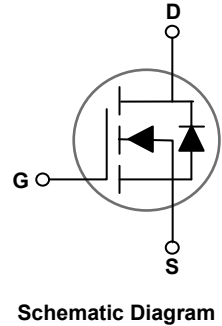
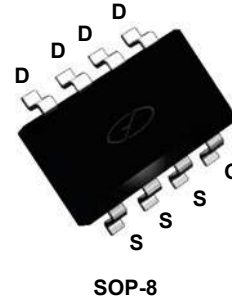


## Main Product Characteristics

$BV_{DSS}$	65V
$R_{DS(ON)}$	16m $\Omega$
$I_D$	7.4A



## 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 GSGQ6988 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	$V_{DS}$	65	V
Gate-Source Voltage	$V_{GS}$	+20/-12	V
Drain Current – Continuous ( $T_A=25^\circ\text{C}$ )	$I_D$	7.4	A
Drain Current – Continuous ( $T_A=70^\circ\text{C}$ )		5.9	A
Drain Current – Pulsed <sup>1</sup>	$I_{DM}$	29.6	A
Single Pulse Avalanche Energy <sup>2</sup>	$E_{AS}$	9.1	mJ
Single Pulse Avalanche Current <sup>2</sup>	$I_{AS}$	13.5	A
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	1.47	W
Power Dissipation – Derate above $25^\circ\text{C}$		0.01	W/ $^\circ\text{C}$
$V_{DS}$ spike voltage ( $\leq 100\text{ns}$ ) <sup>5</sup>	$V_{SPIKE}$	80	V
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	85	$^\circ\text{C}/\text{W}$
Storage Temperature Range	$T_{STG}$	-55 to +150	$^\circ\text{C}$
Operating Junction Temperature Range	$T_J$	-55 to +150	$^\circ\text{C}$

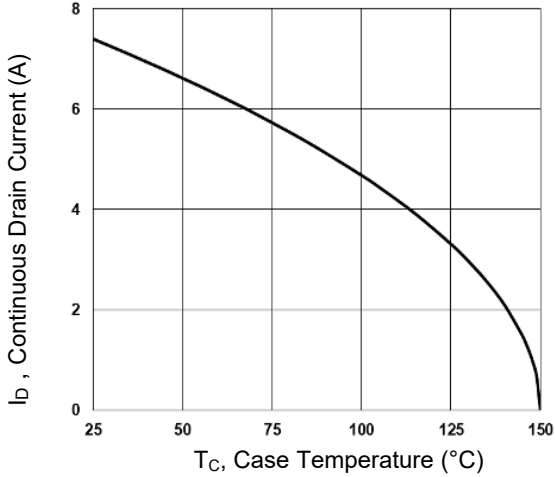
**Electrical Characteristics** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On/Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	65	-	-	V
$BV_{DSS}$ Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=1mA$	-	0.03	-	$V/^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V,$ $T_J=25^\circ\text{C}$	-	-	1	$\mu A$
		$V_{DS}=48V, V_{GS}=0V,$ $T_J=85^\circ\text{C}$	-	-	10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=20V, V_{DS}=0V$	-	-	100	nA
Static Drain-Source On-Resistance <sup>3</sup>	$R_{DS(ON)}$	$V_{GS}=10V, I_D=3A$	-	13	16	m $\Omega$
		$V_{GS}=10V,$ $I_D=3A (T_J=125^\circ\text{C})$	-	20	-	
		$V_{GS}=4.5V, I_D=2A$	-	23	30	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1	1.6	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	-5.1	-	$mV/^\circ\text{C}$
Forward Transconductance	$g_{fs}$	$V_{DS}=10V, I_D=3A$	-	5	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>3,4</sup>	$Q_g$	$V_{DS}=30V, I_D=3A,$ $V_{GS}=10V$	-	10.9	22	nC
Gate-Source Charge <sup>3,4</sup>	$Q_{gs}$		-	1.5	3	
Gate-Drain Charge <sup>3,4</sup>	$Q_{gd}$		-	4.4	9	
Turn-On Delay Time <sup>3,4</sup>	$t_{d(on)}$	$V_{DD}=30V, R_G=3.3\Omega,$ $V_{GS}=10V, I_D=1A$	-	8	16	nS
Rise Time <sup>3,4</sup>	$t_r$		-	12	24	
Turn-Off Delay Time <sup>3,4</sup>	$t_{d(off)}$		-	25	50	
Fall Time <sup>3,4</sup>	$t_f$		-	18	36	
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V,$ $F=1MHz$	-	653	1300	pF
Output Capacitance	$C_{oss}$		-	192	380	
Reverse Transfer Capacitance	$C_{rss}$		-	27	60	
Gate Resistance	$R_g$	$V_{GS}=0V, V_{DS}=0V,$ $F=1MHz$	-	0.3	-	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V,$	-	-	7.4	A
Pulsed Source Current <sup>3</sup>	$I_{SM}$	Force Current	-	-	14.8	A
Diode Forward Voltage <sup>3</sup>	$V_{SD}$	$V_{GS}=0V, I_S=1A,$ $T_J=25^\circ\text{C}$	-	-	1	V
Reverse Recovery Time	$t_{rr}$	$V_{GS}=0V, I_S=5A,$ $di/dt=100A/\mu s,$	-	33.7	-	nS
Reverse Recovery Charge	$Q_{rr}$	$T_J=25^\circ\text{C}$	-	23.7	-	nC

