

## **5A, 600V N-CHANNEL MOSFET**

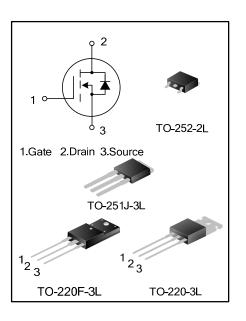
#### **GENERAL DESCRIPTION**

SVF5N60T/F/D/MJ is an N-channel enhancement mode power MOS field effect transistor which is produced using Silan proprietary F-Cell<sup>TM</sup> structure VDMOS technology. improved planar stripe cell and the improved guard 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

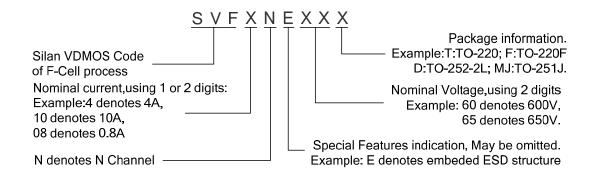
These devices are widely used in AC-DC power suppliers, DC-DC converters and H-bridge PWM motor drivers.

## **FEATURES**

- \*  $5A,600V,R_{DS(on)}(typ) = 1.88\Omega@V_{GS}=10V$
- \* Low gate charge
- \* Low Crss
- \* Fast switching
- \* Improved dv/dt capability



#### **NOMENCLATURE**



#### ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SVF5N60T	TO-220-3L	SVF5N60T	Pb free	Tube
SVF5N60F	TO-220F-3L	SVF5N60F	Pb free	Tube
SVF5N60D	TO-252-2L	SVF5N60D	Pb free	Tube
SVF5N60DTR	TO-252-2L	SVF5N60D	Pb free	Tape & Reel
SVF5N60MJ	TO-251J-3L	SVF5N60MJ	Pb free	Tube

Page 1 of 10



# SVF5N60T/F/D/MJ\_Datasheet

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

Characteristics		0 1 1	Ratings		
		Symbol	SVF5N60T/D/MJ	SVF5N60F	Unit
Drain-Source Voltage	Drain-Source Voltage		600		V
Gate-Source Voltage	Gate-Source Voltage		±30		V
But O was	T <sub>C</sub> =25°C		5		A
Drain Current	T <sub>C</sub> =100°C	l <sub>D</sub>	3.1		
Drain Current Pulsed		I <sub>DM</sub>	20		Α
Power Dissipation(T <sub>C</sub> =25°C)			120	40	W
-Derate above 25°C		P <sub>D</sub>	0.96	0.32	W/°C
Single Pulsed Avalanche Energy (Note 1)		E <sub>AS</sub>	242		mJ
Operation Junction Temperature Range		TJ	<i>-</i> 55∼+150		°C
Storage Temperature Range		T <sub>stg</sub>	-55∼+150		°C

## THERMAL CHARACTERISTICS

		Ratings				
Characteristics	Symbol	SVF5N	SVF5N	SVF5N	SVF5N	Unit
		60T	60D	60MJ	60F	
Thermal Resistance, Junction-to-Case	R <sub>0</sub> JC	1.04	1.04	1.00	3.13	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	110	110	120	°C/W

