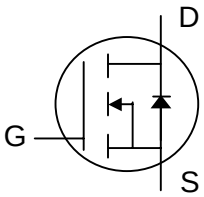
N-CHANNEL ENHANCEMENT-MODE POWER MOSFET

Low gate-charge

Simple drive requirement

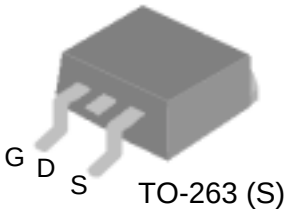
Fast switching



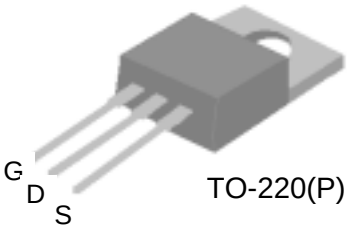
BV_{DSS}	60V
$R_{DS(ON)}$	18mΩ
I_D	60A

Description

The SSM9972GS is in a TO-263 package, which is widely used for commercial and industrial surface mount applications, and is well suited for low voltage applications such as DC/DC converters. The through-hole version, the SSM9972GP in TO-220, is available for low-footprint vertical mounting. These devices are manufactured with an advanced process, providing improved on-resistance and switching performance.



TO-263 (S)



TO-220(P)

Pb-free lead finish (second-level interconnect)

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±25	V
I_D @ T_C=25°C	Continuous Drain Current, V_{GS} @ 10V[3]	60	A
I_D @ T_C=100°C	Continuous Drain Current, V_{GS} @ 10V	38	A
I_{DM}	Pulsed Drain Current[1]	230	A
P_D @ T_C=25°C	Total Power Dissipation	89	W
	Linear Derating Factor	0.7	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	Units
Rthj-c	Thermal Resistance Junction-case	Max.	1.4	°C/W
Rthj-a	Thermal Resistance Junction-ambient	Max.	62	°C/W

Electrical Characteristics @ T_j=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	60	-	-	V
$\Delta BV_{DSS}/\Delta Tj$	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I_D=1mA	-	0.06	-	V/°C
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=35A	-	-	18	mΩ
		V_{GS}=4.5V, I_D=25A	-	-	22	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1	-	3	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=35A	-	55	-	S
I_{DSS}	Drain-Source Leakage Current (T_j=25°C)	V_{DS}=60V, V_{GS}=0V	-	-	10	uA
	Drain-Source Leakage Current (T_j=150°C)	V_{DS}=48V ,V_{GS}=0V	-	-	25	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±25V	-	-	±100	nA
Q_g	Total Gate Charge[2]	I_D=35A	-	32	51	nC
Q_{gs}	Gate-Source Charge	V_{DS}=48V	-	8	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	20	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=30V	-	11	-	ns
t_r	Rise Time	I_D=35A	-	58	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω,V_{GS}=10V	-	45	-	ns
t_f	Fall Time	R_D=0.86Ω	-	80	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	3170	5070	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	280	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	230	-	pF
R_g	Gate Resistance	f=1.0MHz	-	1.7	-	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=35A, V_{GS}=0V	-	-	1.2	V
t_{rr}	Reverse Recovery Time	I_S=35A, V_{GS}=0V,	-	50	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	48	-	nC

Notes:

1.Pulse width limited by max. junction temperature.

2.Pulse width ≤300us , duty cycle ≤2%.

