

2A, 600V N-CHANNEL MOSFET

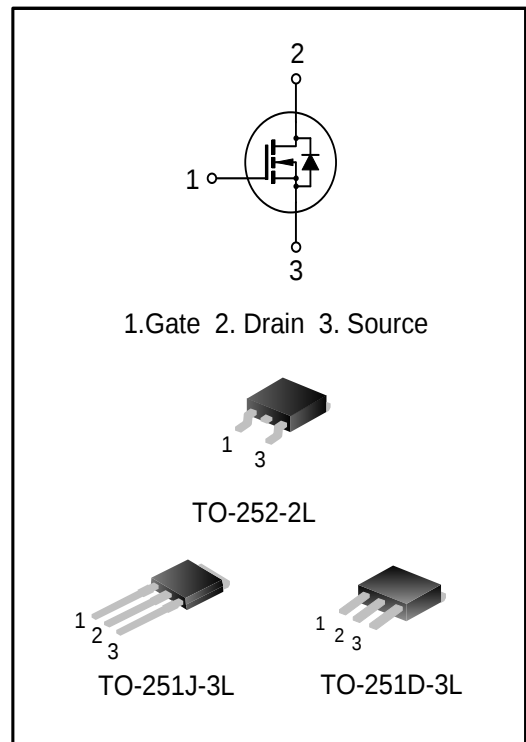
GENERAL DESCRIPTION

SVF2N60RD/M/MJ 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 C_{rss}
- ♦ Fast switching
- ♦ Improved dv/dt capability



ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SVF2N60RDTR	TO-252-2L	2N60RD	Halogen free	Tape&Reel
SVF2N60RM	TO-251D-3L	2N60RM	Halogen free	Tube
SVF2N60RMJ	TO-251J-3L	2N60RMJ	Halogen free	Tube

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

Characteristics	Symbol	Rating	Unit
		SVF2N60RM/D/MJ	
Drain-Source Voltage	V _{DS}	600	V
Gate-Source Voltage	V _{GS}	±30	V
Drain Current	I _D	TC=25°C	A
		TC=100°C	
Drain Current Pulsed	I _{DM}	8.0	A
Power Dissipation(TC=25°C) -Derate above 25°C	P _D	34	W
		0.27	W/°C
Single Pulsed Avalanche Energy (Note 1)	E _{AS}	115	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	Rating	Unit
		SVF2N60RM/D/MJ	
Thermal Resistance, Junction-to-Case	R _{θJC}	3.7	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	62.0	°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 =1.0A	--	3.7	4.2	Ω
Input Capacitance	R _g	f=1.0MHz	--	3.1	--	Ω
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	--	250	--	pF
Output Capacitance	C _{oss}		--	30	--	
Reverse Transfer Capacitance	C _{rss}		--	2.7	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} =300V, I _D =2.0A, R _G =25Ω (Note4, 5)	--	8.0	--	ns
Turn-on Rise Time	t _r		--	23	--	
Turn-off Delay Time	t _{d(off)}		--	17	--	
Turn-off Fall Time	t _f		--	24	--	
Total Gate Charge	Q _g	V _{DS} =480V, I _D =2.0A, V _{GS} =10V (Note 4, 5)	--	8.9	--	nC
Gate-Source Charge	Q _{gs}		--	2.5	--	
Gate-Drain Charge	Q _{gd}		--	4.4	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

