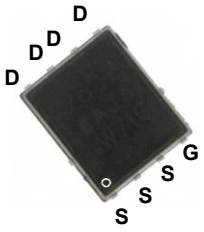
GOOD-ARK SEMICONDUCTOR

GSGP6988

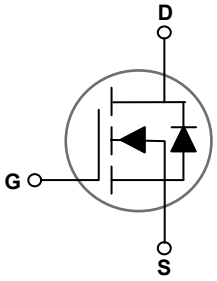
65V N-Channel MOSFET

Main Product Characteristics

BV_{DSS}	65V
$R_{DS(ON)}$	16mΩ
I_D	44A



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 GSGP6988 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_C=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	+20/-12	V
Drain Current-Continuous (T_C=25°C)	I_D	44	A
Drain Current-Continuous (T_C=100°C)		27	A
Drain Current-Pulsed[1]	I_{DM}	176	A
Single Pulse Avalanche Energy[2]	E_{AS}	9.1	mJ
Single Pulse Avalanche Current[2]	I_{AS}	13.5	A
Power Dissipation (T_C=25°C)	P_D	54.3	W
Power Dissipation-Derate above 25°C		0.43	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.3	°C/W
Operating Junction Temperature Range	T_J	-55 To +150	°C
Storage Temperature Range	T_{STG}	-55 To +150	°C

Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	65	-	-	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=1mA	-	0.03	-	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V, T_J=25°C	-	-	1	uA
		V_{DS}=48V, V_{GS}=0V, T_J=85°C	-	-	10	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=+20V, V_{DS}=0V	-	-	100	nA
On Characteristics						
Static Drain-Source On-Resistance[3]	$R_{DS(ON)}$	V_{GS}=10V, I_D=16A	-	13.6	16	mΩ
		V_{GS}=4.5V, I_D=12A	-	24.5	30	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250uA	1	1.6	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		-	-5.1	-	mV/°C
Forward Transconductance	gfs	V_{DS}=10V, I_D=3A	-	5	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[3, 4]	Q_g	V_{DS}=30V, V_{GS}=10V, I_D=12A	-	10.9	22	nC
Gate-Source Charge[3, 4]	Q_{gs}		-	1.5	3	
Gate-Drain Charge[3, 4]	Q_{gd}		--	4.4	9	
Turn-On Delay Time[3, 4]	$T_{d(on)}$	V_{DD}=30V, V_{GS}=10V, R_G=3.3Ω, I_D=1A	-	8	16	nS
Rise Time[3, 4]	T_r		-	12	24	
Turn-Off Delay Time[3, 4]	$T_{d(off)}$		-	25	50	
Fall Time[3, 4]	T_f		-	18	36	
Input Capacitance	C_{iss}	V_{DS}=30V, V_{GS}=0V, F=1MHz	-	653	1300	pF
Output Capacitance	C_{oss}		-	192	380	
Reverse Transfer Capacitance	C_{rss}		-	27	60	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	0.3	-	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	44	A
Pulsed Source Current[3]	I_{SM}		-	-	88	A
Diode Forward Voltage[3]	V_{SD}	V_{GS}=0V, I_S=1A, T_J=25°C	-	-	1	V

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V, V_{GS}=10V, L=0.1mH, I_{AS}=13.5A, R_G=25Ω, Starting T_J=25°C.
3. Pulse test, pulse width ≦ 300uS, duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