## **ELECTRICAL CHARACTERISTICS** (Tc=25°C unless otherwise noted)

Characteristics	Symbol	Test conditions	Min.	Тур.	Max.	Unit
Drain -Source Breakdown Voltage	B <sub>VDSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	600			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V	-		1.0	μΑ
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±30V, V <sub>DS</sub> =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 <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =2.5A	-	1.88	2.15	Ω
Input Capacitance	$C_{iss}$		-	479.8		
Output Capacitance	$C_{oss}$	V <sub>DS</sub> =25V,V <sub>GS</sub> =0V, f=1.0MHZ		62.7		pF
Reverse Transfer Capacitance	$C_{rss}$			2.1		
Turn-on Delay Time	$t_{d(on)}$			14.93		
Turn-on Rise Time	t <sub>r</sub>	$V_{DD}$ =300V, $I_{D}$ =5.0A, $R_{G}$ =25 $\Omega$	-	28.40		
Turn-off Delay Time	$t_{d(off)}$	(Nata 2.2)	-	28.27		ns
Turn-off Fall Time	t <sub>f</sub>	(Note 2,3)	-	21.73		
Total Gate Charge	$Q_g$			9.27		
Gate-Source Charge	$Q_gs$	$V_{DS}$ =480V, $I_{D}$ =5.0A, $V_{GS}$ =10V		2.79		nC
Gate-Drain Charge	$Q_{gd}$	(Note 2,3)		3.37		



## SVF5N60T/F/D/MJ\_Datasheet

## SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

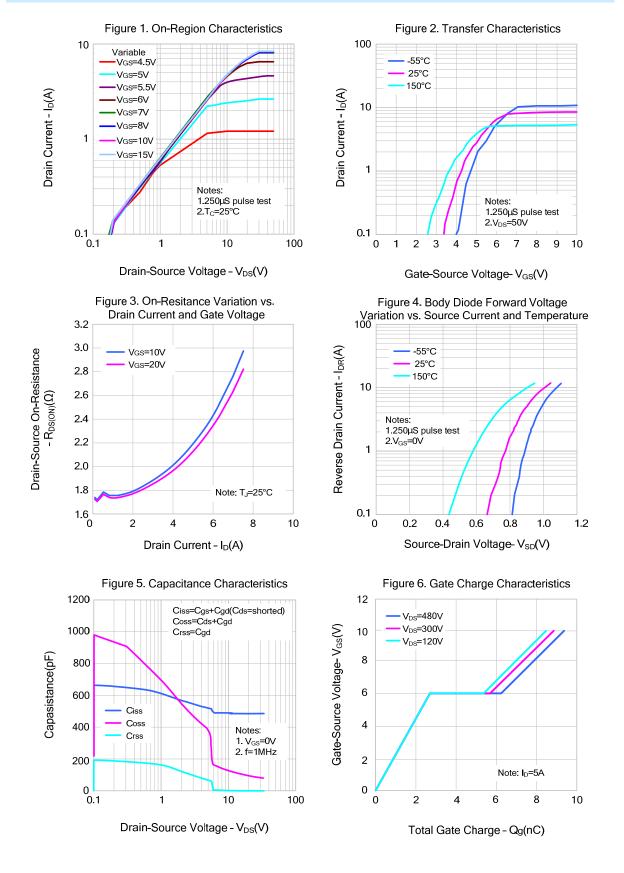
Characteristics	Symbol	Test conditions	Min.	Тур.	Max.	Unit
Continuous Source Current	Is	Integral Reverse P-N			5	
Pulsed Source Current	I <sub>SM</sub>	Junction Diode in the MOSFET			20	Α
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =5.0A,V <sub>GS</sub> =0V	-	-	1.4	V
Reverse Recovery Time	T <sub>rr</sub>	I <sub>S</sub> =5.0A,V <sub>GS</sub> =0V,	-	190	-	ns
Reverse Recovery Charge	Qrr	dl <sub>F</sub> /dt=100A/μs		0.53		μC

#### Notes:

- 1. L=30 mH,  $I_{AS}$ =3.78A,  $V_{DD}$ =70V,  $R_{G}$ =25 $\Omega$ , starting  $T_{J}$ =25 $^{\circ}$ C;
- 2. Pulse Test: Pulse width ≤300µs,Duty cycle≤2%;
- 3. Essentially independent of operating temperature.

