

10A, 600V N-CHANNEL MOSFET

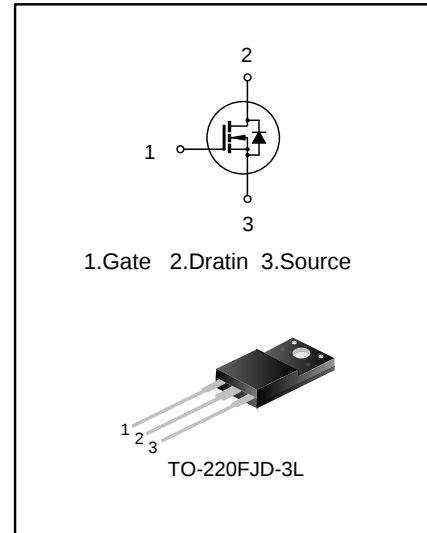
GENERAL DESCRIPTION

SVFP10N60CFJD is an N-channel enhancement mode power MOS field effect transistor which is produced using Silan proprietary F-Cell™ structure 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

- 10A, 600V, $R_{DS(on)}(typ.)=0.75\Omega@V_{GS}=10V$
- Low gate charge
- Low C_{rss}
- Fast switching
- Improved dv/dt capability



ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SVFP10N60CFJD	TO-220FJD-3L	P10N60CFJD	Halogen free	Tube

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

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V _{DS}	600	V
Gate-Source Voltage		V _{GS}	±30	V
Drain Current	T _C = 25°C	I _D	10	A
	T _C = 100°C		6.3	
Drain Current Pulsed		I _{DM}	40	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}	654	mJ
Reverse Diode dv/dt (Note 2)		dv/dt	4.5	V/ns
MOSFET dv/dt Ruggedness (Note 3)		dv/dt	50	V/ns
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_J=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	600	--	--	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =600V, 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	--	0.75	0.9	Ω
Input Capacitance	R _g	f=1.0MHz	--	5.0	--	Ω
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	--	1086	--	pF
Output Capacitance	C _{oss}		--	143	--	
Reverse Transfer Capacitance	C _{rss}		--	12	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} =300V, I _D =10A, R _G =25Ω (Note 4,5)	--	22	--	ns
Turn-on Rise Time	t _r		--	42	--	
Turn-off Delay Time	t _{d(off)}		--	79	--	
Turn-off Fall Time	t _f		--	41	--	
Total Gate Charge	Q _g	V _{DS} =480V, I _D =10A, V _{GS} =10V (Note 4,5)	--	28	--	nC
Gate-Source Charge	Q _{gs}		--	6.3	--	
Gate-Drain Charge	Q _{gd}		--	13	--	

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	--	--	10	A
Pulsed Source Current	I_{SM}		--	--	40	
Diode Forward Voltage	V_{SD}	$I_S=10A, V_{GS}=0V$	--	--	1.3	V
Reverse Recovery Time	T_{rr}	$I_S=10A, V_{GS}=0V,$ $dI_F/dt=100A/\mu s$ (Note 4)	--	542	--	ns
Reverse Recovery Charge	Q_{rr}		--	4.2	--	μC

Notes:

1. $L=30mH, I_{AS}=6.0A, V_{DD}=100V, R_G=25\Omega$, starting temperature $T_J=25^\circ C$;
2. $V_{DS}=0\sim 400V, I_{SD}\leq 10A, T_J=25^\circ C$;
3. $V_{DS}=0\sim 480V$;
4. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;
5. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

