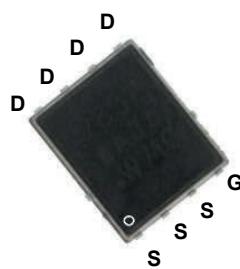
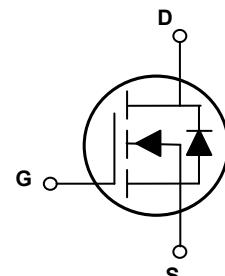


Main Product Characteristics

$V_{(BR)DSS}$	40V
$R_{DS(ON)}$	2.1mΩ (max.)
I_D	129A



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 GSGP2R104 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 ($T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Parameter	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, @ Steady-State ($T_C=25^\circ\text{C}$)	I_D	129	A
Continuous Drain Current, @ Steady-State ($T_C=100^\circ\text{C}$)		81	A
Pulsed Drain Current ¹	I_{DM}	516	A
Power Dissipation ($T_C=25^\circ\text{C}$) ²	P_D	93	W
		0.744	W/ $^\circ\text{C}$
Single Pulse Avalanche Energy ³	E_{AS}	105	mJ
Single Pulse Avalanche Current	I_{AS}	46	A
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	50	$^\circ\text{C}/\text{W}$
Junction-to-Case	$R_{\theta JC}$	1.35	$^\circ\text{C}/\text{W}$
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +150	$^\circ\text{C}$
Soldering Temperature	T_{sold}	260	$^\circ\text{C}$

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	40	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=40\text{V}, V_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	-	-	1.0	μA
		$V_{\text{DS}}=40\text{V}, V_{\text{GS}}=0\text{V}, T_J=125^\circ\text{C}$	-	1.0	-	μA
Gate-to-Source Forward Leakage	I_{GSS}	$V_{\text{DS}}=0\text{V}, V_{\text{GS}}=20\text{V}$	-	-	100	nA
		$V_{\text{DS}}=0\text{V}, V_{\text{GS}}=-20\text{V}$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_D=50\text{A}$	-	1.6	2.1	$\text{m}\Omega$
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}}=V_{\text{GS}}, I_D=250\mu\text{A}$	1.2	-	2.6	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	$V_{\text{GS}}=0\text{V}, V_{\text{DS}}=25\text{V}, f=1\text{MHz}$	-	2612	-	pF
Output Capacitance	C_{oss}		-	926	-	
Reverse Transfer Capacitance	C_{rss}		-	42	-	
Total Gate Charge ^{4,5}	Q_g	$I_D=50\text{A}, V_{\text{DD}}=20\text{V}, V_{\text{GS}}=10\text{V}$	-	43	-	nC
Gate-to-Source Charge ^{4,5}	Q_{gs}		-	13	-	
Gate-to-Drain ("Miller") Charge ^{4,5}	Q_{gd}		-	6.4	-	
Gate Plateau ^{4,5}	V_{plateau}		-	4.6	-	V
Turn-On Delay Time ^{4,5}	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=20\text{V}, V_{\text{GS}}=10\text{V}, R_G=4.7\Omega, I_D=50\text{A}$	-	12	-	nS
Rise Time ^{4,5}	t_r		-	56	-	
Turn-Off Delay Time Time ^{4,5}	$t_{\text{d}(\text{off})}$		-	42	-	
Fall Time ^{4,5}	t_f		-	12	-	
Gate Resistance	R_g	$f=1\text{MHz}$	-	1.1	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_s	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	129	A
Diode Pulse Current	$I_{\text{s, pulse}}$		-	-	516	A
Diode Forward Voltage	V_{SD}	$I_s=50\text{A}, V_{\text{GS}}=0\text{V}$	-	-	1.4	V
Reverse Recovery Time ⁴	T_{rr}	$I_s=25\text{A}, V_{\text{GS}}=0\text{V}, V_R=20\text{V}, dI_F/dt=100\text{A/us}$	-	48	-	nS
Reverse Recovery Charge ⁴	Q_{rr}		-	46	-	nC

Notes:

1. Pulse time of 5μs.
2. The dissipated power value will change with the temperature. When it is greater than 25°C, the dissipated power value will decrease by 0.55°C/W for every 1 degree of temperature increase.
3. L=0.1mH, $V_{\text{DD}}=32\text{V}$, $R_G=25\Omega$, starting temperature $T_J=25^\circ\text{C}$.
4. Pulse test : pulse width ≤ 300μs, duty cycle ≤ 2%.
5. Basically unaffected by operating temperature.

