

## 10A, 800V N-CHANNEL MOSFET

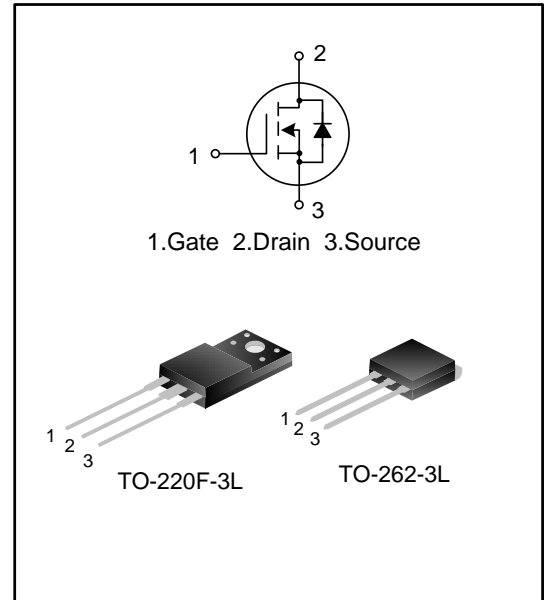
### GENERAL DESCRIPTION

SVF10N80F/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

- ◆ 10A,800V, $R_{DS(on)(typ.)}=0.92\Omega@V_{GS}=10V$
- ◆ Low gate charge
- ◆ Low Crss
- ◆ Fast switching
- ◆ Improved dv/dt capability



### ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SVF10N80F	TO-220F-3L	SVF10N80F	Pb free	Tube
SVF10N80K	TO-262-3L	SVF10N80K	Pb free	Tube

**ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub>=25°C UNLESS OTHERWISE NOTED)**

Characteristics	Symbol	Ratings		Unit
		SVF10N80F	SVF10N80K	
Drain-Source Voltage	V <sub>DS</sub>	800		V
Gate-Source Voltage	V <sub>GS</sub>	±30		V
Drain Current	I <sub>D</sub>	T <sub>C</sub> =25°C		A
		T <sub>C</sub> =100°C		
Drain Current Pulsed	I <sub>DM</sub>	40		A
Power Dissipation(T <sub>C</sub> =25°C) -Derate above 25°C	P <sub>D</sub>	62	230	W
		0.50	1.84	W/°C
Single Pulsed Avalanche Energy(Note 1)	E <sub>AS</sub>	938		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 <sub>J</sub>	-55~+150		°C
Storage Temperature Range	T <sub>stg</sub>	-55~+150		°C

**THERMAL CHARACTERISTICS**

Characteristics	Symbol	Ratings		Unit
		SVF10N80F	SVF10N80K	
Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	2.02	0.54	°C/W
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	62.5	62.5	°C/W

**ELECTRICAL CHARACTERISTICS (T<sub>c</sub>=25°C UNLESS OTHERWISE NOTED)**

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Drain -Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	800	--	--	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =800V, V <sub>GS</sub> =0V	--	--	1.0	μA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V	--	--	±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> =250μA	2.0	--	4.0	V
Static Drain- Source On State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =5.0A	--	0.92	1.15	Ω
Input Capacitance	R <sub>g</sub>	f=1.0MHz	--	16	--	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz	--	1626	--	pF
Output Capacitance	C <sub>oss</sub>		--	151	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	6.5	--	
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =400V, R <sub>G</sub> =25Ω, I <sub>D</sub> =10.0A, (Note4,5)	--	27	--	ns
Turn-on Rise Time	t <sub>r</sub>		--	40	--	
Turn-off Delay Time	t <sub>d(off)</sub>		--	89	--	
Turn-off Fall Time	t <sub>f</sub>		--	43	--	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =640V, I <sub>D</sub> =10.0A, V <sub>GS</sub> =10V (Note 4,5)	--	33	--	nC
Gate-Source Charge	Q <sub>gs</sub>		--	8.6	--	
Gate-Drain Charge	Q <sub>gd</sub>		--	13	--	

**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS**

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I <sub>S</sub>	Integral Reverse P-N Junction Diode in the MOSFET	--	--	10.0	A
Pulsed Source Current	I <sub>SM</sub>		--	--	40.0	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =10.0A, V <sub>GS</sub> =0V	--	--	1.4	V
Reverse Recovery Time	T <sub>rr</sub>	I <sub>S</sub> =10.0A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/μs (Note 4)	--	611	--	ns
Reverse Recovery Charge	Q <sub>rr</sub>		--	5.6	--	μC

**Notes:**

- L=30mH, I<sub>AS</sub>=7.50A, V<sub>DD</sub>=100V, R<sub>G</sub>=25Ω, starting temperature T<sub>J</sub>=25°C;
- V<sub>DS</sub>=0~400V, I<sub>SD</sub>≤10A, T<sub>J</sub>=25°C;
- V<sub>DS</sub>=0~480V;
- Pulse Test: Pulse width ≤300μs, Duty cycle≤2%;
- Essentially independent of operating temperature.

