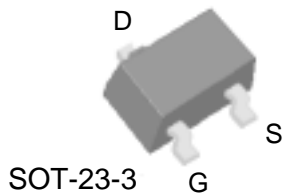


N-channel Enhancement-mode Power MOSFET

PRODUCT SUMMARY

BV_{DSS}	60V
$R_{DS(ON)}$	2 Ω
I_D	640mA

 **Pb-free; RoHS-compliant SOT-23-3**



DESCRIPTION

The SSM7002KGEN achieves 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 SSM7002KGEN is supplied in an RoHS-compliant SOT-23-3 package, which is widely used for lower power commercial and industrial surface mount applications.

The gate has internal ESD protection.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Units
V_{DS}	Drain-source voltage	60	V
V_{GS}	Gate-source voltage	± 20	V
I_D	Continuous drain current ³ , $T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$	640	mA
		500	mA
I_{DM}	Pulsed drain current ^{1,2}	950	mA
P_D	Total power dissipation ³ , $T_A = 25^\circ\text{C}$	1.38	W
	Linear derating factor	0.01	W/ $^\circ\text{C}$
T_{STG}	Storage temperature range	-55 to 150	$^\circ\text{C}$
T_J	Operating junction temperature range	-55 to 150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Units
$R_{\theta JA}$	Maximum thermal resistance, junction-ambient ³	90	$^\circ\text{C}/\text{W}$

Notes:

1. Pulse width must be limited to avoid exceeding the maximum junction temperature of 150 $^\circ\text{C}$.
2. Pulse width <300us, duty cycle <2%.
3. Mounted on a square inch of copper pad on FR4 board ; 270 $^\circ\text{C}/\text{W}$ when mounted on the minimum pad area required for soldering.

ELECTRICAL CHARACTERISTICS (at $T_j = 25^\circ\text{C}$, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-source breakdown voltage	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown voltage temperature coefficient	Reference to $25^\circ\text{C}, I_D=1\text{mA}$	-	0.06	-	V/ $^\circ\text{C}$
$R_{DS(ON)}$	Static drain-source on-resistance	$V_{GS}=10V, I_D=500\text{mA}$	-	-	2	Ω
		$V_{GS}=4.5V, I_D=200\text{mA}$	-	-	4	Ω
$V_{GS(th)}$	Gate threshold voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1	-	2.5	V
g_{fs}	Forward transconductance	$V_{DS}=10V, I_D=600\text{mA}$	-	0.6	-	S
I_{DSS}	Drain-source leakage current	$V_{DS}=60V, V_{GS}=0V$	-	-	10	μA
		$V_{DS}=48V, V_{GS}=0V, T_j = 70^\circ\text{C}$	-	-	100	μA
I_{GSS}	Gate-source leakage current	$V_{GS}=\pm 20V$	-	-	± 30	μA
Q_g	Total gate charge ²	$I_D=0.6A$	-	1	1.6	nC
Q_{gs}	Gate-source charge	$V_{DS}=50V$	-	0.5	-	nC
Q_{gd}	Gate-drain ("Miller") charge	$V_{GS}=4.5V$	-	0.5	-	nC
$t_{d(on)}$	Turn-on delay time ²	$V_{DS}=30V$	-	12	-	ns
t_r	Rise time	$I_D=0.6A$	-	10	-	ns
$t_{d(off)}$	Turn-off delay time	$R_G=3.3\Omega, V_{GS}=10V$	-	56	-	ns
t_f	Fall time	$R_D=52\Omega$	-	29	-	ns
C_{iss}	Input capacitance	$V_{GS}=0V$	-	32	50	pF
C_{oss}	Output capacitance	$V_{DS}=25V$	-	8	-	pF
C_{rss}	Reverse transfer capacitance	$f=1.0\text{MHz}$	-	6	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward voltage ²	$I_S=1.2A, V_{GS}=0V$	-	-	1.2	V

Notes:

