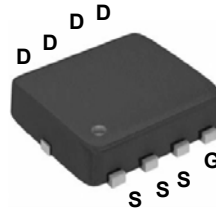
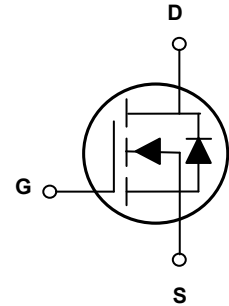


Main Product Characteristics

$V_{(BR)DSS}$	20V
$R_{DS(ON)}$	5.4m Ω
I_D	65A



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 GSFN2306 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	Max.	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 10	V
Drain Current-Continuous ($T_C=25^\circ\text{C}$)	I_D	65	A
Drain Current-Continuous ($T_C=100^\circ\text{C}$)		41	
Drain Current-Pulsed ¹	I_{DM}	260	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	44.6	W
Power Dissipation-Derate above 25°C		0.36	
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.8	$^\circ\text{C/W}$
Operating Junction Temperature Range	T_J	-55 To +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 To +150	$^\circ\text{C}$

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}	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=1\text{mA}$	-	0.01	-	$V/^{\circ}\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=20V,$ $V_{GS}=0V, T_J=25^{\circ}\text{C}$	-	-	1	μA
		$V_{DS}=16V,$ $V_{GS}=0V, T_J=125^{\circ}\text{C}$	-	-	10	
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=20A$	-	4.5	5.4	m Ω
		$V_{GS}=2.5V, I_D=15A$	-	5.5	6.8	
		$V_{GS}=1.8V, I_D=10A$	-	6.8	8.8	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	0.3	0.6	1	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	2	-	mV/ $^{\circ}\text{C}$
Forward Transconductance	g_{fs}	$V_{DS}=10V, I_S=5A$	-	20	-	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{2, 3}	Q_g	$V_{DS}=10V, V_{GS}=4.5V,$ $I_D=6A$	-	29.8	45	nC
Gate-Source Charge ^{2, 3}	Q_{gs}		-	2.7	6	
Gate-Drain Charge ^{2, 3}	Q_{gd}		-	9	14	
Turn-On Delay Time ^{2, 3}	$T_{d(on)}$	$V_{DD}=10V, V_{GS}=4.5V,$ $R_G=25\Omega, I_D=1A$	-	13.5	26	nS
Rise Time ^{2, 3}	T_r		-	29	55	
Turn-Off Delay Time ^{2, 3}	$T_{d(off)}$		-	66.9	127	
Fall Time ^{2, 3}	T_f		-	19.2	36	
Input Capacitance	C_{iss}	$V_{DS}=10V,$ $V_{GS}=0V, F=1\text{MHz}$	-	1920	2790	pF
Output Capacitance	C_{oss}		-	280	410	
Reverse Transfer Capacitance	C_{rss}		-	180	270	
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	$V_G=V_D=0V,$ Force Current	-	-	65	A
Pulsed Source Current	I_{SM}		-	-	130	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=1A,$ $T_J=25^{\circ}\text{C}$	-	-	1	V

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. Pulsed tested: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

