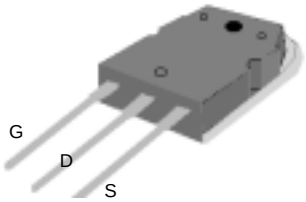
N-channel Enhancement-mode Power MOSFET

PRODUCT SUMMARY

BV_{DSS}	900V
$R_{DS(ON)}$	1.2Ω
I_D	8.6A

Pb-free; RoHS-compliant TO-247



TO-247 (suffix W)

DESCRIPTION

The SSM09N90GW acheives fast switching performance with low gate charge without a complex drive circuit. It is suitable for high voltage applications such as AC/DC converters and offline power supplies.

The SSM09N90GW is in a TO-247 (TO-3P) package, which is widely used for commercial and industrial applications, where the greater pin spacing is needed to meet safety specifications. The through-hole package is suitable for vertical mounting, where a small footprint is required on the board, and/or an external heatsink is to be attached.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Units
V_{DS}	Drain-source voltage	900	V
V_{GS}	Gate-source voltage	±30	V
I_D	Continuous drain current, T_C = 25°C	8.6	A
	T_C = 100°C	5	A
I_{DM}	Pulsed drain current[1]	30	A
P_D	Total power dissipation, T_C = 25°C	240	W
	Linear derating factor	1.92	W/°C
E_{AS}	Single pulse avalanche energy[3]	92	mJ
I_{AS}	Avalanche current	5.2	A
E_{AR}	Repetitive avalanche energy	8.6	mJ
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
$R_{\Theta JC}$	Maximum thermal resistance, junction-case	0.52	°C/W
$R_{\Theta JA}$	Maximum thermal resistance, junction-ambient	40	°C/W

Notes:

1. Pulse width must be limited to avoid exceeding the safe operating area.
2. Pulse width <300us, duty cycle <2%.
3. Starting Tj=25°C, V_{DD}=50V , L=6.8mH , R_G=25Ω , I_{AS}=5.2A.

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=1mA	900	-	-	V
$\Delta BV_{DSS}/\Delta Tj$	Breakdown voltage temperature coefficient	Reference to 25°C, I_D=1mA	-	0.67	-	V/°C
$R_{DS(ON)}$	Static drain-source on-resistance	V_{GS}=10V, I_D=4.5A	-	-	1.2	Ω
$V_{GS(th)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2	-	4	V
g_{fs}	Forward transconductance	V_{DS}=10V, I_D=4.5A	-	11.5	-	S
I_{DSS}	Drain-source leakage current	V_{DS}=900V, V_{GS}=0V	-	-	10	uA
		V_{DS}=720V ,V_{GS}=0V, Tj = 125°C	-	-	100	uA
I_{GSS}	Gate-source leakage current	V_{GS}=±30V	-	-	±100	nA
Q_g	Total gate charge [2]	I_D=8.6A	-	67.1	120	nC
Q_{gs}	Gate-source charge	V_{DS}=540V	-	17	-	nC
Q_{gd}	Gate-drain ("Miller") charge	V_{GS}=10V	-	19.9	-	nC
$t_{d(on)}$	Turn-on delay time [2]	V_{DS}=450V	-	25.8	-	ns
t_r	Rise time	I_D=5A	-	10.3	-	ns
$t_{d(off)}$	Turn-off delay time	R_G=10Ω , V_{GS}=10V	-	305	-	ns
t_f	Fall time	R_D=90Ω	-	536	-	ns
C_{iss}	Input capacitance	V_{GS}=0V	-	4087	6000	pF
C_{oss}	Output capacitance	V_{DS}=25V	-	221	-	pF
C_{rss}	Reverse transfer capacitance	f=1.0MHz	-	51	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward voltage [2]	I_S=8.6A, V_{GS}=0V	-	-	1.5	V
I_S	Continuous source current (body diode)	V_D=V_G=0V, V_S=1.5V		-	8.6	A
I_{SM}	Pulsed source current (body diode)[1]		-	-	3	A

Notes:

