

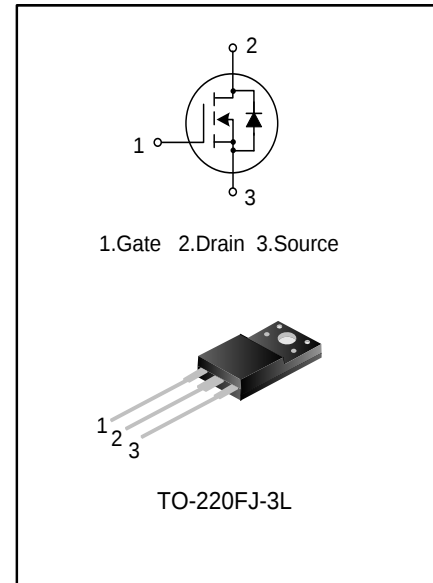
6A, 650V N-CHANNEL MOSFET

GENERAL DESCRIPTION

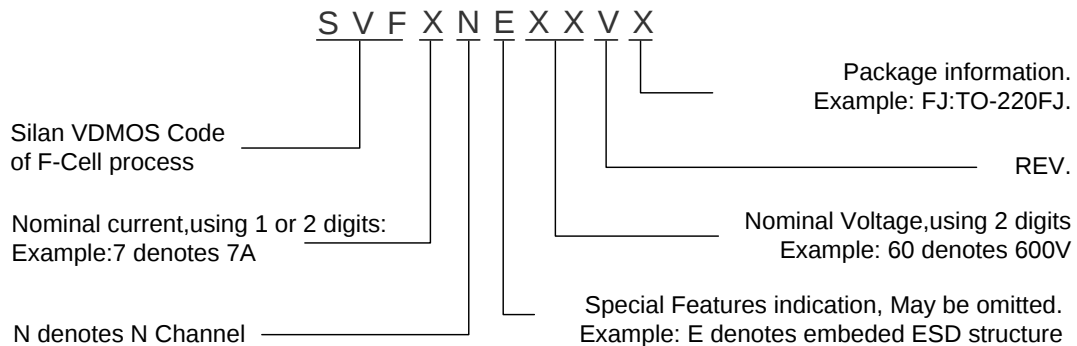
SVF6N65VFJ is an N-channel enhancement mode power MOS field effect transistor which is produced using Silan proprietary F-Cell™ high-voltage planar VDMOS technology. The improved process and cell structure have been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are widely used in AC-DC power supplies, DC-DC converters and H-bridge PWM motor drivers.

FEATURES

- 6A, 650V, $R_{DS(on)}(typ.)=0.80\Omega@V_{GS}=10V$
- Low gate charge
- Low C_{rss}
- Fast switching
- Improved dv/dt capability



NOMENCLATURE



ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing
SVF6N65VFJ	TO-220FJ-3L	SVF6N65VFJ	Halogen free	Tube

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

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V _{DS}	650	V
Gate-Source Voltage		V _{GS}	±30	V
Drain Current	T _C = 25°C	I _D	6	A
	T _C = 100°C		3.8	
Drain Current Pulsed		I _{DM}	24	A
Power Dissipation(T _C =25°C) -Derate above 25°C		P _D	50	W
			0.4	W/°C
Single Pulsed Avalanche Energy (Note 1)		E _{AS}	618	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 _{θJC}	2.5	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	62.5	°C/W

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

Characteristics	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	--	--	1.0	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 =5.0A	--	0.8	1.0	Ω
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHZ	--	1159	--	pF
Output Capacitance	C _{oss}		--	126	--	
Reverse Transfer Capacitance	C _{rss}		--	11.3	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} =325V, I _D =6A, R _G =24Ω (Note 2,3)	--	20.3	--	ns
Turn-on Rise Time	t _r		--	31.9	--	
Turn-off Delay Time	t _{d(off)}		--	79.6	--	
Turn-off Fall Time	t _f		--	34.9	--	
Total Gate Charge	Q _g	V _{DS} =520V, I _D =6A, V _{GS} =10V (Note 2,3)	--	29.6	--	nC
Gate-Source Charge	Q _{gs}		--	7.5	--	
Gate-Drain Charge	Q _{gd}		--	12.5	--	

