

9A, 900V N-CHANNEL MOSFET

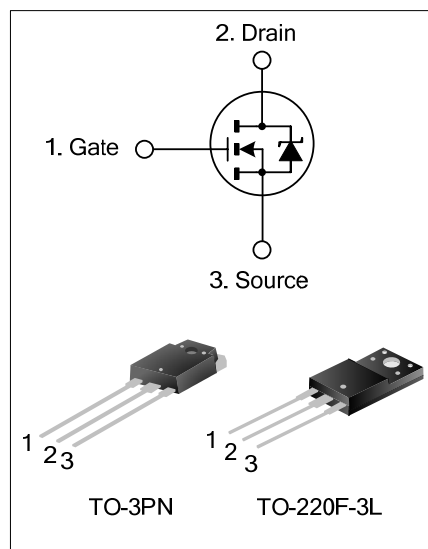
DESCRIPTION

SVF9N90F/PN is an N-channel enhancement mode power MOS field effect transistor which is produced using Silan proprietary F-Cell™ structure VDMOS technology. The 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 mode.

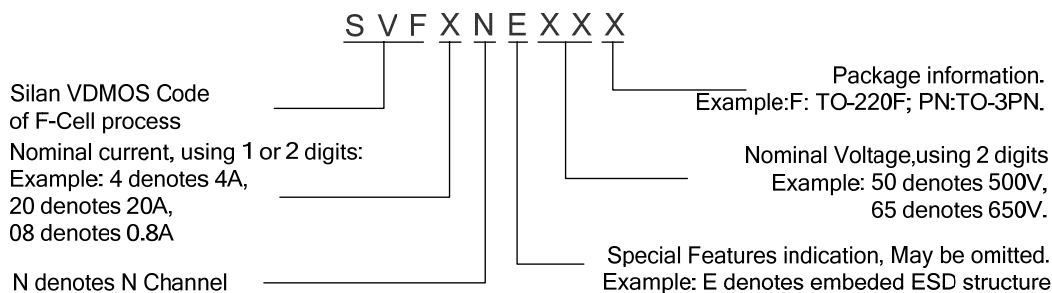
These devices are widely used in AC-DC power suppliers, DC-DC converters and H-bridge PWM motor drivers.

FEATURES

- * 9A, 900V, $R_{DS(on)}(typ.)=1.10\Omega@V_{GS}=10V$
- * Low gate charge
- * Low C_{rss}
- * Fast switching
- * Improved dv/dt capability



NOMENCLATURE



ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SVF9N90F	TO-220F-3L	SVF9N90F	Pb free	Tube
SVF9N90PN	TO-3PN	9N90	Pb free	Tube

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

Characteristics		Symbol	Ratings		Unit
			SVF9N90F	SVF9N90PN	
Drain-Source Voltage		V _{DS}	900		V
Gate-Source Voltage		V _{GS}	±30		V
Drain Current	T _C =25°C	I _D	9.0		A
	T _C =100°C		5.7		
Drain Current Pulsed		I _{DM}	36.0		A
Power Dissipation (T _C =25°C) -Derate above 25°C		P _D	68	240	W
			0.54	1.92	W/°C
Single Pulsed Avalanche Energy (Note 1)		E _{AS}	823		mJ
Operation Junction Temperature Range		T _J	-55~+150		°C
Storage Temperature Range		T _{stg}	-55~+150		°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings		Unit
		SVF9N90F	SVF9N90PN	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.84	0.52	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	120	50	$^{\circ}\text{C/W}$