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

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

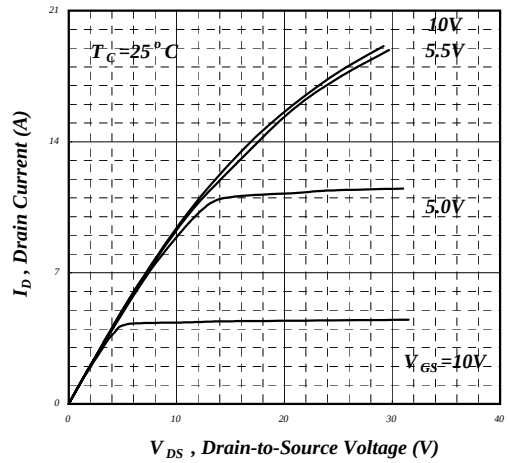


Fig 1. Typical Output Characteristics

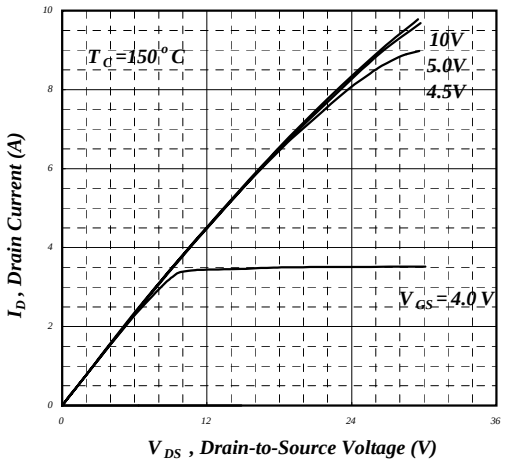


Fig 2. Typical Output Characteristics

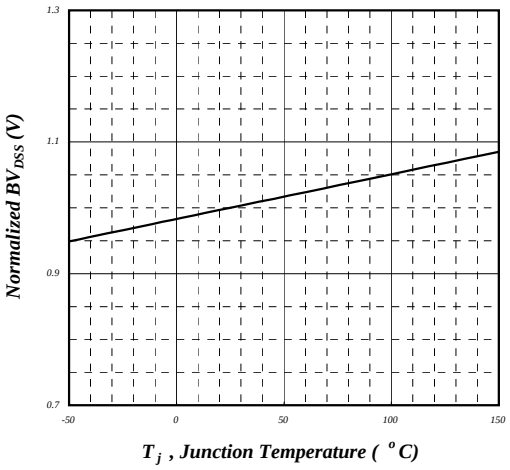


Fig 3. Normalized BVD_{SS} vs. Junction Temperature

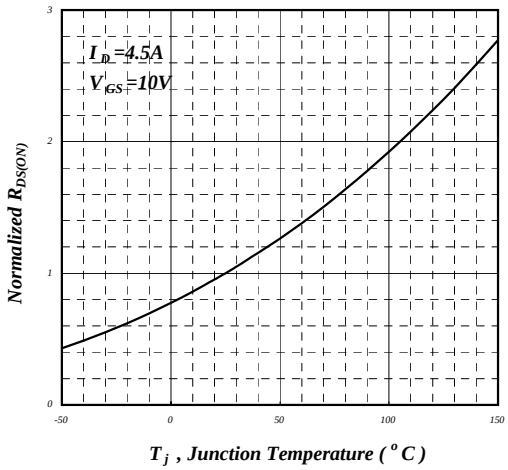


Fig 4. Normalized On-Resistance vs. Junction Temperature

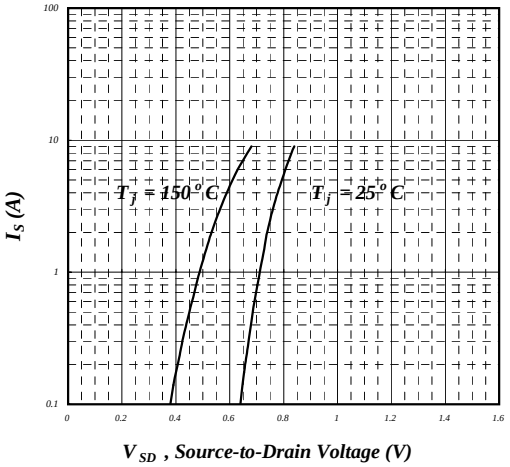


Fig 5. Forward Characteristic of Reverse Diode

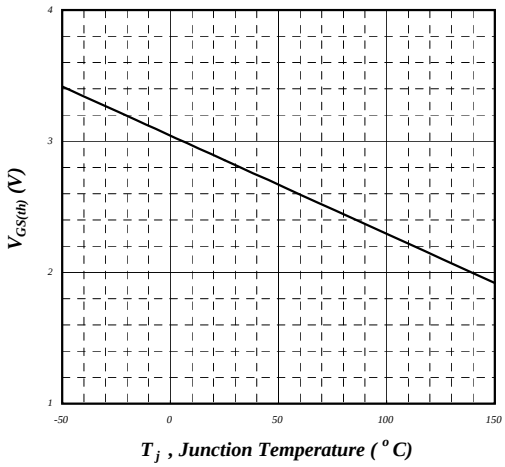


