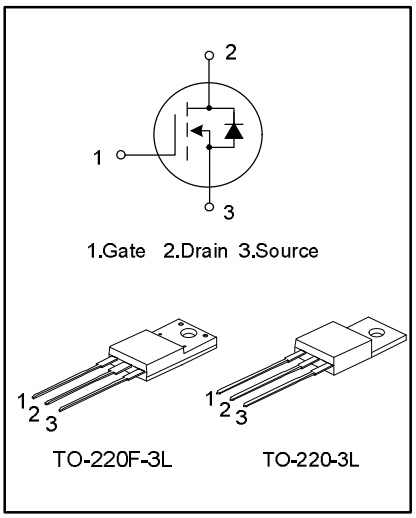
4A, 650V N-CHANNEL MOSFET

GENERAL DESCRIPTION

SVD4N65T/F is an N-channel enhancement mode power MOS field effect transistor which is produced using Silan proprietary S-Rin™ structure DMOS technology. The improved planar stripe cell and the improved guarding ring terminal have been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are widely used in AC-DC power suppliers, DC-DC converters and H-bridge PWM motor drivers.



FEATURES

- 4A,650V,$R_{DS(on)}$（typ）=2.3Ω@V_{GS}=10V
- Low gate charge
- Low Crss
- Fast switching
- Improved dv/dt capability

ORDERING SPECIFICATIONS

Part No.	Package	Marking	Shipping
SVD4N65T	TO-220-3L	SVD4N65T	50Unit/Tube
SVD4N65F	TO-220F-3L	SVD4N65F	50Unit/Tube

ABSOLUTE MAXIMUM RATINGS (Tc=25°C unless otherwise noted)

Parameter	Symbol	SVD4N65T	SVD4N65F	Unit
Drain-Source Voltage	V_{DS}	650		V
Gate-Source Voltage	V_{GS}	±30		V
Drain Current	I_D	4.0		A
Drain Current Pulsed	I_{DM}	16		A
Power Dissipation(T_C=25°C)	P_D	100	33	W
-Derate above 25°C		0.8	0.26	W/°C
Single Pulsed Avalanche Energy (Note 1)	E_{AS}	240		mJ
Repetitive Avalanche Energy	E_{AR}	10.6		mJ
Operation Junction Temperature	T_J	-55～+150		°C
Storage Temperature	T_{stg}	-55～+150		°C

THERMAL CHARACTERISTICS

Parameter	Symbol	SVD4N65T	SVD4N65F	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.25	3.79	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	62.5	°C/W

ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise noted)

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Drain -Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	650	--	--	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=650V, V_{GS}=0V	--	--	10	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V, 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=2A	--	2.3	3.0	Ω
Forward Transconductance	g_{FS}	VDS = 50 V, ID = 2 A	--	5.34	--	S
Input Capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V, f=1.0MHZ	--	556	710	pF
Output Capacitance	C_{oss}		--	50	80	
Reverse Transfer Capacitance	C_{rss}		--	3	11	
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=325V,I_D=4.0A, R_G=25Ω (Note 2,3)	--	20	30	ns
Turn-on Rise Time	t_r		--	19.3	80	
Turn-off Delay Time	$t_{d(off)}$		--	128	180	
Turn-off Fall Time	t_f		--	20	90	
Total Gate Charge	Q_g	V_{DS}=520V,I_D=4.0A, V_{GS}=10V (Note 2,3)	--	15.8	20	nC
Gate-Source Charge	Q_{gs}		--	3.5	--	
Gate-Drain Charge	Q_{gd}		--	5.6	--	

