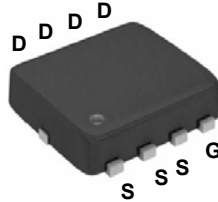
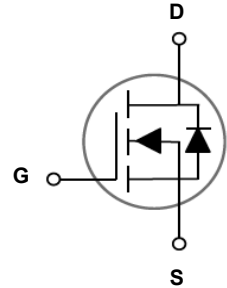


Main Product Characteristics

$V_{(BR)DSS}$	20V
$R_{DS(ON)}$	3.5m Ω
I_D	80A



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 GSFN2604 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}	±12	V
Drain Current – Continuous (Chip Limitation, T _C =25°C)	I _D	80	A
Drain Current – Continuous (Chip Limitation, T _C =100°C)		51	A
Drain Current – Pulsed ¹	I _{DM}	320	A
Power Dissipation (T _C =25°C)	P _D	66	W
Power Dissipation – Derate above 25°C		0.53	W/°C
Storage Temperature Range	T _{STG}	-55 to +175	°C
Operating Junction Temperature Range	T _J	-55 to +175	°C

Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction to Ambient	R _{θJA}	---	62	°C/W
Thermal Resistance Junction to Case	R _{θJC}	---	2	°C/W

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static State Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	20	---	---	V
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}	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	± 100	nA
Static Drain-Source On-Resistance ²	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=15A$	---	2.8	3.5	m Ω
		$V_{GS}=2.5V, I_D=10A$	---	3.5	4.5	
		$V_{GS}=1.8V, I_D=6A$	---	5	7	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	0.3	0.65	1	V
Forward Transconductance	g_{fs}	$V_{DS}=5V, I_D=5A$	---	35	---	S
Dynamic Characteristics						
Total Gate Charge	Q_g	$V_{DS}=10V, V_{GS}=4.5V, I_D=5A$	---	52	100	nC
Gate-Source Charge	Q_{gs}		---	6.6	12	
Gate-Drain Charge	Q_{gd}		---	13.8	28	
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=10V, V_{GS}=4.5V, R_G=3.3\Omega, I_D=1A$	---	20.2	40	nS
Rise Time	T_r		---	31.2	60	
Turn-Off Delay Time	$T_{d(off)}$		---	68.5	120	
Fall Time	T_f		---	21.2	42	
Input Capacitance	C_{iss}	$V_{DS}=10V, V_{GS}=0V, F=1\text{MHz}$	---	3870	5500	μF
Output Capacitance	C_{oss}		---	580	850	
Reverse Transfer Capacitance	C_{rss}		---	340	600	
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	1.3	2.6	Ω
Drain-Source Diode Characteristics						
Continuous Source Current	I_S	$V_G=V_D=0V, \text{Force Current}$	---	---	80	A
Pulsed Source Current ²	I_{SM}		---	---	160	A
Diode Forward Voltage ²	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. The data tested by pulsed, pulse width $\leq 300\mu S$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