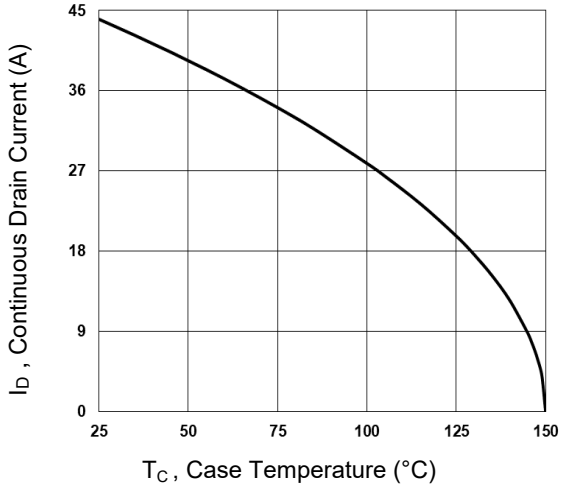


Figure 1. Continuous Drain Current vs. T_C

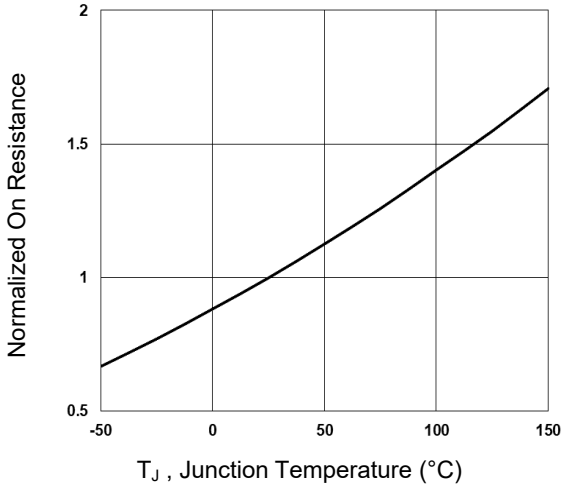


Figure 2. Normalized R_{DSON} vs. T_J

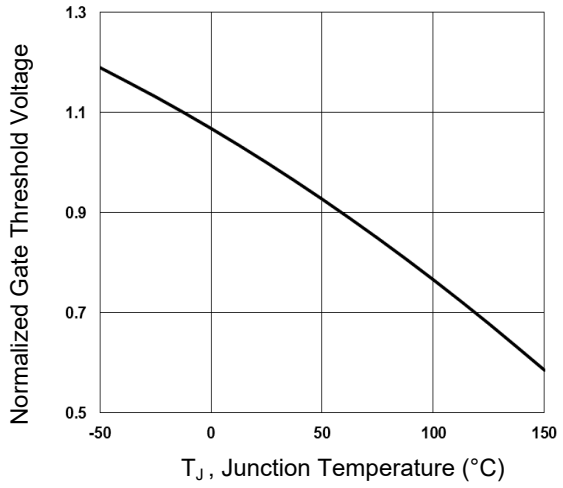


Figure 3. Normalized V_{th} vs. T_J

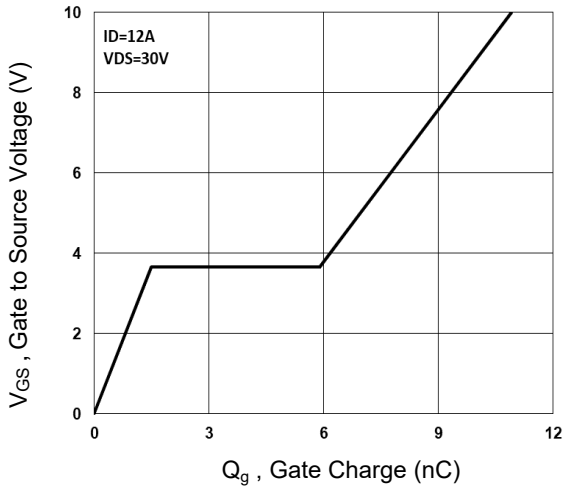


Figure 4. Gate Charge Waveform

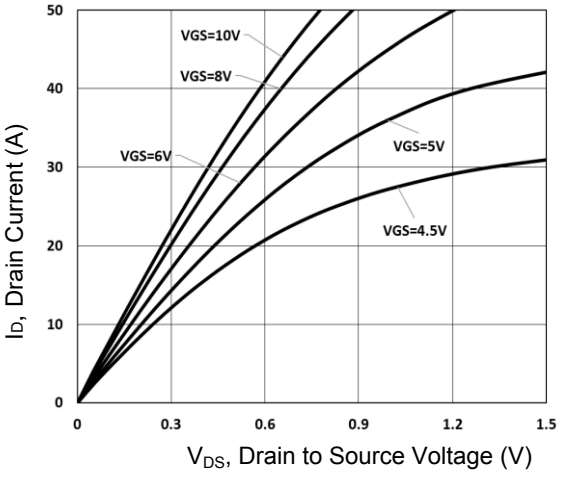


