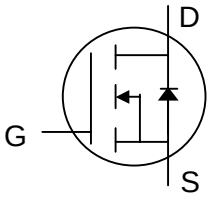
N-channel Enhancement-mode Power MOSFET

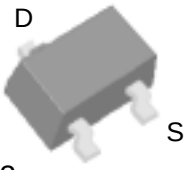
- Low gate-charge
- Simple drive requirement
- Fast switching
- **Pb-free; RoHS compliant.**



BV_{DSS}	20V
$R_{DS(ON)}$	50mΩ
I_D	4.3A

DESCRIPTION

The SSM2312GN is in a SOT-23-3 package, which is widely used for lower power commercial and industrial surface mount applications. This device is suitable for low-voltage applications such as DC/DC converters and and general switching applications.



SOT-23-3

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D @ T_A=25°C	Continuous Drain Current[3]	4.3	A
I_D @ T_A=70°C	Continuous Drain Current[3]	3.4	A
I_{DM}	Pulsed Drain Current[1,2]	10	A
P_D @ T_A=25°C	Total Power Dissipation	1.38	W
	Linear Derating Factor	0.01	W/°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

THERMAL DATA

Symbol	Parameter	Value	Unit
$R_{\Theta JA}$	Maximum Thermal Resistance, Junction-ambient[3]	90	°C/W

ELECTRICAL CHARACTERISTICS (at Tj = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	20	-	-	V
$\Delta BV_{DSS}/\Delta Tj$	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I_D=1mA	-	0.02	-	V/°C
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=5A	-	-	36	mΩ
		V_{GS}=4.5V, I_D=4A	-	-	50	mΩ
		V_{GS}=2.5V, I_D=3A	-	-	75	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	0.5	-	1.2	V
g_{fs}	Forward Transconductance	V_{DS}=5V, I_D=4A	-	16	-	S
I_{DSS}	Drain-Source Leakage Current (T_j=25°C)	V_{DS}=20V, V_{GS}=0V	-	-	1	uA
	Drain-Source Leakage Current (T_j=70°C)	V_{DS}=16V ,V_{GS}=0V	-	-	10	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±12V	-	-	±100	nA
Q_g	Total Gate Charge[2]	I_D=4A	-	5	8	nC
Q_{gs}	Gate-Source Charge	V_{DS}=16V	-	1	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	2.3	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=15V	-	8	-	ns
t_r	Rise Time	I_D=1A	-	9	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω , V_{GS}=5V	-	11	-	ns
t_f	Fall Time	R_D=15Ω	-	2	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	360	580	pF
C_{oss}	Output Capacitance	V_{DS}=20V	-	75	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	60	-	pF
R_g	Gate Resistance	f=1.0MHz	-	1.5	-	Ω

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	I_S=4A, V_{GS}=0V,	-	16	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	8	-	nC

Notes:

1.Pulse width limited by maximum junction temperature.

2.Pulse width ≤300us, duty cycle ≤2%.

3.Surface-mounted on 1 in^2 copper pad on FR4 board , t ≤10sec ; 270°C/W when mounted on minimum copper pad.

