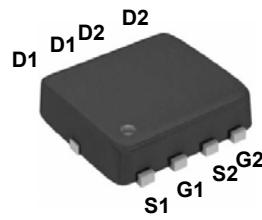
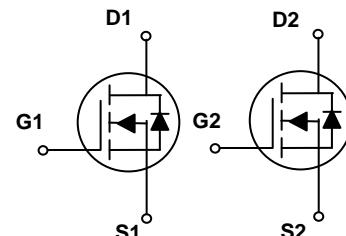


Main Product Characteristics

BV _{DSS}	30V
R _{DS(ON)}	20mΩ
I _D	20A



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 GSFN3812 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 _{DS}	30	V
Gate-Source Voltage	V _{GS}	±20	V
Drain Current-Continuous ($T_C=25^\circ\text{C}$)	I _D	20	A
Drain Current-Continuous ($T_C=100^\circ\text{C}$)		13	
Drain Current-Pulsed ¹	I _{DM}	80	A
Single Pulse Avalanche Energy ²	E _{AS}	14	mJ
Single Pulse Avalanche Current ²	I _{AS}	17	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P _D	20	W
Power Dissipation-Derate above 25°C		0.16	W/°C
Thermal Resistance, Junction-to-Ambient	R _{θJA}	62	°C/W
Thermal Resistance, Junction-to-Case	R _{θJC}	6.4	°C/W
Operating Junction Temperature Range	T _J	-55 To +150	°C
Storage Temperature Range	T _{STG}	-55 To +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=250\mu\text{A}$	30	-	-	V
Bv _{DSS} Temperature Coefficient	$\Delta \text{BV}_{\text{DSS}}/\Delta T_J$	Reference to 25°C , $I_{\text{D}}=1\text{mA}$	-	0.04	-	$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=30\text{V}, V_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	-	-	1	μA
		$V_{\text{DS}}=30\text{V}, V_{\text{GS}}=0\text{V}, T_J=125^\circ\text{C}$	-	-	10	
Gate-Source Leakage Current	I_{GSS}	$V_{\text{GS}}=\pm 20\text{V}, V_{\text{DS}}=0\text{V}$	-	-	± 100	nA
Static Drain-Source On-Resistance ³	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_{\text{D}}=10\text{A}$	-	17	20	$\text{m}\Omega$
		$V_{\text{GS}}=4.5\text{V}, I_{\text{D}}=6\text{A}$	-	23	30	
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}}=V_{\text{DS}}, I_{\text{D}}=250\mu\text{A}$	1.2	1.5	2.5	V
$V_{\text{GS}(\text{th})}$ Temperature Coefficient	$\Delta V_{\text{GS}(\text{th})}$		-	-4	-	$\text{mV}/^\circ\text{C}$
Forward Transconductance	g_{fs}	$V_{\text{DS}}=5\text{V}, I_{\text{D}}=6\text{A}$	-	13	-	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{3,4}	Q_g	$V_{\text{DS}}=15\text{V}, I_{\text{D}}=8\text{A}, V_{\text{GS}}=4.5\text{V}$	-	4.1	6	nC
Gate-Source Charge ^{3,4}	Q_{gs}		-	1	1.4	
Gate-Drain Charge ^{3,4}	Q_{gd}		-	2.1	4	
Turn-On Delay Time ^{3,4}	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=15\text{V}, R_{\text{G}}=6\Omega, V_{\text{GS}}=10\text{V}, I_{\text{D}}=1\text{A}$	-	2.8	5	nS
Rise Time ^{3,4}	t_r		-	7.2	14	
Turn-Off Delay Time ^{3,4}	$t_{\text{d}(\text{off})}$		-	15.8	30	
Fall Time ^{3,4}	t_f		-	4.6	9	
Input Capacitance	C_{iss}	$V_{\text{DS}}=25\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	345	500	pF
Output Capacitance	C_{oss}		-	55	80	
Reverse Transfer Capacitance	C_{rss}		-	32	55	
Gate Resistance	R_g	$V_{\text{GS}}=0\text{V}, V_{\text{DS}}=0\text{V}, F=1\text{MHz}$	-	3.2	6.4	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_s	$V_G=V_D=0\text{V}$, Force Current	-	-	20	A
Pulsed Source Current ³	I_{SM}		-	-	80	A
Diode Forward Voltage ³	V_{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}	$V_{\text{GS}}=0\text{V}, I_s=1\text{A}, \frac{di}{dt}=100\text{A}/\text{us}, T_J=25^\circ\text{C}$	-	8.37	-	nS
Reverse Recovery Charge	Q_{rr}		-	2.08	-	nC