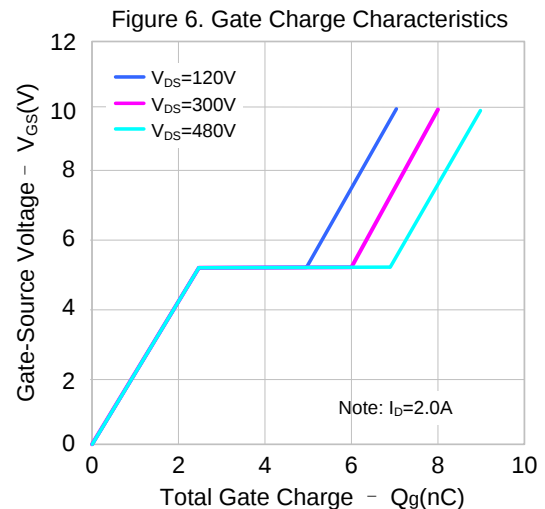
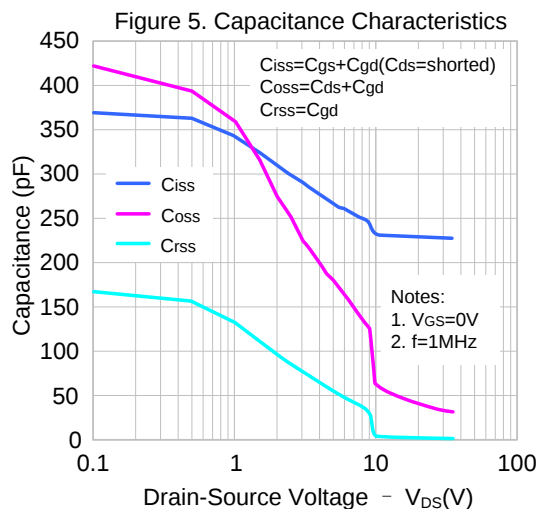
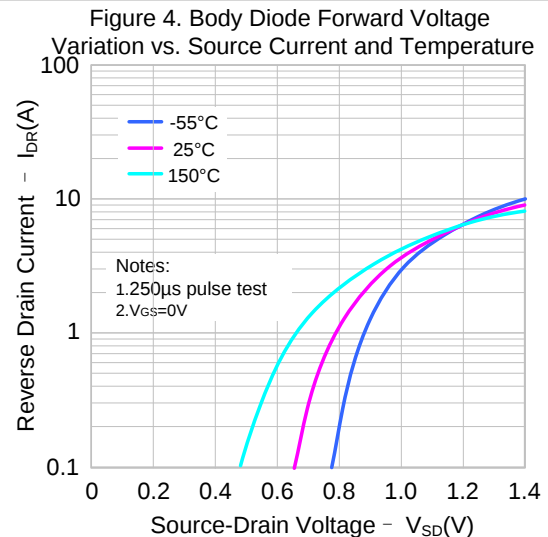
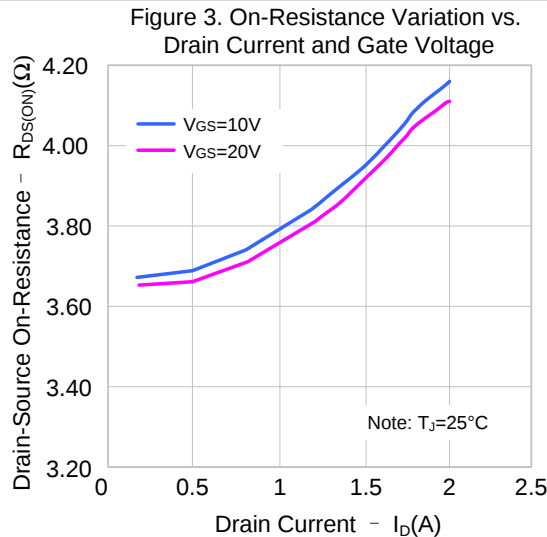
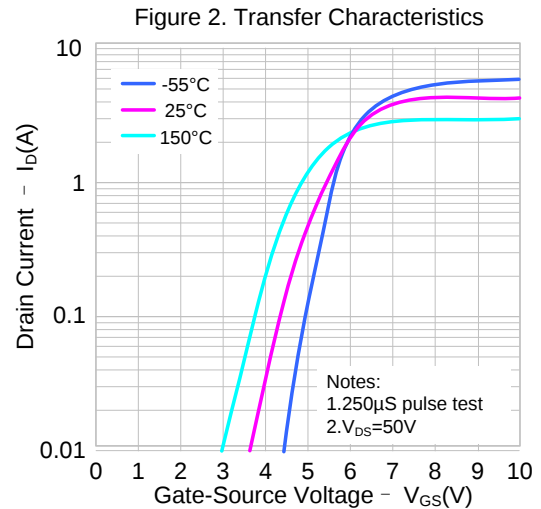
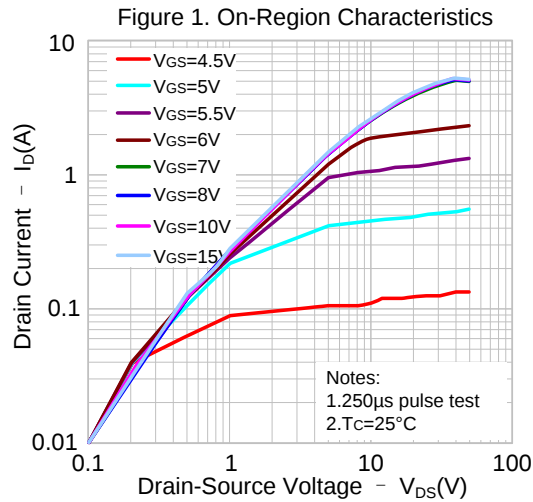
Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I _S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	2.0	A
Pulsed Source Current	I _{SM}		--	--	8.0	
Diode Forward Voltage	V _{SD}	I _S =2.0A, V _{GS} =0V	--	--	1.4	V
Reverse Recovery Time	T _{rr}	I _S =2.0A, V _{GS} =0V, dI _F /dt=100A/μs (Note 4)	--	330	--	ns
Reverse Recovery Charge	Q _{rr}		--	0.87	--	μC

