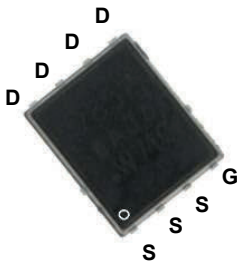
GOOD-ARK SEMICONDUCTOR

GSGP9R115

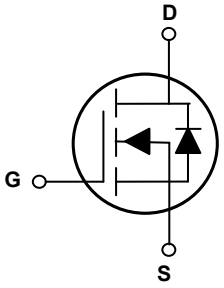
150V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	150V
$R_{DS(ON)}$	9.3mΩ (Max)
I_D	87A



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 GSGP9R115 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	Parameter	Unit
Drain-Source Voltage	V_{DS}	150	V
Gate-to-Source Voltage	V_{GS}	±20	V
Continuous Drain Current, @ Steady-State (T_C=25°C)	I_D	87	A
Continuous Drain Current, @ Steady-State (T_C=100°C)		55	A
Pulsed Drain Current[2]	I_{DM}	348	A
Power Dissipation (T_C=25°C)[3]	P_D	142	W
		1.136	W/°C
Single Pulse Avalanche Energy[1]	E_{AS}	193	mJ
Single Pulse Avalanche Current	I_{AS}	27.8	A
Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	50	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.88	°C/W
Operating Junction and Storage Temperature Range	T_J/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-to-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	150	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=150V, V_{GS}=0V, T_J=25°C	-	-	1.0	μA
		V_{DS}=150V, V_{GS}=0V, T_J=125°C	-	5.0	-	μA
Gate-to-Source Forward Leakage	I_{GSS}	V_{DS}=0V, V_{GS}=20V	-	-	100	nA
		V_{DS}=0V, V_{GS}=-20V	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=44A	-	7.9	9.3	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	3.0	-	4.6	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=75V, f=1MHz	-	2800	-	pF
Output Capacitance	C_{oss}		-	710	-	
Reverse Transfer Capacitance	C_{rss}		-	17	-	
Total Gate Charge[4,5]	Q_g	I_D=44A, V_{DD}=75V, V_{GS}=10V	-	40	-	nC
Gate-to-Source Charge[4,5]	Q_{gs}		-	23	-	
Gate-to-Drain ("Miller") Charge[4,5]	Q_{gd}		-	6.6	-	
Gate Plateau[4,5]	$V_{plateau}$		-	7.3	-	V
Turn-on Delay Time[4,5]	$t_{d(on)}$	V_{DD}=75V, V_{GS}=10V, R_G=3Ω, I_D=44A	-	24	-	nS
Rise Time[4,5]	t_r		-	91	-	
Turn-Off Delay Time Time[4,5]	$t_{d(off)}$		-	27	-	
Fall Time[4,5]	t_f		-	32	-	
Gate Resistance	R_g	f=1MHz	-	1.6	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	87	A
Diode Pulse Current	$I_{S.pulse}$		-	-	348	A
Diode Forward Voltage	V_{SD}	I_S=30A, V_{GS}=0V	-	-	1.4	V
Reverse Recovery Time[4]	T_{rr}	I_S=30A, V_{GS}=0V, V_R=48V, dI_F/dt=100A/us	-	48	-	nS
Reverse Recovery Charge[4]	Q_{rr}		-	58	-	nC
Kata	G_{fs}	Is=44A, V_{GS}=0V, dI_F/dt=100A/us	-	41	-	S

Notes:

1. The rated value is only the maximum absolute value of 25°C in shell temperature. If the shell temperature is higher than 25°C, the rating shall be reduced according to the actual environmental conditions.
2. Pulse time of 5μs.
3. The dissipated power value will change with the temperature. When it is greater than 25°C, the dissipated power value will decrease by 1.14°C/W for every 1 degree of temperature increase.
4. Pulse test: pulse width ≤ 300μs, duty cycle ≤ 2%.
5. Basically unaffected by operating temperature.