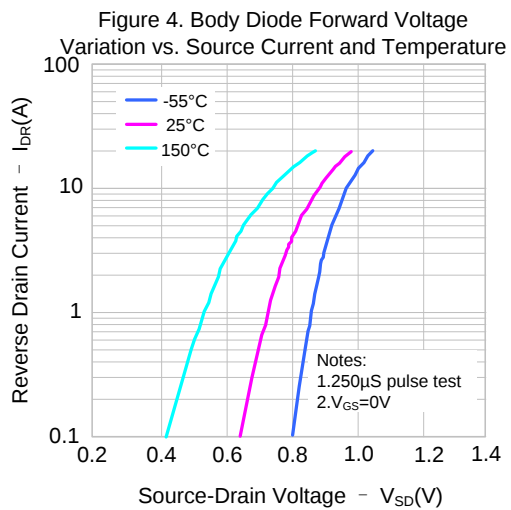
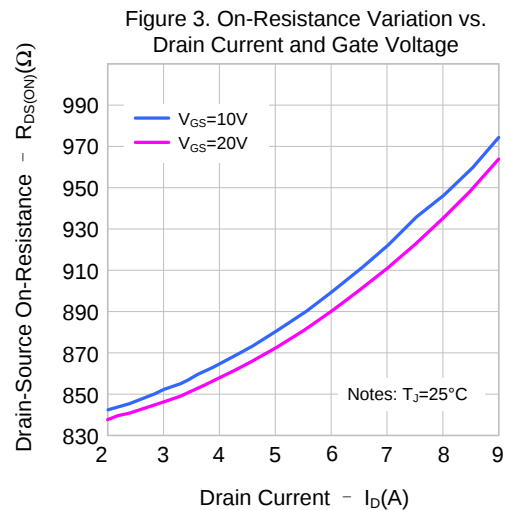
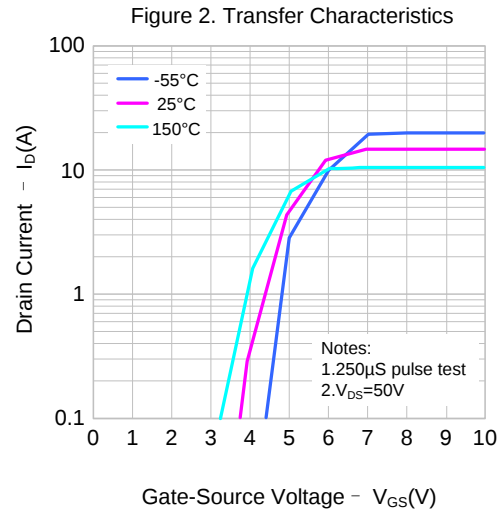
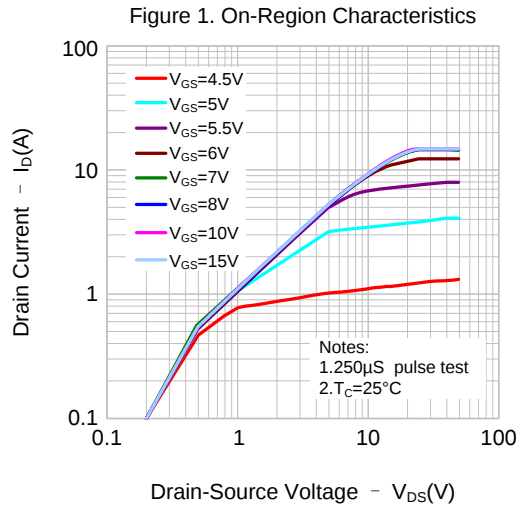
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse p-n Junction Diode in the MOSFET	--	--	6	A
Pulsed Source Current	I_{SM}		--	--	24	
Diode Forward Voltage	V_{SD}	$I_S=6A, V_{GS}=0V$	--	--	1.3	V
Reverse Recovery Time	T_{rr}	$I_S=6A, V_{GS}=0V, dl_F/dt=100A/\mu S$	--	456.7	--	ns
Reverse Recovery Charge	Q_{rr}		--	2.9	--	μC

