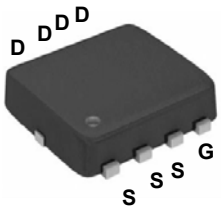
GOOD-ARK SEMICONDUCTOR

GSFN2306

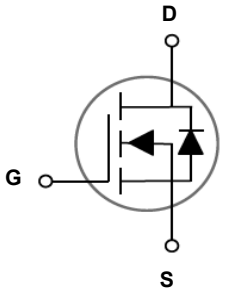
20V N-Channel MOSFET

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

RoHS Compliant

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°C unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±10	V
Drain Current – Continuous (T_C=25°C)	I_D	65	A
Drain Current – Continuous (T_C=100°C)		41	A
Drain Current – Pulsed[1]	I_{DM}	260	A
Power Dissipation (T_C=25°C)	P_D	44.6	W
Power Dissipation – Derate above 25°C		0.36	W/°C
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C

Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	---	62	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	---	2.8	°C/W

Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	20	---	---	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=1mA	---	0.01	---	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V, T_J=25°C	---	---	1	uA
		V_{DS}=16V, V_{GS}=0V, T_J=125°C	---	---	10	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±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	mΩ
		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 =250uA	0.3	0.6	1	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		---	2	---	mV/°C
Forward Transconductance	gfs	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=25Ω, 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=1MHz	---	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°C	---	---	1	V

Note:
1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≦ 300uS, duty cycle ≦ 2 %.
3. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