Typical Electrical and Thermal Characteristic Curves

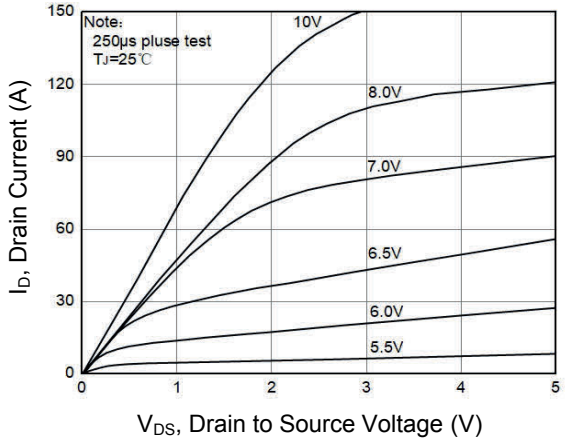


Figure 1. Typical Output Characteristics

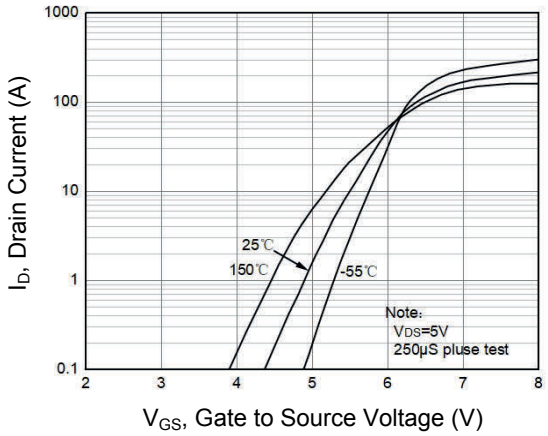


Figure 2. Transfer Characteristics

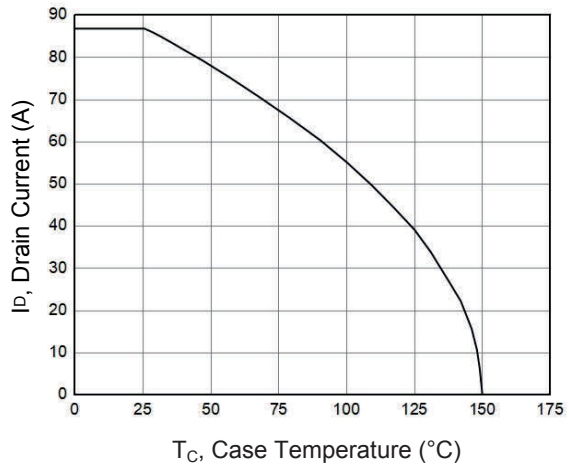


Figure 3. I_D vs. T_C

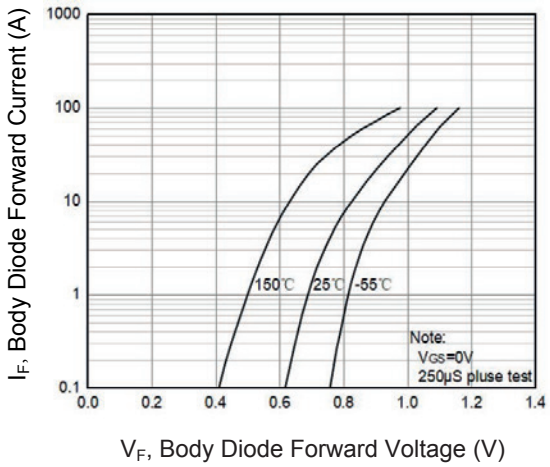


Figure 4. Body Diode Characteristics

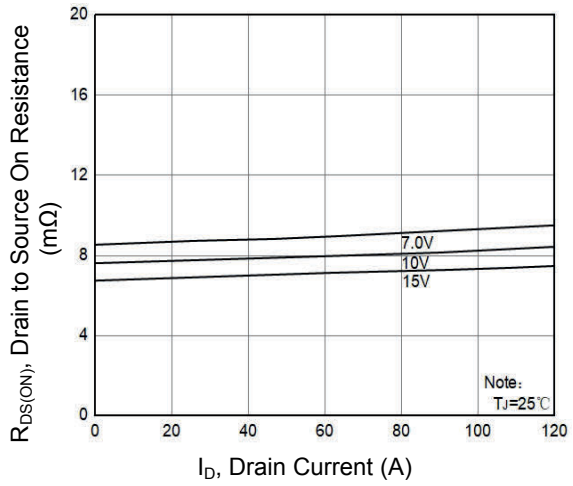


Figure 5. $R_{DS(ON)}$ vs. Drain Current

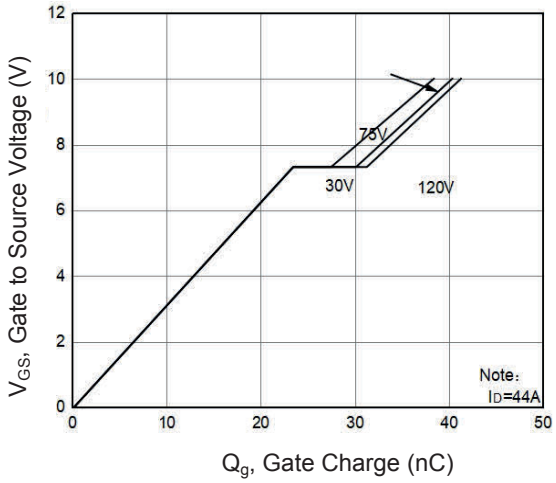


Figure 6. Gate Charge Characteristics

Typical Electrical and Thermal Characteristic Curves

