

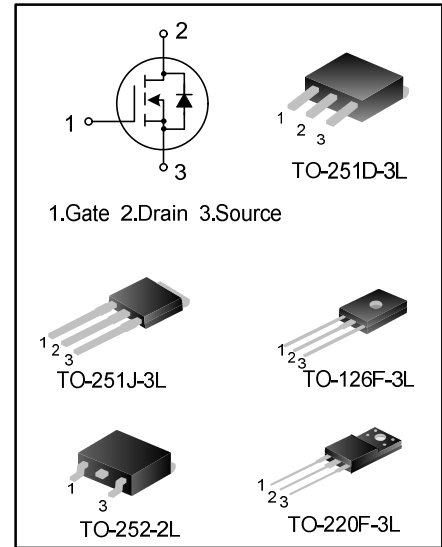
2A, 600V N-CHANNEL MOSFET

GENERAL DESCRIPTION

SVF2N60M(MJ)(NF)(F)(D) 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

- 2A,600V, $R_{DS(on)(typ.)}=3.7\Omega@V_{GS}=10V$
- Low gate charge
- Low Crss
- Fast switching
- Improved dv/dt capability



ORDERING INFORMATION

Part No.	Package Type	Marking	Hazardous substance control	Packing
SVF2N60M	TO-251D-3L	SVF2N60M	Halogen free	Tube
SVF2N60MJ	TO-251J-3L	SVF2N60MJ	Halogen free	Tube
SVF2N60NF	TO-126F-3L	SVF2N60NF	Pb free	Tube
SVF2N60F	TO-220F-3L	SVF2N60F	Pb free	Tube
SVF2N60DTR	TO-252-2L	SVF2N60D	Halogen free	Tape&Reel

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

Characteristics		Symbol	Ratings				Unit
			SVF2N 60NF	SVF2N 60M/D	SVF2N 60MJ	SVF2N 60F	
Drain-Source Voltage		V _{DS}	600				V
Gate-Source Voltage		V _{GS}	±30				V
Drain Current	T _C =25°C	I _D	2.0				A
	T _C =100°C		1.3				
Drain Current Pulsed		I _{DM}	8.0				A
Power Dissipation(T _C =25°C) -Derate above 25°C		P _D	16	34	35	23	W
			0.13	0.27	0.28	0.18	W/°C
Single Pulsed Avalanche Energy(Note1)		E _{AS}	115				mJ
Operation Junction Temperature Range		T _J	-55~+150				°C
Storage Temperature Range		T _{stg}	-55~+150				°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings				Unit
		SVF2N 60NF	SVF2N 60M/D	SVF2N 60MJ	SVF2N 60F	
Thermal Resistance, Junction-to-Case	R _{θJC}	7.81	3.7	3.57	5.56	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	120	62.0	62.0	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 =1.0A	--	3.7	4.2	Ω
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHZ	179	233	303	pF
Output Capacitance	C _{oss}		--	32	--	
Reverse Transfer Capacitance	C _{rss}		--	2.8	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} =300V, I _D =2.0A, R _G =25Ω (Note 2,3)	--	8.9	--	ns
Turn-on Rise Time	t _r		--	23.0	--	
Turn-off Delay Time	t _{d(off)}		--	23.4	--	
Turn-off Fall Time	t _f		--	24.9	--	
Total Gate Charge	Q _g	V _{DS} =480V, I _D =2.0A, V _{GS} =10V (Note 2,3)	--	8.24	--	nC
Gate-Source Charge	Q _{gs}		--	1.64	--	
Gate-Drain Charge	Q _{gd}		--	4.44	--	

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	--	--	2.0	A
Pulsed Source Current	I _{SM}		--	--	8.0	
Diode Forward Voltage	V _{SD}	I _S =2.0A, V _{GS} =0V	--	--	1.4	V
Reverse Recovery Time	T _{rr}	I _S =2.0A, V _{GS} =0V, dI _F /dt=100A/μS	--	326	--	ns
Reverse Recovery Charge	Q _{rr}		--	0.87	--	μC

Notes:

