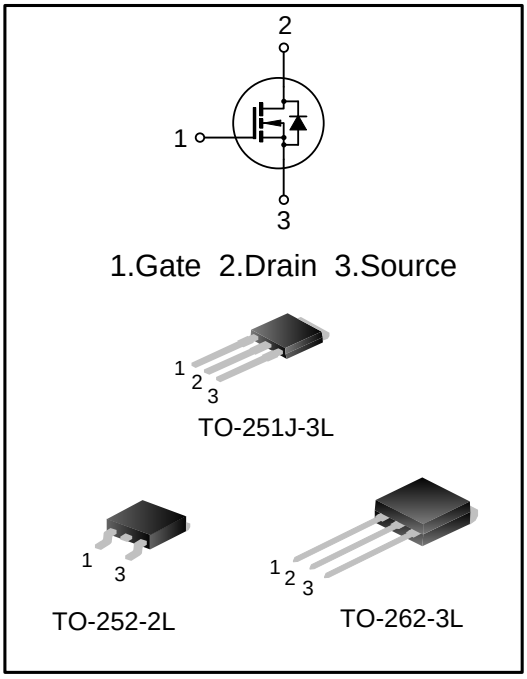
6A, 800V N-CHANNEL MOSFET

GENERAL DESCRIPTION

SVF6N80D(K)(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

- 6A,800V, $R_{DS(on)(typ.)}$=2.0Ω@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
SVF6N80DTR	TO-252-2L	SVF6N80D	Halogen free	Tape&Reel
SVF6N80K	TO-262-3L	SVF6N80K	Pb free	Tube
SVF6N80MJ	TO-251J-3L	SVF6N80MJ	Halogen free	Tube

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

Characteristics		Symbol	Ratings		Unit
			SVF6N80D/MJ	SVF6N80K	
Drain-Source Voltage		V_{DS}	800		V
Gate-Source Voltage		V_{GS}	±30		V
Drain Current	T_C=25°C	I_D	6.0		A
	T_C=100°C		3.9		
Drain Current Pulsed		I_{DM}	24		A
Power Dissipation(T_C=25°C)		P_D	132	138	W
-Derate above 25°C			1.06	1.1	W/°C
Single Pulsed Avalanche Energy(Note 1)		E_{AS}	323		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
		SVF6N80D/MJ	SVF6N80K	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.95	0.91	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.0	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	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=3.0A	--	2.0	2.7	Ω
Input Capacitance	R_g	f=1.0MHz	--	4.8	--	Ω
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz	---	677	---	pF
Output Capacitance	C_{oss}		--	71	--	
Reverse Transfer Capacitance	C_{rss}		--	4.0	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=400V, I_D=6.0A, R_G=25Ω (Note 3,4)	--	12	--	ns
Turn-on Rise Time	t_r		--	23	--	
Turn-off Delay Time	$t_{d(off)}$		--	25	--	
Turn-off Fall Time	t_f		--	23	--	
Total Gate Charge	Q_g	V_{DS}=640V, I_D=6.0A, V_{GS}=10V (Note 3,4)	--	15	--	nC
Gate-Source Charge	Q_{gs}		--	4.3	--	
Gate-Drain Charge	Q_{gd}		--	6.8	--	

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	--	--	6.0	A
Pulsed Source Current	I_{SM}		--	--	24	
Diode Forward Voltage	V_{SD}	I_S=6.0A,V_{GS}=0V	--	--	1.4	V
Reverse Recovery Time	T_{rr}	I_S=6.0A,V_{GS}=0V, dI_F/dt=100A/μS (Note4)	--	549	--	ns
Reverse Recovery Charge	Q_{rr}		--	3.0	--	μC

Notes:

1. L=30mH, I_{AS}=4.5A, V_{DD}=60V, R_G=25Ω, starting temperature T_J=25°C;
2. V_{DS}=0~400V, I_{SD}<=6.0A, T_J=25°C;
3. V_{DS}=0~480V;
4. Pulse Test: Pulse width ≤300μs,Duty cycle≤2%;
5. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

