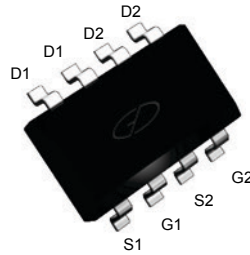
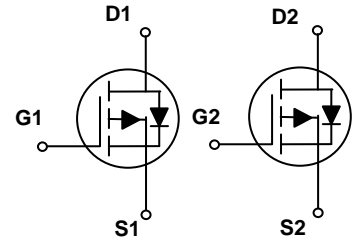


**Main Product Characteristics**

$V_{DS}$	-20V
$R_{DS(ON)}$	28m $\Omega$
$I_D$	-9A



SOP-8



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 GSFQ0209 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** ( $T_A=25^{\circ}C$  unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous	$I_D$	-9	A
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	-40	A
Maximum Power Dissipation	$P_D$	3.1	W
Derating Factor		0.0248	W/ $^{\circ}C$
Thermal Resistance, Junction-to-Ambient <sup>2</sup>	$R_{\theta JA}$	42	$^{\circ}C/W$
Storage Temperature Range	$T_{STG}$	-55 To +150	$^{\circ}C$
Operating Junction Temperature Range	$T_J$	-55 To +150	$^{\circ}C$

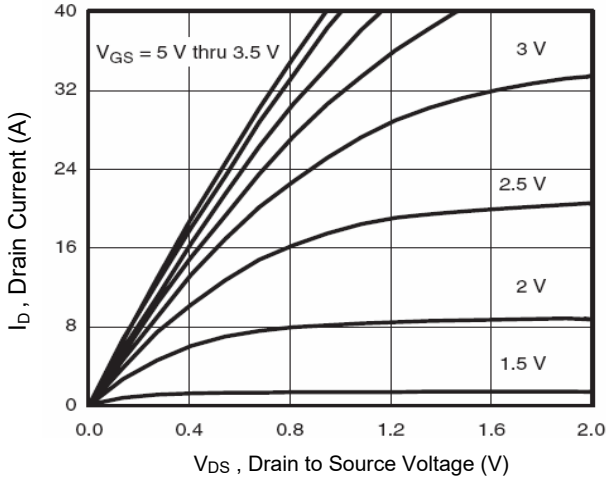
### Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-20	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V	-	-	-1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics<sup>3</sup></b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-0.5	-0.7	-1.4	V
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-6A	-	22	28	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-5A	-	32	40	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-6A	-	17	-	S
<b>Dynamic and Switching Characteristics<sup>4</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, F=1MHz	-	2100	-	pF
Output Capacitance	C <sub>oss</sub>		-	498	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	300	-	
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-10V, R <sub>G</sub> =6Ω V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1A	-	25	-	nS
Turn-On Rise Time	t <sub>r</sub>		-	30	-	
Turn-Off Delay Time	t <sub>d(off)</sub>		-	70	-	
Turn-Off Fall Time	t <sub>f</sub>		-	50	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-6A, V <sub>GS</sub> =-4.5V	-	17	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	4.1	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	4.3	-	
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>3</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =-9A	-	-	-1.2	V
Diode Forward Current <sup>2</sup>	I <sub>S</sub>		-	-	-18	A

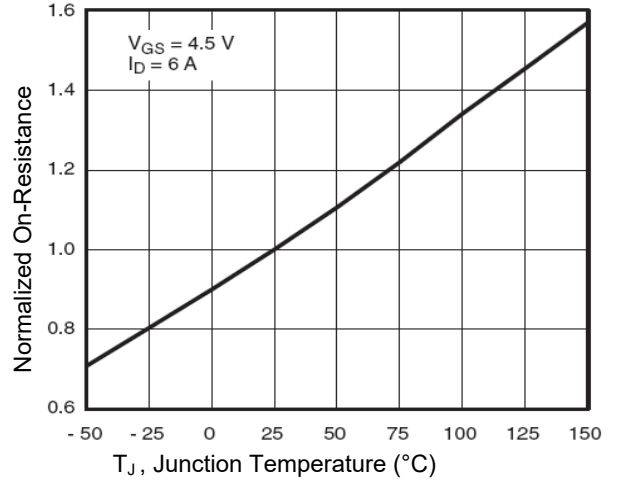
Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production.

