

14A, 60V N-CHANNEL MOSFET

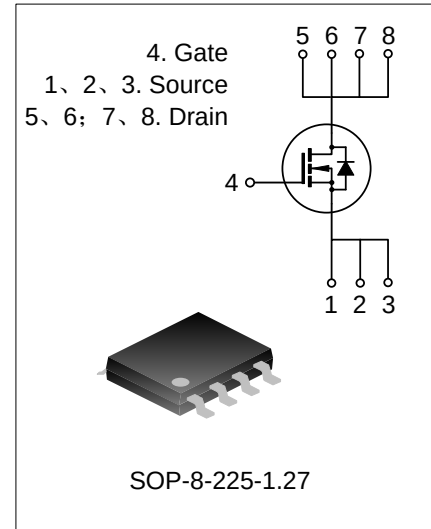
DESCRIPTION

SVGP069R5NSA is an N-channel enhancement mode power MOS field effect transistor which is produced using Silan's LVMOS technology. The improved process and cell structure have been especially tailored to minimize on-state resistance, provide superior switching performance.

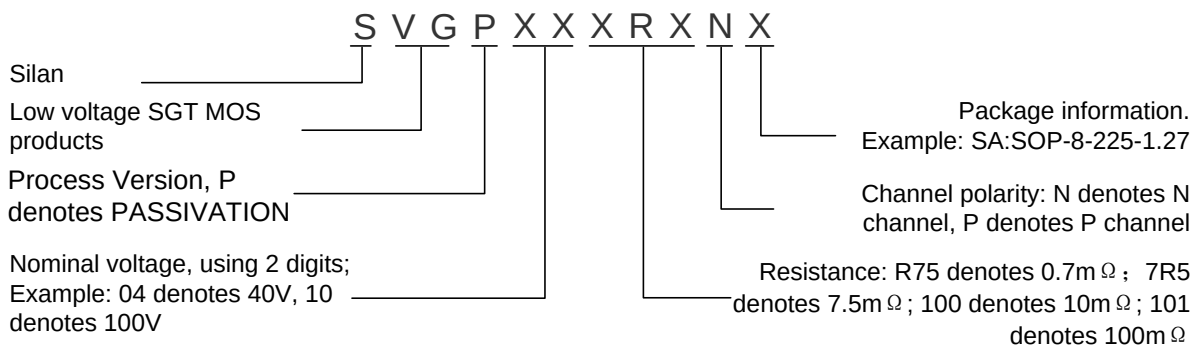
This device is widely used in Secondary synchronous rectifier, Power Management for Inverter Systems.

FEATURES

- ◆ 14A, 60V, $R_{DS(on)(typ.)}=8m\Omega@V_{GS}=10V$
- ◆ Low gate charge
- ◆ Low C_{rss}
- ◆ Fast switching
- ◆ Improved dv/dt capability



NOMENCLATURE



ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SVGP069R5NSA	SOP-8-225-1.27	P069R5	Halogen free	Tube
SVGP069R5NSATR	SOP-8-225-1.27	P069R5	Halogen free	Tape&Reel

ABSOLUTE MAXIMUM RATINGS (Unless otherwise noted, T_C=25°C)

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V _{DS}	60	V
Gate-Source Voltage		V _{GS}	±20	V
Drain Current	T _C =25°C	I _D	14	A
	T _C =100°C		9	
Drain Current Pulsed		I _{DM}	56	A
Power Dissipation(T _C =25°C) -Derate above 25°C		P _D	3.2	W
			0.03	W/°C
Single Pulsed Avalanche Energy(Note 1)		E _{AS}	81	mJ
Operation Junction Temperature Range		T _J	-55~+150	°C
Storage Temperature Range		T _{stg}	-55~+150	°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings	Unit
Thermal Resistance, Junction-to-Case	R _{θJC}	39	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	85	°C/W