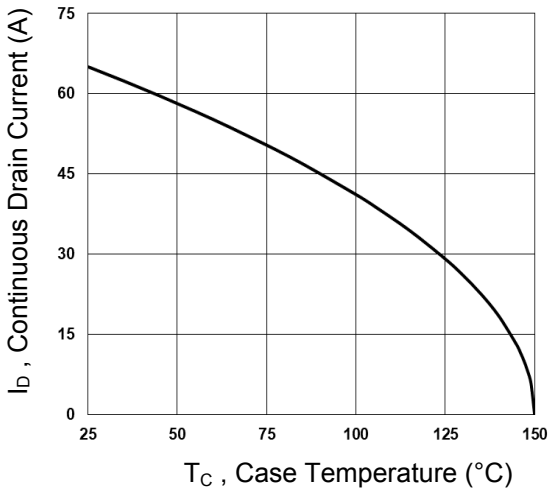


Fig.1 Continuous Drain Current vs. T_C

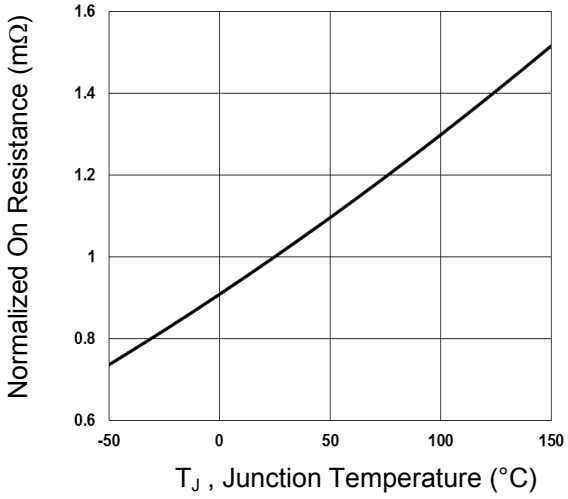


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

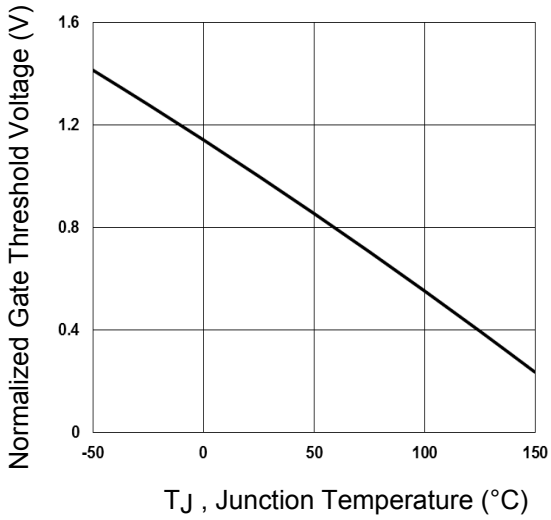


Fig.3 Normalized V_{th} vs. T_J

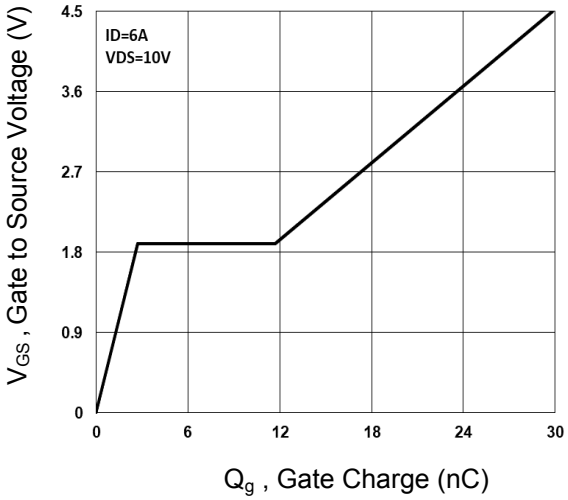


Fig.4 Gate Charge Waveform

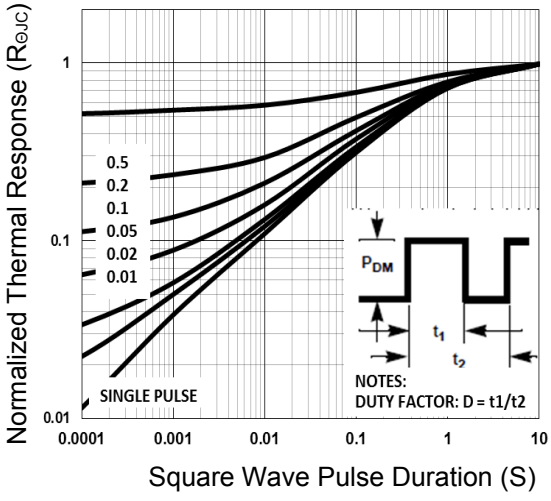


Fig.5 Normalized Transient Impedance

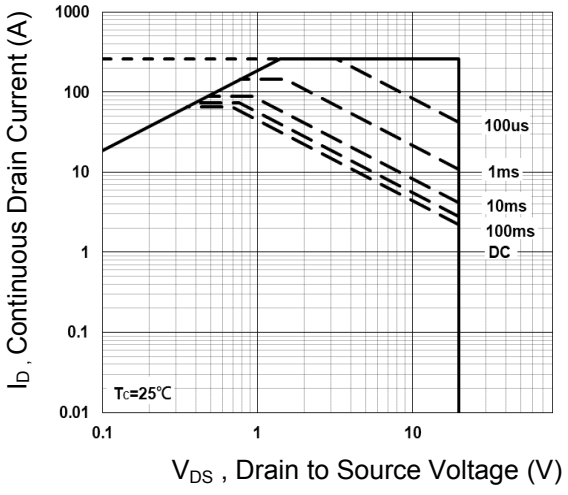


Fig.6 Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

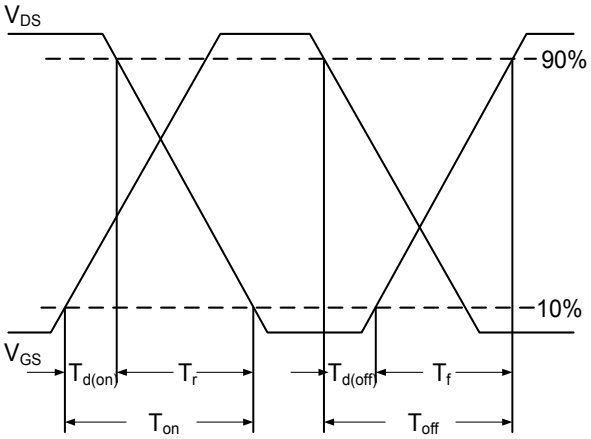


