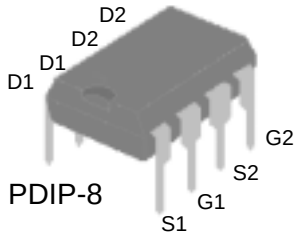
Dual N-channel Enhancement-mode Power MOSFETs

PRODUCT SUMMARY

BV_{DSS}	60V
$R_{DS(ON)}$	50mΩ
I_D	5A

Pb-free; RoHS-compliant SO-8



DESCRIPTION

The SSM9971GD acheives fast switching performance with low gate charge without a complex drive circuit. It is suitable for low voltage applications such as DC/DC converters and general load-switching circuits.

The SSM2310GD is supplied in an RoHS-compliant PDIP-8 package, which is widely used for medium power commercial and industrial applications, where through-hole insertion into the board is required.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Units
V_{DS}	Drain-source voltage	60	V
V_{GS}	Gate-source voltage	± 25	V
I_D	Continuous drain current [3], T_A = 25°C	5	A
	T_A = 70°C	3.2	A
I_{DM}	Pulsed drain current [1,2]	20	A
P_D	Total power dissipation [3], T_A = 25°C	2	W
	Linear derating factor	0.016	W/°C
T_{STG}	Storage temperature range	-55 to 150	°C
T_J	Operating junction temperature range	-55 to 150	°C

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Units
$R_{\Theta JA}$	Maximum thermal resistance, junction-ambient[3]	62.5	°C/W

Notes:

1.Pulse width must be limited to avoid exceeding the maximum junction temperature of 150°C.

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

3.Mounted on a square inch of copper pad on FR4 board; 90°C/W when mounted on the minimum pad area required for soldering.

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	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=5A	-	-	50	mΩ
		V_{GS}=4.5V, I_D=2.5A	-	-	60	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=5A	-	7	-	S
I_{DSS}	Drain-source leakage current	V_{DS}=60V, V_{GS}=0V	-	-	1	uA
		V_{DS}=48V ,V_{GS}=0V, Tj = 70°C	-	-	25	uA
I_{GSS}	Gate-source leakage current	V_{GS}=±25V	-	-	±100	nA
Q_g	Total gate charge [2]	I_D=5A	-	32.5	-	nC
Q_{gs}	Gate-source charge	V_{DS}=48V	-	4.9	-	nC
Q_{gd}	Gate-drain ("Miller") charge	V_{GS}=10V	-	8.8	-	nC
$t_{d(on)}$	Turn-on delay time [2]	V_{DS}=30V	-	9.6	-	ns
t_r	Rise time	I_D=5A	-	10	-	ns
$t_{d(off)}$	Turn-off delay time	R_G=3.3Ω , V_{GS}=10V	-	30	-	ns
t_f	Fall time	R_D=6Ω	-	5.5	-	ns
C_{iss}	Input capacitance	V_{GS}=0V	-	1560	-	pF
C_{oss}	Output capacitance	V_{DS}=25V	-	156	-	pF
C_{rss}	Reverse transfer capacitance	f=1.0MHz	-	110	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward voltage [2]	I_S=1.6A, V_{GS}=0V	-	-	1.2	V
t_{rr}	Reverse-recovery time	I_S=5A, V_{GS}=0V,	-	29.2	-	ns
Q_{rr}	Reverse-recovery charge	dI/dt=100A/μs	-	48	-	nC

Notes:

1.Pulse width must be limited to avoid exceeding the maximum junction temperature of 150°C.

