

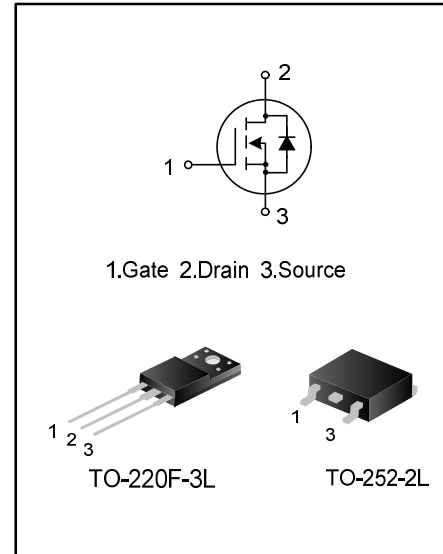
5A, 650V DP MOS POWER TRANSISTOR

GENERAL DESCRIPTION

SVS5N65F(D)D2 is an N-channel enhancement mode high voltage power MOSFETs produced using Silan's DP MOS technology. It achieves low conduction loss and switching losses. It leads the design engineers to their power converters with high efficiency, high power density, and superior thermal behavior. Furthermore, it's universal applicable, i.e., suitable for hard and soft switching topologies.

FEATURES

- ◆ 5A, 650V, $R_{DS(on)(typ.)}=0.78\Omega@V_{GS}=10V$
- ◆ New revolutionary high voltage technology
- ◆ Ultra low gate charge
- ◆ Enhanced avalanche capability
- ◆ Extreme dv/dt rated
- ◆ High peak current capability



ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing
SVS5N65FD2	TO-220F-3L	SVS5N65FD2	Halogen free	Tube
SVS5N65DD2	TO-252-2L	SVS5N65DD2	Halogen free	Tape&Reel

ABSOLUTE MAXIMUM RATINGS ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Characteristics		Symbol	Ratings		Unit
			SVS5N65FD2	SVS5N65DD2	
Drain-Source Voltage		V _{DS}	650		V
Gate-Source Voltage		V _{GS}	±30		V
Drain Current	T _C =25°C	I _D	5.0		A
	T _C =100°C		3.2		
Drain Current Pulsed		I _{DM}	20		A
Power Dissipation(T _C =25°C) -Derate above 25°C		P _D	27	42	W
			0.22	0.28	W/°C
Single Pulsed Avalanche Energy (Note 1)		E _{AS}	214		mJ
Operation Junction Temperature Range		T _J	-55~+150		°C
Storage Temperature Range		T _{stg}	-55~+150		°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings		Unit
		SVS5N65FD2	SVS5N65DD2	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	4.6	3.57	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.50	62.0	°C/W

ELECTRICAL CHARACTERISTICS ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Drain -Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	650	--	--	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$	--	--	1.0	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	--	--	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	--	4.0	V
Static Drain-Source On State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=2.5A$	--	0.78	0.96	Ω
Input Capacitance	C_{iss}	$V_{DS}=100V, V_{GS}=0V, f=1.0MHz$	--	315	--	pF
Output Capacitance	C_{oss}		--	16.4	--	
Reverse Transfer Capacitance	C_{rss}		--	3.5	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=325V, I_D=5.0A, V_{GS}=10V, R_G=24\Omega$ (Note 2,3)	--	8.47	--	ns
Turn-on Rise Time	t_r		--	31.9	--	
Turn-off Delay Time	$t_{d(off)}$		--	51.3	--	
Turn-off Fall Time	t_f		--	26.5	--	
Total Gate Charge	Q_g	$V_{DS}=520V, I_D=5.0A, V_{GS}=10V$ (Note 2,3)	--	17.18	--	nC
Gate-Source Charge	Q_{gs}		--	2.73	--	
Gate-Drain Charge	Q_{gd}		--	10.3	--	

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	--	--	5.0	A
Pulsed Source Current	I_{SM}		--	--	20.0	
Diode Forward Voltage	V_{SD}	$I_S=5.0A, V_{GS}=0V$	--	--	1.4	V
Reverse Recovery Time	T_{rr}	$I_S=5.0A, V_{GS}=0V, dI_F/dt=100A/\mu s$	--	363	--	ns
Reverse Recovery Charge	Q_{rr}		--	2.12	--	μC

