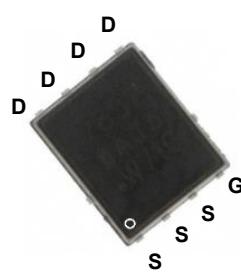
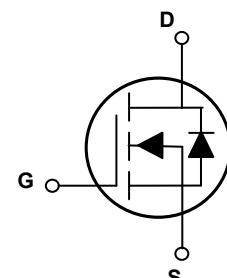


Main Product Characteristics

BV_{DSS}	40V
$R_{DS(ON)}$	1.24mΩ (Max)
I_D	150A



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 GSGP1R204 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 ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous, @ Steady-State, $T_C=25^\circ\text{C}$	I_D	150	A
Drain Current-Continuous, @ Steady-State, $T_C=100^\circ\text{C}$		95	
Drain Current-Pulsed ($T_C=25^\circ\text{C}$) ¹	I_{DM}	500	A
Single Pulse Avalanche Energy	E_{AS}	266	mJ
Single Pulse Current	I_{AS}	73	A
Power Dissipation ($T_C=25^\circ\text{C}$) ²	P_D	104	W
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	50	$^\circ\text{C}/\text{W}$
Junction-to-Case	$R_{\theta JC}$	1.2	$^\circ\text{C}/\text{W}$
Operating Junction Temperature Range	T_J	-55 To +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 To +150	$^\circ\text{C}$
Soldering Temperature (SMD)	T_{sold}	260	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=250\mu\text{A}$	40	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=40\text{V}, V_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	-	-	1	μA
		$V_{\text{DS}}=40\text{V}, V_{\text{GS}}=0\text{V}, T_J=125^\circ\text{C}$	-	2.0	-	μA
Gate-Source Forward Leakage	I_{GSS}	$V_{\text{GS}}=\pm 20\text{V}, V_{\text{DS}}=0\text{V}$	-	-	± 100	nA
Static Drain-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_{\text{D}}=50\text{A}$	-	1.0	1.24	$\text{m}\Omega$
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}}=V_{\text{DS}}, I_{\text{D}}=250\mu\text{A}$	1.4	-	2.4	V
Dynamic and Switching Characteristics						
Total Gate Charge ^{3,4}	Q_g	$V_{\text{DD}}=20\text{V}, I_{\text{D}}=50\text{A}, V_{\text{GS}}=10\text{V}$	-	87	-	nC
Gate-Source Charge ^{3,4}	Q_{gs}		-	29	-	
Gate-Drain ("Miller") Charge ^{3,4}	Q_{gd}		-	9.3	-	
Gate to Plateau ^{3,4}	V_{plateau}		-	4.6	-	
Turn-On Delay Time ^{3,4}	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=20\text{V}, R_{\text{G}}=4.7\Omega, V_{\text{GS}}=10\text{V}, I_{\text{D}}=50\text{A}$	-	21	-	nS
Rise Time ^{3,4}	t_r		-	62	-	
Turn-Off Delay Time ^{3,4}	$t_{\text{d}(\text{off})}$		-	86	-	
Fall Time ^{3,4}	t_f		-	29	-	
Input Capacitance	C_{iss}	$V_{\text{DS}}=20\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	5870	-	pF
Output Capacitance	C_{oss}		-	2100	-	
Reverse Transfer Capacitance	C_{rss}		-	112	-	
Gate Resistance	R_g	$F=1\text{MHz}$	-	2.3	-	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.	-	-	150	A
Pulsed Source Current	$I_{\text{s,pulse}}$		-	-	500	A
Diode Forward Voltage	V_{SD}	$V_{\text{GS}}=0\text{V}, I_{\text{s}}=100\text{A}$	-	-	1.4	V
Reverse Recovery Time ³	t_{rr}	$V_{\text{GS}}=0\text{V}, V_R=40\text{V}, I_{\text{s}}=37.5\text{A}, \text{diF/dt}=100\text{A}/\mu\text{s}$	-	67	-	nS
Reverse Recovery Charge ³	Q_{rr}		-	73	-	nC

Note:

1. Pulse time of 5us, pulse width limited by maximum junction temperature.
2. The dissipated power value will change with the temperature. When it is greater than 25°C , the dissipated power value will decrease by $0.83^\circ\text{C}/\text{W}$ for every 1 degree of temperature increase.
3. Pulse test: Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