Typical Electrical and Thermal Characteristic Curves

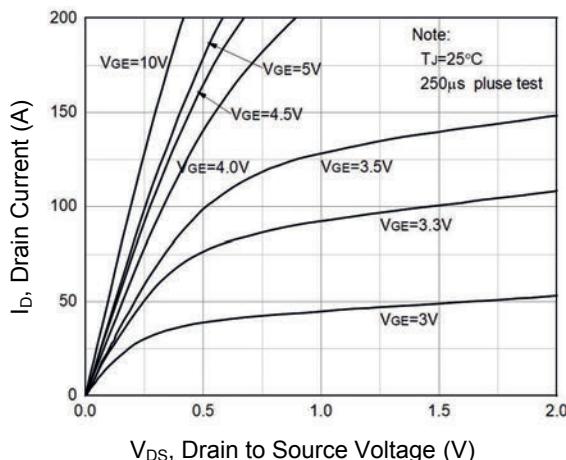


Figure 1. Typical Output Characteristics

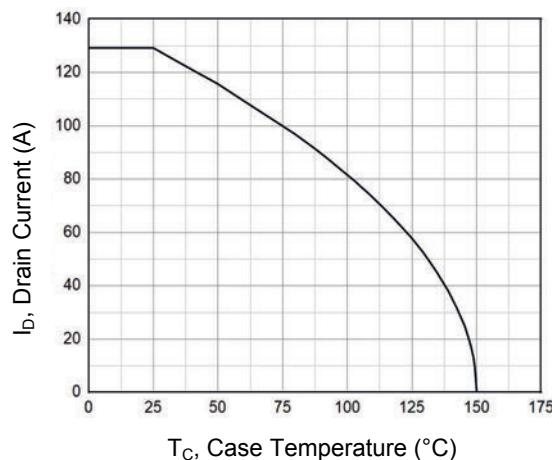


Figure 2. Drain Current vs. T_c

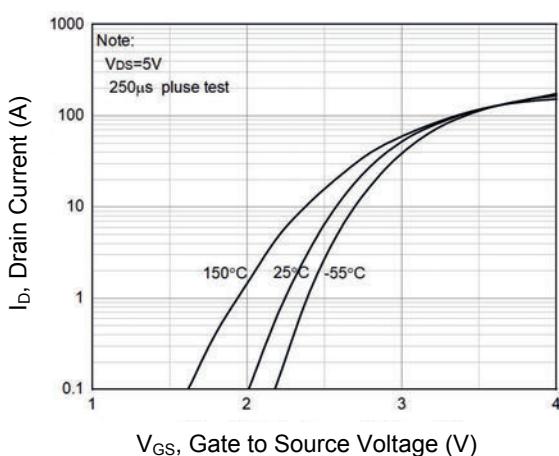


Figure 3. Transfer Characteristics

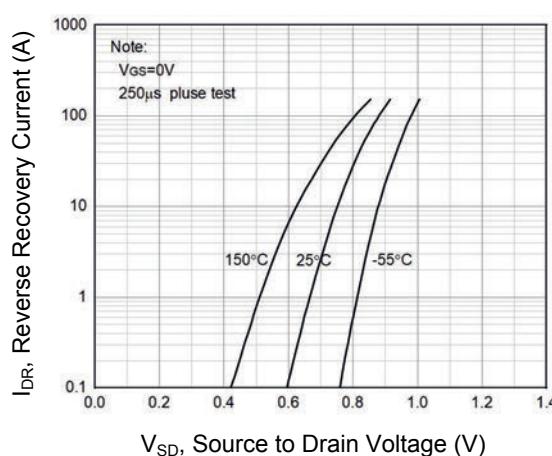


Figure 4. Body Diode Characteristics

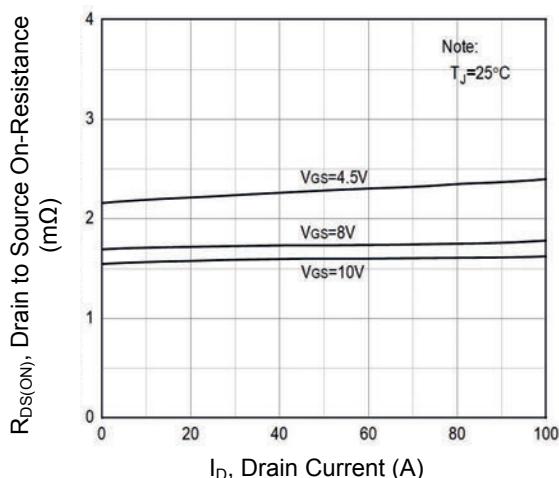


Figure 5. $R_{DS(ON)}$ vs. Drain Current

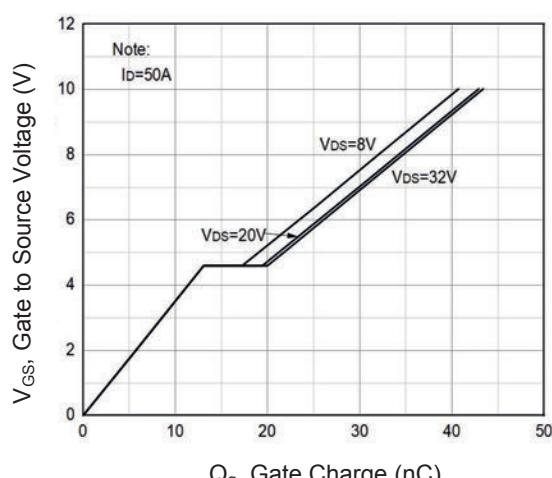