Figure 5. Typical Output Characteristics

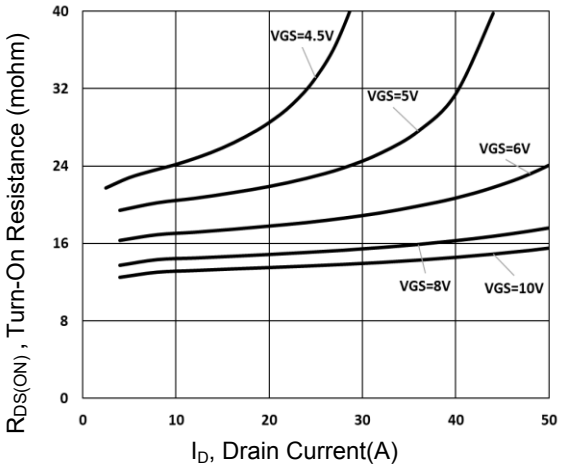


Figure 6. Turn-On Resistance vs. I_D

Typical Electrical and Thermal Characteristic Curves

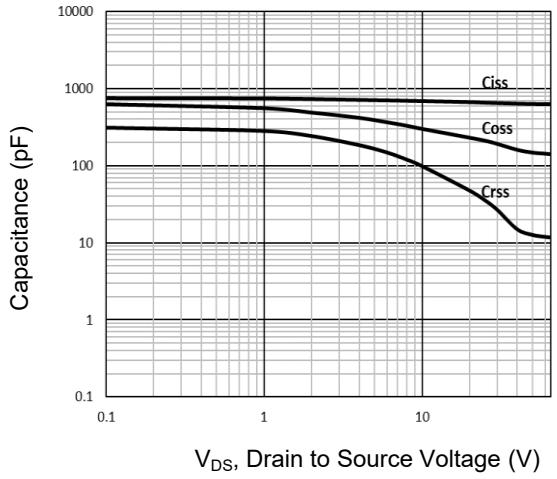


Figure 7. Capacitance Characteristics

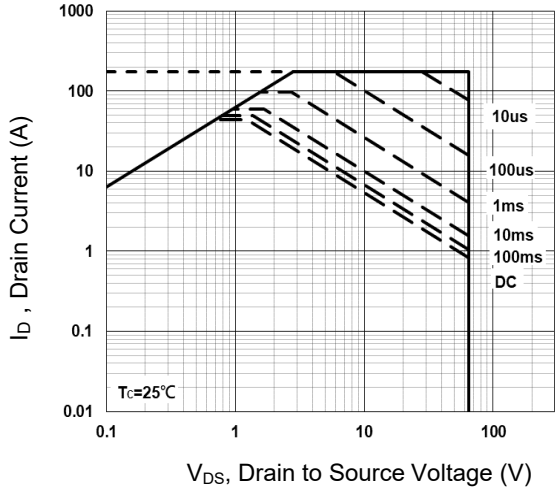


Figure 8. Maximum Safe Operation Area

