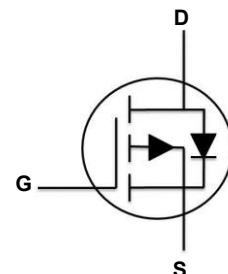
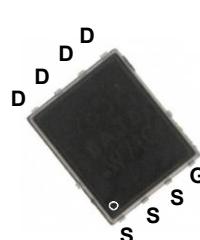


## Main Product Characteristics

BV <sub>DSS</sub>	-30V
R <sub>DS(ON)</sub>	5.9mΩ
I <sub>D</sub>	-100A



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 GSFP3983 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 ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V <sub>DS</sub>	-30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Drain Current-Continuous ( $T_C=25^\circ\text{C}$ )	I <sub>D</sub>	-100	A
Drain Current-Continuous ( $T_C=100^\circ\text{C}$ )		-64	
Drain Current-Pulsed <sup>1</sup>	I <sub>DM</sub>	-400	A
Single Pulse Avalanche Energy <sup>2</sup>	E <sub>AS</sub>	245	mJ
Single Pulse Avalanche Current <sup>2</sup>	I <sub>AS</sub>	-70	A
Power Dissipation ( $T_C=25^\circ\text{C}$ )	P <sub>D</sub>	121	W
Power Dissipation - Derate above 25°C		0.97	W/°C
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	62	°C/W
Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	1.03	°C/W
Operating Junction Temperature Range	T <sub>J</sub>	-55 To +150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 To +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On / Off Characteristics</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=-250\mu\text{A}$	-30	-	-	V
Drain-Source Leakage Current	$I_{\text{DSS}}$	$V_{\text{DS}}=-30\text{V}, V_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	-	-	-1	$\mu\text{A}$
		$V_{\text{DS}}=-24\text{V}, V_{\text{GS}}=0\text{V}, T_J=125^\circ\text{C}$	-	-	-10	$\mu\text{A}$
Gate-Source Leakage Current	$I_{\text{GSS}}$	$V_{\text{GS}}=\pm20\text{V}, V_{\text{DS}}=0\text{V}$	-	-	$\pm100$	nA
Static Drain-Source On-Resistance <sup>3</sup>	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=-10\text{V}, I_{\text{D}}=-15\text{A}$	-	4.9	5.9	$\text{m}\Omega$
		$V_{\text{GS}}=-4.5\text{V}, I_{\text{D}}=-10\text{A}$	-	7.6	9.9	
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}}=V_{\text{DS}}, I_{\text{D}}=-250\mu\text{A}$	-1.2	-1.6	-2.5	V
Forward Transconductance	$g_{\text{fs}}$	$V_{\text{DS}}=-10\text{V}, I_{\text{D}}=-1\text{A}$	-	6	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>3,4</sup>	$Q_g$	$V_{\text{DS}}=-15\text{V}, I_{\text{D}}=-50\text{A}$ $V_{\text{GS}}=-10\text{V}$	-	69	105	nC
Gate-Source Charge <sup>3,4</sup>	$Q_{\text{gs}}$		-	13	20	
Gate-Drain Charge <sup>3,4</sup>	$Q_{\text{gd}}$		-	15	25	
Turn-On Delay Time <sup>3,4</sup>	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=-15\text{V}, R_{\text{G}}=6\Omega$ $V_{\text{GS}}=-10\text{V}, I_{\text{D}}=-50\text{A}$	-	35	55	nS
Rise Time <sup>3,4</sup>	$t_r$		-	14	25	
Turn-Off Delay Time <sup>3,4</sup>	$t_{\text{d}(\text{off})}$		-	235	355	
Fall Time <sup>3,4</sup>	$t_f$		-	85	130	
Input Capacitance	$C_{\text{iss}}$	$V_{\text{DS}}=-15\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	4100	6150	pF
Output Capacitance	$C_{\text{oss}}$		-	610	915	
Reverse Transfer Capacitance	$C_{\text{rss}}$		-	450	675	
Gate Resistance	$R_g$	$V_{\text{GS}}=0\text{V}, V_{\text{DS}}=0\text{V}, F=1\text{MHz}$	-	6.6	-	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_s$	$V_G=V_D=0\text{V},$ Force Current	-	-	-100	A
Pulsed Source Current	$I_{\text{SM}}$		-	-	-200	A
Diode Forward Voltage	$V_{\text{SD}}$	$V_{\text{GS}}=0\text{V}, I_s=-1\text{A}, T_J=25^\circ\text{C}$	-	-	-1	V
Reverse Recovery Time	$t_{rr}$	$V_R=-30\text{V}, I_s=-10\text{A}$ $dI/dt=100\text{A}/\mu\text{s}, T_J=25^\circ\text{C}$	-	150	-	nS
Reverse Recovery Charge	$Q_{rr}$		-	250	-	nC