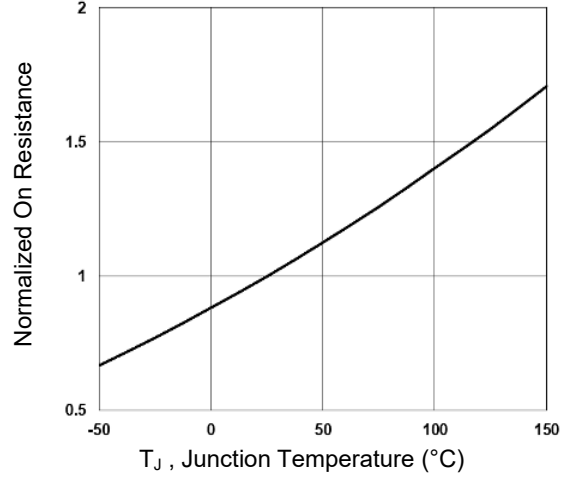
Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=50V, V_{GS}=10V, L=0.1mH, I_{AS}=13.5A, R_G=25\Omega, \text{Starting } T_J=25^\circ\text{C}$ .
3. Pulse test, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.
5. The spike duty cycle 1% max. , limited by  $T_{J(max)}=125^\circ\text{C}$ .

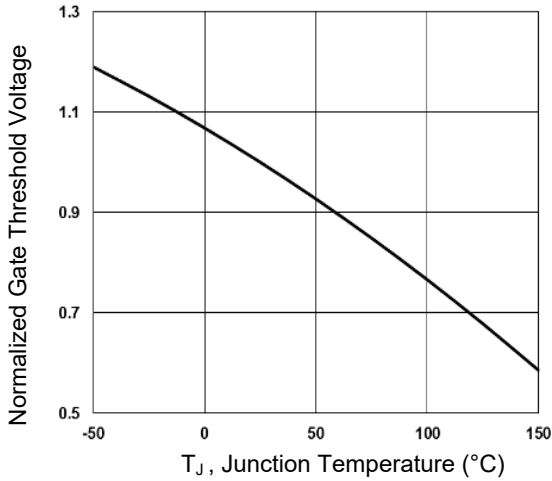
**Typical Electrical and Thermal Characteristic Curves**