1. L=30mH, I_{AS}=2.52A, 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

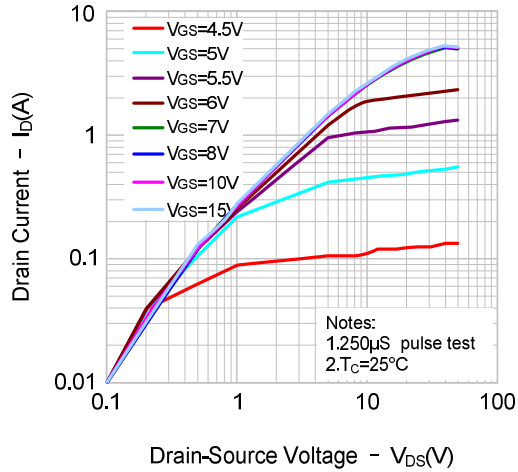


Figure 2. Transfer Characteristics

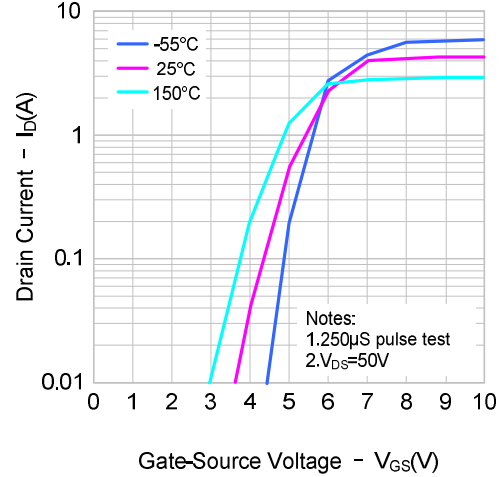


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

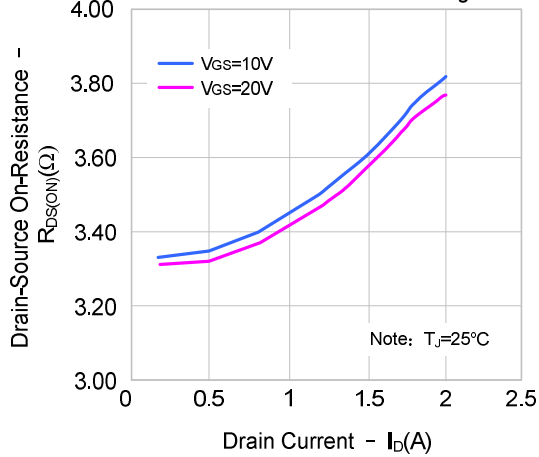


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

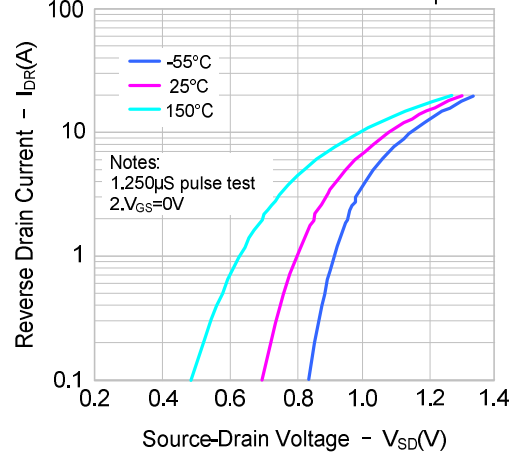


Figure 5. Capacitance Characteristics

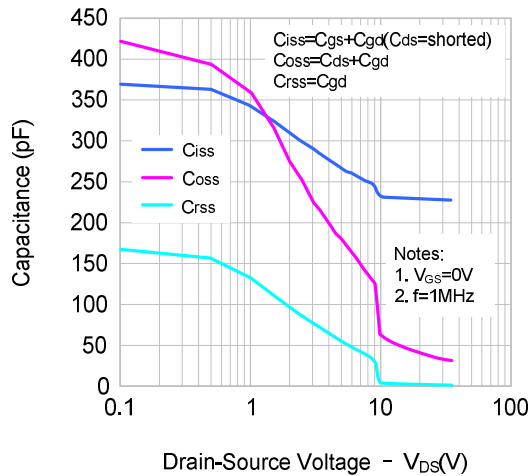
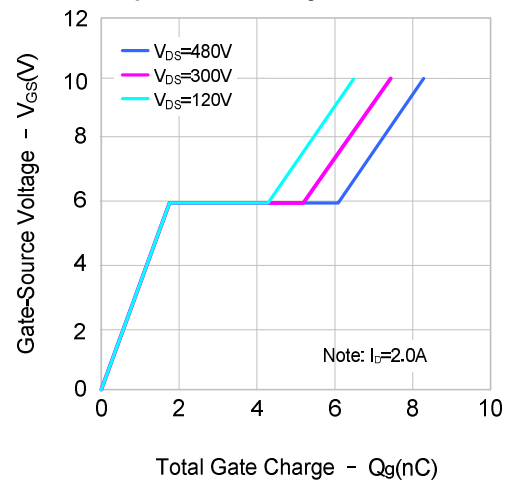