Fig 6. Gate Threshold Voltage vs. Junction Temperature

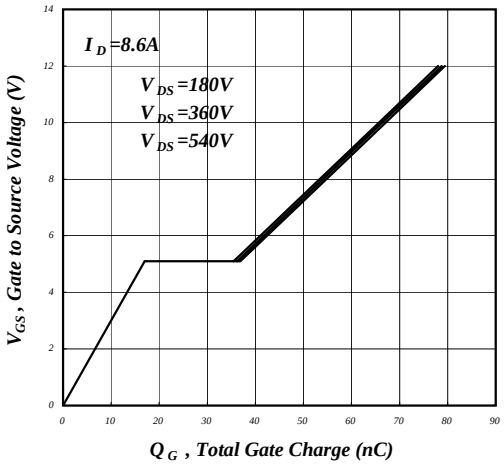


Fig 7. Gate Charge Characteristics

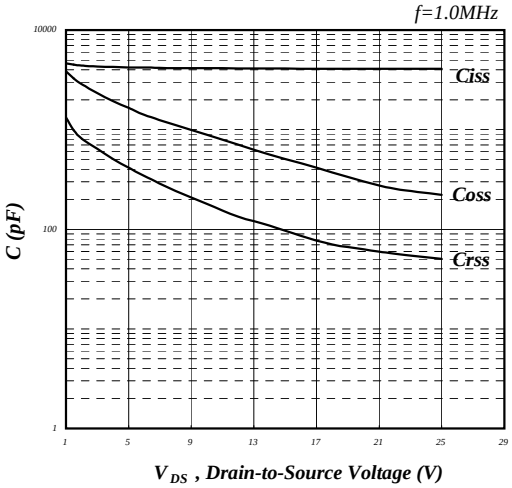


Fig 8. Typical Capacitance Characteristics

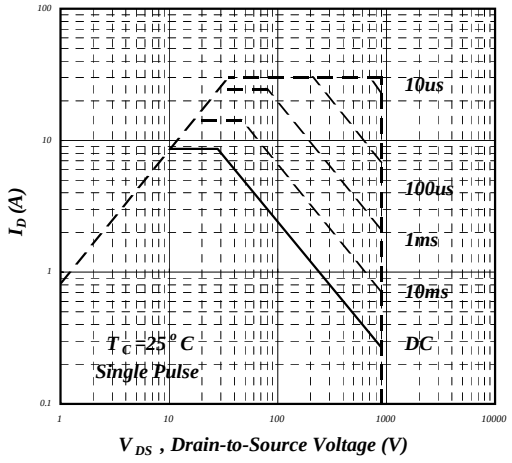


Fig 9. Maximum Safe Operating Area

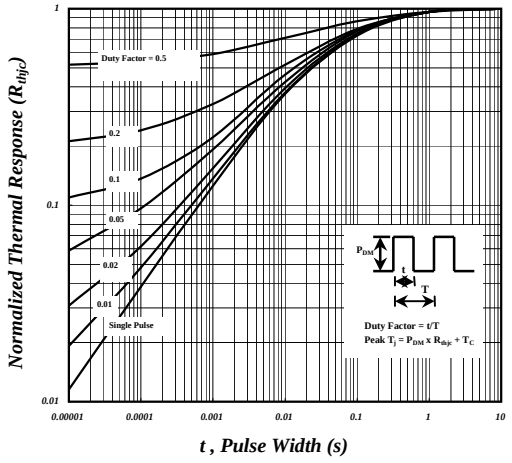


Fig 10. Effective Transient Thermal Impedance

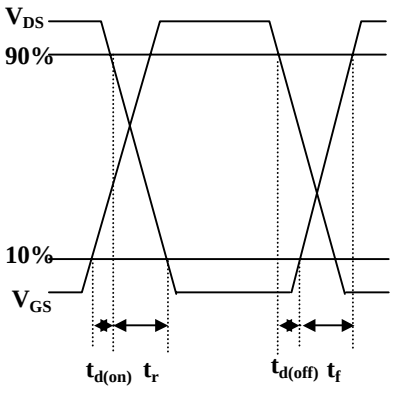


Fig 11. Switching Time Waveform

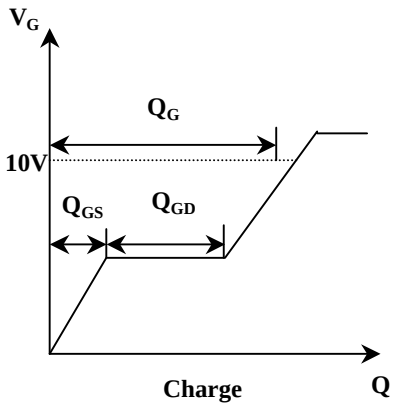
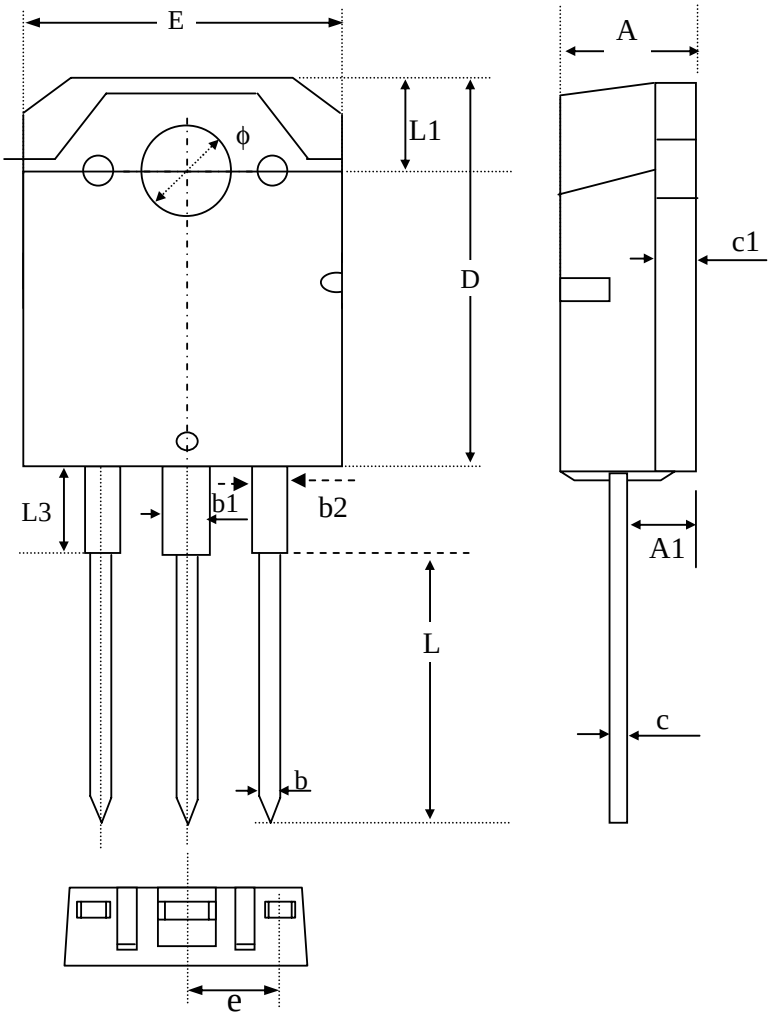


Fig 12. Gate Charge Waveform

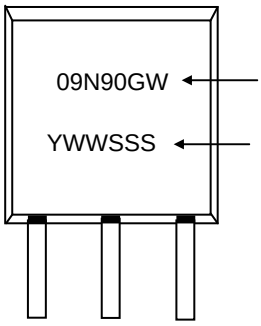
PHYSICAL DIMENSIONS - TO-247



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.60	4.80	5.00
A1	1.20	1.40	1.60
b	0.80	1.00	1.20
b1	2.80	3.00	3.20
b2	1.80	2.00	2.20
c	0.55	0.60	0.75
c1	1.45	1.50	1.65
D	19.70	19.90	20.10
E	15.40	15.60	15.80
e	5.15	5.45	5.75
L	16.20	16.50	16.80
L1	3.60	3.80	4.00
L3	3.30	3.50	3.70

1. All dimensions are in millimeters.
2. Dimensions do not include mold protrusions.

PART MARKING - TO-247



PART NUMBER: 09N90GW = SSM09N90GW

DATE/LOT CODE:

Y = last digit of the year

WW = work week (01 -> 52)

SSS = lot code sequence

PACKING: Moisture sensitivity level MSL3

1000pcs in tubes packed inside a moisture barrier bag (MBB).