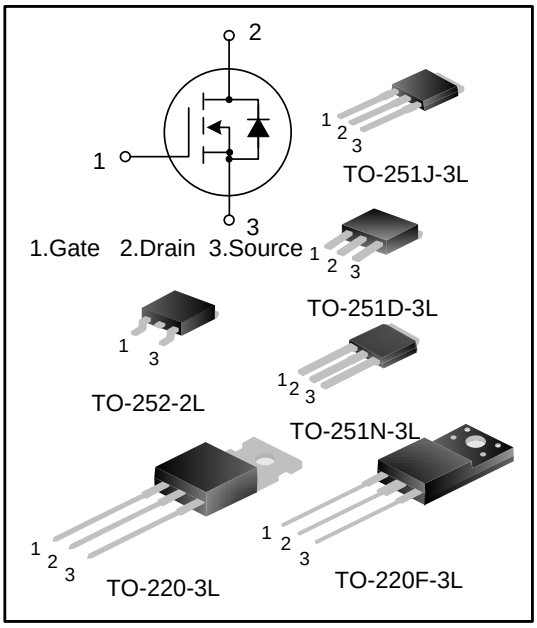
3A, 800V N-CHANNEL MOSFET

GENERAL DESCRIPTION

SVF3N80M/MJ/F/D/T/MN 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

- 3A,800V,$R_{DS(on)(typ.)}$=3.8Ω@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
SVF3N80MJ	TO-251J-3L	SVF3N80MJ	Halogen free	Tube
SVF3N80M	TO-251D-3L	SVF3N80M	Halogen free	Tube
SVF3N80T	TO-220-3L	SVF3N80T	Pb free	Tube
SVF3N80F	TO-220F-3L	SVF3N80F	Pb free	Tube
SVF3N80DTR	TO-252-2L	SVF3N80D	Halogen free	Tape & Reel
SVF3N80MN	TO-251N-3L	3N80MN	Halogen free	Tube

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

Characteristics		Symbol	Ratings				Unit
			SVF3N80M/D	SVF3N80MJ/MN	SVF3N80F	SVF3N80T	
Drain-Source Voltage		V_{DS}	800				V
Gate-Source Voltage		V_{GS}	±30				V
Drain Current	T_C=25°C	I_D	3.0				A
	T_C=100°C		1.9				
Drain Current Pulsed		I_{DM}	12.0				A
Power Dissipation(T_C=25°C)		P_D	80	90	39	106	W
-Derate above 25°C			0.64	0.72	0.31	0.85	W/°C
Single Pulsed Avalanche Energy(Note 1)		E_{AS}	173				mJ
Operation Junction Temperature Range		T_J	-55～+150				°C
Storage Temperature Range		T_{stg}	-55～+150				°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings				Unit
		SVF3N80M/D	SVF3N80MJ/MN	SVF3N80F	SVF3N80T	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.56	1.39	3.21	1.18	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.0	62.0	62.5	62.5	°C/W

ELECTRICAL CHARACTERISTICS (TC=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=1.5A	--	3.8	4.8	Ω
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz	--	390.3	--	pF
Output Capacitance	C_{oss}		--	42.7	--	
Reverse Transfer Capacitance	C_{rss}		--	2.0	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=400V, I_D=3.0A, R_G=25Ω, (Note2,3)	--	13.87	--	ns
Turn-on Rise Time	t_r		--	30.53	--	
Turn-off Delay Time	$t_{d(off)}$		--	22.40	--	

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Turn-off Fall Time	t_f		--	18.27	--	
Total Gate Charge	Q_g	V_{DS}=640V, I_D=3.0A, V_{GS}=10V, (Note 2,3)	--	9.00	--	nC
Gate-Source Charge	Q_{gs}		--	2.46	--	
Gate-Drain Charge	Q_{gd}		--	3.74	--	
Gate Resistance	R_g	F=1 MHz, 1Vpp	--	4.4	--	Ω

