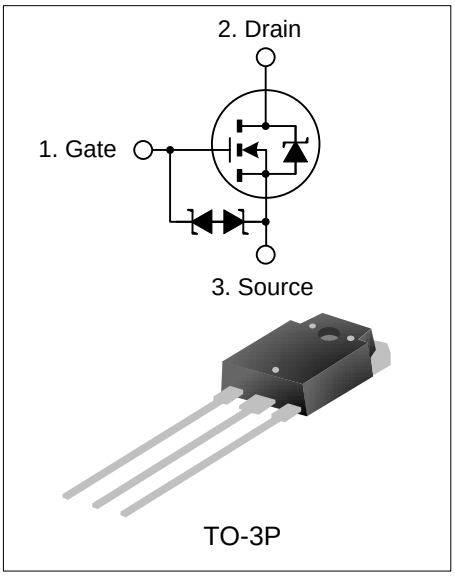
25A, 500V N-CHANNEL MOSFET

DESCRIPTION

SVF25NE50PN 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

- 25A, 500V, $R_{DS(on)\ (typ.)}$=0.18Ω@V_{GS}=10V
- Low gate charge
- Low Crss
- Fast switching
- Improved dv/dt capability

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SVF25NE50PN	TO-3P	25NE50	Pb free	Tube

ABSOLUTE MAXIMUM RATINGS (UNLESS OTHERWISE NOTED, T_C=25°C)

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	500	V
Gate-Source Voltage		V_{GS}	±30	V
Drain Current	T_C=25°C	I_D	25.0	A
	T_C=100°C		15.81	
Drain Current Pulsed		I_{DM}	100	A
Power Dissipation (T_C=25°C)		P_D	260	W
-Derate above 25°C			2.08	W/°C
Single Pulsed Avalanche Energy (Note 1)		E_{AS}	2560	mJ
Operation Junction Temperature Range		T_J	-55～+150	°C
Storage Temperature Range		T_{stg}	-55～+150	°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.48	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	°C/W

ELECTRICAL CHARACTERISTICS (UNLESS OTHERWISE NOTED, T_C=25°C)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Drain -Source Breakdown Voltage	B_{VDSS}	V_{GS}=0V, I_D=250μA	500	--	--	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=500V, V_{GS}=0V	--	--	1.0	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V	--	--	±100	μA
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}= V_{DS}, ID=250μA	2.0	--	4.0	V
On State Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=12.5A	--	0.18	0.27	Ω
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1.0MHZ	--	3466.5	--	pF
Output Capacitance	C_{oss}		--	413.0	--	
Reverse Transfer Capacitance	C_{rss}		--	9.5	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=250V, V_{GS}=10V, R_G=25Ω, I_D=25.0A (Note2,3)	--	54.1	--	ns
Turn-on Rise Time	t_r		--	76.1	--	
Turn-off Delay Time	$t_{d(off)}$		--	165.4	--	
Turn-off Fall Time	t_f		--	74.4	--	
Total Gate Charge	Q_g	V_{DD}=400V,V_{GS}=10V, I_D=25.0A (Note 2,3)	--	51.83	--	nC
Gate-Source Charge	Q_{gs}		--	16.22	--	
Gate-Drain Charge	Q_{gd}		--	14.49	--	

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	--	--	25.0	A
Pulsed Source Current	I_{SM}		--	--	100.0	
Diode Forward Voltage	V_{SD}	I_S=25.0A,V_{GS}=0V	--	--	1.4	V
Reverse Recovery Time	T_{rr}	I_S=25.0A,V_{GS}=0V, dI_F/dt=100A/μS (Note2)	--	626.13	--	ns
Reverse Recovery Charge	Q_{rr}		--	8.94	--	μC

Notes:

1. L=30mH, I_{AS}=12A, V_{DD}=100V, R_G=25Ω, starting T_J=25°C;
2. Pulse Test: Pulse width ≤300μs,Duty cycle≤2%;
3. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