Note:

- Repetitive rating: Pulsed width limited by maximum junction temperature.
- $V_{\text{DD}}=-25\text{V}, V_{\text{GS}}=-10\text{V}, L=0.1\text{mH}, I_{\text{AS}}=-70\text{A}, R_{\text{G}}=25\Omega$ , starting  $T_J=25^\circ\text{C}$ .
- Pulse test: pulse width  $\leq 300\text{us}$ , duty cycle  $\leq 2\%$ .
- Essentially independent of operating temperature.

## Typical Electrical and Thermal Characteristic Curves

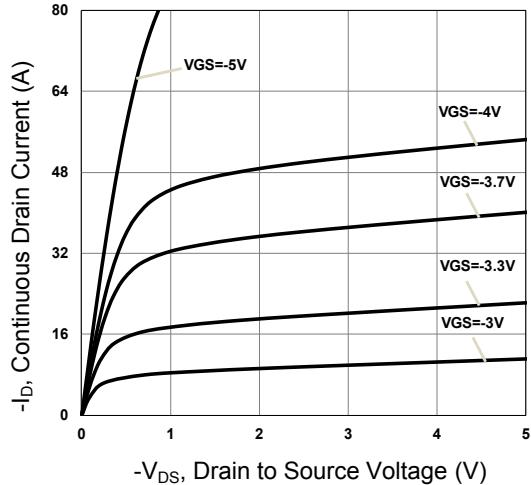


