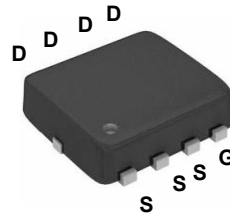
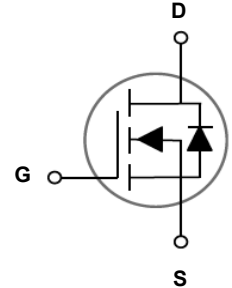


Main Product Characteristics

$V_{(BR)DSS}$	60V
$R_{DS(ON)}$	15mΩ
I_D	35A



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 GSFN6964 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	Rating	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current – Continuous ($T_C=25^\circ\text{C}$)	I_D	35	A
Drain Current – Continuous ($T_C=100^\circ\text{C}$)		22	A
Drain Current – Pulsed ¹	I_{DM}	140	A
Single Pulse Avalanche Energy ²	E_{AS}	45	mJ
Single Pulse Avalanche Current ²	I_{AS}	30	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	46	W
Power Dissipation – Derate above 25°C		0.37	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	$R_{\theta JC}$	---	2.7	°C/W

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}	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=48V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
On Characteristics						
Static Drain-Source On-Resistance ³	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10A$	---	13	15	m Ω
		$V_{GS}=4.5V, I_D=5A$	---	16	19	m Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.7	2.5	V
Forward Transconductance	g_{fs}	$V_{DS}=10V, I_D=3A$	---	10	---	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{3, 4}	Q_g	$V_{DS}=30V, V_{GS}=10V, I_D=10A$	---	27	54	nC
Gate-Source Charge ^{3, 4}	Q_{gs}		---	4.2	9	
Gate-Drain Charge ^{3, 4}	Q_{gd}		---	6.2	12	
Turn-On Delay Time ^{3, 4}	$T_{d(on)}$	$V_{DD}=15V, V_{GS}=10V, R_G=6\Omega, I_D=1A$	---	8.6	16	nS
Rise Time ^{3, 4}	T_r		---	24.2	48	
Turn-Off Delay Time ^{3, 4}	$T_{d(off)}$		---	32.3	64	
Fall Time ^{3, 4}	T_f		---	7.9	16	
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	1515	3000	pF
Output Capacitance	C_{oss}		---	120	200	
Reverse Transfer Capacitance	C_{rss}		---	76	120	
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	1.8	3.6	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	$V_G=V_D=0V, \text{Force Current}$	---	---	35	A
Pulsed Source Current ³	I_{SM}		---	---	70	A
Diode Forward Voltage ³	V_{SD}	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_S=1A, di/dt=100A/\mu S, T_J=25^\circ\text{C}$	---	19	---	nS
Reverse Recovery Charge	Q_{rr}		---	5	---	nC

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=30A, R_G=25\Omega, \text{Starting } T_J=25^\circ\text{C}$.
3. The data tested by pulsed, pulse width $\leq 300\mu S$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