Figure 1. On-Region Characteristics

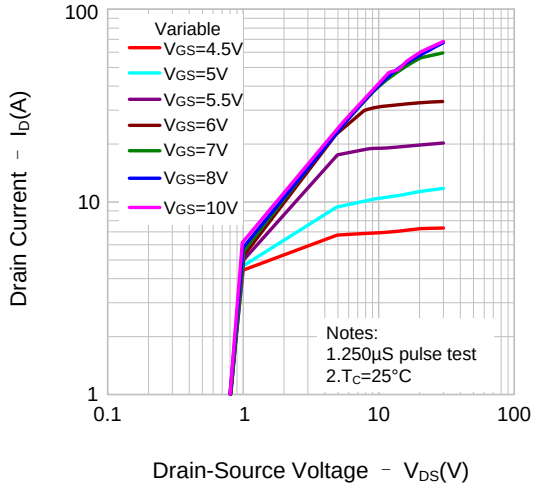


Figure 2. Transfer Characteristics

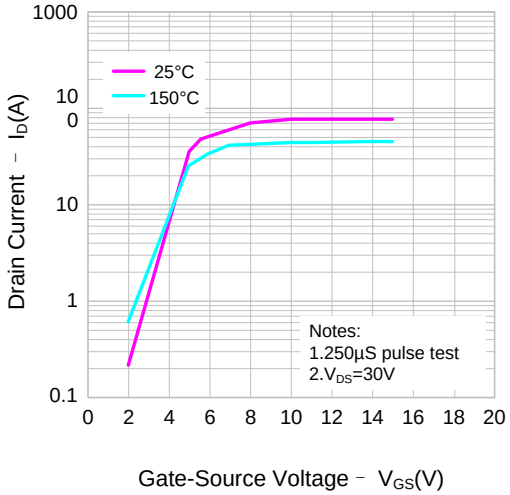


Figure 3. On-Resitance Variation vs. Drain Current and Gate Voltage

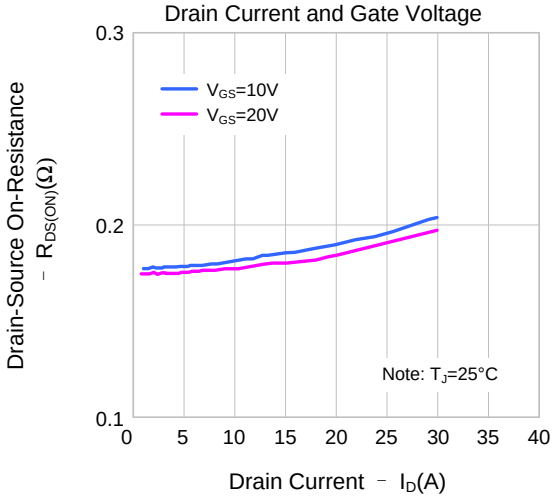
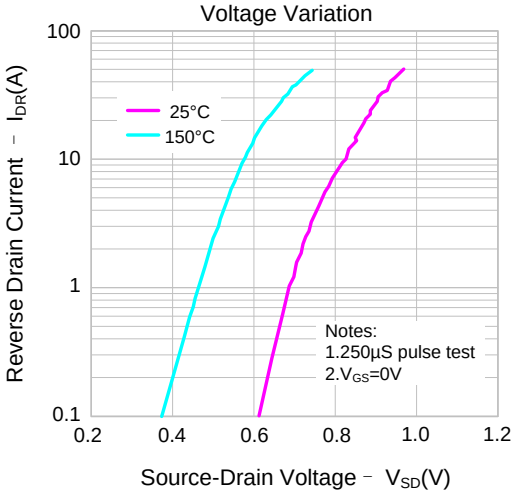