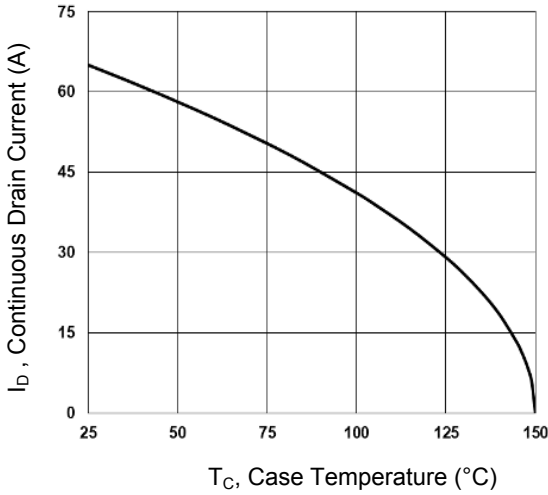


Figure 1. Continuous Drain Current vs. T_C

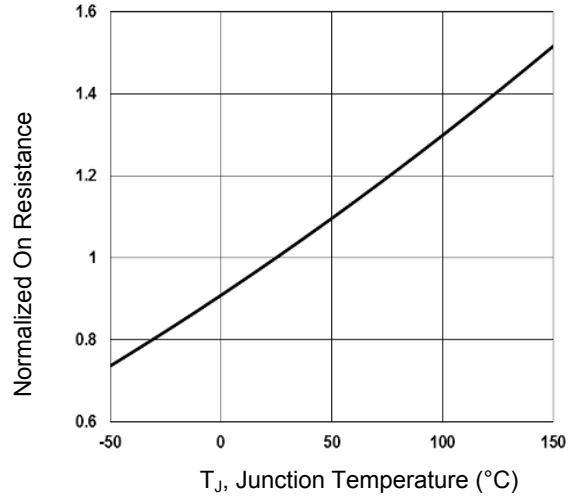


Figure 2. Normalized $R_{DS(ON)}$ vs. T_J

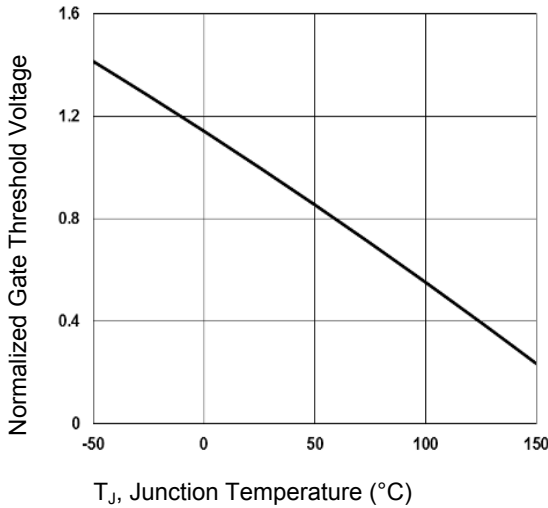


Figure 3. Normalized V_{th} vs. T_J

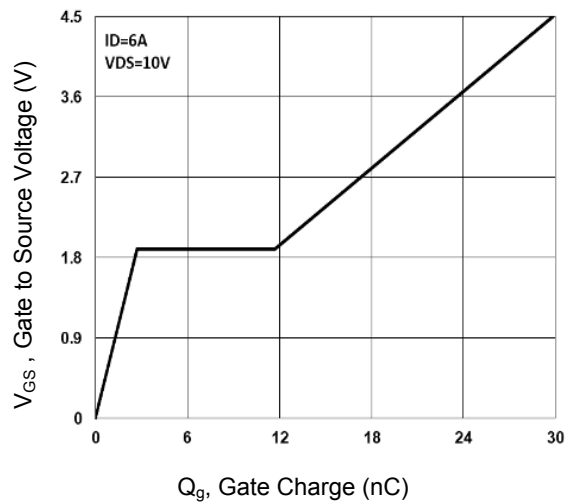


Figure 4. Gate Charge Waveform

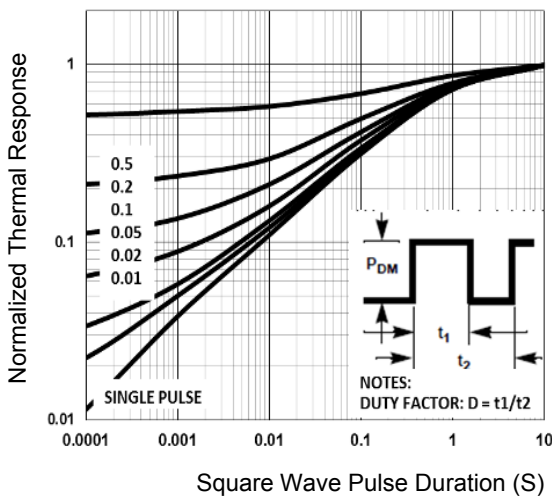


