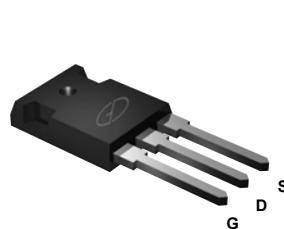
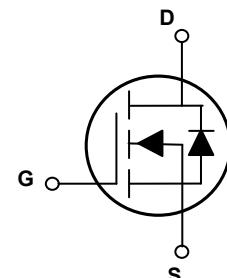


Main Product Characteristics

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



TO-247



Schematic Diagram

Features and Benefits

- Advance 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 GSJA60R190 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 ($T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	600	V
Gate-Source Voltage	V_{GS}	± 30	V
Drain Current-Continuous, at Steady-State, ($T_C=25^\circ\text{C}$)	I_D	20	A
Drain Current-Continuous, at Steady-State, ($T_C=100^\circ\text{C}$)		12	
Drain Current-Pulsed	I_{DM}	80	A
Single Pulse Avalanche Energy ¹	E_{AS}	967	mJ
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	150	W
		1.2	W/ $^\circ\text{C}$
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	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.83	$^\circ\text{C/W}$
Operating Junction Temperature Range	T_J	-55 To +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 To +150	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=250\mu\text{A}$	600	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=600\text{V}, V_{\text{GS}}=0\text{V}$	-	-	200	nA
Gate-Source Forward Current	I_{GSS}	$V_{\text{GS}}=\pm 30\text{V}, V_{\text{DS}}=0\text{V}$	-	-	± 100	nA
Static Drain-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_{\text{D}}=10\text{A}, T_J=25^\circ\text{C}$	-	0.16	0.19	Ω
		$V_{\text{GS}}=10\text{V}, I_{\text{D}}=10\text{A}, T_J=125^\circ\text{C}$	-	0.3	-	
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}}=V_{\text{DS}}, I_{\text{D}}=250\mu\text{A}$	2.0	-	4.0	V
Dynamic and Switching Characteristics						
Total Gate Charge ^{4,5}	Q_g	$V_{\text{DD}}=480\text{V}, I_{\text{D}}=20\text{A}, V_{\text{GS}}=10\text{V}$	-	39	-	nC
Gate-Source Charge ^{4,5}	Q_{gs}		-	9.6	-	
Gate-Drain ("Miller") Charge ^{4,5}	Q_{gd}		-	20	-	
Turn-On Delay Time ^{4,5}	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=300\text{V}, R_{\text{G}}=25\Omega, V_{\text{GS}}=10\text{V}, I_{\text{D}}=20\text{A}$	-	20	-	nS
Rise Time ^{4,5}	t_r		-	60	-	
Turn-Off Delay Time ^{4,5}	$t_{\text{d}(\text{off})}$		-	105	-	
Fall Time ^{4,5}	t_f		-	42	-	
Input Capacitance	C_{iss}	$V_{\text{DS}}=100\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	1174	-	pF
Output Capacitance	C_{oss}		-	67	-	
Reverse Transfer Capacitance	C_{rss}		-	4.0	-	
Gate Resistance	R_g	$F=1\text{MHz}$	-	2.6	-	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current (Body Diode)	I_s	$T_c=25^\circ\text{C}$, MOSFET symbol showing the integral reverse p-n junction diode.	-	-	20	A
Pulsed Source Current	I_{SM}		-	-	80	A
Diode Forward Voltage	V_{SD}	$V_{\text{GS}}=0\text{V}, I_s=20\text{A}$	-	-	1.2	V
Reverse Recovery Time ³	t_{rr}	$V_{\text{DD}}=50\text{V}, I_F=20\text{A}, dI/dt=100\text{A}/\mu\text{s}$	-	426	-	nS
Reverse Recovery Charge ³	Q_{rr}		-	6.2	-	μC

Note:

1. $L=79\text{mH}, V_{\text{DD}}=100\text{V}, I_{\text{AS}}=4.6\text{A}$, starting temperature $T_J=25^\circ\text{C}$.
2. $V_{\text{DS}}=0 \text{ - } 400\text{V}, I_{\text{SD}} \leq I_s, T_J=25^\circ\text{C}$.
3. $V_{\text{DS}}=0 \text{ - } 480\text{V}$.
4. Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
5. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