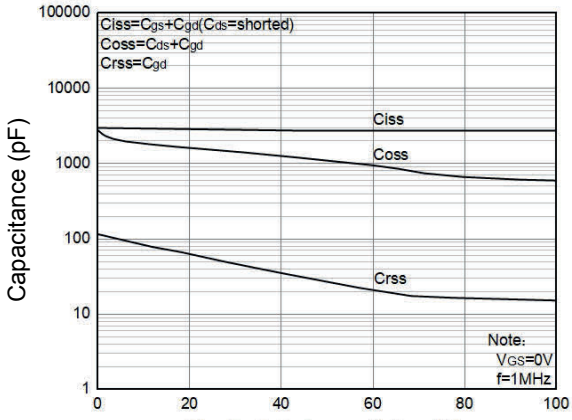


Figure 7. Capacitance Characteristics

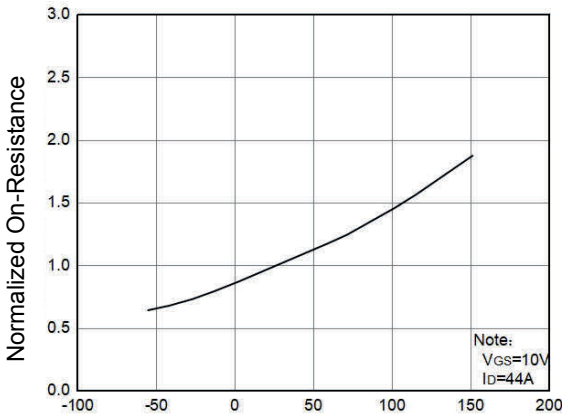


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

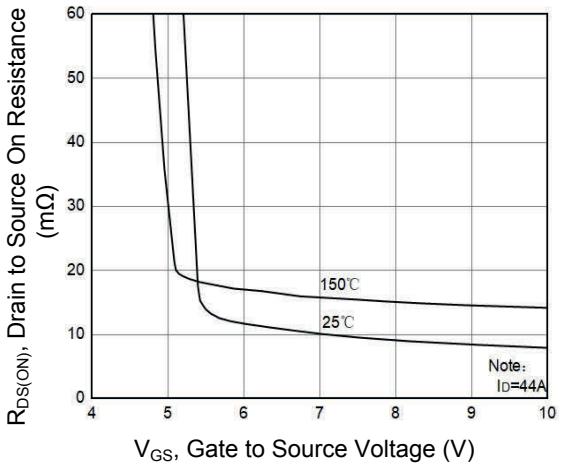


Figure 9. $R_{DS(ON)}$ vs. V_{GS}

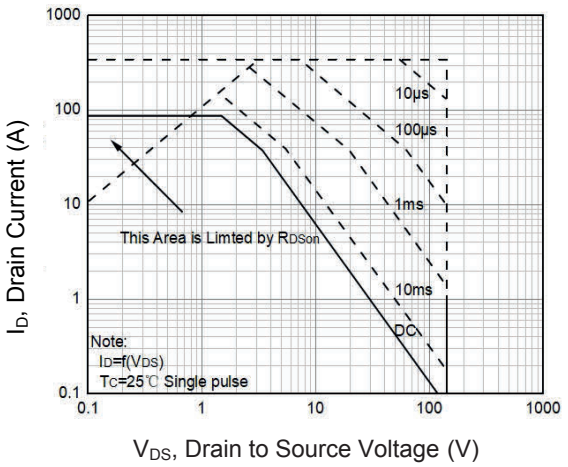


Figure 10. Safe Operation Area

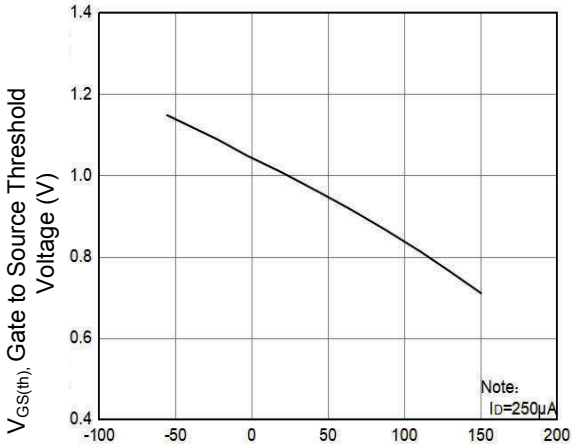


Figure 11. Gate Threshold Voltage vs. T_J

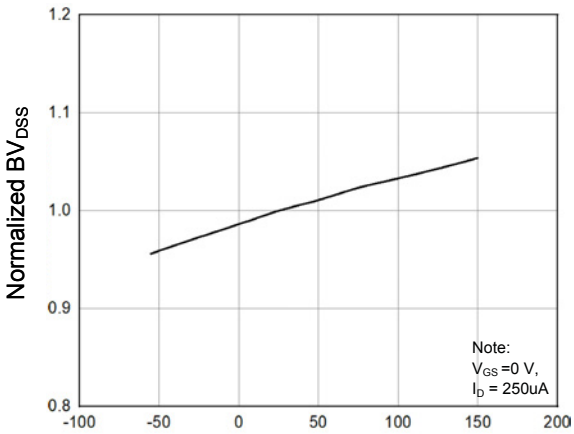


Figure 12. Normalized BV_{DSS} vs. T_J

Typical Electrical and Thermal Characteristic Curves

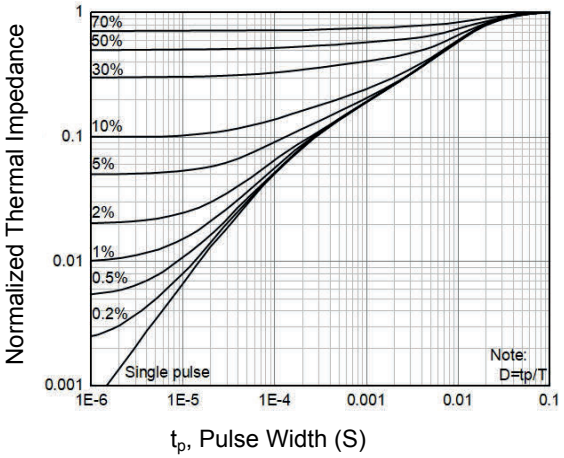