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. $V_{\text{DD}}=25\text{V}, V_{\text{GS}}=10\text{V}, L=0.1\text{mH}, I_{\text{AS}}=17\text{A}, R_{\text{G}}=25\Omega$, starting $T_J=25^\circ\text{C}$.
3. Pulse test: pulse width $\leq 300\text{us}$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

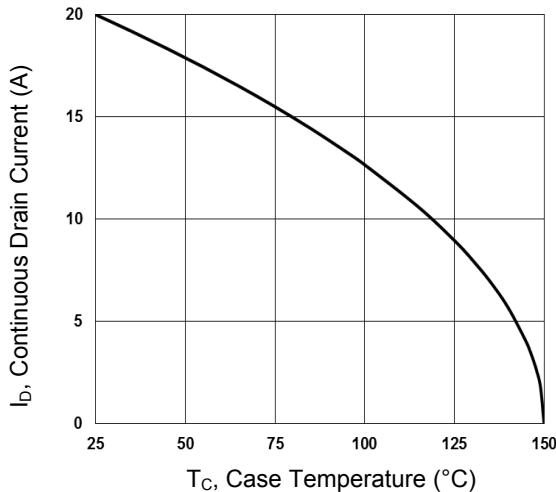


Figure 1. Continuous Drain Current vs. T_c

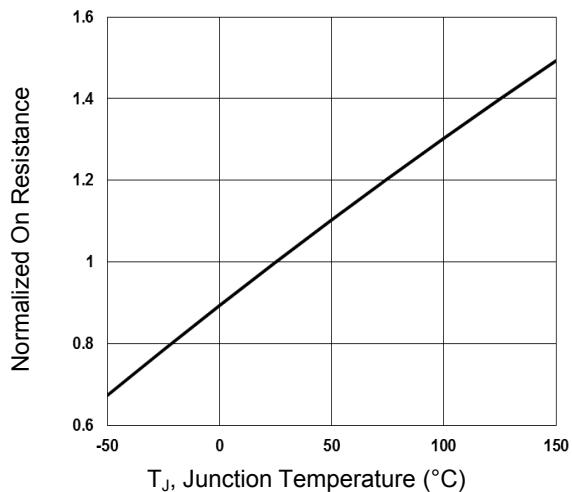


