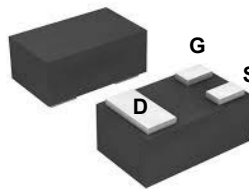
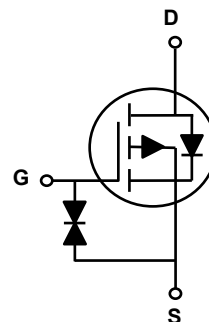


**Main Product Characteristics**

$V_{DSS}$	-20V
$R_{DS(ON)}$	640mΩ
$I_D$	-0.85A



SOT-883



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 GSF02009 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** ( $T_J=25^{\circ}C$  unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{DSS}$	-20	V
Gate-Source Voltage	$V_{GSS}$	±12	V
Drain Current-Continuous( $T_A=25^{\circ}C$ ) <sup>1,3</sup>	$I_D$	-0.85	A
Drain Current-Continuous( $T_A=70^{\circ}C$ ) <sup>1,3</sup>		-0.68	
Pulse Drain Current <sup>2</sup>	$I_{DM}$	-2.1	A
Power Dissipation( $T_A=25^{\circ}C$ )	$P_D$	0.69	W
Power Dissipation( $T_A=70^{\circ}C$ )		0.44	
Thermal Resistance, Junction-to-Ambient <sup>2</sup>	$R_{\theta JA}$	180	$^{\circ}C/W$
Storage Temperature Range	$T_{STG}$	-55 To +150	$^{\circ}C$
Operating Junction Temperature Range	$T_J$	-55 To +150	$^{\circ}C$

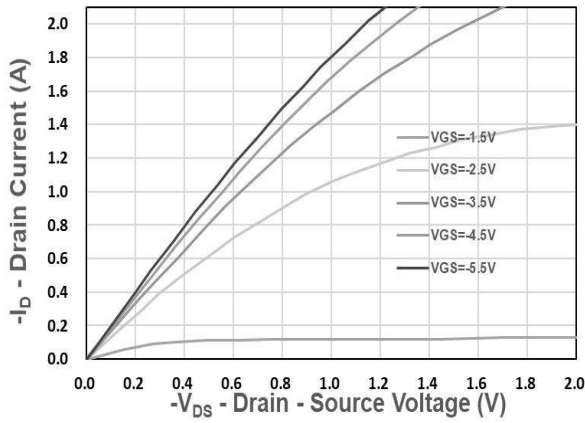
**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-16V, V_{GS}=0V$	-	-	-1	$\mu A$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	-0.5	-	-1	V
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	$\pm 10$	$\mu A$
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-0.55A$	-	530	640	m $\Omega$
		$V_{GS}=-2.5V, I_D=-0.45A$	-	730	950	
		$V_{GS}=-1.8V, I_D=-0.35A$	-	1300	1950	
Forward Transconductance	$g_{fs}$	$V_{GS}=-5V, I_D=-0.55A$	-	1	-	S
Total Gate Charge	$Q_g$	$V_{DS}=-10V, I_D=-1A, V_{GS}=-2.5V$	-	0.53	-	nC
Total Gate Charge	$Q_g$	$V_{DS}=-10V, I_D=-1A, V_{GS}=-4.5V$	-	0.8	-	nC
Gate-Source Charge	$Q_{gs}$		-	0.2	-	
Gate-Drain Charge	$Q_{gd}$		-	0.2	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=-10V, R_{GEN}=3\Omega, V_{GS}=-4.5V, I_D=-1.33A$	-	400	-	nS
Turn-On Rise Time	$t_r$		-	60	-	
Turn-Off Delay Time	$t_{d(off)}$		-	20	-	
Turn-Off Fall Time	$t_f$		-	800	-	
Input Capacitance	$C_{iss}$	$V_{DS}=-10V, V_{GS}=0V, F=1MHz$	-	58	-	pF
Output Capacitance	$C_{oss}$		-	5.7	-	
Reverse Transfer Capacitance	$C_{rss}$		-	4.4	-	
<b>Reverse Diode Characteristics</b>						
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_{SD}=-1A$	-	-	-1.1	V
Reverse Recovery Time	$t_{rr}$	$I_F=-1A, di/dt=100A/\mu s$	-	9.2	-	nS
Reverse Recovery Charge	$Q_{rr}$		-	0.8	-	nC