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	--	--	3.0	A
Pulsed Source Current	I_{SM}		--	--	12.0	
Diode Forward Voltage	V_{SD}	I_S=3.0A,V_{GS}=0V	--	--	1.4	V
Reverse Recovery Time	T_{rr}	I_S=3.0A,V_{GS}=0V, dI_F/dt=100A/μs (Note 2)	--	437	--	ns
Reverse Recovery Charge	Q_{rr}		--	1.68	--	μC

Notes:

1. L=30mH, I_{AS}=3.15A, 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

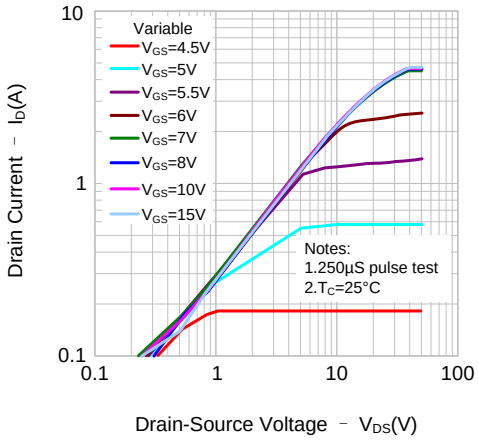


Figure 2. Transfer Characteristics

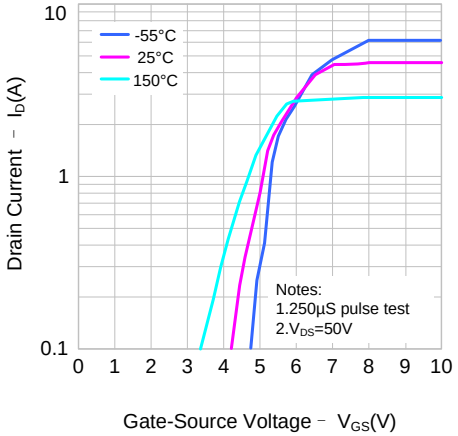


Figure 3. On-Resitance Variation vs. Drain Current and Gate Voltage

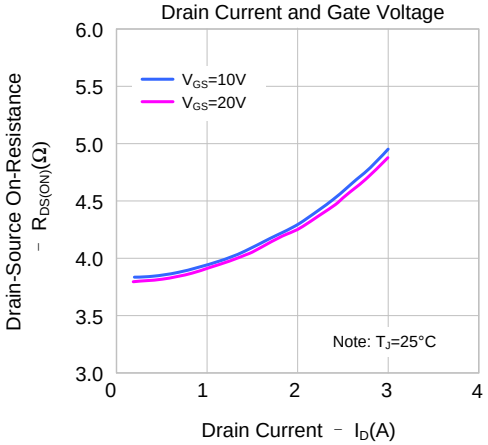
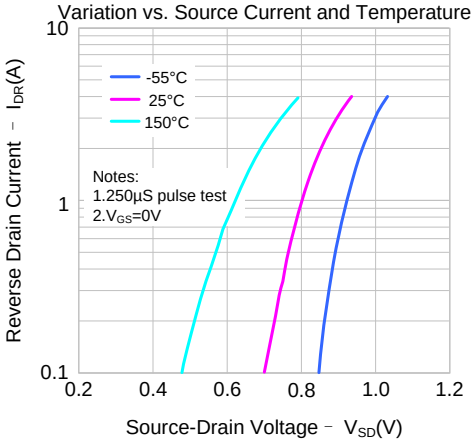


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature



TYPICAL CHARACTERISTICS(CONTINUED)

