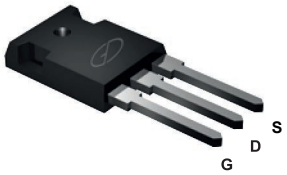
GOOD-ARK SEMICONDUCTOR

GSGA60R160

600V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	600V
$R_{DS(ON)}$	0.16Ω (max.)
I_D	25A



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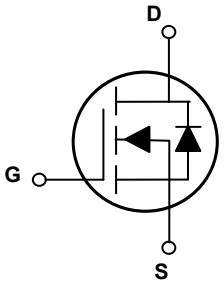


Schematic Diagram

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

Description

The GSGA60R160 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}	600	V
Gate-to-Source Voltage	V_{GS}	±30	V
Continuous Drain Current, @ Steady-State (T_C=25°C)	I_D	25	A
Continuous Drain Current, @ Steady-State (T_C=100°C)		16	A
Pulsed Drain Current	I_{DM}	100	A
Power Dissipation (T_C=25°C)	P_D	180	W
		1.44	W/°C
Single Pulse Avalanche Energy[1]	E_{AS}	1060	mJ
Body Diode Reverse Voltage Slope[2]	dv/dt	15	V/ns
MOS dv/dt Ruggedness[3]	dv/dt	50	V/ns
Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.69	°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	-	-	1	uA
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-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=12A	-	0.125	0.16	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	-	1482	-	pF
Output Capacitance	C_{oss}		-	84	-	
Reverse Transfer Capacitance	C_{rss}		-	4.8	-	
Total Gate Charge[4,5]	Q_g	I_D=24A, V_{DD}=480V, V_{GS}=10V	-	50	-	nC
Gate-to-Source Charge[4,5]	Q_{gs}		-	13	-	
Gate-to-Drain ("Miller") Charge[4,5]	Q_{gd}		-	26	-	
Turn-On Delay Time[4,5]	$t_{d(on)}$	V_{DD}=300V, V_{GS}=10V, R_G=25Ω, I_D=24A	-	21	-	nS
Rise Time[4,5]	t_r		-	74	-	
Turn-Off Delay Time[4,5]	$t_{d(off)}$		-	211	-	
Fall Time[4,5]	t_f		-	64	-	
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.	-	-	24	A
Source Pulse Current	I_{SM}		-	-	96	A
Diode Forward Voltage	V_{SD}	I_S=24A, V_{GS}=0V	-	1.1	1.4	V
Reverse Recovery Time[2]	T_{rr}	I_F=24A, V_{DD}=50V, dI_F/dt=100A/us	-	442	-	nS
Reverse Recovery Charge[2]	Q_{rr}		-	7.0	-	μC

Notes:

1. L=79mH, I_{AS}=4.8A, 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 ≤ 300μs, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