ELECTRICAL CHARACTERISTICS (Unless otherwise noted, T_C=25°C)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Drain -Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	60	--	--	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V	--	--	1.0	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D =250μA	1.4	--	2.5	V
Static Drain- Source On State Resistance	R _{DS(on)}	V _{GS} =10V, I _D =13.5A	--	8	9.5	mΩ
		V _{GS} =4.5V, I _D =11.5A	--	11	13.5	mΩ
Gate Resistance	R _G	f=1MHz	--	1.8	--	Ω
Input Capacitance	C _{iss}	f=1MHz, V _{GS} =0V, V _{DS} =30V	--	1061	--	pF
Output Capacitance	C _{oss}		--	432	--	
Reverse Transfer Capacitance	C _{rss}		--	23	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V, V _{GS} =10V, R _G =3Ω, I _D =13.5A (Note 2,3)	--	8.0	--	ns
Turn-on Rise Time	t _r		--	54	--	
Turn-off Delay Time	t _{d(off)}		--	19	--	
Turn-off Fall Time	t _f		--	8.8	--	
Total Gate Charge	Q _g	V _{DD} =48V, V _{GS} =10V, I _D =13.5A (Note 2,3)	--	17	--	nC
Gate-Source Charge	Q _{gs}		--	5.8	--	
Gate-Drain Charge	Q _{gd}		--	2.6	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction	--	--	14	A
Pulsed Source Current	I_{SM}	Diode in the MOSFET	--	--	56	
Diode Forward Voltage	V_{SD}	$I_S=13.5A, V_{GS}=0V$	--	--	1.4	V
Reverse Recovery Time	T_{rr}	$I_S=13.5A, V_{GS}=0V,$	--	52	--	ns
Reverse Recovery Charge	Q_{rr}	$dI/dt=100A/\mu s$ (Note 2)	--	0.05	--	μC

Notes:

1. $L=0.5mH$, $V_{DD}=50V$, $R_G=10\Omega$, starting $T_J=25^\circ C$;
2. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;
3. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

