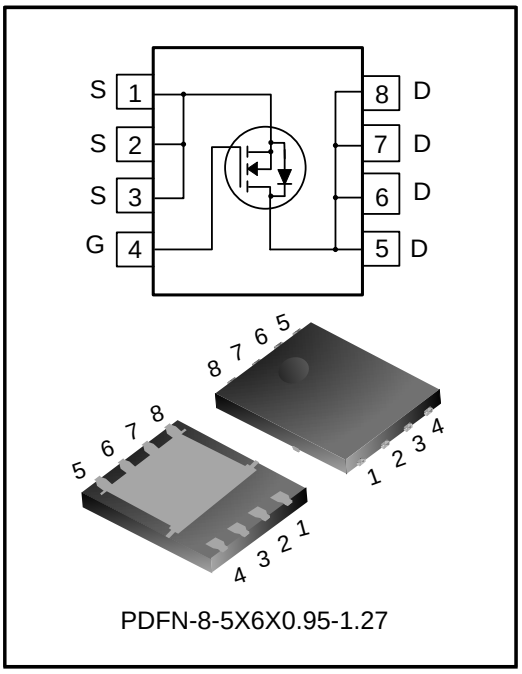
90A, 30V N-CHANNEL MOSFET

DESCRIPTION

SVT034R1NL5 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.



PDFN-8-5X6X0.95-1.27

FEATURES

- 90A, 30V, $R_{DS(on)(typ.)}$=3.0mΩ@V_{GS}=10V
- Low gate charge
- Low Crss
- Fast switching
- Extreme dv/dt rated
- 100% avalanche tested
- Pb-free lead plating
- RoHS compliant

KEY PERFORMANCE PARAMETERS

Characteristics	Ratings	Unit
V_{DS}	30	V
$V_{GS(th)}$	1.2~2.2	V
$R_{DS(on),max.}$	4.0	mΩ
I_D	90	A
$Q_{g.typ.}$	32	nC

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SVT034R1NL5TR	PDFN-8-5X6X0.95-1.27	034R1NL5	Halogen free	Tape&Reel

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

Characteristics		Symbol	Test conditions	Ratings			Unit
				Min.	Typ.	Max.	
Drain-source Voltage		V_{DS}	--	30	--	--	V
Gate-source Voltage		V_{GS}	--	-20	--	20	V
Drain Current		I_D	T_C=25°C	--	--	90	A
			T_C=100°C	--	--	64	A
Drain Current Pulsed (Note 1)		I_{DM}	T_C=25°C	--	--	330	A
Power Dissipation (Note 2)		P_D	T_C=25°C	--	--	65	W
Single Pulsed Avalanche Energy	L=0.1mH	E_{AS}	V_{DD}=24V, R_G=25Ω, starting temperature T_J=25°C	--	--	120	mJ
	L=0.5mH			--	--	169	
Single Pulsed Current		I_{AS}	L=0.1mH	--	--	49	A
			L=0.5mH	--	--	26	
Operation Junction Temperature Range		T_J	--	-55	--	150	°C
Storage Temperature Range		T_{stg}	--	-55	--	150	°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Thermal Resistance, Junction-case, Bottom	$R_{\theta JC}$	--	--	--	1.92	°C/W
Thermal Resistance, Junction-ambient	$R_{\theta JA}$	--	--	--	50.0	°C/W

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

Static characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Drain-source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	30	--	--	V
Drain-source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V, T_J=25°C	--	--	1.0	μA
		V_{DS}=30V, V_{GS}=0V, T_J=125°C	--	1.5	--	
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	1.2	--	2.2	V
Static Drain-source On State Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=20A	--	3.0	4.0	mΩ
		V_{GS}=4.5V, I_D=16A	--	5.4	6.8	mΩ
Gate Resistance	R_G	f=1MHz	--	1.6	--	Ω