Figure 5. Capacitance Characteristics

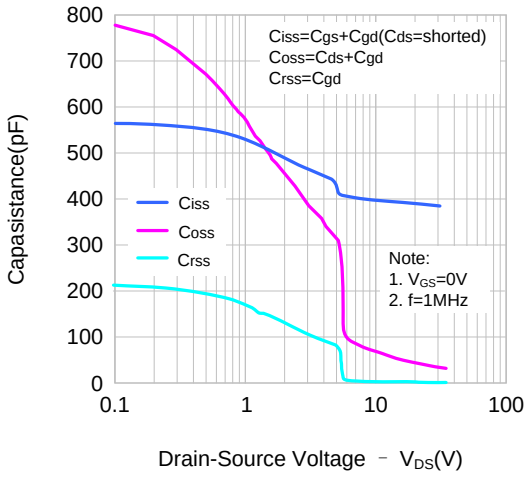


Figure 6. Gate Charge Characteristics

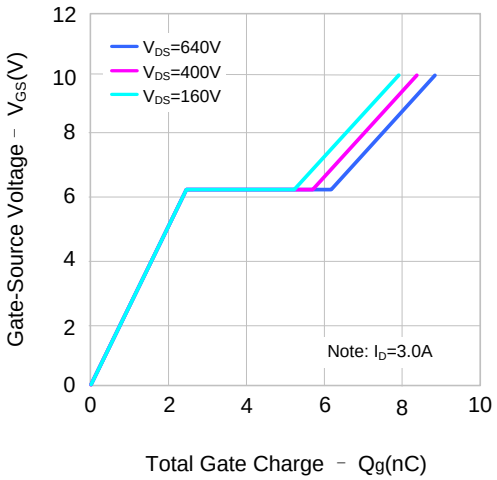


Figure 7. Breakdown Voltage Variation vs. Temperature

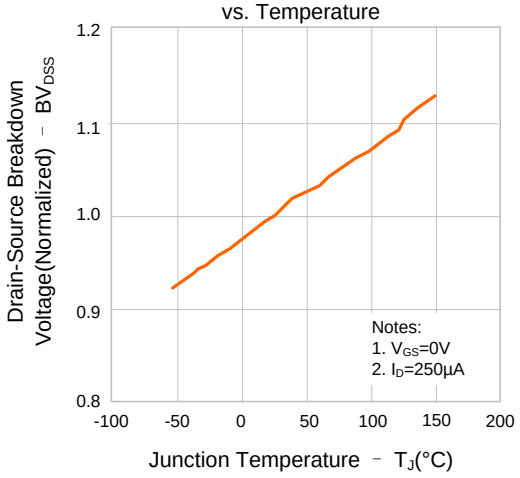


Figure 8. On-resistance Variation vs. Temperature

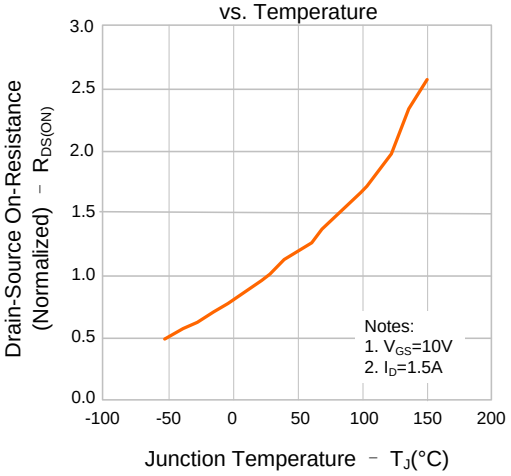


Figure 9-1. Max. Safe Operating Area(SVF3N80M/D)

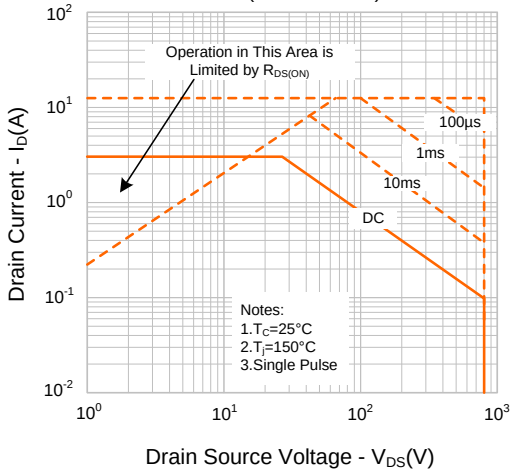
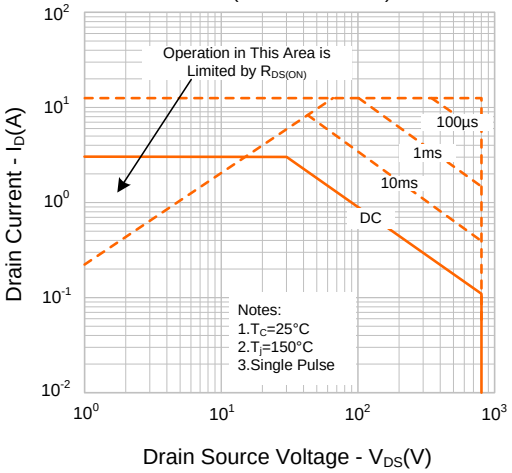


