

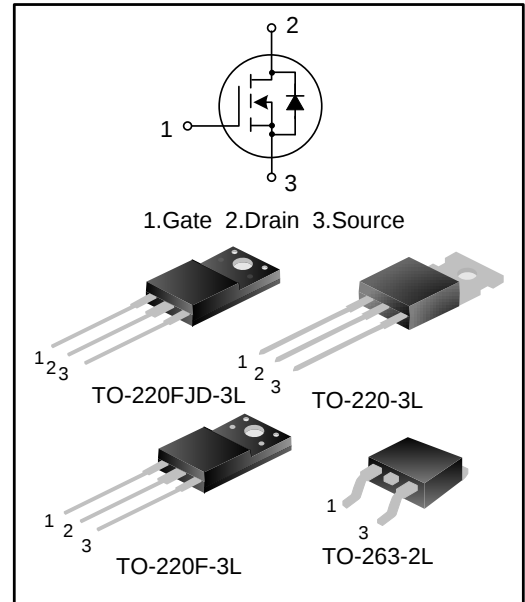
10A, 600V N-CHANNEL MOSFET

GENERAL DESCRIPTION

SVF10N60CF/T/FJD/S is an N-channel enhancement mode power MOS field effect transistor which is produced using Silan proprietary F-Cell™ structure VDMOS technology. The improved cell and 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 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
SVF10N60CF	TO-220F-3L	SVF10N60CF	Halogen free	Tube
SVF10N60CT	TO-220-3L	SVF10N60CT	Pb free	Tube
SVF10N60CFJD	TO-220FJD-3L	10N60CFJD	Halogen free	Tube
SVF10N60CS	TO-263-2L	10N60CS	Halogen free	Tube
SVF10N60CSTR	TO-263-2L	10N60CS	Halogen free	Tape & Reel

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

Characteristics		Symbol	Ratings		Unit
			SVF10N60CF/FJD	SVF10N60CT/S	
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	156	W
			0.4	1.25	W/°C
Single Pulsed Avalanche Energy (Note 1)		E _{AS}	654		mJ
Operation Junction Temperature Range		T _J	-55~+150		°C
Storage Temperature Range		T _{stg}	-55~+150		°C

THERMAL CHARACTERISTICS

Characteristics		Symbol	Ratings		Unit
			SVF10N60CF/FJD	SVF10N60CT/S	
Thermal Resistance, Junction-to-Case		R _{θJC}	2.5	0.8	°C/W
Thermal Resistance, Junction-to-Ambient		R _{θJA}	62.5	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	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
Gate Resistance	R _g	f=1MHz	--	4.1	--	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 2,3)	--	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 2,3)	--	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 2)	--	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 $T_J=25^\circ C$;
2. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;
3. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

