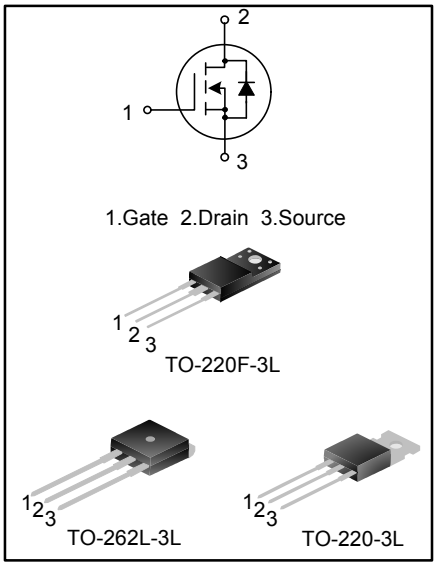
7A, 800V N-CHANNEL MOSFET

GENERAL DESCRIPTION

SVF7N80T/F/KL 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

- 7A,800V,$R_{DS(on)(typ.)}$=1.39Ω@V_{GS}=10V
- Low gate charge
- Low Crss
- Fast switching
- Improved dv/dt capability

NOMENCLATURE

S V F X N E X X X

Silan VDMOS Code of F-Cell process

Nominal current,using 1 or 2 digits:
Example:4 denotes 4A,
10 denotes 10A,
08 denotes 0.8A

N denotes N Channel

Special Features indication, May be omitted.
Example: E denotes embeded ESD structure

Nominal Voltage,using 2 digits
Example: 60 denotes 600V,
65 denotes 650V.

Package information.
Example:T:TO-220;
F:TO-220F;KL:TO-262L.

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing
SVF7N80T	TO-220-3L	SVF7N80T	Pb free	Tube
SVF7N80F	TO-220F-3L	SVF7N80F	Pb free	Tube
SVF7N80KL	TO-262L-3L	SVF7N80KL	Pb free	Tube

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

Characteristics		Symbol	Ratings			Unit
			SVF7N80T	SVF7N80F	SVF7N80KL	
Drain-Source Voltage		V_{DS}	800			V
Gate-Source Voltage		V_{GS}	±30			V
Drain Current	T_C=25°C	I_D	7.0			A
	T_C=100°C		4.4			
Drain Current Pulsed		I_{DM}	28.0			A
Power Dissipation(T_C=25°C)		P_D	154	50	150	W
-Derate above 25°C			1.23	0.40	1.20	W/°C
Single Pulsed Avalanche Energy(Note 1)		E_{AS}	534			mJ
Operation Junction Temperature Range		T_J	-55～+150			°C
Storage Temperature Range		T_{stg}	-55～+150			°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings			Unit
		SVF7N80T	SVF7N80F	SVF7N80KL	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.81	2.50	0.83	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	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	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=3.5A	--	1.4	1.6	Ω
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz	---	1087	---	pF
Output Capacitance	C_{oss}		--	104	--	
Reverse Transfer Capacitance	C_{rss}		--	5.7	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=400V, R_G=25Ω , I_D=7.0A (Note 2,3)	--	34	--	ns
Turn-on Rise Time	t_r		--	72	--	
Turn-off Delay Time	$t_{d(off)}$		--	63	--	
Turn-off Fall Time	t_f		--	35	--	
Total Gate Charge	Q_g	V_{DS}=640V, I_D=7.0A, V_{GS}=10V (Note 2,3)	--	23	--	nC
Gate-Source Charge	Q_{gs}		--	7.0	--	
Gate-Drain Charge	Q_{gd}		--	9.0	--	

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	--	--	7.0	A
Pulsed Source Current	I_{SM}		--	--	28	
Diode Forward Voltage	V_{SD}	I_S=7.0A,V_{GS}=0V	--	--	1.4	V
Reverse Recovery Time	T_{rr}	I_S=7.0A,V_{GS}=0V, dI_F/dt=100A/μS (Note2)	--	590	--	ns
Reverse Recovery Charge	Q_{rr}		--	3.9	--	μC

Notes:

1. L=30mH, I_{AS}=5.50A, V_{DD}=100V, R_G=20Ω, starting TB_{JB}=25°C;
2. Pulse Test: Pulse width ≤300μs,Duty cycle≤2%;
3. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