Fig.7 Switching Time Waveform

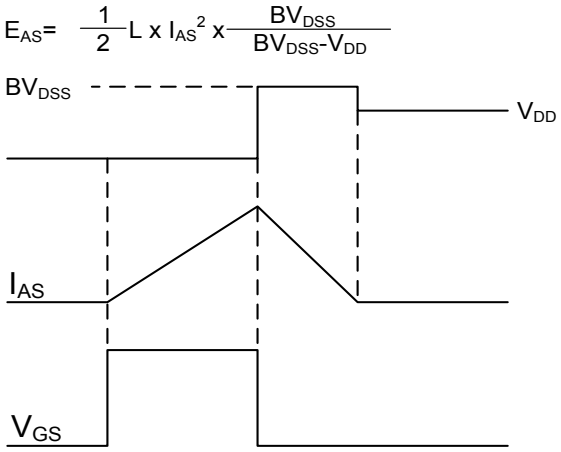
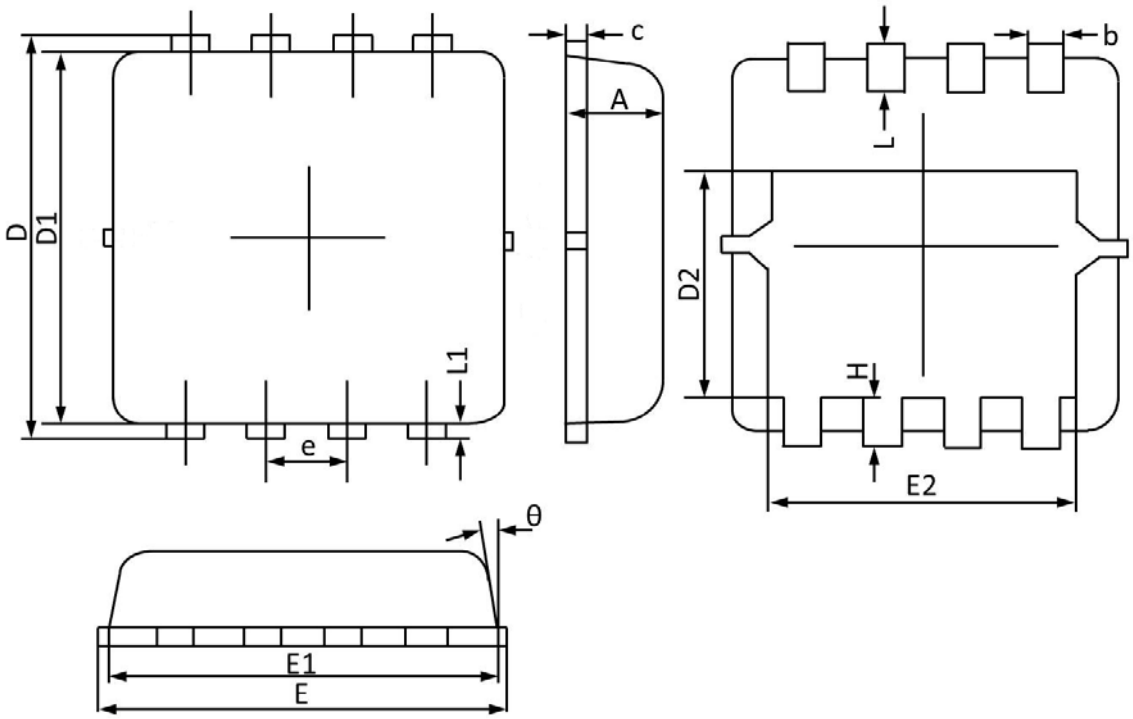


Fig.8 E_{AS} Waveform

Package Outline Dimensions PPAK3X3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.9	0.7	0.035	0.028
b	0.35	0.24	0.014	0.009
c	0.25	0.1	0.01	0.004
D	3.45	3.05	0.136	0.12
D1	3.2	2.9	0.126	0.114
D2	1.85	1.35	0.073	0.053
E	3.4	3	0.134	0.118
E1	3.25	2.9	0.128	0.114
E2	2.6	2.35	0.102	0.093
e	0.65BSC		0.026BSC	
H	0.5	0.3	0.02	0.012
L	0.5	0.3	0.02	0.012
L1	0.2	0.07	0.008	0.003
ɗ	12A	0A	12A	0A