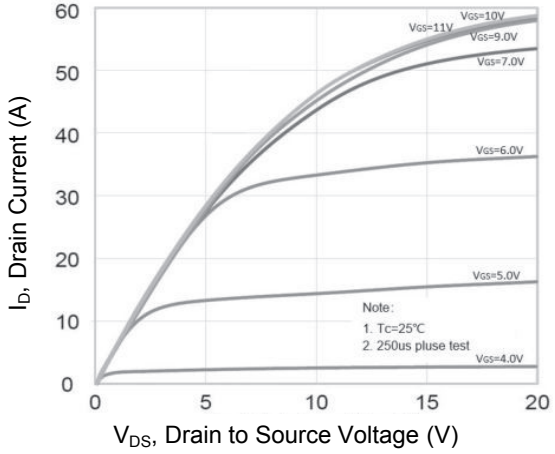


Figure 1. Typical Output Characteristics

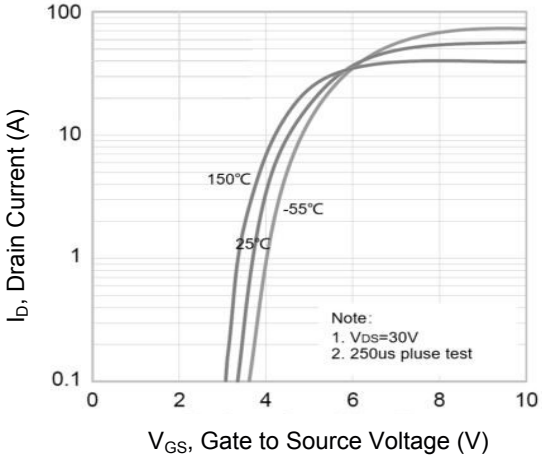


Figure 2. Transfer Characteristics

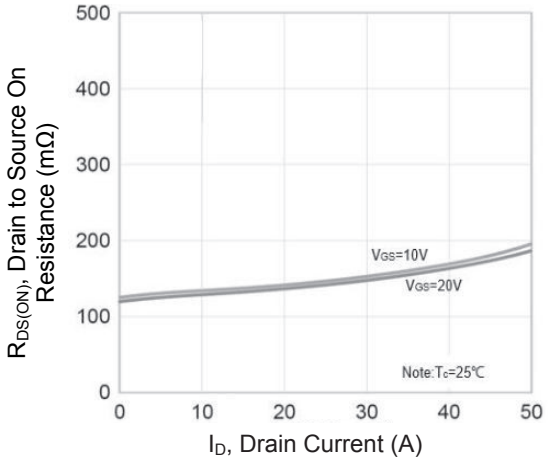


Figure 3. $R_{DS(ON)}$ vs. Drain Current

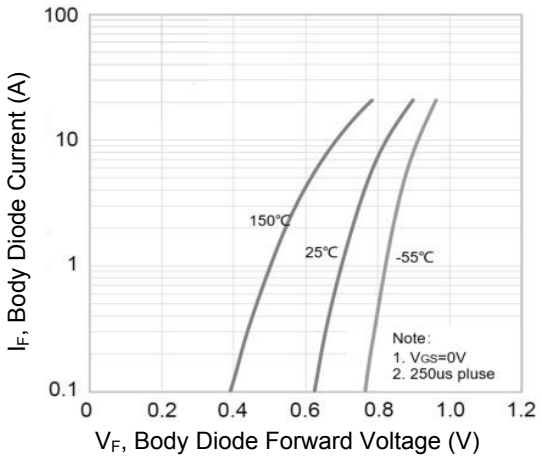


Figure 4. Body Diode Characteristics

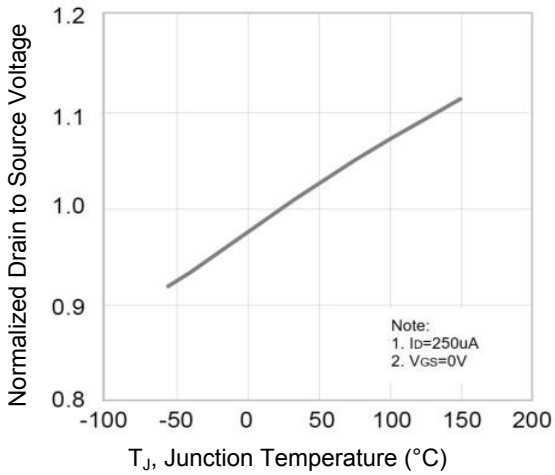


Figure 5. Normalized BV_{DSS} vs. T_J

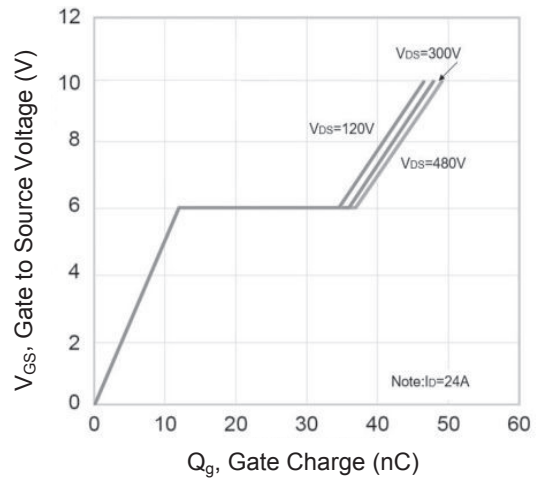


Figure 6. Gate Charge

Typical Electrical and Thermal Characteristic Curves

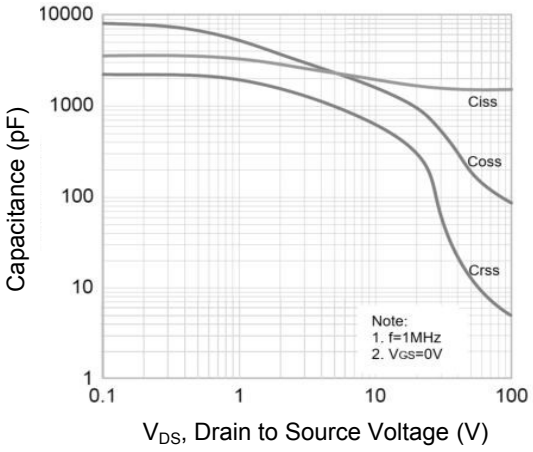


Figure 7. Capacitance Characteristics

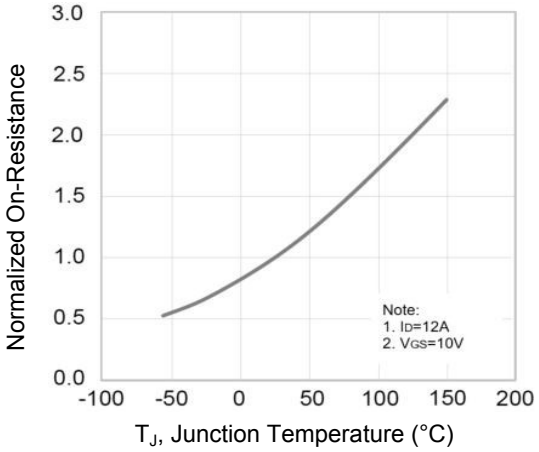