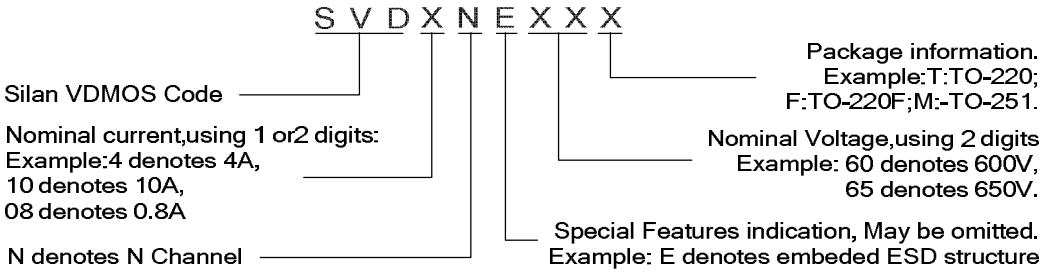
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	4.0	A
Pulsed Source Current	I_{SM}		--	--	16	
Diode Forward Voltage	V_{SD}	I_S=4.0A,V_{GS}=0V	--	--	1.4	V
Reverse Recovery Time	T_{rr}	I_S=4.0A,V_{GS}=0V, dI_F/dt=100A/μs	--	300	--	ns
Reverse Recovery Charge	Q_{rr}		--	2.2	--	μC

Notes:

1. L=27.5mH,I_{AS}=4.0A,V_{DD}=50V,R_G=25Ω,starting T_J=25°C;
2. Pulse Test: Pulse width ≤300μs,Duty cycle≤2%;
3. Essentially independent of operating temperature.

NOMENCLATURE



TYPICAL CHARACTERISTICS

Figure 1. On-Region Characteristics

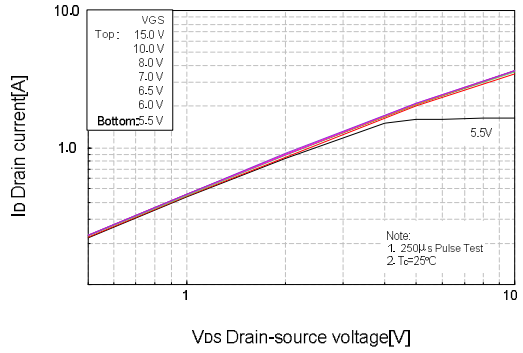


Figure 2. Transfer Characteristics

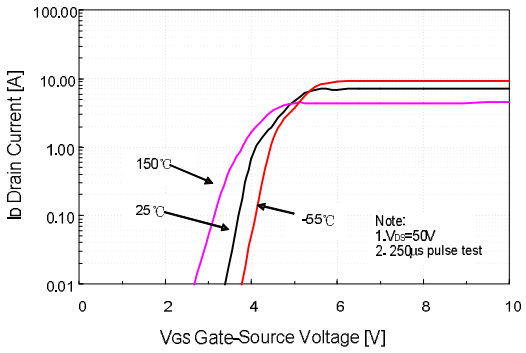


Figure 3. On-Resitance Variation vs. Drain Current and Gate Voltage

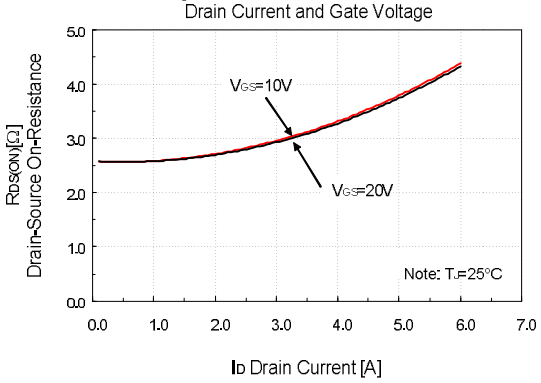
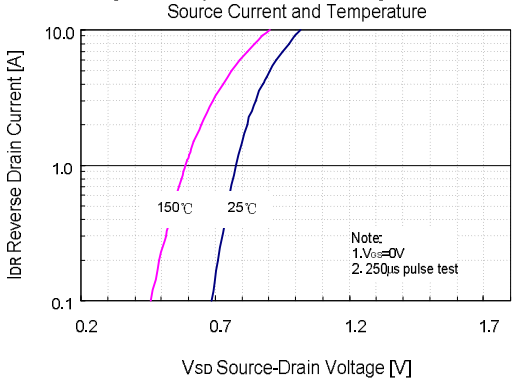


