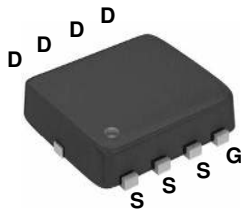
GOOD-ARK SEMICONDUCTOR

GSFN3908

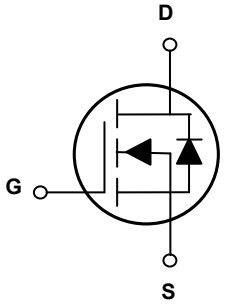
30V N-Channel MOSFET

Main Product Characteristics

BV_{DSS}	30V
$R_{DS(ON)}$	7.8mΩ
I_D	48A



PPAK 3x3



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 GSFN3908 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	Max.	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous (T_C=25°C)	I_D	48	A
Drain Current-Continuous (T_C=100°C)		30	A
Drain Current-Pulsed[1]	I_{DM}	192	A
Single Pulse Avalanche Energy[2]	E_{AS}	45	mJ
Single Pulse Avalanche Current[2]	I_{AS}	30	A
Power Dissipation (T_C=25°C)	P_D	35	W
Power Dissipation-Derate Above 25°C		0.28	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.6	°C/W
Storage Temperature Range	T_{STG}	-55 To +150	°C
Operating Junction Temperature Range	T_J	-55 To +150	°C

Electrical Characteristics (T_J=25°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=250μA	30	-	-	V
BV_{DSS} Temperatire Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=1mA	-	0.04	-	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V, T_J=25°C	-	-	1	μA
		V_{DS}=24V, V_{GS}=0V, T_J=125°C	-	-	10	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Drain-Source On-State Resistance[3]	$R_{DS(ON)}$	V_{GS}=10V, I_D=16A	-	6.5	7.8	mΩ
		V_{GS}=4.5V, I_D=8A	-	9.2	12	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.2	1.6	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		-	-4	-	mV/°C
Forward Transconductance	g_{fs}	V_{DS}=10V, I_D=8A	-	9.5	-	S
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=25V, V_{GS}=0V, F=1MHz	-	850	1700	pF
Output Capacitance	C_{oss}		-	133	260	
Reverse Transfer Capacitance	C_{rss}		-	78	160	
Turn-On Delay Time[3,4]	$T_{d(on)}$	V_{DD}=15V, R_G=3.3Ω V_{GS}=10V, I_D=15A	-	4.8	9	nS
Rise Time[3,4]	T_r		-	12.5	24	
Turn-Off Delay Time[3,4]	$T_{d(off)}$		-	27.6	52	
Fall Time[3,4]	T_f		-	8.2	16	
Total Gate Charge[3,4]	Q_g	V_{DS}=15V, I_D=20A, V_{GS}=4.5V	-	7.5	12	nC
Gate-Source Charge[3,4]	Q_{gs}		-	1.3	2.6	
Gate-Drain Charge[3,4]	Q_{gd}		-	4.5	8	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHZ	-	2.7	5.4	Ω
Guaranteed Avalabche Energy						
Single Pulse Avalance Energy	E_{AS}	V_{DD}=25V, L=0.1mH, I_{AS}=15A	12	-	-	mJ
Drain-Source Diode Characteristics						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	48	A
Pulsed Source Current[3]	I_{SM}		-	-	96	A
Diode Forward Voltage[3]	V_{SD}	V_{GS}=0V, I_S=1A, T_J=25°C	-	-	1	V
		V_{GS}=0V, I_S=10A, T_J=25°C	-	-	1.2	V
Reverse Recovery Time	t_{rr}	V_{GS}=0V, I_S=1A, di/dt=100A/μs, T_J=25°C	-	8.1	-	nS
Reverse Recovery Charge	Q_{rr}		-	1.6	-	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=30A.,R_G=25Ω, Starting T_J=25°C.
3. Pulsed tested: pulse width ≦ 300us, duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