Figure 6. Gate Charge Characteristics

Typical Electrical and Thermal Characteristic Curves

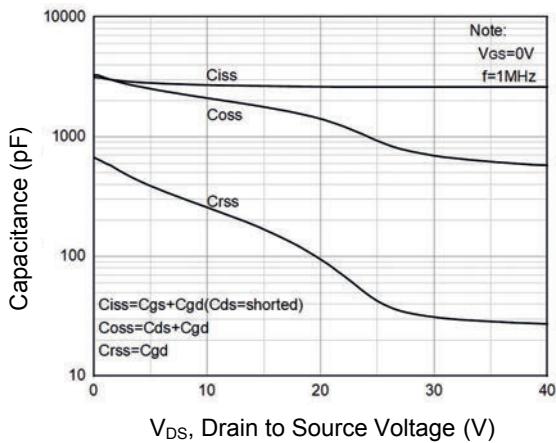


Figure 7. Capacitance Characteristics

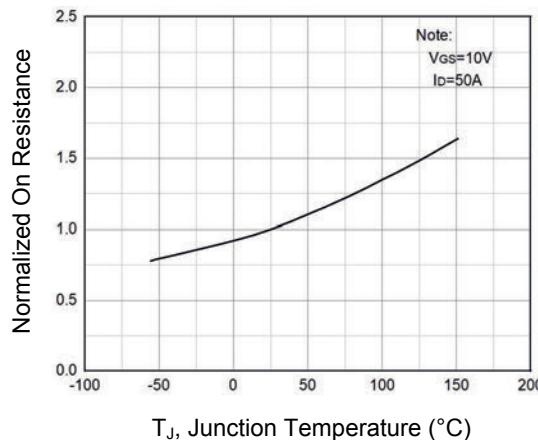


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

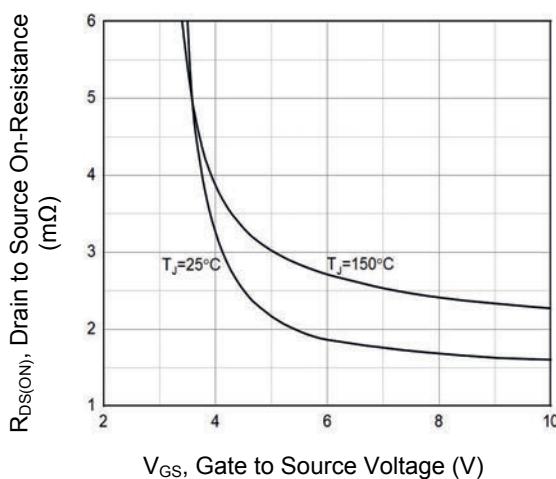


Figure 9. $R_{DS(ON)}$ vs. V_{GS}

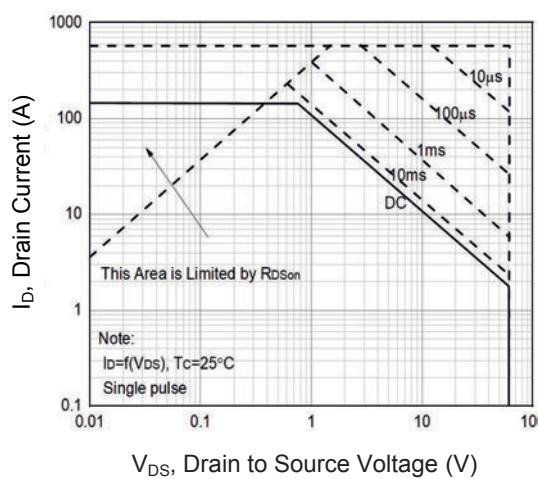


Figure 10. Safe Operation Area

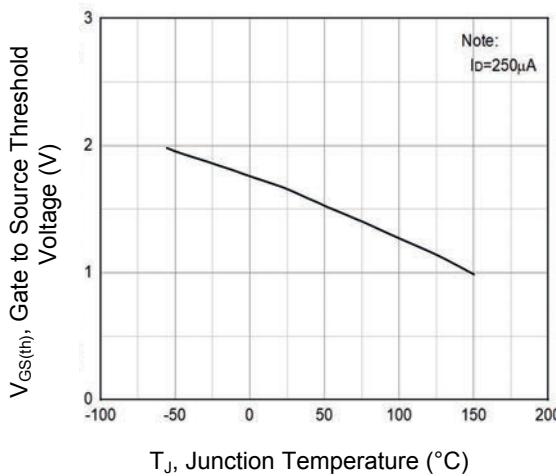


Figure 11. Gate Threshold Voltage vs. T_J

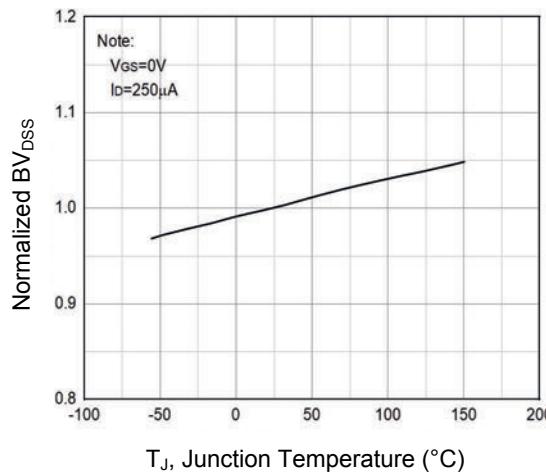
