	42	-	
Gate Resistance	R_g	F=1MHz	-	2.6	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	T_C=25°C, MOSFET symbol showing the integral reverse p-n junction diode.	-	-	20	A
Source Pulse Current	I_{SM}		-	-	80	A
Diode Forward Voltage	V_{SD}	I_S=20A, V_{GS}=0V	-	-	1.2	V
Reverse Recovery Time[3]	T_{rr}	I_F=20A, V_{DD}=50V, dI_F/dt=100A/us	-	426	-	nS
Reverse Recovery Charge[3]	Q_{rr}		-	6.2	-	μC

Note:

1. L=79mH, I_{AS}=4.6A, V_{DD}=100V, starting temperature T_J=25°C.
2. V_{DS}=0-400V, I_{SD}<=20A, T_J=25°C.
3. V_{DS}=0-480V.
4. Pulse test: Pulse width ≤ 300μs, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

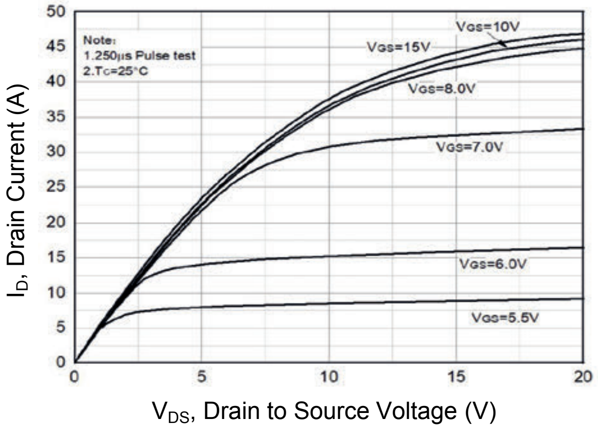


Figure 1. Typical Output Characteristics

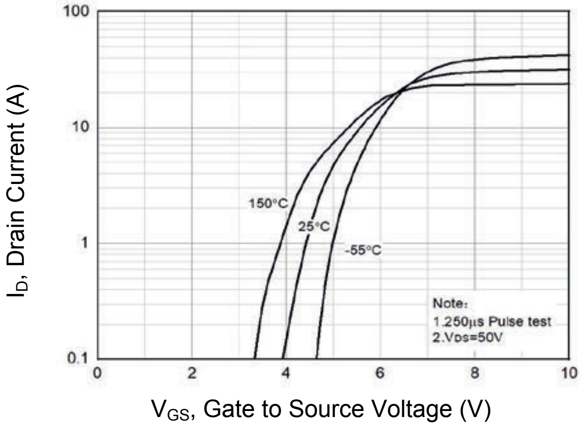


Figure 2. Transfer Characteristics

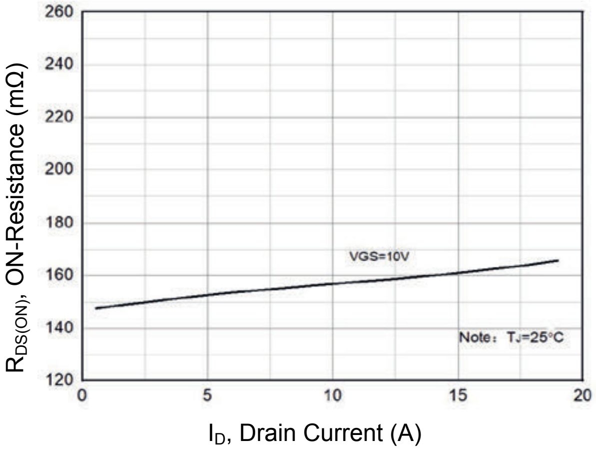


Figure 3. On-Resistance vs. Drain Current

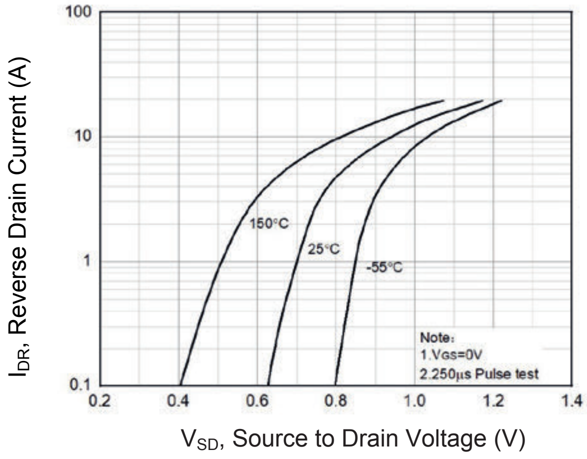


Figure 4. Body Diode Characteristics

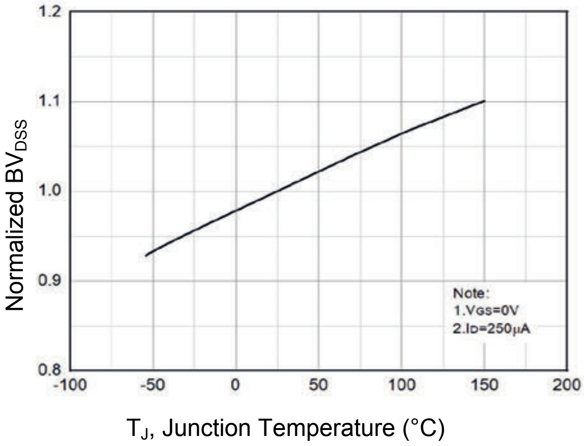


Figure 5. Normalized BV_{DSS} vs. T_J

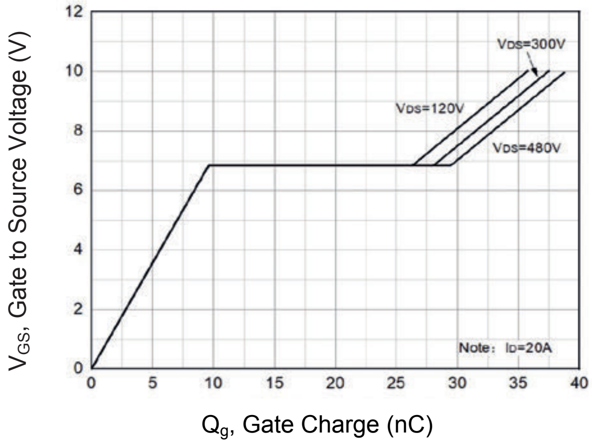