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

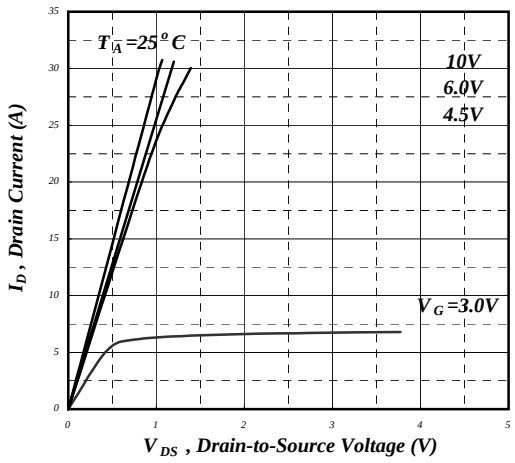


Fig 1. Typical output characteristics

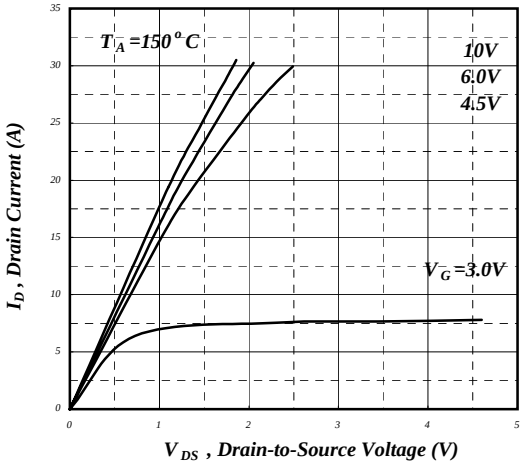


Fig 2. Typical output characteristics

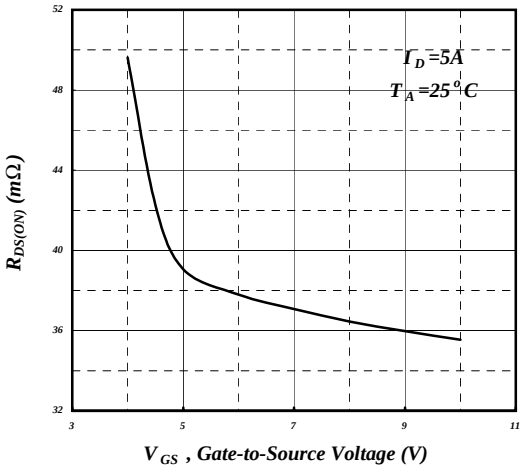


Fig 3. On-resistance vs. gate voltage

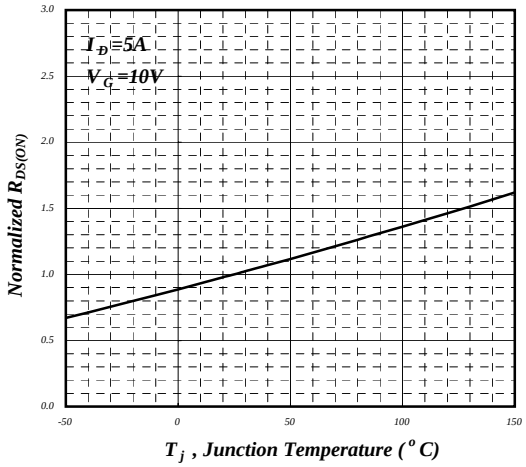


Fig 4. Normalized on-resistance vs. junction temperature

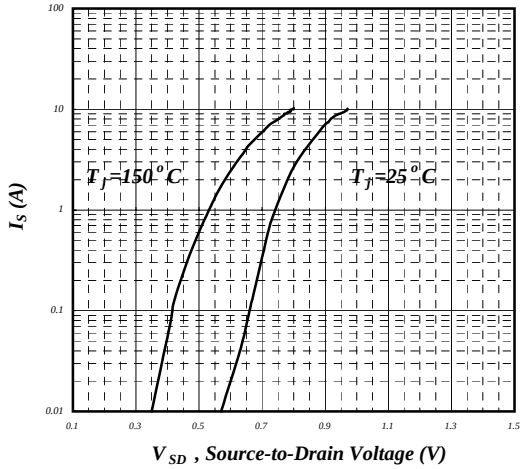


Fig 5. Forward characteristic of the reverse diode