Figure 1. On-Region Characteristics

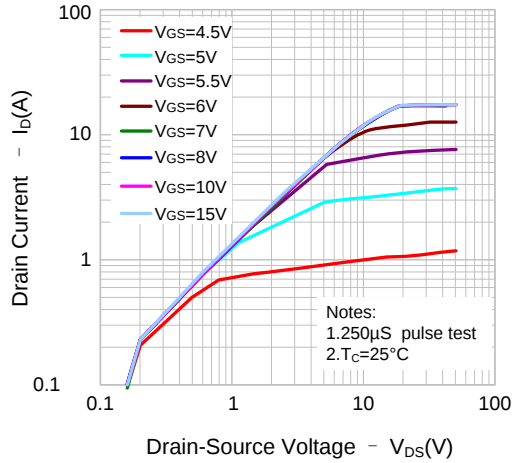


Figure 2. Transfer Characteristics

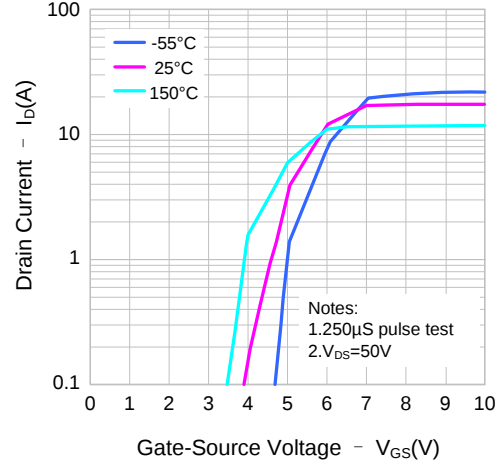


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

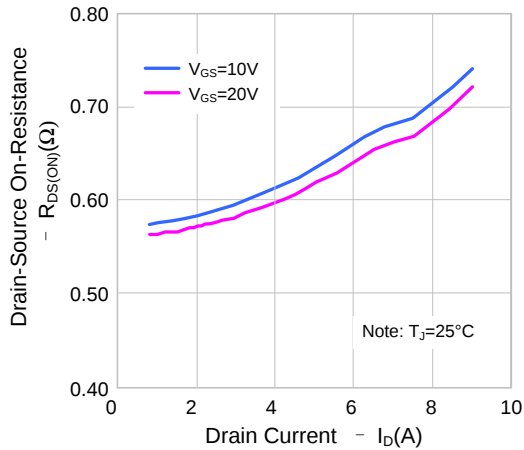


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

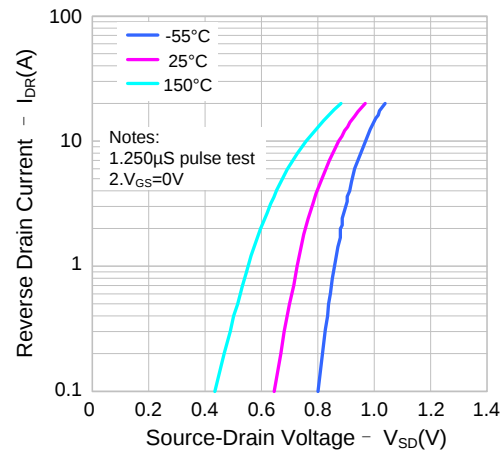


Figure 5. Capacitance Characteristics

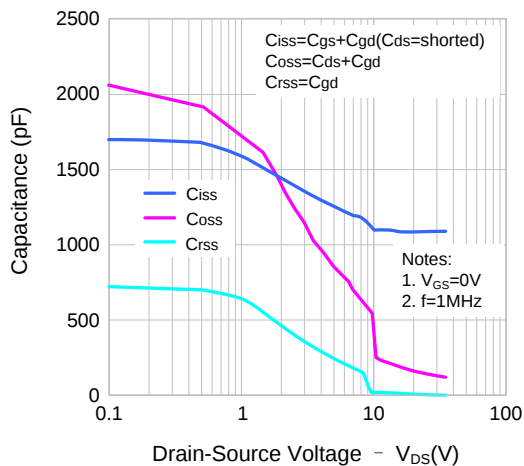
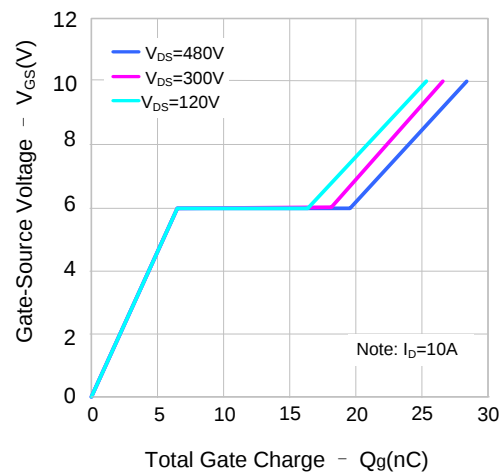


Figure 6. Gate Charge Characteristics



TYPICAL CHARACTERISTICS (CONTINUED)