Figure 1. On-Region Characteristics

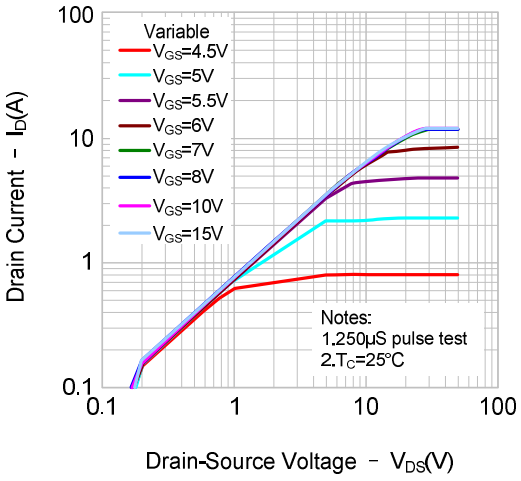


Figure 2. Transfer Characteristics

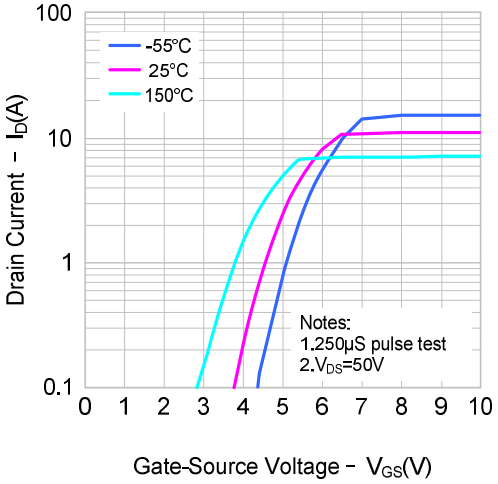


Figure 3. On-Resitance Variation vs. Drain Current and Gate Voltage

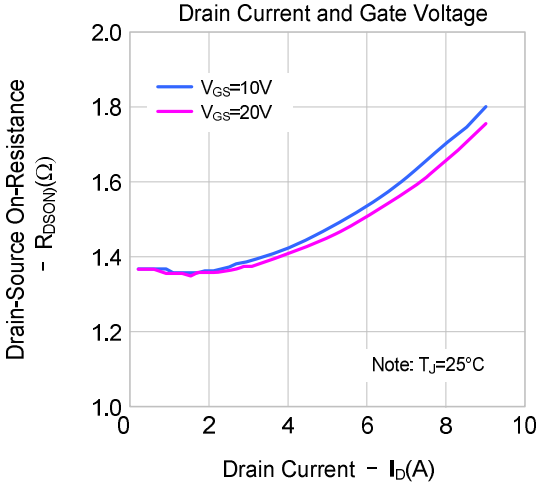


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

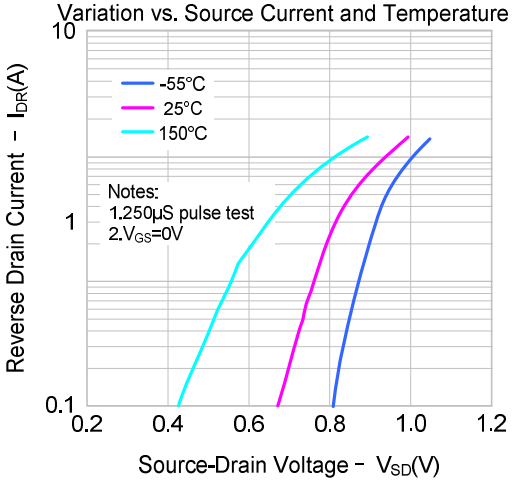


Figure 5. Capacitance Characteristics

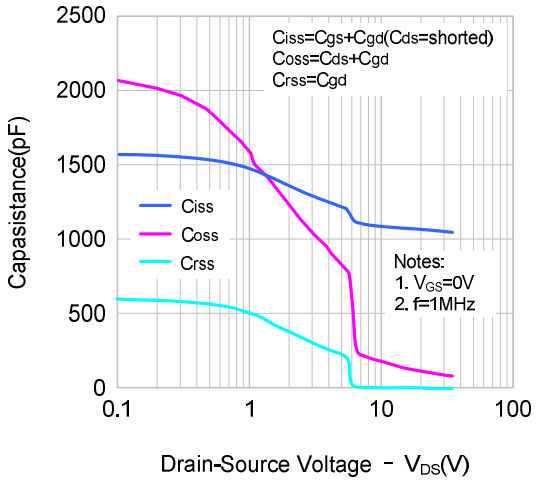
