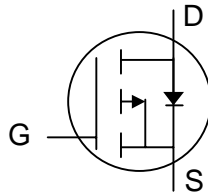


P-channel Enhancement-mode Power MOSFET

- Low gate-charge
- Simple drive requirement
- Fast switching

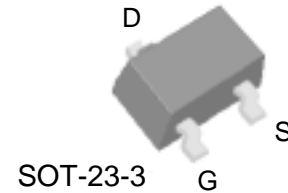
 **Pb-free; RoHS compliant.**



BV_{DSS}	-30V
$R_{DS(ON)}$	75m Ω
I_D	-3.7A

DESCRIPTION

The SSM2309GN is in a SOT-23-3 package, which is widely used for lower power commercial and industrial surface mount applications. It is well suited for low voltage applications such as DC/DC converters and and general switching applications.



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A=25^\circ\text{C}$	Continuous Drain Current ³	-3.7	A
$I_D @ T_A=70^\circ\text{C}$	Continuous Drain Current ³	-3	A
I_{DM}	Pulsed Drain Current ^{1,2}	-12	A
$P_D @ T_A=25^\circ\text{C}$	Total Power Dissipation	1.38	W
	Linear Derating Factor	0.01	W/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

THERMAL DATA

Symbol	Parameter	Value	Unit
Rthj-a	Thermal Resistance, Junction-ambient ³	Max. 90	$^\circ\text{C}/\text{W}$

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to $25^\circ\text{C}, I_D=-1\text{mA}$	-	-0.02	-	V/ $^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-3A$	-	-	75	m Ω
		$V_{GS}=-4.5V, I_D=-2.6A$	-	-	120	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-	-3	V
g_{fs}	Forward Transconductance	$V_{DS}=-10V, I_D=-3A$	-	5	-	S
I_{DSS}	Drain-Source Leakage Current ($T_j=25^\circ\text{C}$)	$V_{DS}=-30V, V_{GS}=0V$	-	-	-1	μA
	Drain-Source Leakage Current ($T_j=55^\circ\text{C}$)	$V_{DS}=-24V, V_{GS}=0V$	-	-	-25	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}=\pm 20V$	-	-	± 100	nA
Q_g	Total Gate Charge ²	$I_D=-3A$	-	5	8	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=-24V$	-	1	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS}=-4.5V$	-	3	-	nC
$t_{d(on)}$	Turn-on Delay Time ²	$V_{DS}=-15V$	-	8	-	ns
t_r	Rise Time	$I_D=-1A$	-	5	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=3.3\Omega, V_{GS}=-10V$	-	20	-	ns
t_f	Fall Time	$R_D=15\Omega$	-	7	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V$	-	412	660	pF
C_{oss}	Output Capacitance	$V_{DS}=-25V$	-	91	-	pF
C_{rss}	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	62	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage ²	$I_S=-1.2A, V_{GS}=0V$	-	-	-1.2	V
t_{rr}	Reverse Recovery Time ²	$I_S=-3A, V_{GS}=0V,$	-	20	-	ns
Q_{rr}	Reverse Recovery Charge	$dI/dt=100A/\mu s$	-	15	-	nC

Notes:

1. Pulse width limited by maximum junction temperature.
2. Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Surface-mounted on 1 in² copper pad of FR4 board; 270°C/W when mounted on minimum copper pad.