**TYPICAL CHARACTERISTICS**

Figure 1. On-Region Characteristics

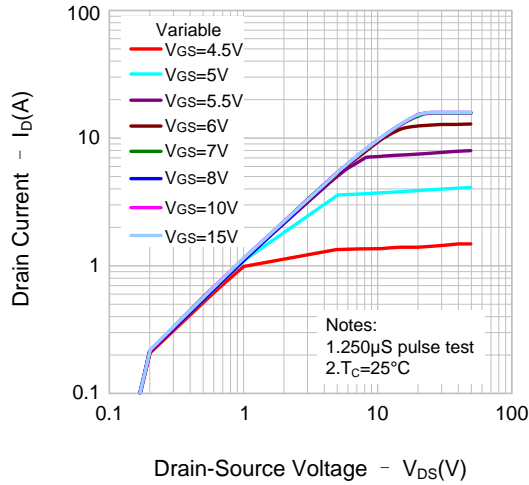


Figure 2. Transfer Characteristics

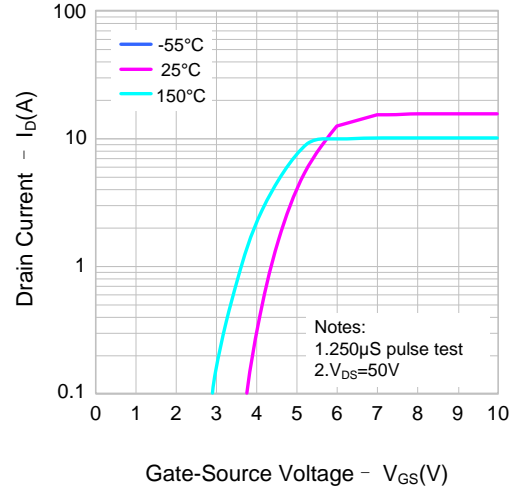


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

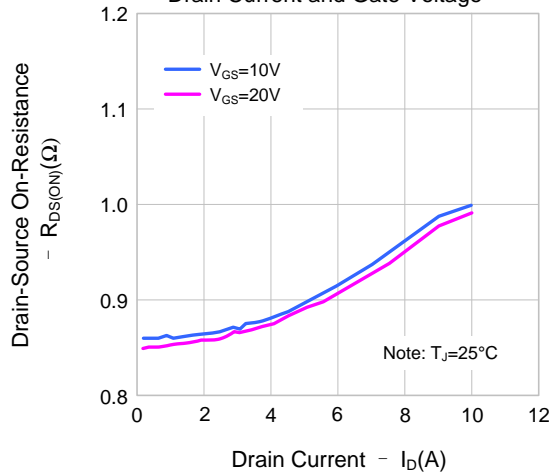


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

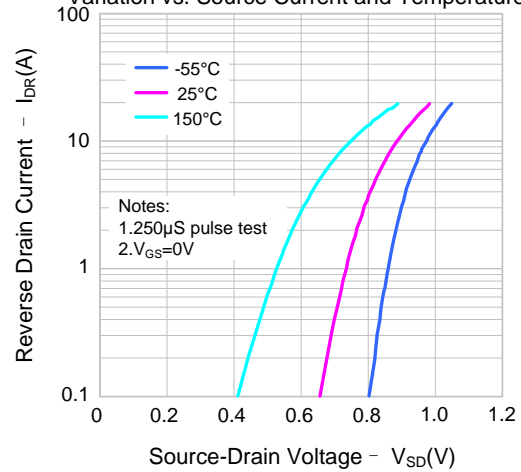


Figure 5. Capacitance Characteristics

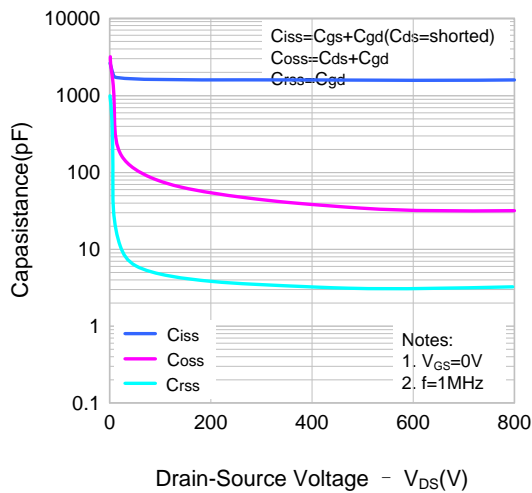