Dynamic characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Input Capacitance	C_{iss}	f=1MHz, V_{GS}=0V, V_{DS}=15V	--	3596	--	pF
Output Capacitance	C_{oss}		--	416	--	
Reverse Transfer Capacitance	C_{rss}		--	348	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=20V, V_{GS}=10V, R_G=6Ω, I_D=20A (Notes 3, 4)	--	12	--	ns
Turn-on Rise Time	t_r		--	42	--	
Turn-off Delay Time	$t_{d(off)}$		--	72	--	
Turn-off Fall Time	t_f		--	33	--	
Total Gate Charge	Q_g	V_{DD}=15V, V_{GS}=4.5V, I_D=20A (Notes 3, 4)	--	32	--	nC
Gate-source Charge	Q_{gs}		--	12	--	
Gate-drain Charge	Q_{gd}		--	11	--	
Gate-plateau Voltage	$V_{plateau}$		--	3.1	--	V

Reverse diode characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Continuous Diode Forward Current	I_S	Integral reverse P-N junction diode in the MOSFET	--	--	90	A
Diode Pulse Current	$I_{S,pulse}$		--	--	330	
Source-Drain diode Voltage	V_{SD}	I_S=2.5A, V_{GS}=0V	--	--	1.4	V
Reverse Recovery Time	T_{rr}	I_S=20A, V_{GS}=0V, dIF/dt=100A/μs (Note 3)	--	20	--	ns
Reverse Recovery Charge	Q_{rr}		--	10	--	nC
Reverse Recovery Peak Current	I_{rrm}		--	1.0	--	A

Notes:

1. Pulse time 5μs;
2. The dissipation power will change with temperature, derating above 25°C: 0.52W/°C;
3. Pulse Test: Pulse width ≤300μs, Duty cycle≤2%;
4. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