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

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Drain -Source Breakdown Voltage	$B_{V_{DS}}$	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	900	--	--	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=900\text{V}, V_{GS}=0\text{V}$	--	--	1.0	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30\text{V}, V_{DS}=0\text{V}$	--	--	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu\text{A}$	2.0	--	4.0	V
On State Resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}, I_D=4.5\text{A}$	--	1.10	1.4	Ω
Input Capacitance	C_{iss}	$V_{DS}=25\text{V}, V_{GS}=0\text{V},$ $f=1.0\text{MHz}$	--	1634.2	--	pF
Output Capacitance	C_{oss}		--	143.5	--	
Reverse Transfer Capacitance	C_{rss}		--	7.1	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=450\text{V}, R_G=25\Omega,$ $I_D=9.0\text{A}$ (Note2,3)	--	21.44	--	ns
Turn-on Rise Time	t_r		--	30.76	--	
Turn-off Delay Time	$t_{d(off)}$		--	56.24	--	
Turn-off Fall Time	t_f		--	30.88	--	
Total Gate Charge	Q_g	$V_{DD}=720\text{V}, V_{GS}=10\text{V},$ $I_D=9.0\text{A}$ (Note 2,3)	--	30.52	--	nC
Gate-Source Charge	Q_{gs}		--	7.97	--	
Gate-Drain Charge	Q_{gd}		--	11.92	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	9.0	A
Pulsed Source Current	I_{SM}		--	--	36.0	
Diode Forward Voltage	V_{SD}	$I_S=9.0A, V_{GS}=0V$	--	--	1.4	V
Reverse Recovery Time	T_{rr}	$I_S=9.0A, V_{GS}=0V,$ $dI_F/dt=100A/\mu S$ (Note2)	--	657.04	--	ns
Reverse Recovery Charge	Q_{rr}		--	5.56	--	μC

Notes:

1. $L=30mH$, $I_{AS}=7.10A$, $V_{DD}=50V$, $R_G=25\Omega$, starting $T_J=25^\circ C$;
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

