

4A, 800V N-CHANNEL MOSFET

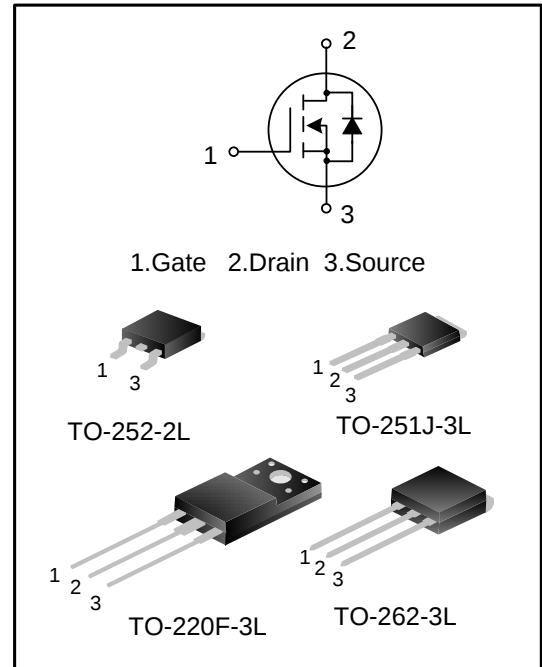
GENERAL DESCRIPTION

SVF4N80F/D/MJ/K 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

- 4A,800V, $R_{DS(on)(typ.)}=3.3\Omega@V_{GS}=10V$
- Low gate charge
- Low Crss
- Fast switching
- Improved dv/dt capability



ORDERING INFORMATION

Part No.	Package	Marking	Hazardous substance control	Packing Type
SVF4N80F	TO-220F-3L	SVF4N80F	Pb free	Tube
SVF4N80D	TO-252-2L	SVF4N80D	Halogen free	Tube
SVF4N80DTR	TO-252-2L	SVF4N80D	Halogen free	Tape&Reel
SVF4N80MJ	TO-251J-3L	SVF4N80MJ	Halogen free	Tube
SVF4N80K	TO-262-3L	SVF4N80K	Pb free	Tube

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

Characteristics		Symbol	Ratings				Unit
			SVF4N80 F	SVF4N80 D	SVF4N80 MJ	SVF4N80 K	
Drain-Source Voltage		V _{DS}	800				V
Gate-Source Voltage		V _{GS}	±30				V
Drain Current	T _C =25°C	I _D	4.0				A
	T _C =100°C		2.5				
Drain Current Pulsed		I _{DM}	16				A
Power Dissipation(T _C =25°C) -Derate above 25°C		P _D	35	95	97	120	W
			0.28	0.76	0.78	0.96	W/°C
Single Pulsed Avalanche Energy(Note 1)	L=30mH	E _{AS}	245				mJ
	L=10mH		84				
Operation Junction Temperature Range		T _J	-55~+150				°C
Storage Temperature Range		T _{stg}	-55~+150				°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings				Unit
		SVF4N80 F	SVF4N80 D	SVF4N80 MJ	SVF4N80 K	
Thermal Resistance, Junction-to-Case	R _{θJC}	3.57	1.32	1.29	1.04	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	62.5	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	800	--	--	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =800V, 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 =2.0A	--	3.30	3.80	Ω
Gate Resistance	R _g	f=1MHz	--	4.0	--	Ω
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	---	513	---	pF
Output Capacitance	C _{oss}		--	54	--	
Reverse Transfer Capacitance	C _{rss}		--	2.8	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} =400V, I _D =4.0A, R _G =25Ω (Note 2,3)	--	15	--	ns
Turn-on Rise Time	t _r		--	35	--	
Turn-off Delay Time	t _{d(off)}		--	28	--	
Turn-off Fall Time	t _f		--	23	--	
Total Gate Charge	Q _g	V _{DS} =640V, I _D =4.0A, V _{GS} =10V (Note 2,3)	--	12	--	nC
Gate-Source Charge	Q _{gs}		--	3.2	--	
Gate-Drain Charge	Q _{gd}		--	5.1	--	