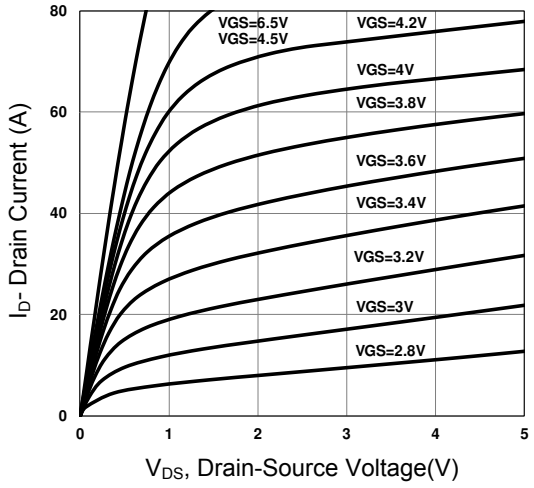


Figure 1. Typical Output Characteristics

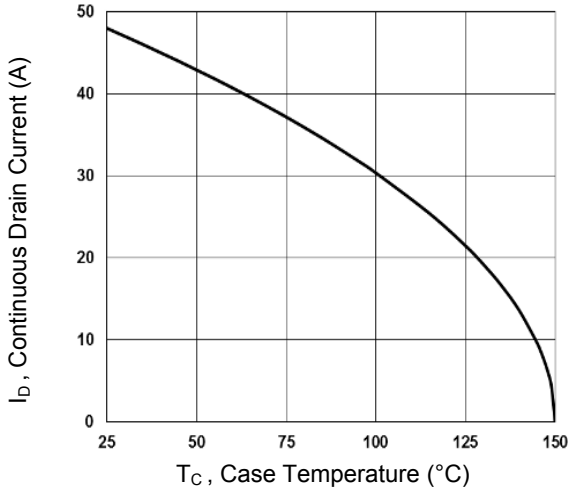


Figure 2. Continuous Drain Current vs. T_C

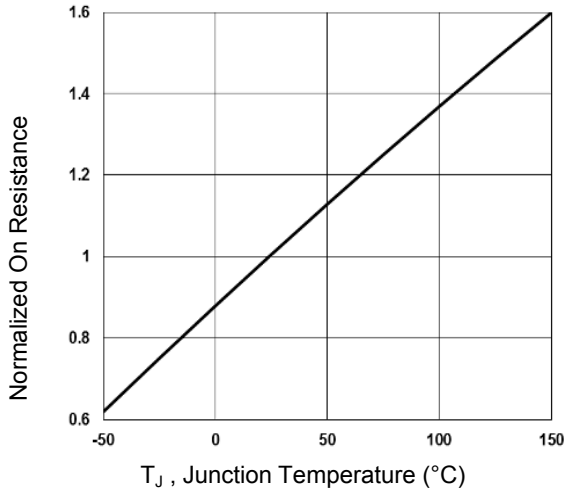


Figure 3. Normalized $R_{DS(ON)}$ vs. T_J

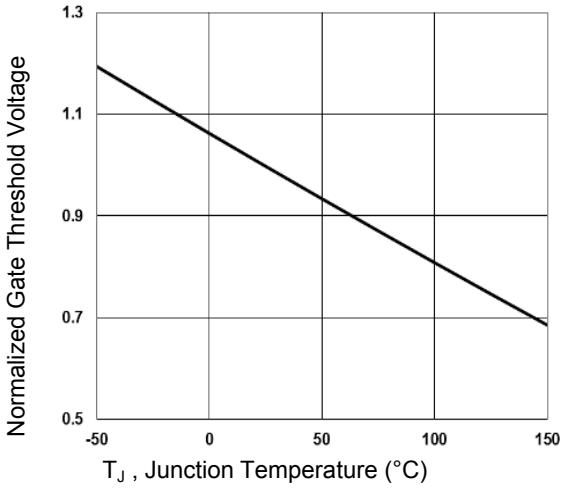


Figure 4. Normalized V_{th} vs. T_J

