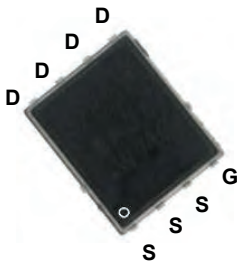
GOOD-ARK SEMICONDUCTOR

GSGP2R912

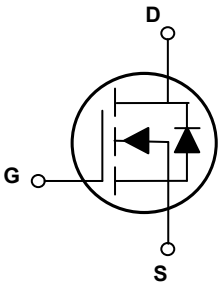
120V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	120V
$R_{DS(ON)}$	2.9mΩ (Max.)
I_D	166A



PPAK5x6



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 GSGP2R912 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_J=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	120	V
Gate-to-Source Voltage	V_{GS}	±20	V
Continuous Drain Current, @ Steady-State (T_C=25°C)[1]	I_D	166	A
Continuous Drain Current, @ Steady-State (T_C=100°C)[1]		118	A
Pulsed Drain Current (T_C=25°C)[2]	I_{DM}	666	A
Power Dissipation (T_C=25°C)	P_D	176	W
Power Dissipation (T_C=100°C)		88	W
Single Pulse Avalanche Energy[3]	E_{AS}	960	mJ
Single Pulse Current	I_{AS}	80	A
Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State)[4]	$R_{\theta JA}$	35	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.85	°C/W
Operating Junction and Storage Temperature Range	T_J/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-to-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	120	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=120V, V_{GS}=0V, T_J=25°C	-	-	1.0	μA
		V_{DS}=120V, V_{GS}=0V, T_J=125°C	-	-	100	
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	2.5	2.9	mΩ
Gate-to-Source Forward Leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2.0	3.0	4.0	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=60V, f=1MHz	-	4548	-	pF
Output Capacitance	C_{oss}		-	1814	-	
Reverse Transfer Capacitance	C_{rss}		-	22	-	
Total Gate Charge	Q_g	I_D=20A, V_{DD}=60V, V_{GS}=10V	-	63	-	nC
Total Gate Charge	Q_g	I_D=20A, V_{DD}=60V, V_{GS}=4.5V	-	40	-	
Gate-to-Source Charge	Q_{gs}	I_D=20A, V_{DD}=60V, V_{GS}=10V	-	18.7	-	
Gate-to-Drain ("Miller") Charge	Q_{gd}		-	13.1	-	
Gate-to-Plateau	$V_{plateau}$		-	4.6	-	V
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=60V, V_{GS}=10V, R_G=3.0Ω, I_D=20A	-	11	-	nS
Rise Time	t_r		-	14	-	
Turn-Off Delay Time	$t_{d(off)}$		-	40	-	
Fall Time	t_f		-	22	-	
Gate Resistance	R_g	f=1MHz	-	1.2	-	Ω
Drain-Source Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	166	A
Diode Forward Voltage	V_{SD}	I_S=2A, V_{GS}=0V	-	0.7	1.2	V
Reverse Recovery Time	t_{rr}	I_F=20A, dI_F/dt=100A/us, T_J=25°C	-	130	-	nS
Reverse Recovery Charge	Q_{rr}		-	153	-	nC

Notes:

1. This current is chip limited, which is calculated based on $R_{\theta JC}$.
2. This current is calculated on single pulse with 10μs pulse & duty cycle=1%.
3. Defined by design, not subject to production test, E_{AS} condition: T_J=25°C, V_{DD}=60V, V_{GS}=10V, L=1.0mH.
4. Device mounted on FR-4 substrate PC board with 2oz copper in 1 inch square cooling area.