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature



TYPICAL CHARACTERISTICS (continued)

Figure 5. Capacitance Characteristics

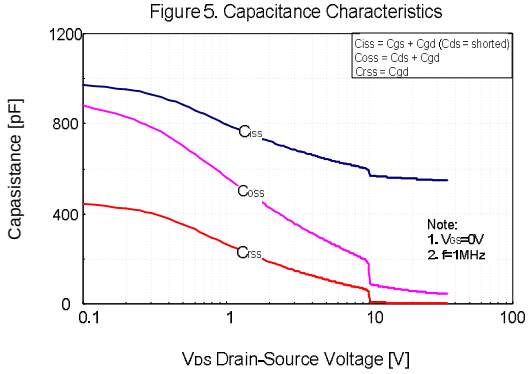


Figure 6. Gate Charge Characteristics

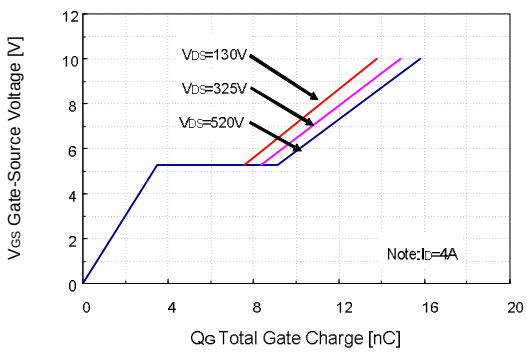


Figure 7. Breakdown Voltage Variation vs. Temperature

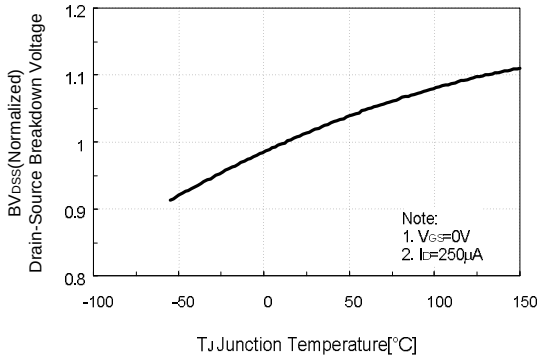
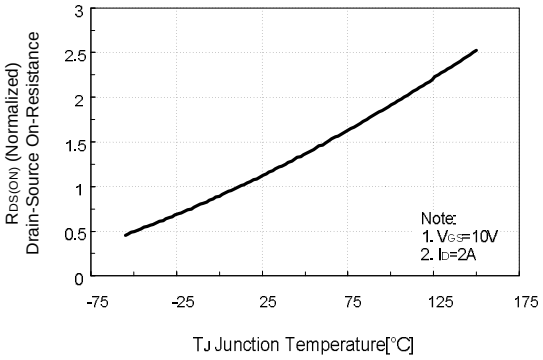
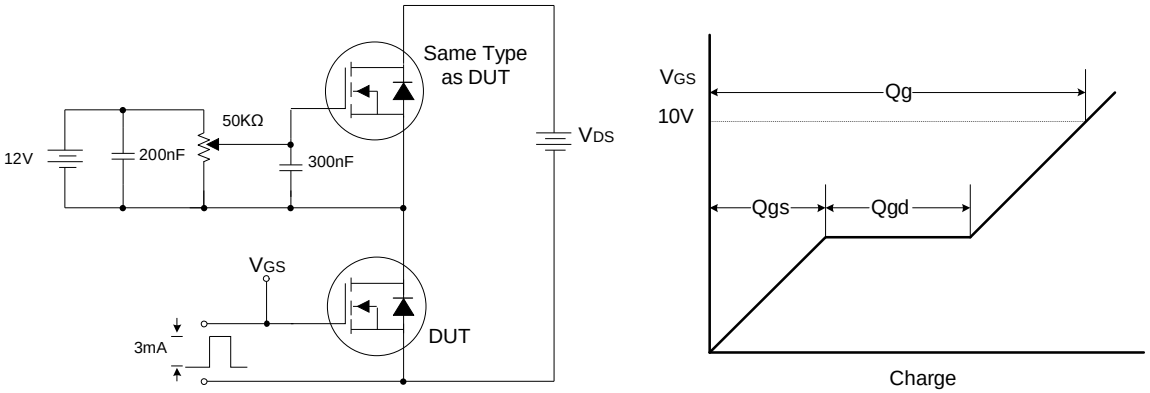