Figure 5. Normalized Transient Response

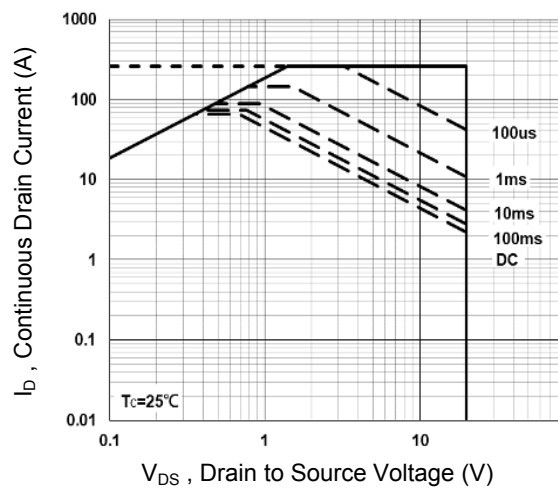


Figure 6. Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

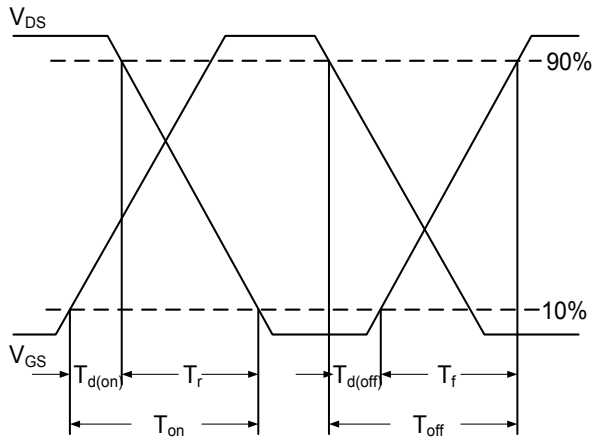


Figure 7. Switching Time Waveform

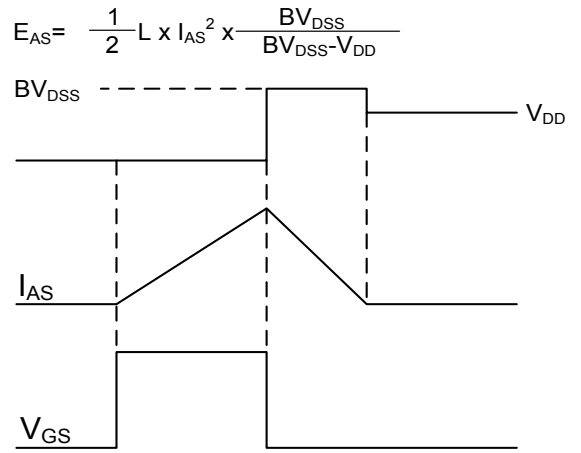
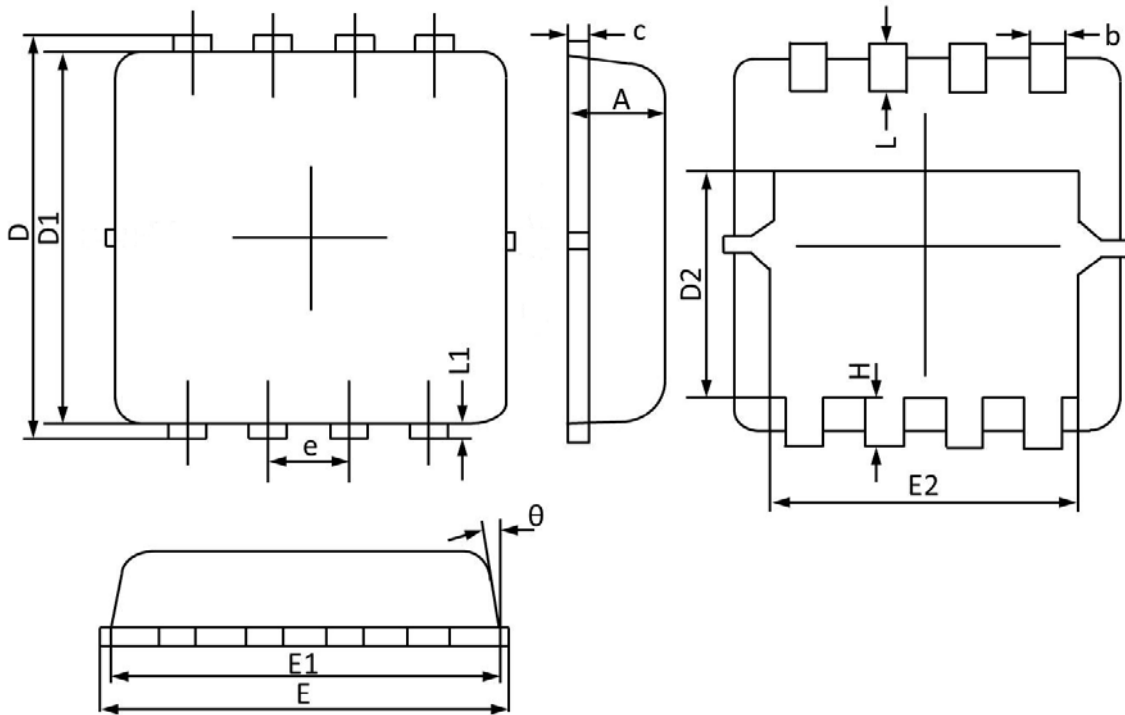


Figure 8. E_{AS} Waveform

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°