Figure 7. Breakdown Voltage vs. Temperature

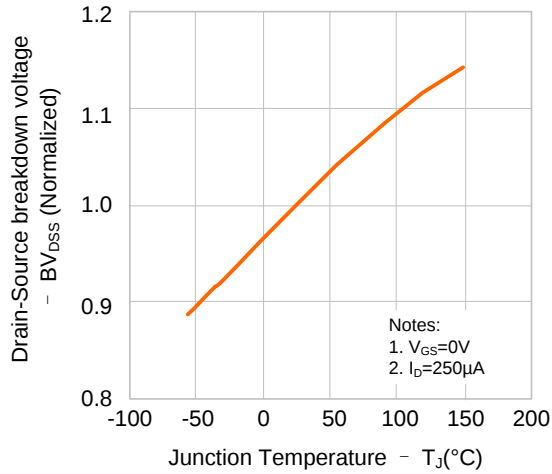


Figure 8. On-resistance Variation vs. Temperature

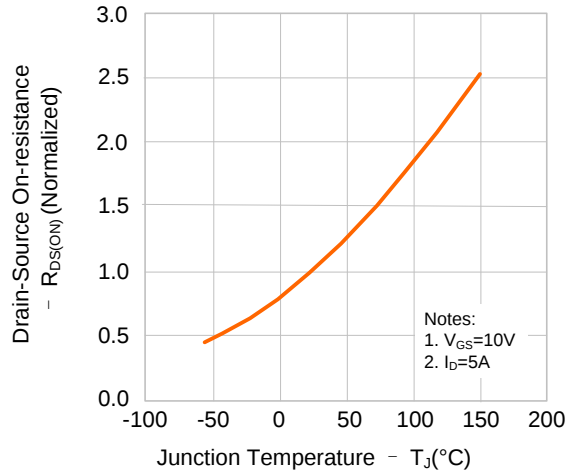


Figure 9-1. Max. Safe Operating Area(SVF10N60CF/FJD)

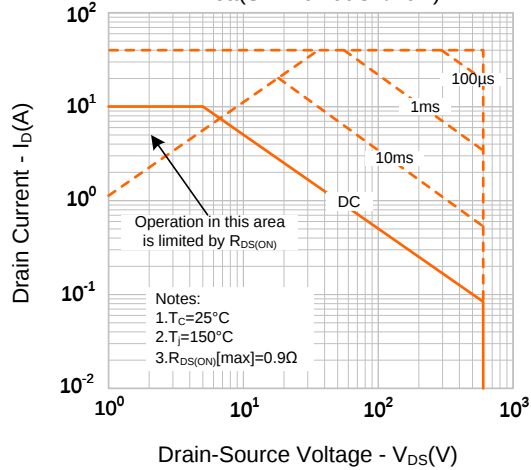


Figure 9-2. Max. Safe Operating Area(SVF10N60CT/S)

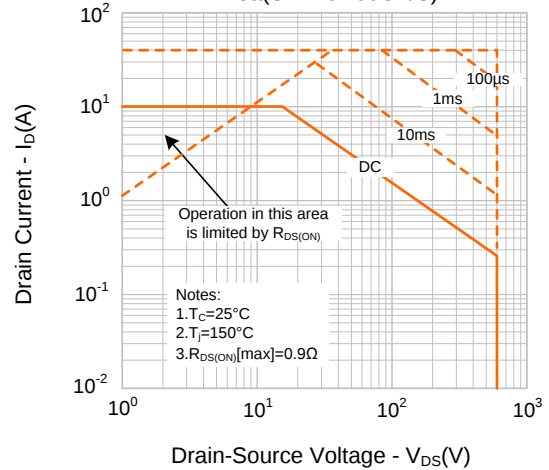
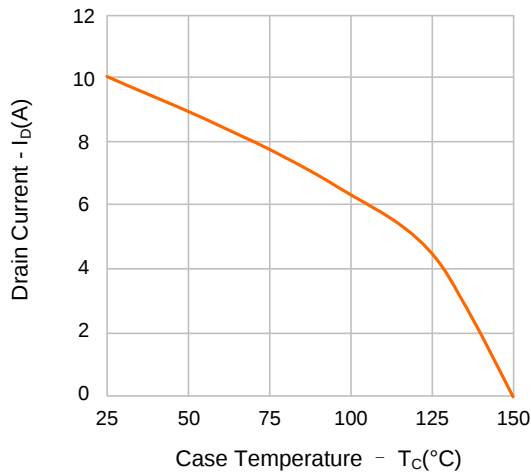
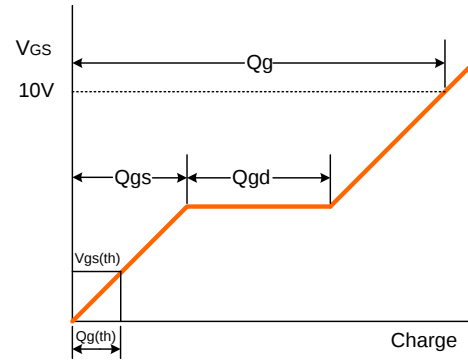
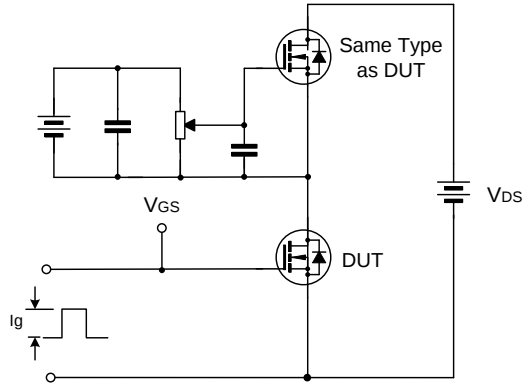