Figure 8. On-resistance Variation vs Temperature

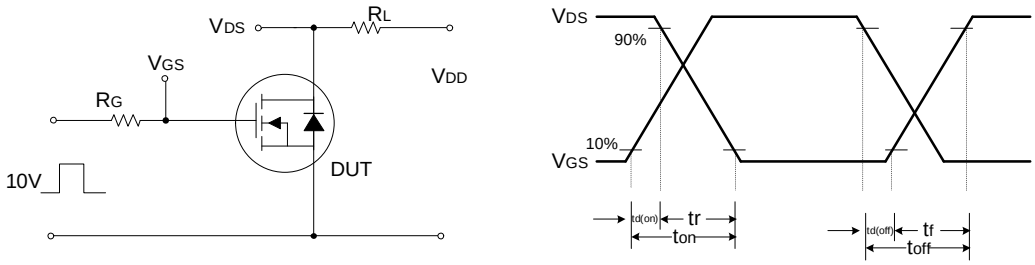


TYPICAL TEST CIRCUIT

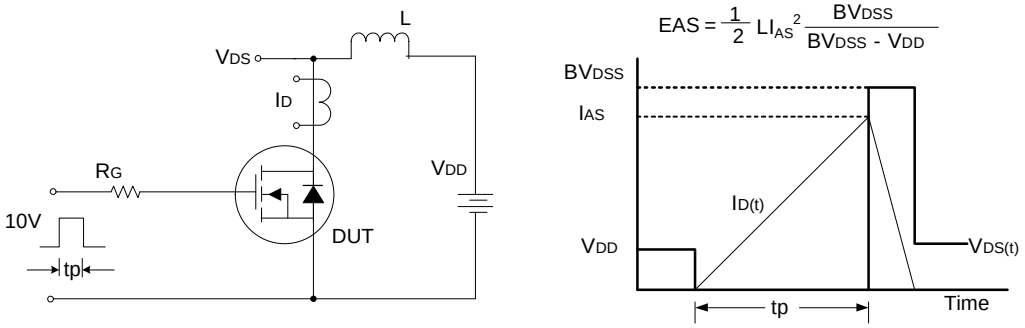
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