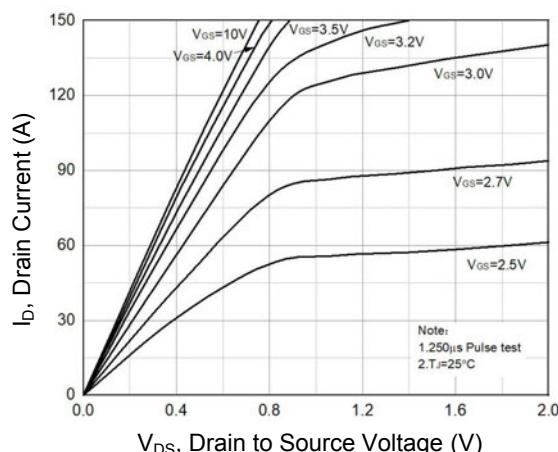


Figure 1. Typical Output Characteristics

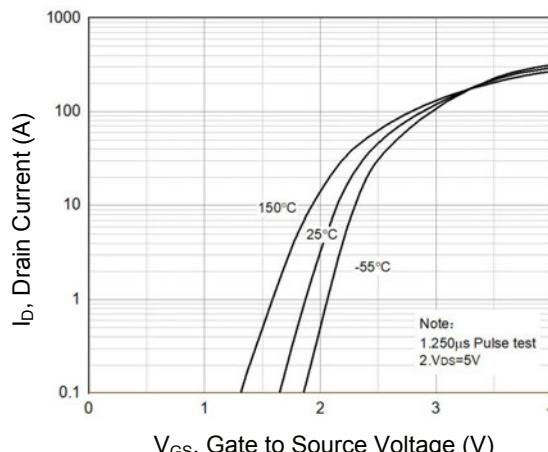


Figure 2. Transfer Characteristics

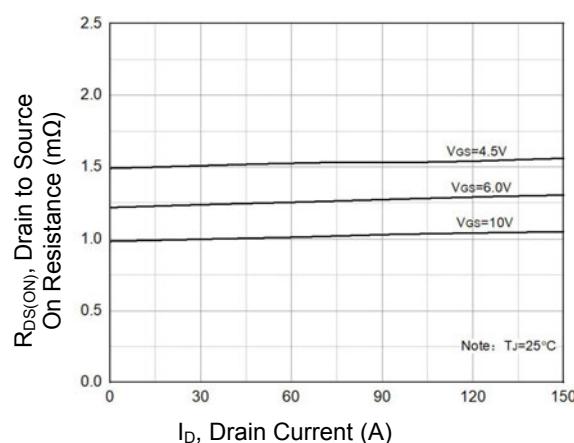


Figure 3. $R_{DS(ON)}$ vs. Drain Current

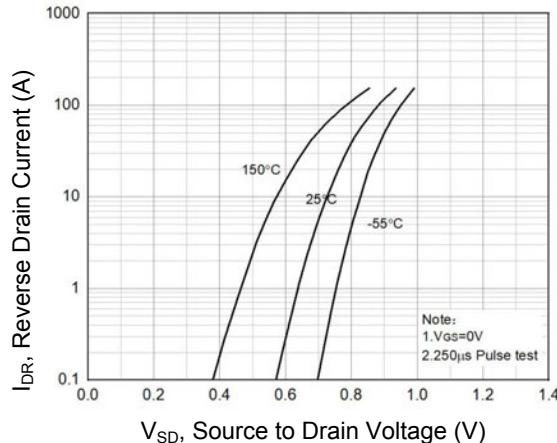


Figure 4. Body Diode Characteristics

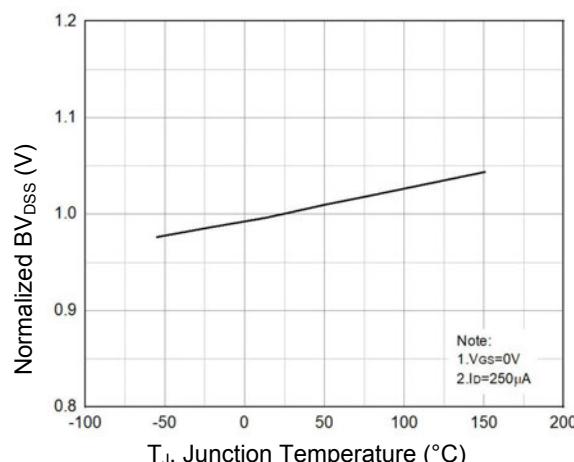


