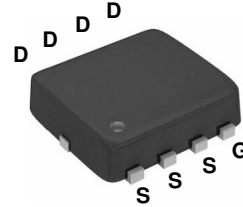
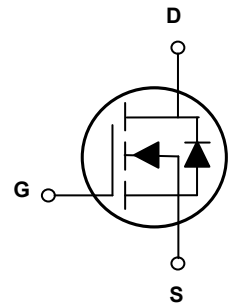


### Main Product Characteristics

$BV_{DSS}$	30V
$R_{DS(ON)}$	7.8m $\Omega$
$I_D$	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

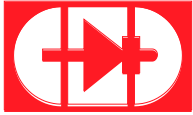


### Description

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 ( $T_C=25^\circ\text{C}$ unless otherwise specified)

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


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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Static State Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
$BV_{DSS}$ Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$	-	0.04	-	$V/^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V, T_J=25^\circ\text{C}$	-	-	1	$\mu A$
		$V_{DS}=24V, V_{GS}=0V, T_J=125^\circ\text{C}$	-	-	10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Drain-Source On-State Resistance <sup>3</sup>	$R_{DS(ON)}$	$V_{GS}=10V, I_D=16A$	-	6.5	7.8	m $\Omega$
		$V_{GS}=4.5V, I_D=8A$	-	9.2	12	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.6	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	-4	-	$\text{mV}/^\circ\text{C}$
Forward Transconductance	$g_{fs}$	$V_{DS}=10V, I_D=8A$	-	9.5	-	S
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	-	850	1700	pF
Output Capacitance	$C_{oss}$		-	133	260	
Reverse Transfer Capacitance	$C_{rss}$		-	78	160	
Turn-On Delay Time <sup>3,4</sup>	$T_{d(on)}$	$V_{DD}=15V, R_G=3.3\Omega, V_{GS}=10V, I_D=15A$	-	4.8	9	nS
Rise Time <sup>3,4</sup>	$T_r$		-	12.5	24	
Turn-Off Delay Time <sup>3,4</sup>	$T_{d(off)}$		-	27.6	52	
Fall Time <sup>3,4</sup>	$T_f$		-	8.2	16	
Total Gate Charge <sup>3,4</sup>	$Q_g$	$V_{DS}=15V, I_D=20A, V_{GS}=4.5V$	-	7.5	12	nC
Gate-Source Charge <sup>3,4</sup>	$Q_{gs}$		-	1.3	2.6	
Gate-Drain Charge <sup>3,4</sup>	$Q_{gd}$		-	4.5	8	
Gate Resistance	$R_g$	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	-	2.7	5.4	$\Omega$
<b>Guaranteed Avalabche Energy</b>						
Single Pulse Avalance Energy	$E_{AS}$	$V_{DD}=25V, L=0.1\text{mH}, I_{AS}=15A$	12	-	-	mJ
<b>Drain-Source Diode Characteristics</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V,$	-	-	48	A
Pulsed Source Current <sup>5</sup>	$I_{SM}$	Force Current	-	-	96	A
Diode Forward Voltage <sup>3</sup>	$V_{SD}$	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	-	-	1	V
		$V_{GS}=0V, I_S=10A, T_J=25^\circ\text{C}$	-	-	1.2	V
Reverse Recovery Time	$t_{rr}$	$V_{GS}=0V, I_S=1A,$	-	8.1	-	nS
Reverse Recovery Charge	$Q_{rr}$	$di/dt=100A/\mu s, T_J=25^\circ\text{C}$	-	1.6	-	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. Pulsed tested: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.