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	--	--	4.0	A
Pulsed Source Current	I _{SM}		--	--	16	
Diode Forward Voltage	V _{SD}	I _S =4.0A, V _{GS} =0V	--	--	1.4	V
Reverse Recovery Time	T _{rr}	I _S =4.0A, V _{GS} =0V, dI _F /dt=100A/μS (Note2)	--	495	--	ns
Reverse Recovery Charge	Q _{rr}		--	2.3	--	μC

Notes:

- V_{DD}=100V, R_G=25Ω, starting T_{B,JB}=25°C;
- Pulse Test: Pulse width ≤300μs, Duty cycles≤2%;
- Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

Figure 1. On-Region Characteristics

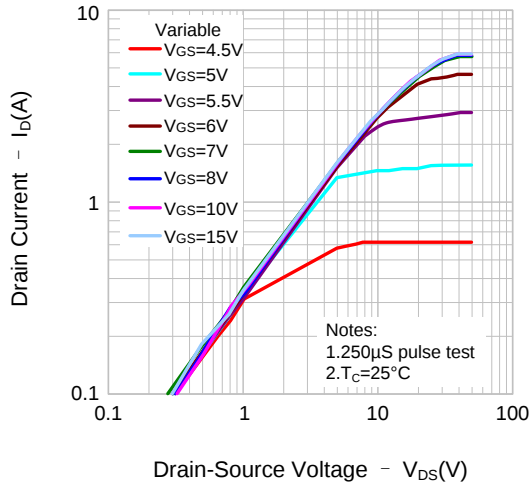


Figure 2. Transfer Characteristics

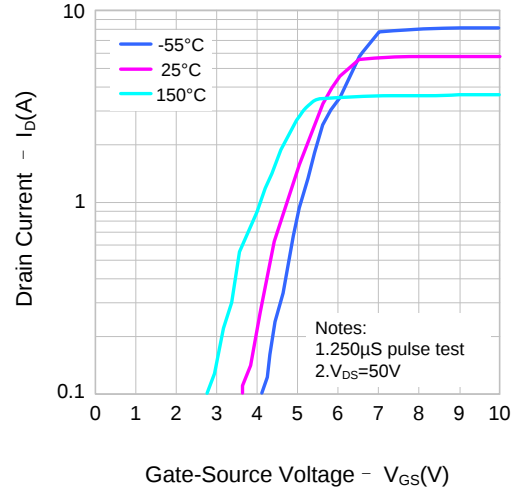