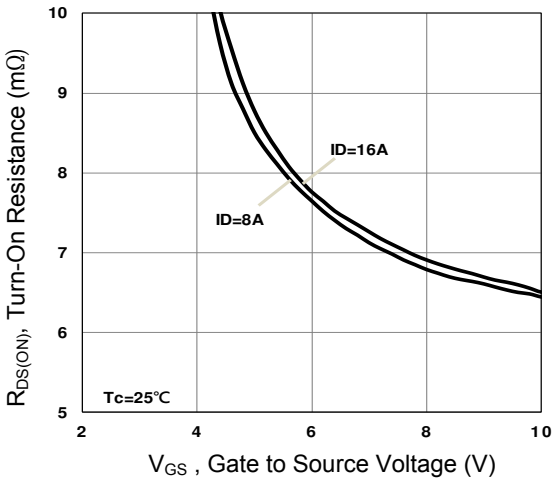


Figure 5. Turn-On Resistance vs. V_{GS}

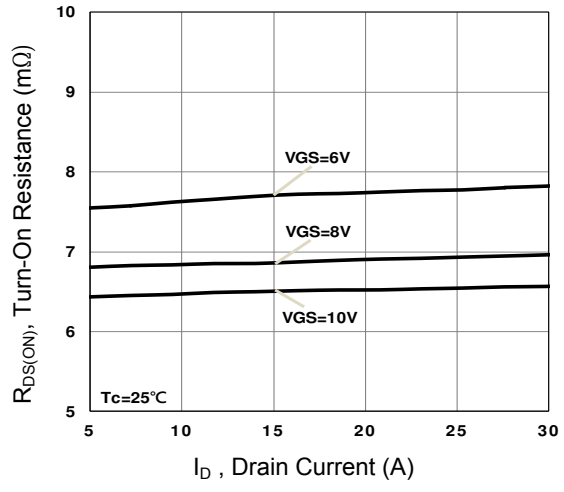


Figure 6. Turn-On Resistance vs. I_D

Typical Electrical and Thermal Characteristic Curves

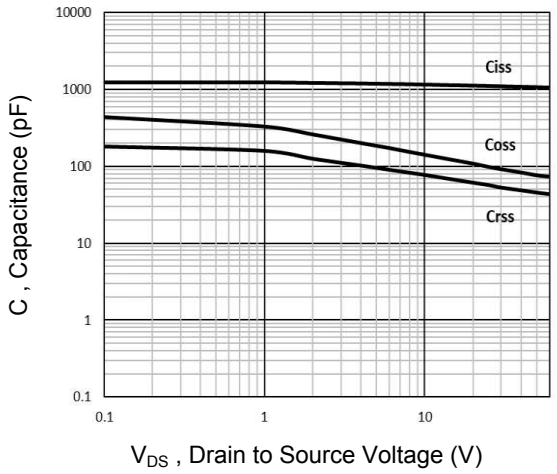


Figure 7. Capacitance Characteristics

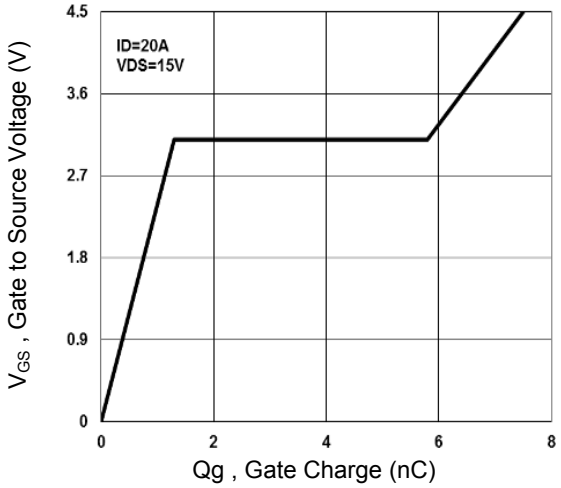