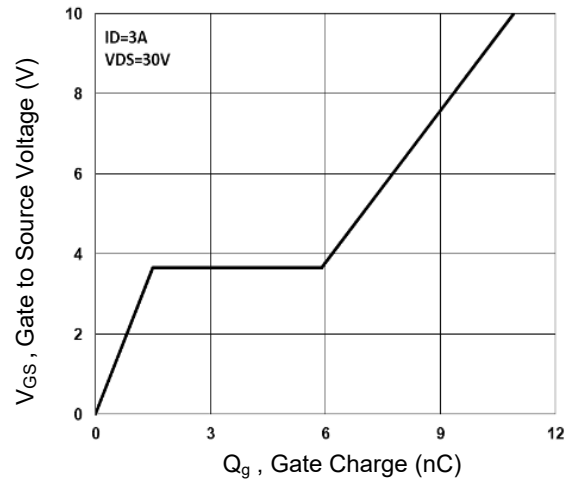
**Figure 1. Continuous Drain Current vs.  $T_c$**



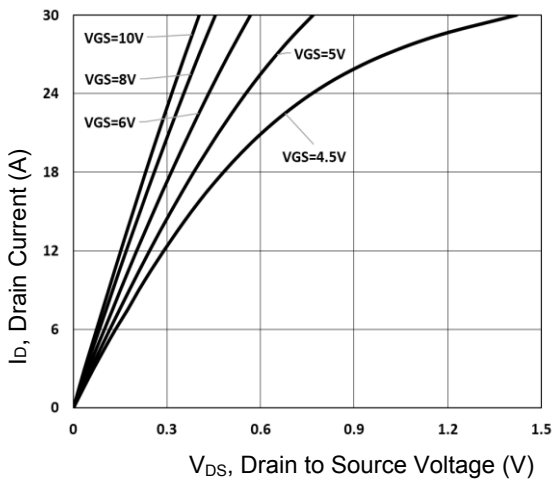
**Figure 2. Normalized  $R_{DSON}$  vs.  $T_j$**



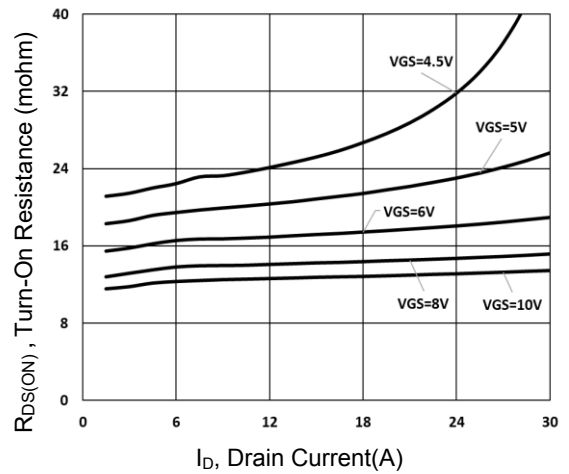
**Figure 3. Normalized  $V_{th}$  vs.  $T_j$**