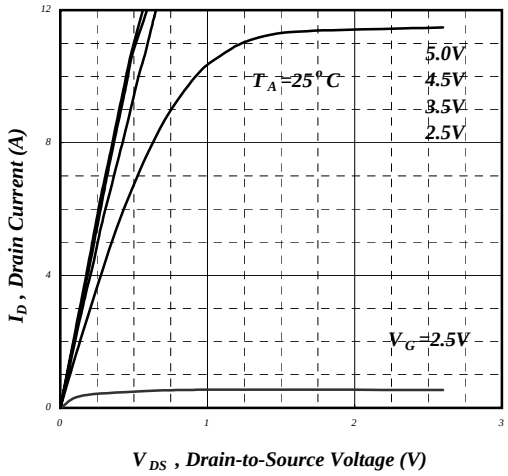


Fig 1. Typical Output Characteristics

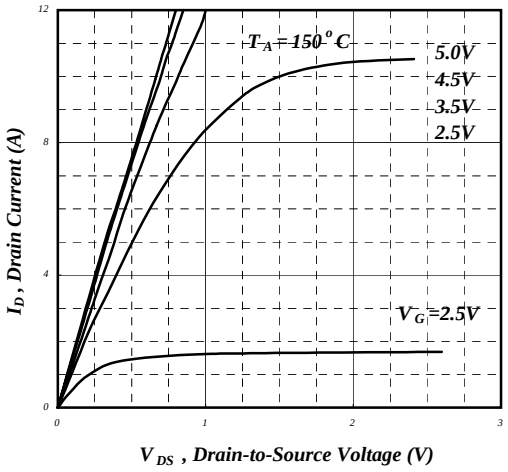


Fig 2. Typical Output Characteristics

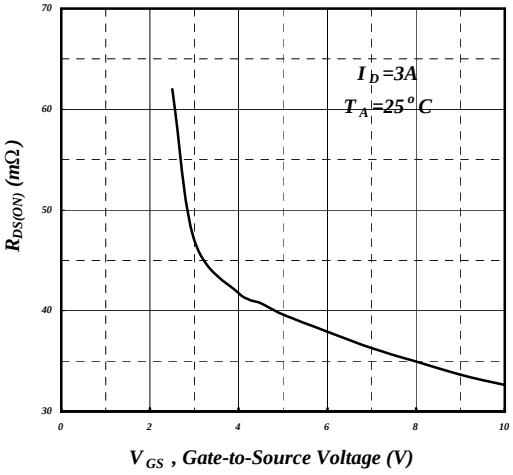


Fig 3. On-Resistance vs. Gate Voltage

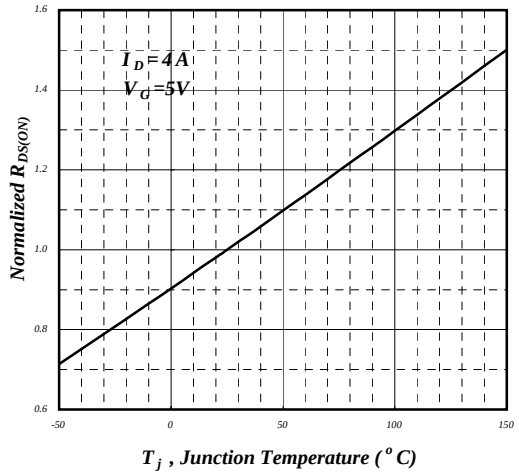


Fig 4. Normalized On-Resistance vs. Junction Temperature

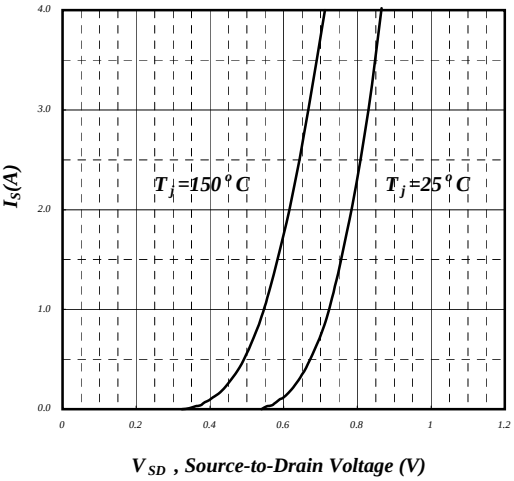


Fig 5. Forward Characteristic of Reverse Diode

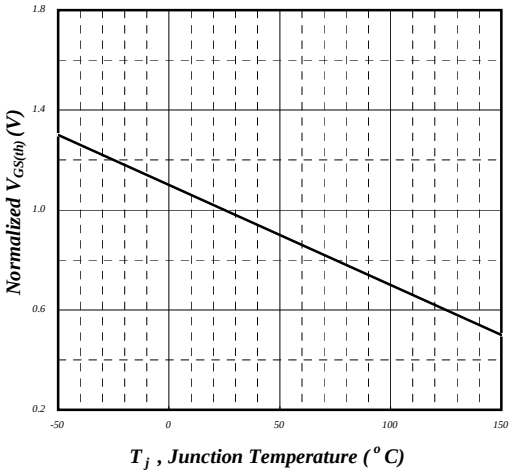


Fig 6. Gate Threshold Voltage vs. Junction Temperature