Figure 1. On-Region Characteristics

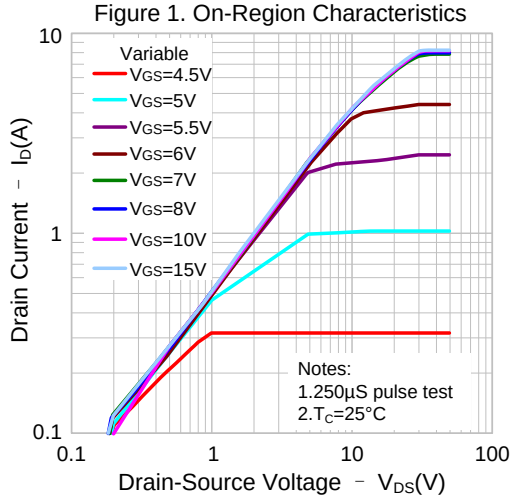


Figure 2. Transfer Characteristics

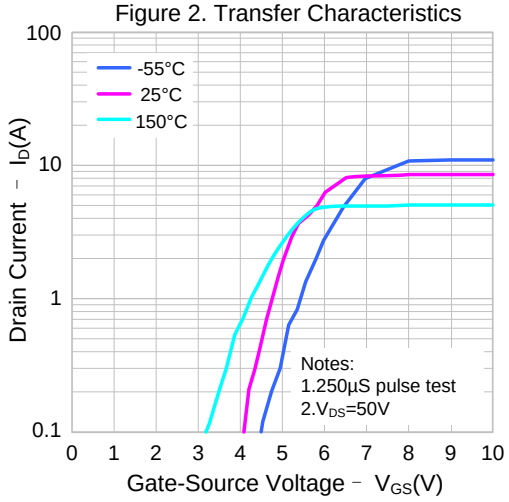


Figure 3. On-Resitance Variation vs. Drain Current and Gate Voltage

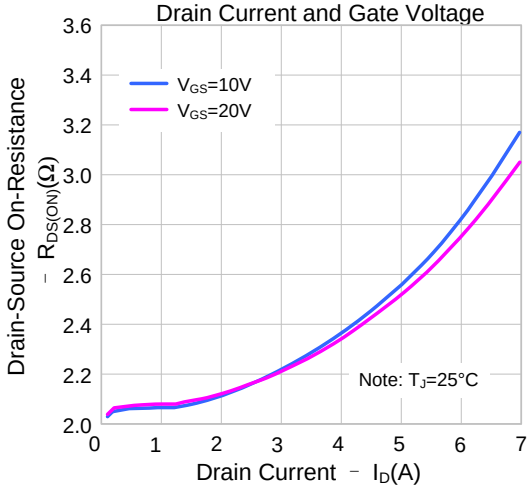


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

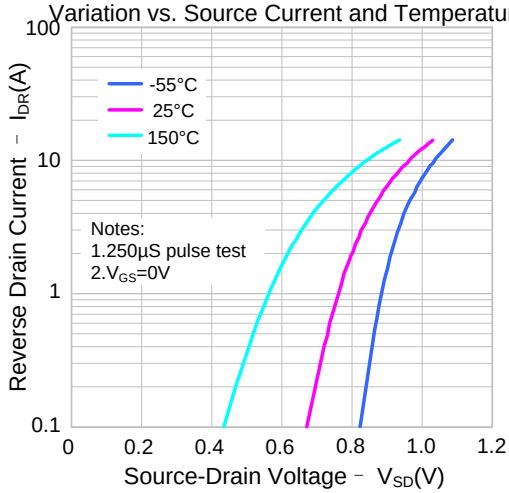


Figure 5. Capacitance Characteristics

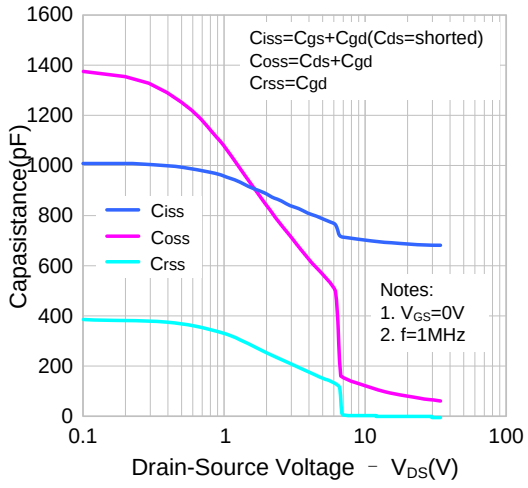