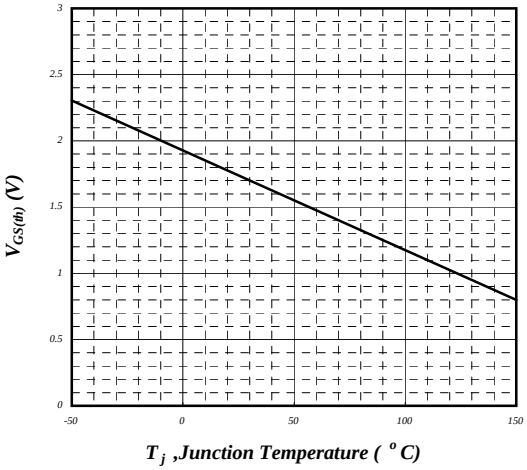


Fig 6. Gate threshold voltage vs. junction temperature

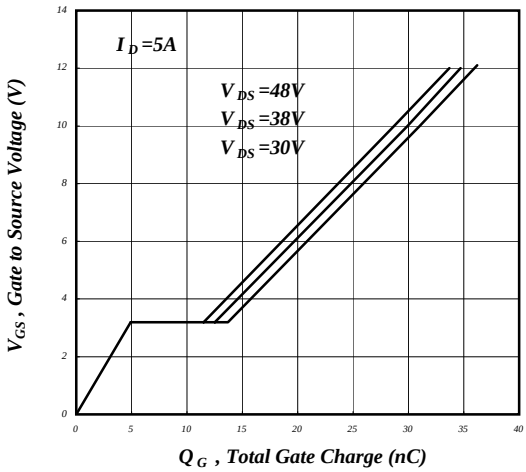


Fig 7. Gate charge characteristics

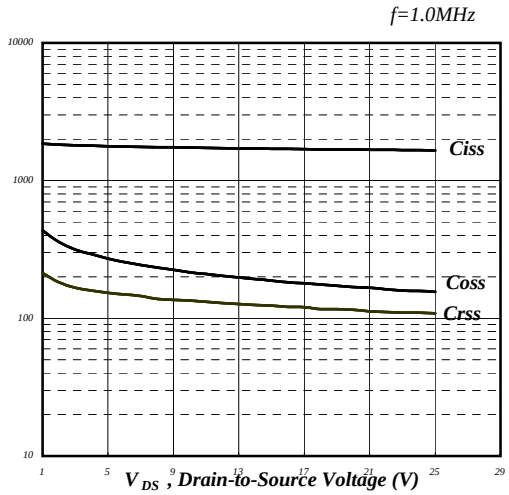


Fig 8. Typical capacitance characteristics

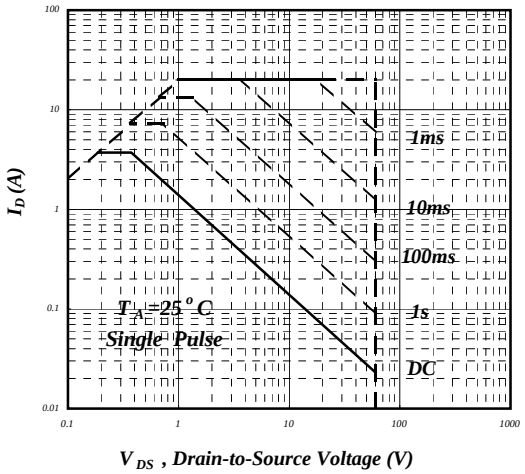


Fig 9. Maximum safe operating area

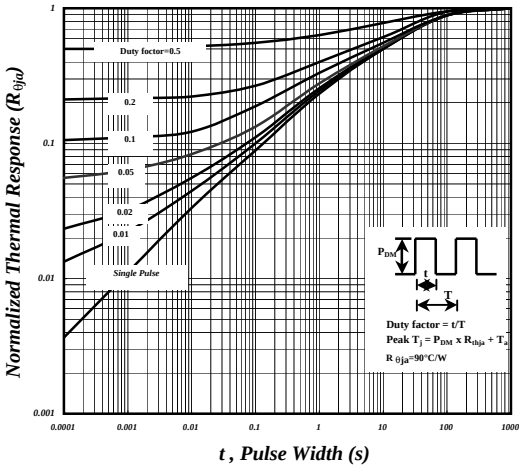


Fig 10. Effective transient thermal impedance

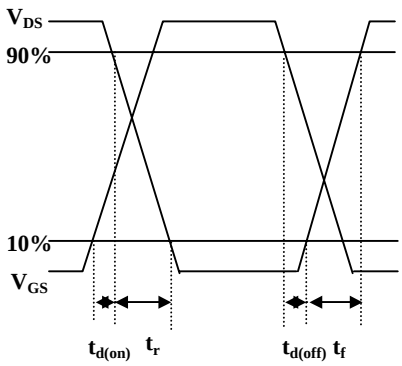


Fig 11. Switching time waveforms