**Figure 4. Gate Charge Waveform**

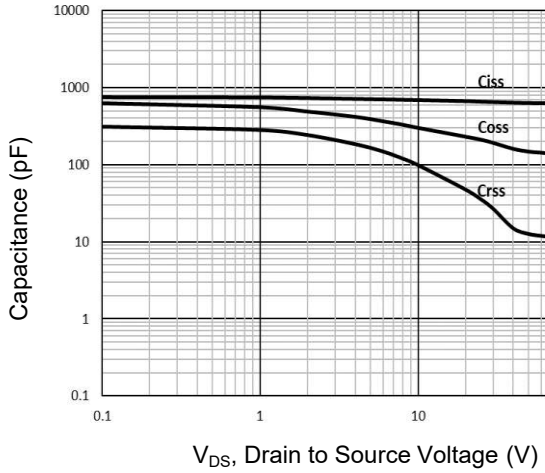


**Figure 5. Typical Output Characteristics**

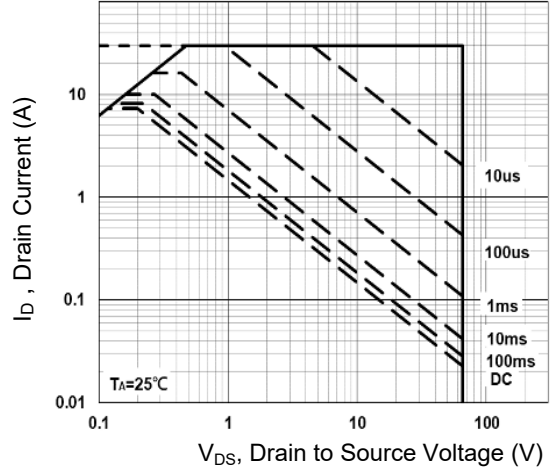


**Figure 6. Turn-On Resistance vs.  $I_D$**

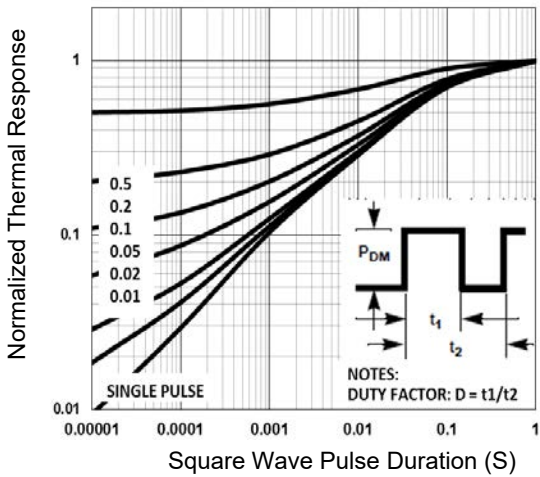
**Typical Electrical and Thermal Characteristic Curves**



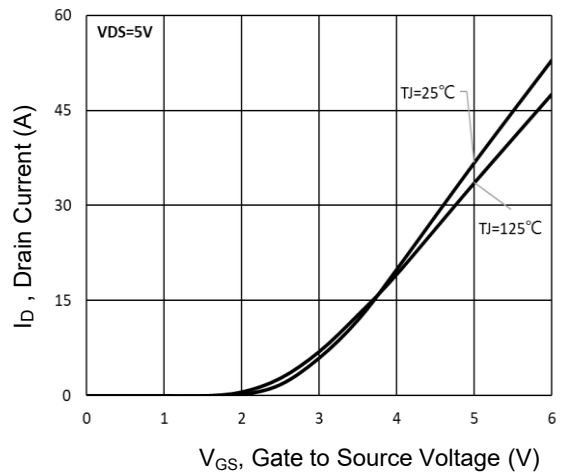
**Figure 7. Capacitance Characteristics**



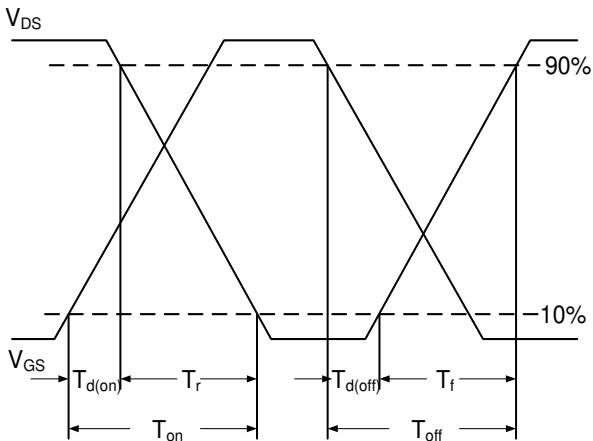
**Figure 8. Maximum Safe Operation Area**