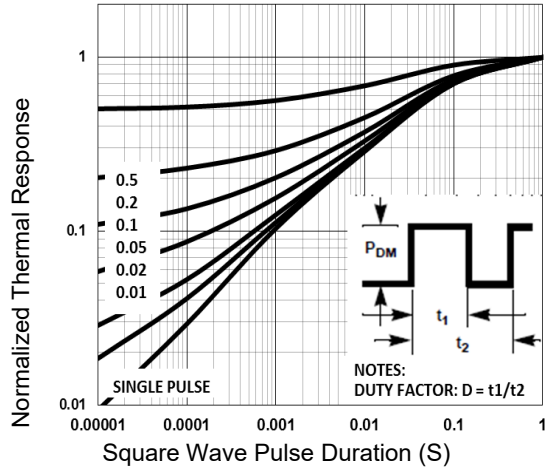


Figure 9. Normalized Transient Response

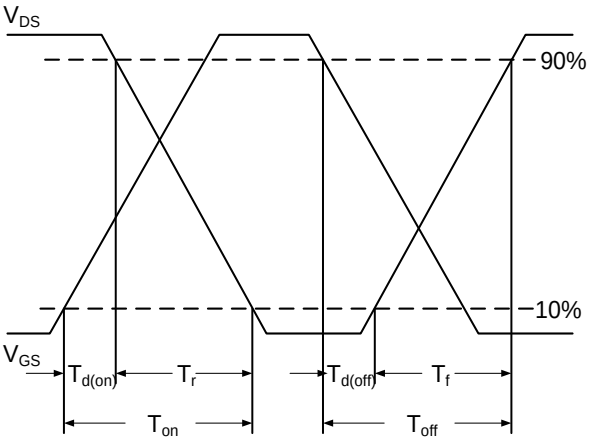


Figure 10. Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

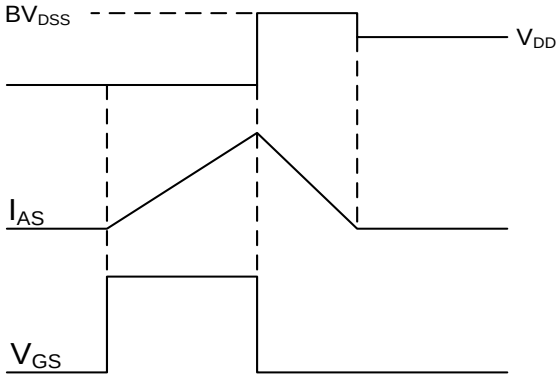
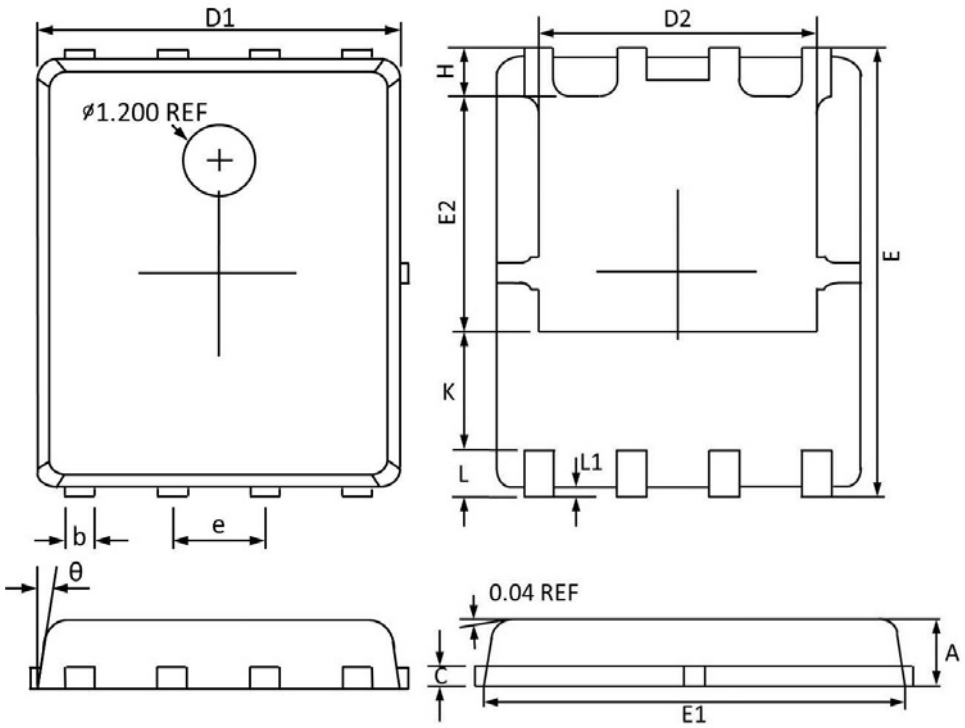


Figure 11. E_{AS} Waveform

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°