Notes:

1. $L=30mH, I_{AS}=6.0A, V_{DD}=100V, R_G=25\Omega$, starting $T_J=25^\circ C$;
2. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;
3. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (continued)

Figure 5. Capacitance Characteristics

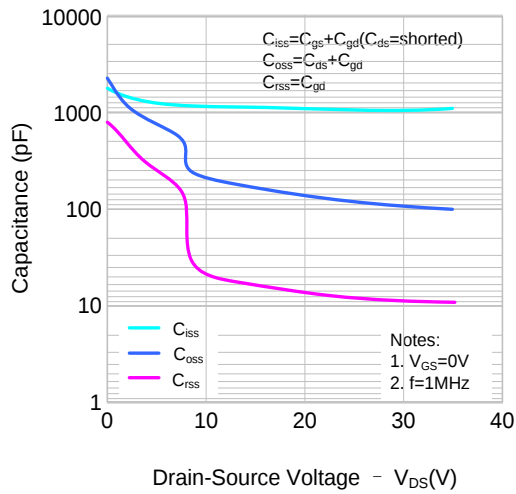


Figure 6. Gate Charge Characteristics

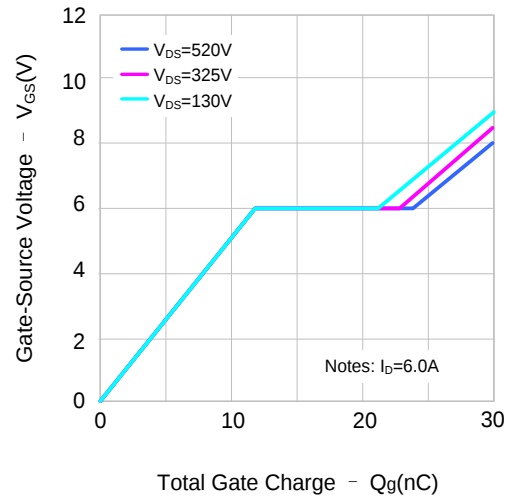