## Typical Electrical and Thermal Characteristic Curves

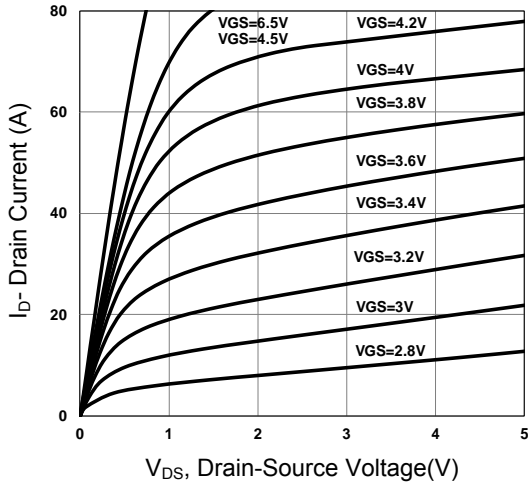


Figure 1. Typical Output Characteristics

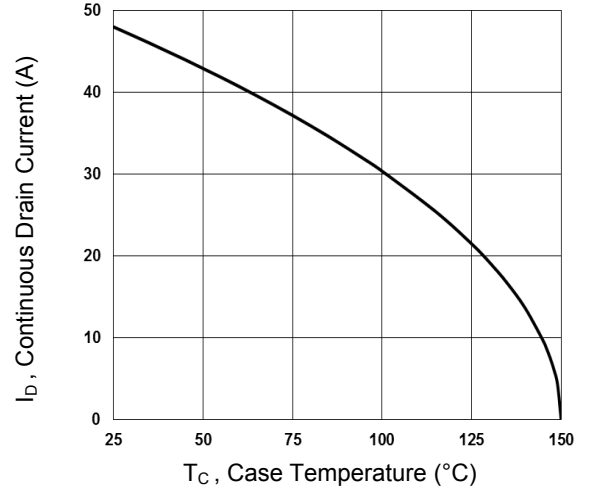


Figure 2. Continuous Drain Current vs.  $T_C$

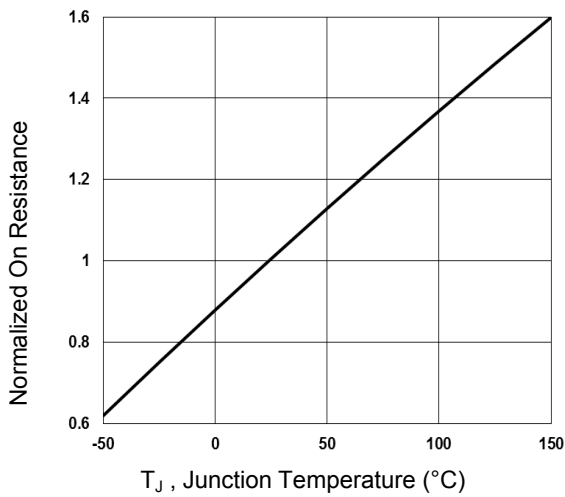


Figure 3. Normalized  $R_{DS(ON)}$  vs.  $T_J$