Figure 1. Output Characteristics

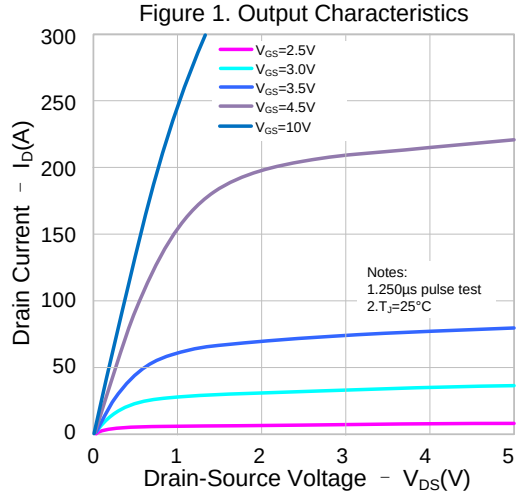


Figure 2. Transfer Characteristics

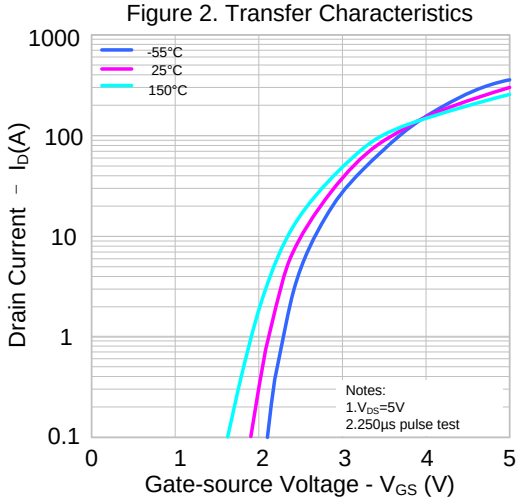


Figure 3. On-resistance vs. Drain Current

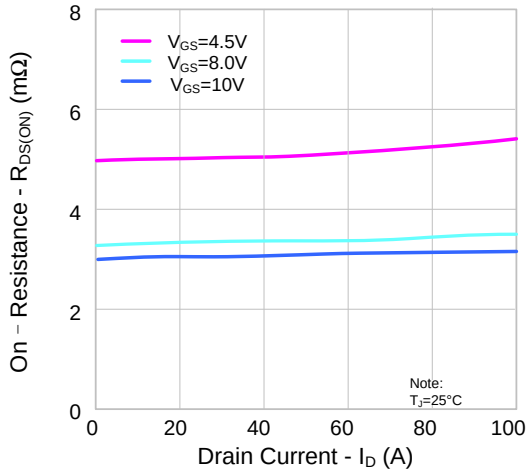


Figure 4. On-resistance vs. Gate-source Voltage

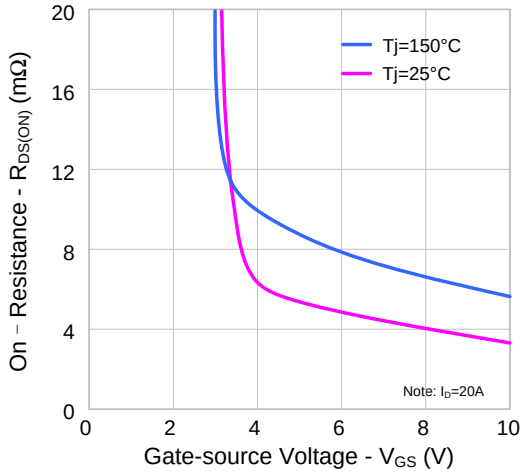


Figure 5. Turn-on Voltage vs. Temperature characteristics

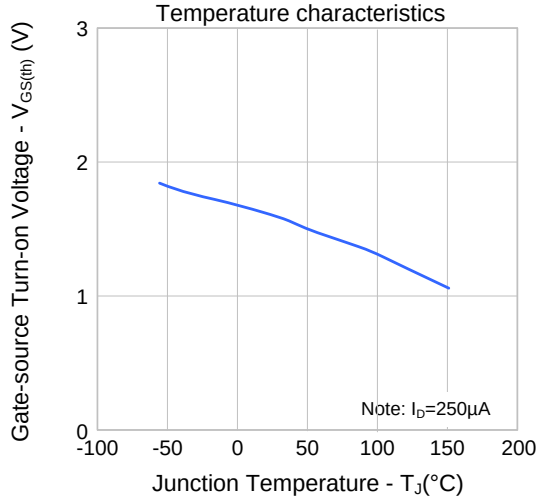
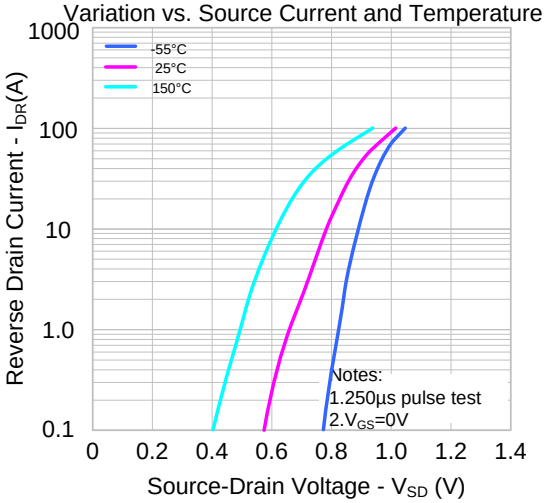


Figure 6. Body Diode Forward Voltage Variation vs. Source Current and Temperature



TYPICAL CHARACTERISTICS (CONTINUED)