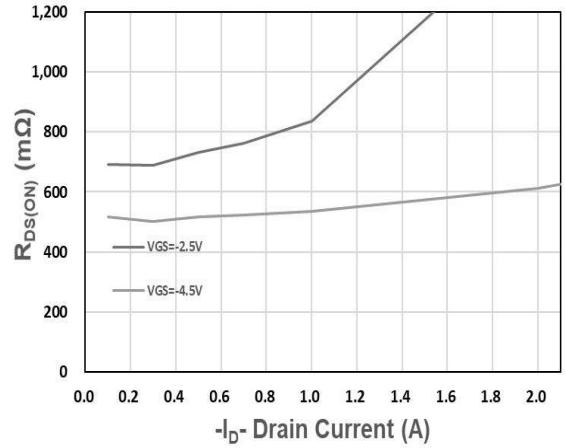
Note :

1. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^{\circ}\text{C}$ . The value in any given application depends on the user's specific board design.
2. Repetitive rating, pulse width limited by junction temperature .
3. The current rating is based on the  $t < 10s$  junction to ambient thermal resistance rating.

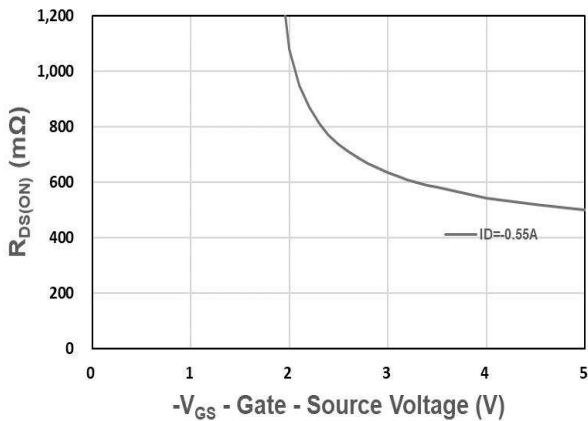
**Typical Electrical and Thermal Characteristic Curves**



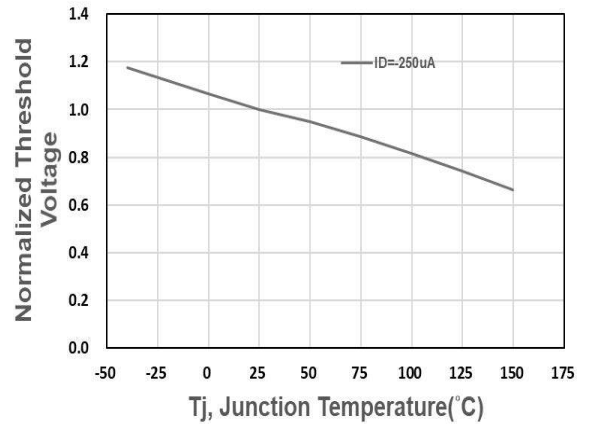
**Figure 1. Output Characteristics**



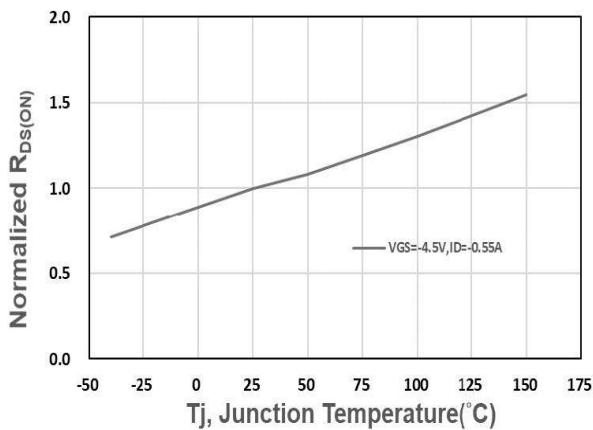
**Figure 2. On-Resistance vs.  $I_D$**



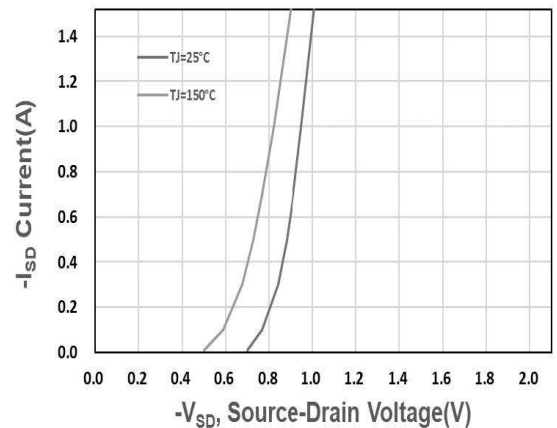
**Figure 3. On-Resistance vs.  $V_{GS}$**



