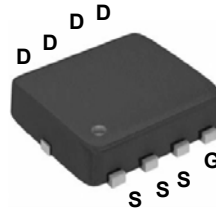
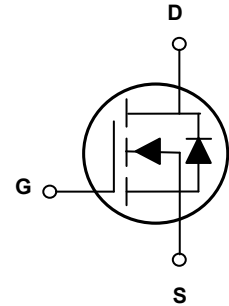


### Main Product Characteristics

$V_{(BR)DSS}$	20V
$R_{DS(ON)}$	5.4mΩ
$I_D$	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 ( $T_C=25^{\circ}C$ unless otherwise specified)

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

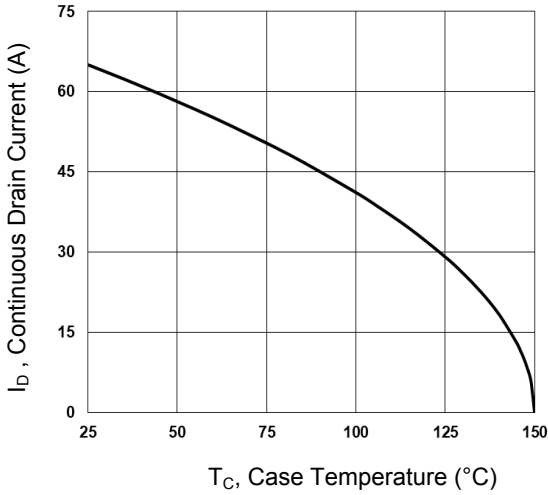
**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
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 $25^{\circ}\text{C}$ , $I_D=1mA$	-	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	$\mu A$
		$V_{DS}=16V,$ $V_{GS}=0V, T_J=125^{\circ}\text{C}$	-	-	10	
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=20A$	-	4.5	5.4	m $\Omega$
		$V_{GS}=2.5V, I_D=15A$	-	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
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2, 3</sup>	$Q_g$	$V_{DS}=10V, V_{GS}=4.5V,$ $I_D=6A$	-	29.8	45	nC
Gate-Source Charge <sup>2, 3</sup>	$Q_{gs}$		-	2.7	6	
Gate-Drain Charge <sup>2, 3</sup>	$Q_{gd}$		-	9	14	
Turn-On Delay Time <sup>2, 3</sup>	$T_{d(on)}$	$V_{DD}=10V, V_{GS}=4.5V,$ $R_G=25\Omega, I_D=1A$	-	13.5	26	nS
Rise Time <sup>2, 3</sup>	$T_r$		-	29	55	
Turn-Off Delay Time <sup>2, 3</sup>	$T_{d(off)}$		-	66.9	127	
Fall Time <sup>2, 3</sup>	$T_f$		-	19.2	36	
Input Capacitance	$C_{iss}$	$V_{DS}=10V,$ $V_{GS}=0V, F=1MHz$	-	1920	2790	pF
Output Capacitance	$C_{oss}$		-	280	410	
Reverse Transfer Capacitance	$C_{rss}$		-	180	270	
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
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

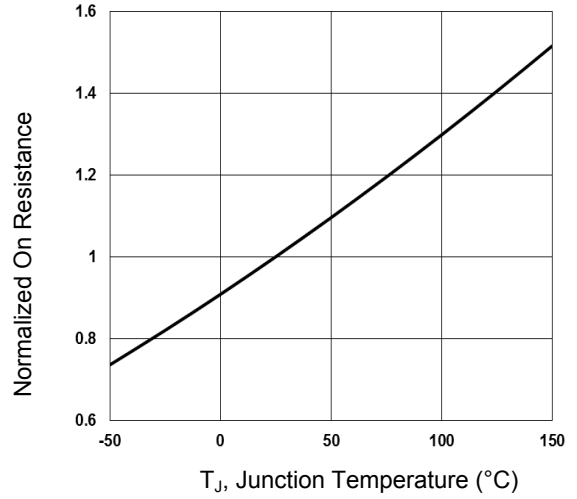
Note:

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.