Figure 1. Output Characteristics

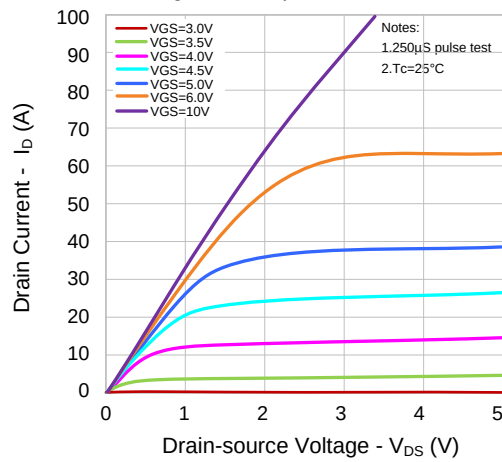


Figure 2. Transfer Characteristics

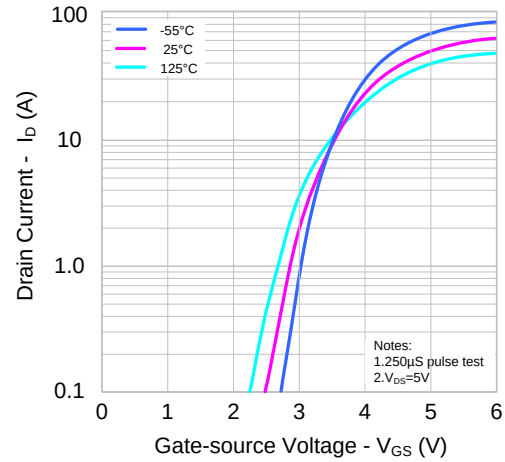


Figure 3. On-resistance vs. Drain Current

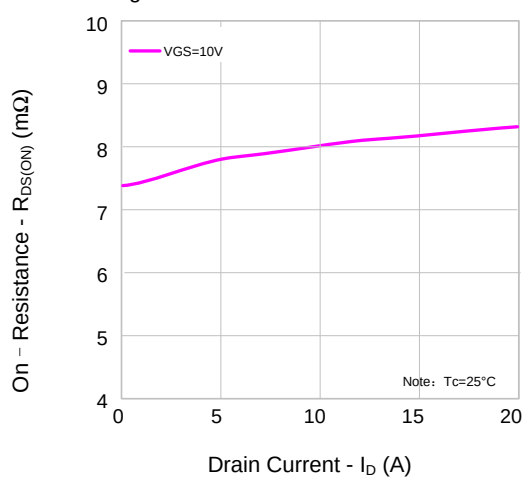


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

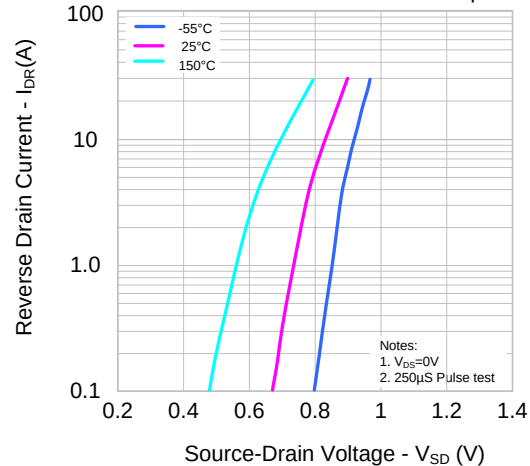


Figure 5. Capacitance Characteristics

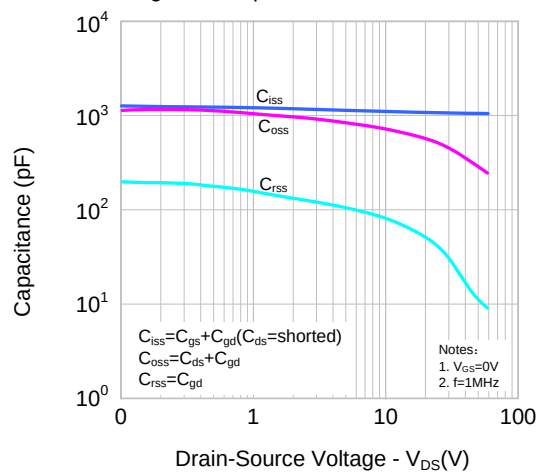
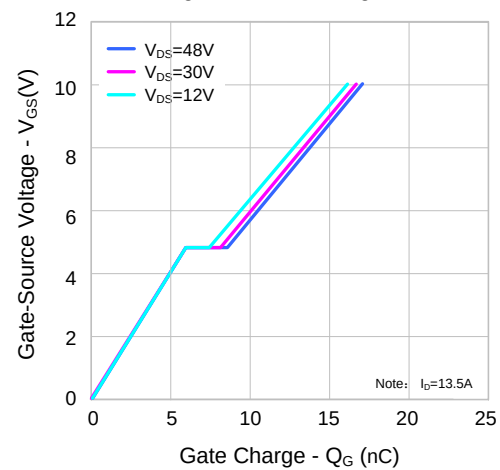
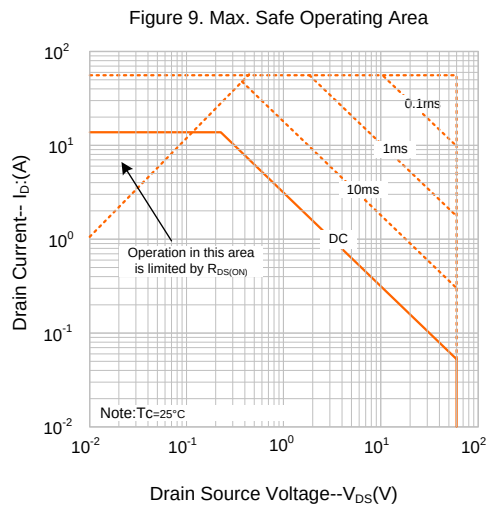
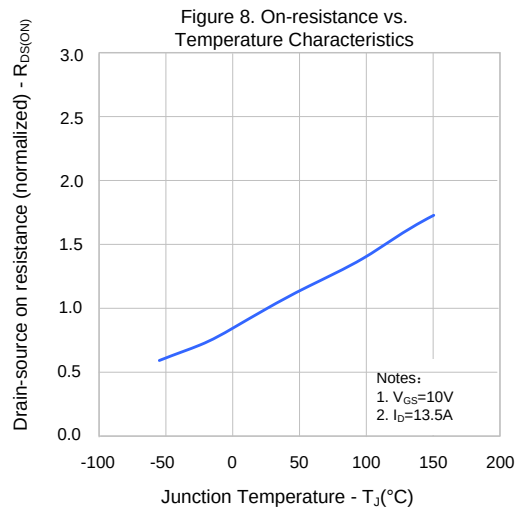
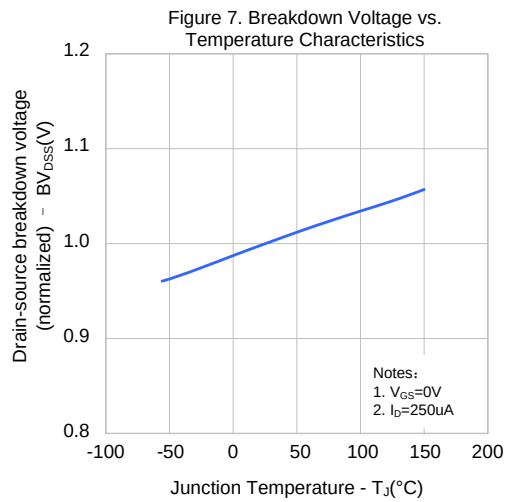