Figure 1. Typical Output Characteristics

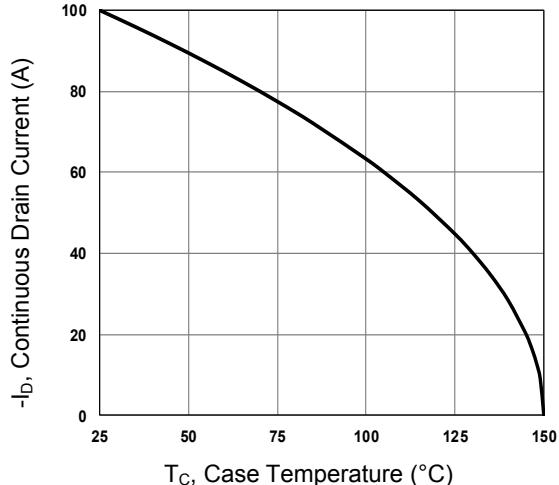


Figure 2. Continuous Drain Current vs.  $T_C$

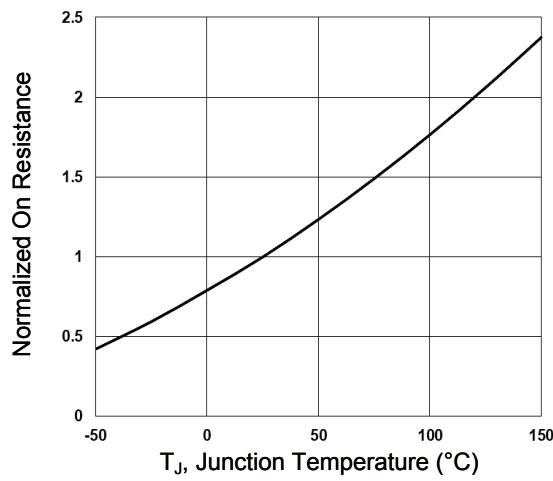


Figure 3. Normalized  $R_{DS(on)}$  vs.  $T_J$

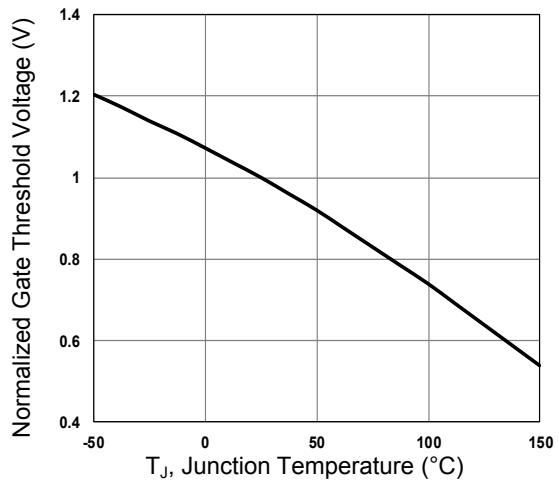


Figure 4. Normalized  $V_{th}$  vs.  $T_J$

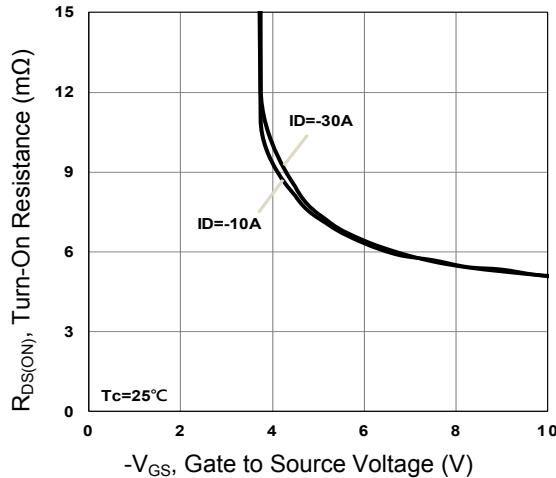


Figure 5. Turn-On Resistance vs.  $V_{GS}$

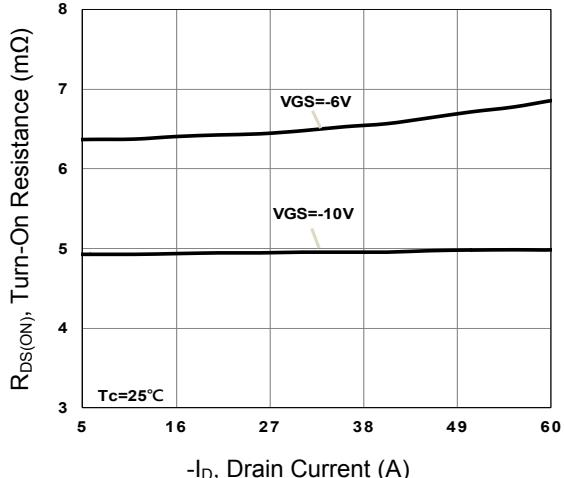


