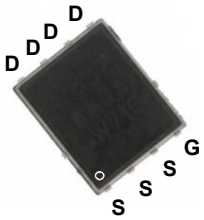
GOOD-ARK SEMICONDUCTOR

GSFP6901

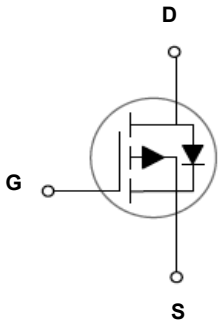
60V P-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	-60V
$R_{DS(ON)}$	8.6mΩ
I_D	-72A



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 GSFP6901 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_C=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous (T_C=25°C)	I_D	-72	A
Drain Current-Continuous (T_C=100°C)		-45.5	
Drain Current-Pulsed[1]	I_{DM}	-288	A
Single Pulse Avalanche Energy[2]	E_{AS}	320	mJ
Single Pulse Avalanche Current[2]	I_{AS}	-80	A
Power Dissipation (T_C=25°C)	P_D	142	W
Power Dissipation - Derate Above 25°C		1.13	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	0.88	°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)

Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250uA	-60	---	---	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=-1mA	---	-0.036	---	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=125°C	---	---	-10	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	---	---	±100	nA
On Characteristics						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-20A	---	7.1	8.6	mΩ
		V_{GS}=-4.5V, I_D=-10A	---	8.8	12	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=-250uA	-1.2	-1.6	-2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		---	6.3	---	mV/°C
Forward Transconductance	gfs	V_{DS}=-10, I_D=-3A	---	18	---	S
Dynamic and Switching Characteristics						
Total Gate Charge[3, 4]	Q_g	V_{DS}=-48V, V_{GS}=-10V, I_D=-5A	---	141	210	nC
Gate-Source Charge[3, 4]	Q_{gs}		---	17	25.5	
Gate-Drain Charge[3, 4]	Q_{gd}		---	28.6	43	
Turn-On Delay Time[3, 4]	$T_{d(on)}$	V_{DD}=-48V, V_{GS}=-10V, R_G=6Ω, I_D=-1A	---	70	140	nS
Rise Time[3, 4]	T_r		---	205	410	
Turn-Off Delay Time[3, 4]	$T_{d(off)}$		---	402	804	
Fall Time[3, 4]	T_f		---	197	394	
Input Capacitance	C_{iss}	V_{DS}=-25V, V_{GS}=0V, F=1MHz	---	8620	12930	pF
Output Capacitance	C_{oss}		---	486	730	
Reverse Transfer Capacitance	C_{rss}		---	288	430	
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	---	---	-72	A
Pulsed Source Current	I_{SM}		---	---	-144	A
Diode Forward Voltage	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}=-80A, R_G=25Ω, starting T_J=25°C.
3. Pulsed test: pulse width ≦ 300uS, duty cycle ≦ 2%
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