Figure 4. Source-Drain Diode Forward Voltage Variation



TYPICAL CHARACTERISTICS

Figure 5. Capacitance Characteristics

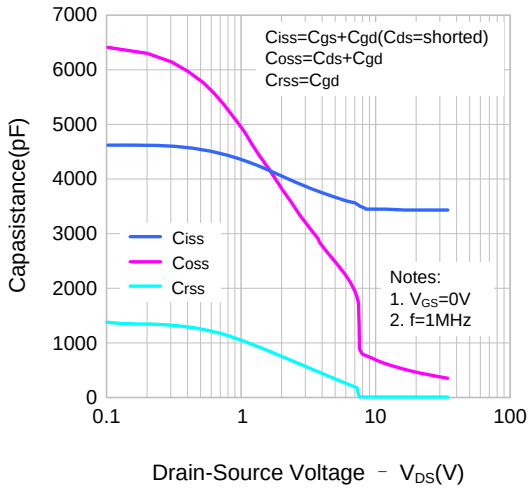


Figure 6. Gate Charge Characteristics

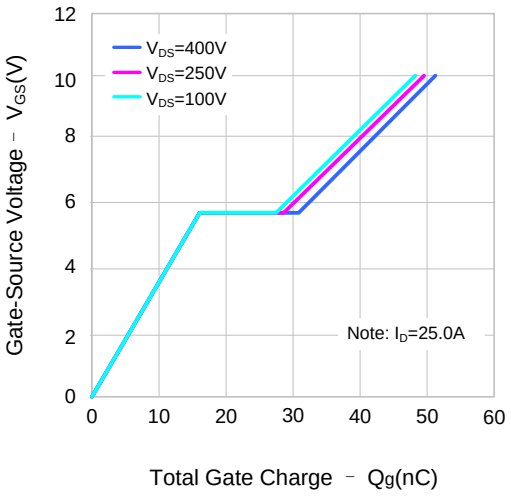


Figure 7. Breakdown Voltage Variation vs. Temperature