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

2. Pulse width $<300\mu s$, duty cycle $<2\%$.

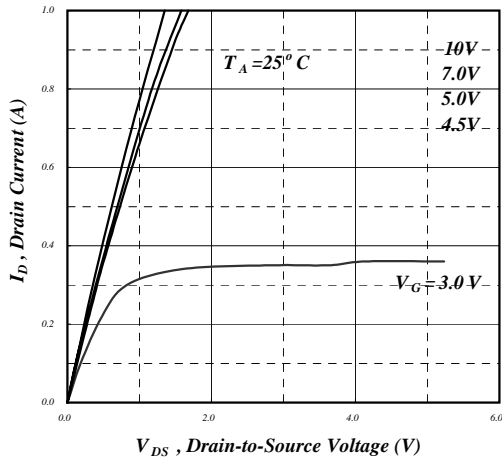


Fig 1. Typical Output Characteristics

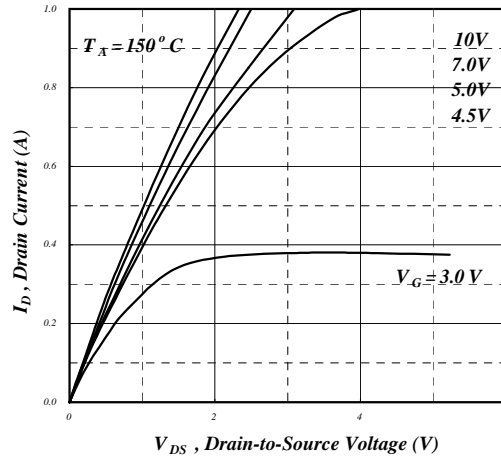


Fig 2. Typical Output Characteristics

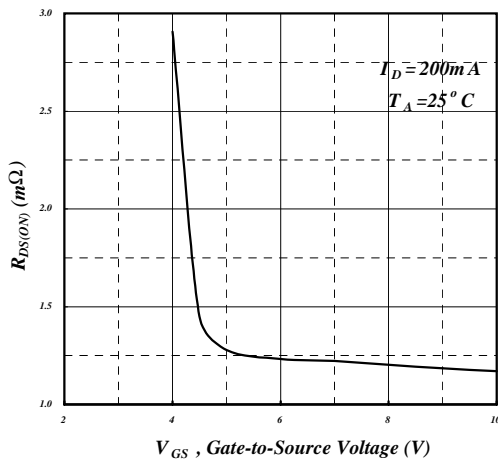


Fig 3. On-Resistance vs. Gate Voltage

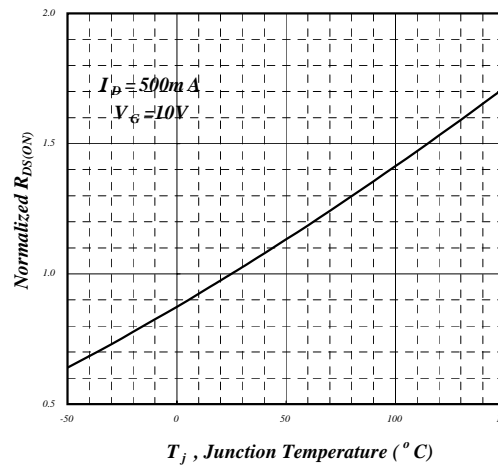


Fig 4. Normalized On-Resistance vs. Junction Temperature

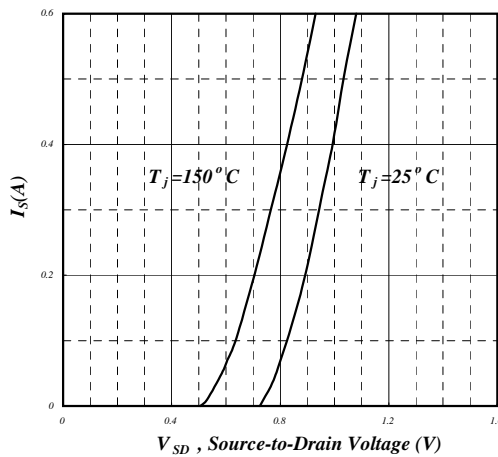


Fig 5. Forward Characteristic of Reverse Diode