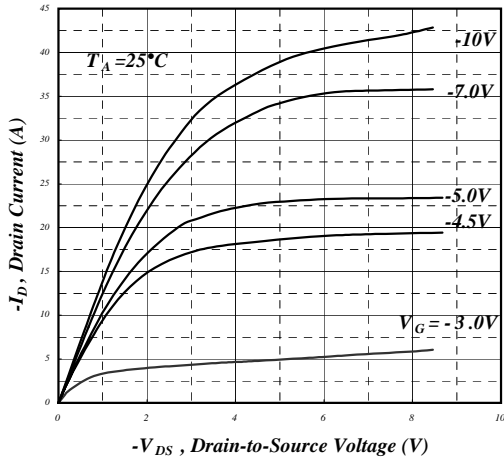


Fig 1. Typical Output Characteristics

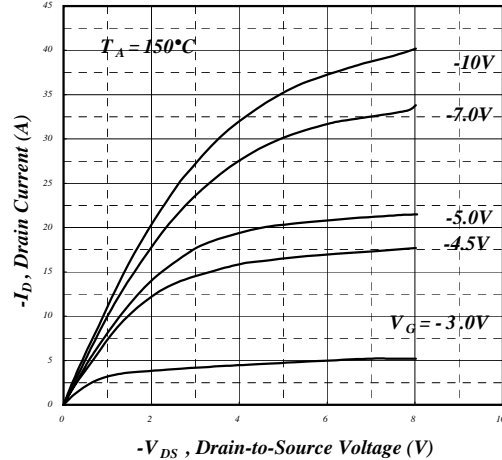


Fig 2. Typical Output Characteristics

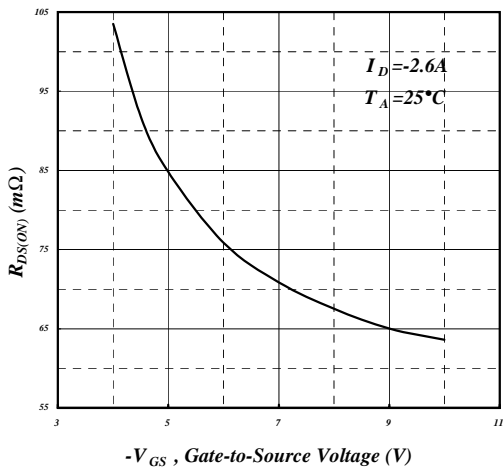


Fig 3. On-Resistance vs. Gate Voltage

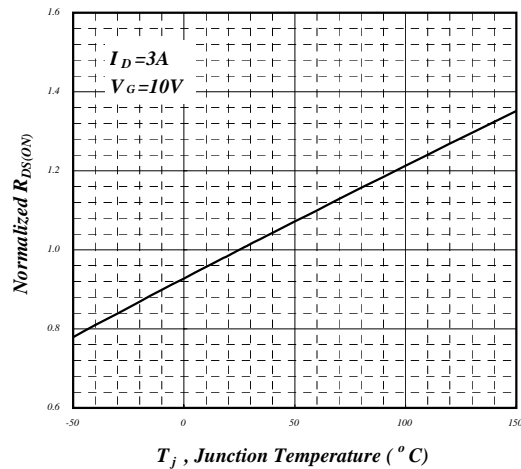


Fig 4. Normalized On-Resistance vs. Junction Temperature

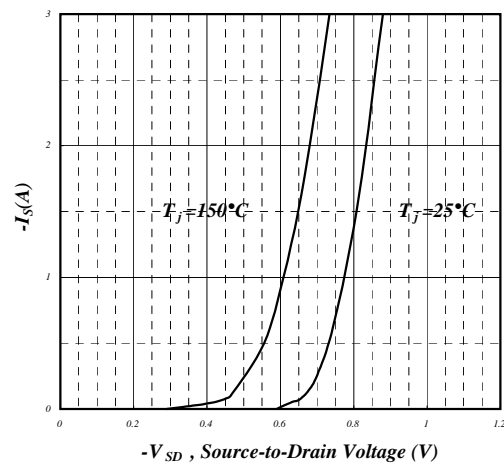


Fig 5. Forward Characteristic of Reverse Diode

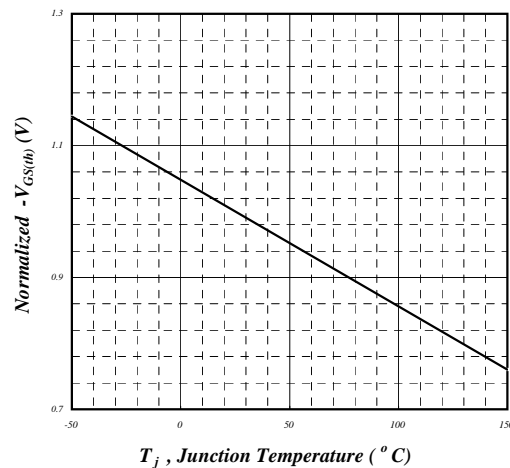


Fig 6. Gate Threshold Voltage vs. Junction Temperature