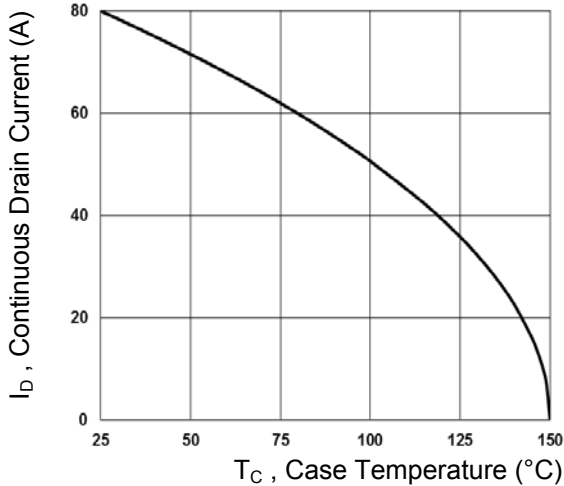


Fig.1 Continuous Drain Current vs. T_c

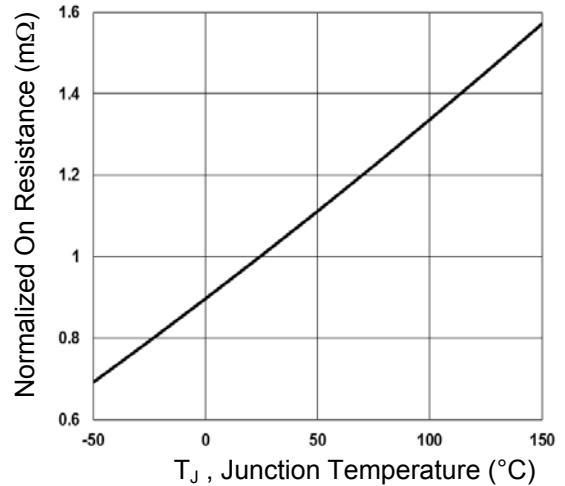


Fig.2 Normalized $R_{DS(ON)}$ vs. T_j

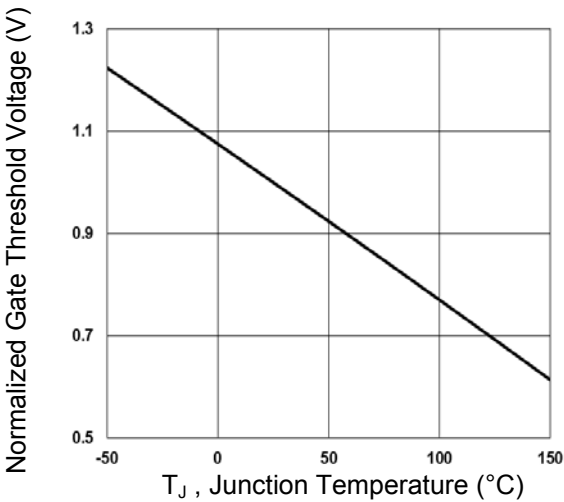


Fig.3 Normalized V_{th} vs. T_j

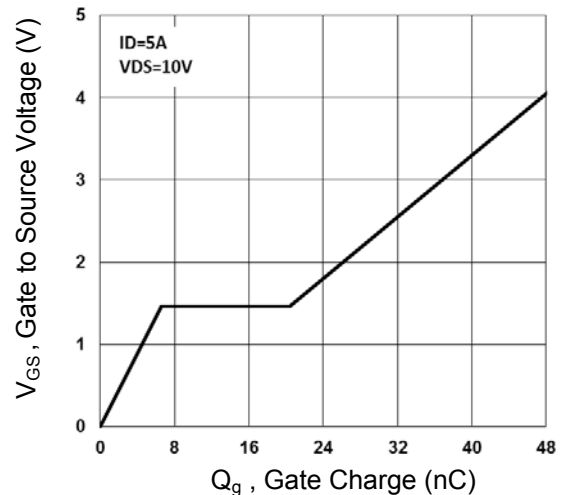


Fig.4 Gate Charge Waveform

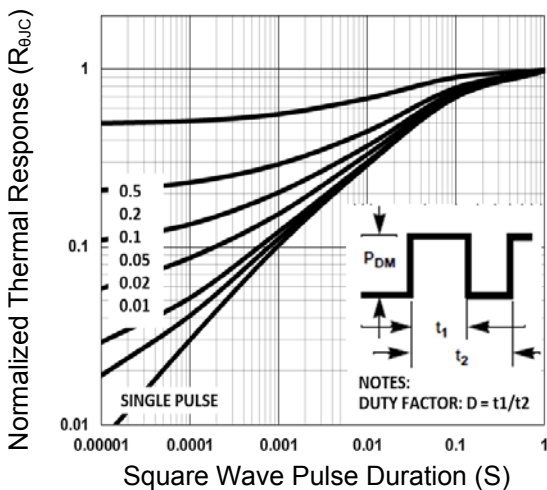


Fig.5 Normalized Transient Impedance

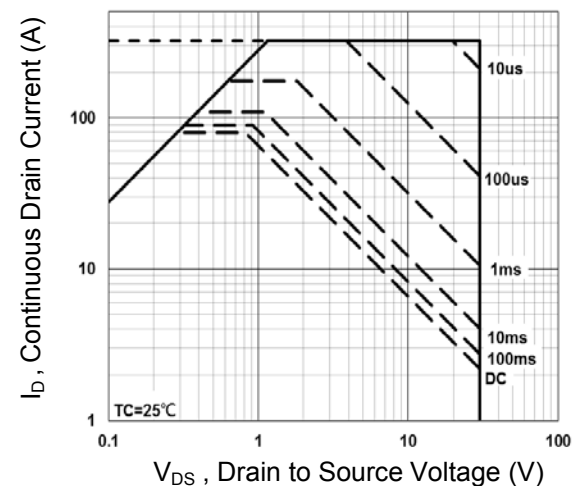


Fig.6 Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

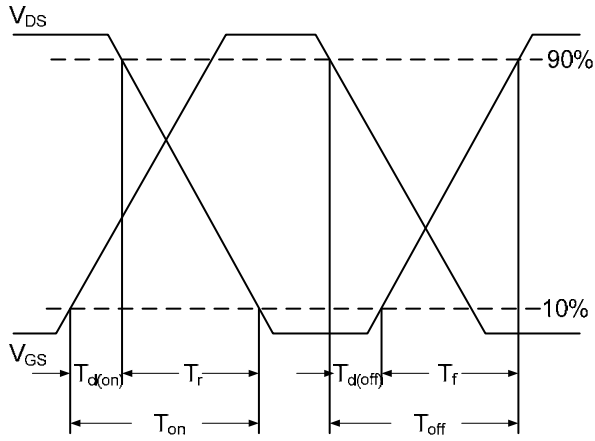


Fig.7 Switching Time Waveform