Figure 1. On-Region Characteristics

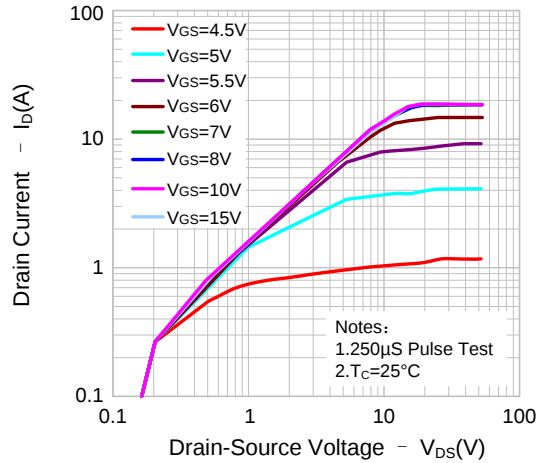


Figure 2. Transfer Characteristics

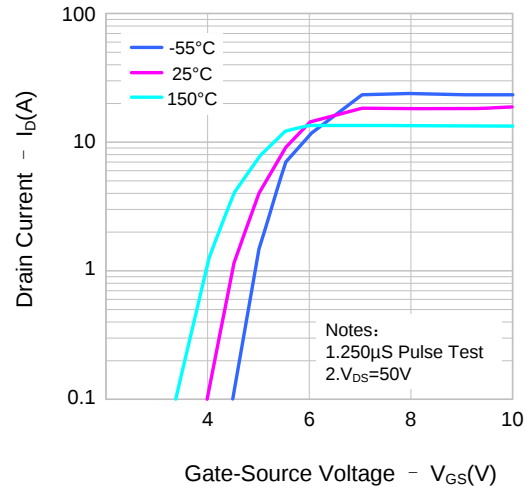


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

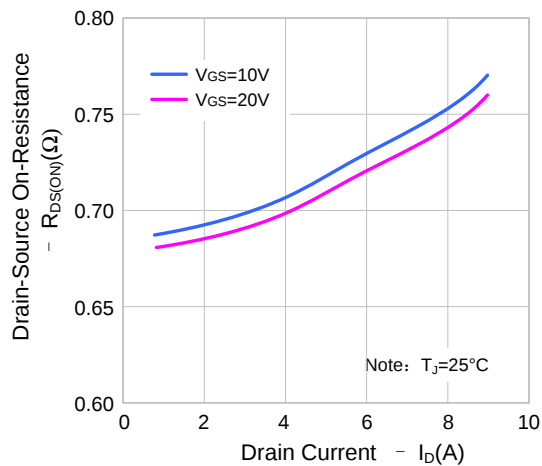
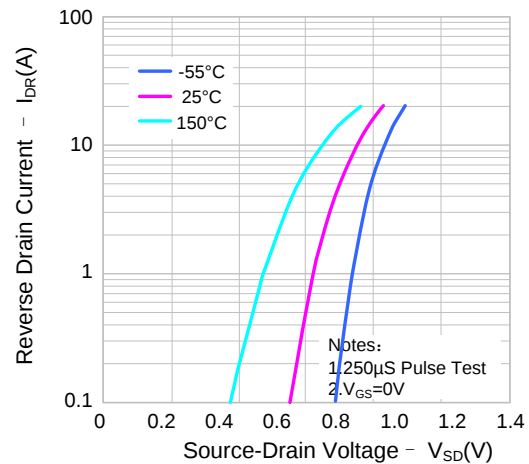


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature



TYPICAL CHARACTERISTICS (CONTINUED)

