

5A, 600V N-CHANNEL MOSFET

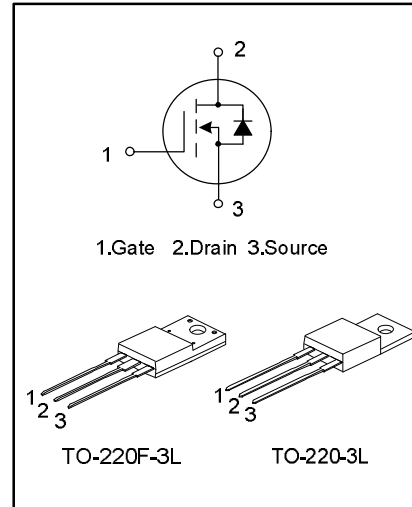
GENERAL DESCRIPTION

SVD5N60AT/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

- * 5A,600V, $R_{DS(on)}$ (typ) = 2.0Ω @ $V_{GS}=10V$
- * Low gate charge
- * Low C_{rss}
- * Fast switching
- * Improved dv/dt capability



ORDERING SPECIFICATIONS

Part No.	Package	Marking	Shipping
SVD5N60AT	TO-220-3L	SVD5N60AT	50Unit/Tube
SVD5N60AF	TO-220F-3L	SVD5N60AF	50Unit/Tube

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

Parameter	Symbol	SVD5N60AT	SVD5N60AF	Unit
Drain-Source Voltage	V_{DS}	600		V
Gate-Source Voltage	V_{GS}	± 30		V
Drain Current	I_D	5.0		A
Power Dissipation(Tc=25°C)	P_D	100	33	W
-Derate above 25°C		0.8	0.26	W/°C
Single Pulsed Avalanche Energy (Note 1)	EAS	330		mJ
Repetitive Avalanche Energy (Note 2)	EAR	7.3		mJ
Operation Junction Temperature	T_J	-55~+150		°C
Storage Temperature	T_{stg}	-55~+150		°C

THERMAL CHARACTERISTICS

Parameter	Symbol	SVD5N60AT	SVD5N60AF	Unit
Thermal Resistance, Junction-to-Case	R _{θJC}	1.25	3.79	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	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	BVDSS	V _{GS} =0V, I _D =250μA	600	--	--	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =600V, 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	--	2.0	2.4	Ω
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHZ	--	672	--	pF
Output Capacitance	C _{oss}		--	66	--	
Reverse Transfer Capacitance	C _{rss}		--	4.7	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} =300V, I _D =4.4A, R _G =25Ω (Note 3,4)	--	27	--	ns
Turn-on Rise Time	t _r		--	19	--	
Turn-off Delay Time	t _{d(off)}		--	160	--	
Turn-off Fall Time	t _f		--	22	--	
Total Gate Charge	Q _g	V _{DS} =480V, I _D =4.4A, V _{GS} =10V (Note 3,4)	--	19.8	--	nC
Gate-Source Charge	Q _{gs}		--	4	--	
Gate-Drain Charge	Q _{gd}		--	7.2	--	

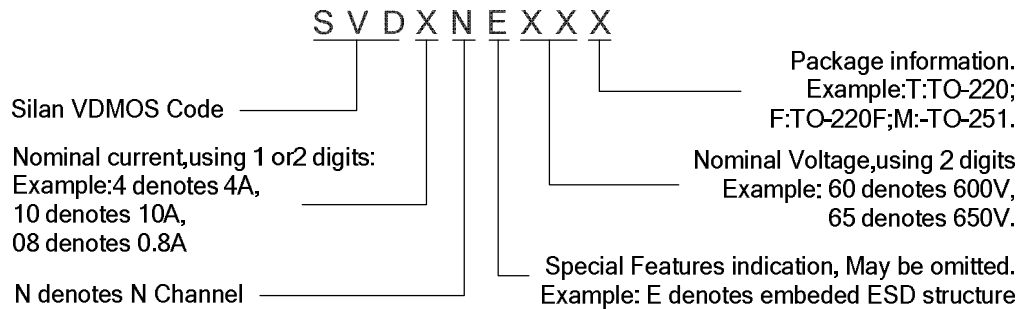
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I _S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	5.0	A
Pulsed Source Current	I _{SM}		--	--	16	
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,	--	300	--	ns
Reverse Recovery Charge	Q _{rr}	dI _F /dt=100A/μs (Note 3)	--	2.2	--	μC

Notes:

1. L=30mH, I_{AS}=4.4A, V_{DD}=85V, R_G=25Ω, starting T_J=25°C;
2. Repetitive Rating: Pulse width limited by maximum junction temperature;
3. Pulse Test: Pulse width ≤300μs, Duty cycles ≤2%;
4. Essentially independent of operating temperature.