Notes:

1. $L=79mH, I_{AS}=2.2A, V_{DD}=100V, R_G=25\Omega$, starting $T_J=25^{\circ}\text{C}$;
2. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycles $\leq 2\%$;
3. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

Figure 1. On-Region Characteristics

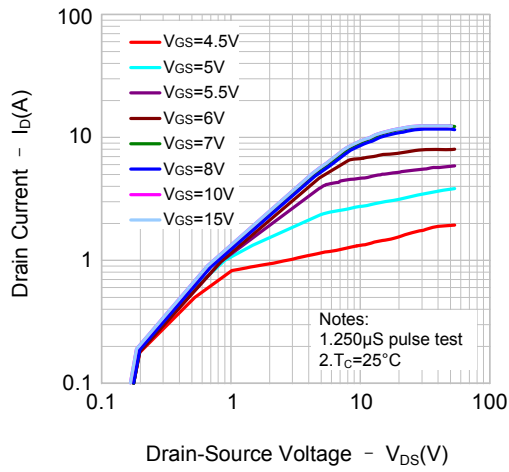


Figure 2. Transfer Characteristics

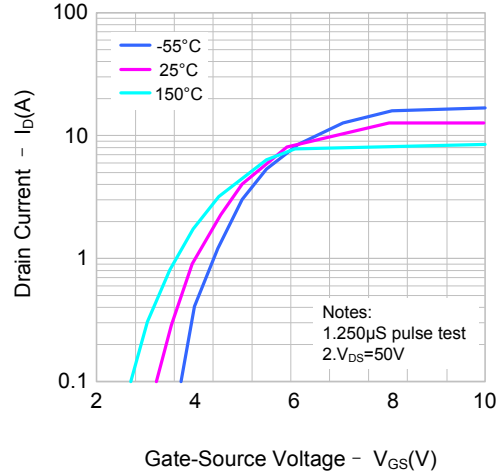


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

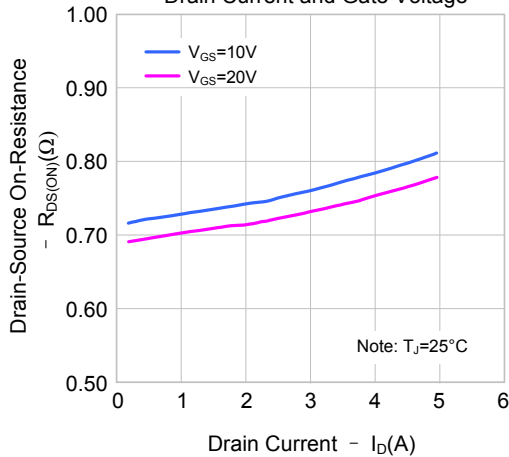