Figure 6. Gate Charge Characteristics



TYPICAL CHARACTERISTICS(continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

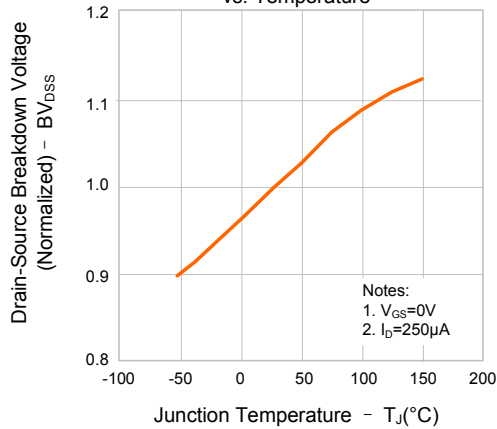


Figure 8. On-resistance vs. Temperature

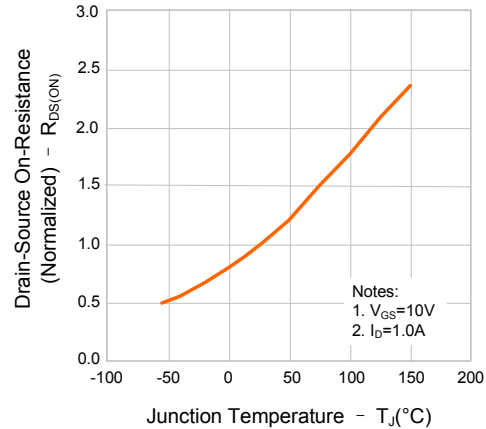


Figure 9-1. Max. Safe Operating Area(SVF2N60F)

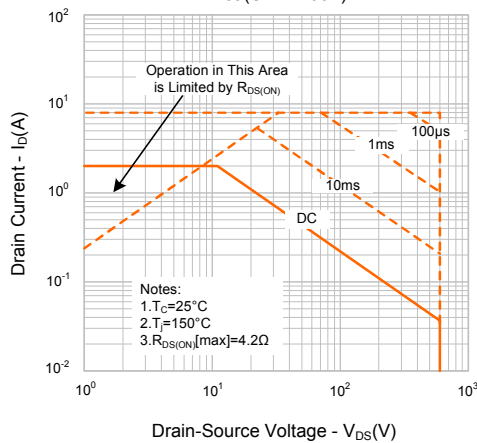


Figure 9-2. Max. Safe Operating Area(SVF2N60NF)

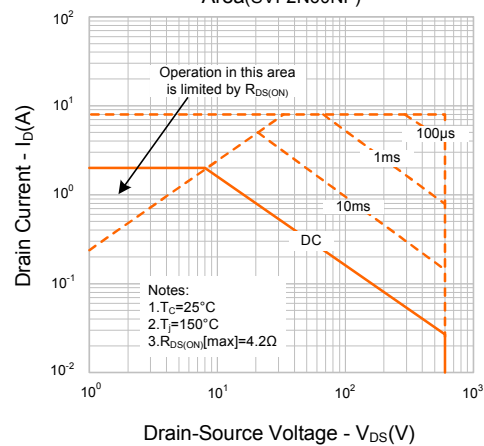


Figure 9-3. Max. Safe Operating Area(SVF2N60M/D)