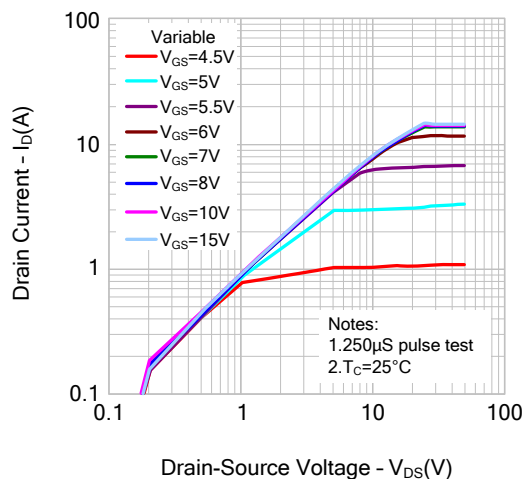


Figure 2. Transfer Characteristics

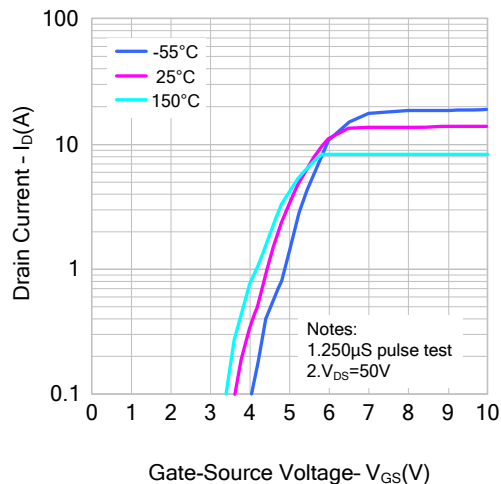


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

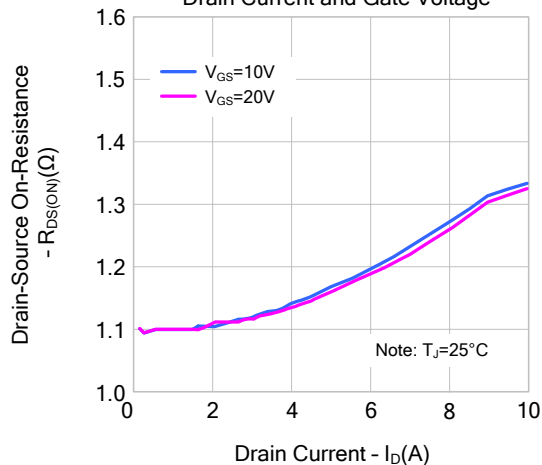


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

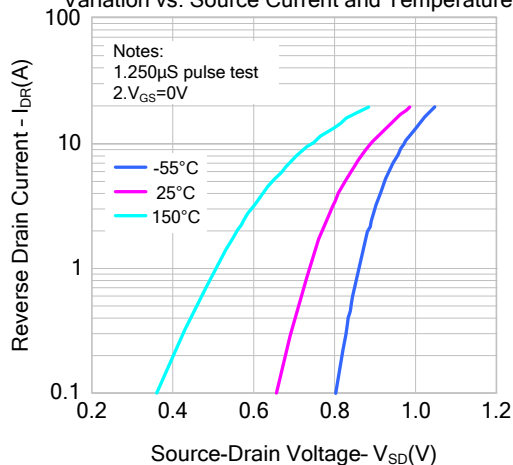


Figure 5. Capacitance Characteristics

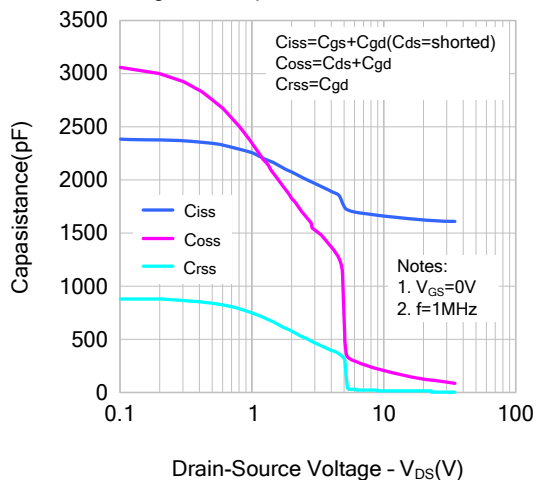
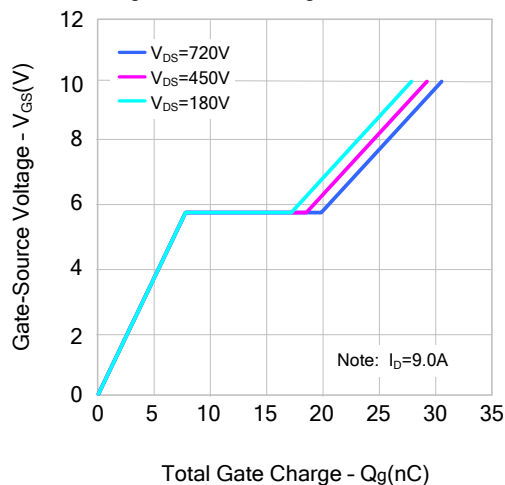


Figure 6. Gate Charge Characteristics



TYPICAL CHARACTERISTICS (continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