Figure 6. Gate Charge

Typical Electrical and Thermal Characteristic Curves

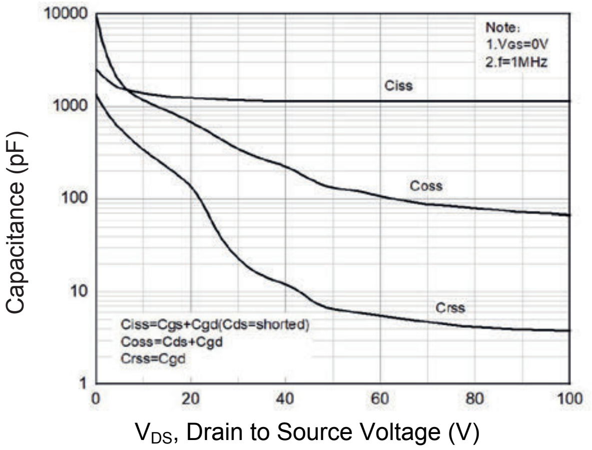


Figure 7. Capacitance Characteristics

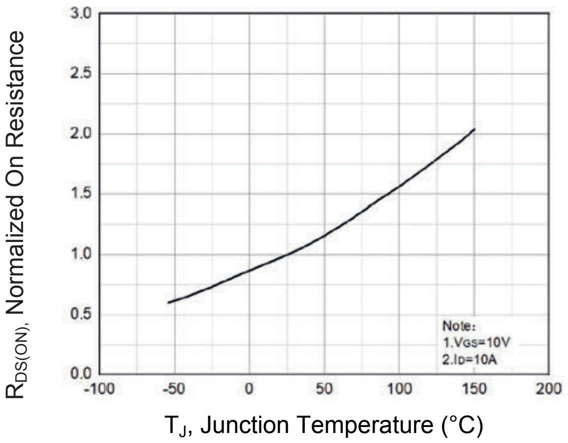


Figure 8. Normalized On-Resistance vs. T_J

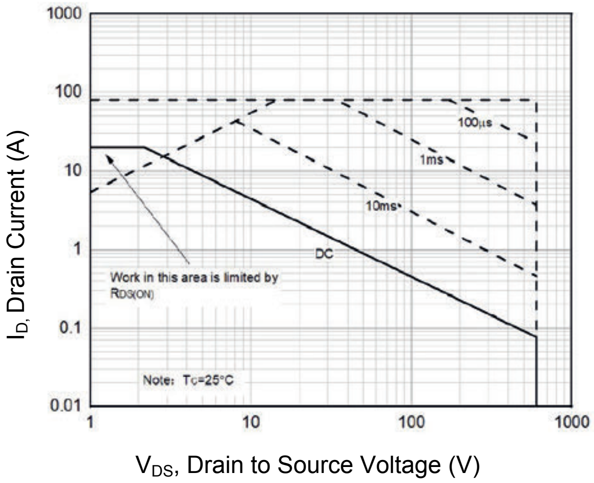
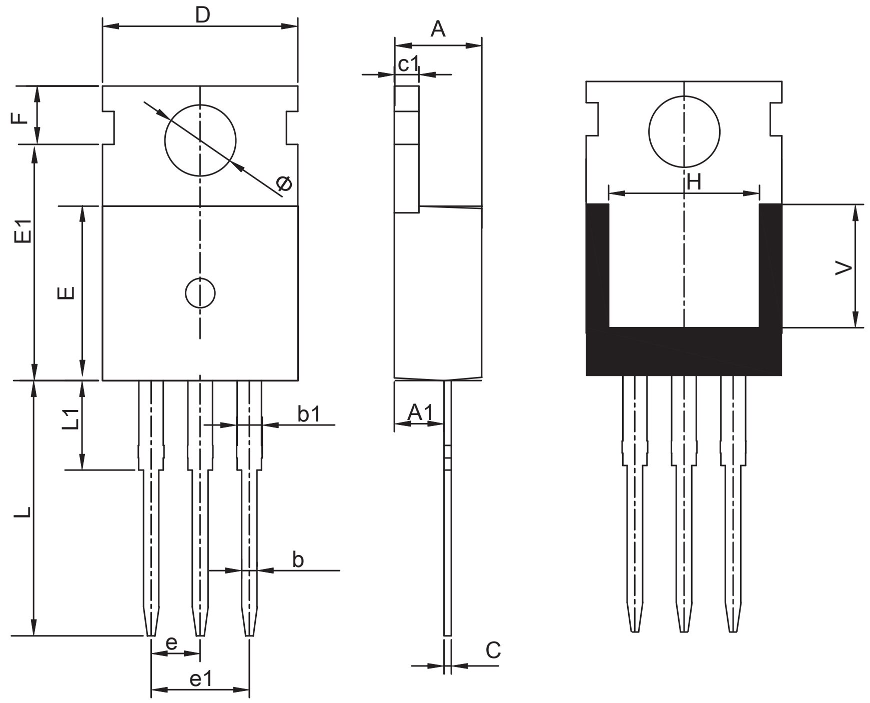


Figure 9. Safe Operation Area

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
GSFH60R190	TO-220	H60R190	Tube	50pcs / Tube

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