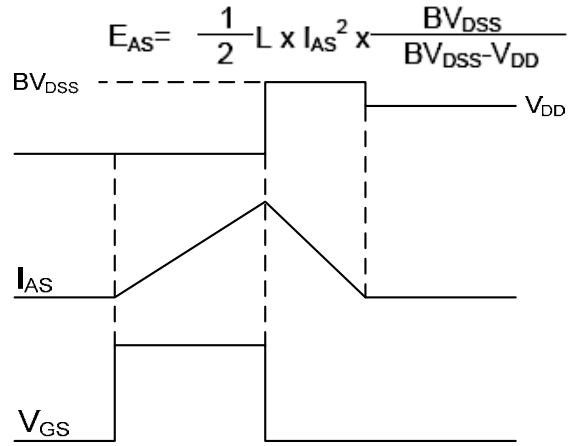
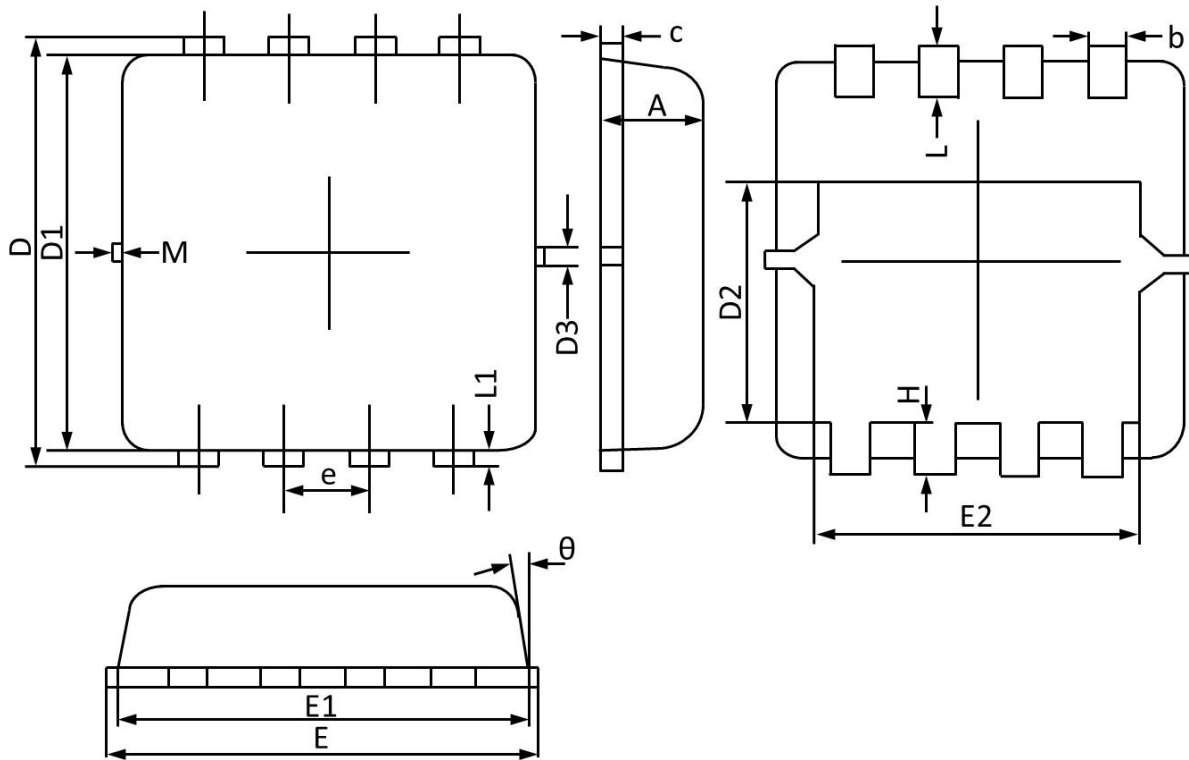


Fig.8 E_{AS} Waveform

Package Outline Dimensions

PPAK3X3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
b	0.250	0.350	0.010	0.013
c	0.100	0.250	0.004	0.009
D	3.250	3.450	0.128	0.135
D1	3.000	3.200	0.119	0.125
D2	1.780	1.980	0.070	0.077
D3	0.130 REF		0.005 REF	
E	3.200	3.400	0.126	0.133
E1	3.000	3.200	0.119	0.125
E2	2.390	2.590	0.094	0.102
e	0.650 BSC		0.026 BSC	
H	0.300	0.500	0.011	0.019
L	0.300	0.500	0.011	0.019
L1	0.130 REF		0.005 REF	
θ	0°	12°	0°	12°
M	0.150 REF		0.006 REF	