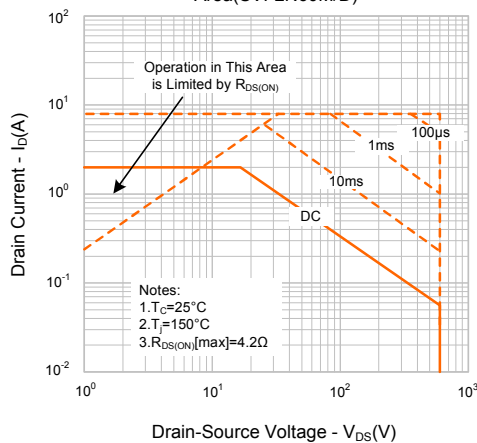
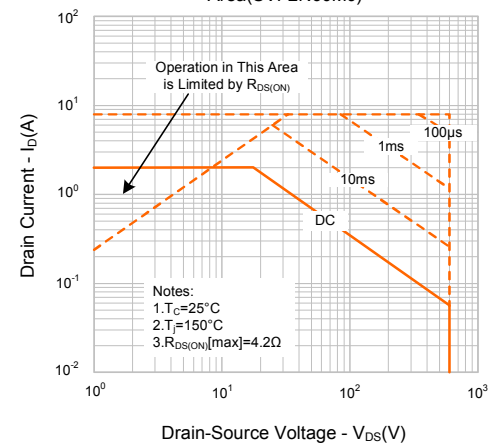
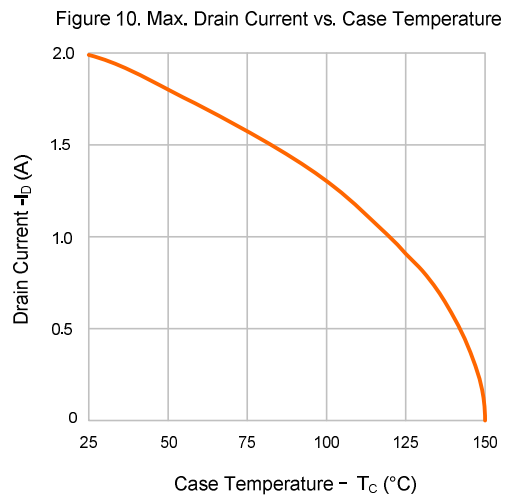


Figure 9-4. Max. Safe Operating Area(SVF2N60MJ)

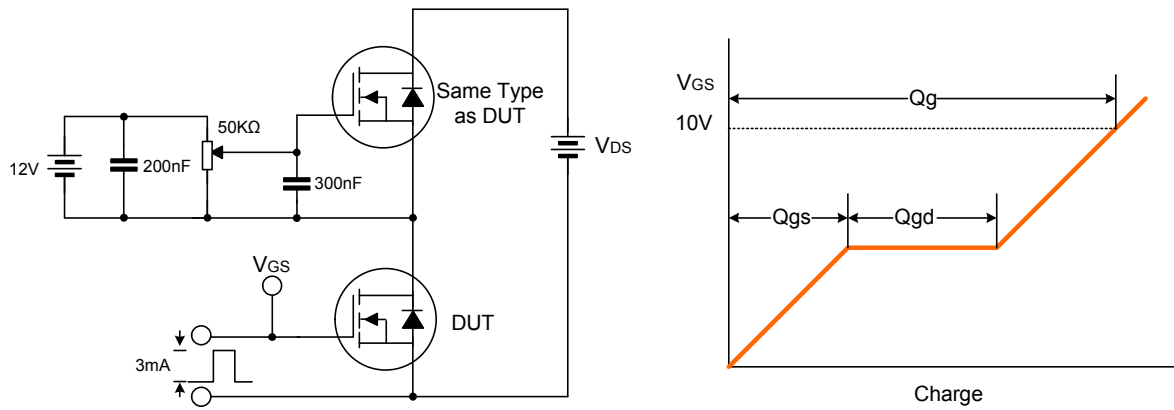


TYPICAL CHARACTERISTICS(continued)