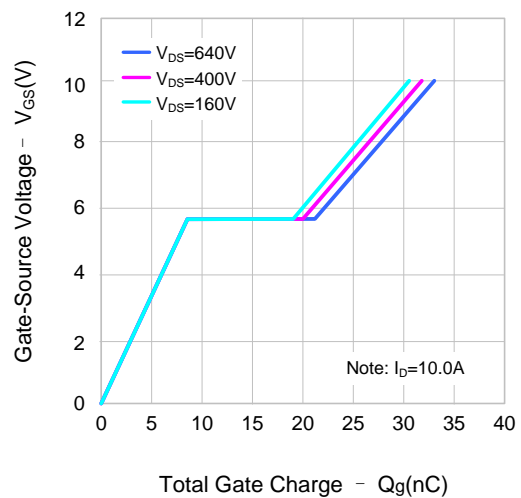


Figure 6. Gate Charge Characteristics



**TYPICAL CHARACTERISTICS(CONTINUED)**

Figure 7. Breakdown Voltage Variation vs. Temperature

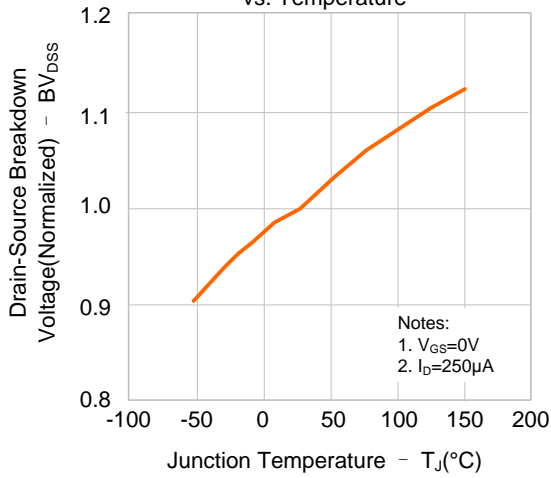


Figure 8. On-resistance Variation vs. Temperature

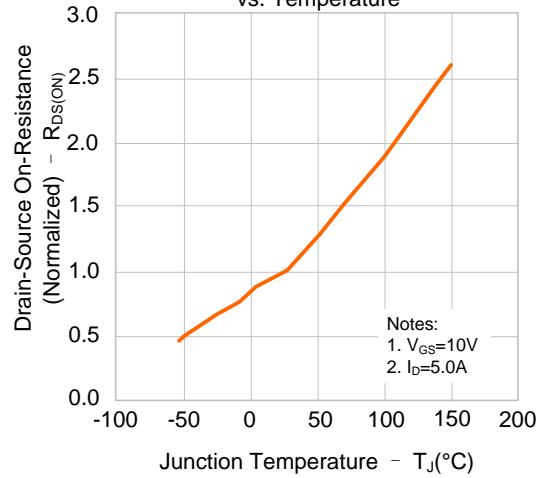


Figure 9-1. Max. Safe Operating Area(SVF10N80F)

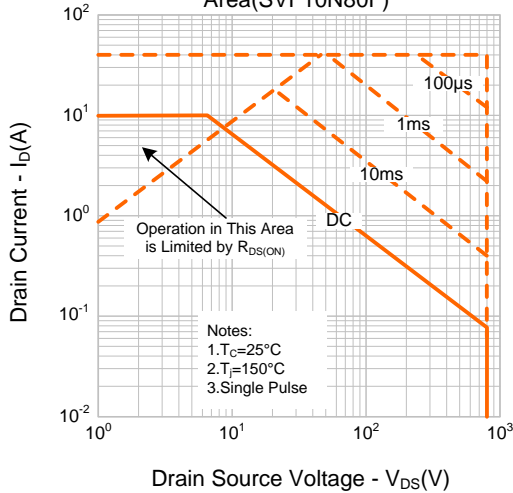


Figure 9-2. Max. Safe Operating Area (SVF10N80K)