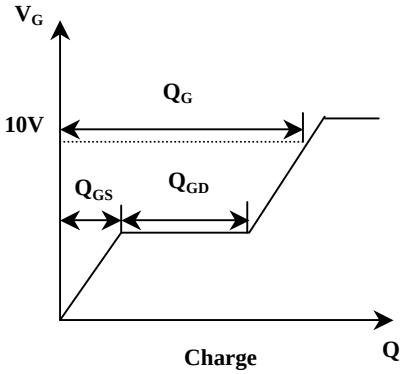
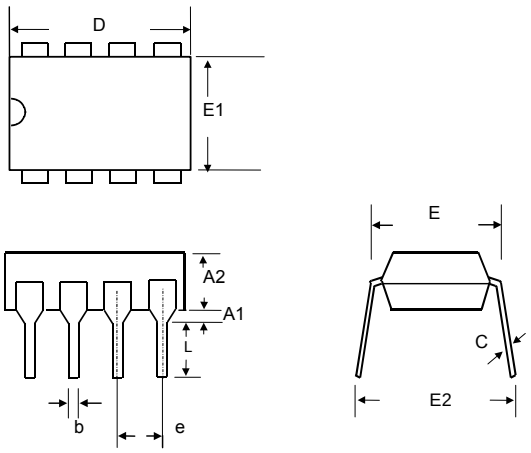


Fig 12. Gate charge diagram

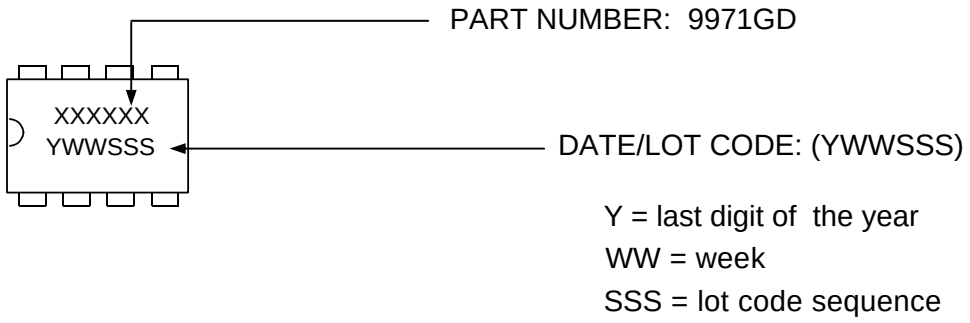
PHYSICAL DIMENSIONS



SYMBOL	MIN	MAX
A1	0.38	—
A2	2.90	5.00
b	0.35	0.56
C	0.20	0.36
D	9.00	10.20
E	7.62	8.26
E1	6.09	7.20
e	2.54 (TYP)	
E2	8.3	11.00
L	2.92	—

All dimensions in millimeters.
Dimensions do not include mold protrusions.

PART MARKING



PACKING: Moisture sensitivity level MSL1

50 pcs in antistatic tube, 20 tubes (1000 pieces) per box.