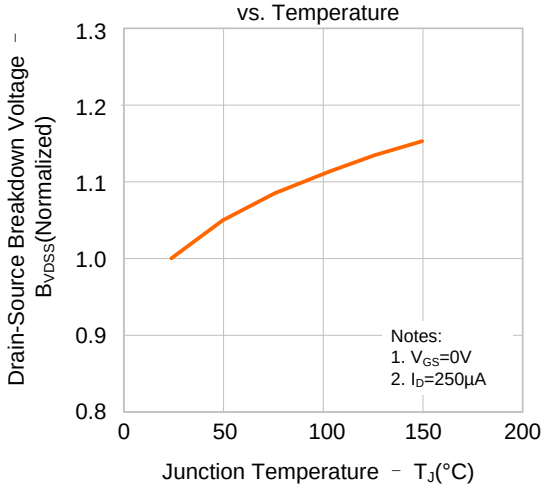


Figure 8. On-resistance Variation vs. Temperature

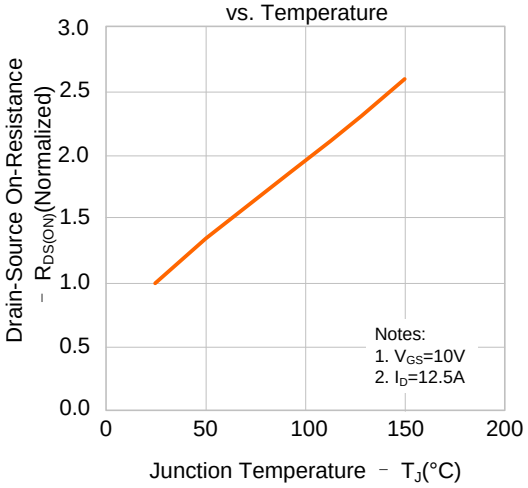


Figure 9. Max. Safe Operating Area

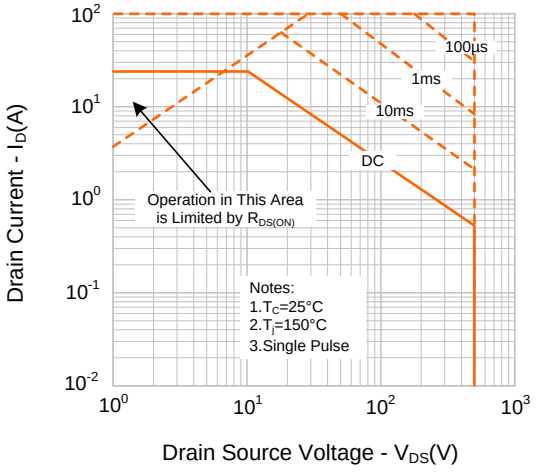
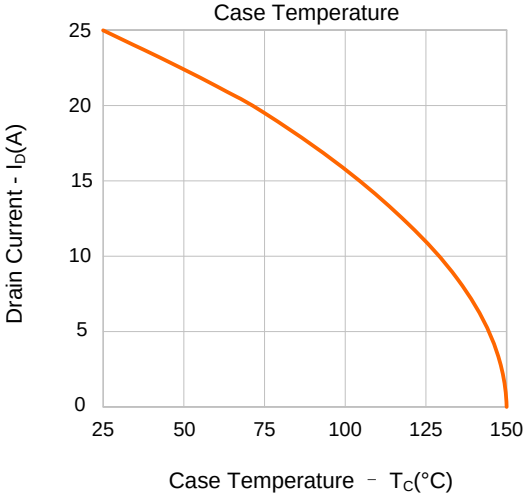
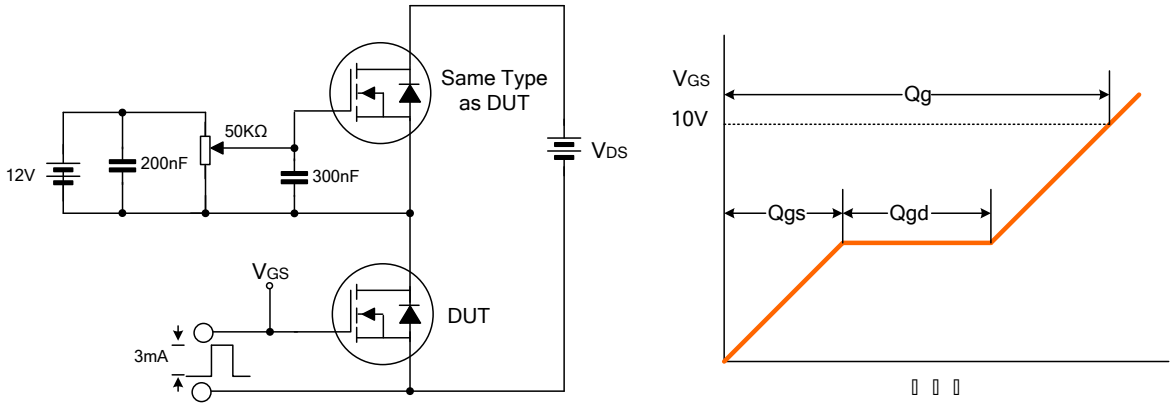