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

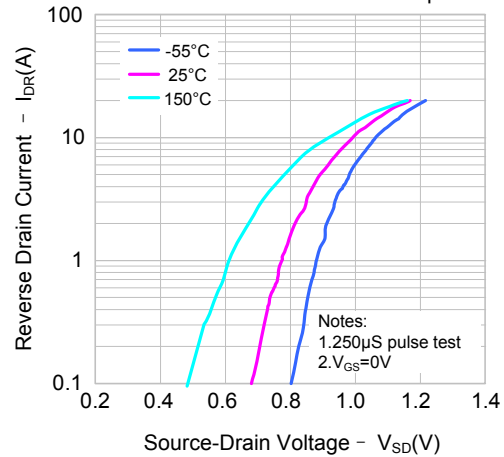


Figure 5. Capacitance Characteristics

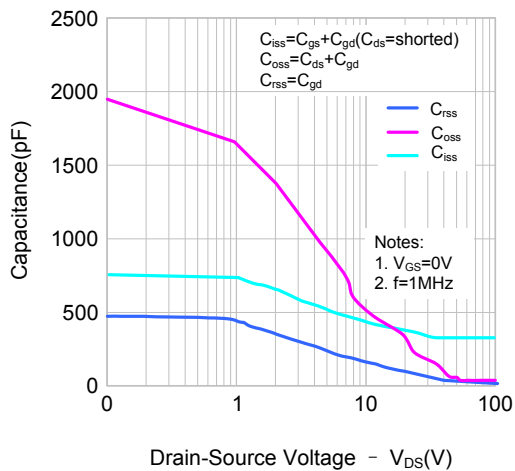
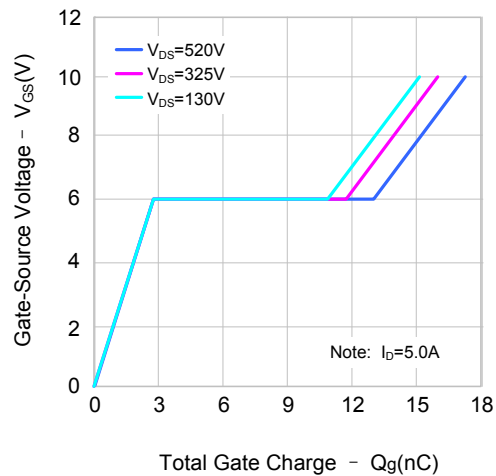


Figure 6. Gate Charge Characteristics



TYPICAL CHARACTERISTICS(continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

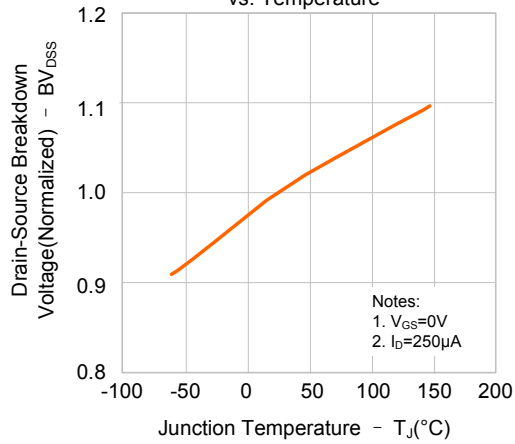


Figure 8. On-resistance Variation vs. Temperature

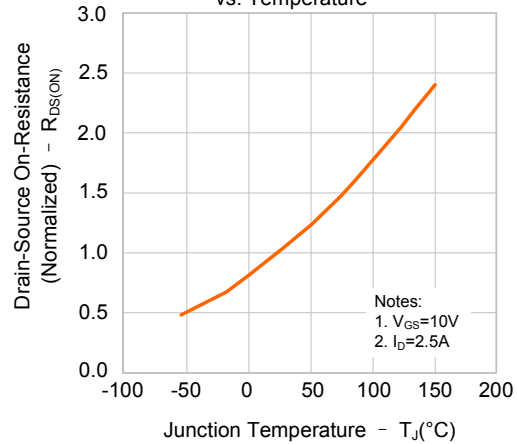


Figure 9-1. Max. Safe Operating Area(SVS5N65FD2)