Figure 7. Breakdown Voltage Variation vs. Temperature

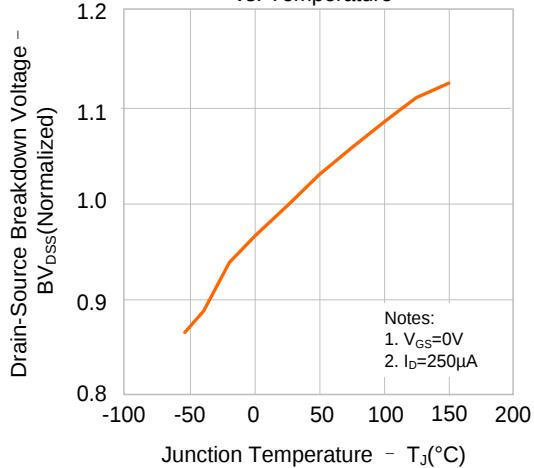


Figure 8. On-resistance vs. Temperature

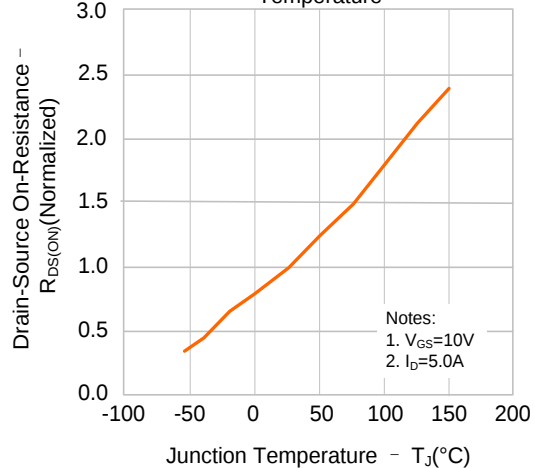


Figure 9. Max. Safe Operating Area

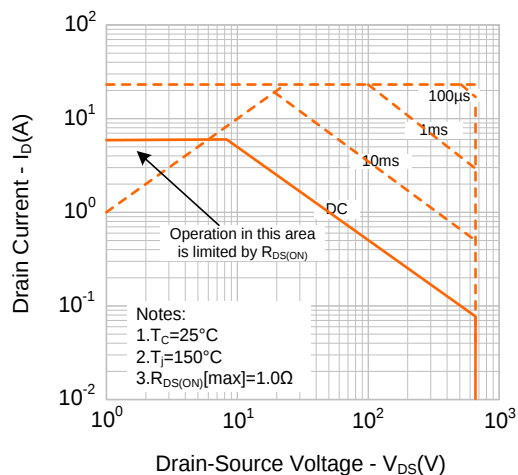
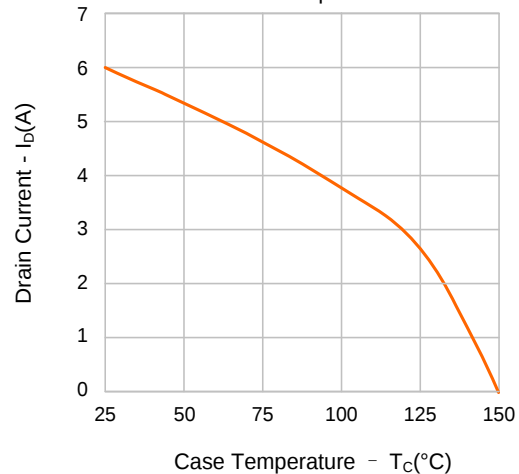
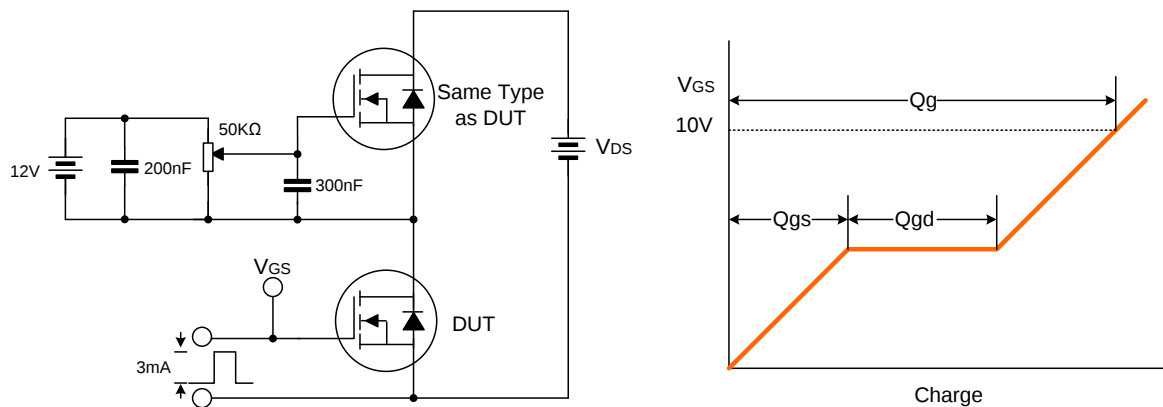