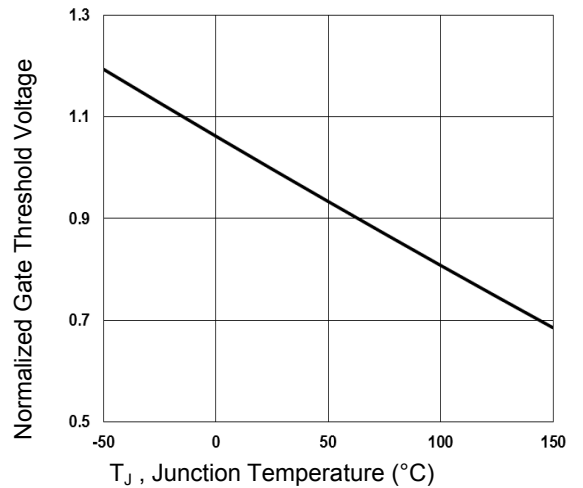


Figure 4. Normalized  $V_{th}$  vs.  $T_J$

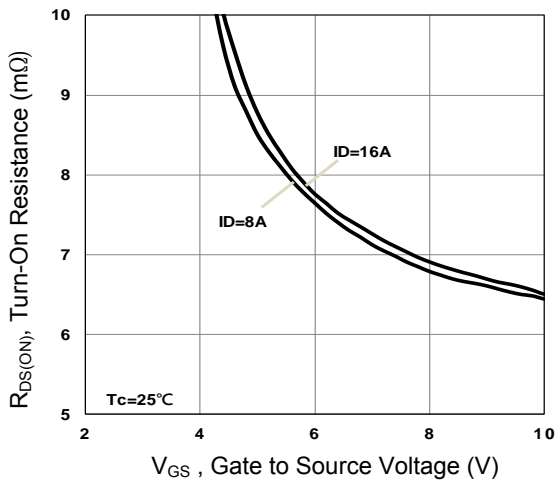


Figure 5. Turn-On Resistance vs.  $V_{GS}$

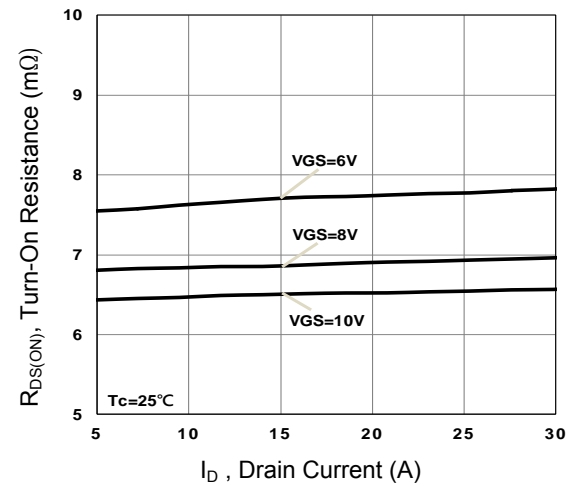


Figure 6. Turn-On Resistance vs.  $I_D$

## Typical Electrical and Thermal Characteristic Curves

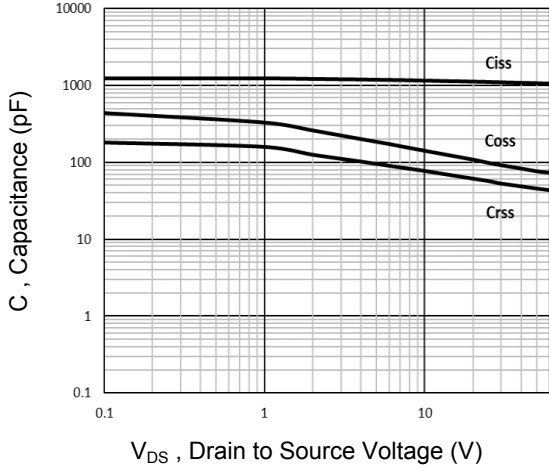


