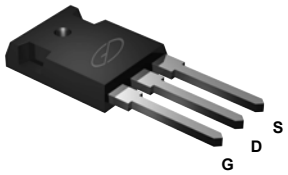
GOOD-ARK SEMICONDUCTOR

GSJA60R069

600V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	600V
$R_{DS(ON)}$	69mΩ (max.)
I_D	48A



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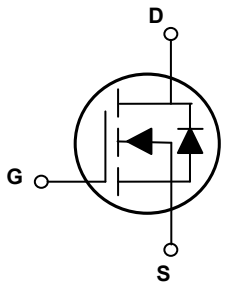


Schematic Diagram

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

RoHS Compliant

Description

The GSJA60R069 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_A=25°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°C)	I_D	48	A
Drain Current-Continuous, at Steady-State, (T_C=100°C)		30	
Drain Current-Pulsed	I_{DM}	192	A
Single Pulse Avalanche Energy[1]	E_{AS}	2650	mJ
Single Pulse Current	I_{AS}	12.4	A
Power Dissipation (T_C=25°C)	P_D	415	W
		3.32	W/°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)	$R_{\theta JA}$	50	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.30	°C/W
Operating Junction Temperature Range	T_J	-55 To +150	°C
Storage Temperature Range	T_{STG}	-55 To +150	°C
Soldering Temperature	T_{sold}	260	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	600	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=600V, V_{GS}=0V, T_J=25°C	-	-	1.0	μA
		V_{DS}=600V, V_{GS}=0V, T_J=125°C	-	2.0	-	μA
Gate-Source Forward Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V	-	-	±100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=23A	-	54	69	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250uA	2.0	-	4.0	V
Dynamic and Switching Characteristics						
Total Gate Charge[4,5]	Q_g	V_{DD}=480V, I_D=47A, V_{GS}=10V	-	96	-	nC
Gate-Source Charge[4,5]	Q_{gs}		-	22	-	
Gate-Drain ("Miller") Charge[4,5]	Q_{gd}		-	48	-	
Gate to Plateau[4,5]	$V_{plateau}$		-	6.3	-	V
Turn-On Delay Time[4,5]	$t_{d(on)}$	V_{DD}=380V, R_G=1.8Ω, V_{GS}=10V, I_D=47A	-	23	-	nS
Rise Time[4,5]	t_r		-	32	-	
Turn-Off Delay Time[4,5]	$t_{d(off)}$		-	86	-	
Fall Time[4,5]	t_f		-	24	-	
Input Capacitance	C_{lss}	V_{DS}=100V, V_{GS}=0V, F=1MHz	-	3082	-	pF
Output Capacitance	C_{oss}		-	171	-	
Reverse Transfer Capacitance	C_{rss}		-	9.4	-	
Gate Resistance	R_g	F=1MHz	-	2.1	-	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current (Body Diode)	I_S	T_C=25°C, MOSFET symbol showing the integral reverse p-n junction diode.	-	-	48	A
Pulsed Source Current	$I_{S.PULSE}$		-	-	192	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=47A	-	-	1.4	V
Reverse Recovery Time[4]	t_{rr}	V_{GS}=0V, I_S=47A, dIF/dt=100A/μs	-	586	-	nS
Reverse Recovery Charge[4]	Q_{rr}		-	14	-	μC
Reverse Recovery Peak Current[4]	I_{rrm}		-	44	-	A

Note:

1. L=30mH, V_{DD}=100V, R_G=25Ω, starting temperature T_J=25°C.
2. V_{DS}= 0 - 400V, I_{SD} ≤ I_S, T_J=25°C.
3. V_{DS}= 0 - 480V.
4. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