Figure 10. Max. Drain Current vs. Case Temperature

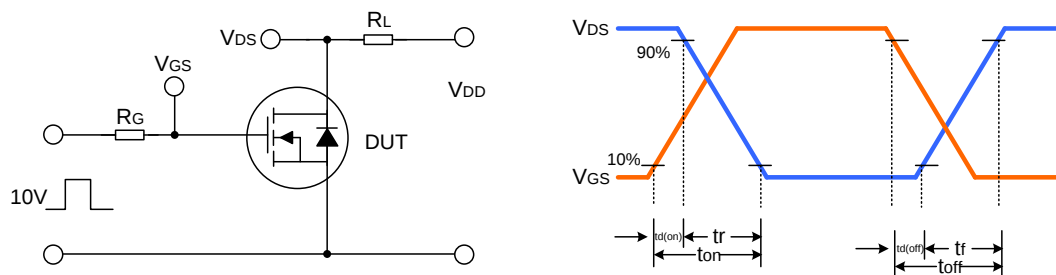


TYPICAL TEST CIRCUIT

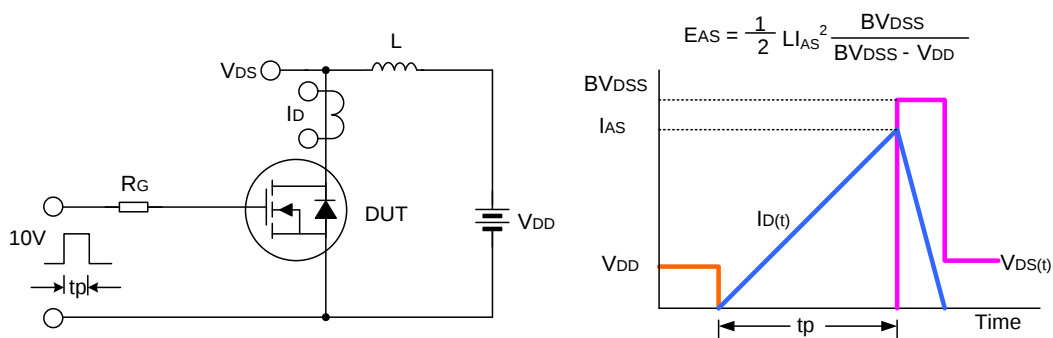
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



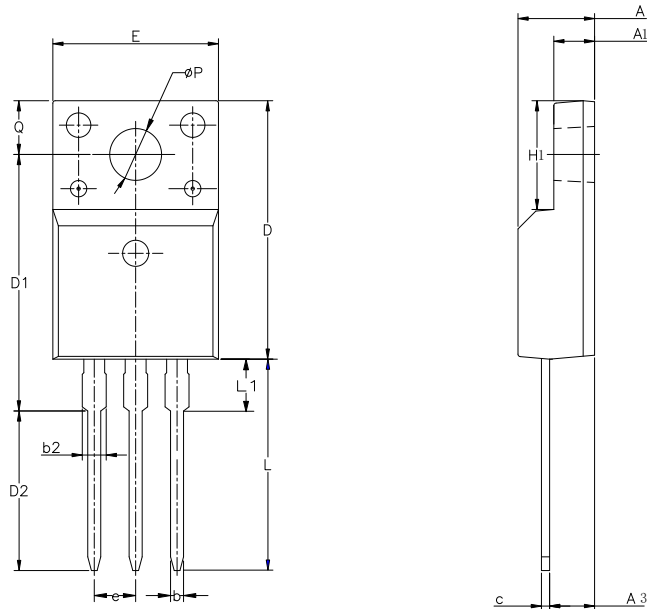
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

TO-220FJ-3L

UNIT: mm



SYMBOL	MIN	NOM	MAX
A	4.42	4.70	5.02
A1	2.30	2.54	2.80
A3	2.50	2.76	3.10
b	0.55	0.70	0.85
b2	—	—	1.29
c	0.35	0.50	0.65
D	15.25	15.87	16.25
D1	13.97	14.47	14.97
D2	10.58	11.08	11.58
E	9.73	10.16	10.36
e	2.54BCS		
H1	6.40	6.68	7.00
L	12.48	12.98	13.48
L1	—	—	2.00
ϕP	3.00	3.18	3.40
Q	3.05	3.30	3.55

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Rev.: 1.1

Revision History:

1. Modify Electrical characteristics
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Rev.: 1.0

Revision History:

1. First release
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