Figure 8. Gate Charge Characteristics

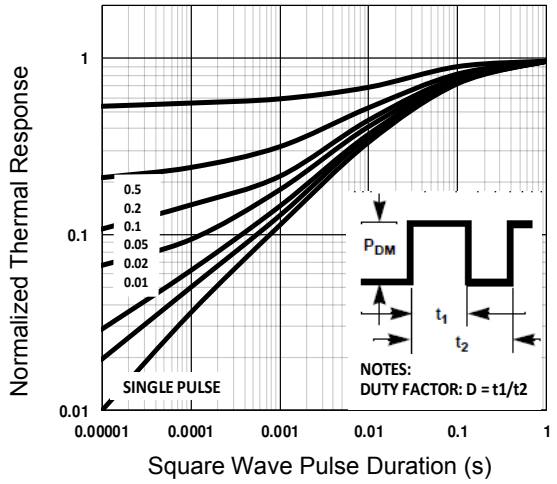


Figure 9. Normalized Transient Impedance

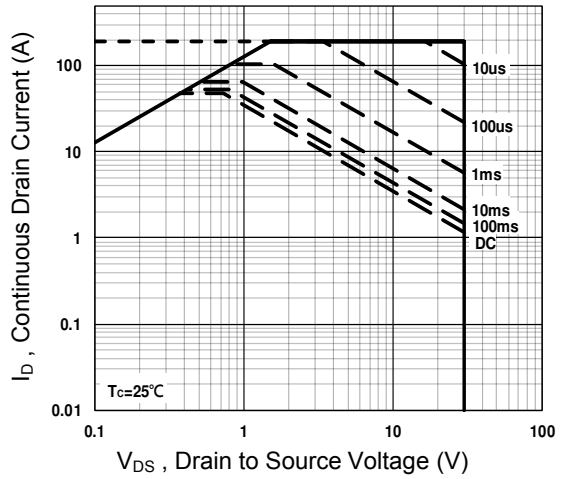


Figure 10. Maximum Safe Operation Area

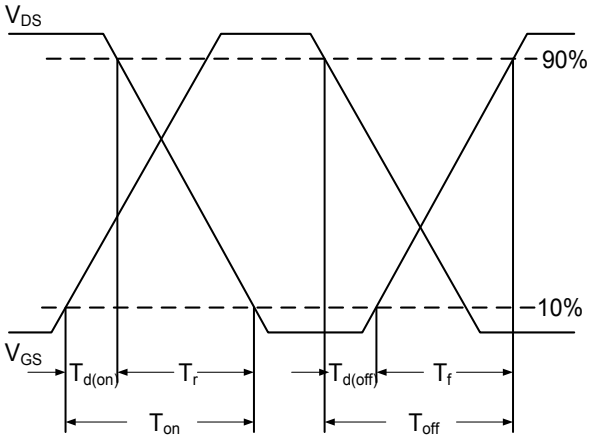


Figure 11. Switching Time Waveform

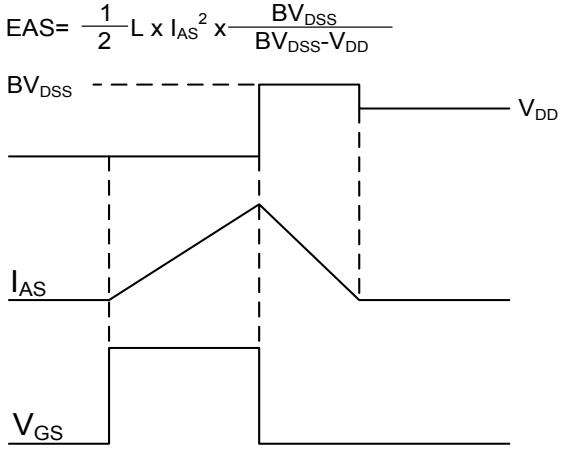
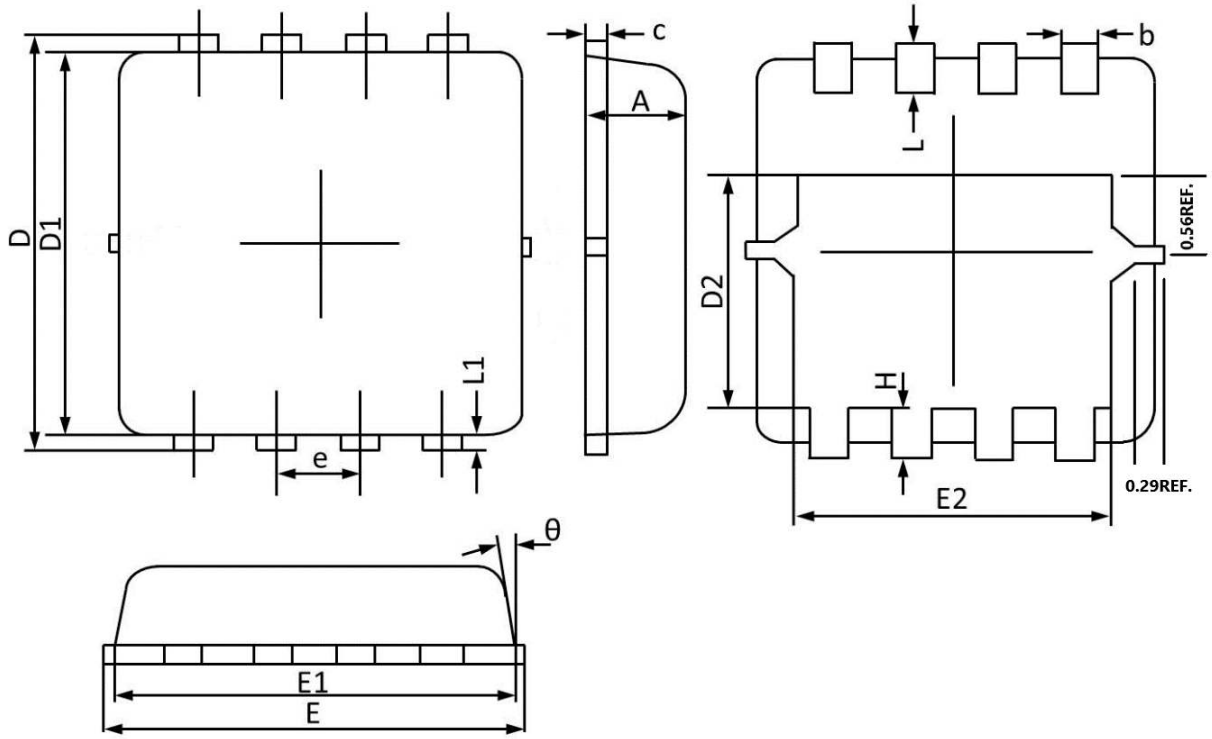