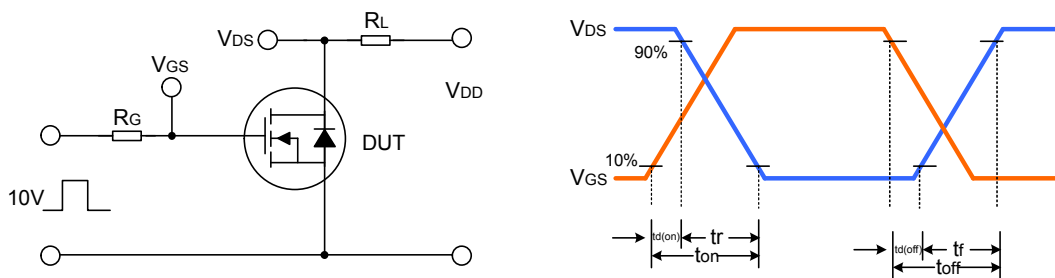


TYPICAL TEST CIRCUIT

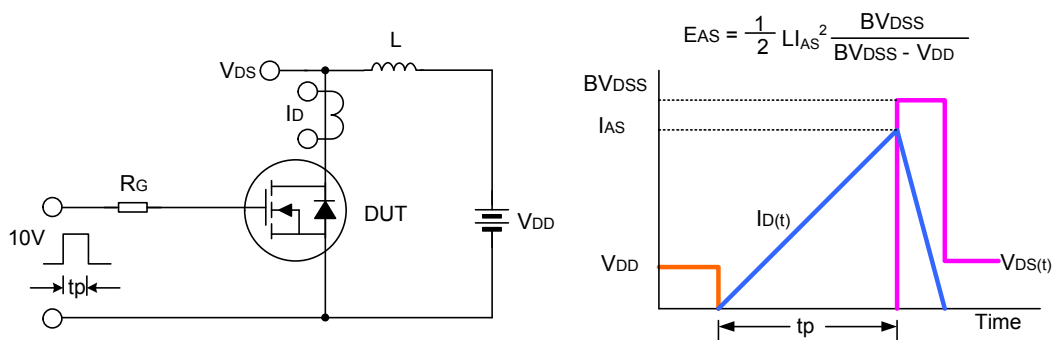
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



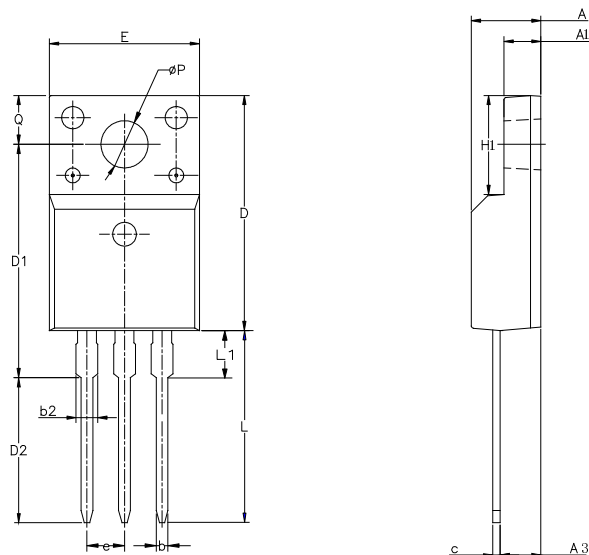
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

TO-220F-3L

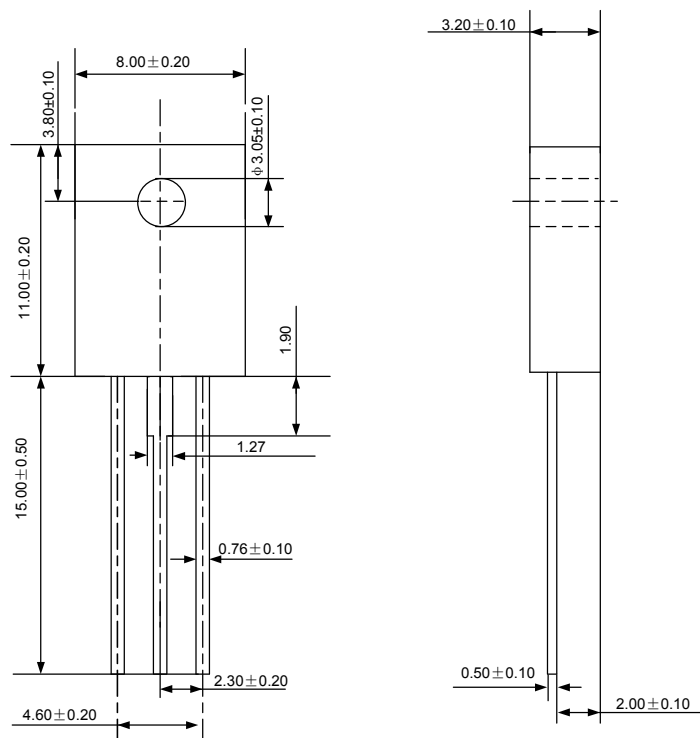
单位: 毫米



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	0.70	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	2.54BCS		
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-126F-3L