Notes:

- L=30mH, I_{AS}=2.52A, V_{DD}=100V, R_G=25Ω, starting temperature T_J=25°C;
- V_{DS}=0~400V, I_{SD}≤2A, T_J=25°C;
- V_{DS}=0~480V;
- Pulse Test: Pulse width ≤300μs, Duty cycle≤2%;
- Essentially independent of operating temperature.



TYPICAL CHARACTERISTICS





TYPICAL CHARACTERISTICS (CONTINUED)

Figure 7. Breakdown Voltage Variation vs. Temperature

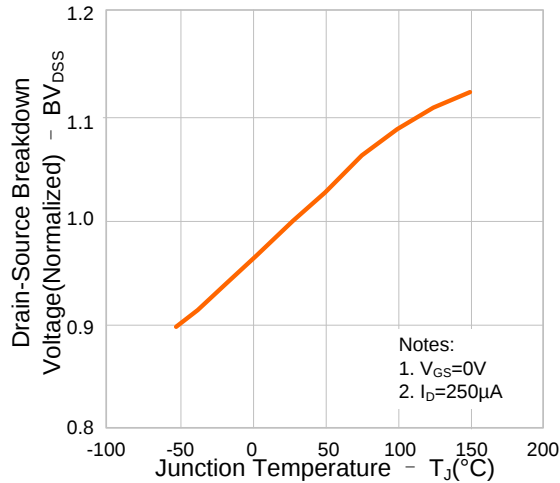


Figure 8. On-resistance Variation vs. Temperature

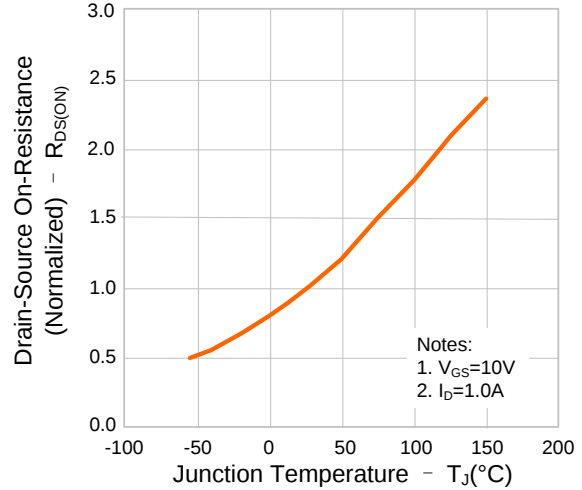


Figure 9. Max. Safe Operating Area (SVF2N60RD/M/MJ)