Figure 6. Turn-On Resistance vs.  $I_D$

## Typical Electrical and Thermal Characteristic Curves

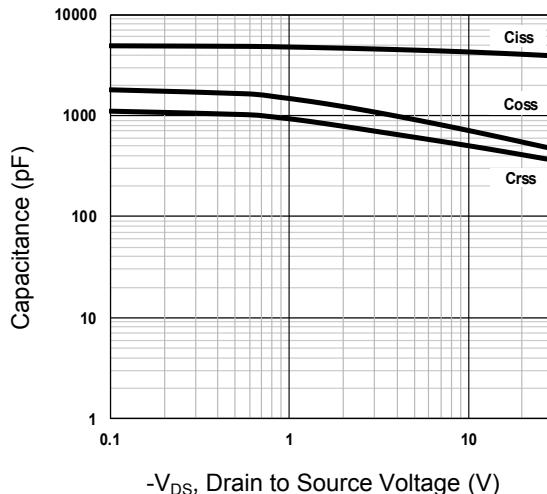


Figure 7. Capacitance Characteristics

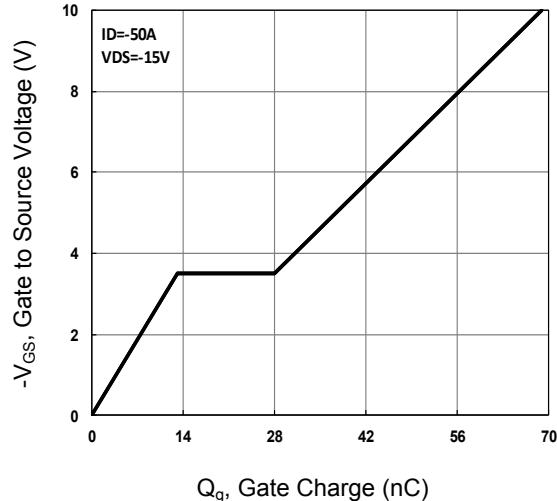


Figure 8. Gate Charge Characteristics

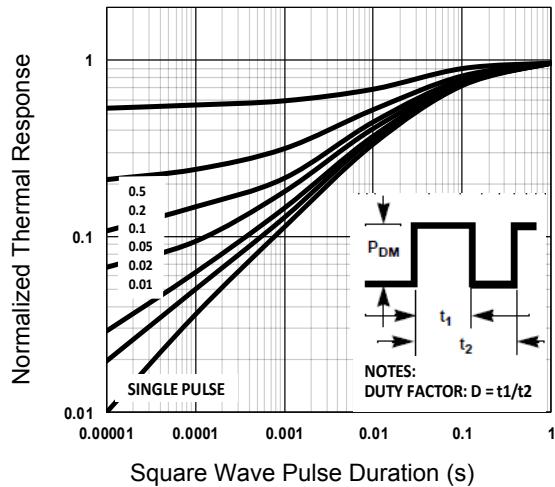


Figure 9. Normalized Transient Impedance

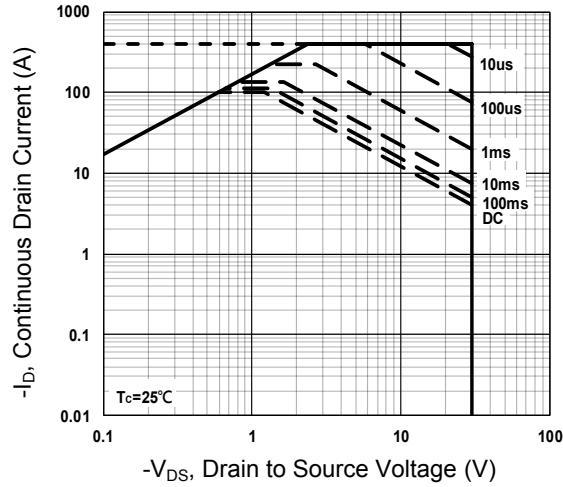


Figure 10. Maximum Safe Operation Area

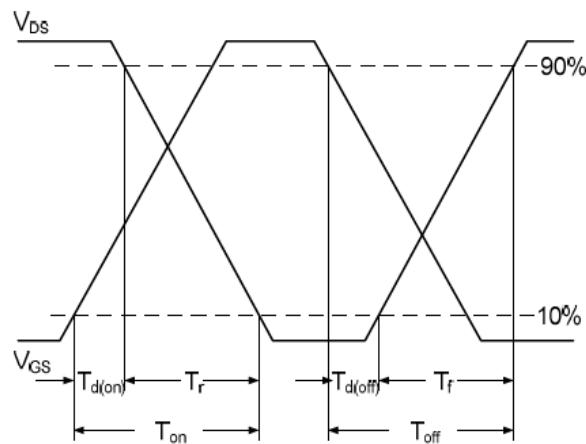