Figure 9-2. Max. Safe Operating Area(SVF3N80MJ/MN)



TYPICAL CHARACTERISTICS(CONTINUED)

Figure 9-3. Max. Safe Operating Area(SVF3N80F)

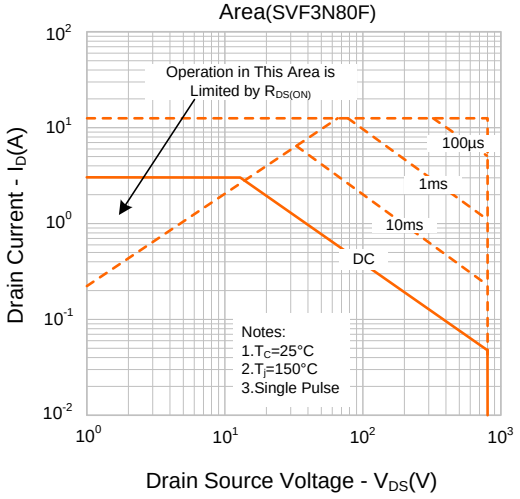


Figure 9-4. Max. Safe Operating Area(SVF3N80T)

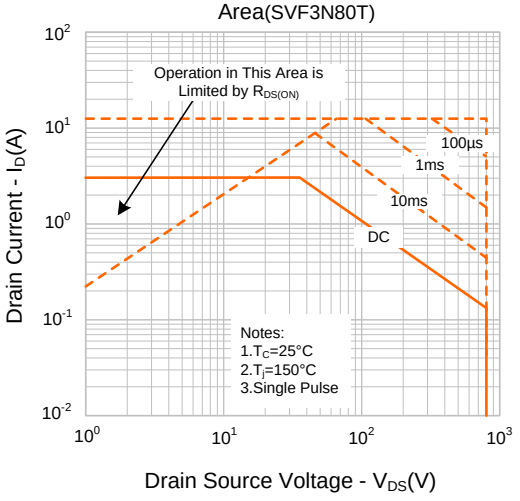
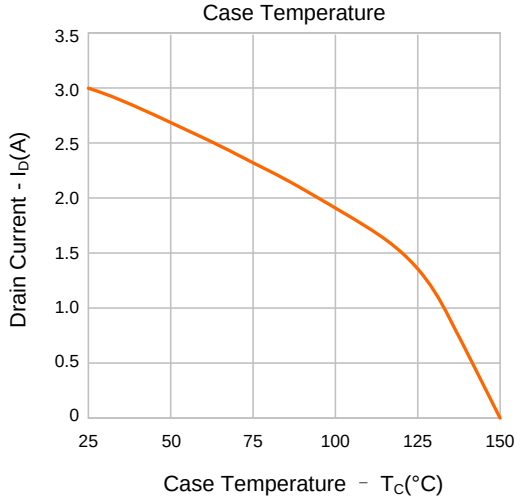
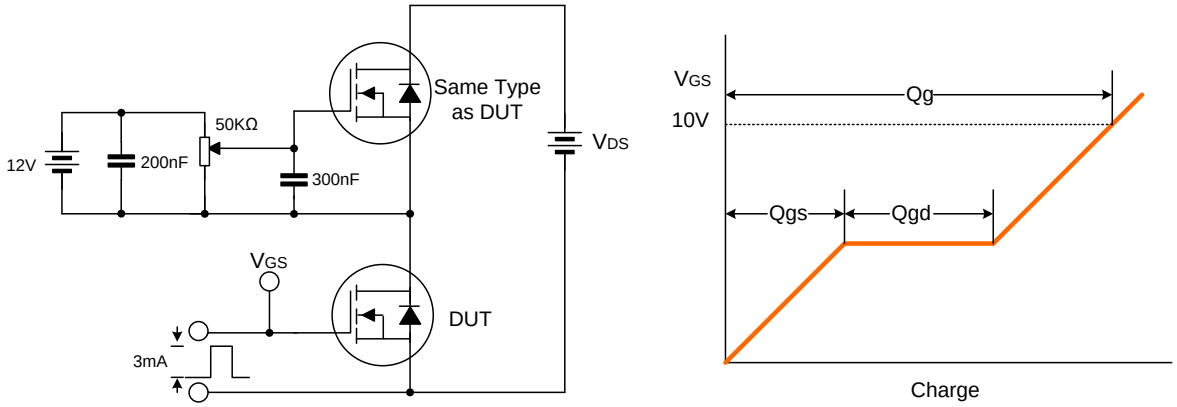