Figure 7. Capacitance Characteristics

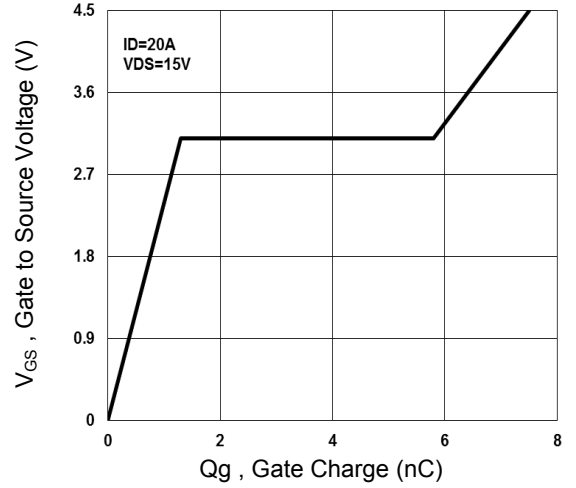


Figure 8. Gate Charge Characteristics

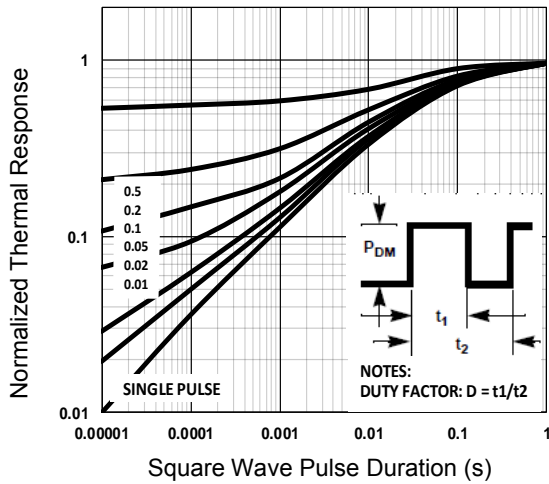


Figure 9. Normalized Transient Impedance

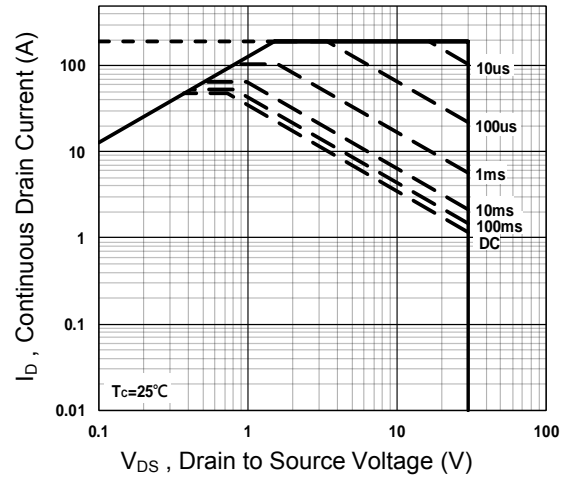


Figure 10. Maximum Safe Operation Area

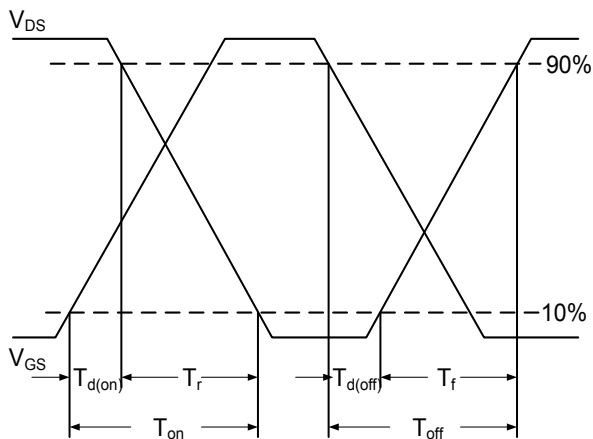