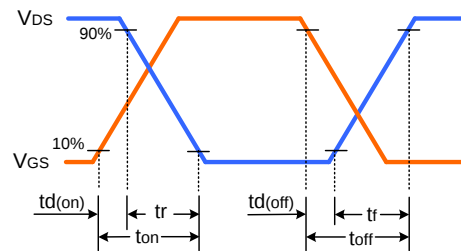
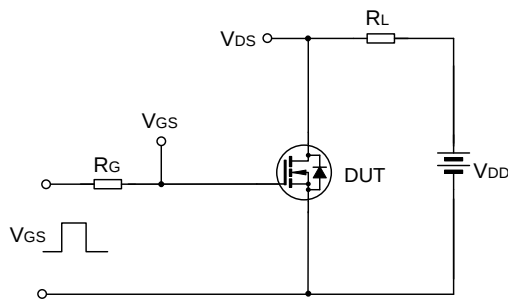
Figure 10. Max. Drain Current vs. Case Temperature



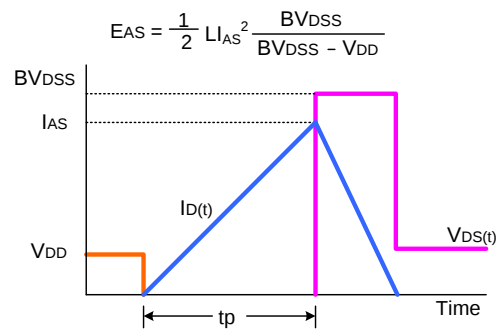
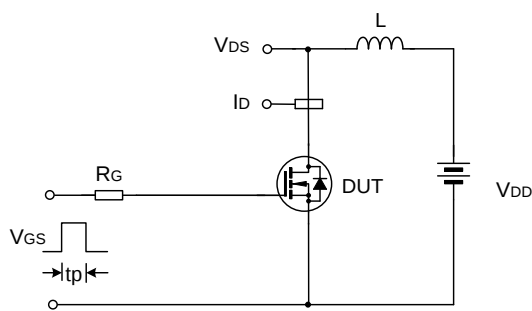
TYPICAL TEST CIRCUIT



Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

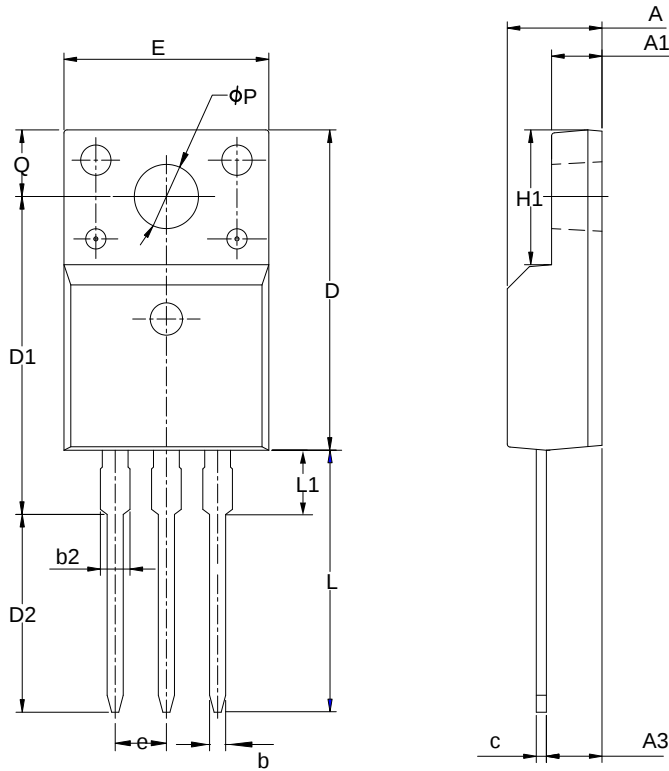


Unclamped Inductive Switching Test Circuit & Waveform

PACKAGE OUTLINE

TO-220F-3L

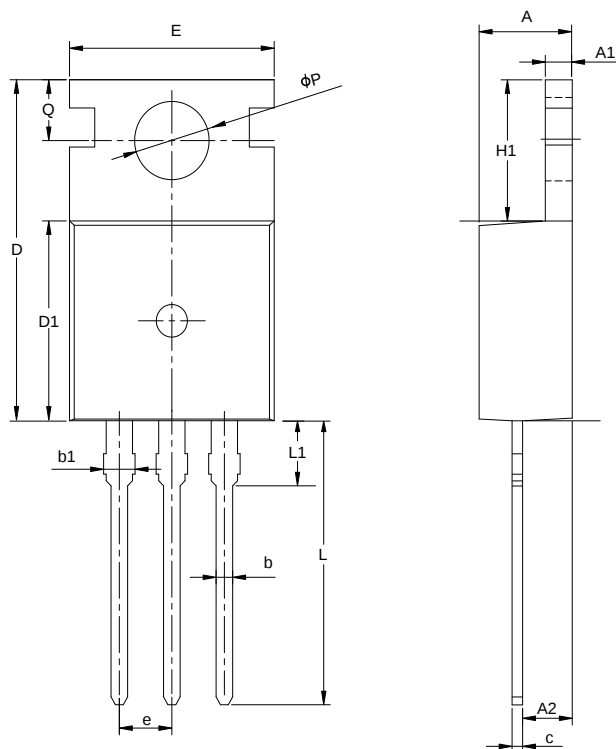
UNIT: mm



SYMBOL	MILLIMETER		
	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	0.70	0.80	0.90
b2	—	—	1.47
c	0.35	0.50	0.65
D	15.25	15.87	16.25
D1	15.30	15.75	16.30
D2	9.30	9.80	10.30
E	9.73	10.16	10.36
e	2.54BSC		
H1	6.40	6.68	7.00
L	12.48	12.98	13.48
L1	—	—	3.50
ϕP	3.00	3.18	3.40
Q	3.05	3.30	3.55

TO-220-3L

UNIT: mm

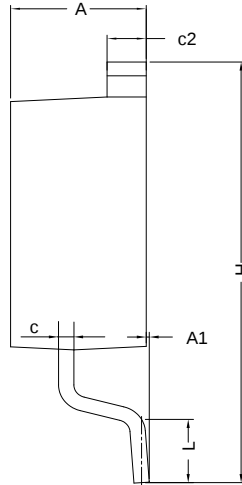
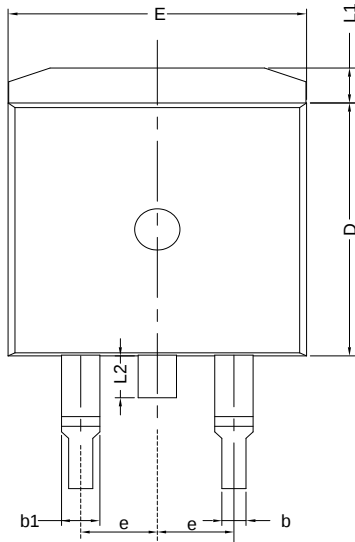