Figure 10. Maximum Drain Current vs. Case Temperature

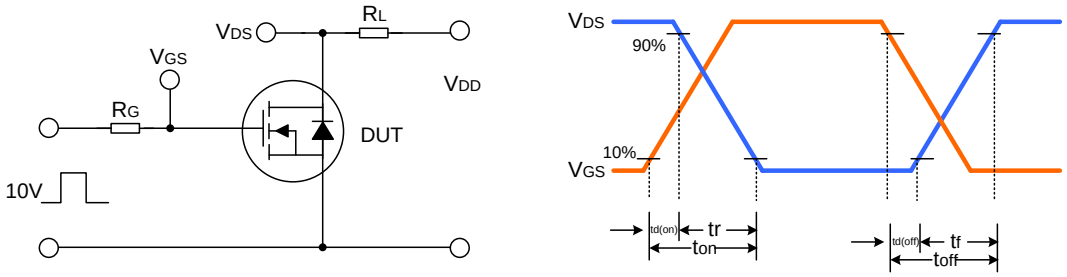


TYPICAL TEST CIRCUIT

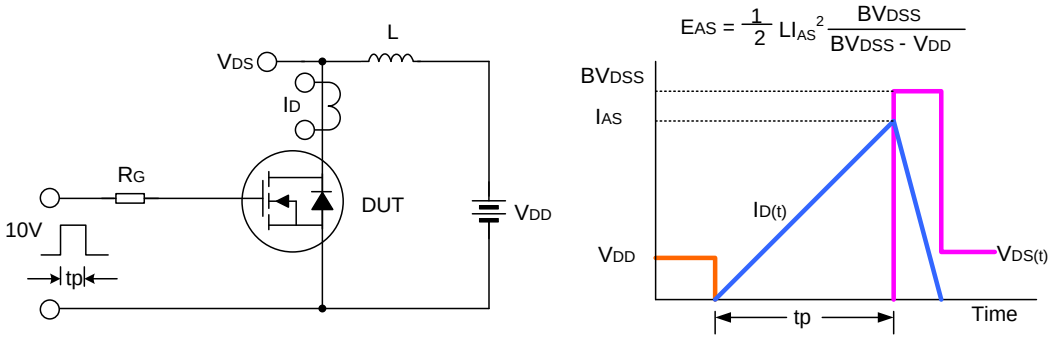
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