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

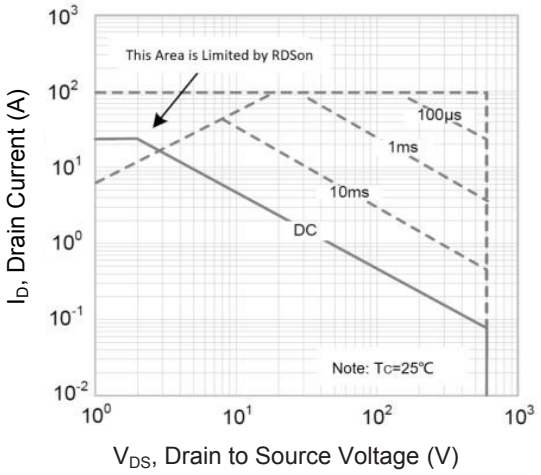
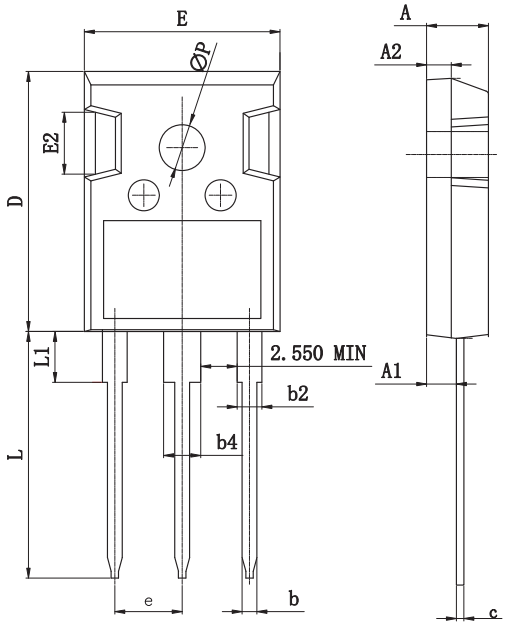


Figure 9. Safe Operation Area

Package Outline Dimensions (TO-247)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.75	5.20	0.187	0.205
A1	2.21	2.65	0.087	0.104
A2	1.85	2.15	0.073	0.085
b	1.00	1.36	0.039	0.054
b2	1.80	2.25	0.071	0.089
b4	2.91	3.25	0.115	0.128
c	0.51	0.75	0.020	0.030
D	20.80	21.30	0.819	0.839
E	15.50	16.10	0.610	0.634
E2	4.40	5.20	0.173	0.205
e	5.44 BSC		0.214 BSC	
L	19.72	20.22	0.776	0.796
L1	-	4.30	-	0.169
P	3.40	3.80	0.134	0.150

Order Information

Device	Package	Marking	Carrier	Quantity
GSGA60R160	TO-247	A60R160	Tube	30pcs / Tube