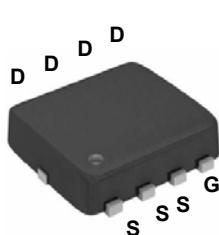
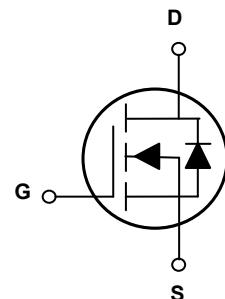


Main Product Characteristics

$V_{(BR)DSS}$	30V
$R_{DS(ON)}$	18mΩ
I_D	25A



PPAK3X3



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 GSFN3912 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 ($T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current – Continuous ($T_C=25^\circ\text{C}$)	I_D	25	A
Drain Current – Continuous ($T_C=100^\circ\text{C}$)		16	A
Drain Current – Pulsed ¹	I_{DM}	100	A
Single Pulse Avalanche Energy ²	E_{AS}	32	mJ
Single Pulse Avalanche Current ²	I_{AS}	8	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	21	W
Power Dissipation – Derate above 25°C		0.17	W/ $^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	---	62	$^\circ\text{C/W}$
Thermal Resistance Junction to Case	$R_{\theta JC}$	---	6	$^\circ\text{C/W}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$\text{V}_{\text{GS}}=0\text{V}, \text{I}_D=250\mu\text{A}$	30	---	---	V
BV_{DSS} Temperature Coefficient	$\Delta \text{BV}_{\text{DSS}}/\Delta T_J$	Reference to 25°C , $\text{I}_D=1\text{mA}$	---	0.04	---	$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	$\text{I}_{\text{DS}(\text{SS})}$	$\text{V}_{\text{DS}}=30\text{V}, \text{V}_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	---	---	1	μA
		$\text{V}_{\text{DS}}=24\text{V}, \text{V}_{\text{GS}}=0\text{V}, T_J=125^\circ\text{C}$	---	---	10	μA
Gate-Source Leakage Current	$\text{I}_{\text{GS}(\text{SS})}$	$\text{V}_{\text{GS}}=\pm 20\text{V}, \text{V}_{\text{DS}}=0\text{V}$	---	---	± 100	nA
On Characteristics						
Static Drain-Source On-Resistance ³	$\text{R}_{\text{DS}(\text{ON})}$	$\text{V}_{\text{GS}}=10\text{V}, \text{I}_D=12\text{A}$	---	14	18	$\text{m}\Omega$
		$\text{V}_{\text{GS}}=4.5\text{V}, \text{I}_D=8\text{A}$	---	20	28	$\text{m}\Omega$
Gate Threshold Voltage	$\text{V}_{\text{GS}(\text{th})}$	$\text{V}_{\text{GS}}=\text{V}_{\text{DS}}, \text{I}_D=250\mu\text{A}$	1.2	1.6	2.5	V
$\text{V}_{\text{GS}(\text{th})}$ Temperature Coefficient	$\Delta \text{V}_{\text{GS}(\text{th})}$		---	-4	---	$\text{mV}/^\circ\text{C}$
Forward Transconductance	g_{fs}	$\text{V}_{\text{DS}}=10\text{V}, \text{I}_D=6\text{A}$	---	6.5	---	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{3, 4}	Q_g	$\text{V}_{\text{DS}}=15\text{V}, \text{V}_{\text{GS}}=4.5\text{V}, \text{I}_D=6\text{A}$	---	4.1	8	nC
Gate-Source Charge ^{3, 4}	Q_{gs}		---	1	2	
Gate-Drain Charge ^{3, 4}	Q_{gd}		---	2.1	4	
Turn-On Delay Time ^{3, 4}	$\text{T}_{\text{d}(\text{on})}$	$\text{V}_{\text{DD}}=15\text{V}, \text{V}_{\text{GS}}=10\text{V}, \text{R}_g=6\Omega, \text{I}_D=1\text{A}$	---	2.8	5	nS
Rise Time ^{3, 4}	T_r		---	7.2	14	
Turn-Off Delay Time ^{3, 4}	$\text{T}_{\text{d}(\text{off})}$		---	15.8	30	
Fall Time ^{3, 4}	T_f		---	4.6	9	
Input Capacitance	C_{iss}	$\text{V}_{\text{DS}}=25\text{V}, \text{V}_{\text{GS}}=0\text{V}, \text{F}=1\text{MHz}$	---	345	500	pF
Output Capacitance	C_{oss}		---	55	80	
Reverse Transfer Capacitance	C_{rss}		---	32	45	
Gate Resistance	R_g	$\text{V}_{\text{GS}}=0\text{V}, \text{V}_{\text{DS}}=0\text{V}, \text{F}=1\text{MHz}$	---	3.2	6.4	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_s	$\text{V}_G=\text{V}_D=0\text{V}, \text{Force Current}$	---	---	25	A
Pulsed Source Current ³	I_{SM}		---	---	50	A
Diode Forward Voltage ³	V_{SD}	$\text{V}_{\text{GS}}=0\text{V}, \text{I}_s=1\text{A}, T_J=25^\circ\text{C}$	---	0.7	1	V