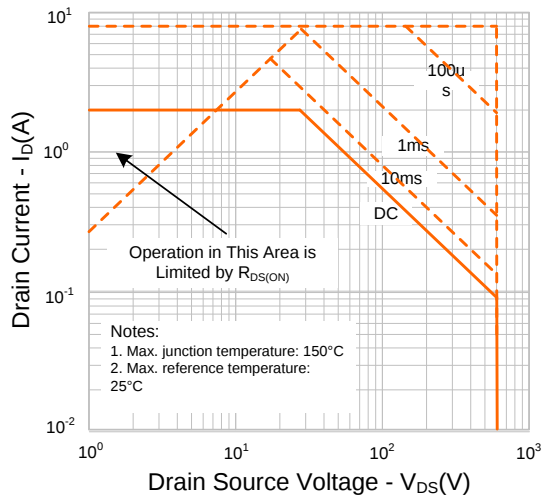
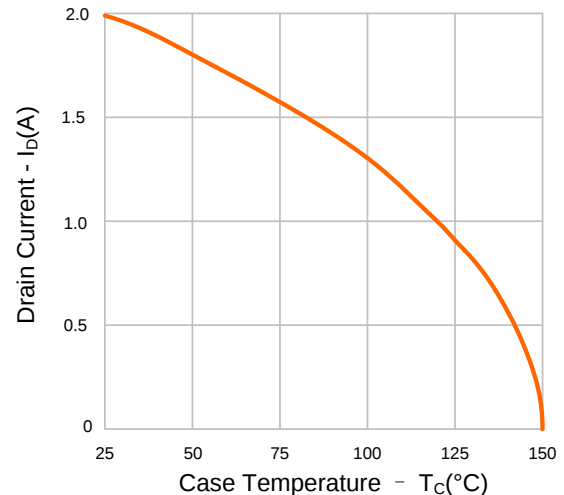
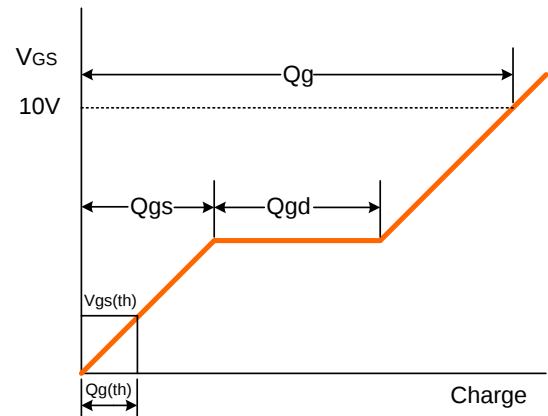
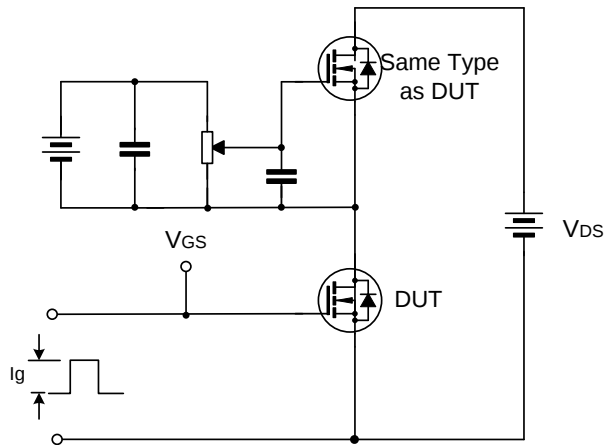


Figure 10. Maximum Drain Current vs. Case Temperature

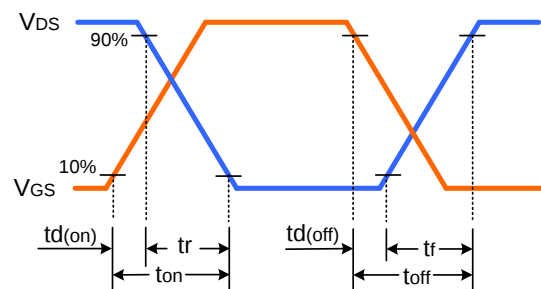
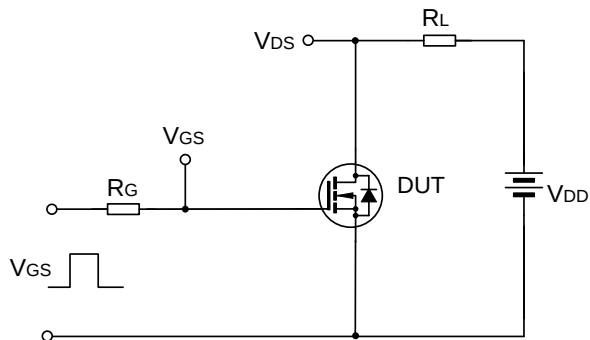