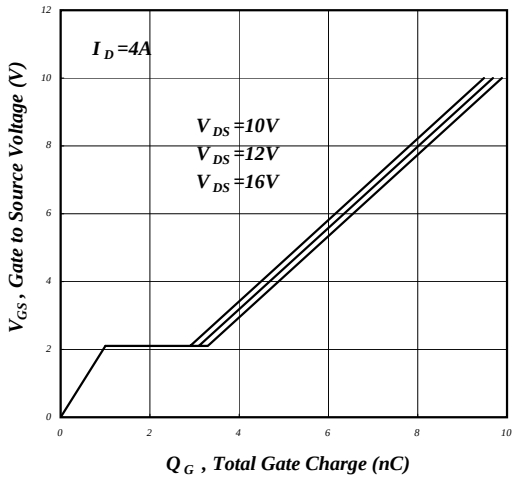


Fig 7. Gate Charge Characteristics

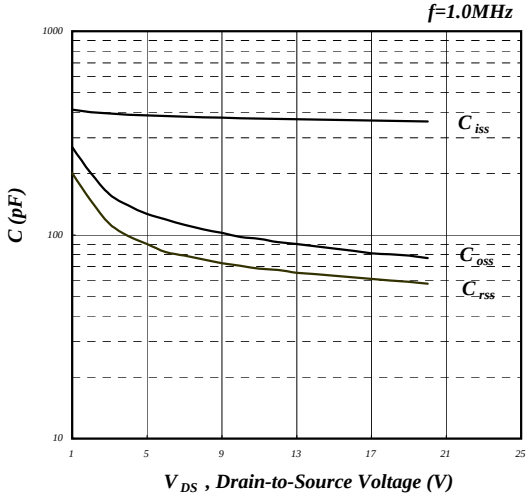


Fig 8. Typical Capacitance Characteristics

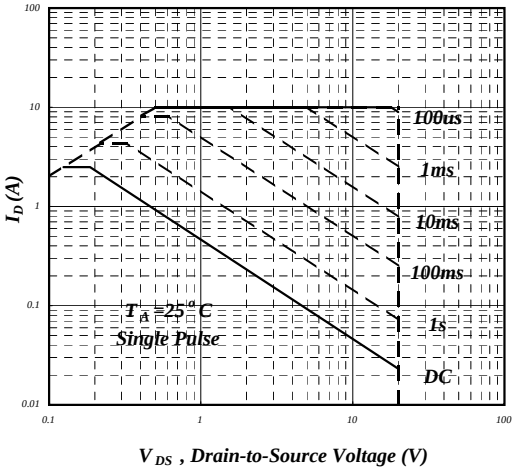


Fig 9. Maximum Safe Operating Area

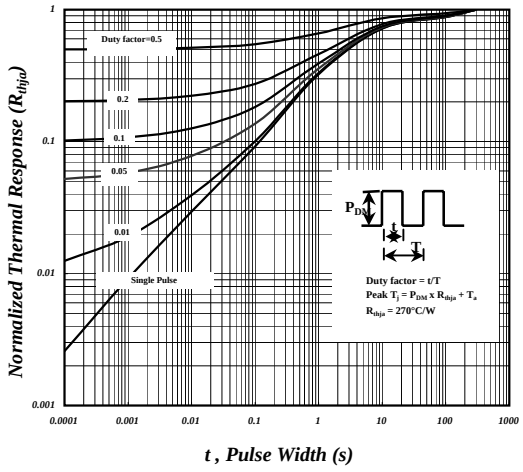


Fig 10. Effective Transient Thermal Impedance

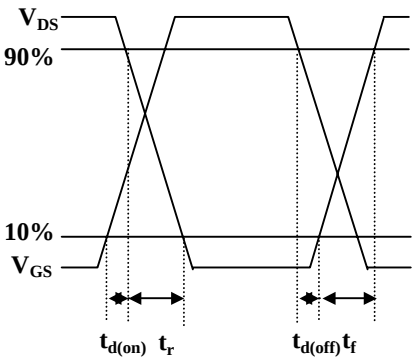


Fig 11. Switching Time Circuit

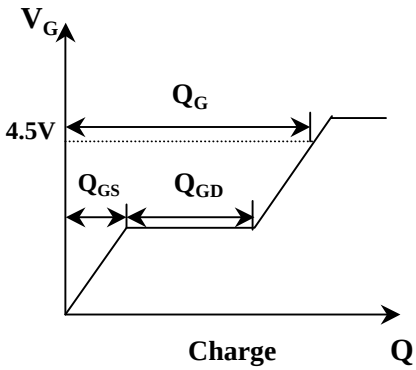


Fig 12. Gate Charge Circuit

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