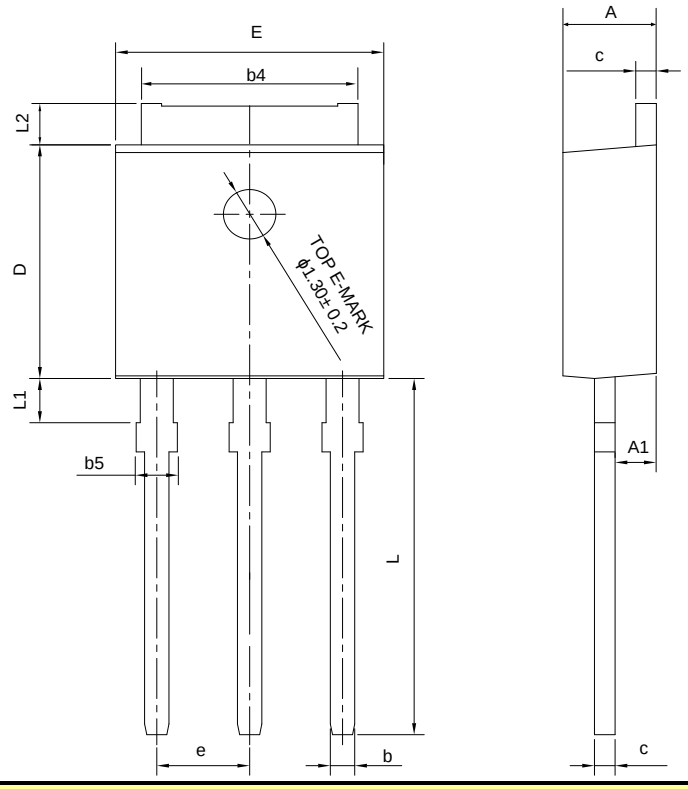
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