NOMENCLATURE



TYPICAL CHARACTERISTICS

Figure 1. On-Region Characteristics

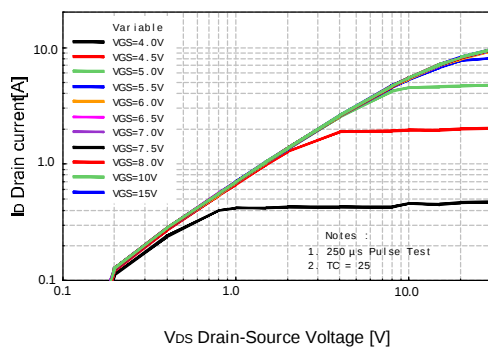


Figure 2. Transfer Characteristics

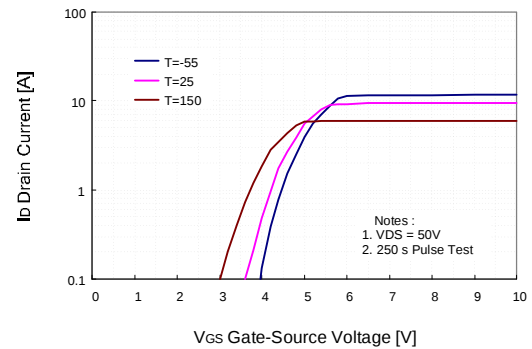


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

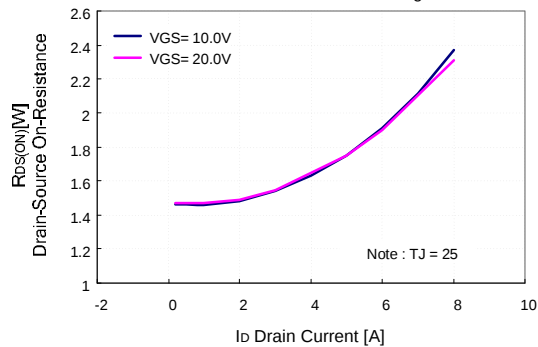
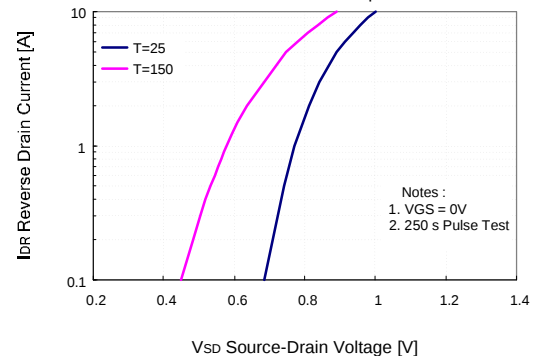


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature



TYPICAL CHARACTERISTICS (continued)