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. $\text{V}_{\text{DD}}=25\text{V}, \text{V}_{\text{GS}}=10\text{V}, \text{L}=1\text{mH}, \text{I}_{\text{AS}}=8\text{A}, \text{R}_g=25\Omega$, Starting $T_J=25^\circ\text{C}$.
3. The data tested by pulsed, pulse width $\leq 300\text{us}$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

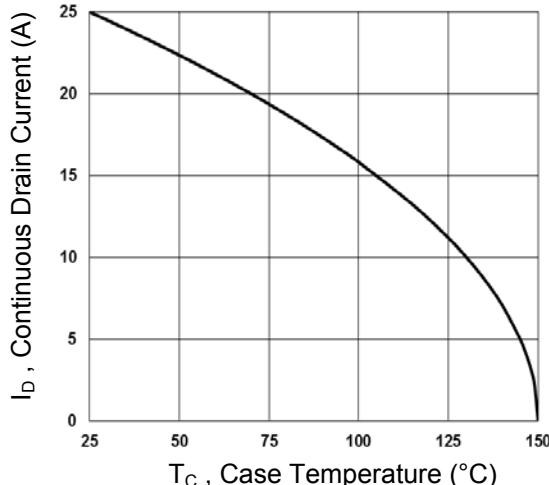


Fig.1 Continuous Drain Current vs. T_C

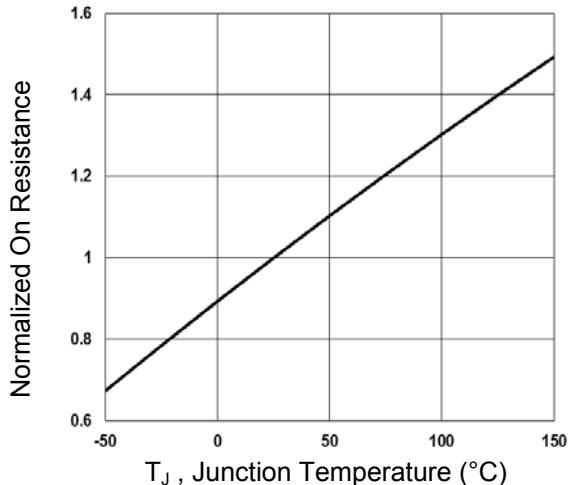