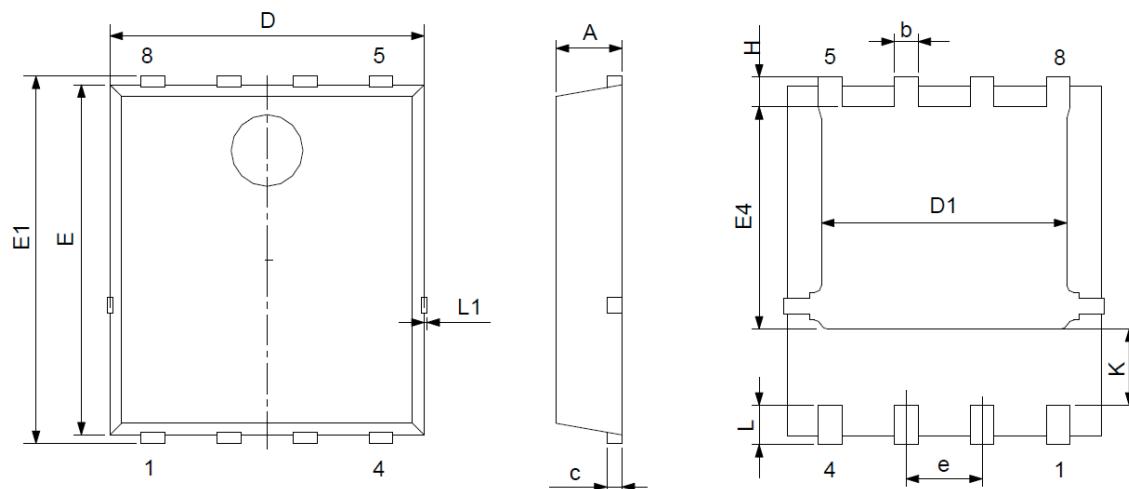


Figure 12. Normalized BV_{DSS} vs. T_J

Package Outline Dimensions (PPAK5x6)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.900	1.200	0.035	0.047
c	0.154	0.354	0.006	0.014
D	4.800	5.400	0.190	0.213
E	5.660	6.060	0.223	0.240
D1	3.760	4.300	0.148	0.169
E1	5.900	6.350	0.232	0.250
b	0.300	0.550	0.012	0.022
k	1.100	1.500	0.043	0.059
e	1.070	1.370	0.042	0.054
E4	3.340	3.920	0.131	0.154
L	0.300	0.710	0.012	0.028
L1	-	0.120	-	0.005
H	0.400	0.710	0.016	0.028