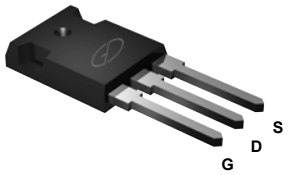
GOOD-ARK SEMICONDUCTOR

GSGA6R015

150V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	150V
$R_{DS(ON)}$	4.8mΩ (Typ.)
I_D	175A



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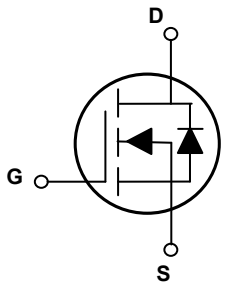


Schematic Diagram

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 GSGA6R015 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}	150	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous, at Steady-State, (T_C=25°C)[1]	I_D	175	A
Drain Current-Continuous, at Steady-State, (T_C=100°C)		124	
Drain Current-Pulsed[2]	I_{DM}	690	A
Single Pulse Avalanche Energy[3]	E_{AS}	803	mJ
Power Dissipation (T_A=25°C)	P_D	500	W
Linear Derating Factor (T_A=25°C)		3.33	W/°C
Junction-to-Ambient (PCB Mounted, Steady-State)[4]	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.3	°C/W
Operating Junction Temperature Range	T_J	-55 To +175	°C
Storage Temperature Range	T_{STG}	-55 To +175	°C

Electrical Characteristics (T_A=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	150	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=150V, V_{GS}=0V	-	-	1	μA
		T_J=125°C	-	-	50	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V	-	-	±100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=100A	-	4.8	6.0	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250uA	2.1	3	3.9	V
Dynamic and Switching Characteristics						
Total Gate Charge	Q_g	V_{DS}=120V, I_D=100A, V_{GS}=10V	-	81	-	nC
Gate-Source Charge	Q_{gs}		-	29	-	
Gate-Drain ("Miller") Charge	Q_{gd}		-	15	-	
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=75V, R_{GEN}=2.5Ω, V_{GS}=10V, I_D=80A	-	16.5	-	nS
Rise Time	t_r		-	106.3	-	
Turn-Off Delay Time	$t_{d(off)}$		-	60.6	-	
Fall Time	t_f		-	104.6	-	
Input Capacitance	C_{lss}	V_{DS}=25V, V_{GS}=0V, F=1MHz	-	5400	-	pF
Output Capacitance	C_{oss}		-	3300	-	
Reverse Transfer Capacitance	C_{rss}		-	80	-	
Gate Resistance	R_g	F=1MHz	-	4.3	-	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.	-	-	175	A
Pulsed Source Current (Body Diode)	I_{SM}		-	-	690	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=80A	-	1	1.2	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=80A, di/dt=100A/μs	-	110	-	nS
Reverse Recovery Charge	Q_{rr}		-	0.36	-	μC

Note:

1. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. L=0.3mH, V_{DD}=50V, R_G=25Ω, T_J=25°C.
4. Device mounted on FR-4 PCB, 1inch x 0.85inch x 0.062inch.