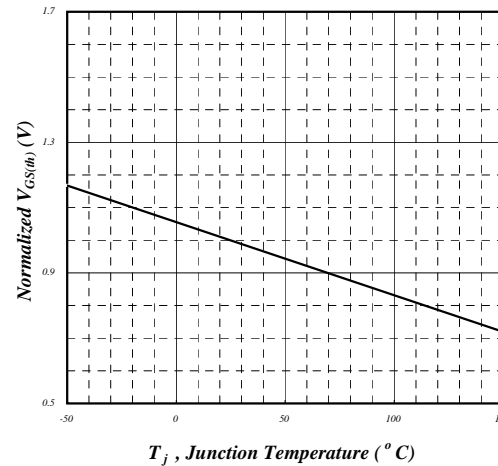


Fig 6. Gate Threshold Voltage vs. Junction Temperature

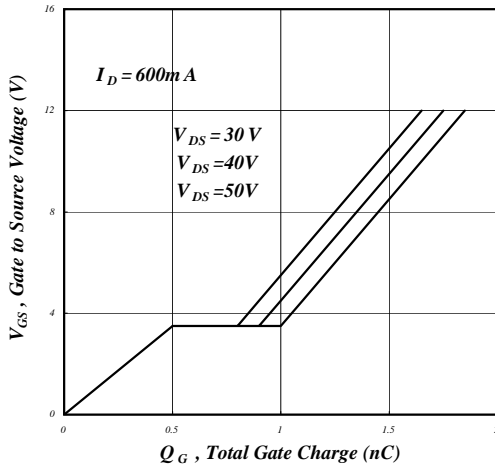


Fig 7. Gate Charge Characteristics

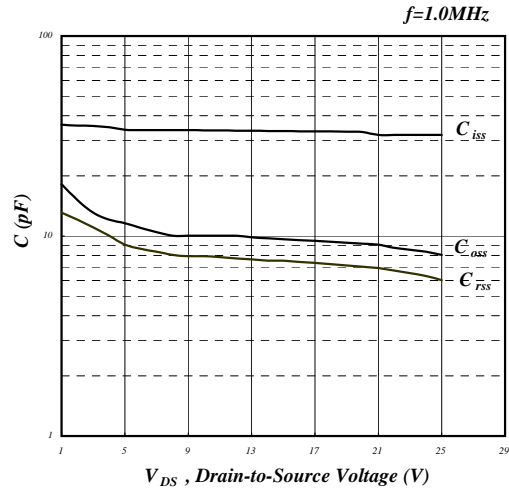


Fig 8. Typical Capacitance Characteristics

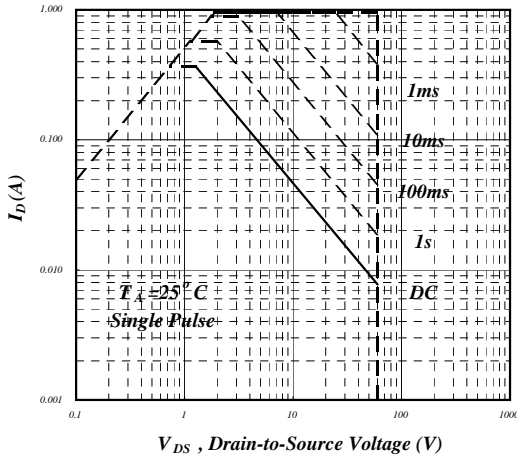


Fig 9. Maximum Safe Operating Area

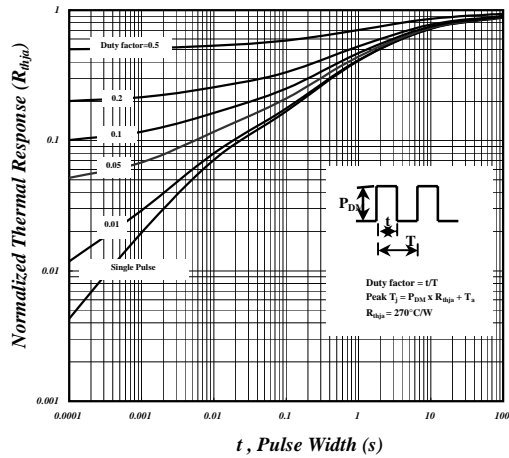


Fig 10. Effective Transient Thermal Impedance

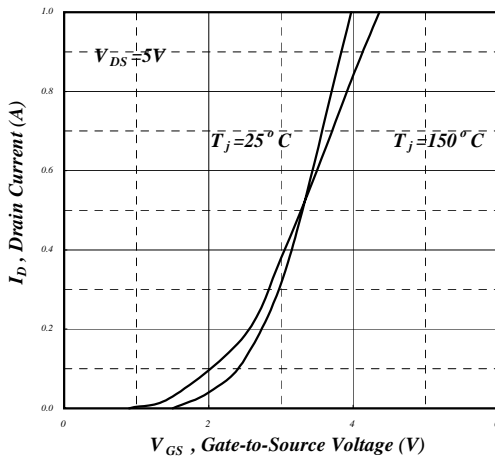


Fig 11. Transfer Characteristics

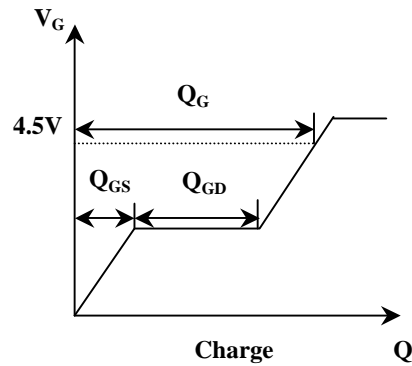