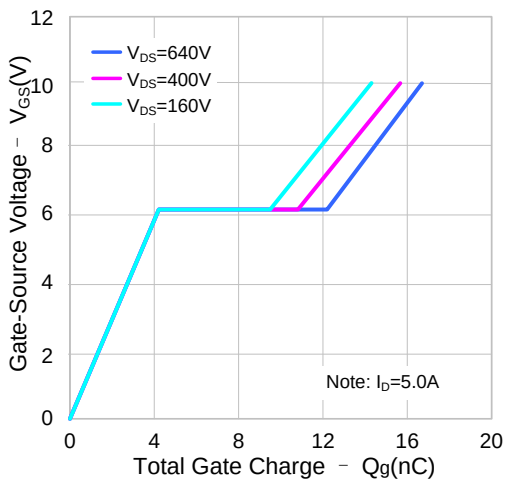


Figure 6. Gate Charge Characteristics



TYPICAL CHARACTERISTICS(CONTINUED)

Figure 7. Breakdown Voltage Variation vs. Temperature

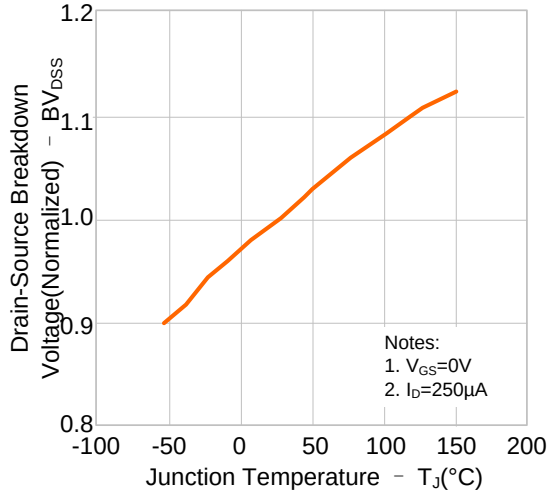


Figure 8. On-resistance Variation vs. Temperature

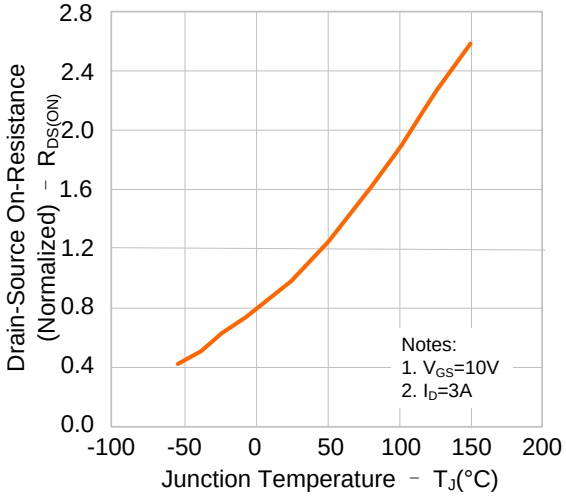


Figure 9-1. Max. Safe Operating Area(SVF6N80D/MJ)

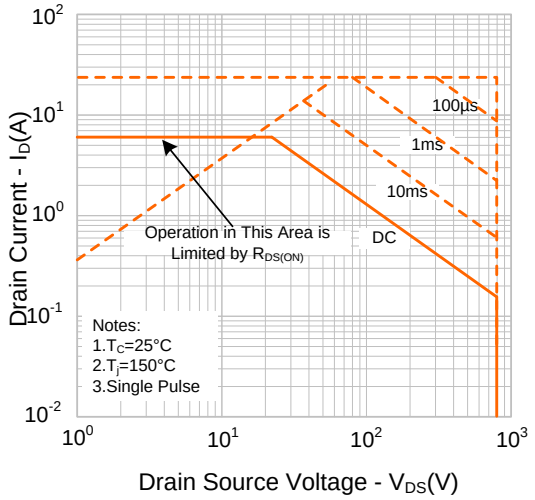


Figure 9-2. Max. Safe Operating Area(SVF6N80K)