Figure 10. Maximum Drain Current vs. Case Temperature

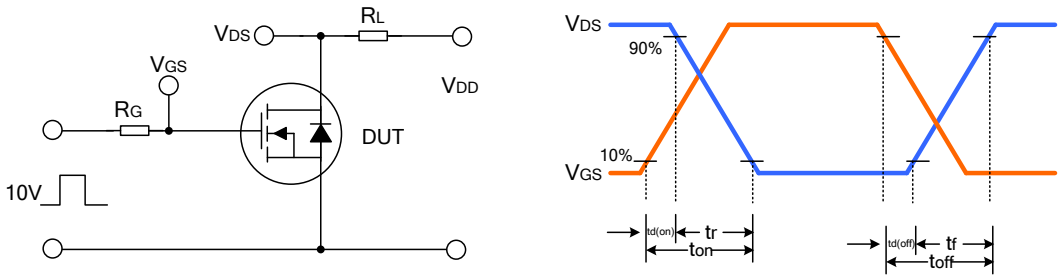


TYPICAL TEST CIRCUIT

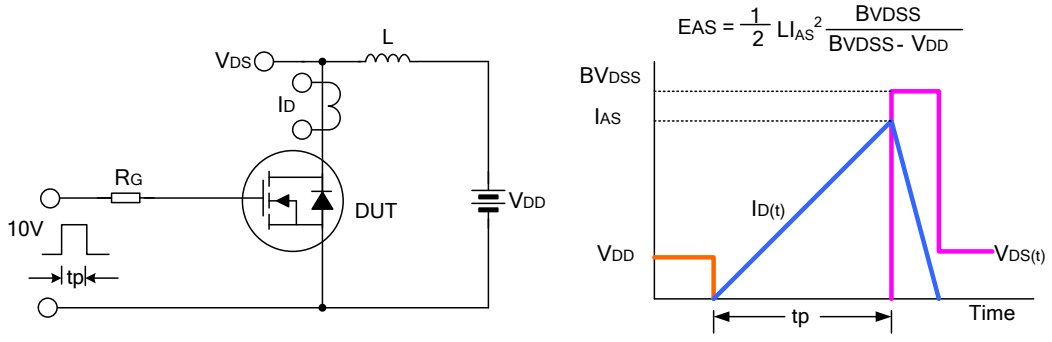
Gate Charge Test Circuit & Waveform



Switching Test Circuit & Waveform

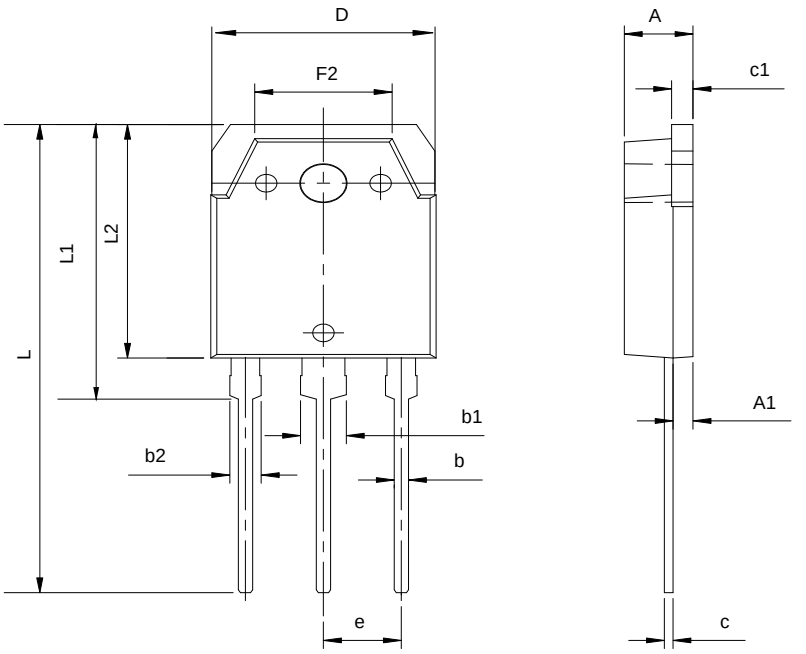


EAS Test Circuit & Waveform



PACKAGE OUTLINE

TO-3P **UNIT：mm**



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.4	—	5.2
C1	1.2	—	1.8
A1	1.2	—	2.0
b	0.7	1.0	1.3
b1	2.7	3.0	3.3
b2	1.7	2.0	2.3
D	15.0	15.5	16.0
C	0.4	0.6	0.8
F2	8.5	—	10.0
e	5.45 TYP		
L1	22.6	—	23.6
L	39.0	—	41.5
L2	19.5	—	21.0

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Rev.: 1.1

Revision History:

1. Deleted NOMENCLATURE
2. Modify Important notice

Rev.: 1.0

Revision History:

1. First release