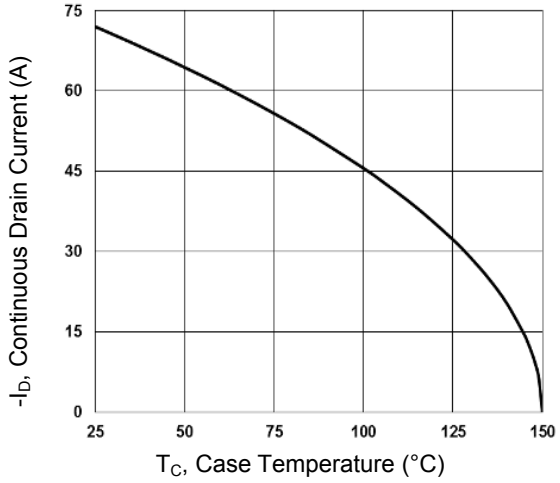


Figure 1. Continuous Drain Current vs. T_C

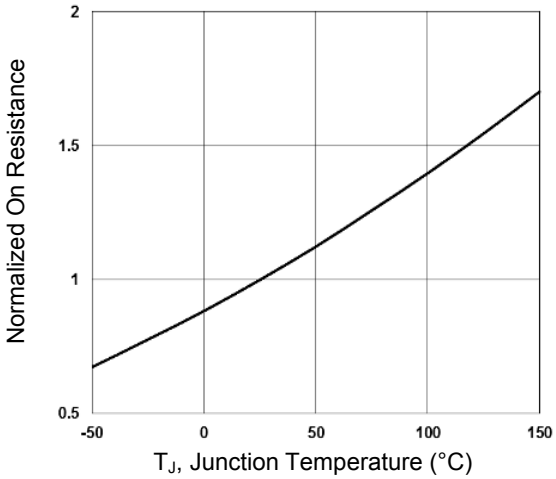


Figure 2. Normalized $R_{DS(ON)}$ vs. T_J

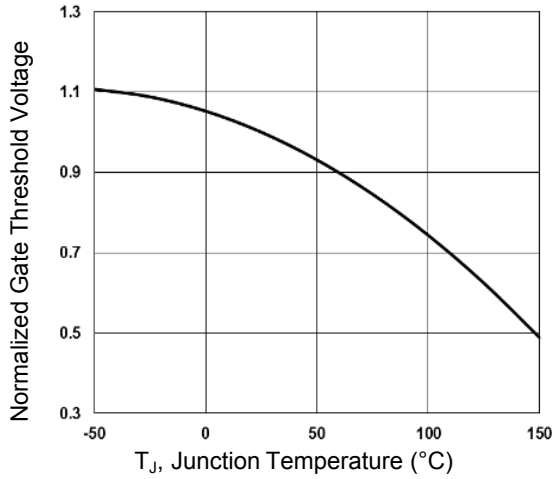


Figure 3. Normalized V_{th} vs. T_J

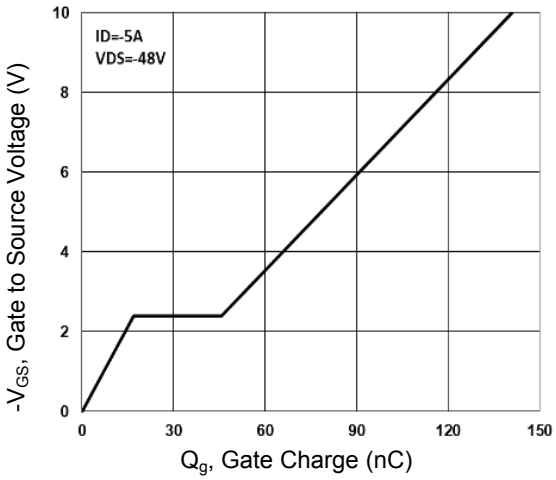


Figure 4. Gate Charge Waveform

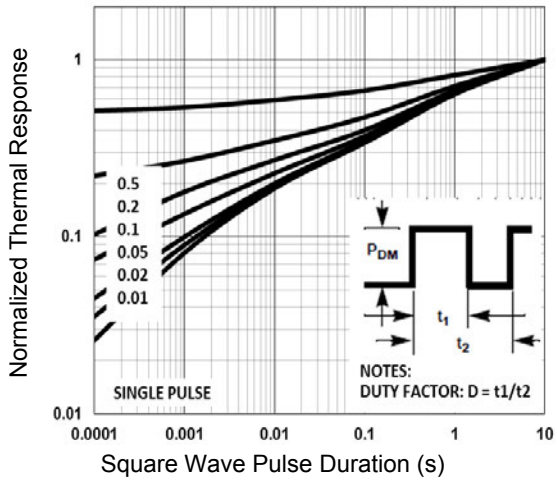


Figure 5. Normalized Transient Impedance

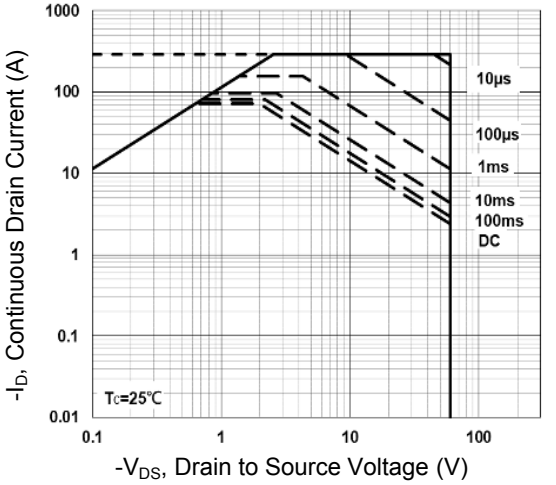


Figure 6. Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

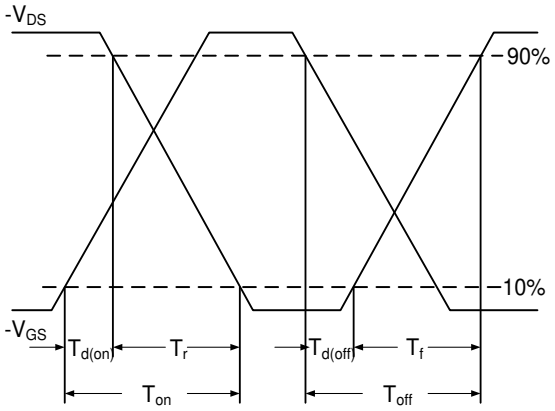


Figure 7. Switching Time Waveform