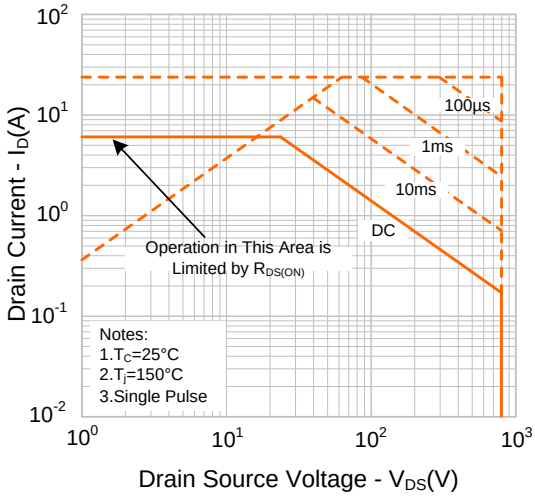
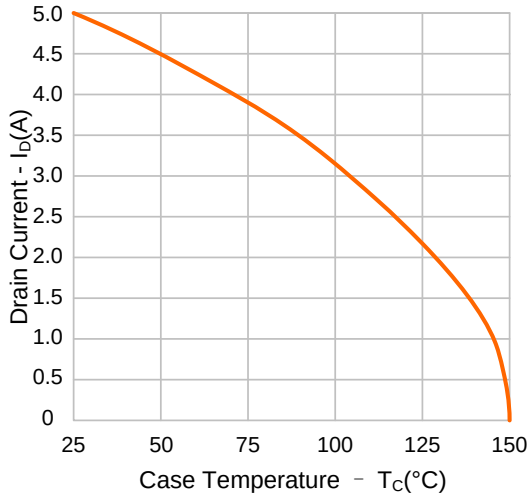
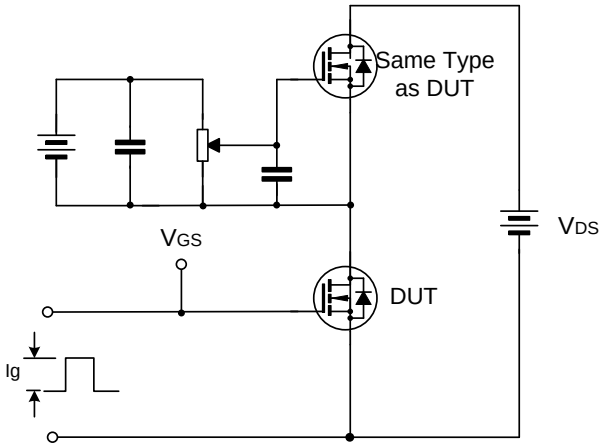


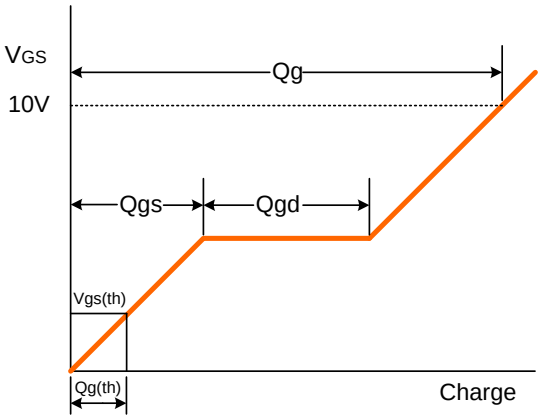
Figure 10. Maximum Drain Current vs. Case Temperature