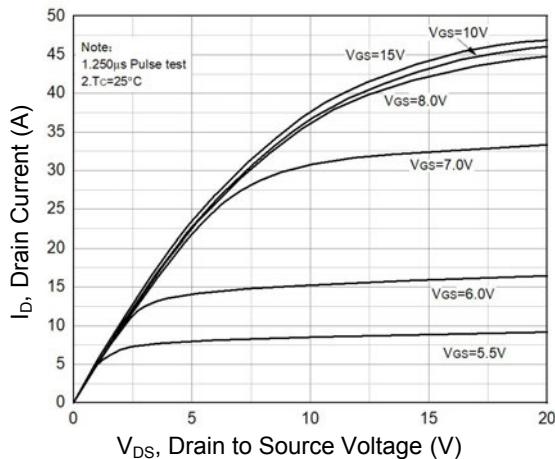


Figure 1. Typical Output Characteristics

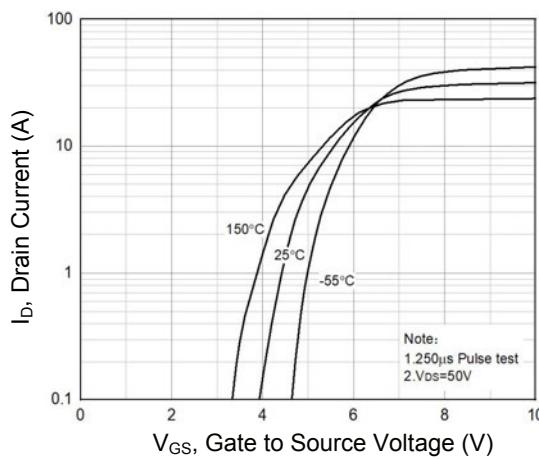


Figure 2. Transfer Characteristics

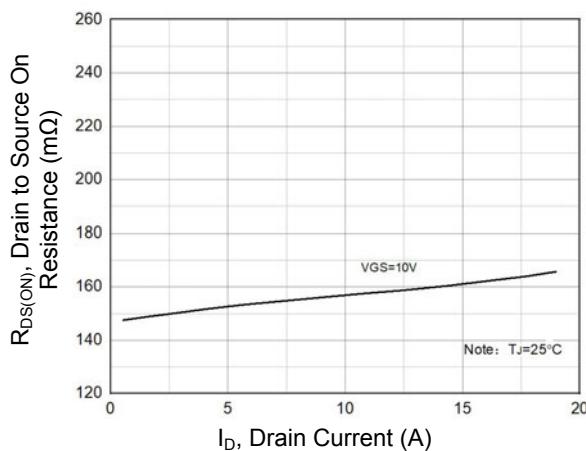


Figure 3. $R_{DS(on)}$ vs. Drain Current

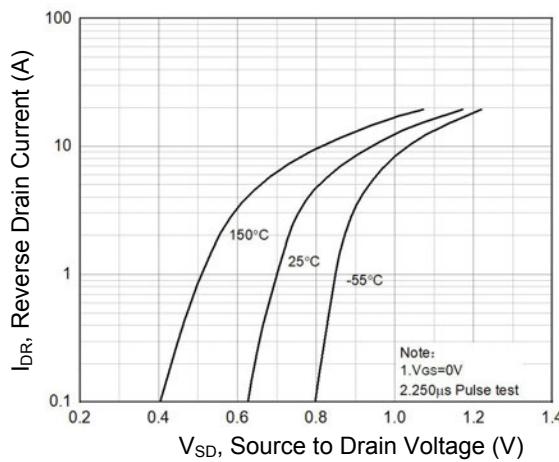


Figure 4. Body Diode Characteristics

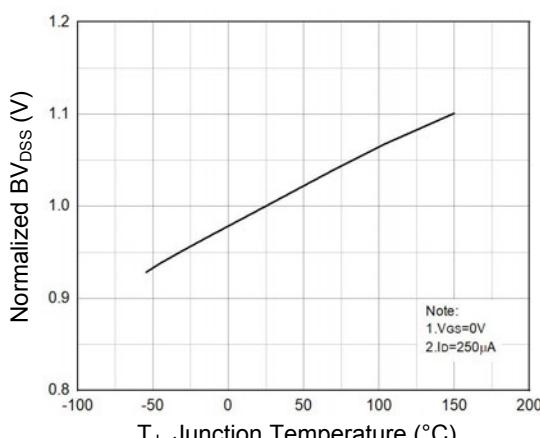


Figure 5. Normalized BV_{DSS} vs. T_j

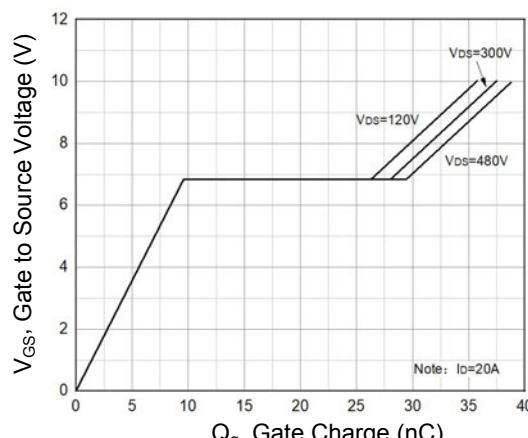


Figure 6. Gate Charge Characteristics

Typical Electrical and Thermal Characteristic Curves

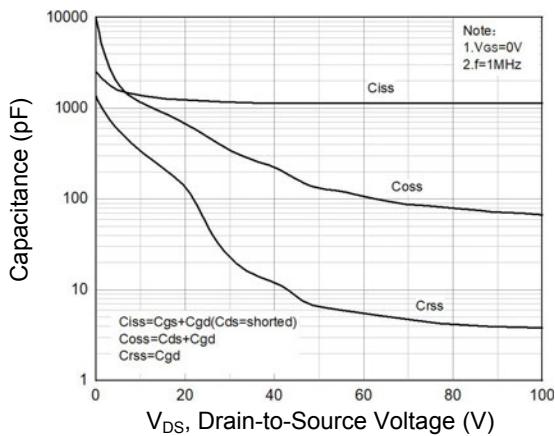


Figure 7. Capacitance Characteristics