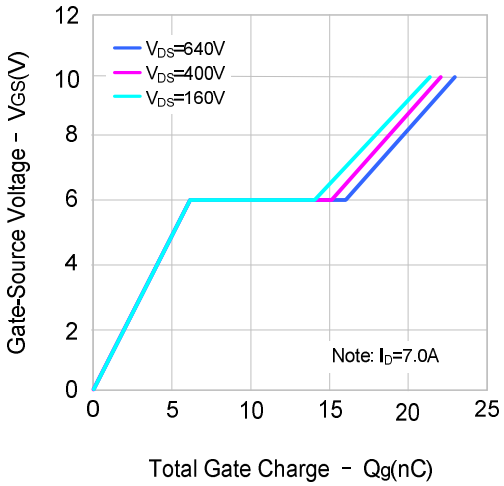


Figure 6. Gate Charge Characteristics



TYPICAL CHARACTERISTICS(continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

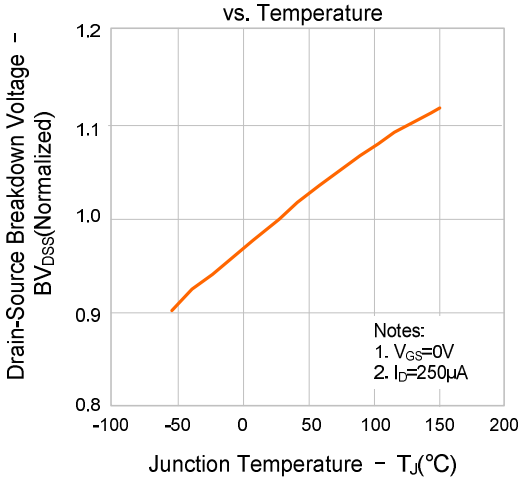


Figure 8. On-resistance Variation vs. Temperature

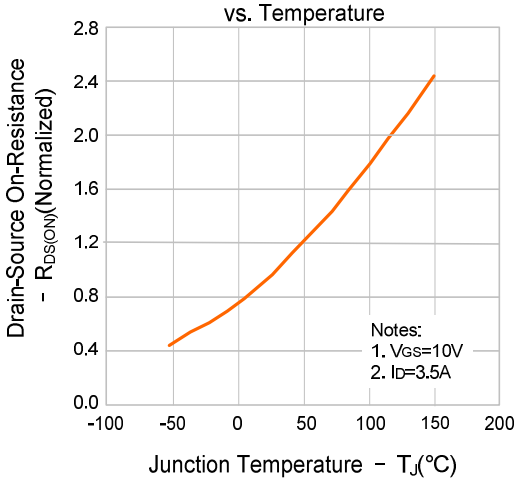


Figure 9-1. Max. Safe Operating Area(SVF7N80T)

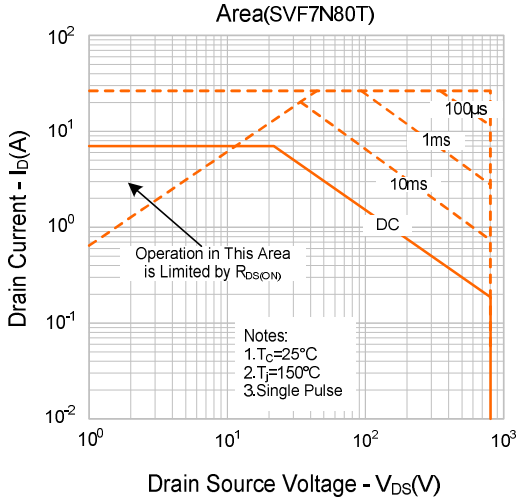


Figure 9-2. Max. Safe Operating Area(SVF7N80F)