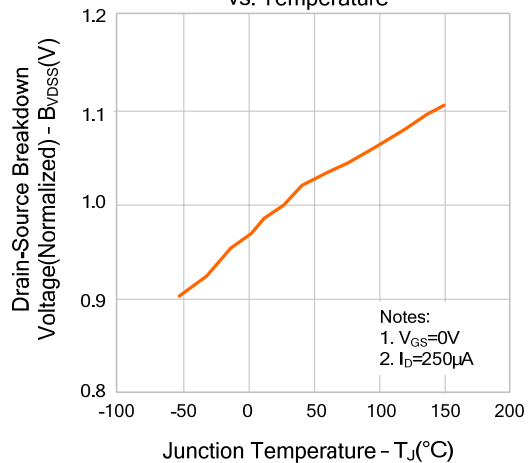


Figure 8. On-resistance Variation vs. Temperature

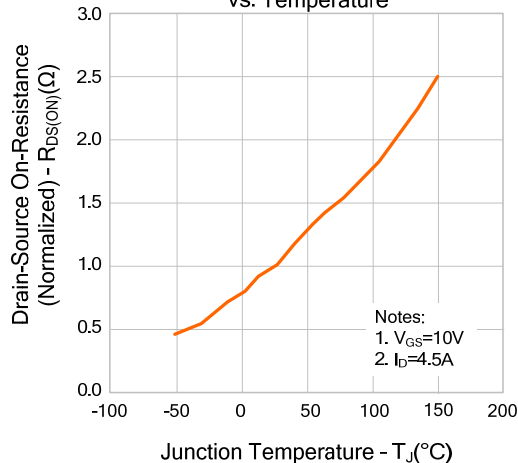


Figure 9-1. Max. Safe Operating Area(SVF9N90F)

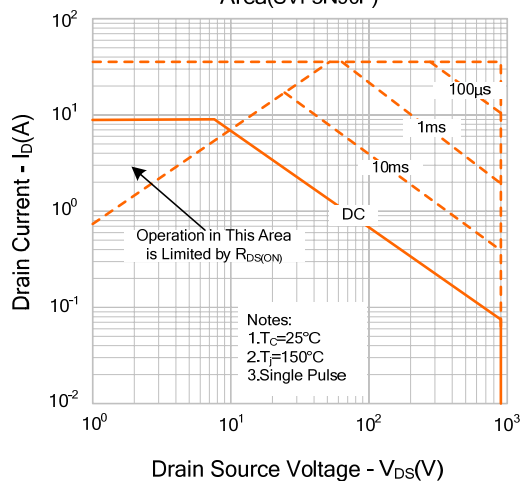


Figure 9-2. Max. Safe Operating Area(SVF9N90PN)

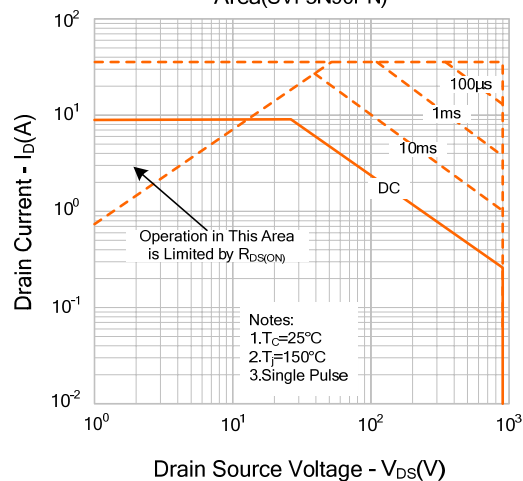
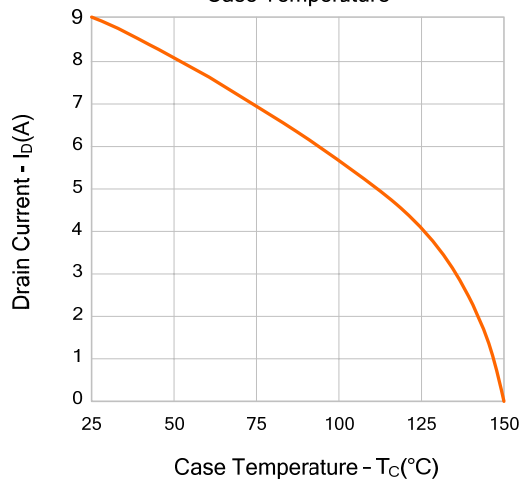
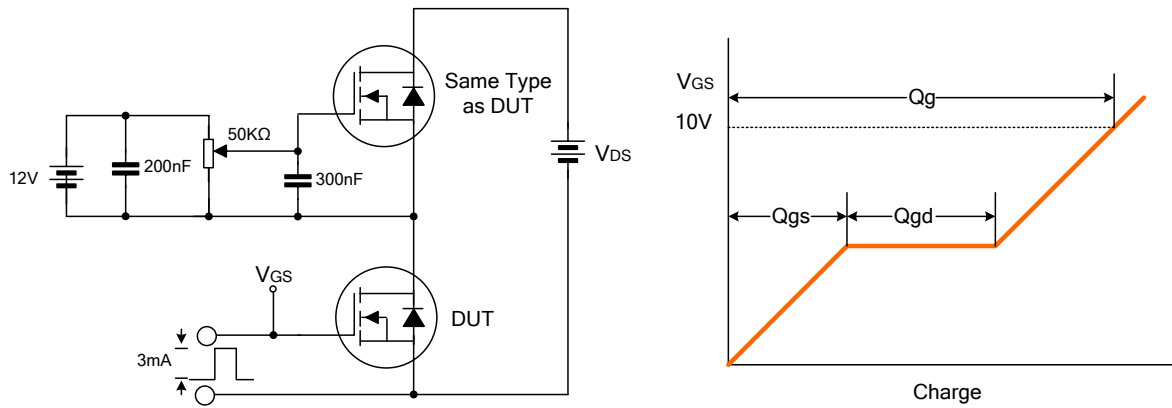


