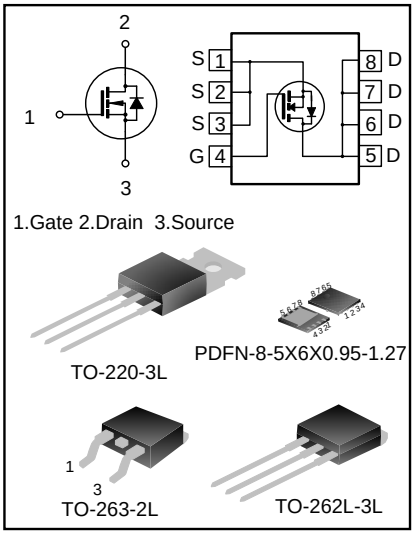
120A, 85V N-CHANNEL MOSFET

DESCRIPTION

The SVT085R5NT/S/L5/KL is an N-channel enhancement mode power MOS field effect transistor which is produced using Silan's LVMOS technology. The improved process and cell structure have been especially tailored to minimize on-state resistance, provide superior switching performance.

This device is widely used in the fields of uninterruptible power supplies and power management of inverter systems.



FEATURES

- 120A, 85V, $R_{DS(on)(typ.)}$=4.5mΩ@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
SVT085R5NT	TO-220-3L	085R5NT	Pb free	Tube
SVT085R5NS	TO-263-2L	085R5NS	Halogen free	Tube
SVT085R5NSTR	TO-263-2L	085R5NS	Halogen free	Tape&Reel
SVT085R5NL5TR	PDFN-8-5X6X0.95-1.27	085R5NL5	Halogen free	Tape&Reel
SVT085R5NKL	TO-262L-3L	085R5NKL	Pb free	Tube

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

Characteristics		Symbol	Ratings		Unit
			SVT085R5NT/S/KL	SVT085R5NL5	
Drain-Source Voltage		V_{DS}	85		V
Gate-Source Voltage		V_{GS}	±20		V
Drain Current	T_C=25°C	I_D	120	100	A
	T_C=100°C		90	64	
Drain Current Pulsed		I_{DM}	480	400	A
Power Dissipation (T_C=25°C)		P_D	160	114	W
-Derate above 25°C			1.3	0.9	W/°C
Single Pulsed Avalanche Energy (Note 1)		E_{AS}	324		mJ
Operation Junction Temperature Range		T_J	-55~+150		°C
Storage Temperature Range		T_{stg}	-55~+150		°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings		Unit
		SVT085R5NT/S/KL	SVT085R5NL5	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.78	1.1	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	50	°C/W

ELECTRICAL CHARACTERISTICS (UNLESS OTHERWISE NOTED, T_J=25°C)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	85	--	--	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=85V, V_{GS}=0V	--	--	1.0	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, 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=50A	--	4.5	5.5	mΩ
Gate Resistance	R_G	f=1MHz	--	1.9	--	Ω
Input Capacitance	C_{iss}	f=1MHz, V_{GS}=0V, V_{DS}=40V	--	4281	--	pF
Output Capacitance	C_{oss}		--	669	--	
Reverse Transfer Capacitance	C_{rss}		--	17	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=40V, V_{GS}=10V, R_G=24Ω, I_D=13.3A (Notes 2,3)	--	41	--	ns
Turn-on Rise Time	t_r		--	68	--	
Turn-off Delay Time	$t_{d(off)}$		--	164	--	
Turn-off Fall Time	t_f		--	85	--	
Total Gate Charge	Q_g	V_{DD}=40V, V_{GS}=10V, I_D=50A (Notes 2,3)	--	68	--	nC
Gate-Source Charge	Q_{gs}		--	28	--	
Gate-Drain Charge	Q_{gd}		--	17	--	

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	--	--	120	A
Pulsed Source Current	I_{SM}		--	--	480	
Diode Forward Voltage	V_{SD}	I_S=50A, V_{GS}=0V	--	--	1.3	V
Reverse Recovery Time	T_{rr}	I_S=20A,V_{GS}=0V, dIF/dt=100A/μs (Notes 2)	--	59	--	ns
Reverse Recovery Charge	Q_{rr}		--	0.12	--	μC

Notes:

1. L=0.5mH, I_{AS}=36A, V_{DD}=64V, R_G=10Ω, starting T_J=25°C;
2. Pulse Test: Pulse width ≤300μs, Duty cycle≤2%;
3. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