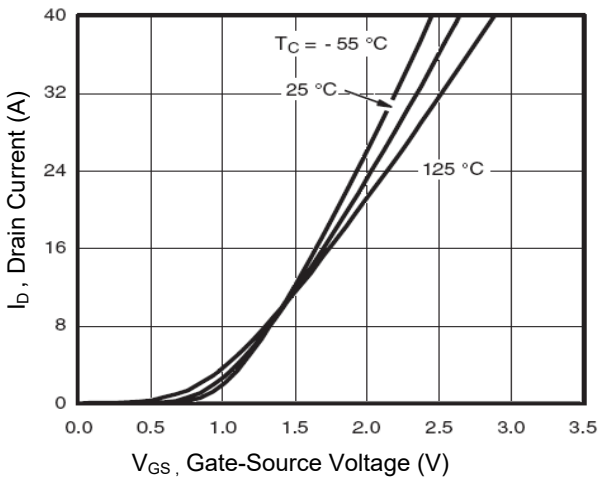
### Typical Electrical and Thermal Characteristic Curves



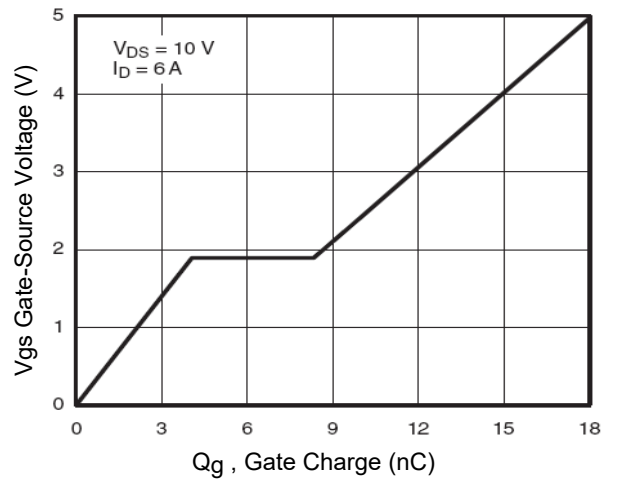
**Figure.1 Output Characteristics**



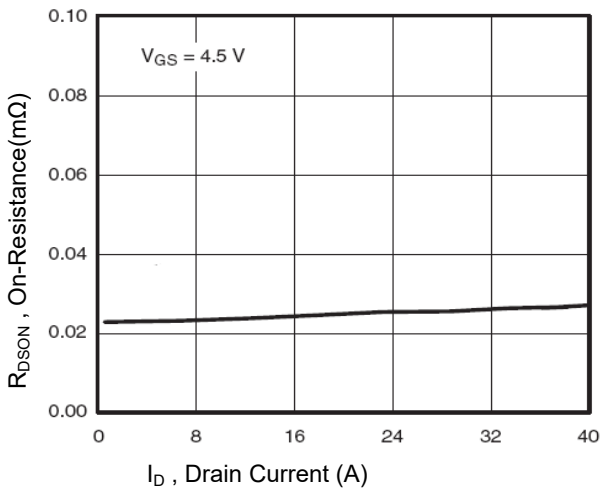
**Figure 2.  $R_{DS(on)}$ -Junction Temperature**