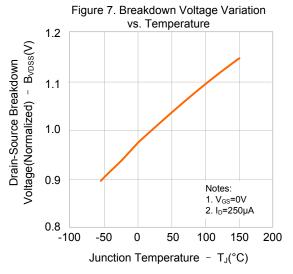


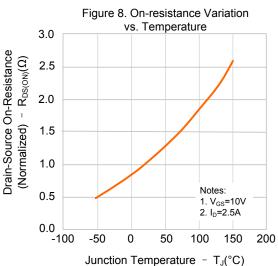
#### **TYPICAL CHARACTERISTICS**

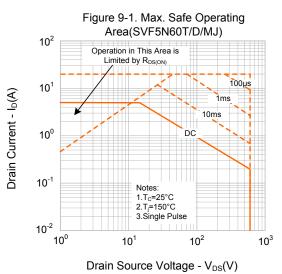


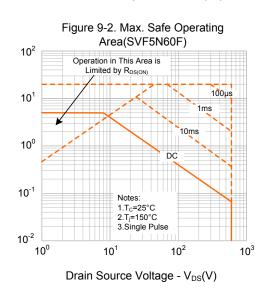


## **TYPICAL CHARACTERISTICS(continued)**

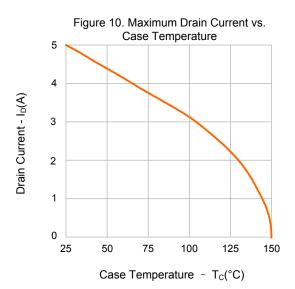








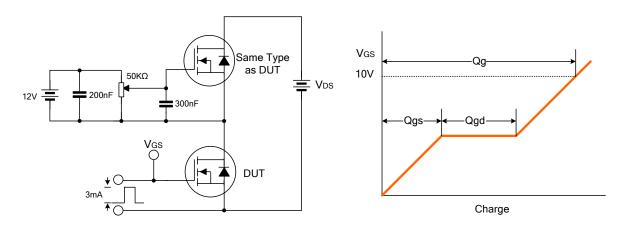
Drain Current - I<sub>D</sub>(A)



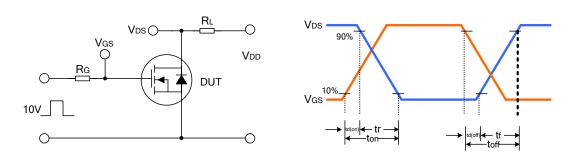


## **TYPICAL TEST CIRCUIT**

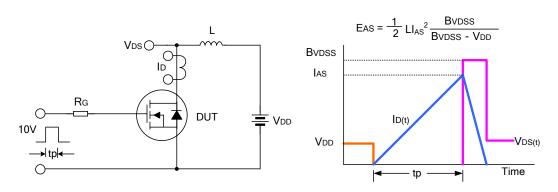
#### Gate Charge Test Circuit & Waveform