Figure 10. Maximum Drain Current vs. Case Temperature

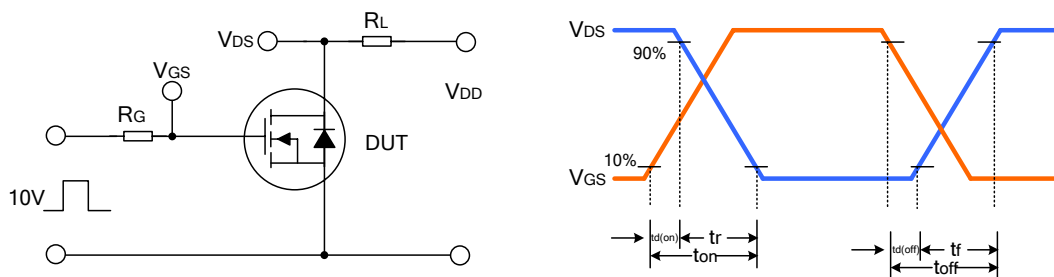


TYPICAL TEST CIRCUIT

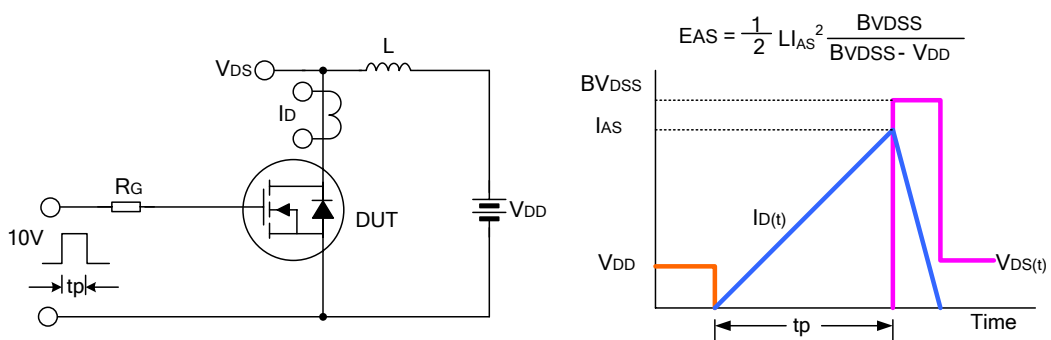
Gate Charge Test Circuit & Waveform



Switching Test Circuit & Waveform



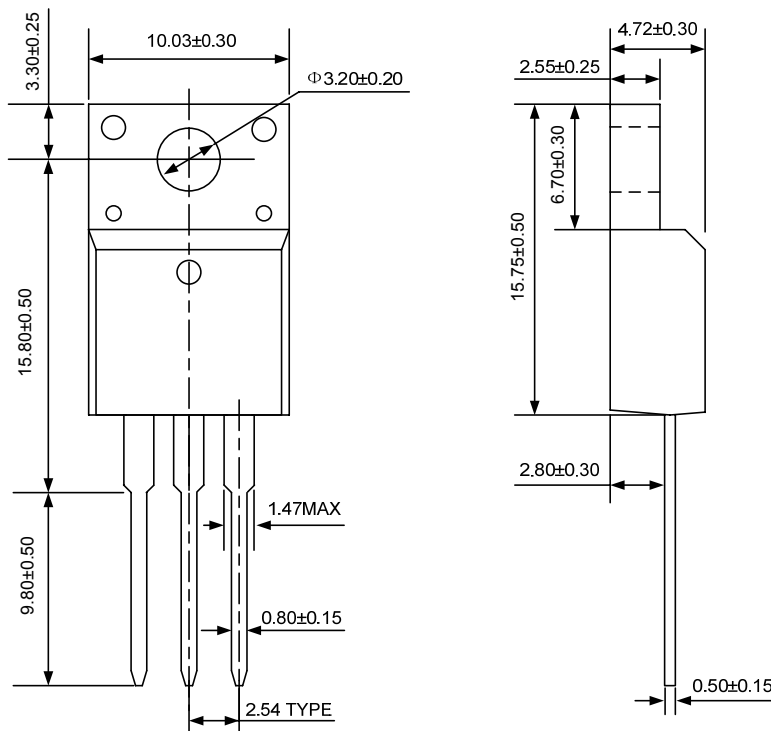
EAS Test Circuit & Waveform