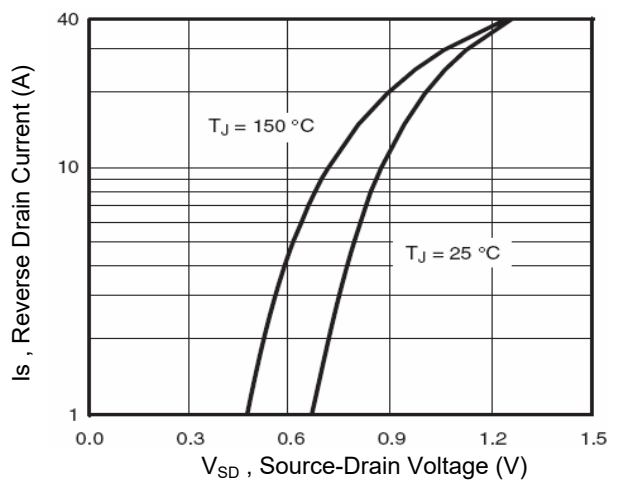
**Figure 3. Transfer Characteristics**



**Figure 4. Gate Charge Characteristics**



**Figure 5.  $R_{ds(on)}$ - Drain Current**



**Figure 6. Source- Drain Diode Forward**

## Typical Electrical and Thermal Characteristic Curves

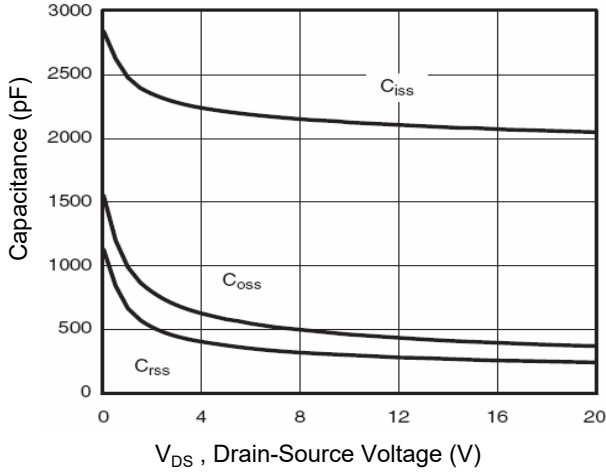


Figure 7. Capacitance vs  $V_{DS}$

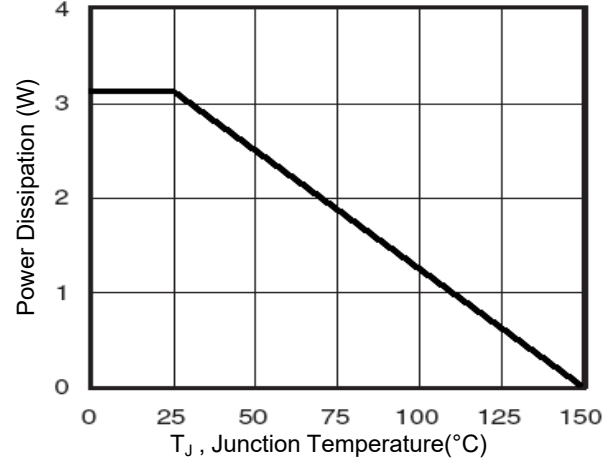


Figure 8. Power De-rating