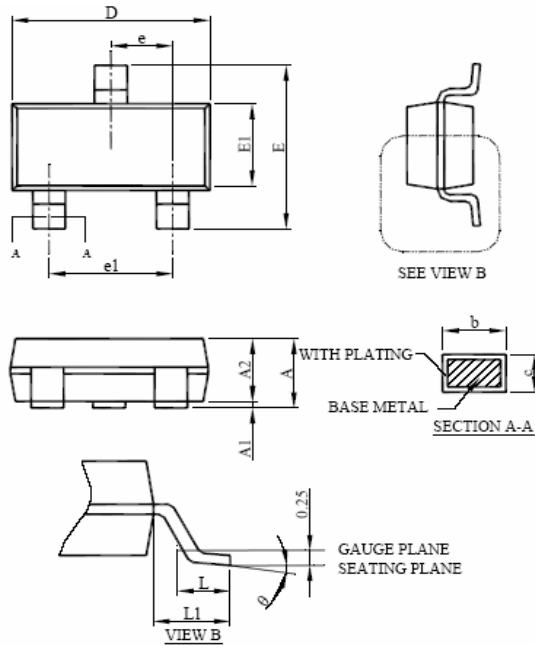


Fig 12. Gate Charge Waveform

PHYSICAL DIMENSIONS

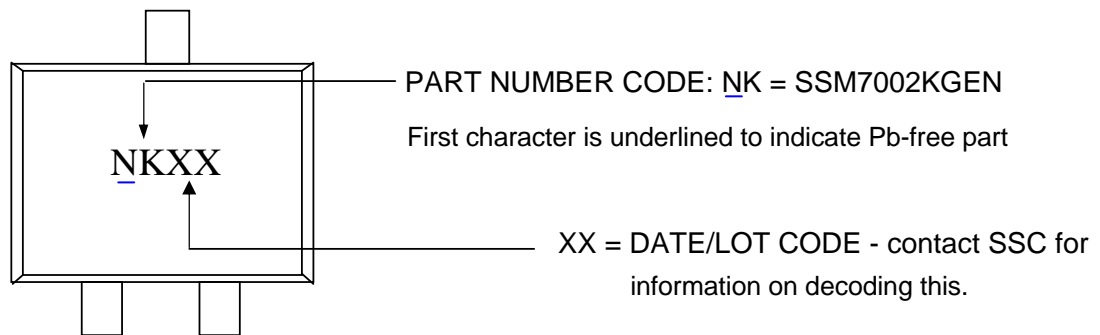
SOT-23-3



SYMBOL	SOT-23-3	
	MILLIMETERS	
	MIN.	MAX.
A	0.89	1.45
A1	0	0.15
A2	0.70	1.30
b	0.30	0.50
c	0.08	0.25
D	2.65	3.10
E	2.10	3.00
E1	1.19	2.30
e	0.95BSC	
e1	1.90BSC	
L	0.30	0.60
L1	0.60REF	
Θ	0°	8°

*Dimensions do not include mold protrusions.

PART MARKING



PACKING: Moisture sensitivity level MSL3

3000 pcs in antistatic tape on a reel packed in a moisture barrier bag (MBB).

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