Figure 11. Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

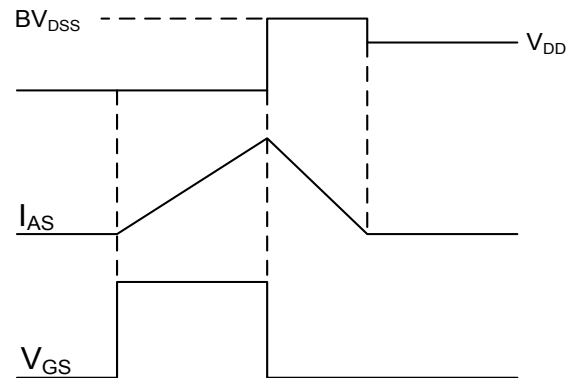
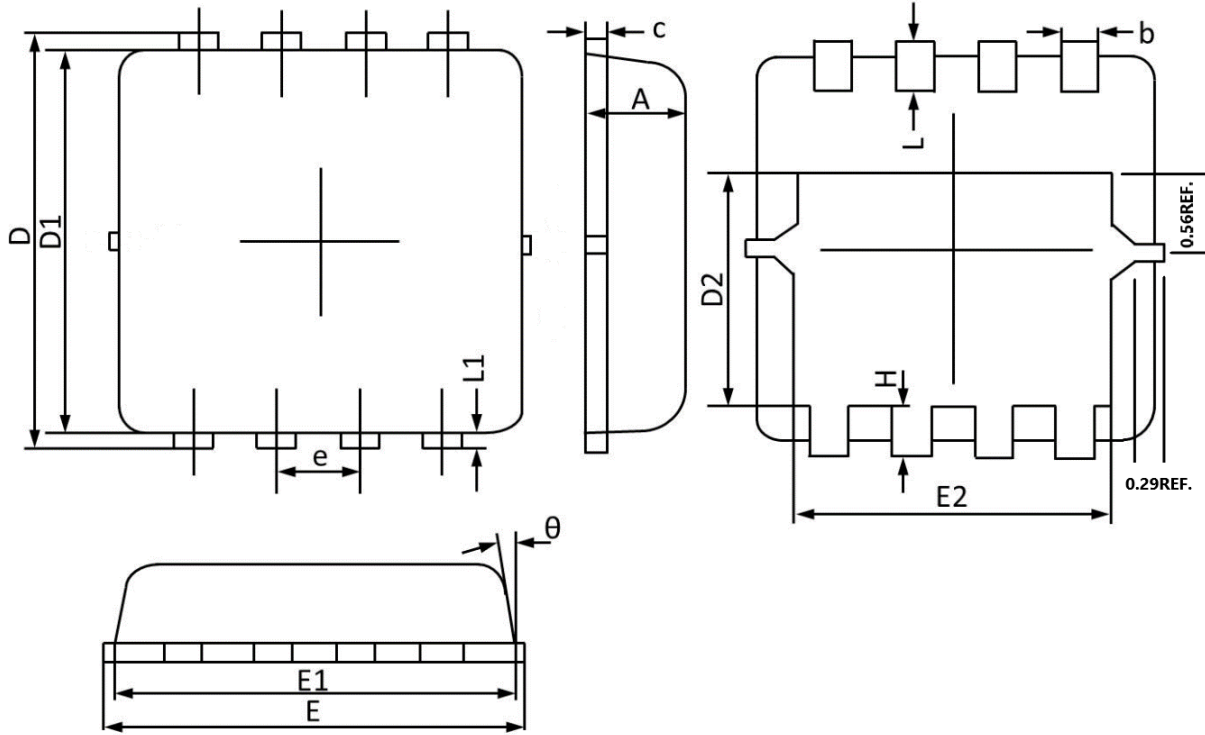


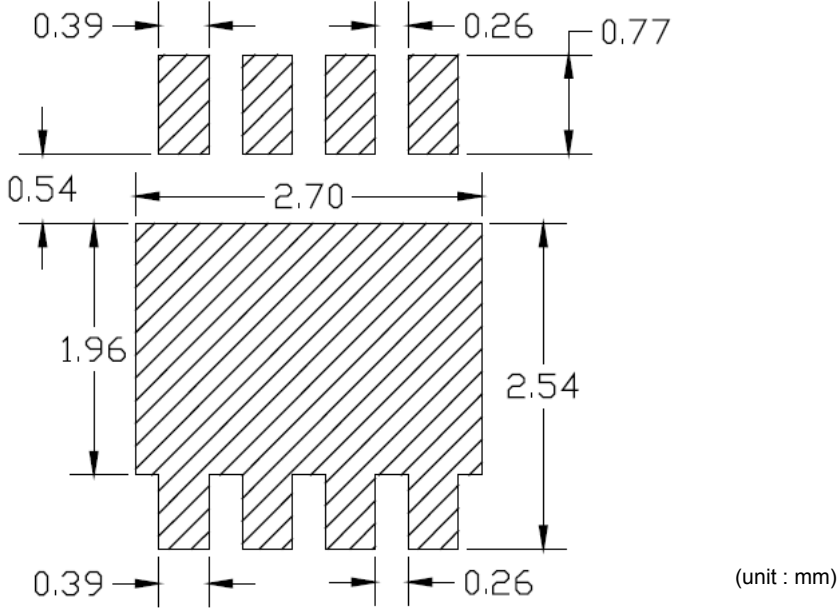
Figure 12. EAS Waveform

**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**



**Order Information**

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