Figure 1. Output Characteristics

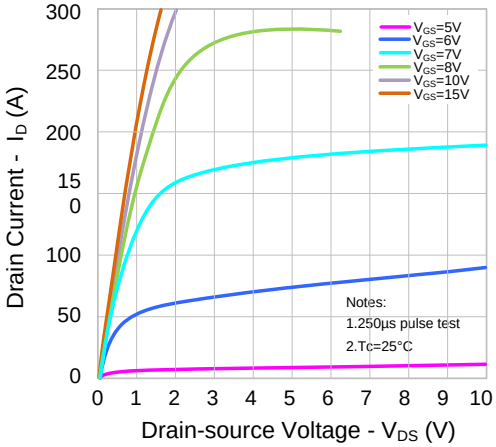


Figure 2. Transfer Characteristics

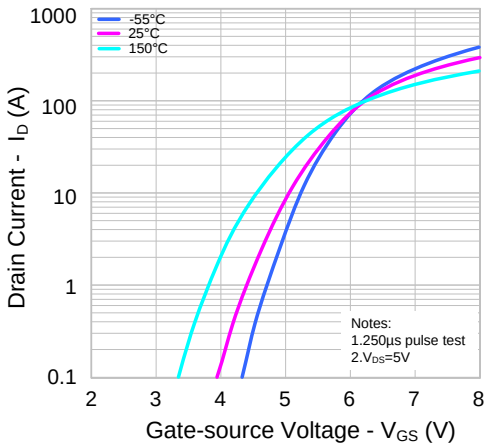


Figure 3. On-resistance vs. Drain Current

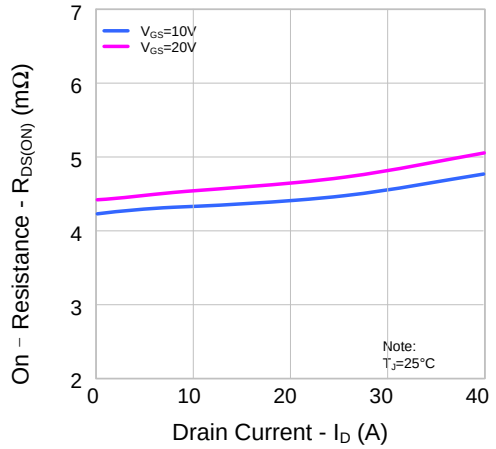


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

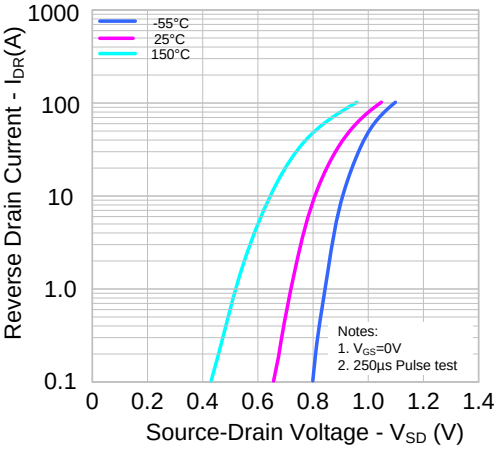


Figure 5. Capacitance Characteristics

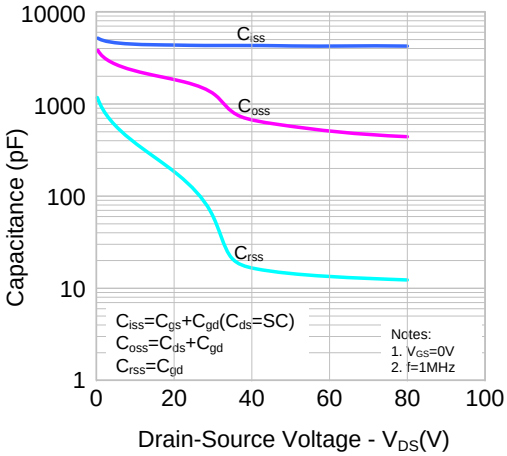
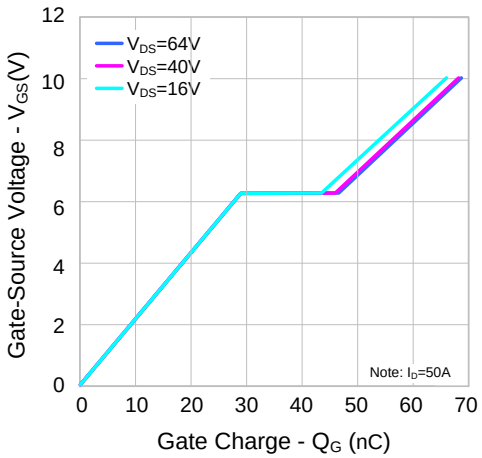


Figure 6. Gate Charge



TYPICAL CHARACTERISTICS (CONTINUED)