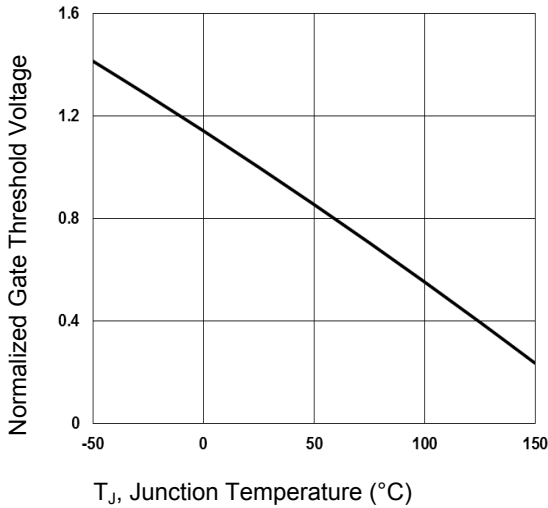
**Typical Electrical and Thermal Characteristic Curves**



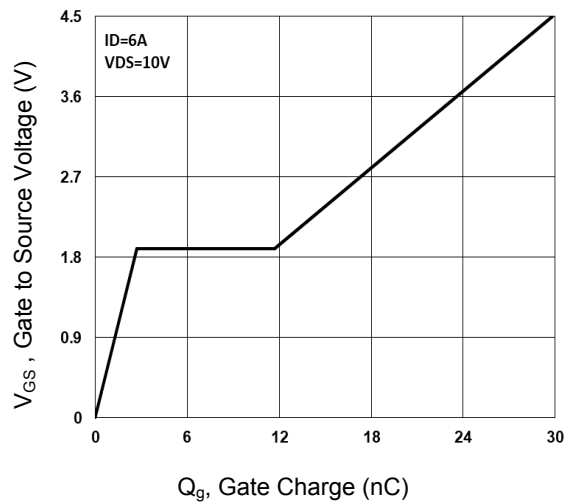
**Figure 1. Continuous Drain Current vs.  $T_C$**



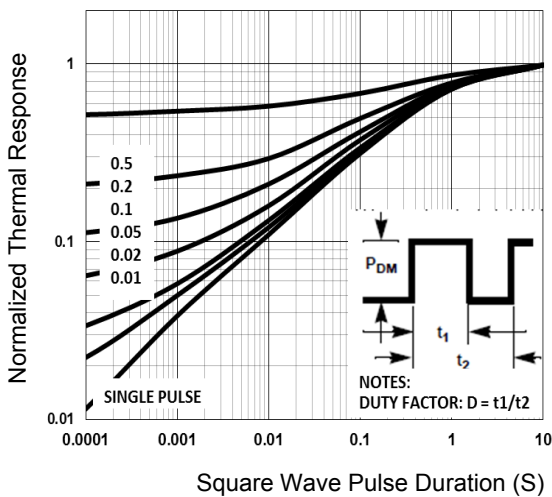
**Figure 2. Normalized  $R_{DS(ON)}$  vs.  $T_J$**



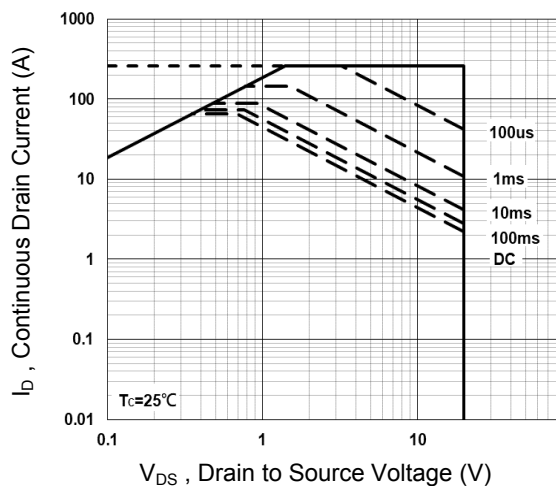
**Figure 3. Normalized  $V_{th}$  vs.  $T_J$**