**Figure 4. Gate Threshold Voltage**

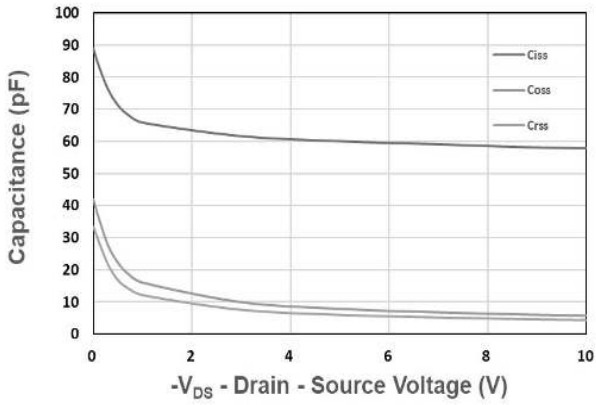


**Figure 5. Drain-Source On Resistance**

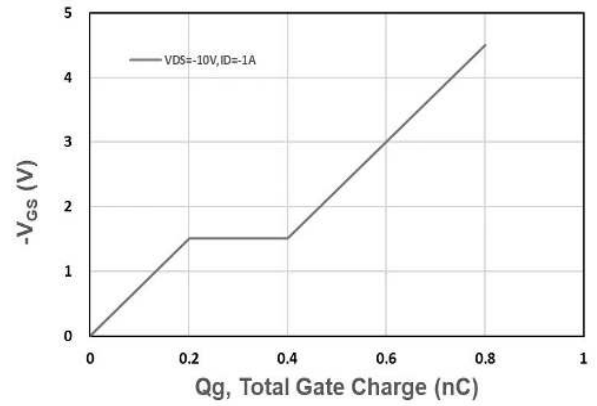


**Figure 6. Source-Drain Diode Forward**

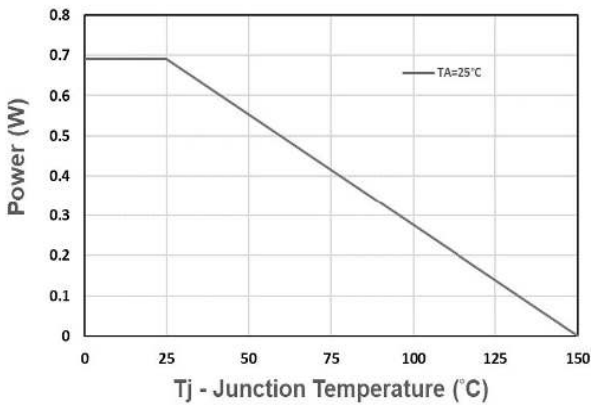
**Typical Electrical and Thermal Characteristic Curves**



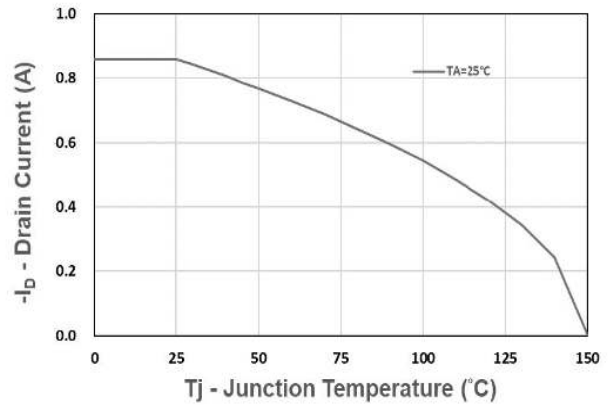
**Figure 7. Capacitance**



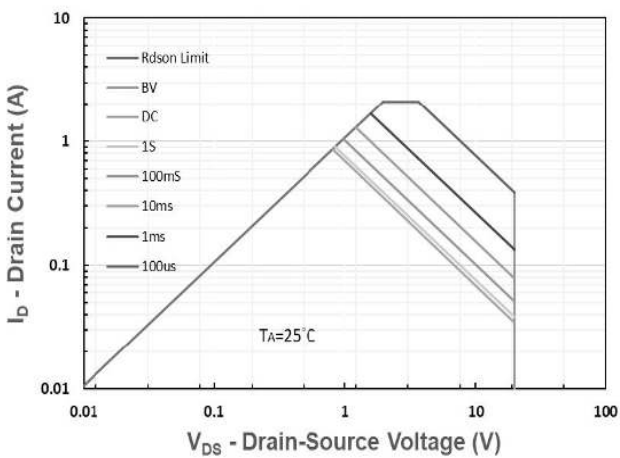
**Figure 8. Gate Charge Characteristics**