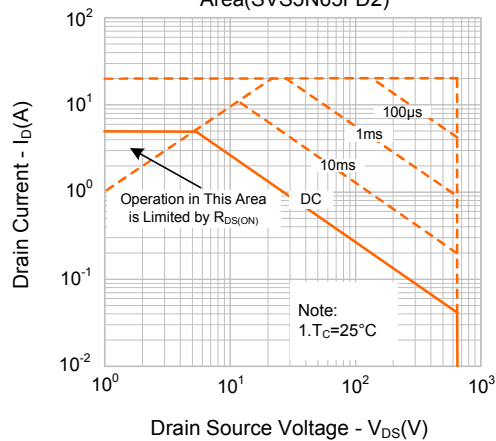
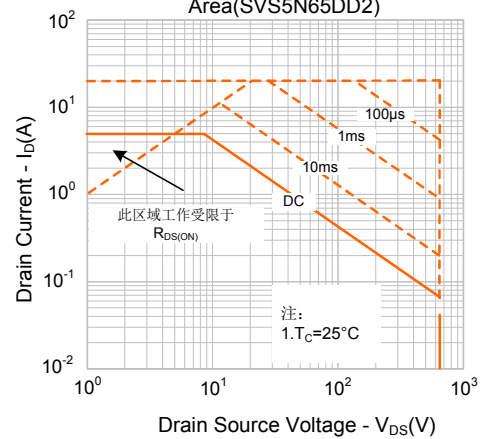
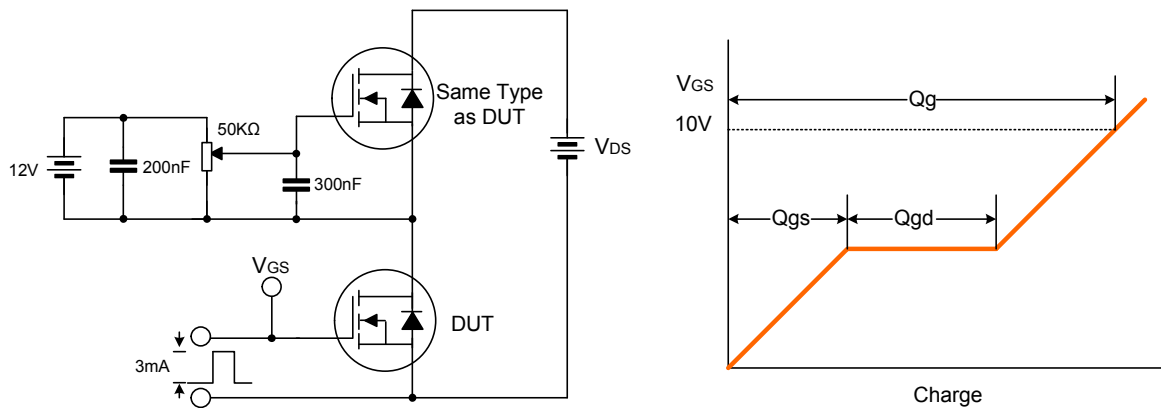


Figure 9-2. Max. Safe Operating Area(SVS5N65DD2)

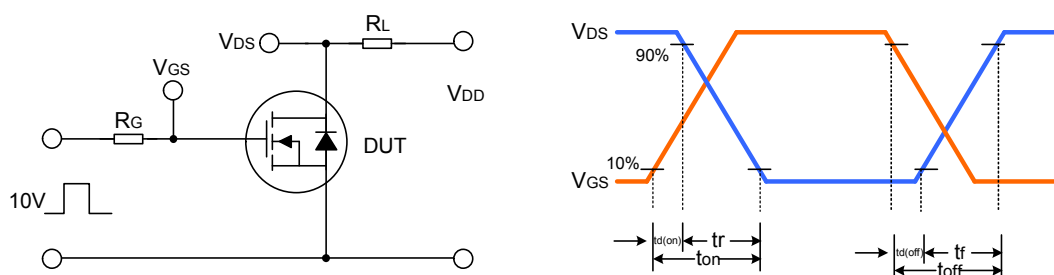


TYPICAL TEST CIRCUIT

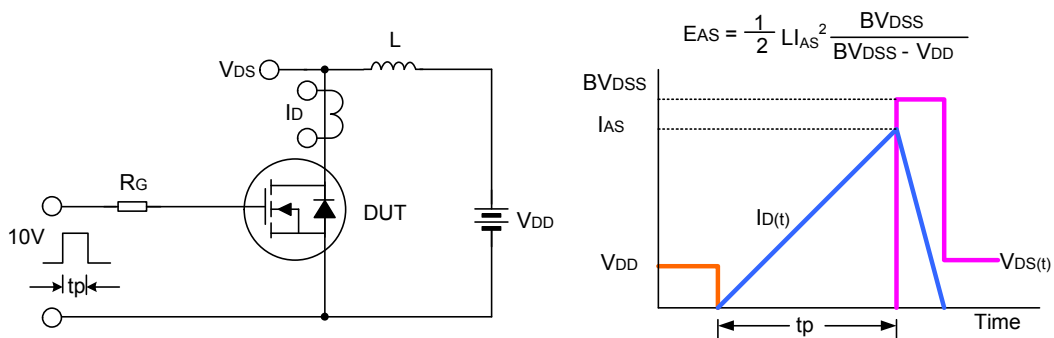
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