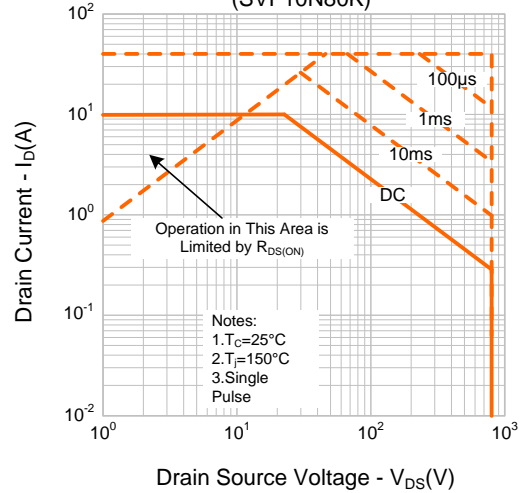
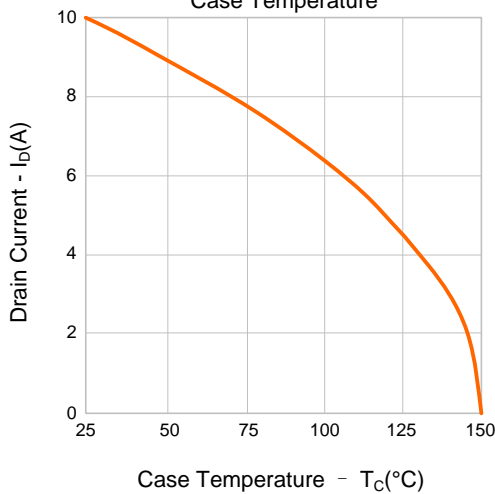
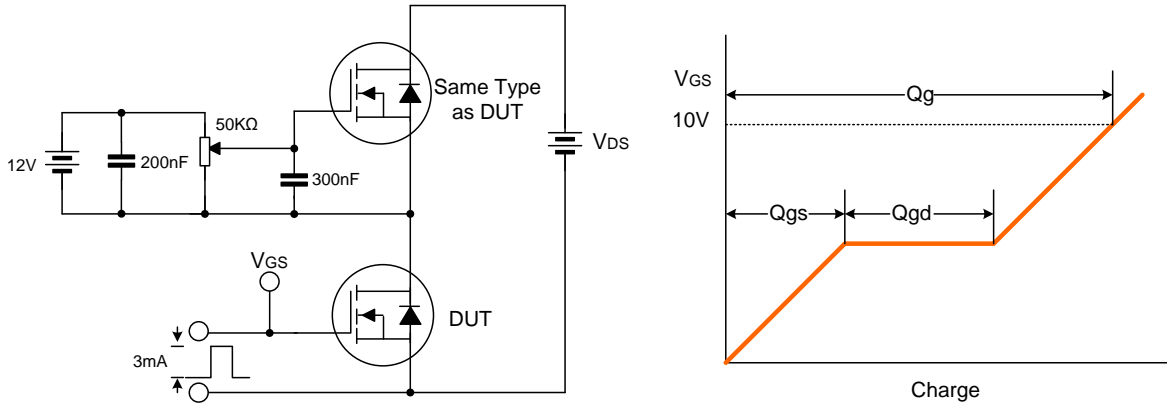


Figure 10. Maximum Drain Current vs. Case Temperature

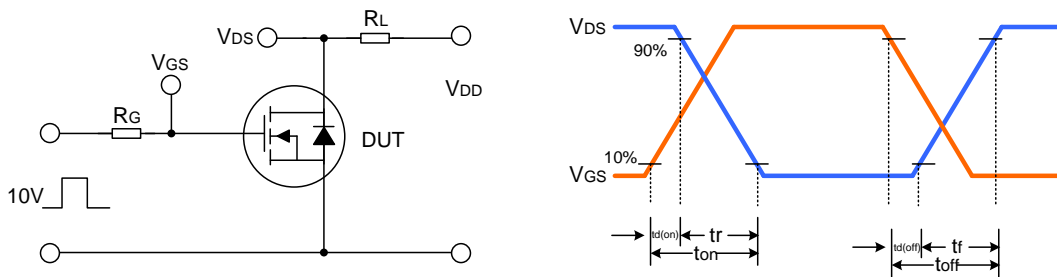


**TYPICAL TEST CIRCUIT**

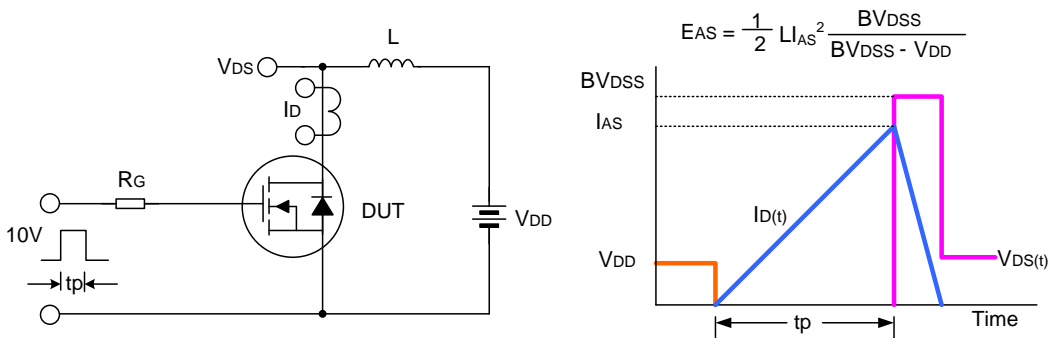
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