TO-251J-3L

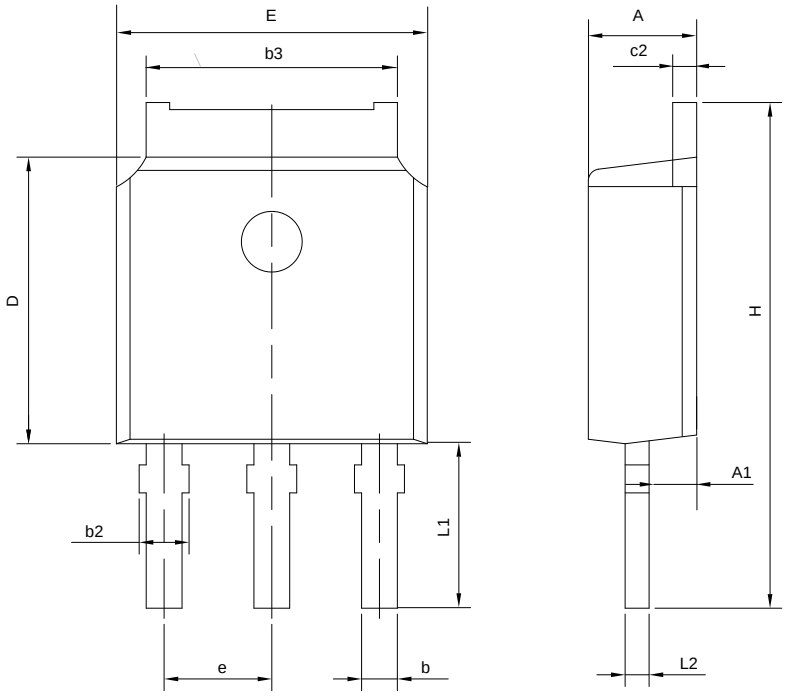
UNIT: mm



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

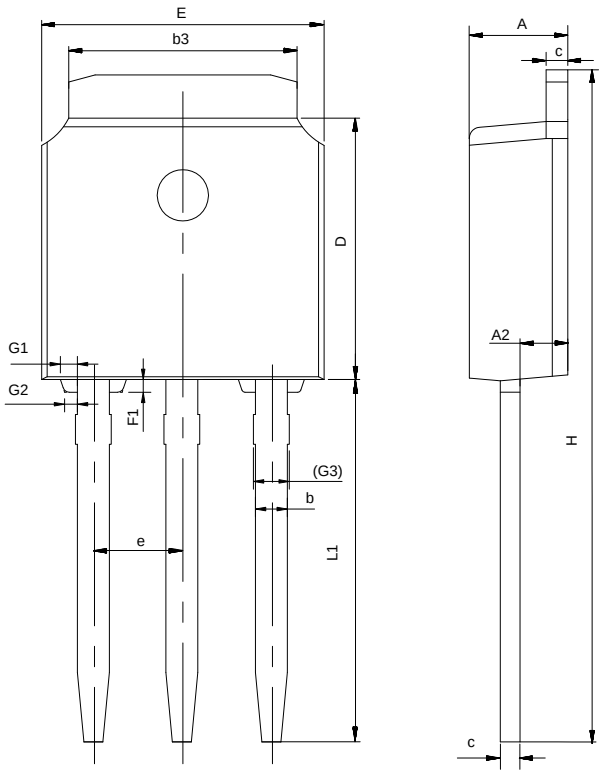


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.20	2.30	2.40
b	0.66	–	0.86
b2	0.72	–	0.90
b3	5.10	5.33	5.46
c2	0.46	–	0.60
D	6.00	6.10	6.20
E	6.50	6.60	6.70
e	2.186	2.286	2.386
H	10.40	10.70	11.00
L1	3.50 REF		
L2	0.508 BSC		

PACKAGE OUTLINE(CONTINUED)

TO-251N-3L

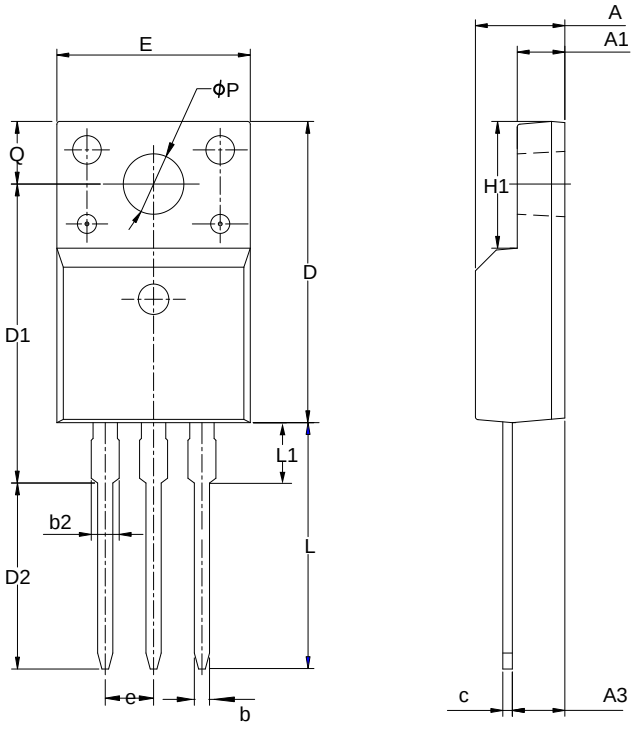
UNIT: mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A2	0.97	1.07	1.17
b	0.58	0.68	0.80
b3	5.20	5.33	5.50
c	0.43	0.53	0.63
D	5.80	6.10	6.40
E	6.30	6.60	6.90
e	2.286 BSC		
F1	0.20	0.30	0.40
G1	0.30	0.40	0.50
G2	0.20	0.30	0.40
G3	0.60	0.74	0.88
H	16.02	16.52	17.02
L1	9.10	9.40	9.70