TYPICAL TEST CIRCUIT

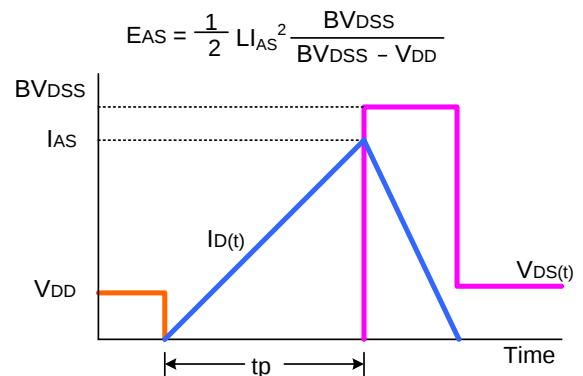
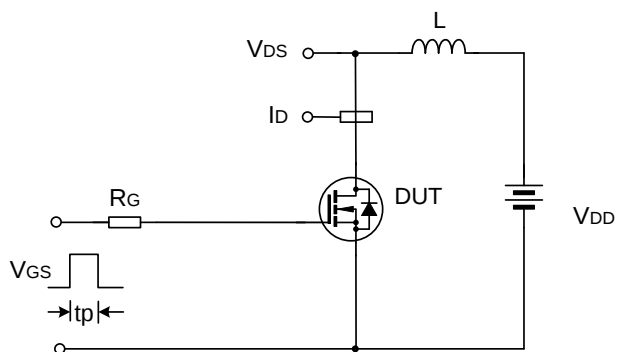
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



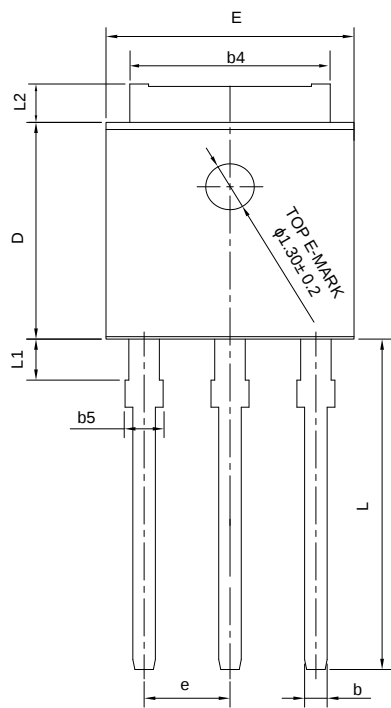
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