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

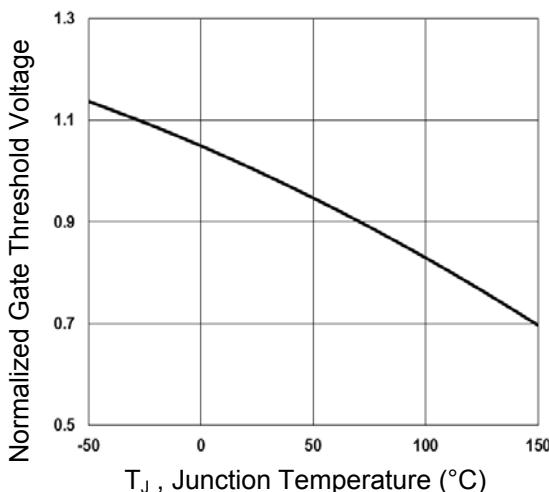


Fig.3 Normalized V_{th} vs. T_J

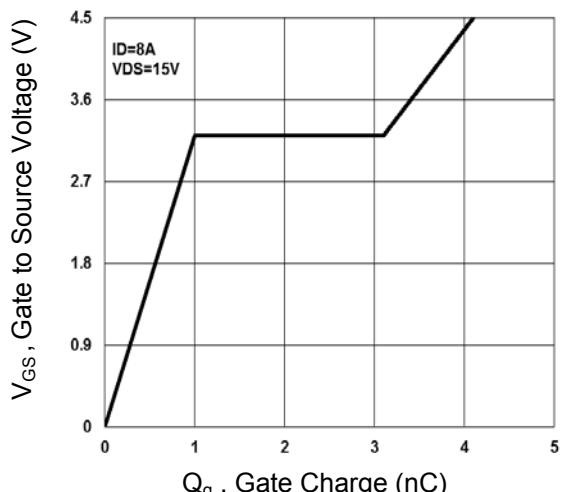


Fig.4 Gate Charge Waveform

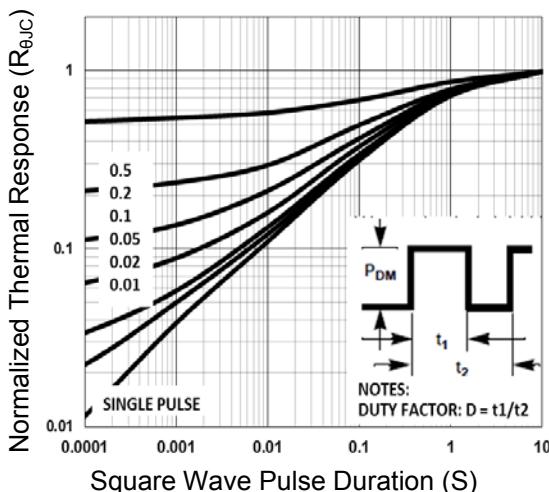


Fig.5 Normalized Transient Response

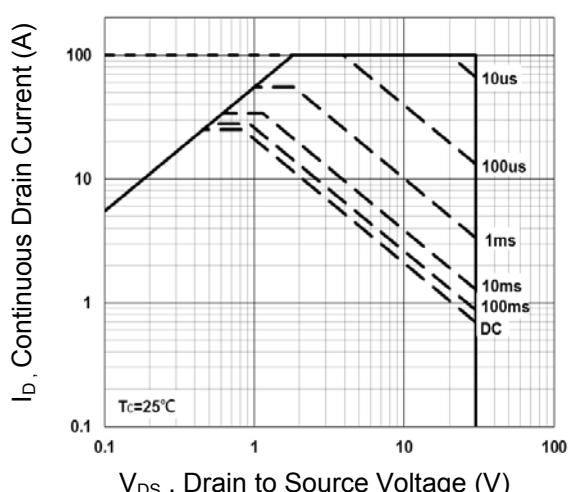


Fig.6 Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

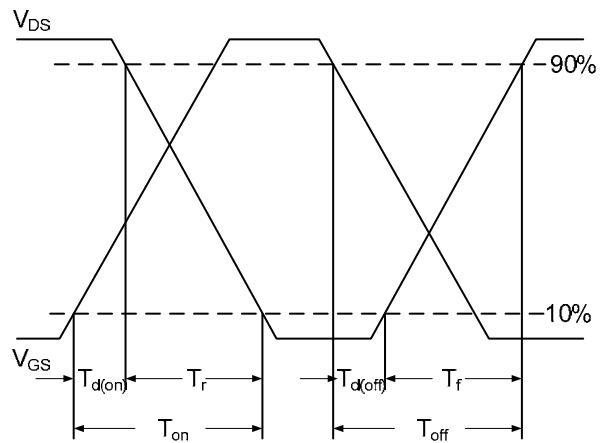


Fig.7 Switching Time Waveform

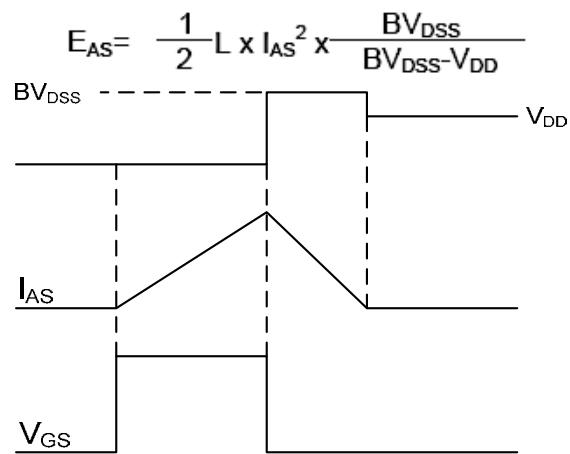