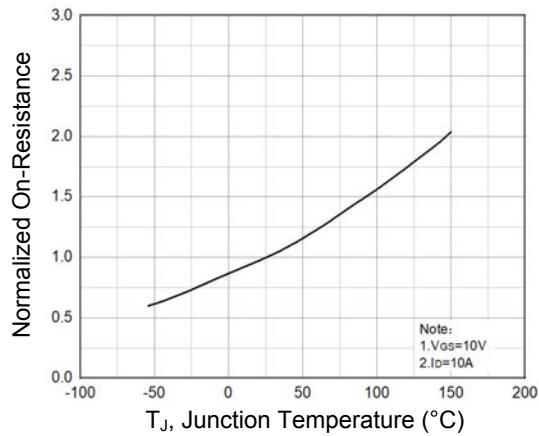


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

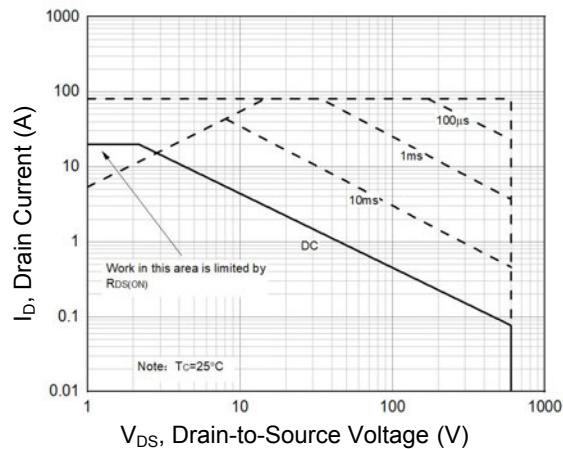
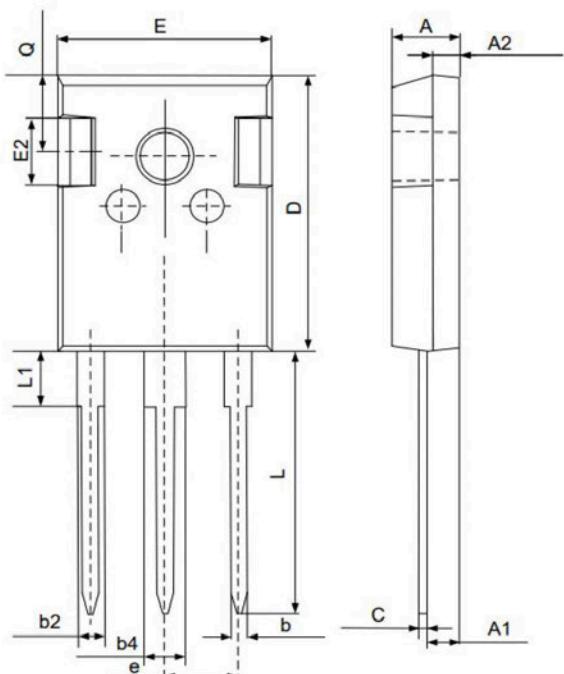


Figure 9. Safe Operation Area

Package Outline Dimensions (TO-247)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	4.800	5.200	0.189	0.205
A1	2.210	2.590	0.087	0.102
A2	1.850	2.150	0.073	0.085
b	1.110	1.360	0.044	0.054
b2	1.910	2.250	0.075	0.089
b4	2.910	3.250	0.115	0.128
c	0.510	0.750	0.020	0.030
D	20.800	21.300	0.819	0.839
E	15.500	16.100	0.610	0.634
E2	4.400	5.200	0.173	0.205
e	5.440 BSC		0.214 BSC	
L	19.720	20.220	0.776	0.796
L1	-	4.300	-	0.169
Q	5.600	6.000	0.220	0.236