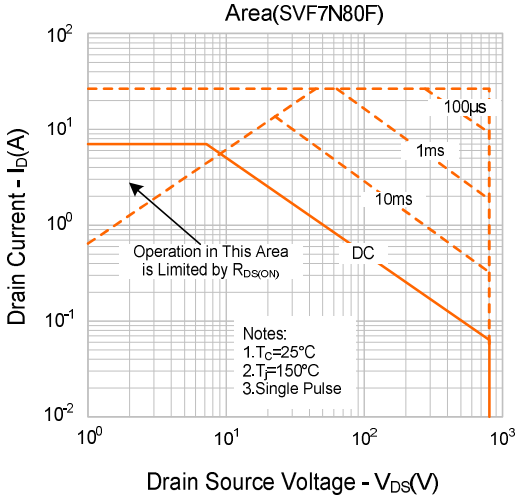


Figure 9-3. Max. Safe Operating Area(SVF7N80KL)

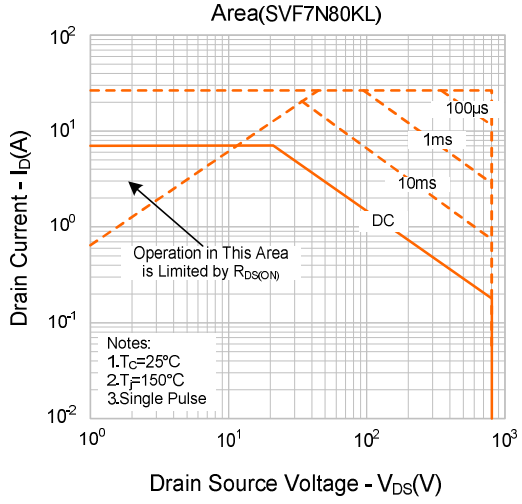
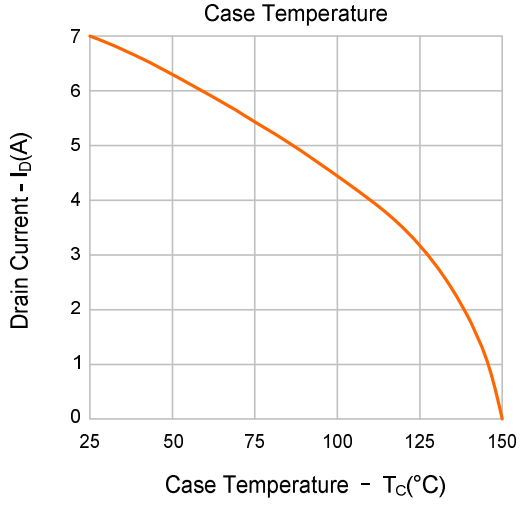
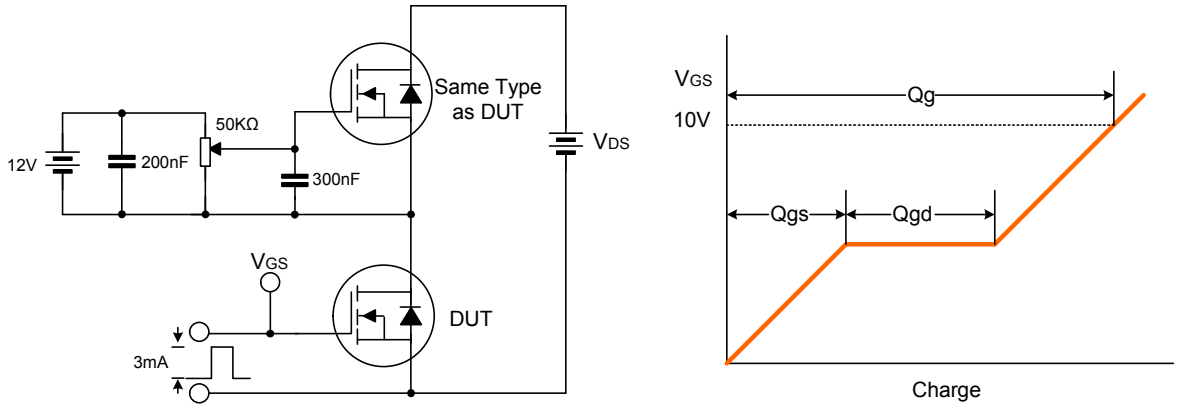


