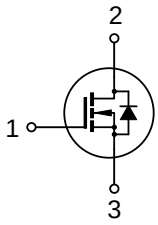
120A, 98V N-CHANNEL MOSFET

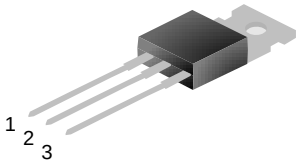
DESCRIPTION

SVG105R5NT 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 power management for UPS and Inverter Systems.



1.Gate 2.Drain 3.Source



TO-220-3L

FEATURES

- 120A, 98V, $R_{DS(on)(typ.)}$=4.6mΩ@V_{GS}=10V
- Low gate charge
- Low Crss
- Fast switching
- Extreme dv/dt rated

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SVG105R5NT	TO-220-3L	105R5NT	Pb free	Tube

ABSOLUTE MAXIMUM RATINGS (UNLESS OTHERWISE NOTED, T_A=25°C)

Characteristics		Symbol	Ratings	Unit
Drain-source Voltage		V_{DS}	98	V
Gate-source Voltage		V_{GS}	±20	V
Drain Current	T_C=25°C	I_D	120	A
	T_C=100°C		100	
Drain Current Pulsed		I_{DM}	480	A
Power Dissipation (T_C=25°C)		P_D	200	W
-Derate above 25°C			1.6	W/°C
Single Pulsed Avalanche Energy (Note 1)		E_{AS}	274	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-case	$R_{\theta JC}$	0.63	°C/W
Thermal Resistance, Junction-ambient	$R_{\theta JA}$	62.5	°C/W

ELECTRICAL CHARACTERISTICS (UNLESS OTHERWISE NOTED, T_j=25°C)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Drain-source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	98	--	--	V
Drain-source Leakage Current	I_{DSS}	V_{DS}=98V, 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	2.0	--	4.0	V
Static Drain-source On State Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=50A	--	4.6	5.5	mΩ
Gate Resistance	R_G	f=1MHz	--	3.6	--	Ω
Input Capacitance	C_{iss}	f=1MHz, V_{GS}=0V, V_{DS}=50V	--	5208	--	pF
Output Capacitance	C_{oss}		--	565	--	
Reverse Transfer Capacitance	C_{rss}		--	22	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=50V, V_{GS}=10V, R_G=1.6Ω, I_D=25A (Notes 2, 3)	--	20	--	ns
Turn-on Rise Time	t_r		--	40	--	
Turn-off Delay Time	$t_{d(off)}$		--	71	--	
Turn-off Fall Time	t_f		--	17	--	
Total Gate Charge	Q_g	V_{DD}=50V, V_{GS}=10V, I_D=25A (Notes 2, 3)	--	80	--	nC
Gate-source Charge	Q_{gs}		--	29	--	
Gate-drain Charge	Q_{gd}		--	17	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	120	A
Pulsed Source Current	I_{SM}		--	--	480	
Diode Forward Voltage	V_{SD}	I_S=50A, V_{GS}=0V	--	--	1.4	V
Reverse Recovery Time	T_{rr}	I_S=25A, V_{GS}=0V, dIF/dt=100A/μs (Note 2)	--	61	--	ns
Reverse Recovery Charge	Q_{rr}		--	0.12	--	μC

Notes:

1.L=0.1mH, I_{AS}=74A, V_{DD}=80V, R_G=25Ω, starting T_J=25°C;

2.Pulse Test: Pulse width ≤300μs,Duty cycle≤2%;