Figure 5. Normalized BV_{DSS} vs. T_J

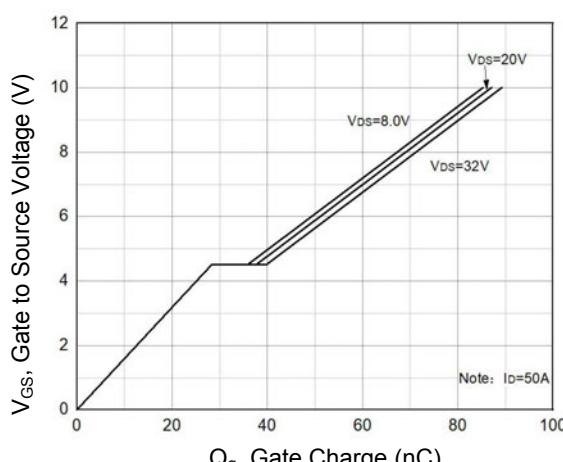


Figure 6. Gate Charge Characteristics

Typical Electrical and Thermal Characteristic Curves

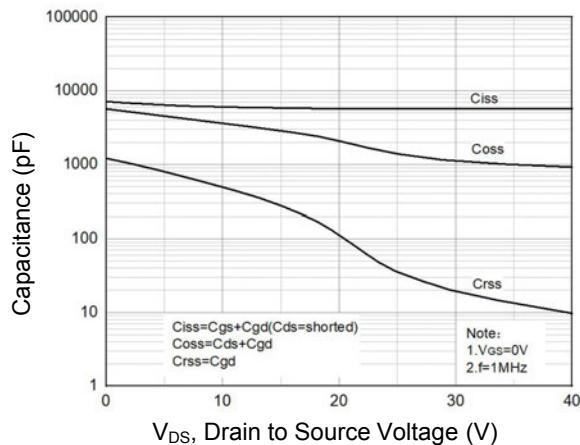


Figure 7. Capacitance Characteristics

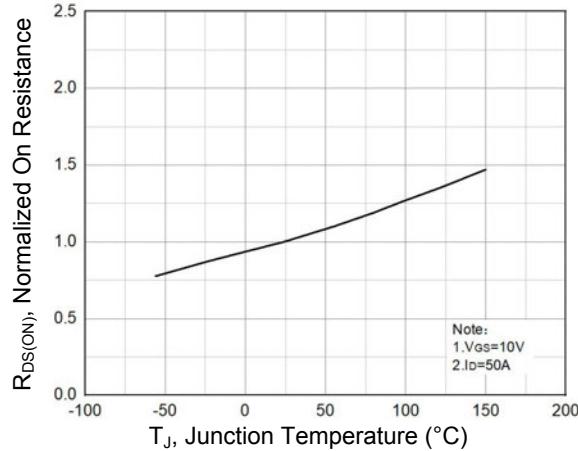


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

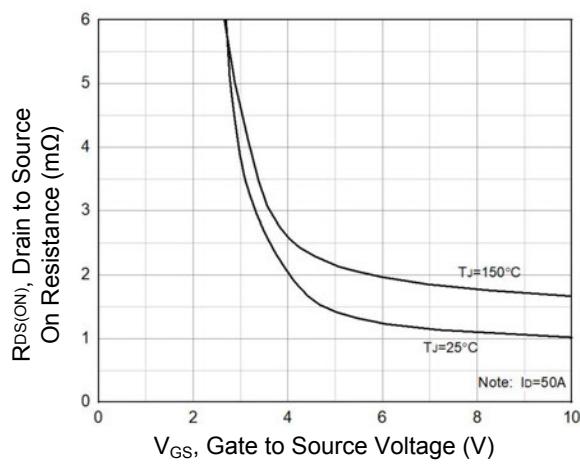