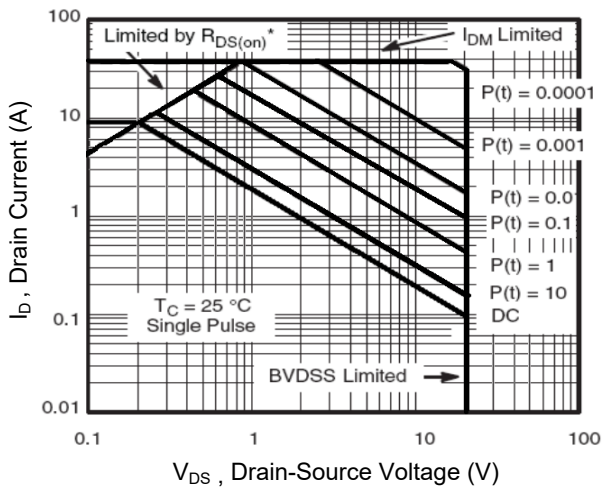


Figure 9. Safe Operation Area

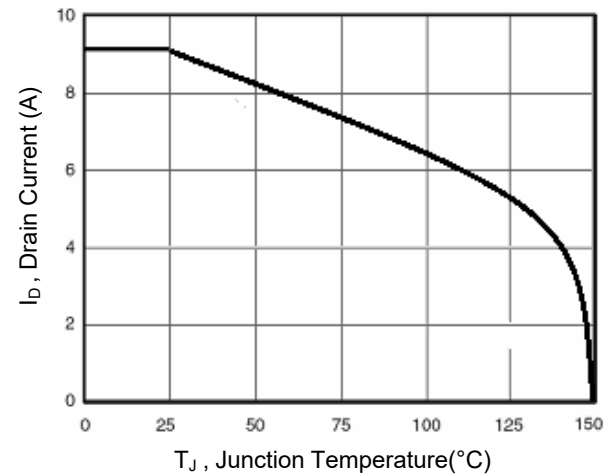


Figure 10. Current De-rating

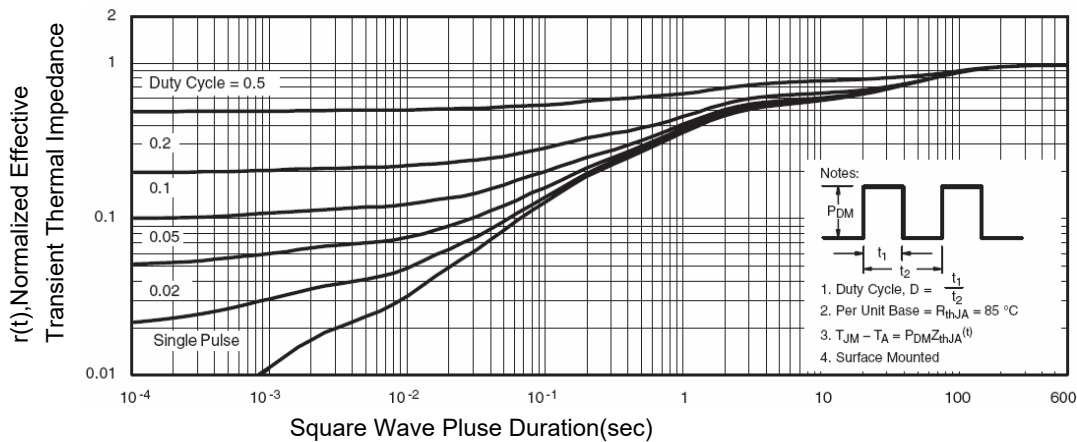
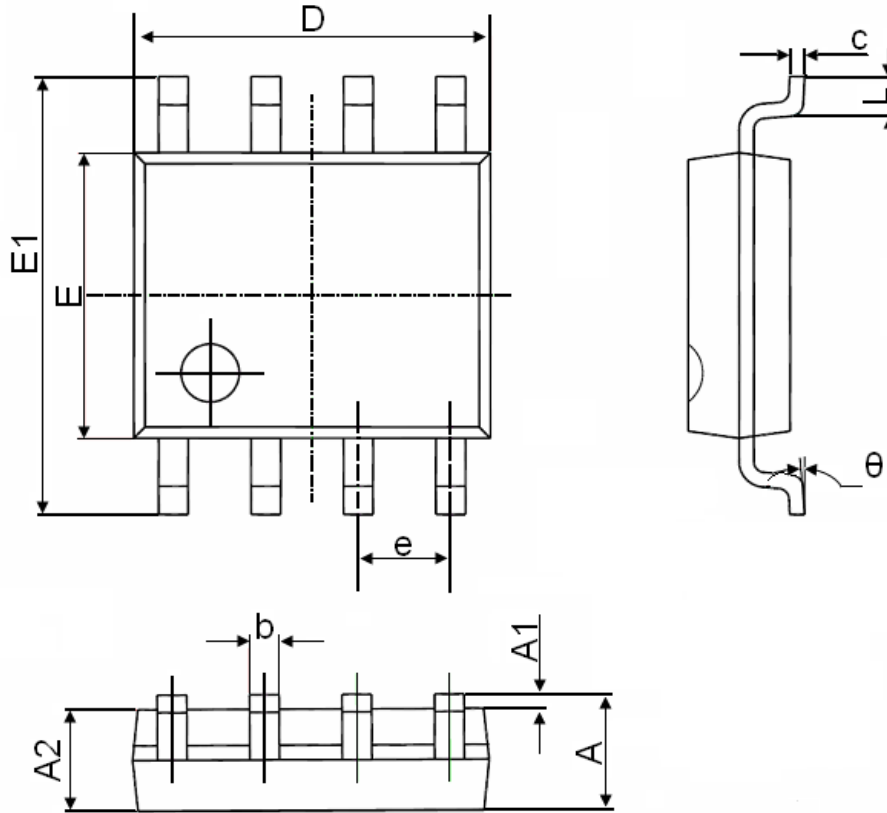


Figure 11. Normalized Maximum Transient Thermal Impedance

## Package Outline Dimensions (SOP-8)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.288	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°