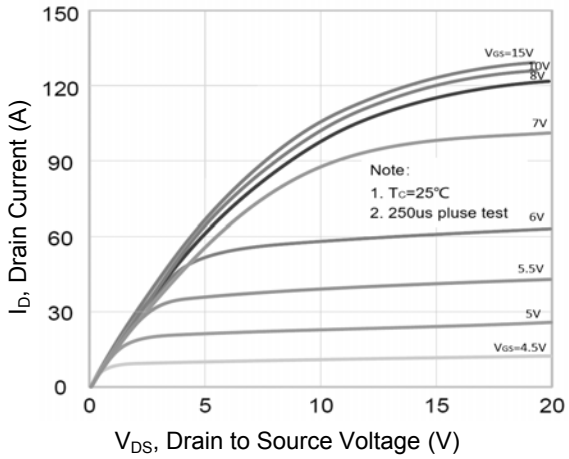


Figure 1. Typical Output Characteristics

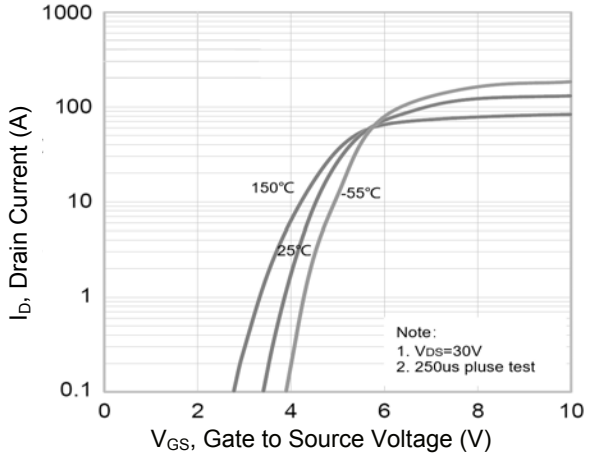


Figure 2. Transfer Characteristics

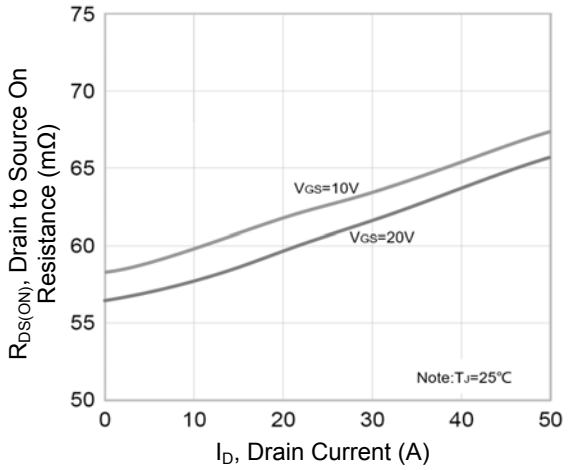


Figure 3. $R_{DS(ON)}$ vs. Drain Current

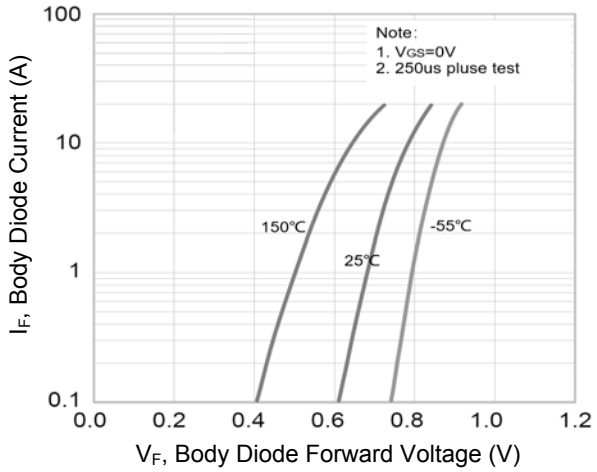


Figure 4. Body Diode Characteristics

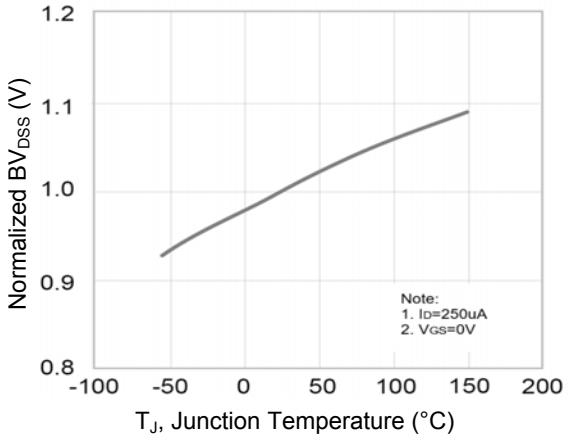


Figure 5. Normalized BV_{DSS} vs. T_J

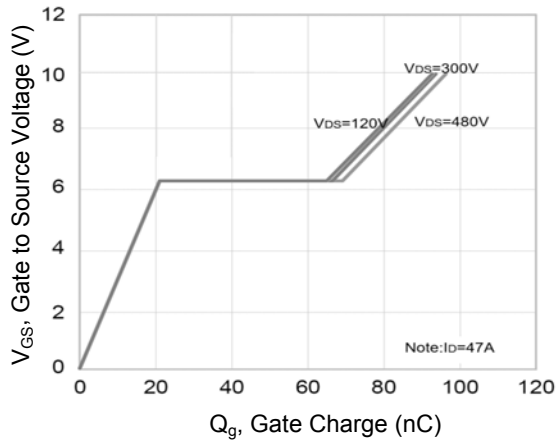