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

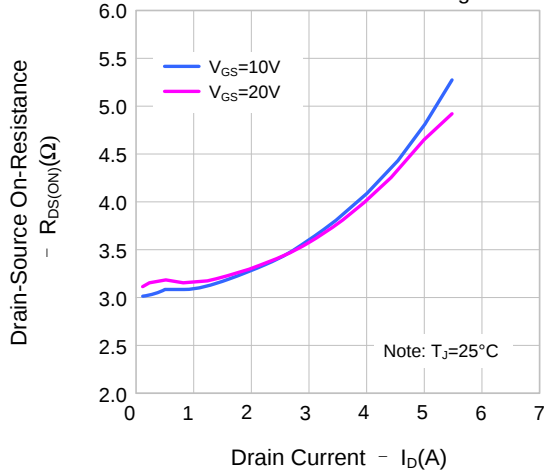


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

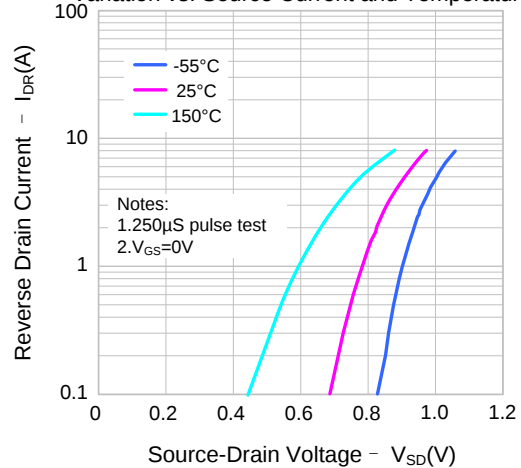


Figure 5. Capacitance Characteristics

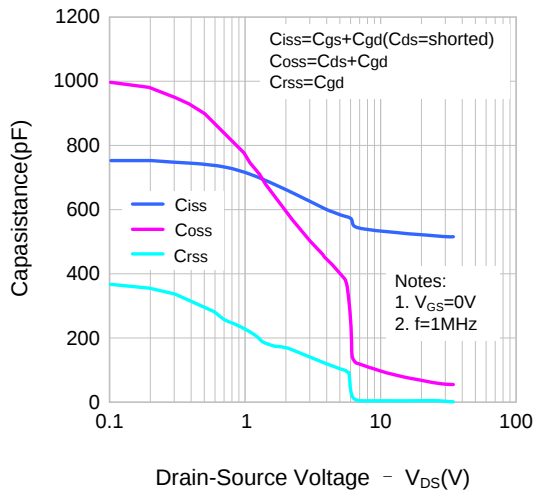
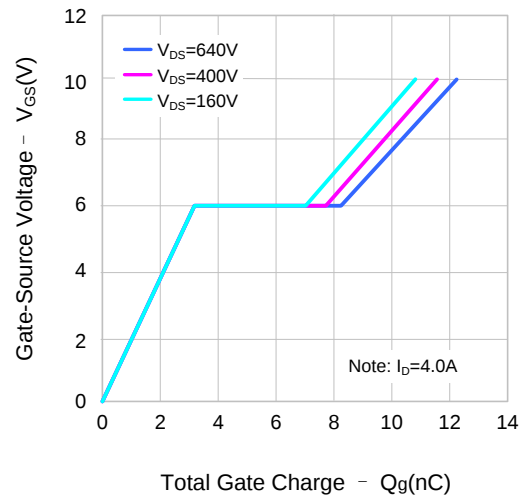


Figure 6. Gate Charge Characteristics



TYPICAL CHARACTERISTICS(CONTINUED)

Figure 7. Breakdown Voltage Variation vs. Temperature

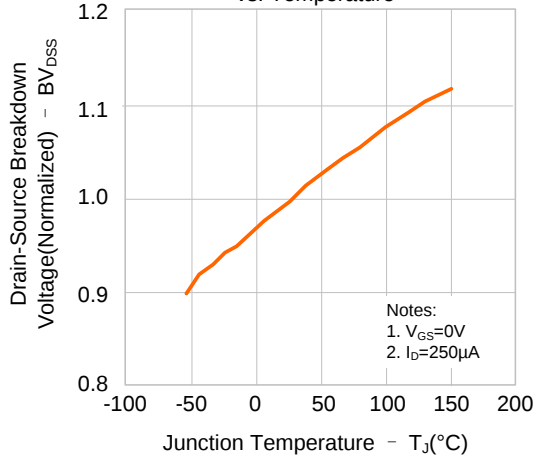


Figure 8. On-resistance Variation vs. Temperature

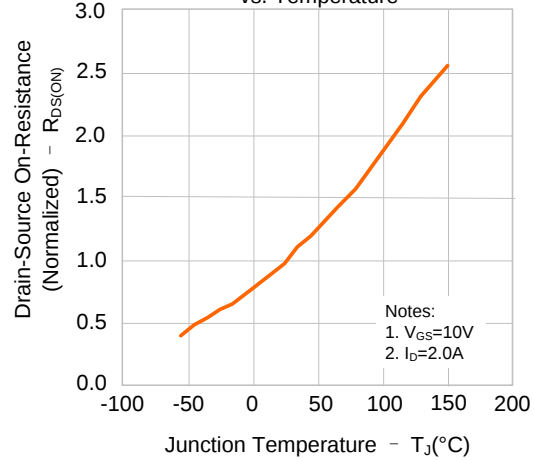


Figure 9-1. Max. Safe Operating Area(SVF4N80F)