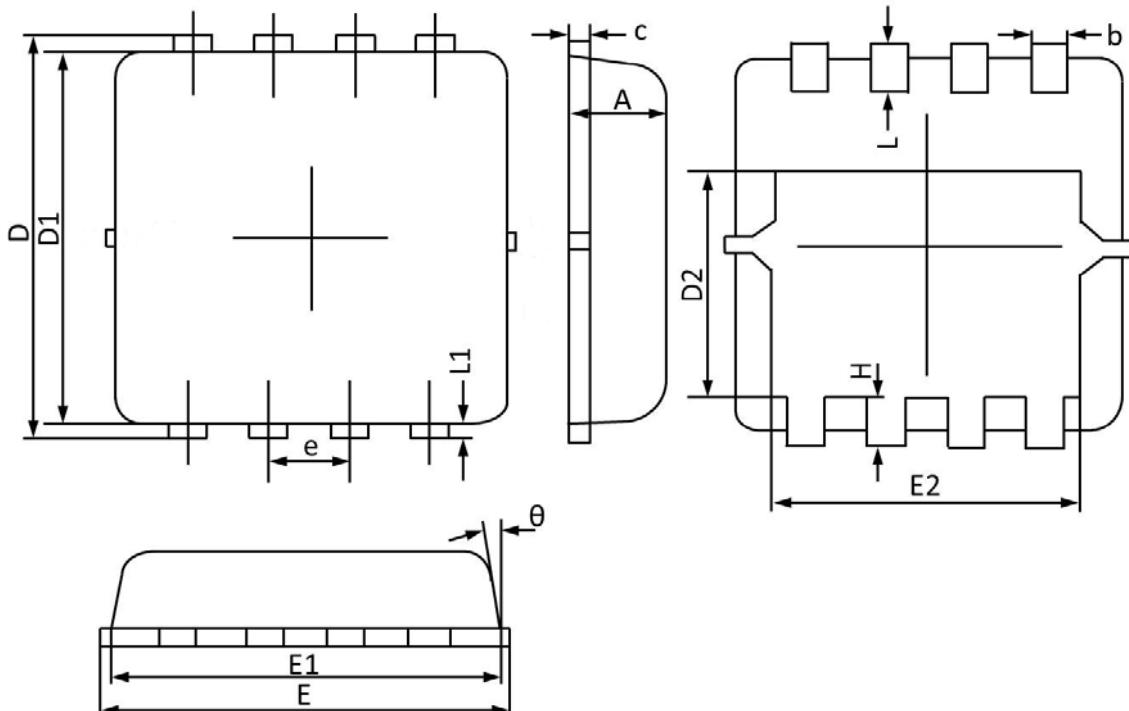


Fig.8 E_{AS} Waveform

Package Outline Dimensions

PPAK3X3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.900	0.700	0.035	0.028
b	0.350	0.240	0.014	0.009
c	0.250	0.100	0.010	0.004
D	3.450	3.050	0.136	0.120
D1	3.200	2.900	0.126	0.114
D2	1.850	1.350	0.073	0.053
E	3.400	3.000	0.134	0.118
E1	3.250	2.900	0.128	0.114
E2	2.600	2.350	0.102	0.093
e	0.65BSC		0.026BSC	
H	0.500	0.300	0.020	0.012
L	0.500	0.300	0.020	0.012
L1	0.200	0.070	0.008	0.003
θ	12°	0°	12°	0°