Figure 7. Breakdown Voltage vs. Temperature Characteristics

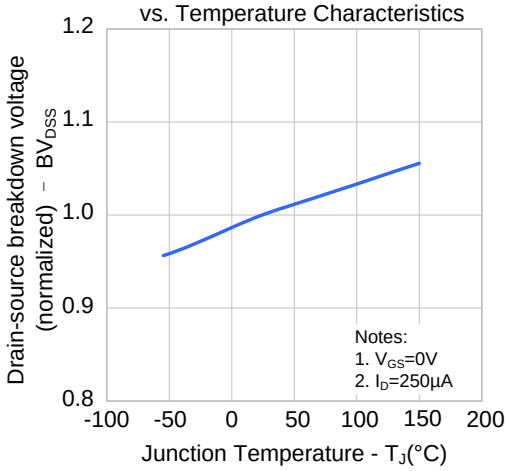


Figure 8. On-resistance vs. Temperature Characteristics

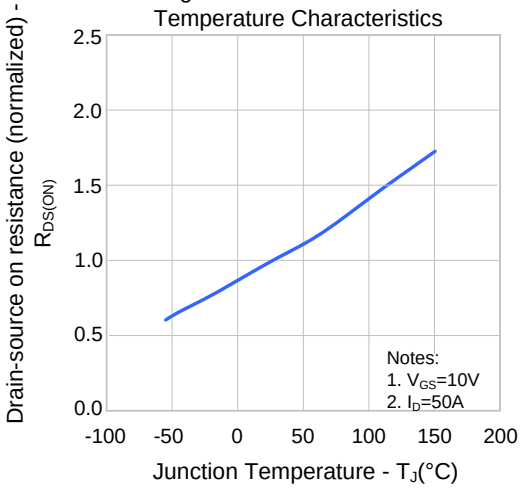


Figure 9-1. Max. Safe Operating Area (SVT085R5NT/S/KL)

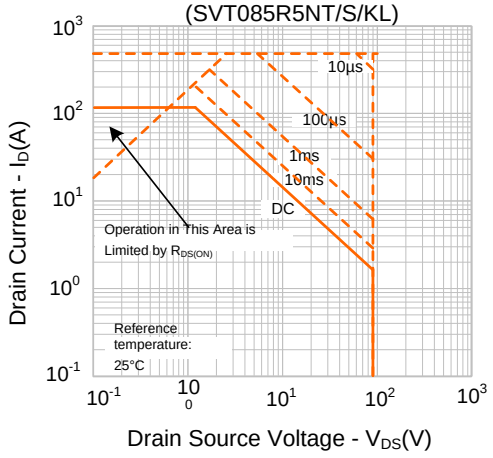
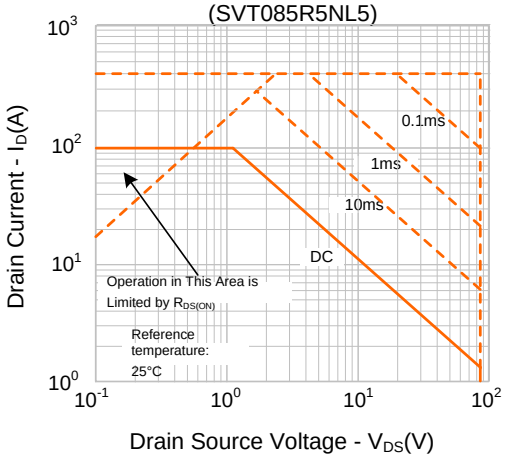
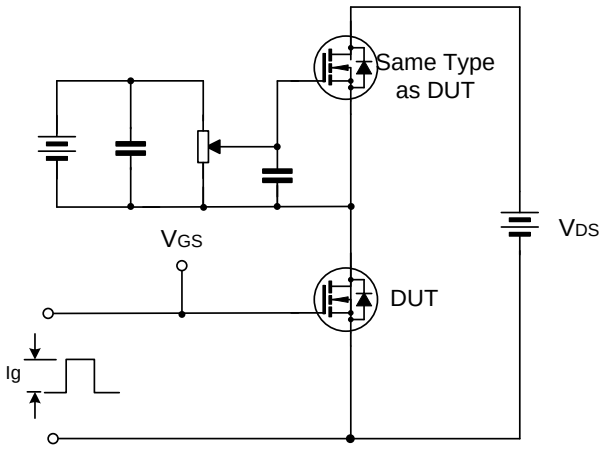


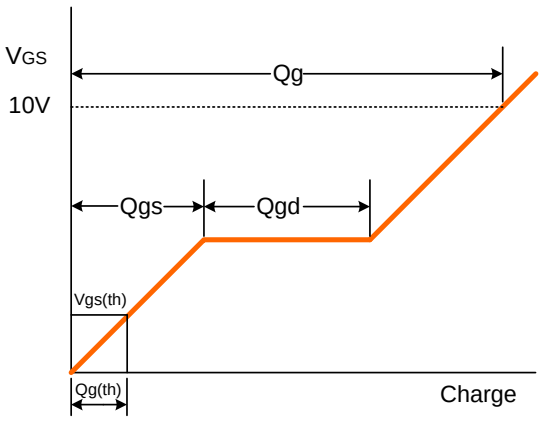
Figure 9-2. Max. Safe Operating Area (SVT085R5NL5)