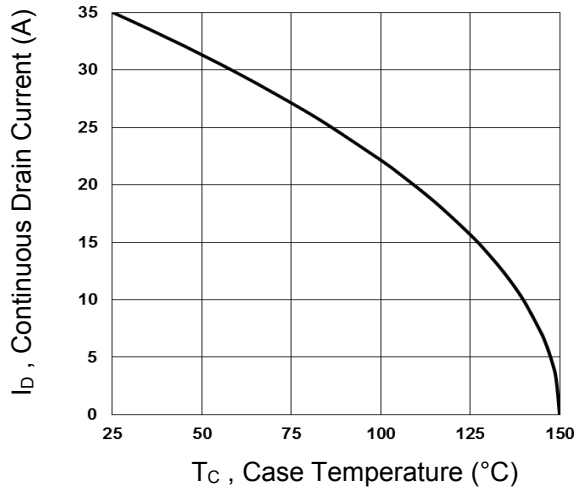


Fig.1 Continuous Drain Current vs. T_c

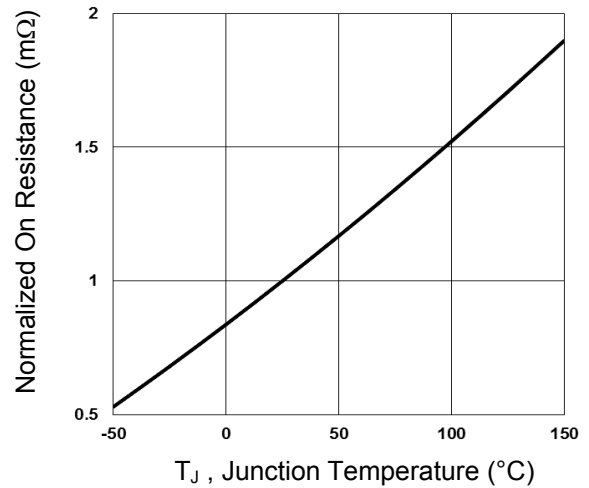


Fig.2 Normalized $R_{DS(ON)}$ vs. T_j

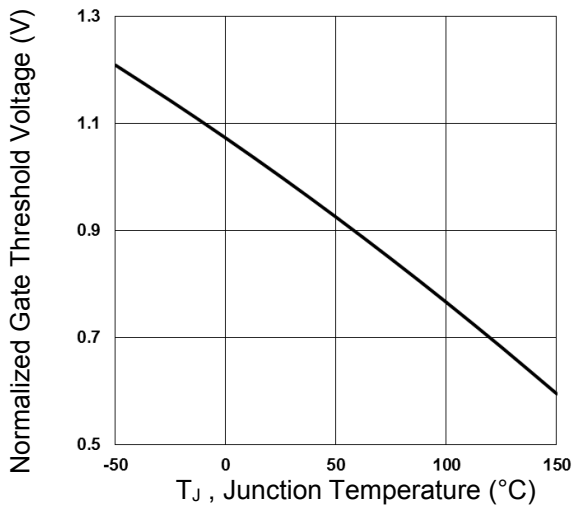


Fig.3 Normalized V_{th} vs. T_j

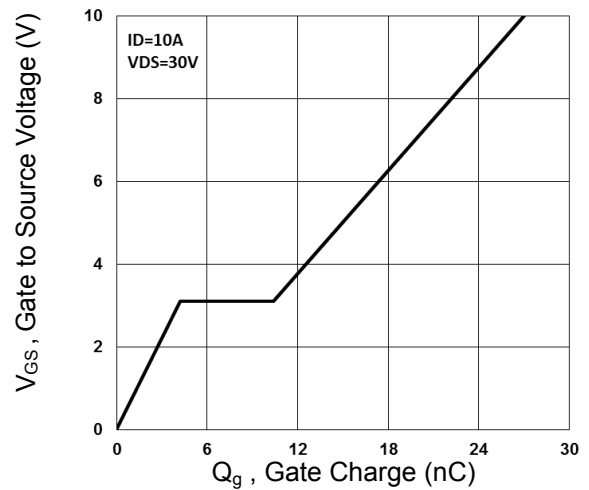


Fig.4 Gate Charge Waveform

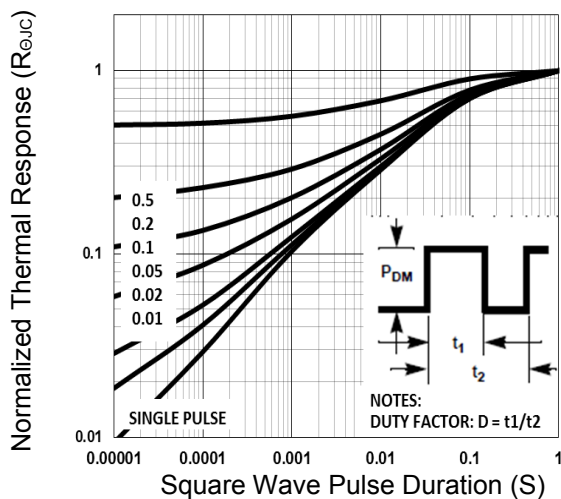