Typical Electrical and Thermal Characteristic Curves

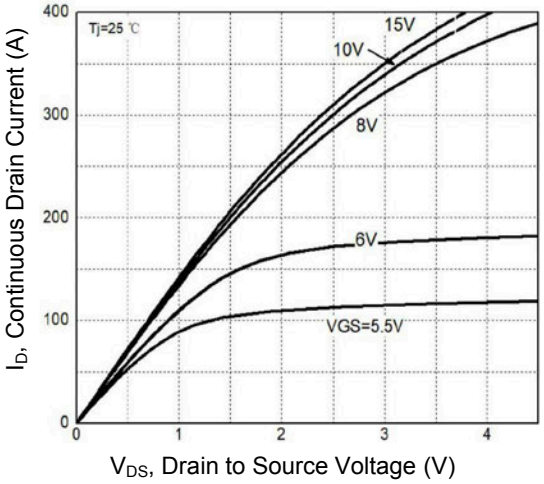


Figure 1. Typical Output Characteristics

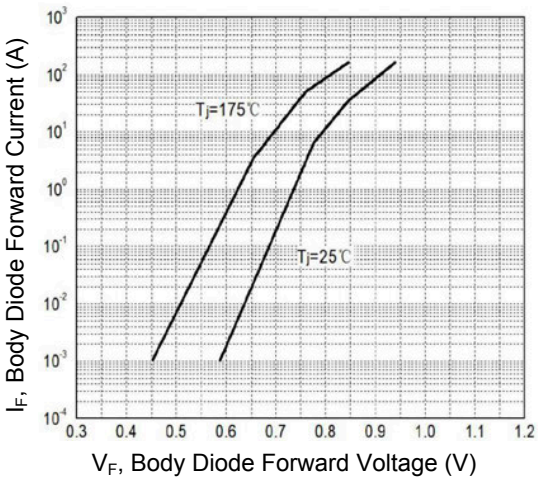


Figure 2. Body Diode Characteristics

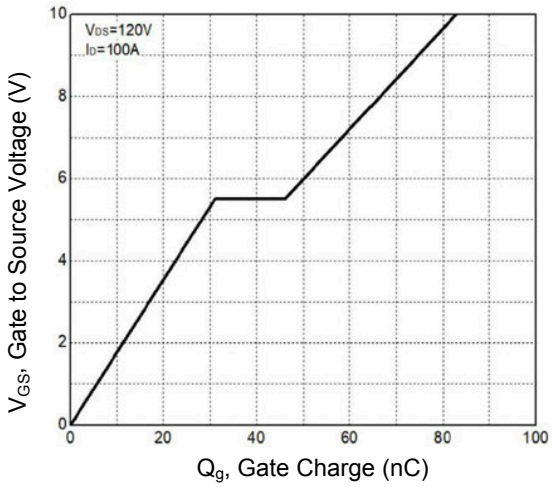


Figure 3. Gate Charge Characteristics

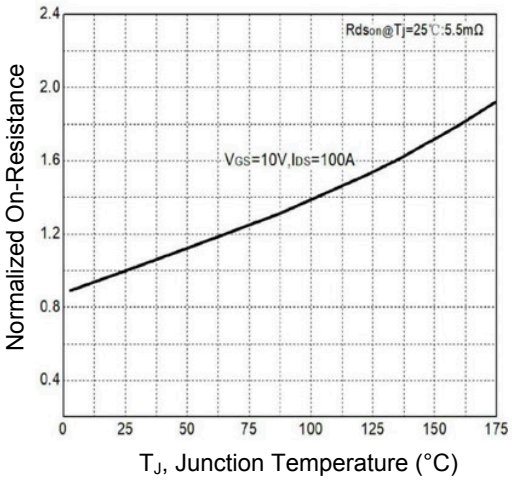


Figure 4. Normalized $R_{DS(ON)}$ vs. T_J

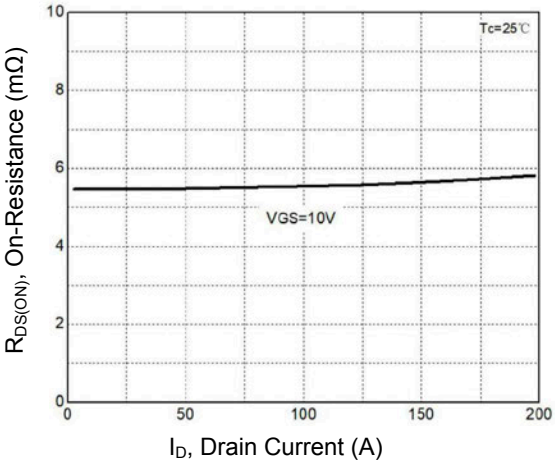