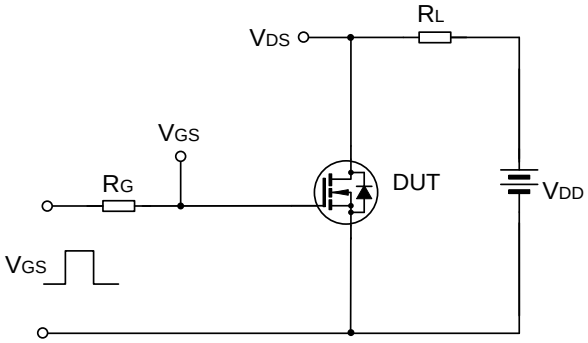
TYPICAL TEST CIRCUIT

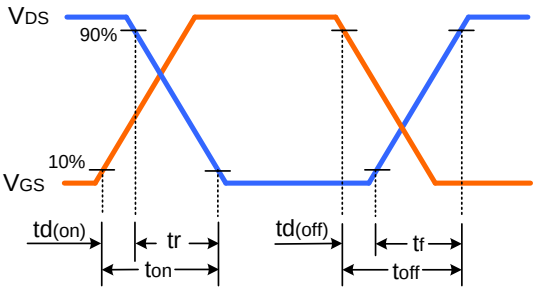
Gate Charge Test Circuit & Waveform



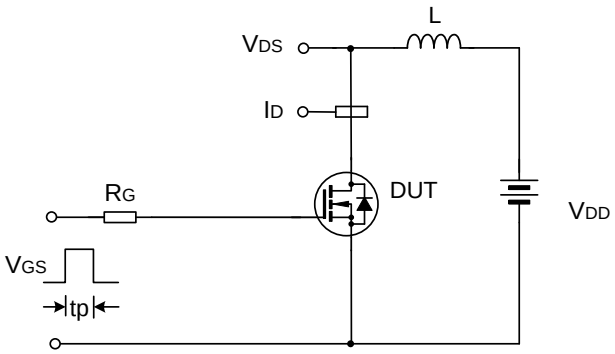


Resistive Switching Test Circuit & Waveform

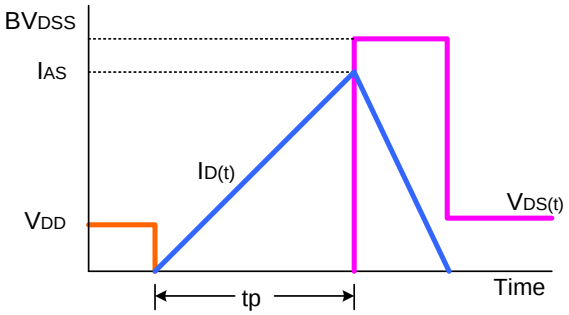




Unclamped Inductive Switching Test Circuit & Waveform

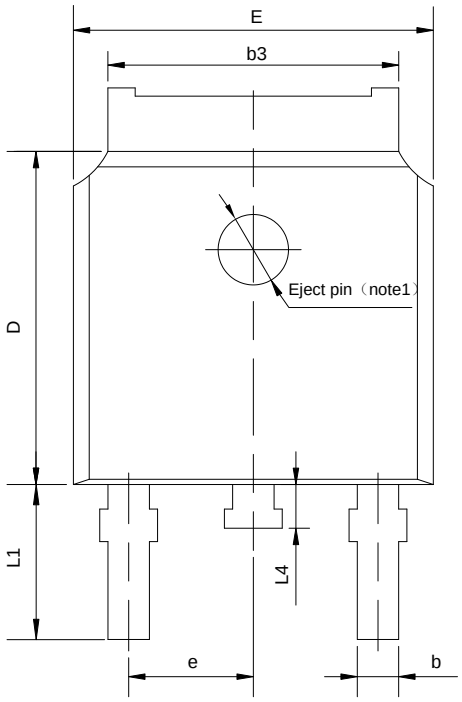


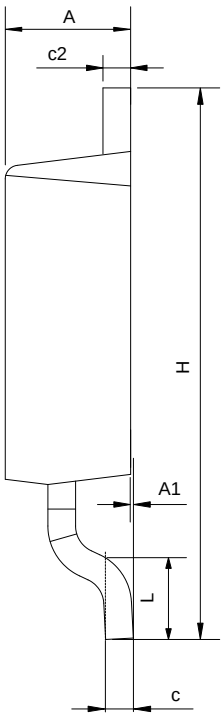
$$E_{AS} = \frac{1}{2} LI_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