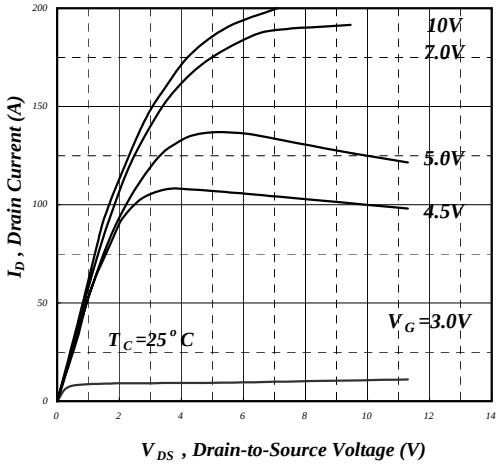


Fig 1. Typical Output Characteristics

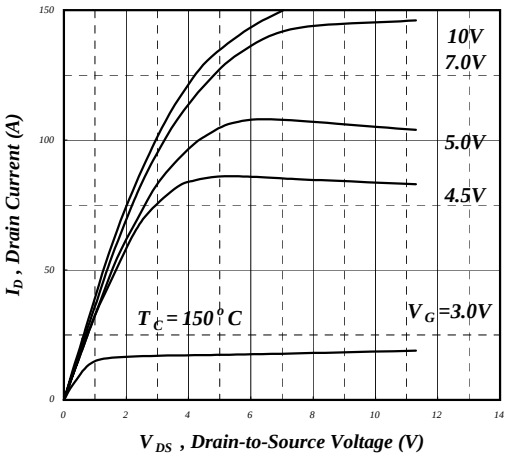


Fig 2. Typical Output Characteristics

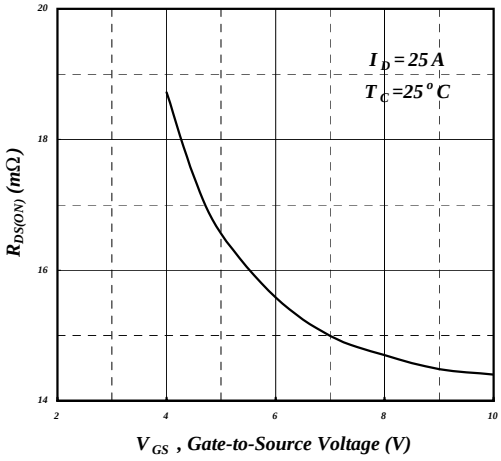


Fig 3. On-Resistance v.s. Gate Voltage

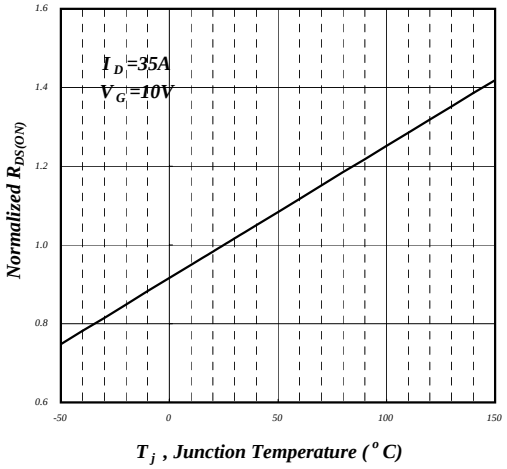


Fig 4. Normalized On-Resistance vs. Junction Temperature

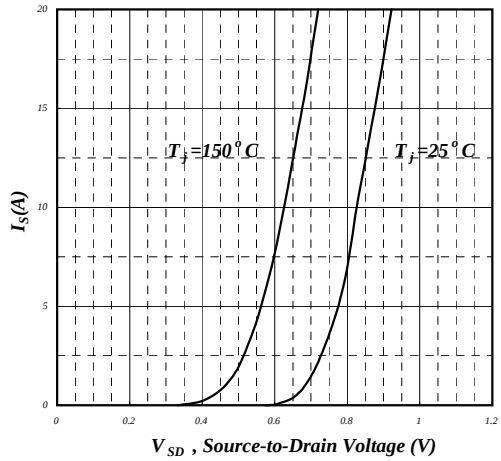


Fig 5. Forward Characteristic of Reverse Diode

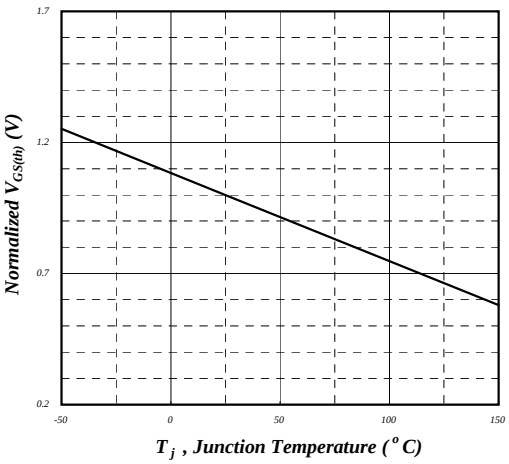


Fig 6. Gate Threshold Voltage vs. Junction Temperature