Figure 5. Capacitance Characteristics

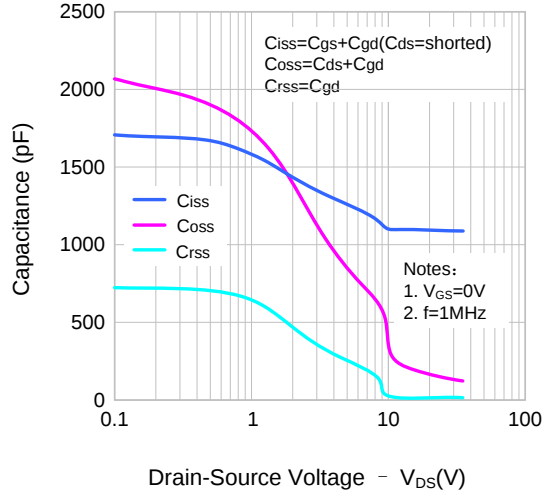


Figure 6. Gate Charge Characteristics

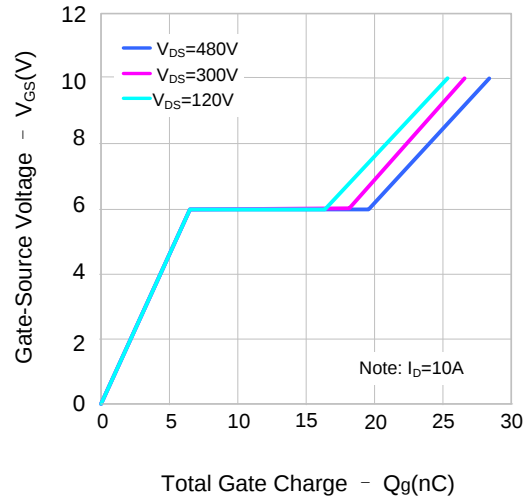


Figure 7. Breakdown Voltage vs. Temperature

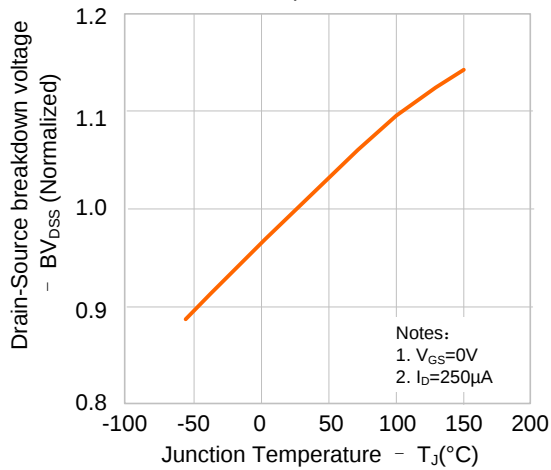


Figure 8. On-resistance Variation vs. Temperature

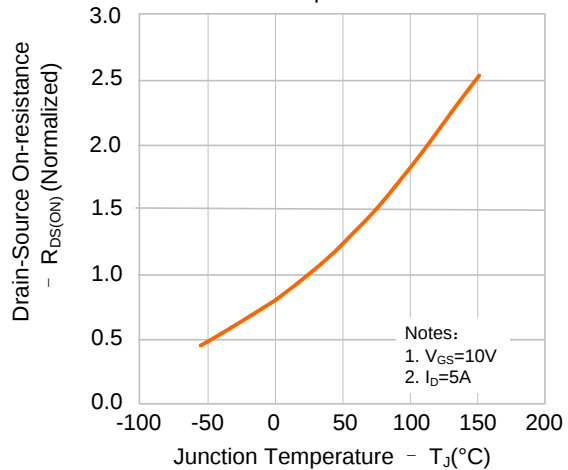


Figure 9. Max. Safe Operating Area

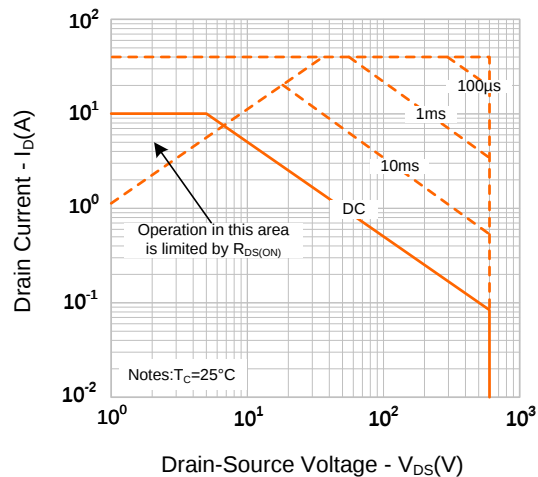
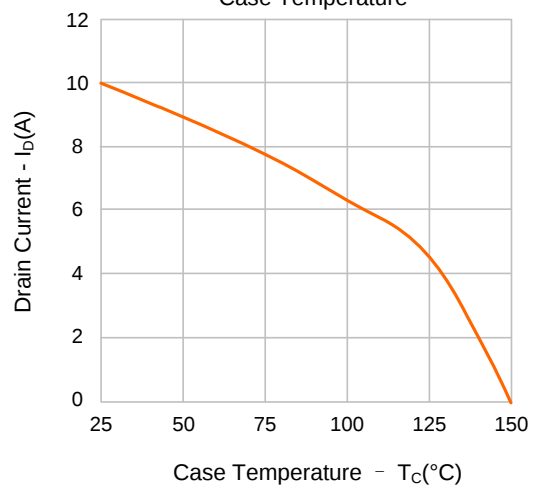
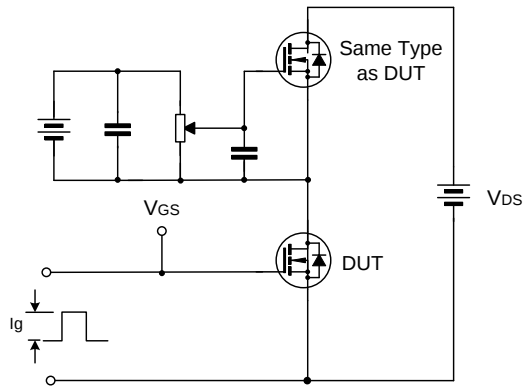