Figure 9. Normalized $R_{DS(ON)}$ vs. V_{GS}

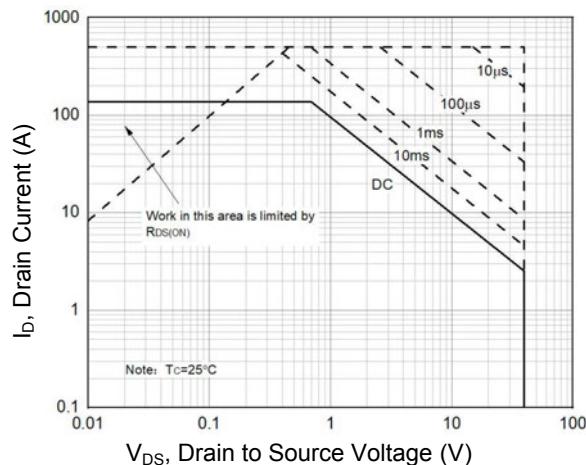


Figure 10. Maximum Safe Operation Area

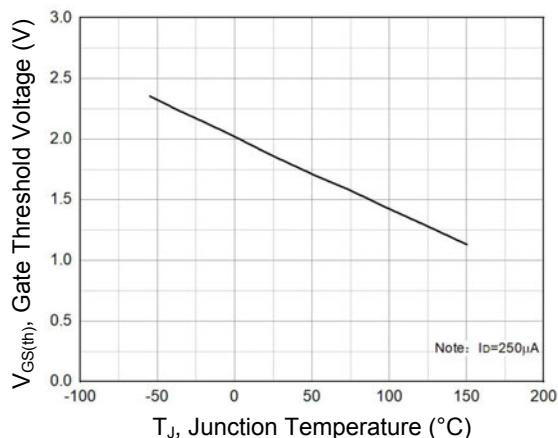


Figure 11. Gate Threshold Voltage vs. T_J

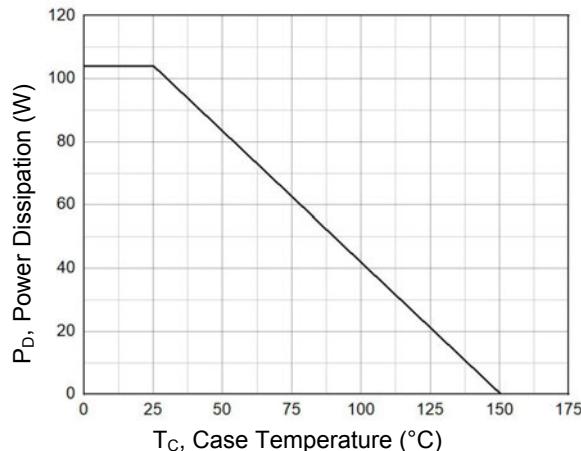
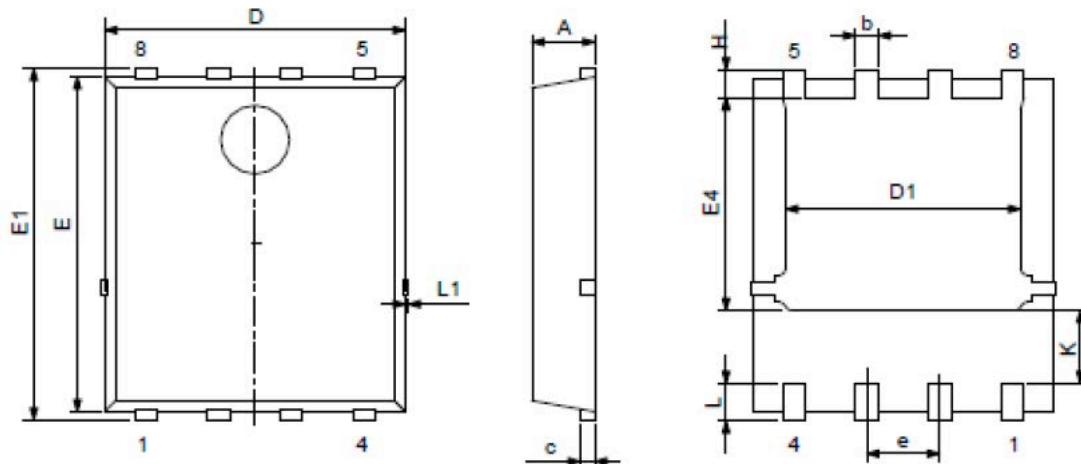


Figure 12. Power Dissipation vs. T_c

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