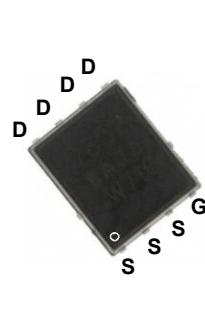
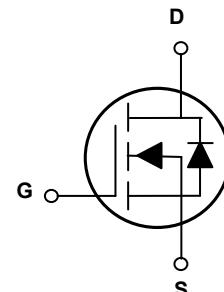


## Main Product Characteristics

BV <sub>DSS</sub>	200V
R <sub>DS(ON)</sub>	0.28Ω
I <sub>D</sub>	9A



PPAK 5X6



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 GSFP2009 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 supply and a wide variety of other applications.

## Absolute Maximum Ratings (T<sub>C</sub>=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V <sub>DS</sub>	200	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Drain Current-Continuous(T <sub>C</sub> =25°C)	I <sub>D</sub>	9	A
Drain Current-Continuous(T <sub>C</sub> =100°C)		5.7	A
Drain Current-Pulsed <sup>1</sup>	I <sub>DM</sub>	36	A
Power Dissipation(T <sub>C</sub> =25°C)	P <sub>D</sub>	72	W
Power Dissipation-Derate Above 25°C		0.6	W/°C
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	62	°C/W
Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	1.74	°C/W
Operating Junction Temperature Range	T <sub>J</sub>	-50 To +150	°C
Storage Temperature Range	T <sub>STG</sub>	-50 To +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=250\mu\text{A}$	200	-	-	V
Drain-Source Leakage Current	$I_{\text{DSS}}$	$V_{\text{DS}}=200\text{V}, V_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	-	-	1	$\mu\text{A}$
		$V_{\text{DS}}=160\text{V}, V_{\text{GS}}=0\text{V}, T_J=125^\circ\text{C}$	-	-	10	$\mu\text{A}$
Gate-Source Leakage Current	$I_{\text{GSS}}$	$V_{\text{GS}}=\pm 20\text{V}, V_{\text{DS}}=0\text{V}$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
Static Drain-Source On-Resistance	$R_{\text{DS(ON)}}$	$V_{\text{GS}}=10\text{V}, I_{\text{D}}=4.5\text{A}$	-	0.23	0.28	$\Omega$
Gate Threshold Voltage	$V_{\text{GS(th)}}$	$V_{\text{DS}}=V_{\text{GS}}, I_{\text{D}}=250\mu\text{A}$	1	-	3	V
$V_{\text{GS(th)}}$ Temperature Coefficient	$\Delta V_{\text{GS}}$		-	-5	-	$\text{mV}/^\circ\text{C}$
Forward Transconductance	$g_{\text{FS}}$	$V_{\text{DS}}=50\text{V}, I_{\text{D}}=5.4\text{A}$	3.8	-	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2,3</sup>	$Q_g$	$V_{\text{DS}}=160\text{V}, I_{\text{D}}=2.5\text{A}, V_{\text{GS}}=10\text{V}$	-	-	44	nC
Gate-Source Charge <sup>2,3</sup>	$Q_{\text{gs}}$		-	-	7.1	
Gate-Drain Charge <sup>2,3</sup>	$Q_{\text{gd}}$		-	23	-	
Turn-On Delay Time <sup>2,3</sup>	$t_{\text{d(on)}}$	$V_{\text{DD}}=100\text{V}, R_{\text{G}}=12\Omega$ $V_{\text{GS}}=10\text{V}, I_{\text{D}}=5.9\text{A}$	-	9.5	-	nS
Rise Time <sup>2,3</sup>	$t_r$		-	28	-	
Turn-Off Delay Time <sup>2,3</sup>	$t_{\text{d(off)}}$		-	40	-	
Fall Time <sup>2,3</sup>	$t_f$		-	20	-	
Input Capacitance	$C_{\text{iss}}$	$V_{\text{DS}}=25\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	300	-	pF
Output Capacitance	$C_{\text{oss}}$		-	53	-	
Reverse Transfer Capacitance	$C_{\text{rss}}$		-	15	-	
Gate Resistance	$R_g$	$V_{\text{GS}}=0\text{V}, V_{\text{DS}}=0\text{V}, F=1\text{MHz}$	-	1.19	-	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_s$	$V_G=V_D=0\text{V}, \text{Force Current}$	-	-	9	A
Pulsed Source Current	$I_{\text{SM}}$		-	-	18	A
Diode Forward Voltage	$V_{\text{SD}}$	$V_{\text{GS}}=0\text{V}, I_{\text{S}}=4.5\text{A}, T_J=25^\circ\text{C}$	-	-	1.5	V
Reverse Recovery Time	$T_{\text{rr}}$	$V_{\text{GS}}=0\text{V}, I_{\text{S}}=5.9\text{A}, d_i/d_t=100\text{A}/\mu\text{s}, T_J=25^\circ\text{C}$	-	172	-	nS
Reverse Recovery Charge	$Q_{\text{rr}}$		-	1.1	-	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu\text{s}$  , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