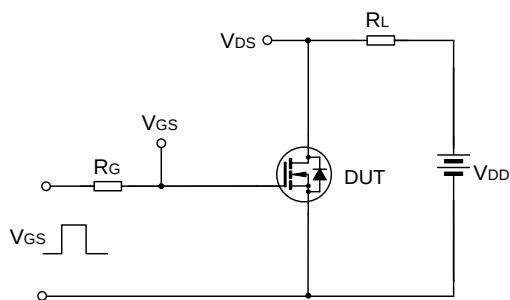
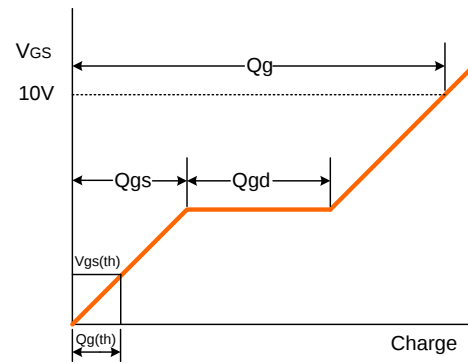
Figure 10. Max. Drain Current vs. Case Temperature



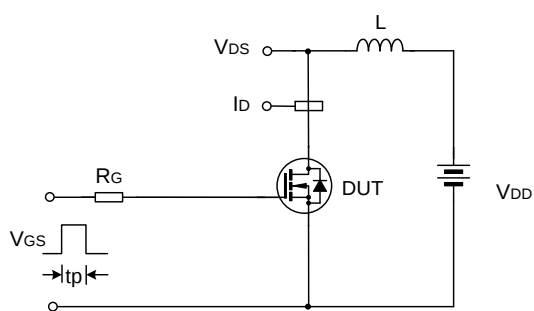
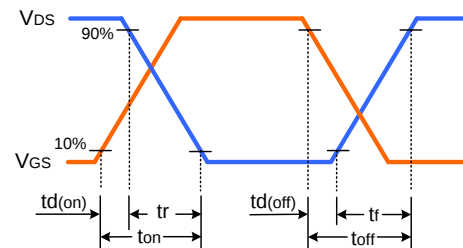
TYPICAL TEST CIRCUIT



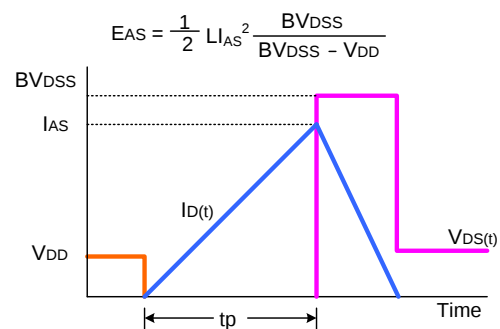
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



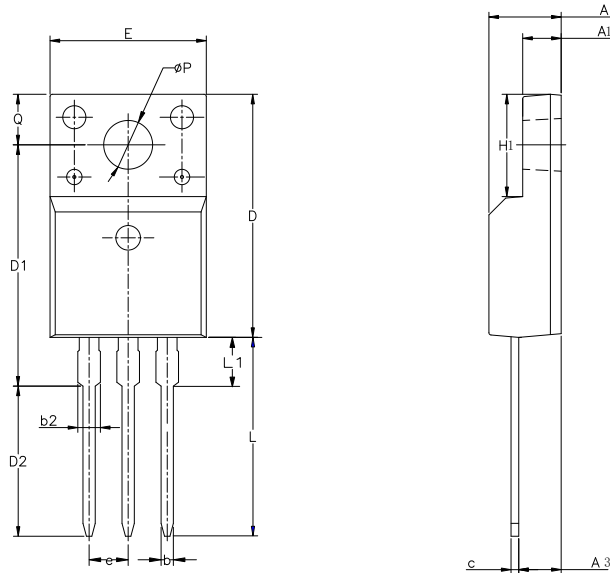
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

TO-220FJD-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
øP	3.00	3.18	3.40
Q	3.05	3.30	3.55

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Part No.:	SVFP10N60CFJD	Document Type:	Datasheet
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Rev.: 1.1

Revision History:

1. Modify Electrical schematic and TYPICAL TEST CIRCUIT
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Rev.: 1.0

Revision History:

1. First release
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