Figure 6. Gate Charge Characteristics

Typical Electrical and Thermal Characteristic Curves

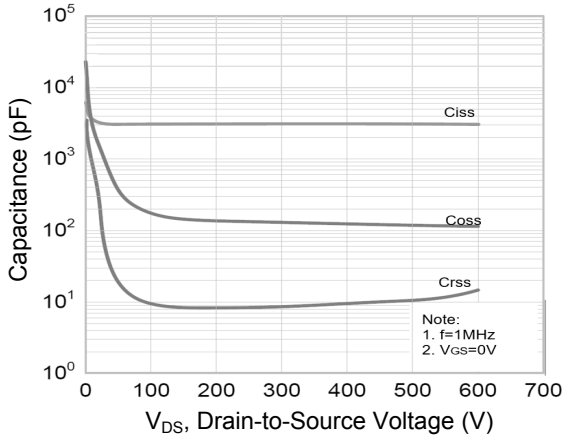


Figure 7. Capacitance Characteristics

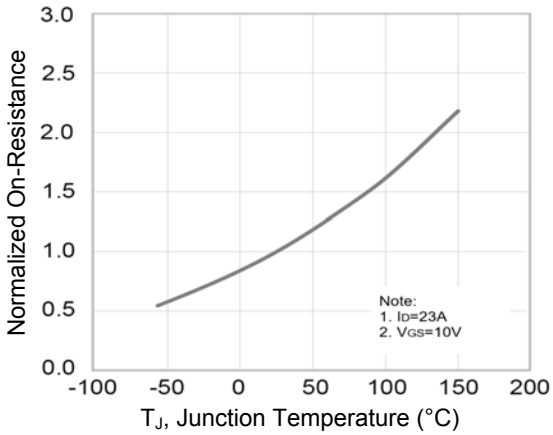


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

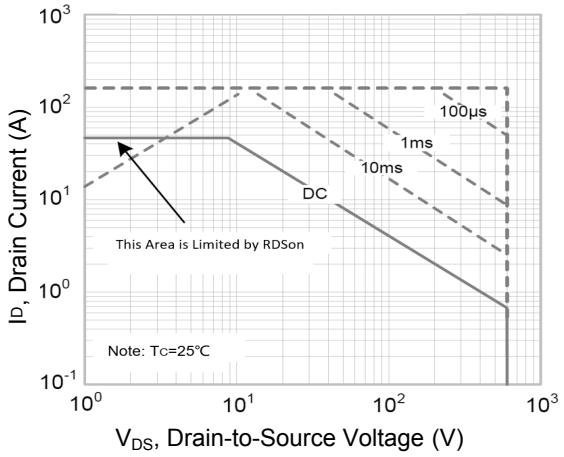
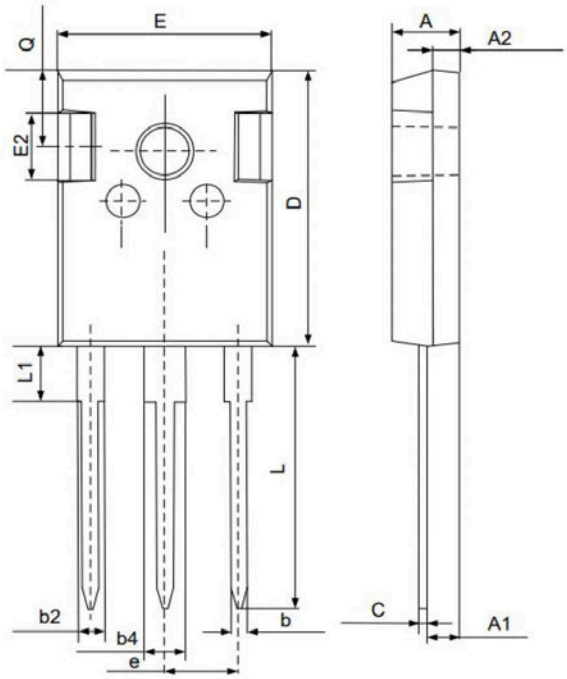


Figure 9. Safe Operation Area

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