Figure 5. $R_{DS(ON)}$ vs. Drain Current

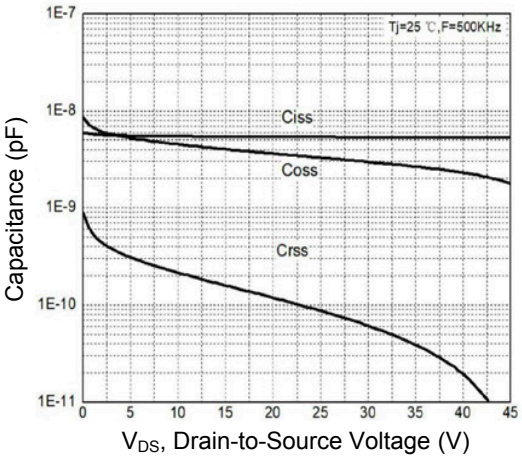


Figure 6. Capacitance Characteristics

Typical Electrical and Thermal Characteristic Curves

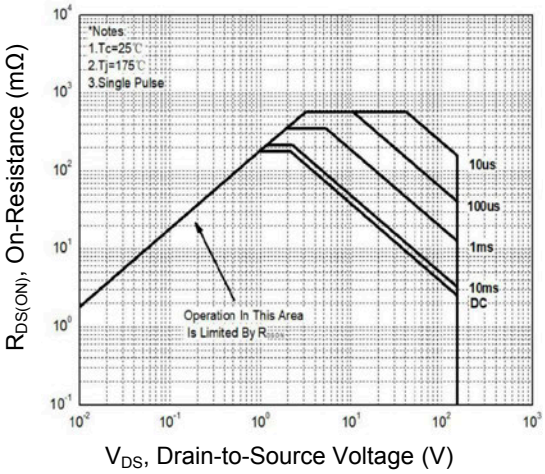


Figure 7. Safe Operation Area

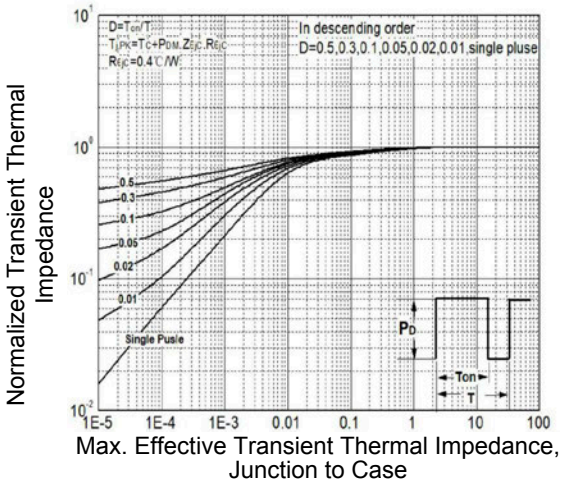
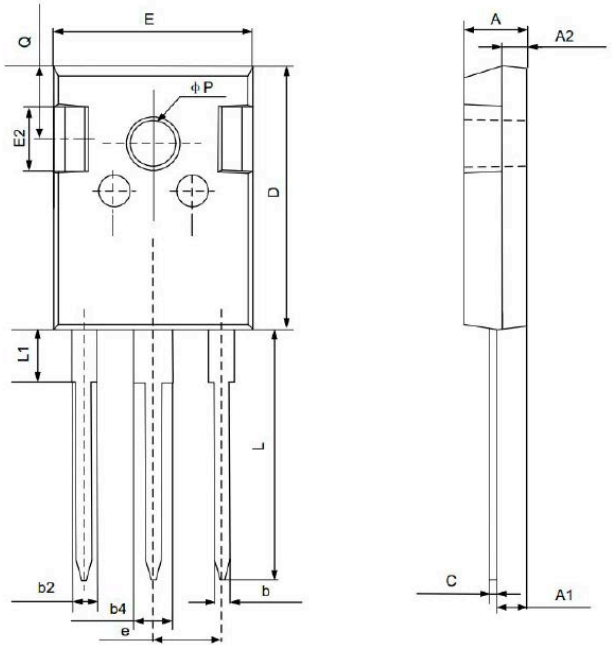


Figure 8. Thermal Transient Impedance

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
P	3.400	3.800	0.134	0.150