Typical Electrical and Thermal Characteristic Curves

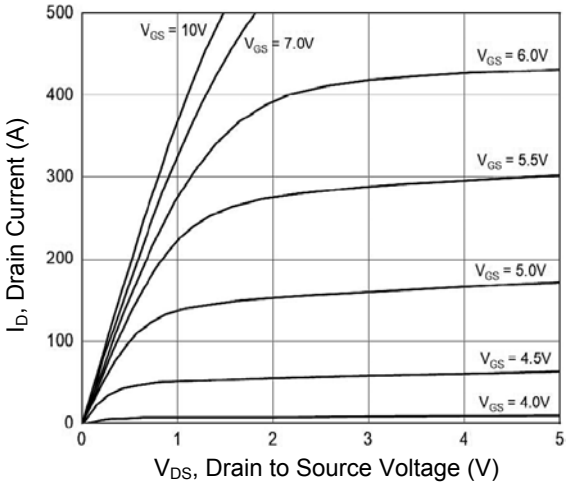


Figure 1. Output Characteristics

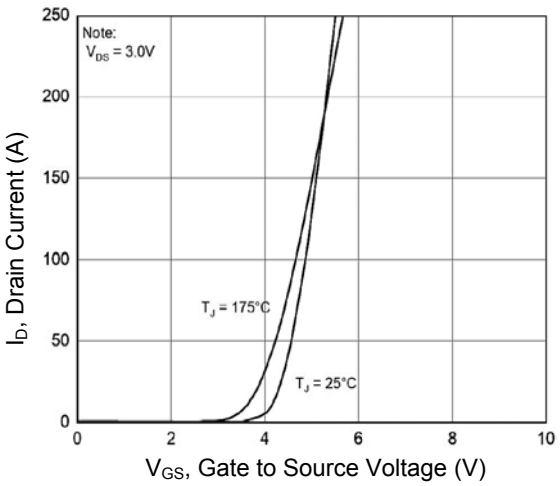


Figure 2. Transfer Characteristics

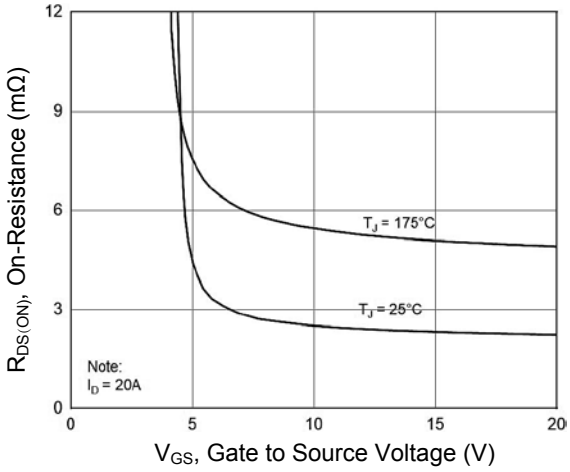


Figure 3. $R_{DS(ON)}$ vs. V_{GS}

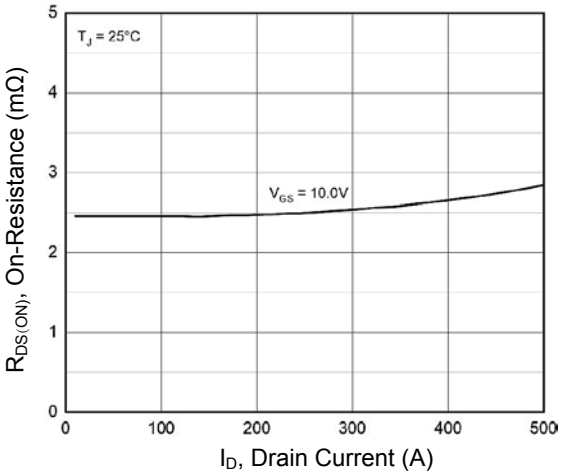


Figure 4. On Resistance vs. Drain Current

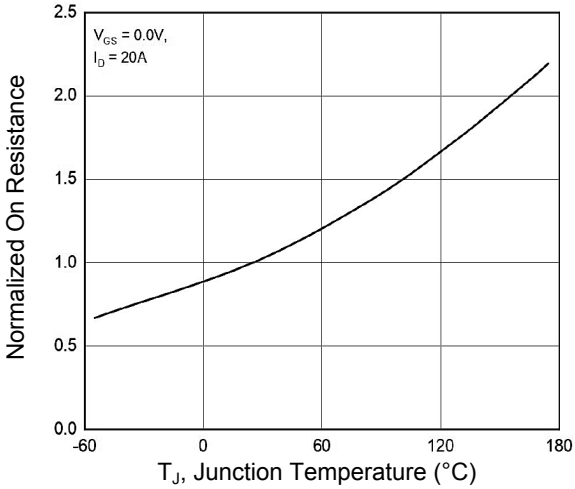


Figure 5. On Resistance vs. Junction Temperature

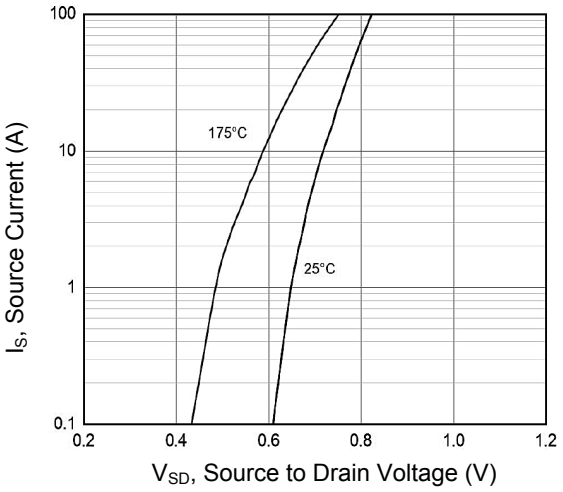


Figure 6. Source Drain Diode Forward Voltage