Figure 2. Normalized R_{DSON} vs. T_j

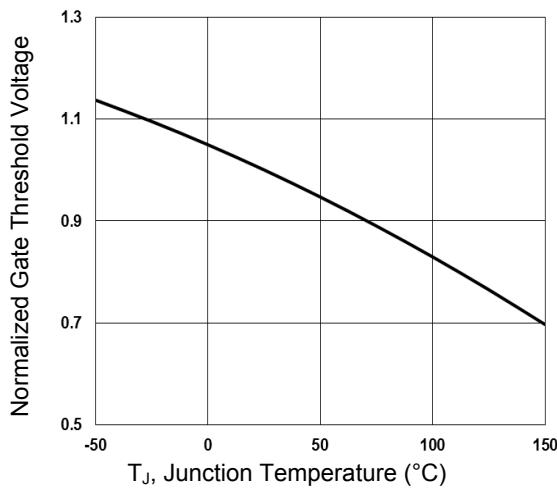


Figure 3. Normalized V_{th} vs. T_j

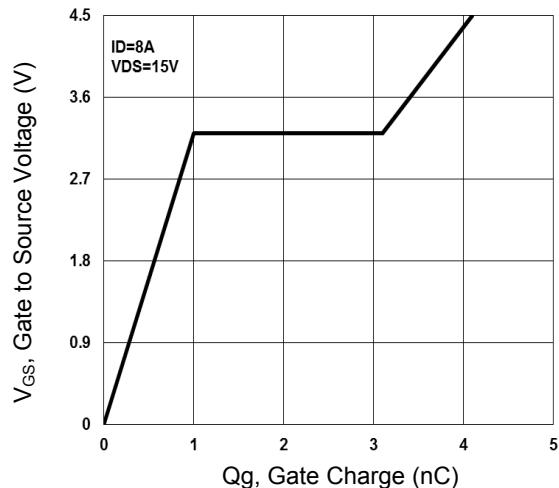


Figure 4. Gate Charge Waveform

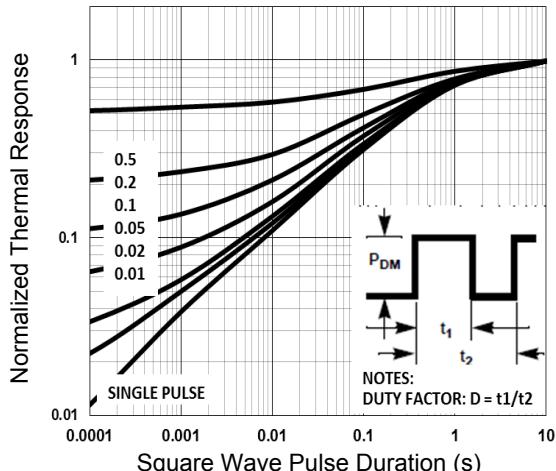


Figure 5. Normalized Transient Response

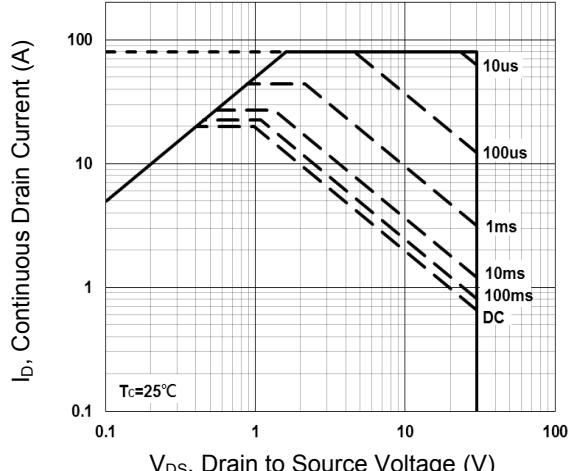
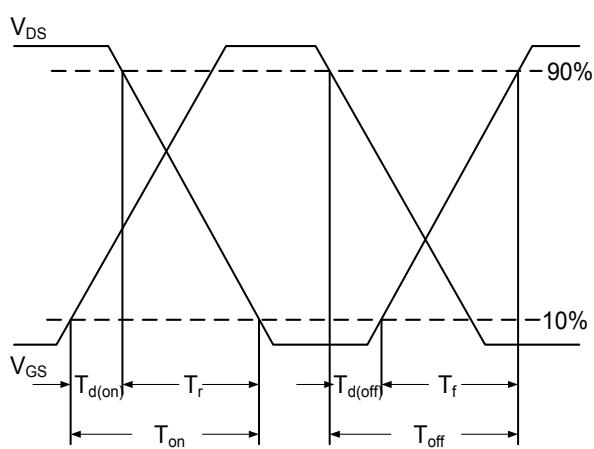
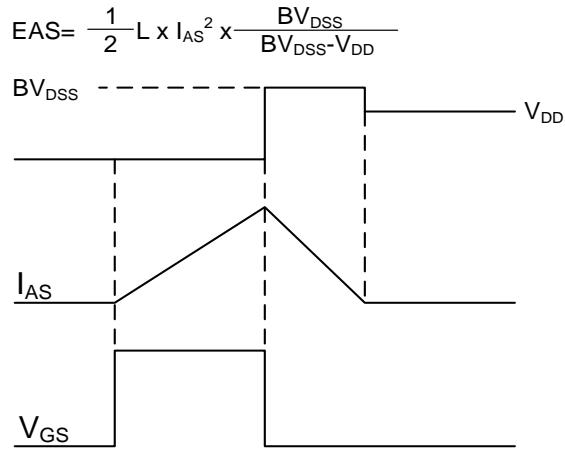