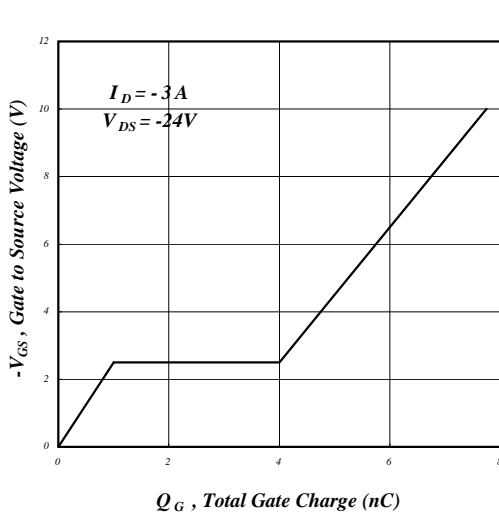


Fig 7. Gate Charge Characteristics

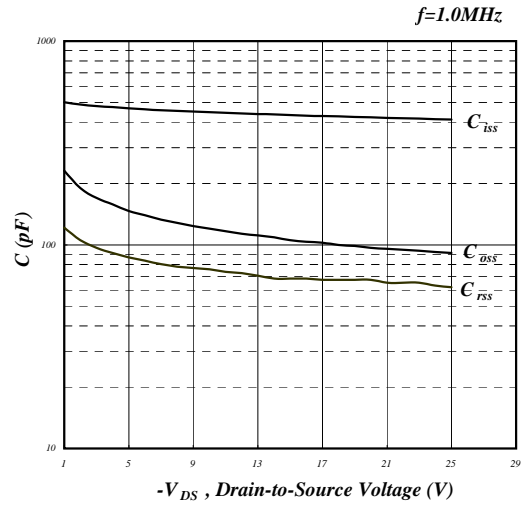


Fig 8. Typical Capacitance Characteristics

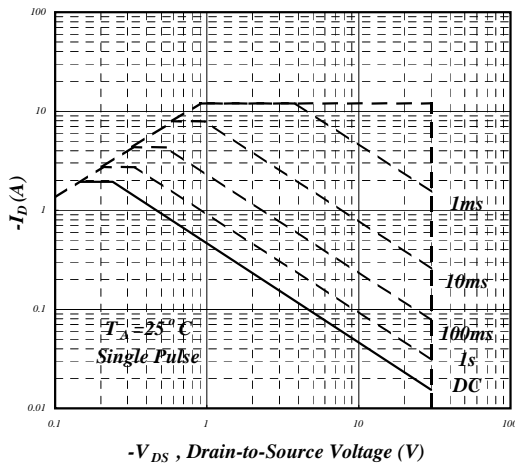


Fig 9. Maximum Safe Operating Area

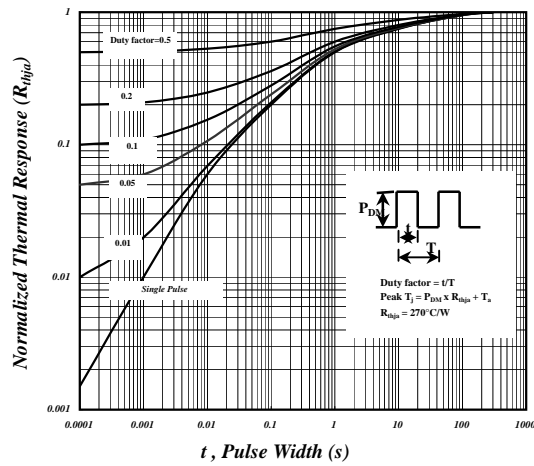


Fig 10. Effective Transient Thermal Impedance

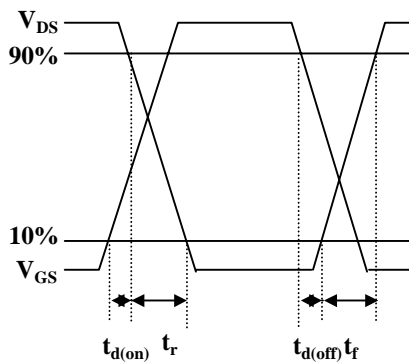


Fig 11. Switching Time Circuit

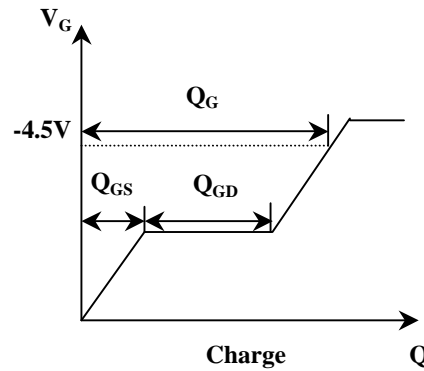


Fig 12. Gate Charge Circuit

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