## Typical Electrical and Thermal Characteristic Curves

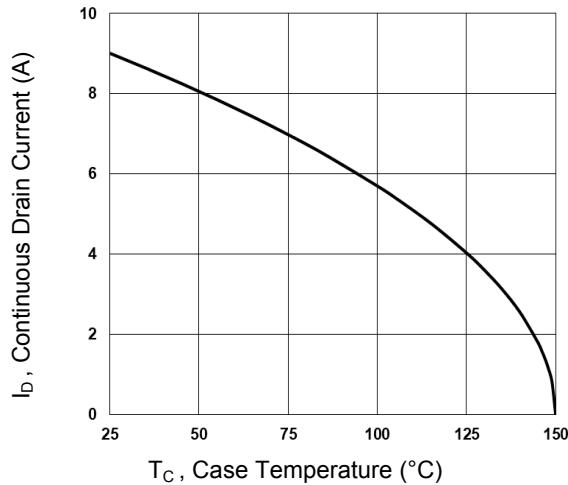


Figure 1. Continuous Drain Current vs. T<sub>C</sub>

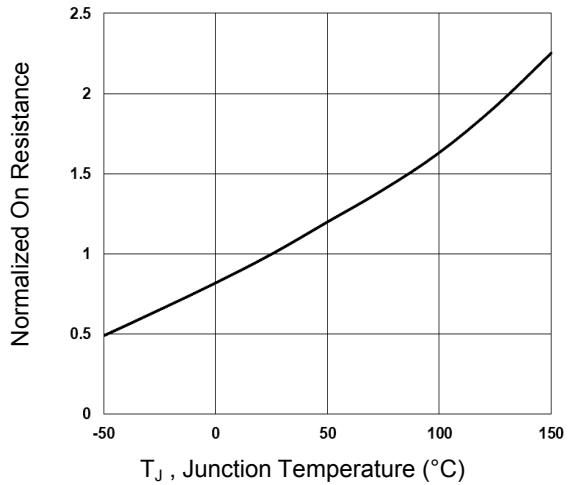


Figure 2. Normalized R<sub>DS(on)</sub> vs. T<sub>J</sub>

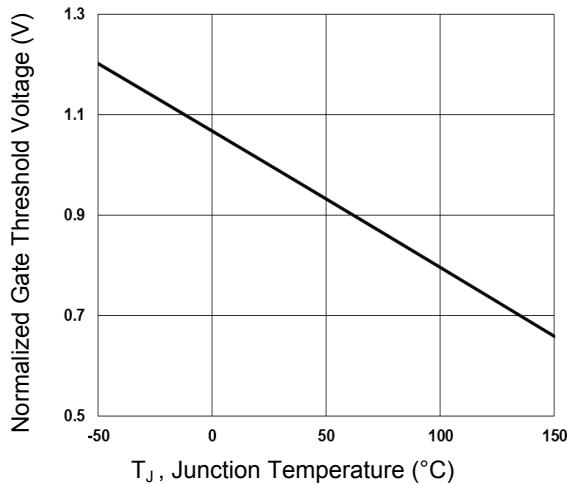


Figure 3. Normalized V<sub>th</sub> vs. T<sub>J</sub>

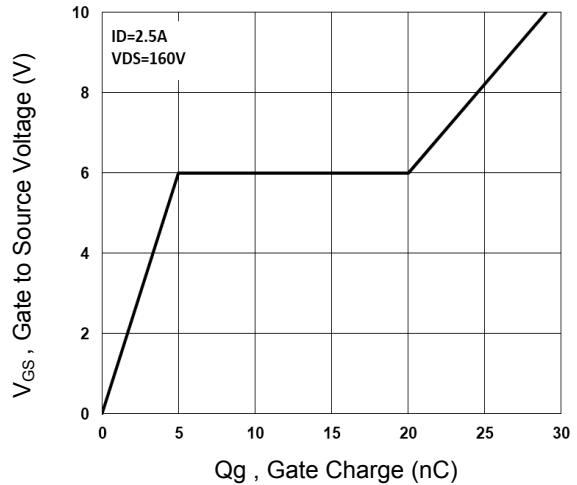


Figure 4. Gate Charge Characteristics

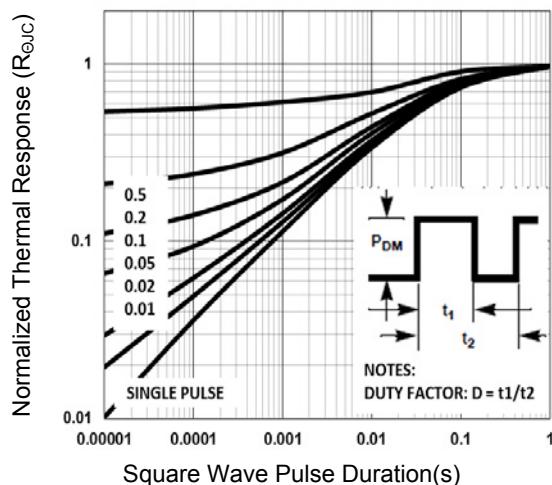


Figure 5. Normalized Transient Impedance

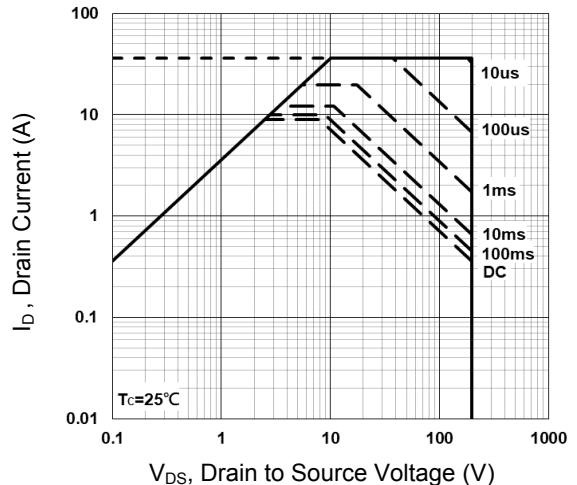


Figure 6. Maximum Safe Operation Area