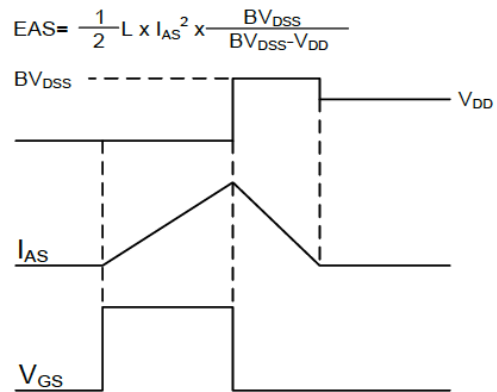
**Figure 9. Normalized Transient Response**



**Figure 10. Transfer Characteristic**



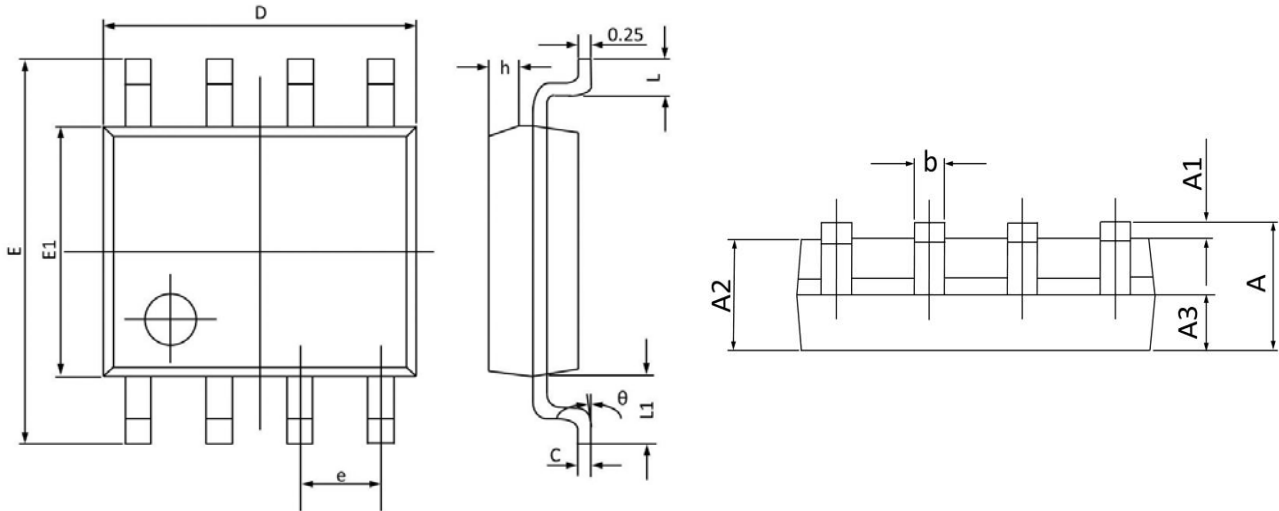
**Figure 11. Switching Time Waveform**



**Figure 12. E<sub>AS</sub> Waveform**

**Package Outline Dimensions**

**SOP-8**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.068
A1	0.100	0.250	0.004	0.009
A2	1.300	1.500	0.052	0.059
A3	0.600	0.700	0.024	0.027
b	0.390	0.480	0.016	0.018
c	0.210	0.260	0.009	0.010
D	4.700	5.100	0.186	0.200
E	5.800	6.200	0.229	0.244
E1	3.700	4.100	0.146	0.161
e	1.270(BSC)		0.050(BSC)	
h	0.250	0.500	0.010	0.019
L	0.500	0.800	0.019	0.031
L1	1.050(BSC)		0.041(BSC)	
θ	0°	8°	0°	8°

**Order Information**

Device	Package	Marking	Carrier	Reel Quantity
GSGQ6988	SOP-8	DS6988	Tape & Reel	3,000pcs