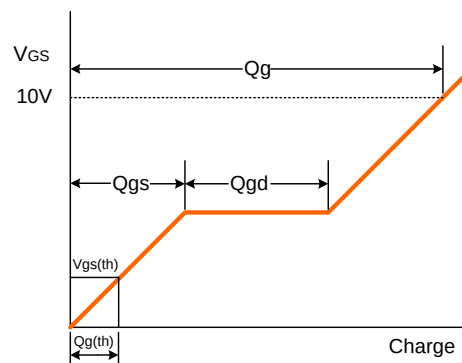
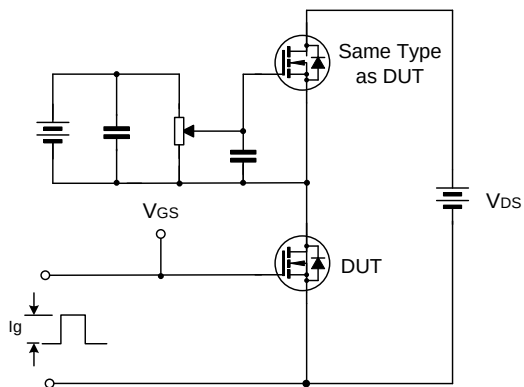
Figure 6. Gate Charge



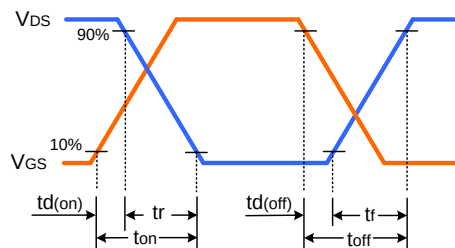
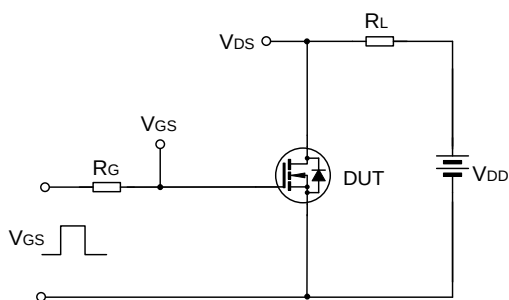
TYPICAL CHARACTERISTICS(continued)



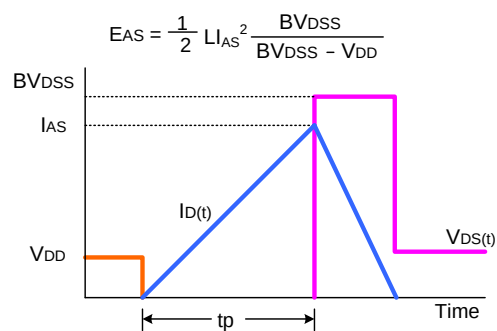
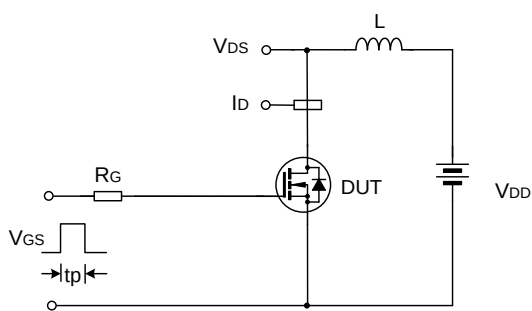
TYPICAL TEST CIRCUIT



Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

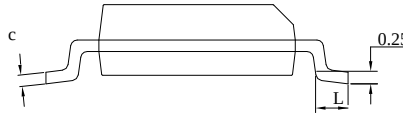
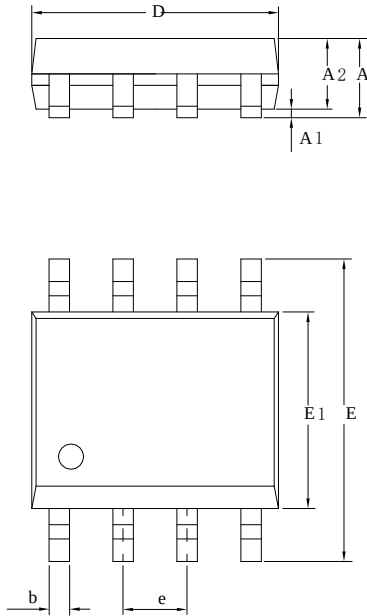


Unclamped Inductive Switching Test Circuit & Waveform

PACKAGE OUTLINE

SOP-8-225-1.27

UNIT: mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	1.35	1.55	1.75
A1	0.05	0.15	0.25
A2	1.25	--	1.65
b	0.32	0.42	0.52
c	0.15	0.2	0.26
D	4.70	4.90	5.30
E	5.60	6.00	6.40
E1	3.60	3.90	4.20
e	1.27BSC		
L	0.30	—	1.27

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Rev.: 1.2

Revision History:

1. Update Electrical schematic
 2. Update TYPICAL TEST CIRCUIT
 3. Update important notice
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Rev.: 1.1

Revision History:

1. Modify electrical characteristics
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Rev.: 1.0

Revision History:

1. First release
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