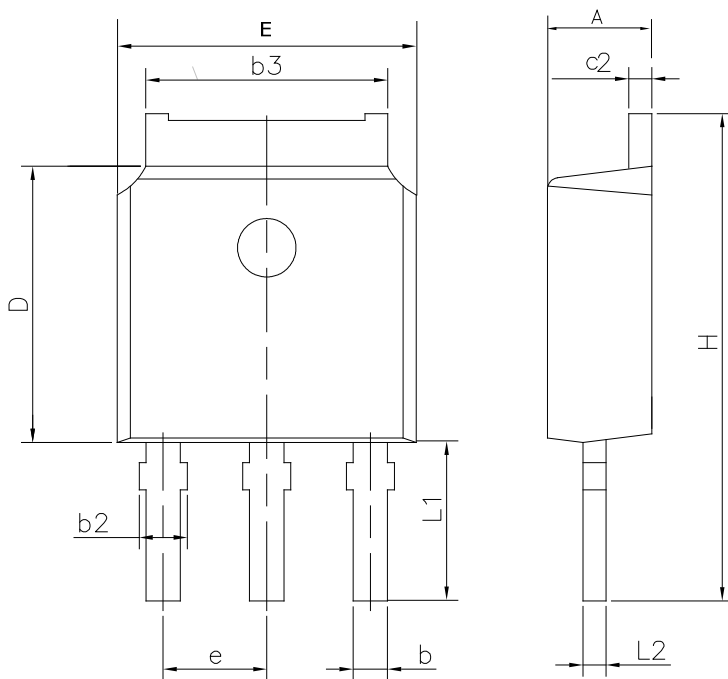
UNIT: mm



PACKAGE OUTLINE(continued)

TO-251D-3L

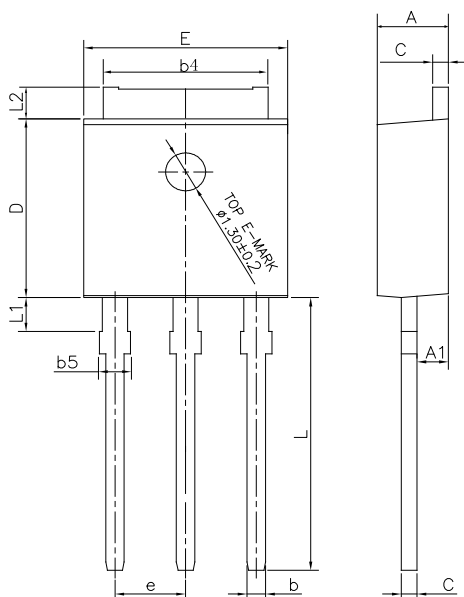
UNIT: mm



SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.40
b	0.66	---	0.86
b2	0.72	---	0.90
b3	5.10	5.33	5.46
c2	0.46	---	0.60
D	6.00	6.10	6.20
E	6.50	6.60	6.70
e	2.186	2.286	2.386
H	10.40	10.70	11.00
L1	3.50 REF		
L2	0.508 BSC		