TO-220F-3L

UNIT: mm

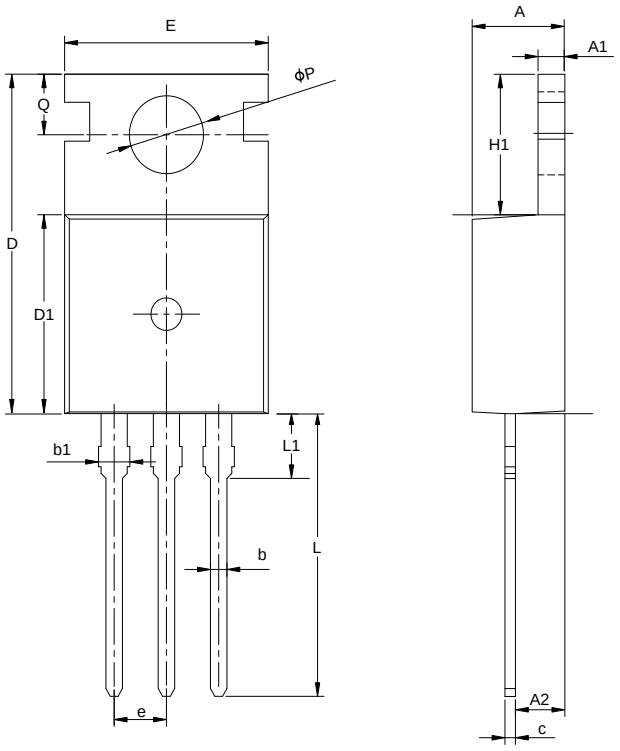


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.42	4.70	5.02
A1	2.30	2.54	2.80
A3	2.50	2.76	3.10
b	0.70	0.80	0.90
b2	–	–	1.47
c	0.35	0.50	0.65
D	15.25	15.87	16.25
D1	15.30	15.75	16.30
D2	9.30	9.80	10.30
E	9.73	10.16	10.36
e	2.54BSC		
H1	6.40	6.68	7.00
L	12.48	12.98	13.48
L1	–	–	3.50
ϕP	3.00	3.18	3.40
Q	3.05	3.30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

PACKAGE OUTLINE(CONTINUED)

TO-220-3L

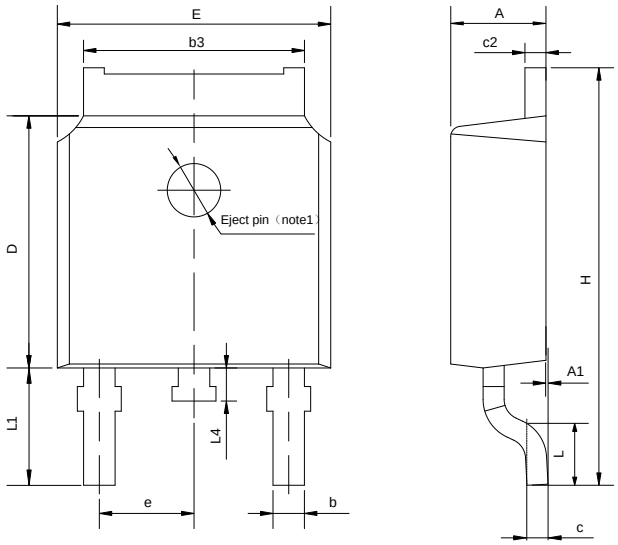
UNIT: mm



SYMBOL	MILLIMETER		
	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-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.

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.**
- **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.**
- **It is strongly recommended to identify the trademark when buying our products. Please conatus us if there is any question.**
- **When exporting, using and reselling our products, buyer must comply with the international export control laws and regulations of China, the United States, the United Kingdom, the European Union and other countries & regions.**
- **Product promotion is endless, our company will wholeheartedly provide customers with better products!**
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Rev.: 2.3

Revision History:

1. Deleted NOMENCLATURE
2. Modify Important notice

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. Add TO-251N-3L

Rev.: 2.0

Revision History:

1. Modify the Typical Characteristics

Rev.: 1.9

Revision History:

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

Rev.: 1.8

Revision History:

1. Modify the thermal characteristics

Rev.: 1.7

Revision History:

1. Modify the ordering information

Rev.: 1.6

Revision History:

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

Rev.: 1.5

Revision History:

1. Add the halogen free information of SVF3N80M
2. Add the characteristics of Rg

Rev.: 1.4

Revision History:

1. Modify “PACKAGE OUTLINE”

Rev.: 1.3

Revision History:

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

Rev.: 1.2

Revision History:

1. Add the package of TO-220-3L

Rev.: 1.1

Revision History:

1. Modify “PACKAGE OUTLINE”
2. Add the package of TO-251D-3L

Rev.: 1.0

Revision History:

1. Initial release