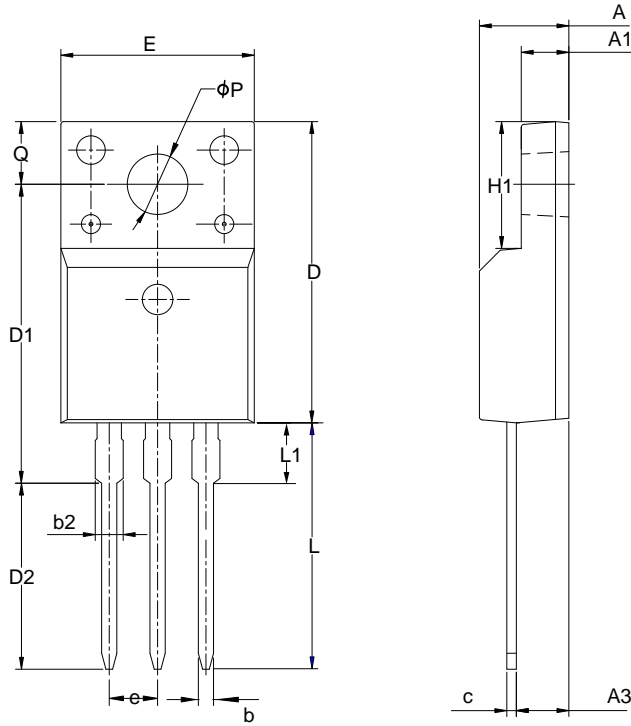
Unclamped Inductive Switching Test Circuit & Waveform



**PACKAGE OUTLINE**

**TO-220F-3L**

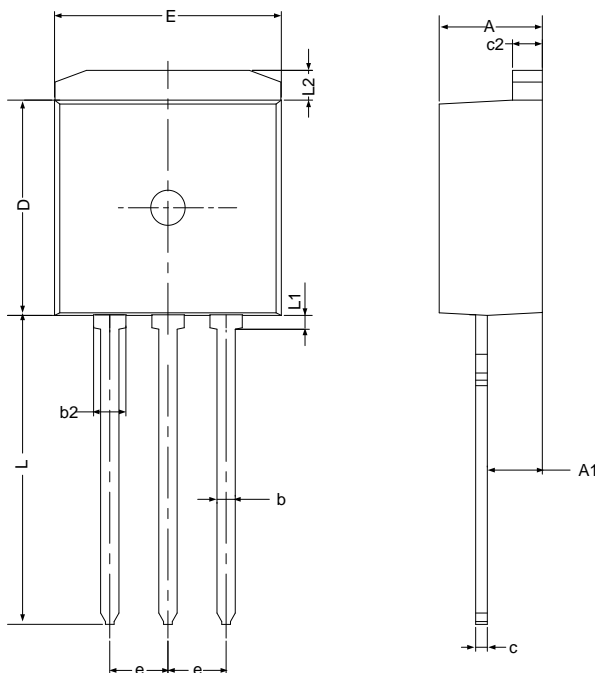
**UNIT: mm**



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
phi P	3.00	3.18	3.40
Q	3.05	3.30	3.55

**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

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Rev.: 1.6

## Revision History:

1. Deleted NOMENCLATURE
2. Modify Important notice
3. Modify the Hazardous Substance Control of SVF10N80K

Rev.: 1.5

## Revision History:

1. Update Fig5
2. Add dv/dt and Rg
3. Update the package outline of TO-220F-3L and TO-262-3L

Rev.: 1.4

## Revision History:

1. Modify the package information of TO-220F-3L
2. Add the package of TO-262-3L

Rev.: 1.3

## Revision History:

1. Modify the thermal characteristics

Rev.: 1.2

## Revision History:

1. Modify the ordering information

Rev.: 1.1

## Revision History:

1. Change the schematic diagram of MOS

Rev.: 1.0

## Revision History:

1. Initial release