Fig.5 Normalized Transient Response

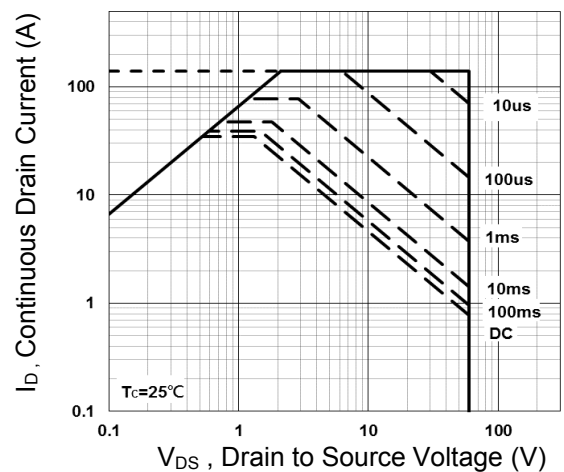


Fig.6 Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

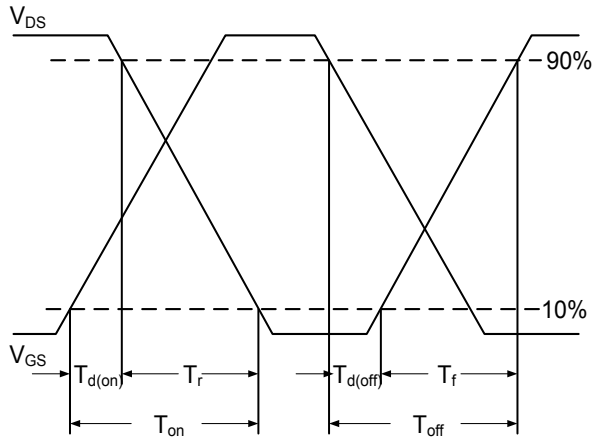


Fig.7 Switching Time Waveform

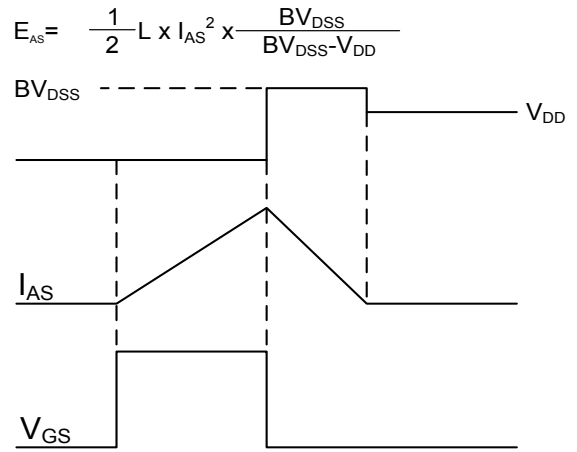
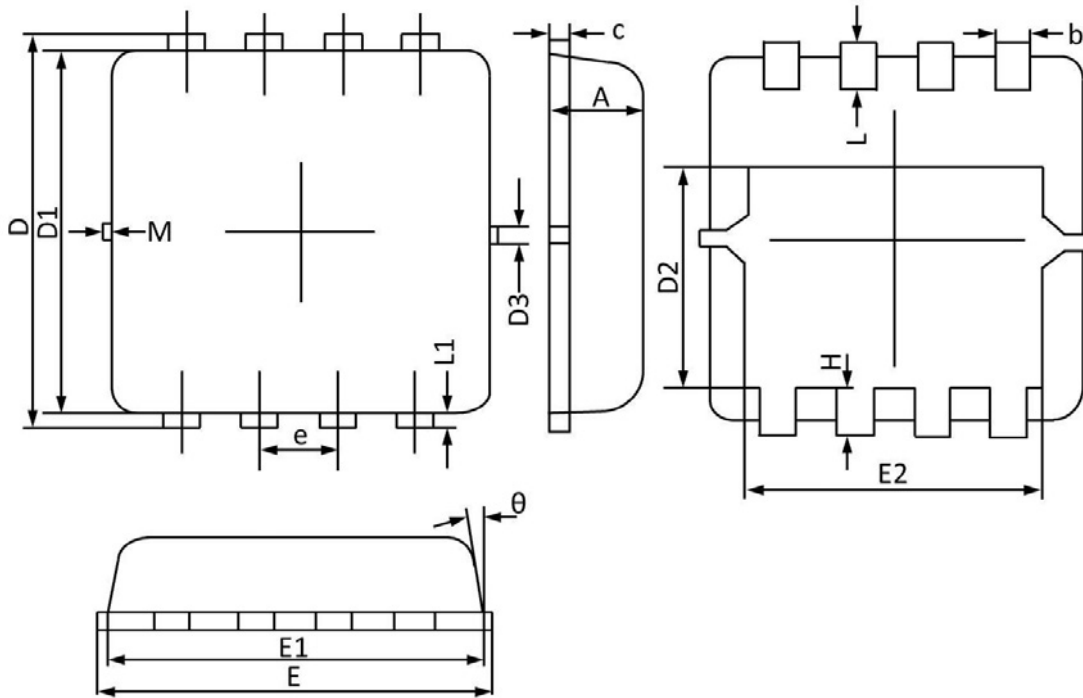


Fig. 8 E_{AS} Waveform

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	