Figure 10. Maximum Drain Current vs. Case Temperature

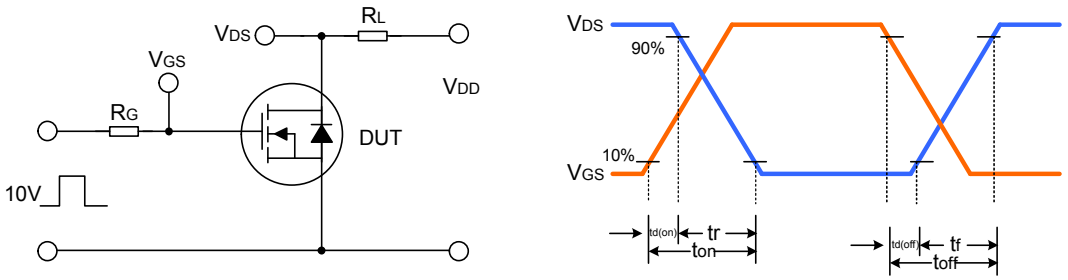


TYPICAL TEST CIRCUIT

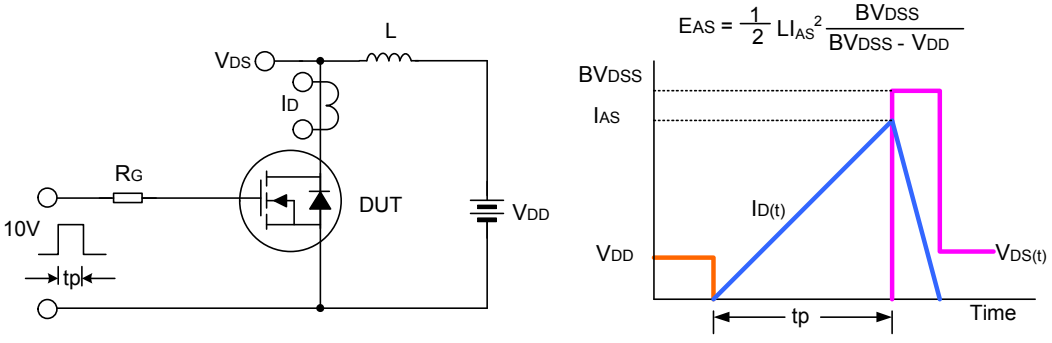
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



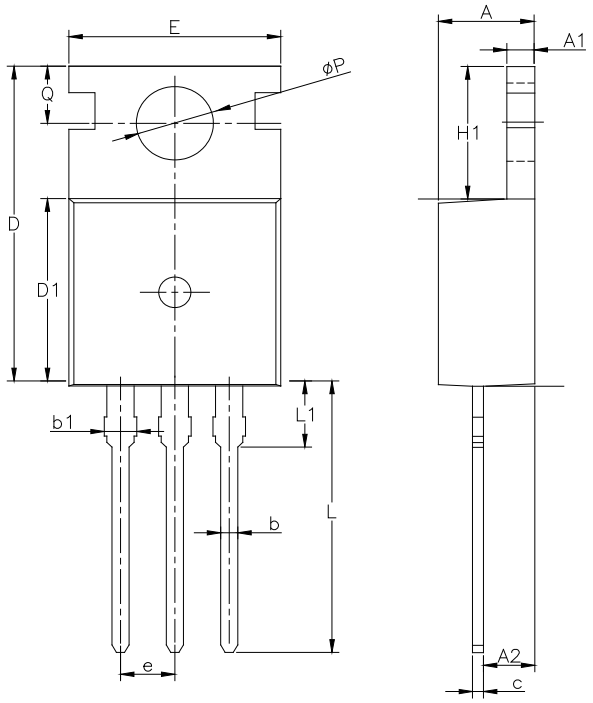
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