Figure 6. Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

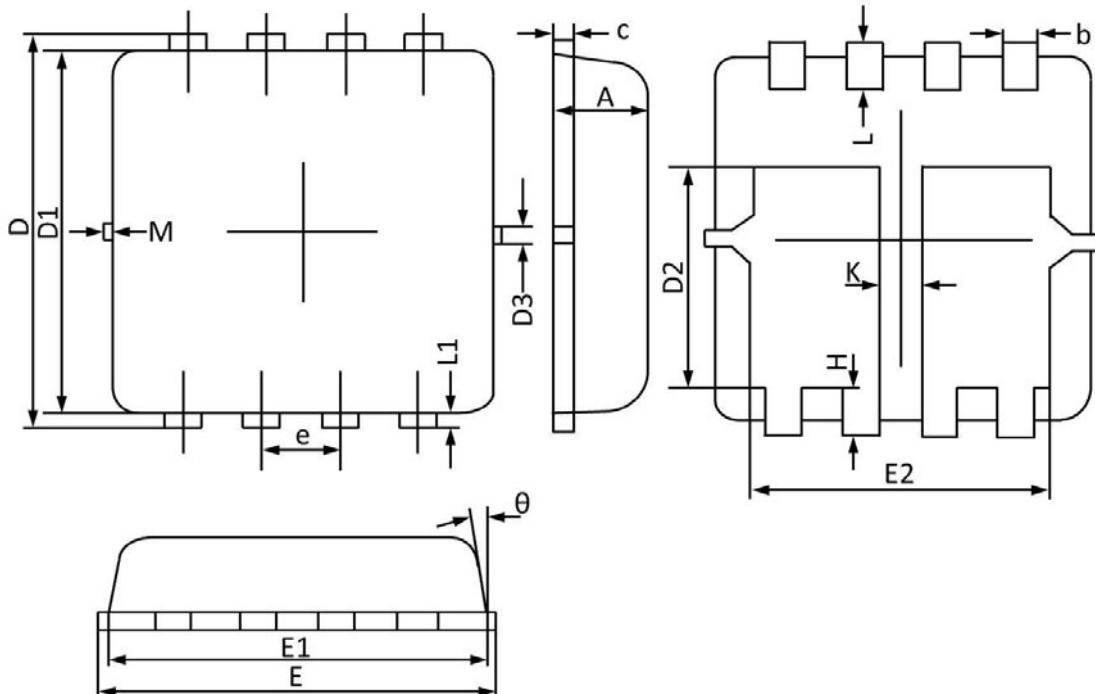


Firgure 7. Switching Time Waveform



Firgure 8. EAS Waveform

Package Outline Dimensions (PPAK3x3 Dual EP)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.670	0.880	0.026	0.035
b	0.250	0.350	0.010	0.014
c	0.100	0.250	0.004	0.010
D	3.150	3.550	0.124	0.140
D1	3.000	3.300	0.118	0.130
D2	1.500	2.000	0.059	0.079
D3	0.130	0.200	0.005	0.008
E	3.100	3.500	0.122	0.138
E1	3.000	3.200	0.118	0.126
E2	2.350	2.600	0.093	0.102
e	0.650 BSC		0.026 BSC	
H	0.300	0.500	0.012	0.020
L	0.300	0.500	0.012	0.020
L1	0.130 REF		0.005 REF	
K	0.300 REF		0.012 REF	
θ	0°	12°	0°	12°
M	0.150 REF		0.006 REF	