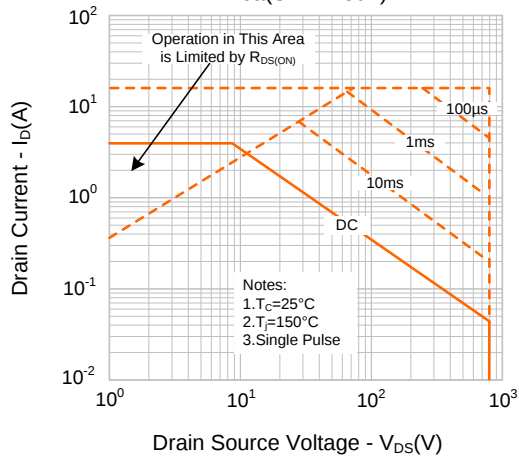


Figure 9-2. Max. Safe Operating Area(SVF4N80D)

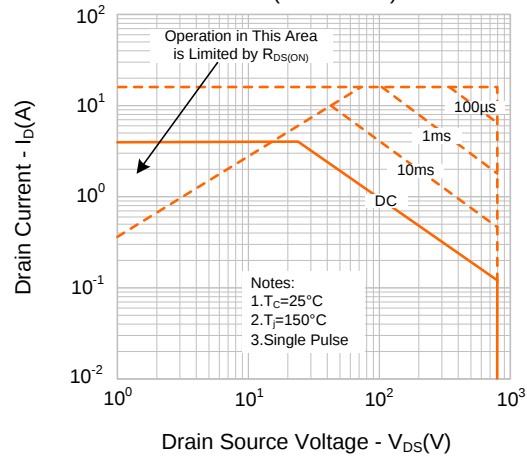


Figure 9-3. Max. Safe Operating Area(SVF4N80MJ)

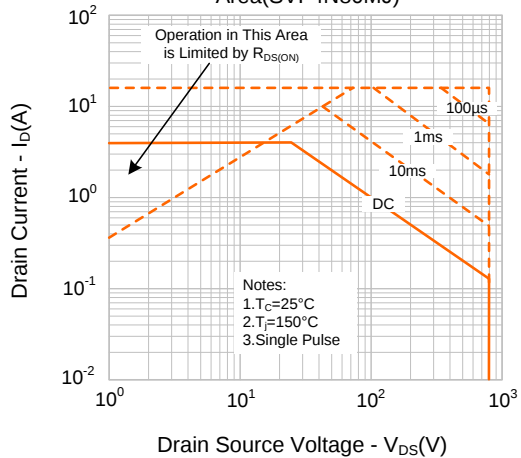
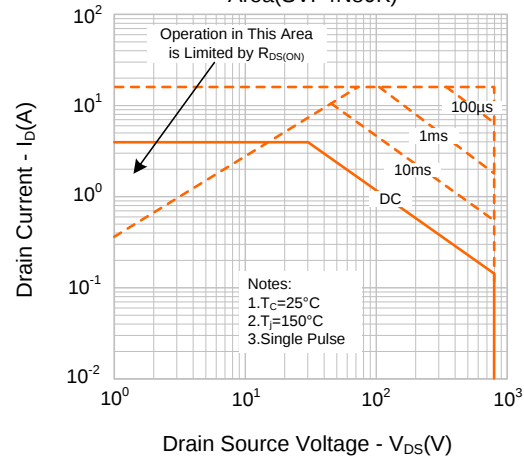
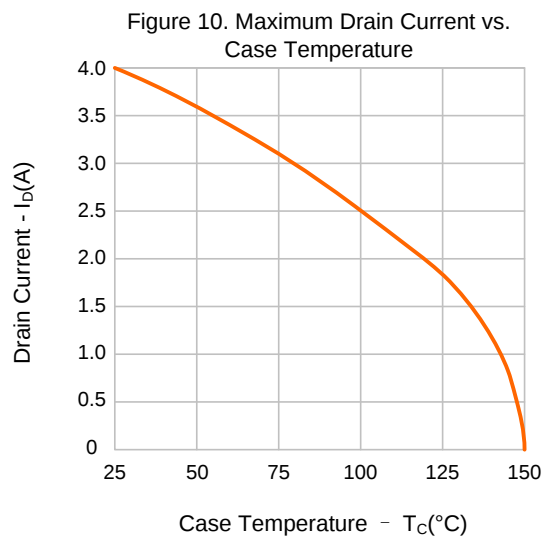