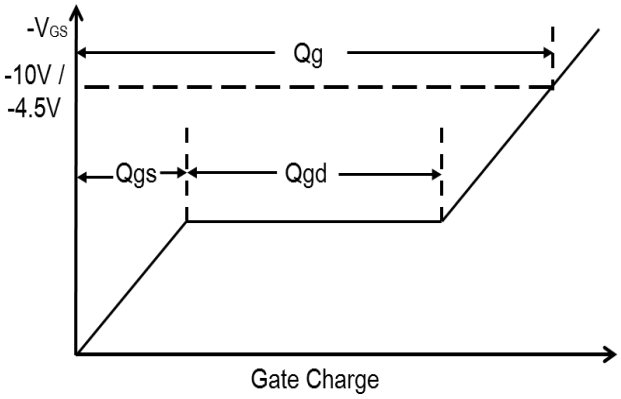
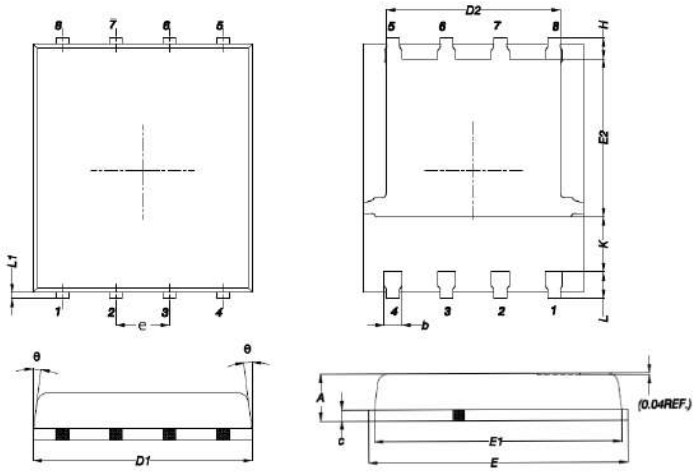


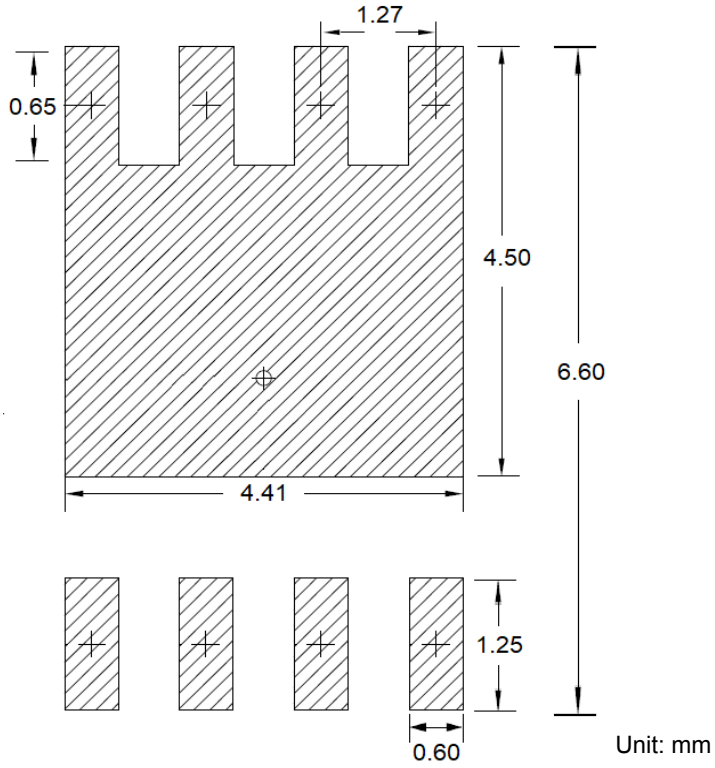
Figure 8. Gate Charge Waveform

Package Outline Dimensions (PPAK5x6)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.850	1.200	0.033	0.047
b	0.300	0.510	0.012	0.020
c	0.200	0.300	0.008	0.012
D1	4.800	5.400	0.189	0.213
D2	3.610	4.310	0.142	0.170
E	5.850	6.300	0.230	0.248
E1	5.450	5.960	0.215	0.235
E2	3.300	3.920	0.130	0.154
e	1.270 BSC		0.050 BSC	
H	0.380	0.650	0.015	0.026
K	1.100	-	0.043	-
L	0.380	0.710	0.015	0.028
L1	0.050	0.250	0.002	0.010
θ	0°	12°	0°	12°

Recommended Pad Layout



Unit: mm