### Typical Electrical and Thermal Characteristic Curves

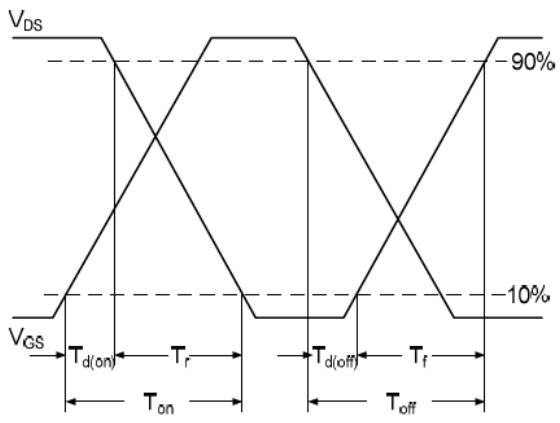


Figure 7. Switching Time Waveform

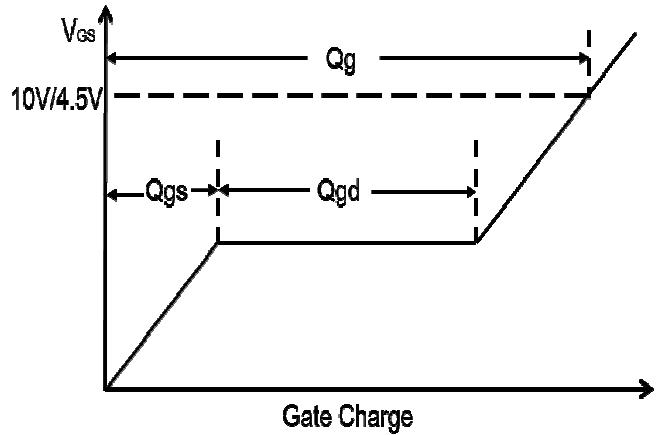
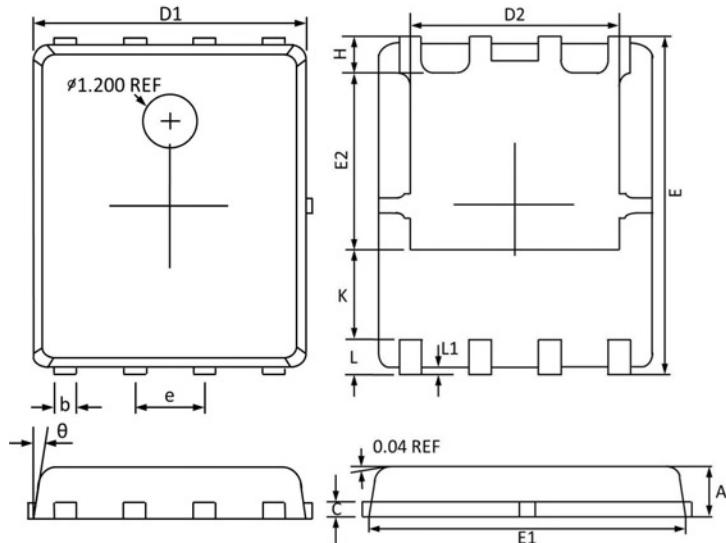


Figure 8. Gate Charge Waveform

### Package Outline Dimensions (PPAK5x6)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.100	0.800	0.043	0.031
b	0.510	0.330	0.020	0.013
C	0.300	0.200	0.012	0.008
D1	5.100	4.800	0.201	0.189
D2	4.100	3.610	0.161	0.142
E	6.200	5.900	0.244	0.232
E1	5.900	5.700	0.232	0.224
E2	3.780	3.350	0.149	0.132
e	1.27BSC		0.05BSC	
H	0.700	0.410	0.028	0.016
K	1.500	1.100	0.059	0.043
L	0.710	0.510	0.028	0.020
L1	0.200	0.060	0.008	0.002
θ	12°	0°	12°	0°