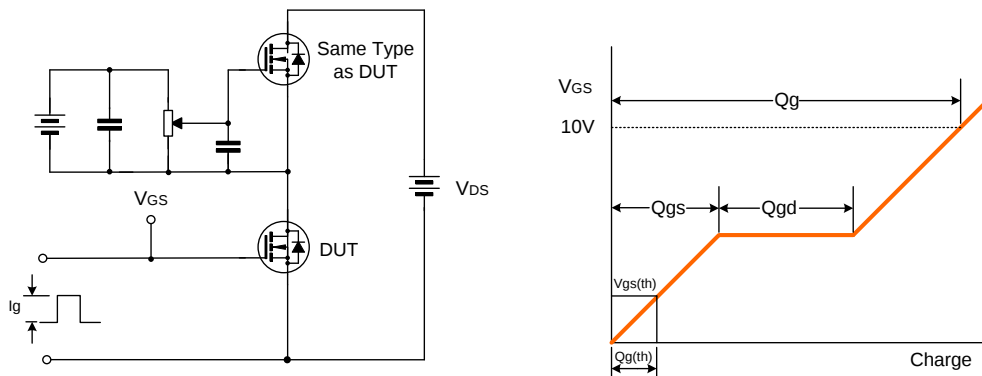
Figure 9-4. Max. Safe Operating Area(SVF4N80K)



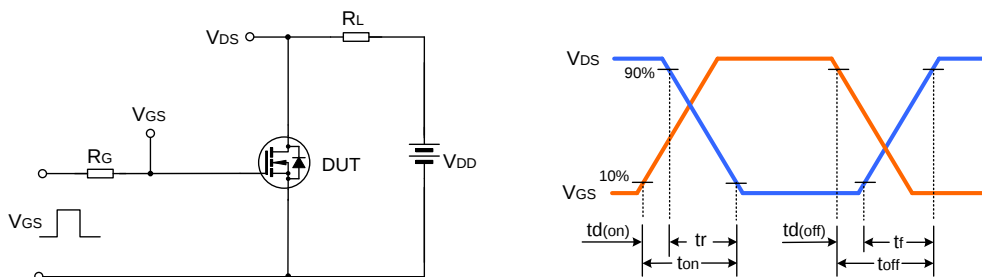
TYPICAL CHARACTERISTICS(CONTINUED)