Figure 5. Capacitance Characteristics

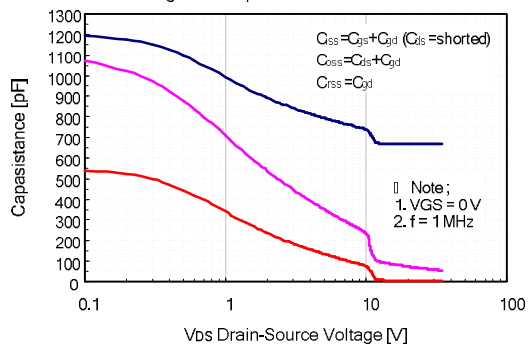


Figure 6. Gate Charge Characteristics

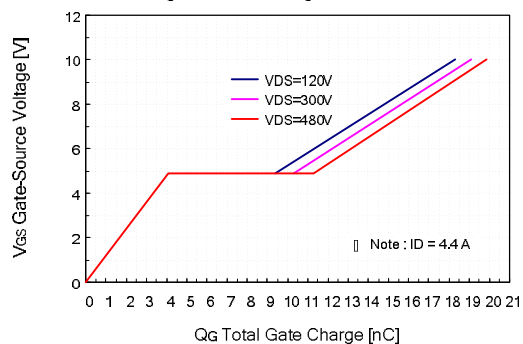


Figure 7. Breakdown Voltage Variation vs. Temperature

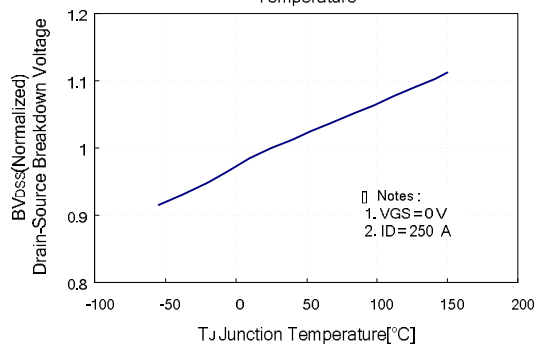
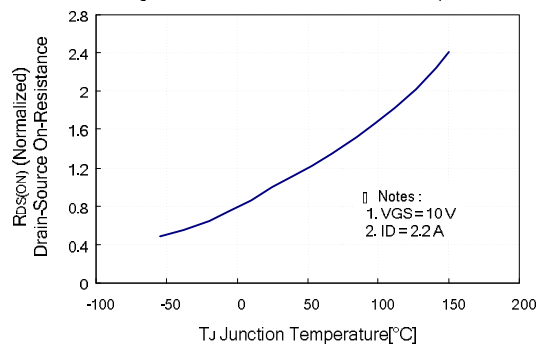
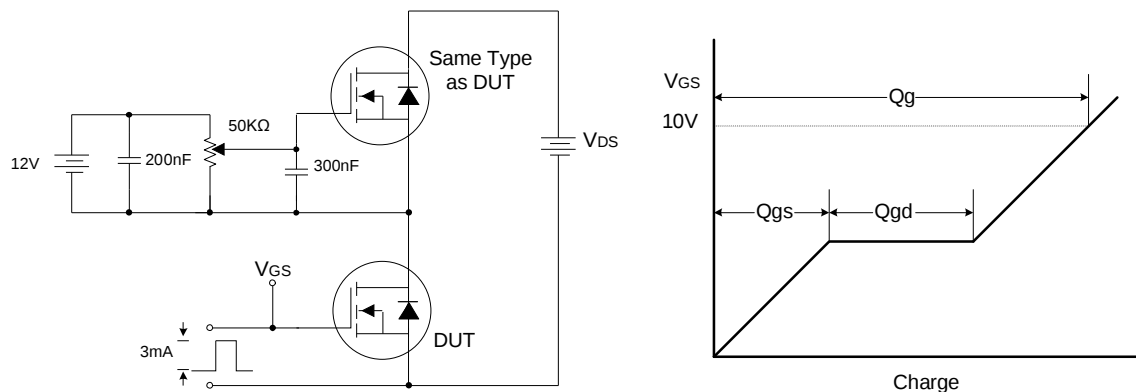


Figure 8. On-resistance Variation vs Temperature

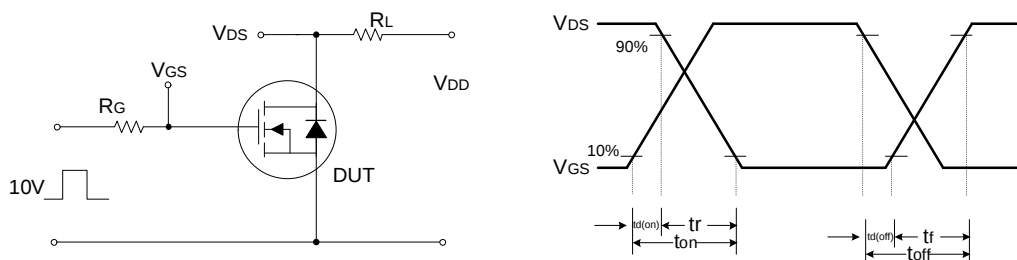


TYPICAL TEST CIRCUIT

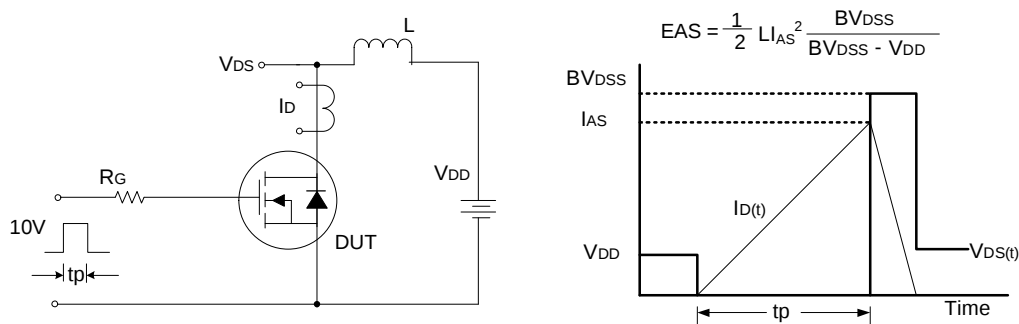
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