3.Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

Figure 1. Output Characteristics

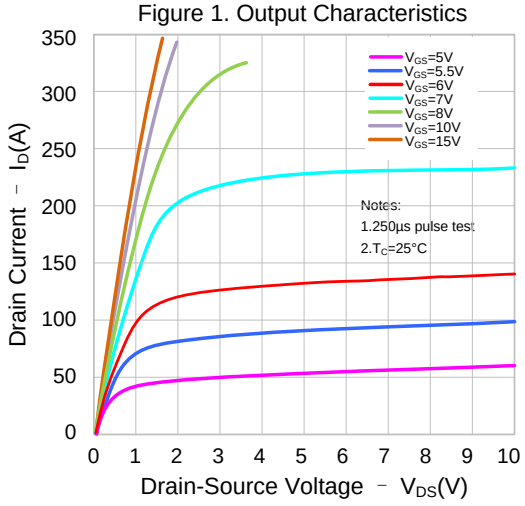


Figure 2. Transfer Characteristics

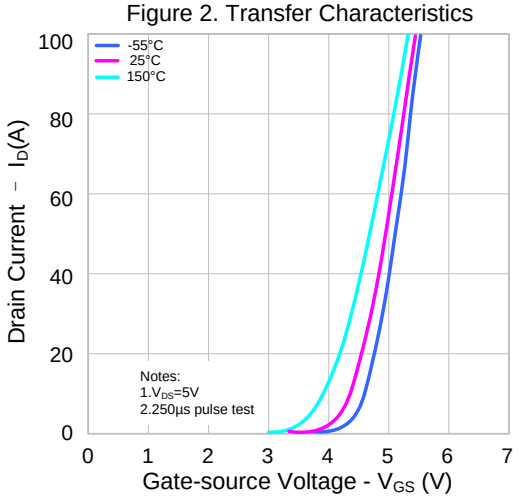


Figure 3. On-resistance vs. Drain Current

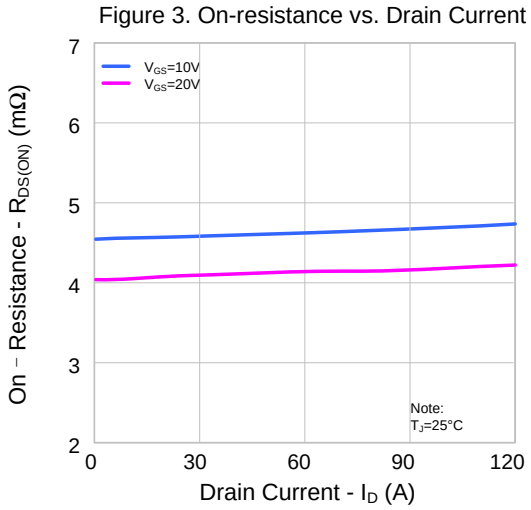


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

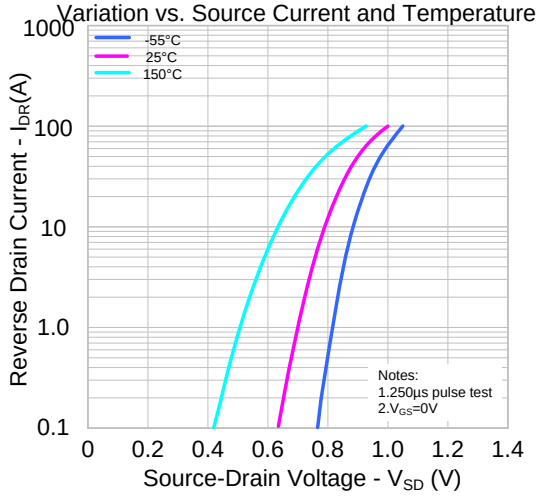


Figure 5. Capacitance Characteristics

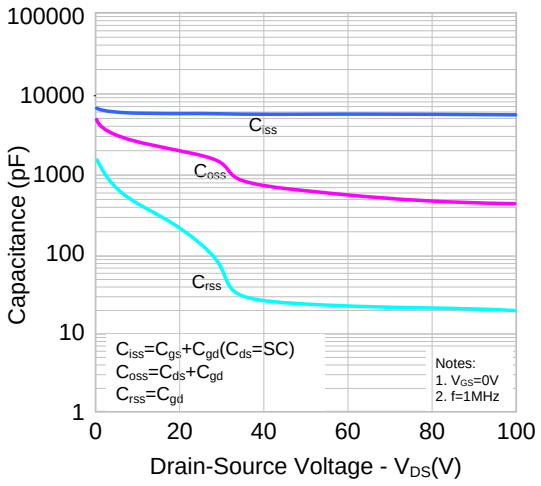
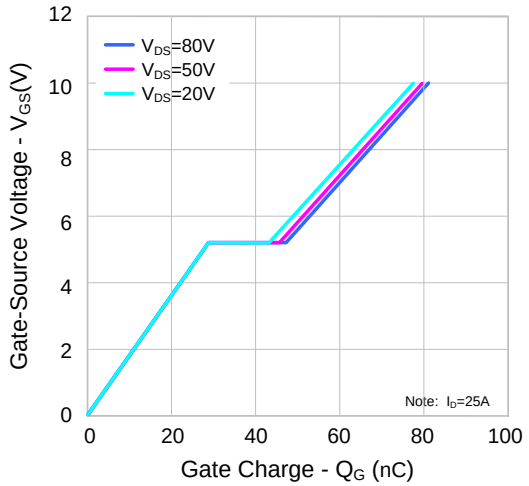