Typical Electrical and Thermal Characteristic Curves

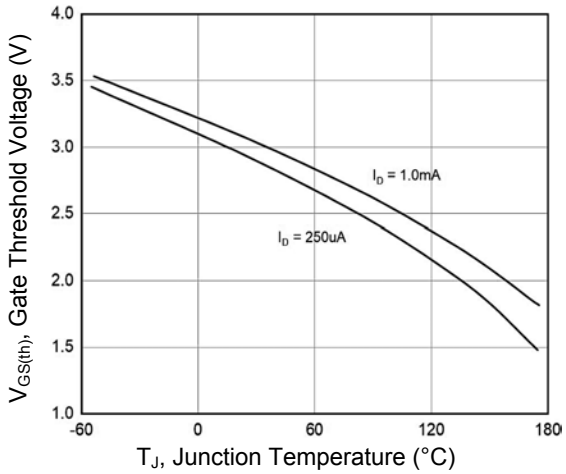


Figure 7. Gate Threshold Voltage vs. T_J

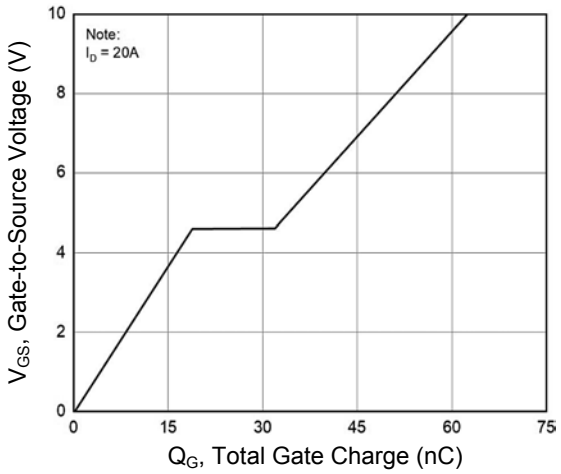


Figure 8. Gate Charge Characteristics

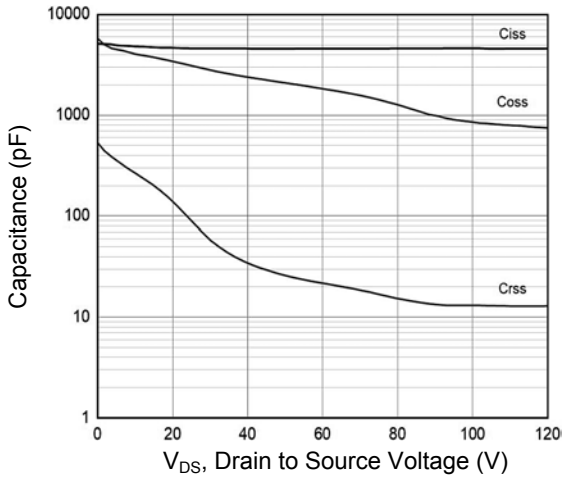


Figure 9. Capacitance Characteristics

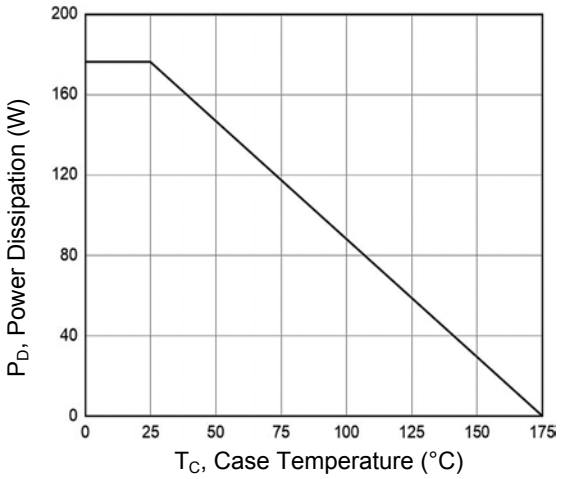


Figure 10. Power Derating

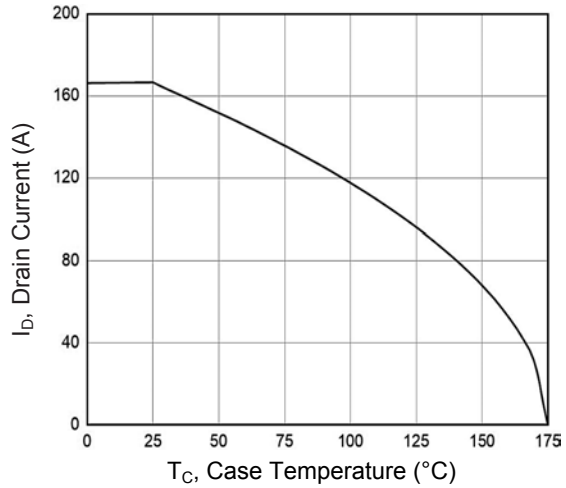


Figure 11. Current Derating

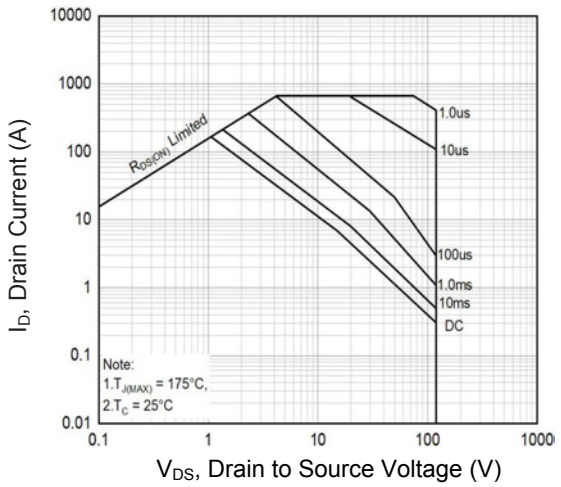
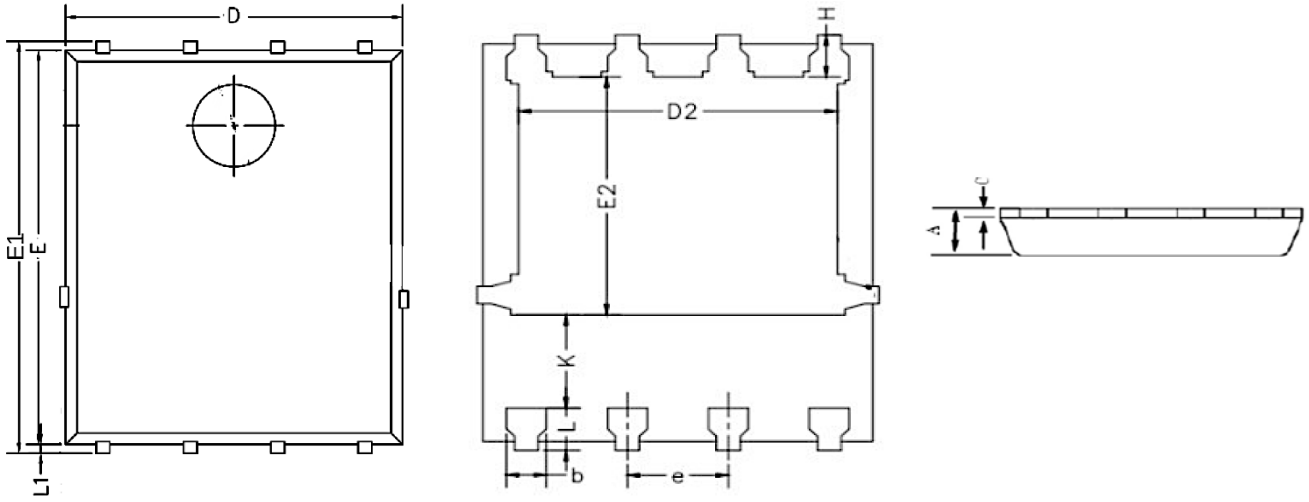


Figure 12. Safe Operating Area

Package Outline Dimensions (PPAK5x6)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.90	1.20	0.035	0.047
b	0.30	0.55	0.012	0.022
C	0.15	0.35	0.006	0.014
D	4.70	5.20	0.185	0.205
D2	3.76	4.20	0.148	0.165
E2	3.30	3.85	0.130	0.152
E	5.60	5.95	0.220	0.234
E1	5.80	6.50	0.228	0.256
K	1.10	-	0.043	-
H	0.45	0.80	0.018	0.031
L	0.45	0.85	0.018	0.033
L1	0.05	0.35	0.002	0.014
e	1.27 BSC		0.050 BSC	

Order Information

Device	Package	Marking	Packaging	SPQ
GSGP2R912	PPAK5x6	P2R912	Tape & Reel	5,000 Pcs / Reel