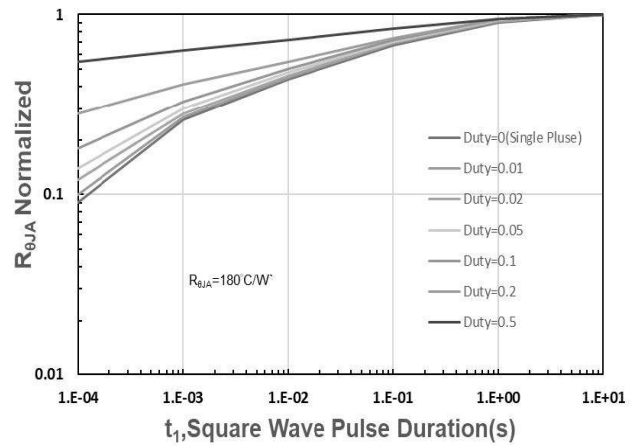
**Figure 9. Power Dissipation**



**Figure 10. Drain Current**

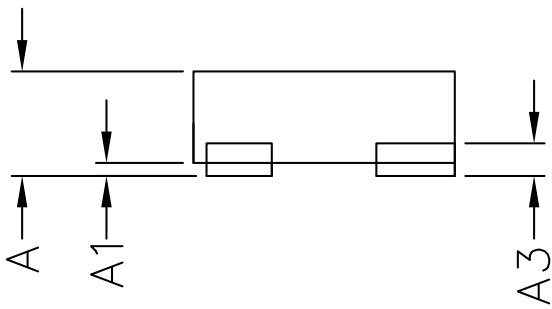
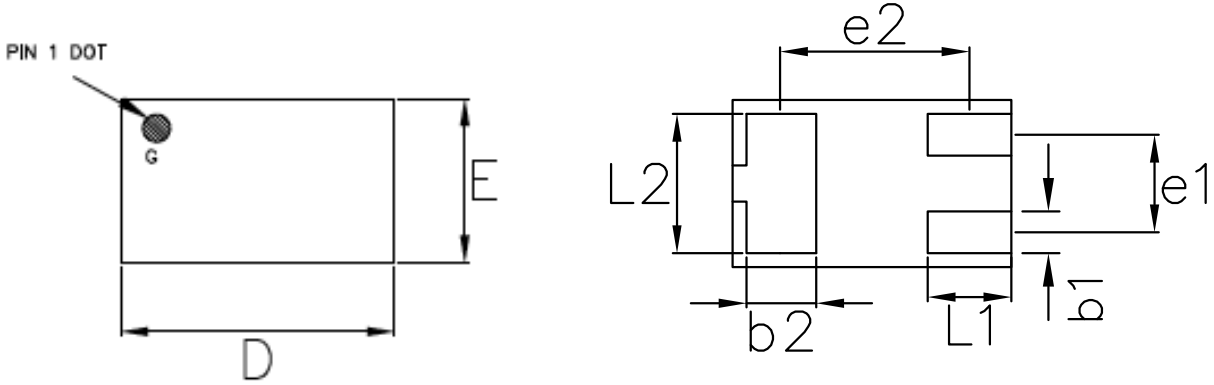


**Figure 11. Safe Operating Area**



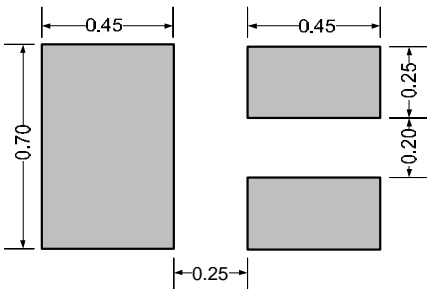
**Figure 12.  $R_{\theta JA}$  Transient Thermal Impedance**

**Package Outline Dimensions (SOT-883)**



Package Outline Dimensions (MM)			
Package	SOT-883		
REF.	MIN.	TYP.	MAX
A	0.40	-	0.50
A1	0.001	-	0.05
A3	0.125 REF.		
D	0.95	1.00	1.05
E	0.55	0.60	0.65
b1	0.10	0.15	0.20
b2	0.20	0.25	0.30
L1	0.20	0.30	0.40
L2	0.40	0.50	0.60
e1	0.35 BSC		
e2	0.675 BSC		

**Recommended Pad Layout**



(Unit in MM)

**Order Information**

MPN	Package	Marking Code	Carrier	Quantity	HSF Status
GSFW02009	SOT-883	49	Tape & Reel	10000/Reel	RoHS Compliant