Figure 6. Gate Charge



TYPICAL CHARACTERISTICS (CONTINUED)

Figure 7. Breakdown Voltage Variation vs. Temperature

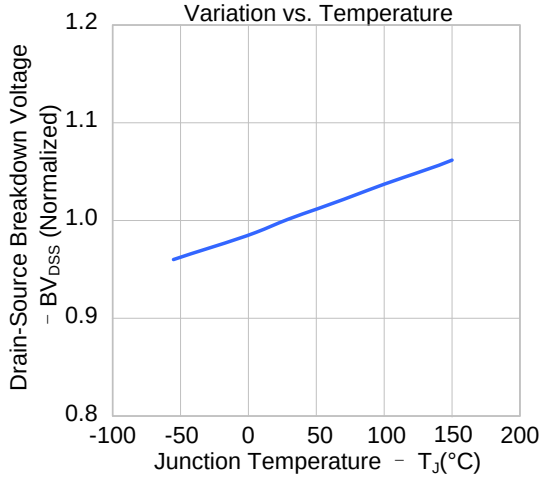


Figure 8. On-resistance Variation vs. Temperature

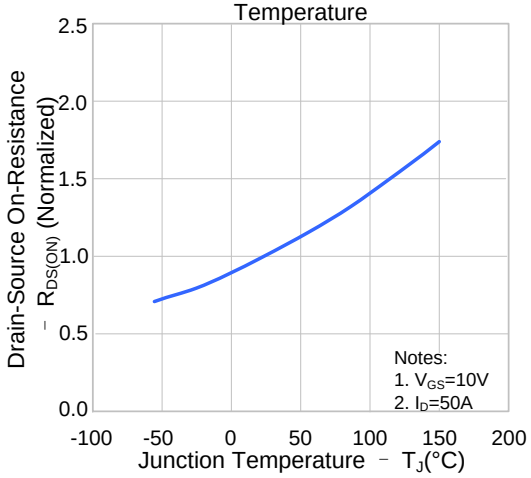


Figure 9. Max. Safe Operating Area

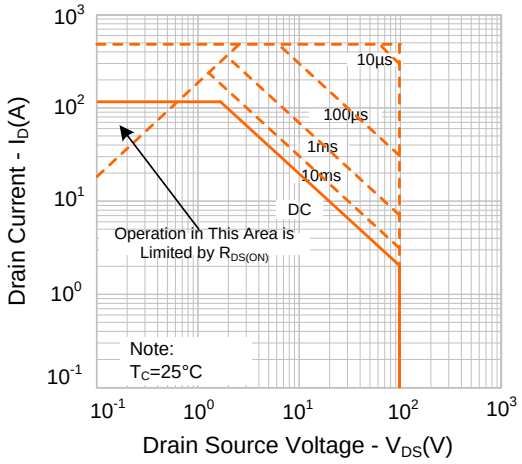
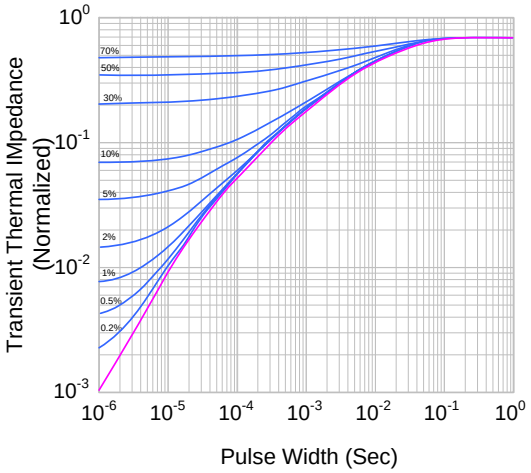
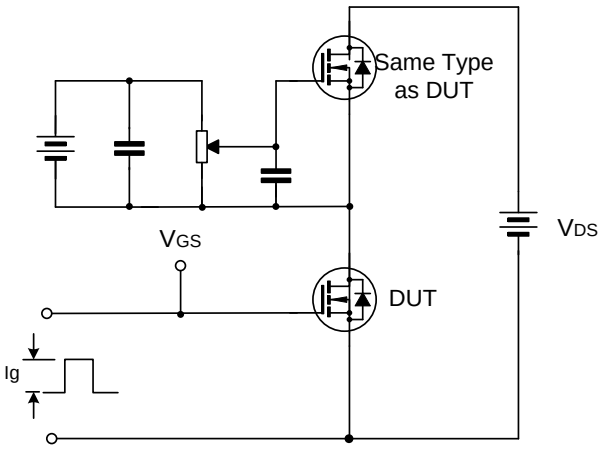