#### Resistive Switching Test Circuit & Waveform

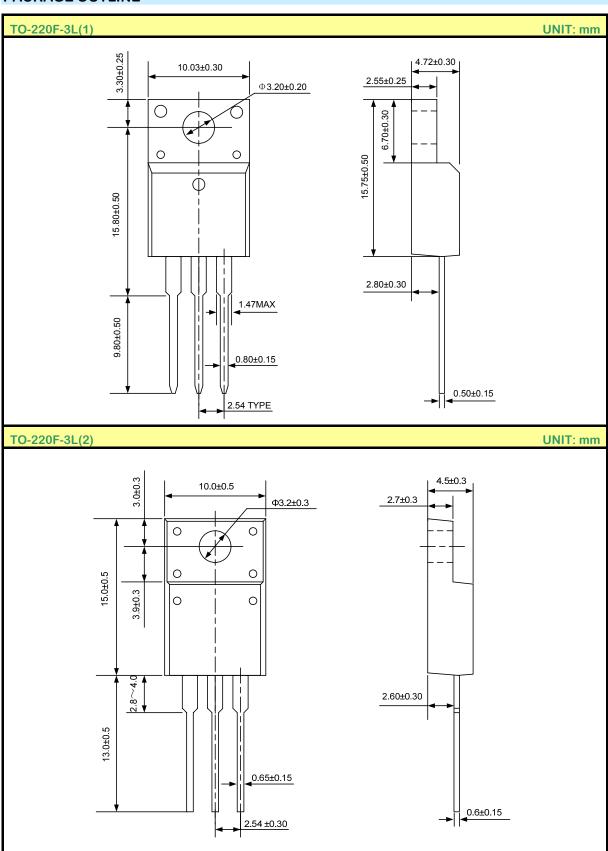


## Unclamped Inductive Switching Test Circuit & Waveform



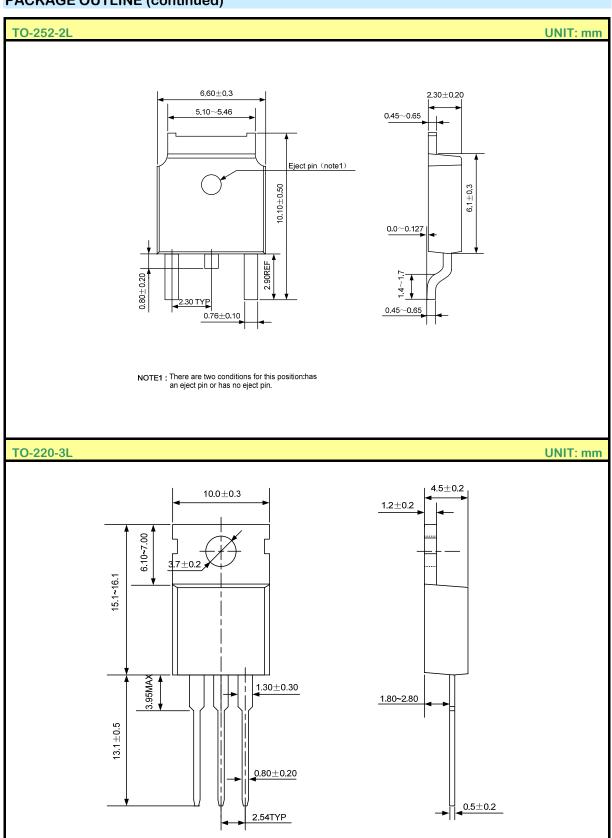


## **PACKAGE OUTLINE**



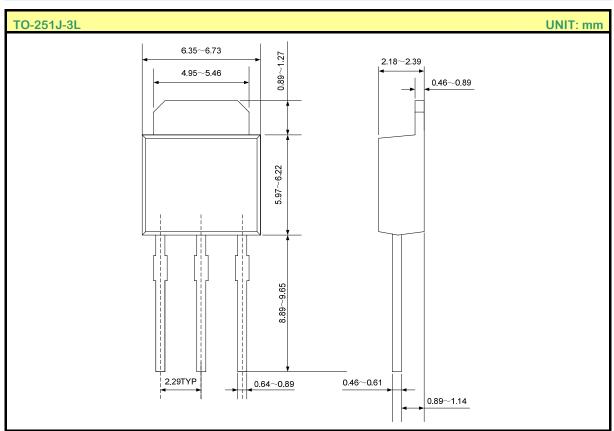


## **PACKAGE OUTLINE (continued)**





## **PACKAGE OUTLINE (continued)**



#### Disclaimer:

- Silan reserves the right to make changes to the information herein for the improvement of the design and performance without further notice! Customers should obtain the latest relevant information before placing orders and should verify that such information is complete and current.
- All semiconductor products malfunction or fail with some probability under special conditions. When using Silan products in system design or complete machine manufacturing, it is the responsibility of the buyer to comply with the safety standards strictly and take essential measures to avoid situations in which a malfunction or failure of such Silan products could cause loss of body injury or damage to property.
- Silan will supply the best possible product for customers!

Page 9 of 10



# SVF5N60T/F/D/MJ\_Datasheet

## **ATTACHMENT**

## **Revision History**

Date	REV	Description	Page
2011.02.11	1.0	Original	
2011.07.04	1.1	Add the package of TO-251J-3L	
2011.09.13	1.2	Update the package outline of TO-220-3L	