**Figure 4. Gate Charge Waveform**

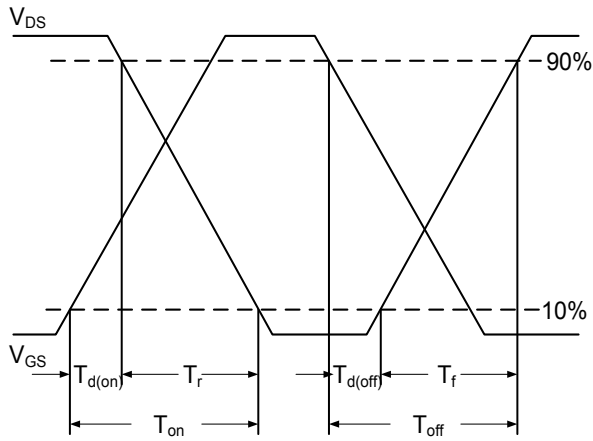


**Figure 5. Normalized Transient Response**

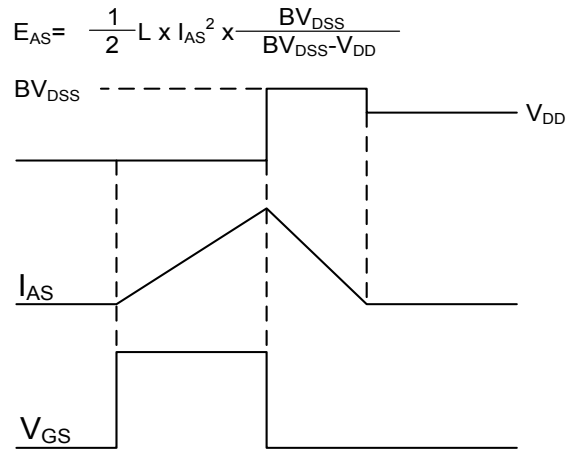


**Figure 6. Maximum Safe Operation Area**

**Typical Electrical and Thermal Characteristic Curves**



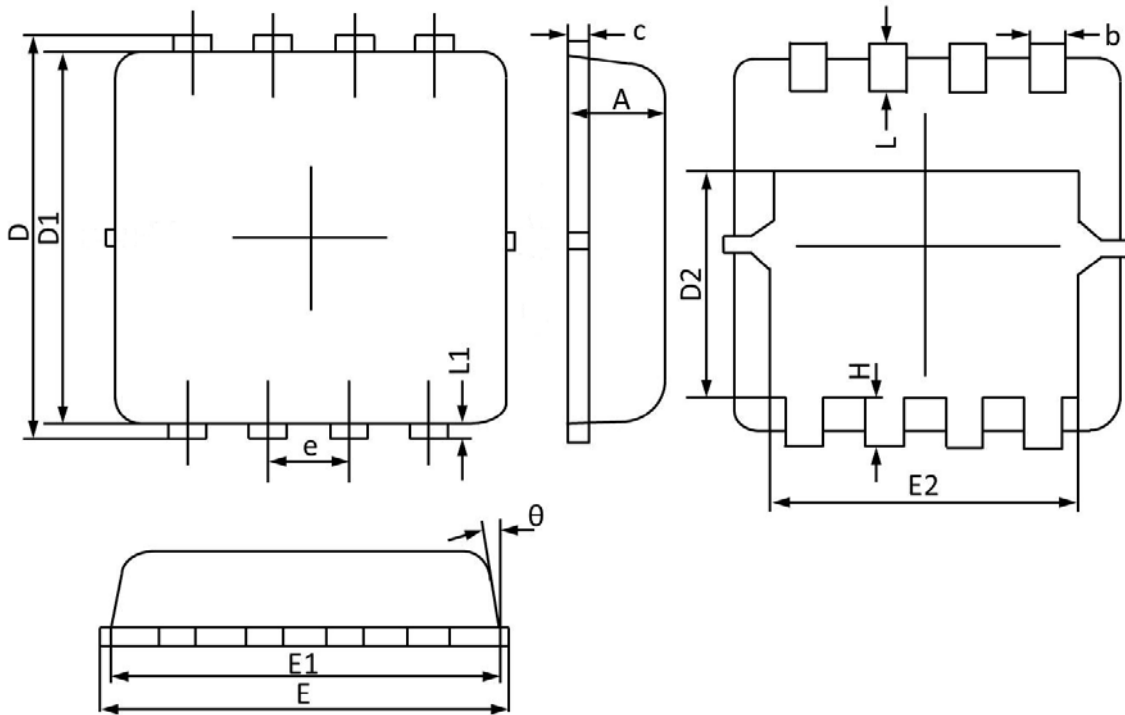
**Figure 7. Switching Time Waveform**



**Figure 8. E<sub>AS</sub> 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°