Figure 7. Capacitance Characteristics

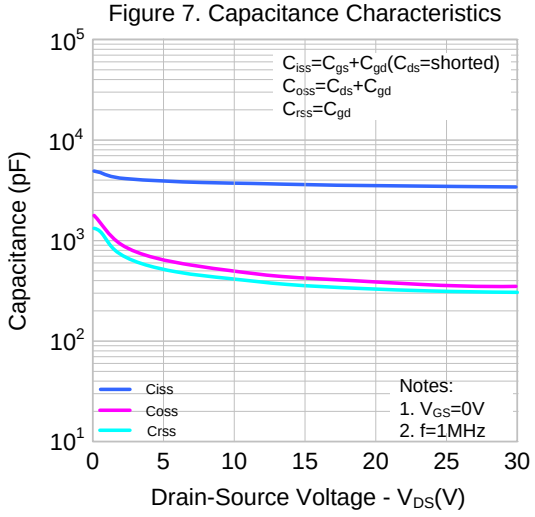


Figure 8. Gate Charge

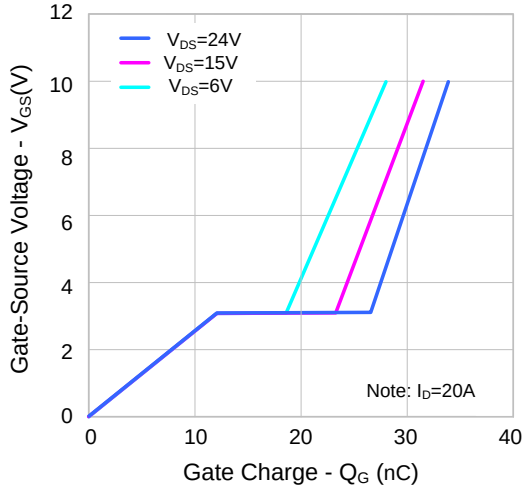


Figure 9. Breakdown Voltage Variation vs. Temperature

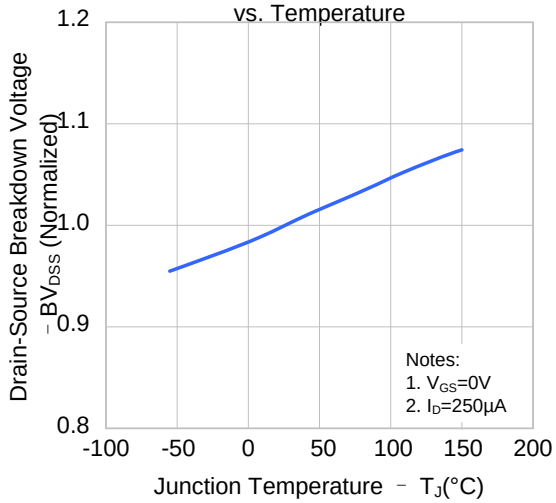


Figure 10. On-resistance Variation vs. Temperature