PACKAGE OUTLINE

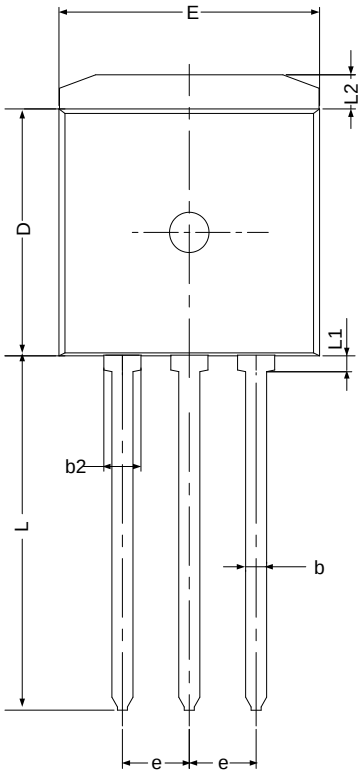
TO-252-2L **UNIT: mm**

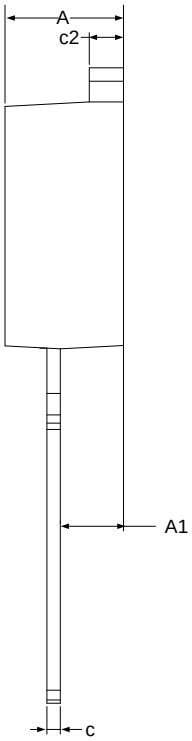




SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.10	2.30	2.50
A1	0	—	0.127
b	0.66	0.76	0.89
b3	5.10	5.33	5.46
c	0.45	—	0.65
c2	0.45	—	0.65
D	5.80	6.10	6.40
E	6.30	6.60	6.90
e	2.30TYP		
H	9.60	10.10	10.60
L	1.40	1.50	1.70
L1	2.90REF		
L4	0.60	0.80	1.00

TO-262-3L **UNIT: mm**

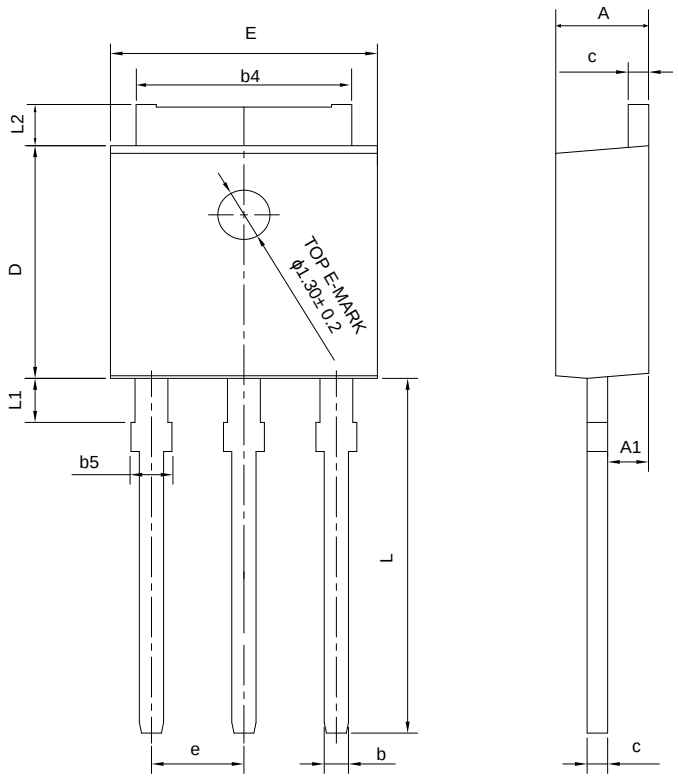




SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	2.20	—	2.92
b	0.71	0.80	0.90
b2	1.20	—	1.50
c	0.34	—	0.65
c2	1.22	1.30	1.35
D	8.38	—	9.30
E	9.80	10.16	10.54
e	2.54 BSC		
L	12.80	—	14.10
L1	—	—	0.75
L2	1.12	—	1.42

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

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Rev.: 1.3

Revision History:

1. Add SVF6N80MJ
2. Update the template of the datasheet

Rev.: 1.2

Revision History:

1. Add Electrical schematic and TYPICAL TEST CIRCUIT

Rev.: 1.1

Revision History:

1. Add SVF6N80K

Rev.: 1.0

Revision History:

1. First release