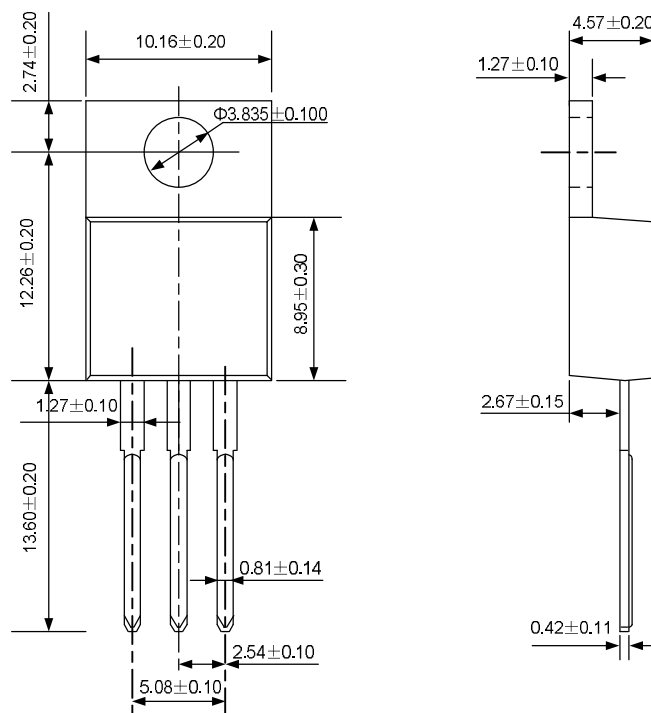
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

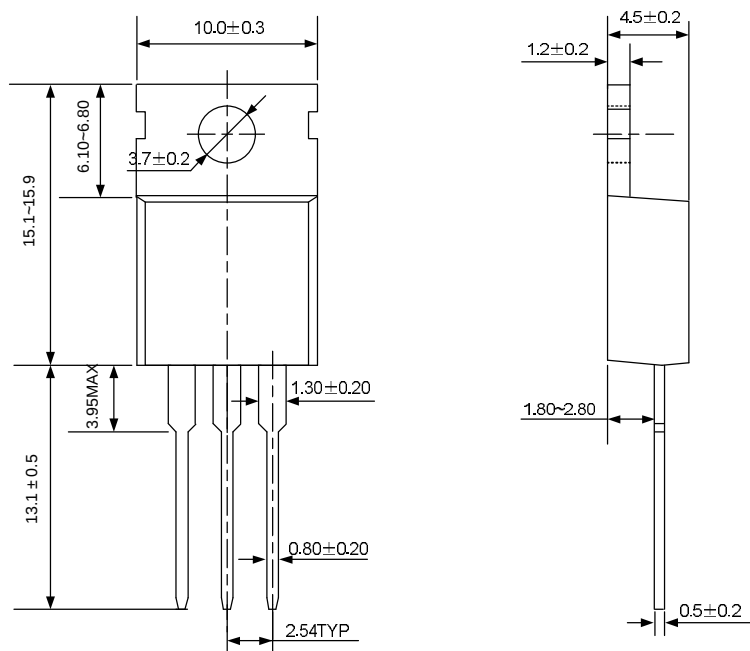
TO-220-3L(One)

UNIT: mm



TO-220-3L (Two)

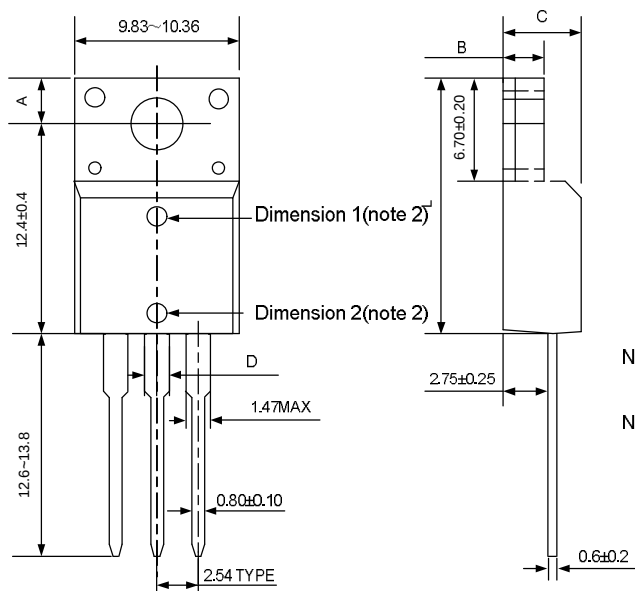
UNIT: mm



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	1.47 MAX	1.75 MAX
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