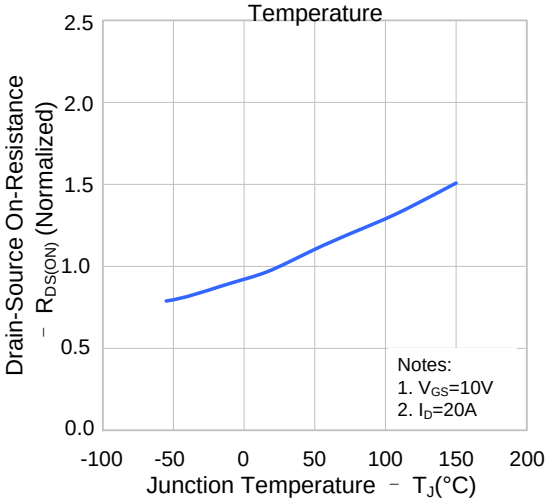


Figure 11. Max. Safe Operating Area

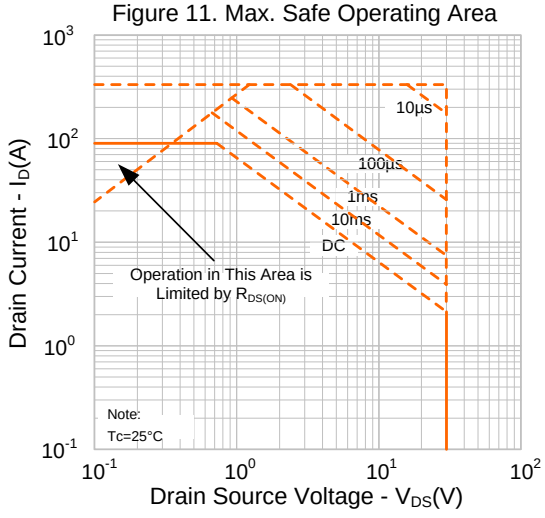
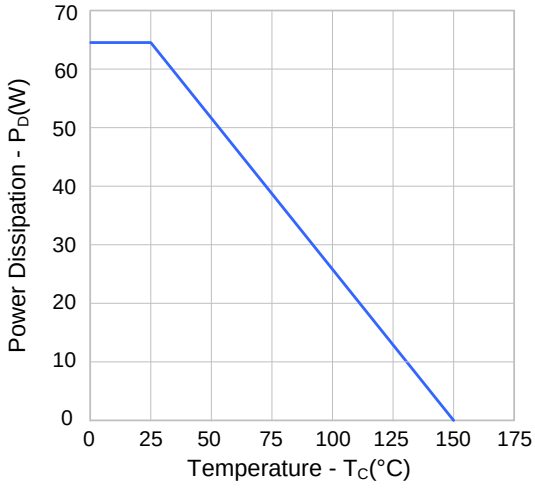
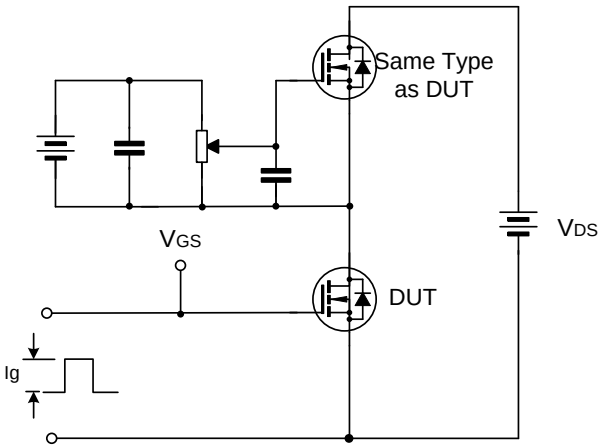


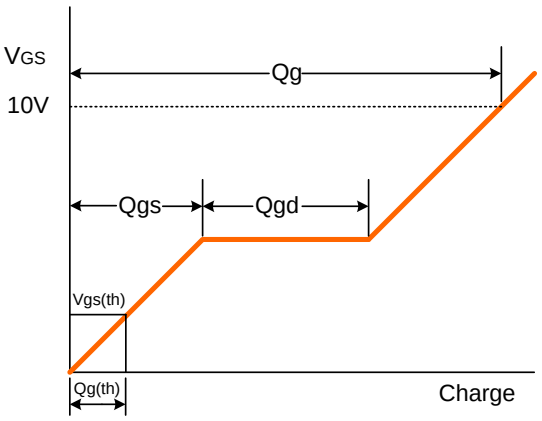
Figure 12. Power Dissipation vs. Case Temperature