TO-251J-3L

UNIT: mm

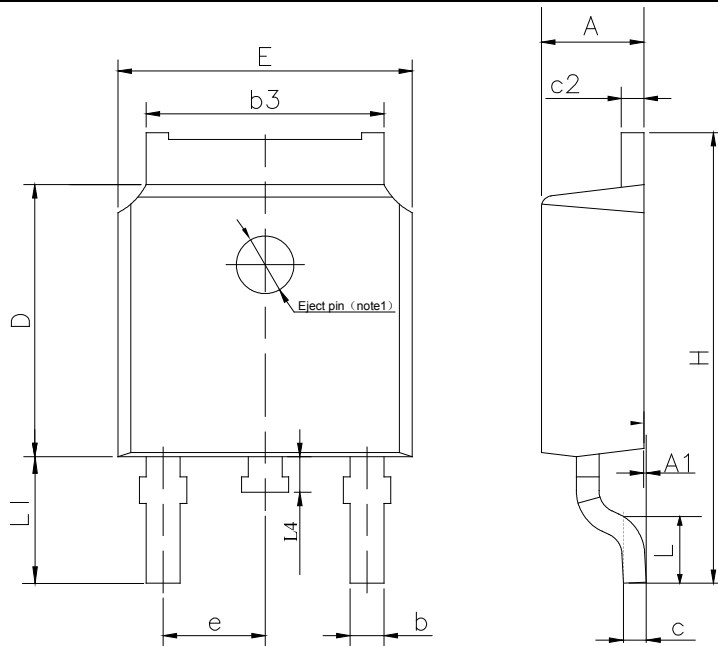


SYMBOL	MIN	NOM	MAX
A	2.18	2.30	2.39
A1	0.89	1.00	1.14
b	0.56	---	0.89
b4	4.95	5.33	5.46
b5	---	---	1.05
c	0.46	---	0.61
D	5.97	6.10	6.27
E	6.35	6.60	6.73
e	2.29 BCS		
L	8.89	9.30	9.65
L1	0.95	---	1.50
L2	0.89	---	1.27

PACKAGE OUTLINE(continued)

TO-252-2L

UNIT: mm



SYMBOL	MIN	NOM	MAX
A	2.10	2.30	2.50
A1	0	—	0.127
b	0.66	0.76	0.89
b3	5.10	5.33	5.46
c	0.45	—	0.65
c2	0.45	—	0.65
D	5.80	6.10	6.40
E	6.30	6.60	6.90
e	2.30TYP		
H	9.60	10.10	10.60
L	1.40	1.50	1.70
L1	2.90REF		
L4	0.60	0.80	1.00

NOTE1: There are two conditions for this position: has an eject pin or has no eject pin.

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- Silan reserves the right to make changes to the information herein for the improvement of the design and performance without prior 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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- Silan will supply the best possible product for customers!

Part No.:	SVF2N60M/MJ/NF/F/D	Document Type:	Datasheet
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Rev.: 3.5

Revision History:

1. Delete the package outline of TO-220-3L
 2. Delete the package outline of TO-126-3L
-

Rev.: 3.4

Revision History:

1. Update the package outline of TO-251J-3L
 2. Delete the package outline of TO-220F-3L(2)
-

Rev.: 3.3

Revision History:

1. Update characteristics
-

Rev.: 3.2

Revision History:

1. Modify the Ordering information
-

Rev.: 3.1

Revision History:

1. Modify the package outline of TO-126-3L
 2. Modify the package outline of TO-251 D -3L
-

Rev.: 3.0

Revision History:

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

Rev.: 2.9

Revision History:

1. Modify the package of TO-220F-3L;Modify the package of TO-252-2L;
-

Rev.: 2.8

Revision History:

1. Modify the thermal characteristics
-

Rev.: 2.7

Revision History:

1. Modify the note 1
-

Rev.: 2.6

Revision History:

1. Add the pin No.
-

Rev.: 2.5

Revision History:

1. Modify the package outline of TO-251J-3L
-

Rev.: 2.4

Revision History:

1. Modify the ordering information
-

Rev.: 2.3

Revision History:

1. Modify the package outline of TO-126-3L
1. Change the schematic diagram of MOS

Rev.: 2.1

Revision History:

1. Modify the package outline of TO-251D-3L; Add the value of forward transconductance

Rev.: 2.0

Revision History:

1. Add the halogen free information of SVF2N60M

Rev.: 1.9

Revision History:

1. Modify "PACKAGE OUTLINE"

Rev.: 1.8

Revision History:

1. Add the package of TO-126-3L(2)

Rev.: 1.7

Revision History:

1. Add the package of TO-126F-3L

Rev.: 1.6

Revision History:

1. Modify the values of T_{rr} and Q_{rr} ; Update the package outline of TO-251D-3L

Rev.: 1.5

Revision History:

1. Add the halogen free information of SVF2N60F

Rev.: 1.4

Revision History:

1. Delete the package of TO-251-3L

Rev.: 1.3

Revision History:

1. Modify "PACKAGE OUTLINE"

Rev.: 1.2

Revision History:

1. Add the package of TO-251D-3L, TO-251J-3L, TO-126-3L

Rev.: 1.1

Revision History:

1. Modify "TYPICAL CHARACTERISTICS", "PACKAGE OUTLINE", the template of Datasheet

Rev.: 1.0

Revision History:

1. Original
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