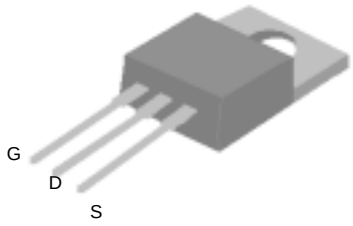
N-channel Enhancement-mode Power MOSFET

PRODUCT SUMMARY

BV_{DSS}	700V
$R_{DS(ON)}$	4.4Ω
I_D	2.5A

Pb-free; RoHS-compliant TO-220



TO-220 (suffix P)

DESCRIPTION

The SSM03N70GP-H achieves fast switching performance with low gate charge without a complex drive circuit. It is suitable for high voltage applications such as AC/DC converters, SMPS and general off-line switching circuits.

The SSM03N70GP-H is in TO-220 for through-hole mounting where a small footprint is required on the board, and/or an external heatsink is to be attached.

These devices are manufactured with an advanced process, providing improved on-resistance and switching performance.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Units
V_{DS}	Drain-source voltage	700	V
V_{GS}	Gate-source voltage	±30	V
I_D	Continuous drain current, T_C = 25°C	2.5	A
	T_C = 100°C	1.6	A
I_{DM}	Pulsed drain current[1]	8	A
P_D	Total power dissipation, T_C = 25°C	54	W
	Linear derating factor	0.44	W/°C
E_{AS}	Single pulse avalanche energy[3]	32	mJ
I_{AR}	Avalanche current	2.5	A
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	2.3	°C/W
$R_{\Theta JA}$	Maximum thermal resistance, junction-ambient	62	°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=1mH , R_G=25Ω , I_{AS}= 2.5A.

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	700	-	-	V
$\Delta BV_{DSS}/\Delta Tj$	Breakdown voltage temperature coefficient	Reference to 25°C, I_D=1mA	-	0.6	-	V/°C
$R_{DS(ON)}$	Static drain-source on-resistance	V_{GS}=10V, I_D=1.6A	-	-	4.4	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=1.6A	-	2	-	S
I_{DSS}	Drain-source leakage current	V_{DS}=600V, V_{GS}=0V	-	-	10	uA
		V_{DS}=480V ,V_{GS}=0V, T_j = 150°C	-	-	100	uA
I_{GSS}	Gate-source leakage current	V_{GS}=±30V	-	-	±100	nA
Q_g	Total gate charge [2]	I_D=1A	-	12	20	nC
Q_{gs}	Gate-source charge	V_{DS}=480V	-	3	-	nC
Q_{gd}	Gate-drain ("Miller") charge	V_{GS}=10V	-	4	-	nC
$t_{d(on)}$	Turn-on delay time [2]	V_{DS}=300V	-	8.5	-	ns
t_r	Rise time	I_D=2.5A	-	6	-	ns
$t_{d(off)}$	Turn-off delay time	R_G=10Ω , V_{GS}=10V	-	19	-	ns
t_f	Fall time	R_D=120Ω	-	8	-	ns
C_{iss}	Input capacitance	V_{GS}=0V	-	590	950	pF
C_{oss}	Output capacitance	V_{DS}=25V	-	50	-	pF
C_{rss}	Reverse transfer capacitance	f=1.0MHz	-	6	-	pF
R_g	Gate resistance	f=1.0MHz	-	3.4	5.1	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward voltage [2]	I_S= 2.5A, V_{GS}=0V	-	-	1.5	V
t_{rr}	Reverse recovery time	I_S=2.5A, V_{GS}=0V,	-	407	-	ns
Q_{rr}	Reverse recovery charge	dI/dt=100A/μs	-	2110	-	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%.