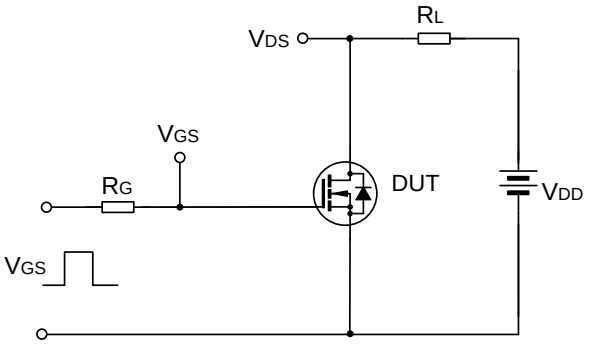
TYPICAL TEST CIRCUIT

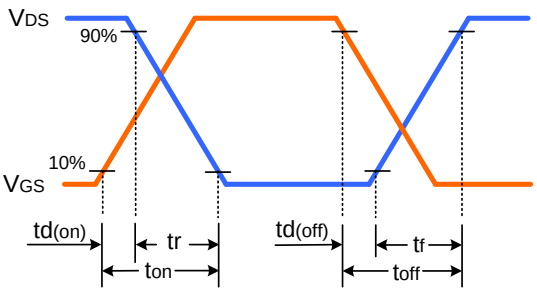
Gate Charge Test Circuit & Waveform



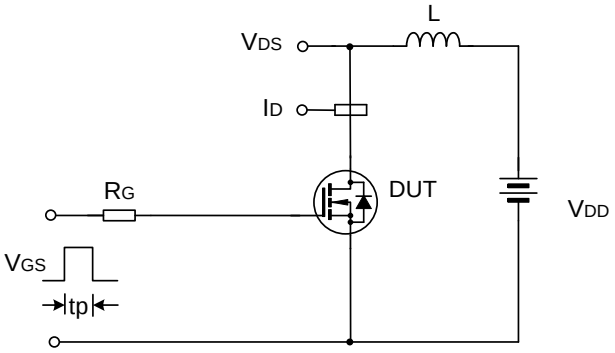


Resistive Switching Test Circuit & Waveform

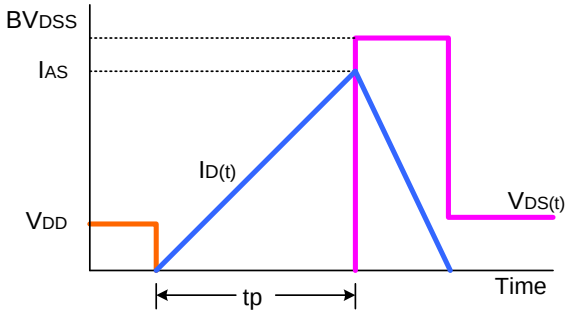




Unclamped Inductive Switching Test Circuit & Waveform

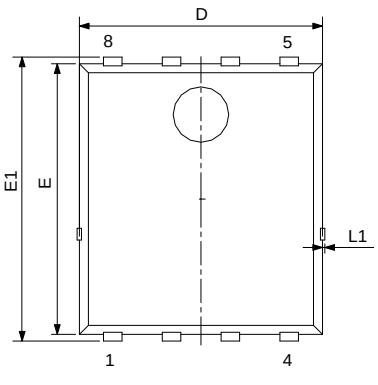


$$E_{AS} = \frac{1}{2} LI_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

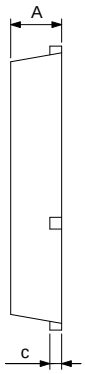


PACKAGE OUTLINE

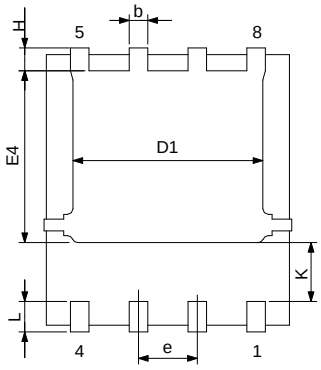
PDFN-8-5X6X0.95-1.27 **UNIT: mm**



Top View



Side View



Bottom View

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.90	—	1.20
c	0.154	0.25	0.354
D	4.80	—	5.40
E	5.66	—	6.06
D1	3.76	—	4.30
E1	5.90	—	6.35
b	0.30	—	0.55
K	1.10	1.30	1.50
e	1.07	1.27	1.37
E4	3.34	—	3.92
L	0.30	0.60	0.71
L1	—	—	0.12
H	0.40	—	0.71

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.:	SVT034R1NL5	Document Type:	Datasheet
Copyright:	HANGZHOU SILAN MICROELECTRONICS CO.,LTD	Website:	http: //www.silan.com.cn

Rev.: 1.0

Revision History:

1. First release