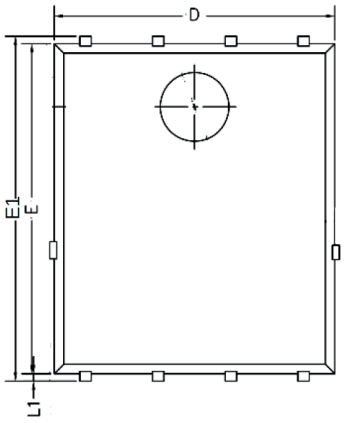
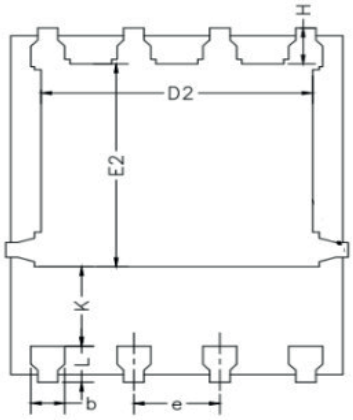


Figure 13. Transient Thermal Impedance vs. t_p

Package Outline Dimensions (PPAK5x6)



TOP VIEW

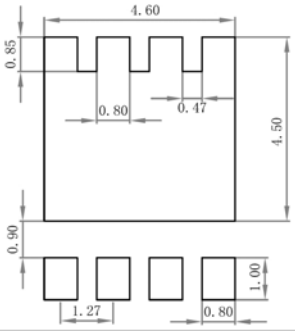


BOTTOM VIEW

SIDE VIEW

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	5.90	0.220	0.232
E1	5.80	6.20	0.228	0.244
K	1.10	-	0.043	-
H	0.45	0.75	0.018	0.030
L	0.45	0.75	0.018	0.030
L1	0.25	0.45	0.010	0.018
e	1.27 BSC		0.050 BSC	

Recommended Pad Layout



Unit: mm

Order Information

Device	Package	Marking	Carrier	Quantity
GSGP9R115	PPAK5x6	P9R115	Tape & Reel	5,000pcs / Reel