TO-251J-3L

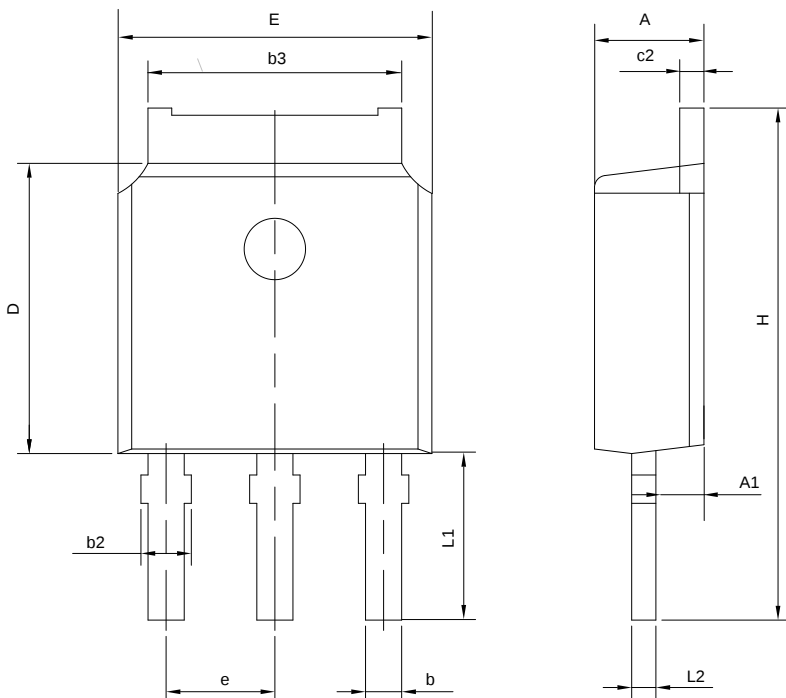
UNIT: mm



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

TO-251D-3L

UNIT: mm

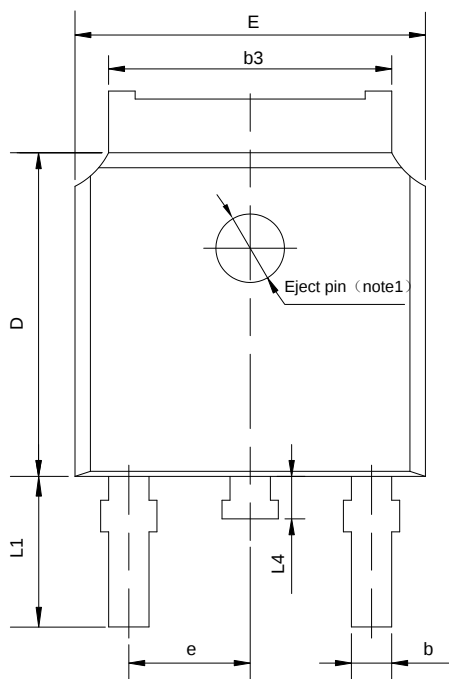


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.20	2.30	2.40
b	0.66	—	0.86
b2	0.72	—	0.90
b3	5.10	5.33	5.46
c2	0.46	—	0.60
D	6.00	6.10	6.20
E	6.50	6.60	6.70
e	2.186	2.286	2.386
H	10.40	10.70	11.00
L1	3.50 REF		
L2	0.508 BSC		

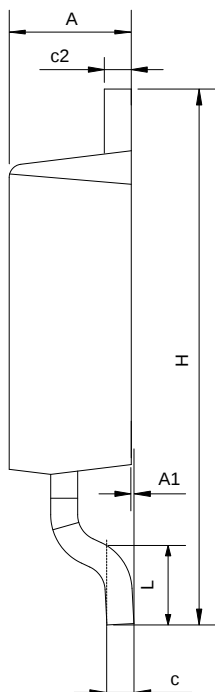
PACKAGE OUTLINE (CONTINUED)

TO-252-2L

UNIT: mm



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



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

Important notice :

1. The instructions are subject to change without notice!
2. Customers should obtain the latest relevant information before placing orders and should verify that such information is complete and current. Please read the instructions carefully before using our products, including the circuit operation precautions.
3. Our products are consumer electronic products or the other civil electronic products.
4. When using our products, please do not exceed the maximum rating of the products, otherwise the reliability of the whole machine will be affected. There is a certain possibility of failure or malfunction of any semiconductor product under specific conditions. The buyer is responsible for complying with safety standards and taking safety measures when using our products for system design, sample and whole machine manufacturing, so as to avoid potential failure risk that may cause personal injury or property loss.
5. It is strongly recommended to identify the trademark when buying our products. Please contact us if there is any question.
6. Product promotion is endless, our company will wholeheartedly provide customers with better products!
7. Website: <http://www.silan.com.cn>

Part No.: SVF2N60RD/M/MJ

Document Type: Datasheet

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Rev.: 1.4

Revision History:

1. Update electrical diagram and typical circuit diagram
2. Electrical parameters above 10 do not retain the decimal, and below 10 retain one decimal
3. Update the curve template
4. Update important notes

Rev.: 1.3

Revision History:

1. Deleted NOMENCLATURE
2. Modify Important notice

Rev.: 1.2

Revision History:

1. Add characteristics of dv/dt , R_g
2. Update SOA

Rev.: 1.1

Revision History:

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

Rev.: 1.0

Revision History:

1. First release