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	1.00	1.30	1.50
A2	1.80	2.40	2.80
b	0.60	0.80	1.00
b1	1.00	—	1.60
c	0.30	—	0.70
D	15.10	15.70	16.10
D1	8.10	9.20	10.00
E	9.60	9.90	10.40
e	2.54BSC		
H1	6.10	6.50	7.00
L	12.60	13.08	13.60
L1	—	—	3.95
ϕP	3.40	3.70	3.90
Q	2.60	—	3.20

PACKAGE OUTLINE (CONTINUED)

TO-263-2L

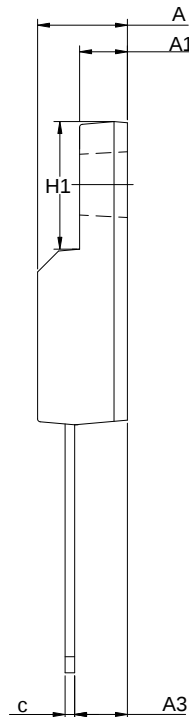
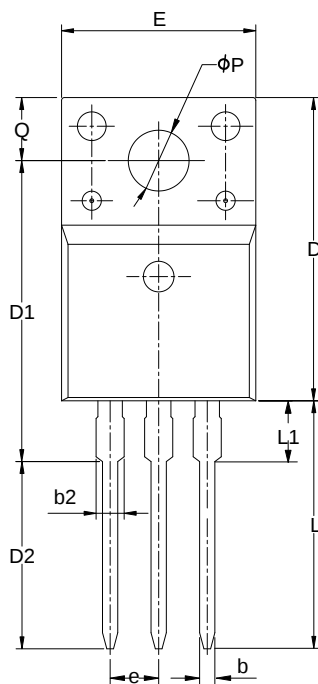
UNIT: mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.30	4.57	4.72
A1	0	0.10	0.25
b	0.71	0.81	0.91
c	0.30	—	0.60
c2	1.17	1.27	1.37
D	8.50	—	9.35
E	9.80	—	10.45
e	2.54BSC		
H	14.70	—	15.75
L	2.00	2.30	2.74
L1	1.12	1.27	1.42
L2	—	—	1.75

TO-220FJD-3L

UNIT: mm



SYMBOL	MILLIMETER		
	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	2.54BSC		
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

Important notice :

- The instructions are subject to change without notice! Customers should obtain the latest relevant information before placing orders and should verify that such information is complete and current.
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- Product promotion is endless, our company will wholeheartedly provide customers with better products!
- Website: <http://www.silan.com.cn>

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Revision History:

1. Deleted NOMENCLATURE
2. Modify Important notice

Rev.: **1.7**

Revision History:

1. Add SVF10N60CS (to-263-2l) wrapper
2. Add parameters and curves with SVF10N60CT
3. Update corresponding electrical diagram and typical circuit diagram
4. Modify ORDERING INFORMATION
5. Modify TYPICAL TEST CIRCUIT
6. Modify Important notice

Rev.: **1.6**

Revision History:

1. Add TO-220FJD-3L

Rev.: **1.5**

Revision History:

1. Modify the absolute maximum ratings.

Rev.: **1.4**

Revision History:

1. Modify the Typical Characteristics

Rev.: **1.3**

Revision History:

1. Modify the package information of TO-220F-3L
2. Modify the package information of TO-220-3L

Rev.: **1.2**

Revision History:



1. Modify the thermal characteristics
-

Rev.: 1.1

Revision History:

1. Modify the figure 6
-

Rev.: 1.0

Revision History:

1. First release
-