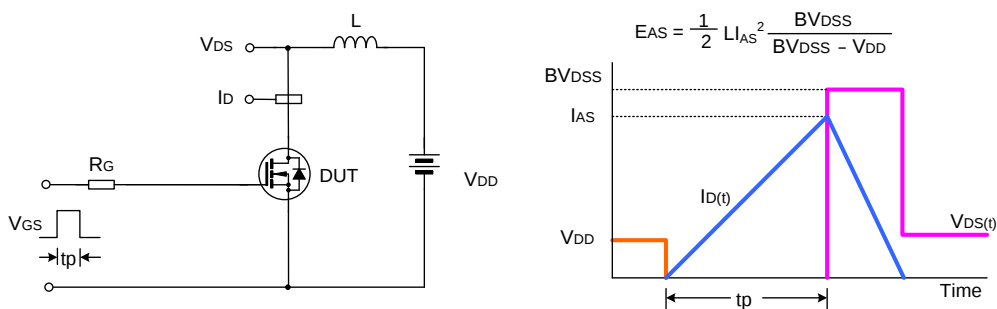
TYPICAL TEST CIRCUIT



Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

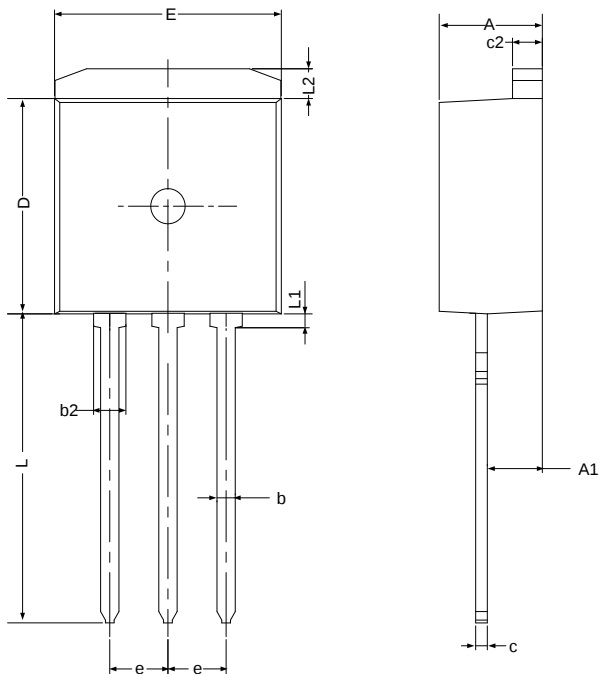


Unclamped Inductive Switching Test Circuit & Waveform

PACKAGE OUTLINE

TO-262-3L

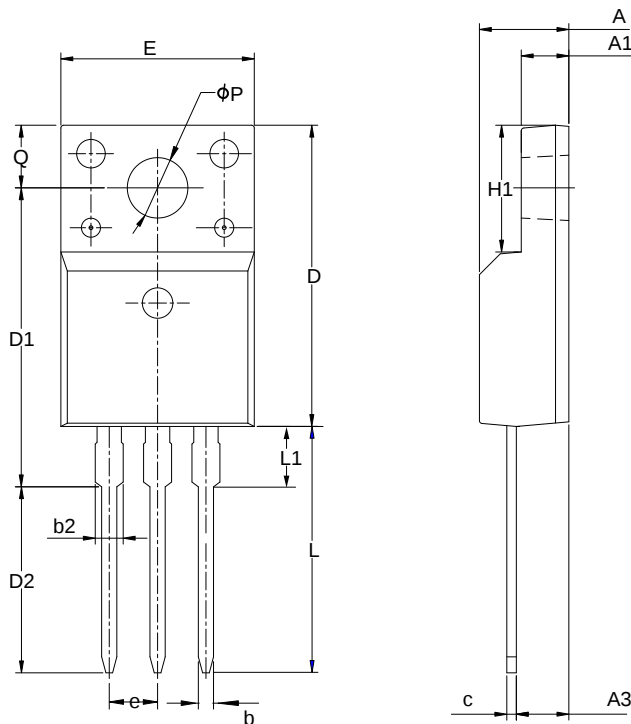
UNIT: mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	2.20	—	2.92
b	0.71	0.80	0.90
b2	1.20	—	1.50
c	0.34	—	0.65
c2	1.22	1.30	1.35
D	8.38	—	9.30
E	9.80	10.16	10.54
e	2.54 BSC		
L	12.80	—	14.10
L1	—	—	0.75
L2	1.12	—	1.42

TO-220F-3L

UNIT: mm

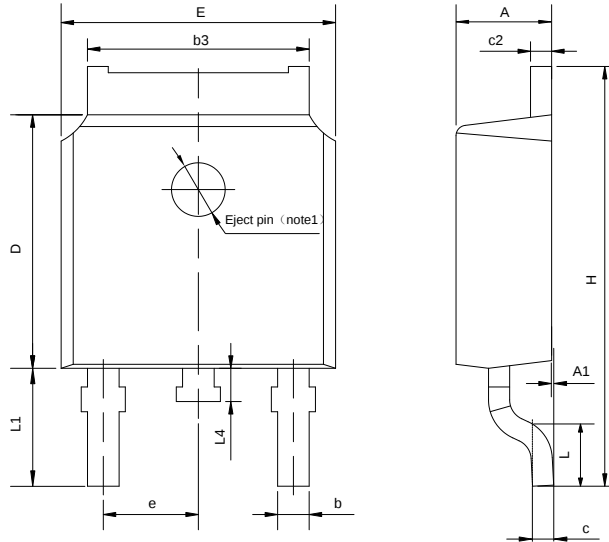


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.42	4.70	5.02
A1	2.30	2.54	2.80
A3	2.50	2.76	3.10
b	0.70	0.80	0.90
b2	—	—	1.47
c	0.35	0.50	0.65
D	15.25	15.87	16.25
D1	15.30	15.75	16.30
D2	9.30	9.80	10.30
E	9.73	10.16	10.36
e	2.54BSC		
H1	6.40	6.68	7.00
L	12.48	12.98	13.48
L1	—	—	3.50
ΦP	3.00	3.18	3.40
Q	3.05	3.30	3.55