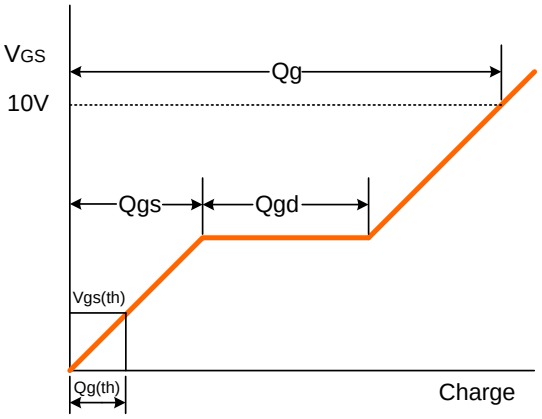
Figure 10. Transient Thermal Impedance- pulse width



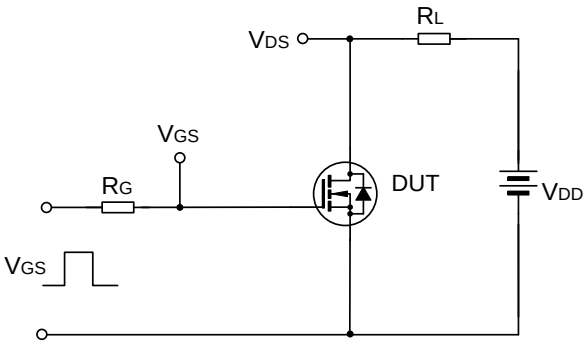
TYPICAL TEST CIRCUIT

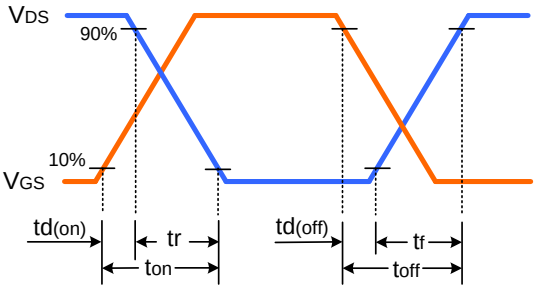
Gate Charge Test Circuit & Waveform



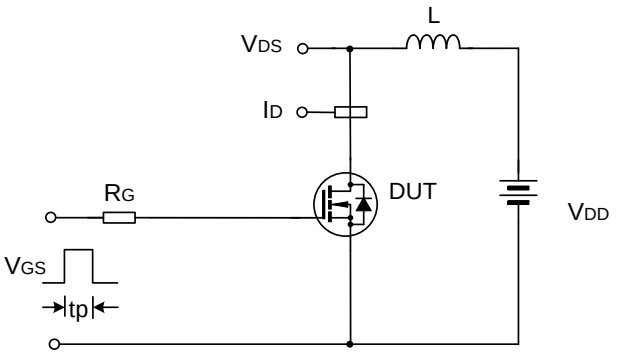


Resistive Switching Test Circuit & Waveform

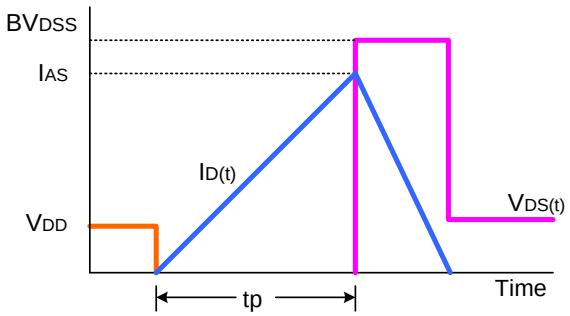




Unclamped Inductive Switching Test Circuit & Waveform

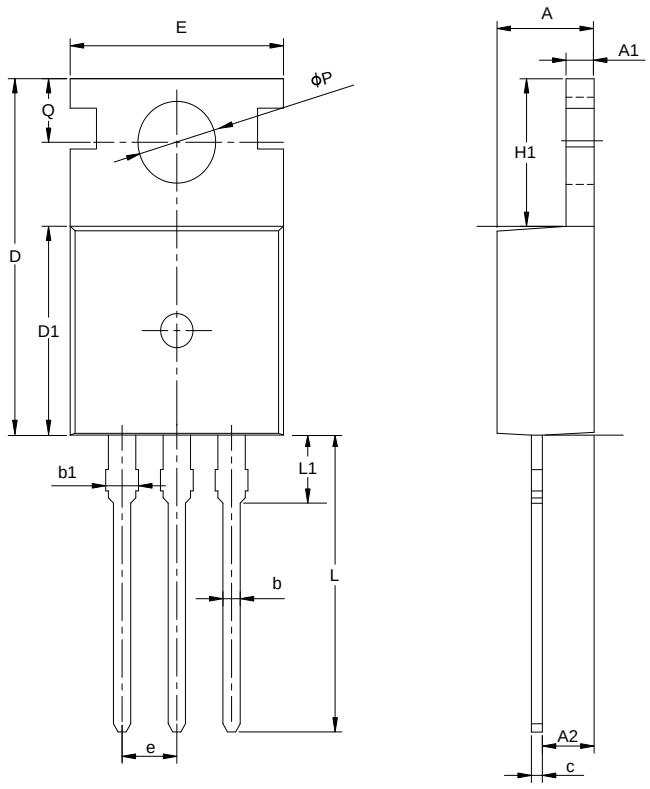


$$E_{AS} = \frac{1}{2} LI_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



PACKAGE OUTLINE

TO-220-3L **UNIT: mm**



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	1.00	1.30	1.50
A2	1.80	2.40	2.80
b	0.60	0.80	1.00
b1	1.00	—	1.60
c	0.30	—	0.70
D	15.10	15.70	16.10
D1	8.10	9.20	10.00
E	9.60	9.90	10.40
e	2.54BSC		
H1	6.10	6.50	7.00
L	12.60	13.08	13.60
L1	—	—	3.95
ϕP	3.40	3.70	3.90
Q	2.60	—	3.20

Important notice:

1. **The instructions are subject to change without notice!**
2. **Customers should obtain the latest relevant information before placing orders and should verify that such information is complete and current. Please read the instructions carefully before using our products, including the circuit operation precautions.**
3. **Our products are consumer electronic products or the other civil electronic products.**
4. **When using our products, please do not exceed the maximum rating of the products, otherwise the reliability of the whole machine will be affected. There is a certain possibility of failure or malfunction of any semiconductor product under specific conditions. The buyer is responsible for complying with safety standards and taking safety measures when using our products for system design, sample and whole machine manufacturing, so as to avoid potential failure risk that may cause personal injury or property loss.**
5. **It is strongly recommended to identify the trademark when buying our products. Please contact us if there is any question.**
6. **Product promotion is endless, our company will wholeheartedly provide customers with better products!**
7. **Website: http: //www.silan.com.cn**

Part No.:	SVG105R5NT	Document Type:	Datasheet
Copyright:	HANGZHOU SILAN MICROELECTRONICS CO.,LTD	Website:	http: //www.silan.com.cn

Rev.: 1.0

Revision History:

1. First release