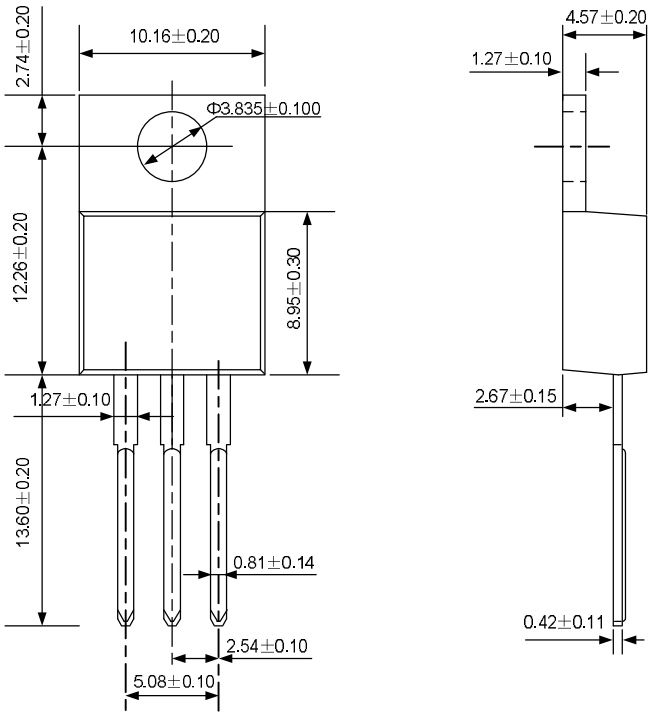


Unclamped Inductive Switching Test Circuit & Waveform

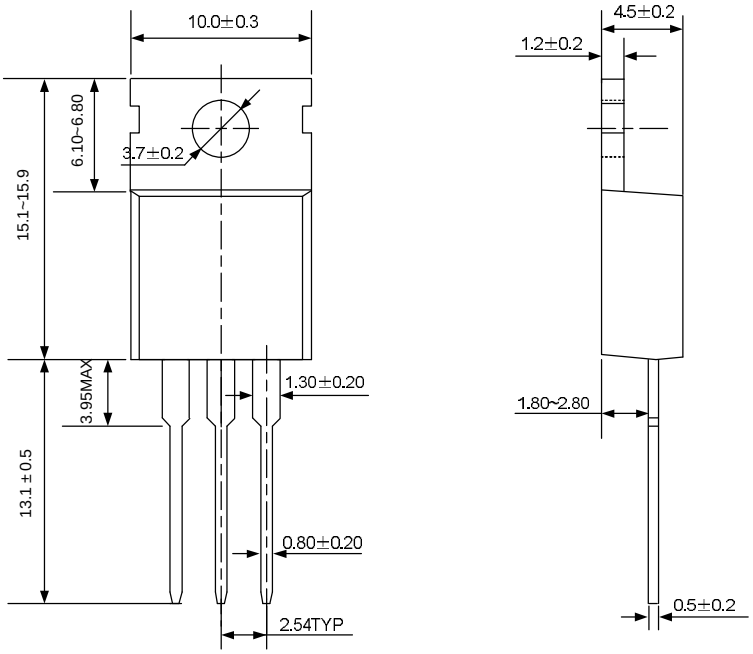


PACKAGE OUTLINE

TO-220-3L(One) UNIT:mm

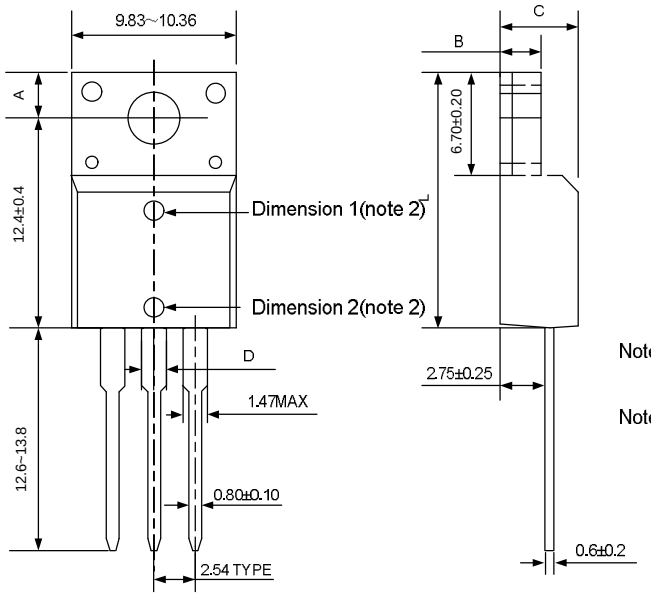


TO-220-3L（Two） UNIT: mm



PACKAGE OUTLINE (continued)

TO-220F-3L(One) UNIT:mm



Symbol(note1)	Dimension1	Dimension2
A	3.30±0.15	2.70±0.15
B	2.55±0.20	3.0±0.20
C	4.72±0.2	4.50±0.20
D	1.47MAX	1.75MAX
L	15.75±0.30	15.00±0.30

Note1: There may be two values for some products due to different plastic mould machine, so two dimensions of the same position are listed;
Note2: When the product size is Dimension1, the thimble hole is on top of the surface; when the size is Dimension2, the center hole is on bottom of the surface.

TO-220F-3L（Two） UNIT: mm