PACKAGE OUTLINE(CONTINUED)

TO-252-2L

UNIT: mm

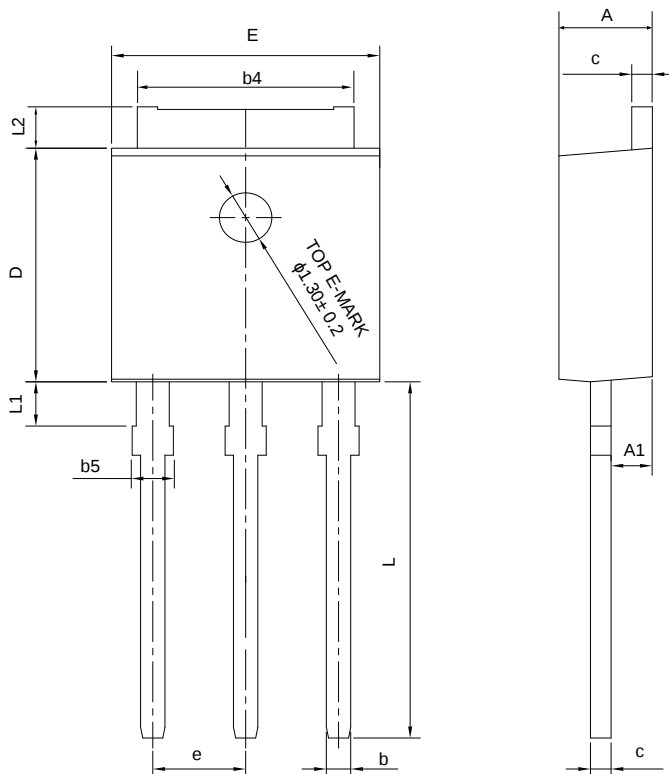


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.10	2.30	2.50
A1	0	—	0.127
b	0.66	0.76	0.89
b3	5.10	5.33	5.46
c	0.45	—	0.65
c2	0.45	—	0.65
D	5.80	6.10	6.40
E	6.30	6.60	6.90
e	2.30TYP		
H	9.60	10.10	10.60
L	1.40	1.50	1.70
L1	2.90REF		
L4	0.60	0.80	1.00

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

TO-251J-3L

UNIT: mm



SYMBOL	MILLIMETER		
	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

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.
- Our products are consumer electronic products, and / or civil electronic products.
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- Product promotion is endless, our company will wholeheartedly provide customers with better products!
- Website: <http://www.silan.com.cn>

Part No.: SVF4N80F/D/MJ/K

Document Type: Datasheet

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Rev.: 2.5

Revision History:

1. Deleted NOMENCLATURE
2. Modify Important notice

Rev.: 2.4

Revision History:

1. Modify ORDERING INFORMATION
2. Modify TYPICAL TEST CIRCUIT
3. Modify Important notice

Rev.: 2.3

Revision History:

1. Add ratings of L=10mH
2. Update the package outline of TO-262-3L

Rev.: 2.2

Revision History:

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

Rev.: 2.1

Revision History:

1. Modify the general description
2. Modify the ordering information
3. Modify the package outline of TO-262-3L

Rev.: 2.0

Revision History:

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

Rev.: 1.9

Revision History:

1. Modify the thermal characteristics

Rev.: 1.8

Revision History:

1. Add the package of TO-262-3L

Rev.: 1.7

Revision History:

1. Modify the ordering information

Rev.: 1.6

Revision History:

1. Change the schematic diagram of MOS

Rev.: 1.5

Revision History:

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

Rev.: 1.4

Revision History:

1. Modify "ELECTRICAL CHARACTERISTICS"

Rev.: 1.3

Revision History:

1. Modify "PACKAGE OUTLINE"

Rev.: 1.2

Revision History:

1. Modify the value of T_{rr} and Q_{rr}

Rev.: 1.1

Revision History:

1. Add the halogen free information of SVF4N80F

Rev.: 1.0

Revision History:

1. Initial release