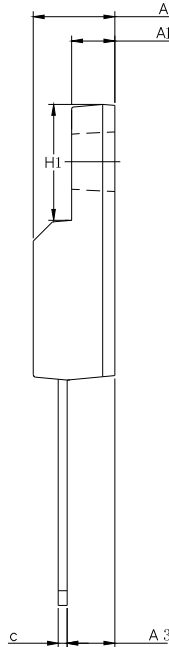
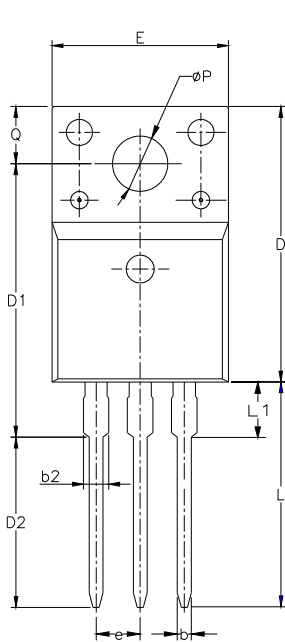
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

TO-220F-3L

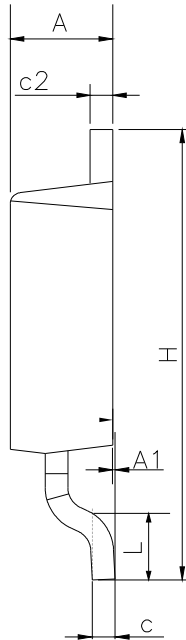
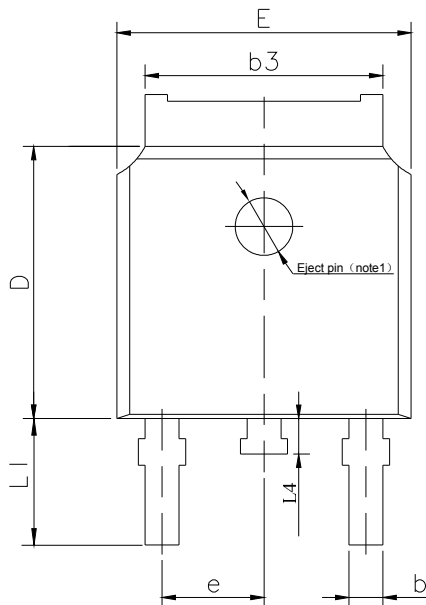
UNIT: mm



SYMBOL	MIN	NOM	MAX
A	4.42	4.70	5.02
A1	2.30	2.54	2.80
A3	2.50	2.76	3.10
b	0.70	0.80	0.90
b2	—	—	1.47
c	0.35	0.50	0.65
D	15.25	15.87	16.25
D1	15.30	15.75	16.30
D2	9.30	9.80	10.30
E	9.73	10.16	10.36
e	2.54BCS		
H1	6.40	6.68	7.00
L	12.48	12.98	13.48
L1	/	/	3.50
ØP	3.00	3.18	3.40
Q	3.05	3.30	3.55

TO-252-2L

UNIT: mm



SYMBOL	MIN	NOM	MAX
A	2.10	2.30	2.50
A1	0	—	0.127
b	0.66	0.76	0.89
b3	5.10	5.33	5.46
c	0.45	—	0.65
c2	0.45	—	0.65
D	5.80	6.10	6.40
E	6.30	6.60	6.90
e	2.30TYP		
H	9.60	10.10	10.60
L	1.40	1.50	1.70
L1	2.90REF		
L4	0.60	0.80	1.00

NOTE1: There are two conditions for this position: has an eject pin or has no eject pin.

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Part No.: **SVS5N65F(D)D2**Document Type: **Datasheet**Copyright: **HANGZHOU SILAN MICROELECTRONICS CO.,LTD**Website: **<http://www.silan.com.cn>**Rev.: **1.1**

Revision History:

1. Add package outline of TO-252-2L

Rev.: **1.0**

Revision History:

1. First release