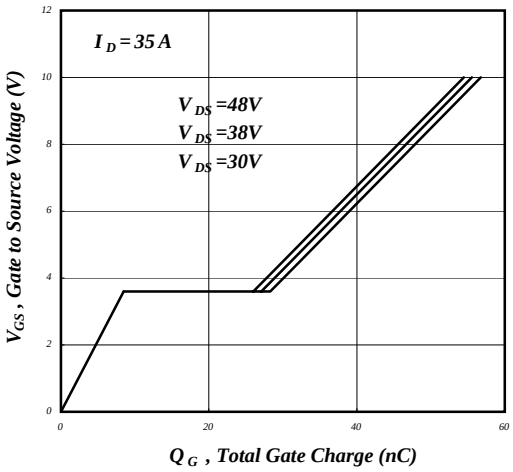


Fig 7. Gate Charge Characteristics

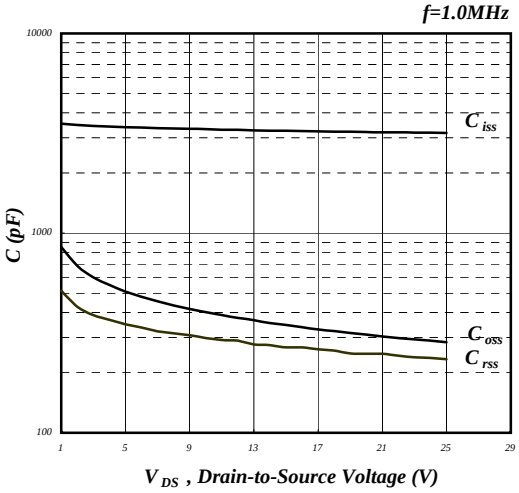


Fig 8. Typical Capacitance Characteristics

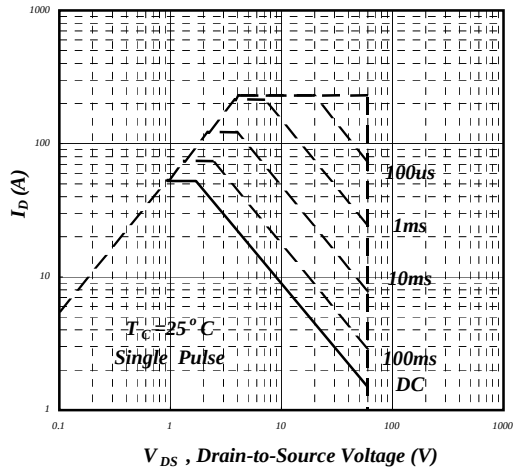


Fig 9. Maximum Safe Operating Area

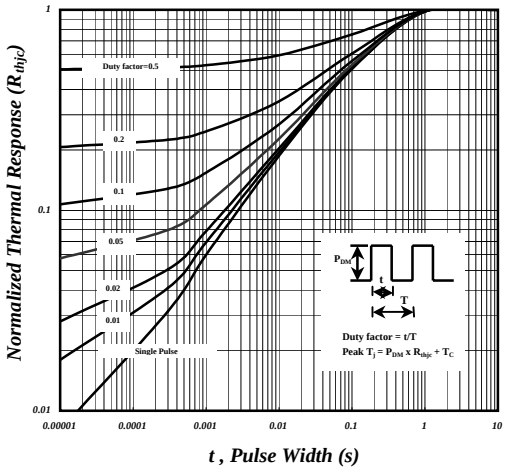


Fig 10. Effective Transient Thermal Impedance

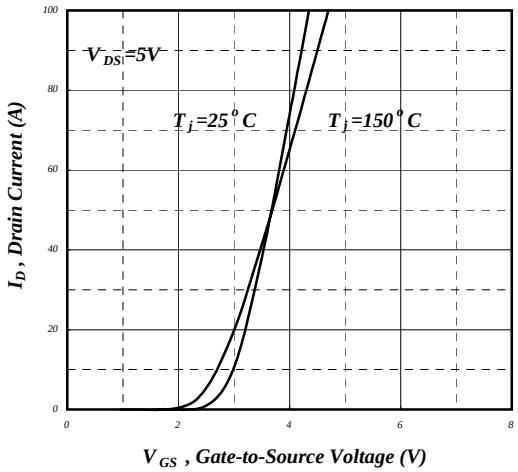


Fig 11. Transfer Characteristics

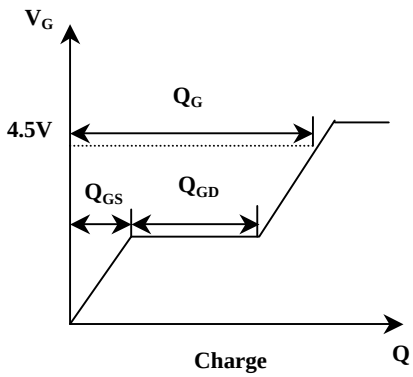


Fig 12. Gate Charge Waveform