TO-220-3L

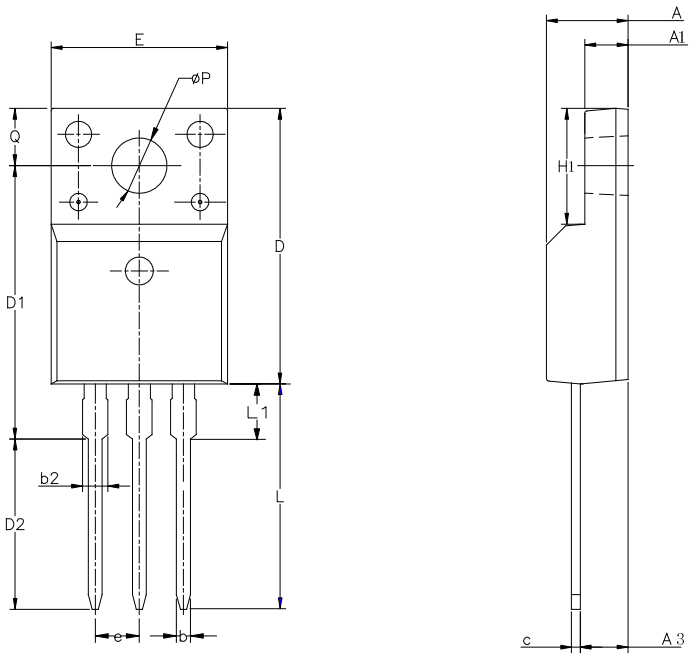
UNIT: mm



SYMBOL	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

TO-220F-3L

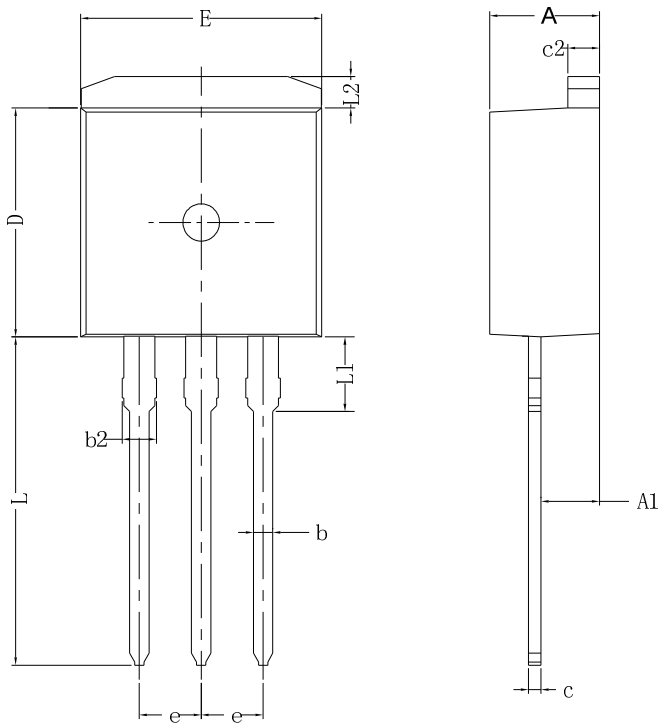
UNIT: mm



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

PACKAGE OUTLINE(Continued)

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



SYMBOL	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	2.20	---	2.92
b	0.71	0.80	0.97
b2	1.20	---	1.50
c	0.34	---	0.76
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	1.23	1.28	1.31
L2	1.12	---	1.42

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Part No.:	SVF7N80T/F/KL	Document Type:	Datasheet
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Rev.: 2.6
Revision History:
1. Add the package outline of TO-262L-3L
2. Delete the package outline of TO-262-3L

Rev.: 2.5
Revision History:
1. Update the package outline of TO-262-3L
2. Add another 3D image of TO-220-3L

Rev.: 2.4
Revision History:
1. Delete the package outline of TO-262L-3L

Rev.: 2.3
Revision History:
1. Update the package outline of TO-262-3L

Rev.: 2.2
Revision History:
1. Add the package outline of TO-262L-3L

Rev.: 2.1
Revision History:
1. Modify the ordering information
2. Modify the package outline of TO-262-3L

Rev.: 2.0
Revision History:
1. Modify the ordering information
2. Modify the package outline of TO-220-3L

Rev.: 1.9
Revision History:
1. Modify the ordering information

Rev.: 1.8
Revision History:
1. Modify the thermal characteristics

Rev.: 1.7
Revision History:
1. Add the package of TO-262-3L

Rev.: 1.6
Revision History:
1. Modify the ordering information

Rev.: 1.5
Revision History:

1. Change the schematic diagram of MOS
2. Modify the figure 7 and figure 8

Rev.: 1.4

Revision History:

1. Modify the figure 7 and figure 8

Rev.: 1.3

Revision History:

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

Rev.: 1.2

Revision History:

1. Modify “ORDERING INFORMATION”

Rev.: 1.1

Revision History:

1. Modify “PACKAGE OUTLINE”

Rev.: 1.0

Revision History:

1. Initial release