PACKAGE OUTLINE

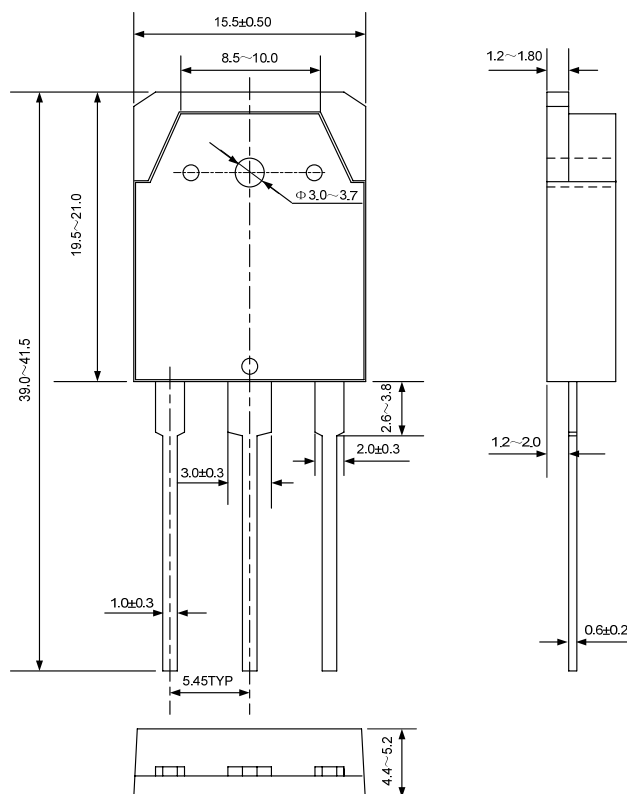
TO-220F-3L

UNIT: mm



TO-3PN

UNIT: mm



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- Silan will supply the best possible product for customers!

ATTACHMENT**Revision History**

Date	REV	Description	Page
2012.05.30	1.0	Initial release	