Figure 11. Switching Time Waveform

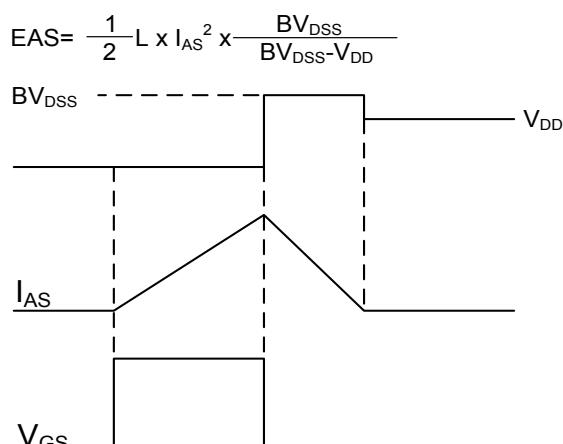
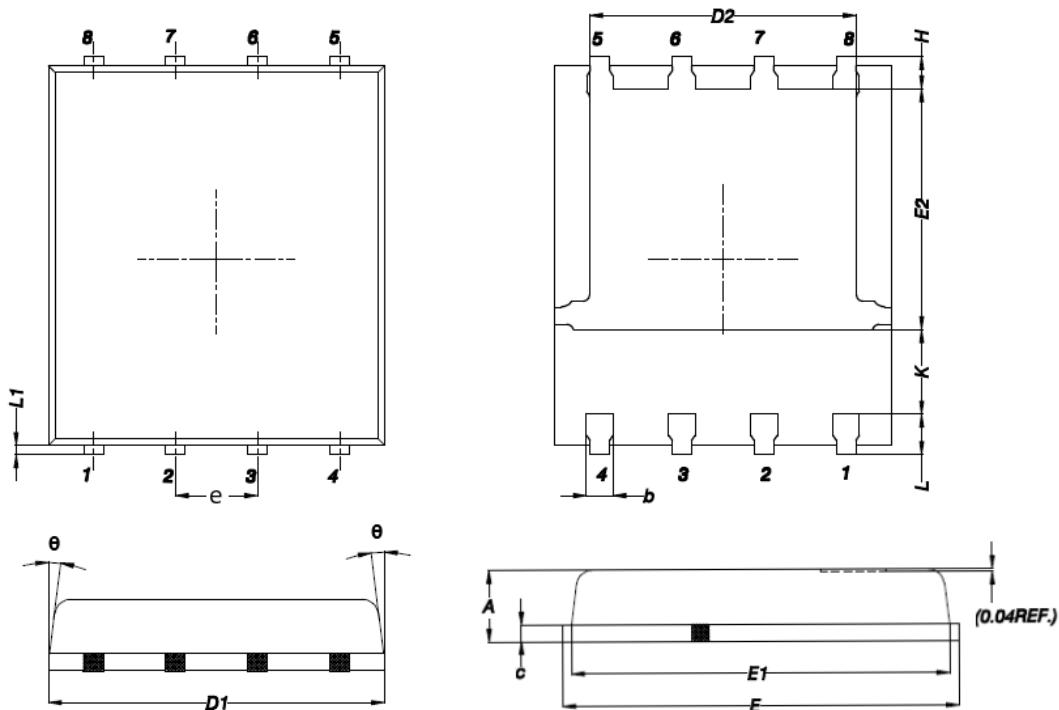


Figure 12. EAS Waveform

### Package Outline Dimensions (PPAK5x6)



Symbol	Dimensions In Millimeters		Dimensions in Inches	
	MIN	MAX	MIN	MAX
A	0.850	1.200	0.031	0.047
b	0.330	0.510	0.013	0.020
C	0.200	0.300	0.008	0.012
D1	4.800	5.400	0.189	0.212
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	0.009
θ	0°	12°	0°	12°