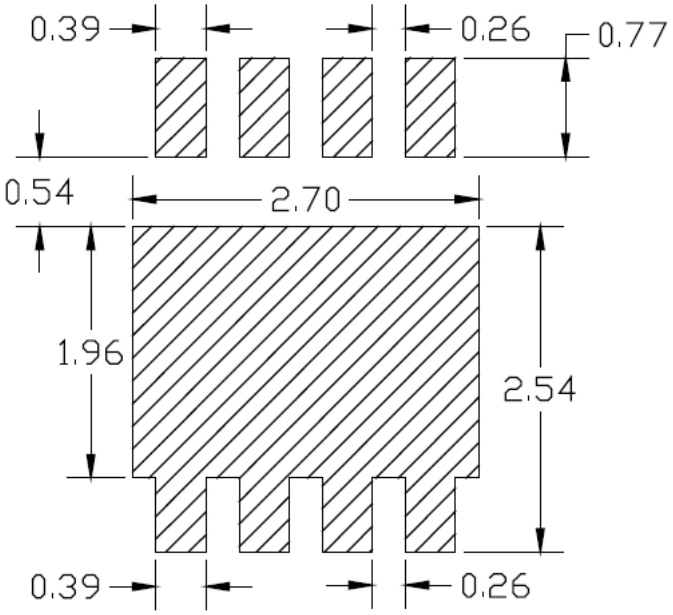
Figure 12. EAS Waveform

Package Outline Dimensions (PPAK 3x3)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.900	0.700	0.035	0.028
b	0.350	0.250	0.014	0.010
c	0.250	0.100	0.010	0.004
D	3.500	3.050	0.138	0.120
D1	3.200	2.900	0.126	0.114
D2	1.950	1.350	0.077	0.053
E	3.400	3.000	0.134	0.118
E1	3.300	2.900	0.130	0.114
E2	2.600	2.350	0.102	0.093
e	0.65BSC		0.026BSC	
H	0.750	0.300	0.030	0.012
L	0.600	0.300	0.024	0.012
L1	0.200	0.060	0.008	0.002
θ	14°	6°	14°	6°

Recommended Pad Layout



(unit : mm)

Order Information

Device	Package	Marking	Carrier	Reel Quantity
GSFN3908	PPAK3x3	DC3908	Tape & Reel	3,000pcs