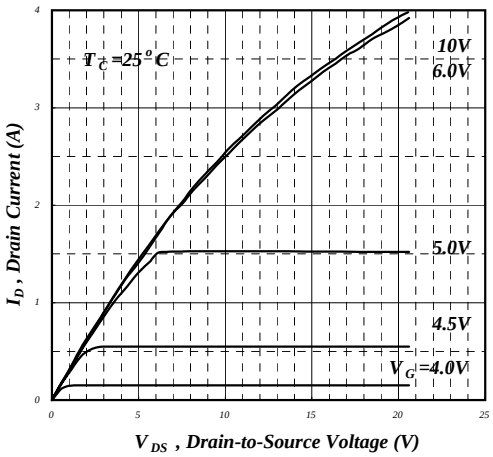


Fig 1. Typical Output Characteristics

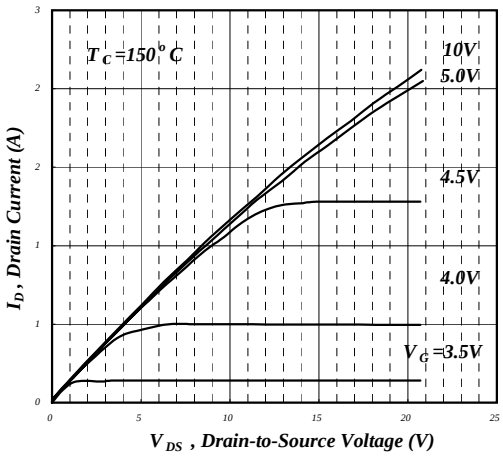


Fig 2. Typical Output Characteristics

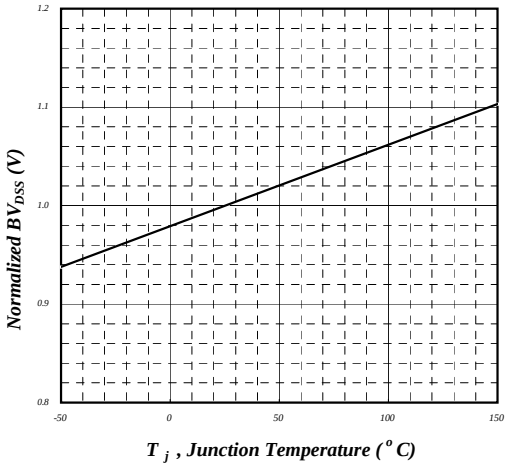


Fig 3. Normalized BV_{DSS} vs. Junction Temperature

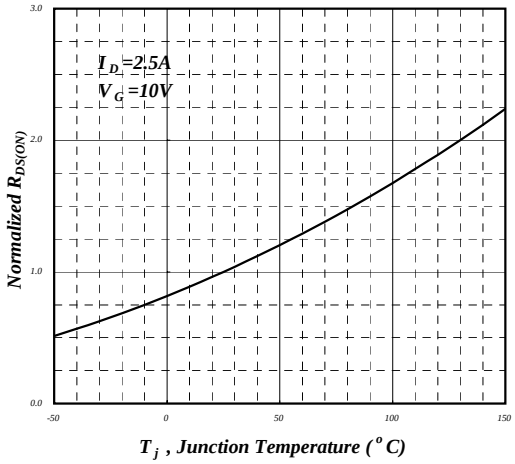


Fig 4. Normalized On-Resistance vs. Junction Temperature

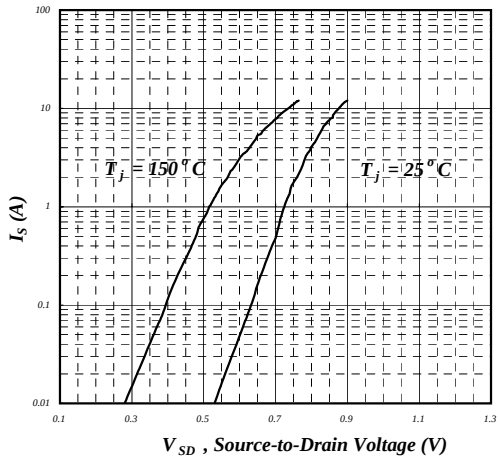


Fig 5. Forward Characteristic of Reverse Diode

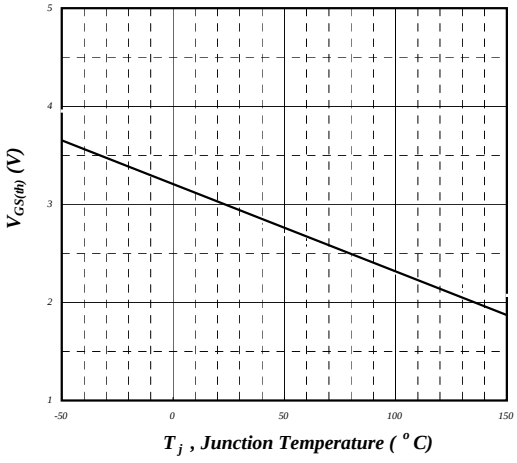


Fig 6. Gate Threshold Voltage vs. Junction Temperature

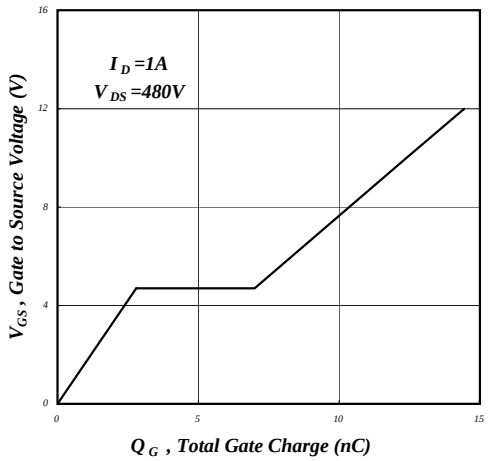


Fig 7. Gate Charge Characteristics

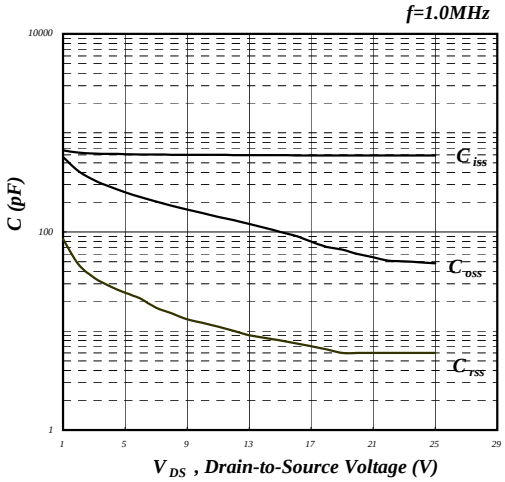


Fig 8. Typical Capacitance Characteristics

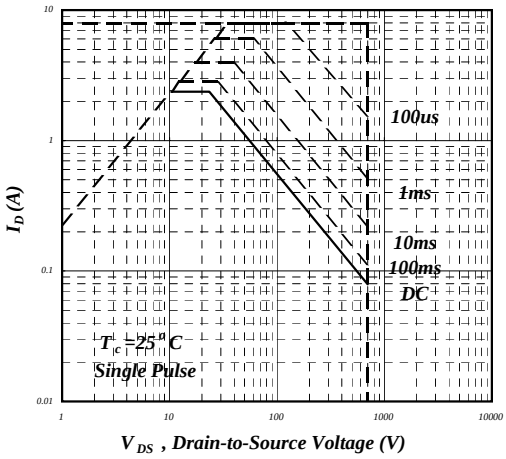


Fig 9. Maximum Safe Operating Area

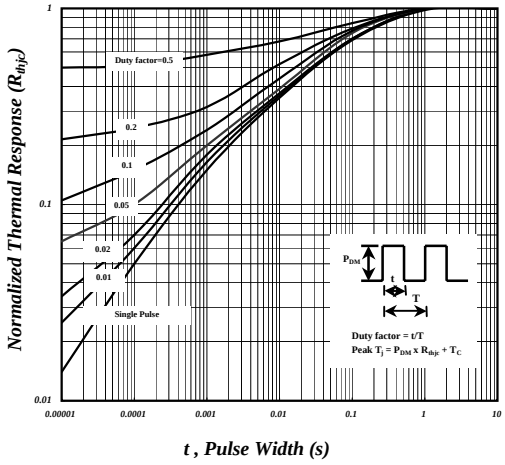


Fig 10. Effective Transient Thermal Impedance

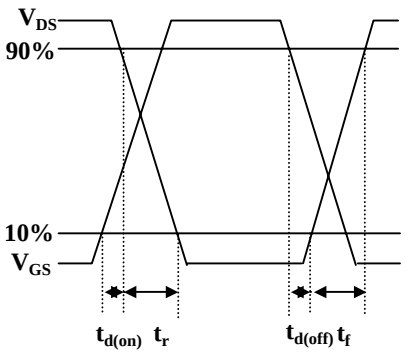


Fig 11. Switching Time Waveform

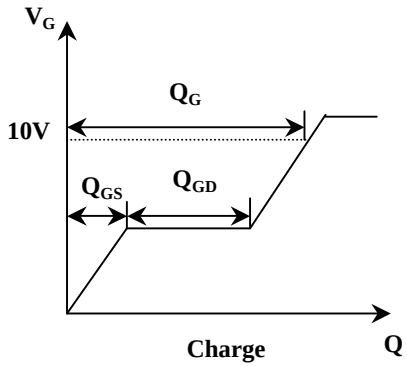
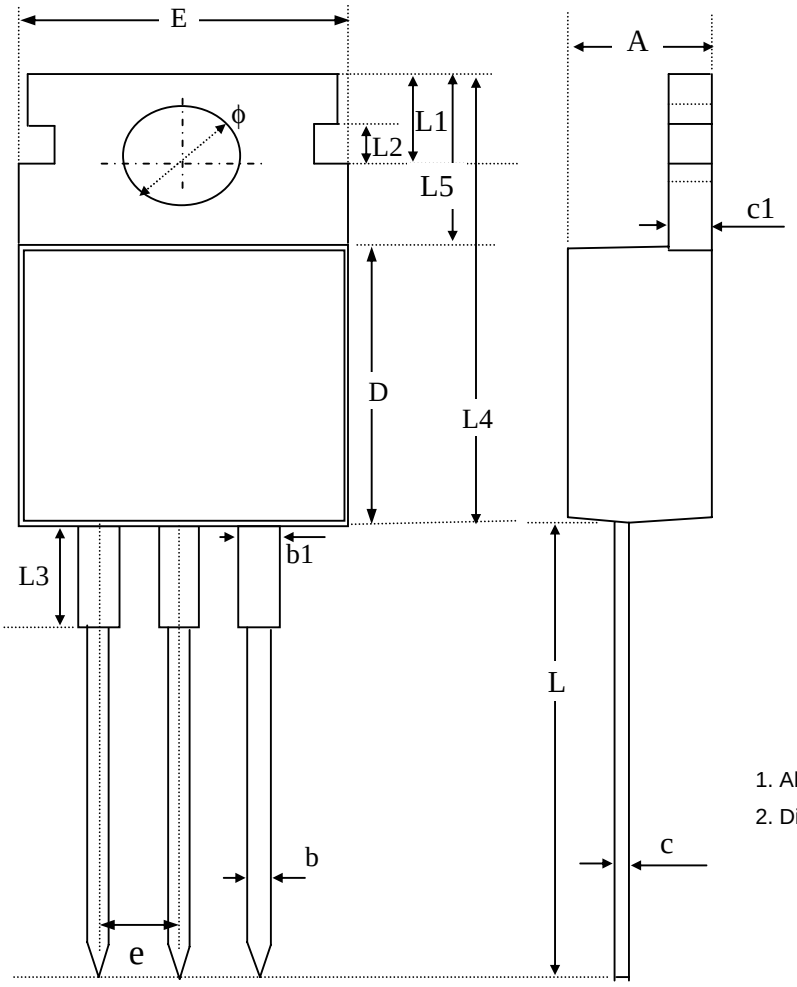


Fig 12. Gate Charge Waveform

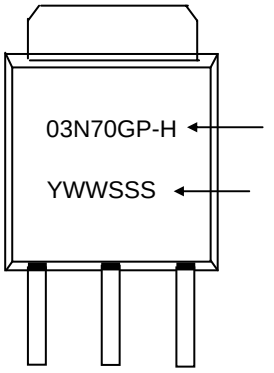
PHYSICAL DIMENSIONS - TO-220



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.25	4.48	4.70
b	0.65	0.80	0.90
b1	1.15	1.38	1.60
c	0.40	0.50	0.60
c1	1.00	1.20	1.40
E	9.70	10.00	10.40
e	----	2.54	----
L	12.70	13.60	14.50
L1	2.60	2.80	3.00
L2	1.00	1.40	1.80
L3	2.6	3.10	3.6
L4	14.70	15.50	16
L5	6.30	6.50	6.70
ϕ	3.50	3.60	3.70
D	8.40	8.90	9.40

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

PART MARKING - TO-220



PART NUMBER: 03N70GP-H = SSM03N70GP-H

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).