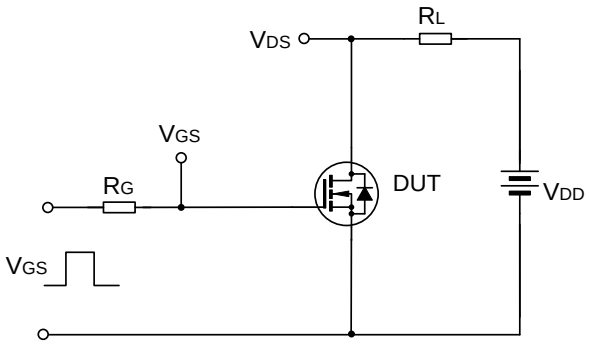
TYPICAL TEST CIRCUIT

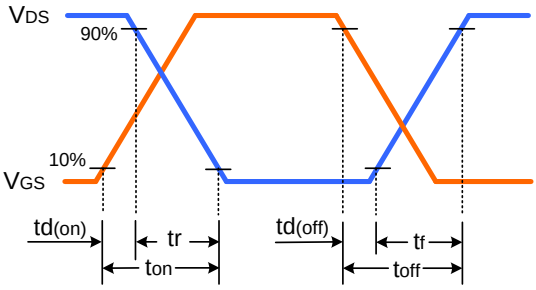
Gate Charge Test Circuit & Waveform



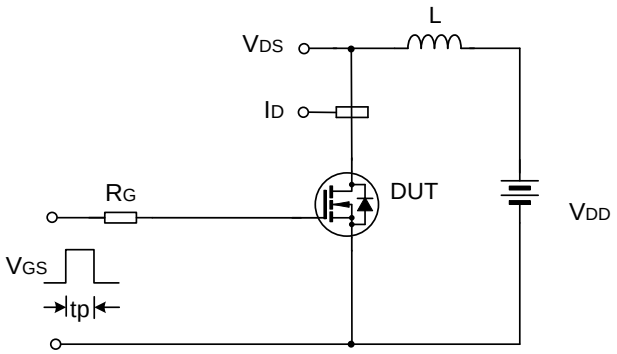


Resistive Switching Test Circuit & Waveform

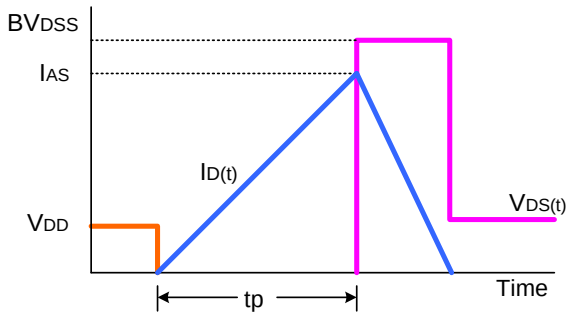




Unclamped Inductive Switching Test Circuit & Waveform

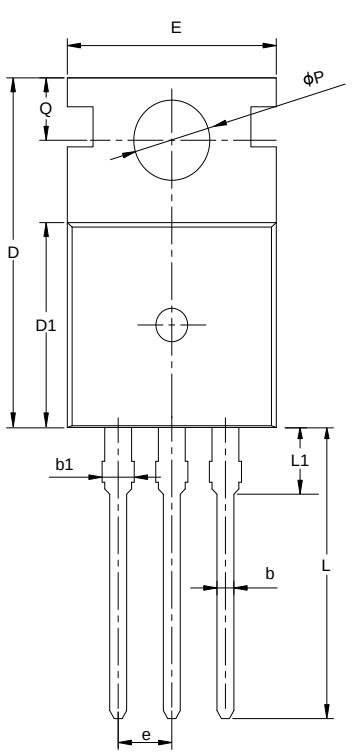


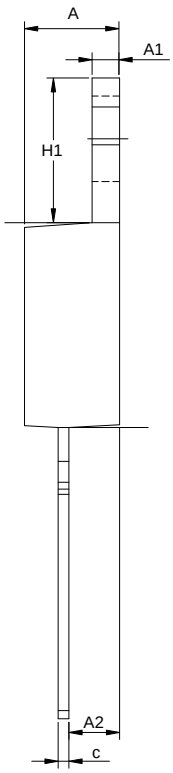
$$E_{AS} = \frac{1}{2} LI_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



PACKAGE OUTLINE

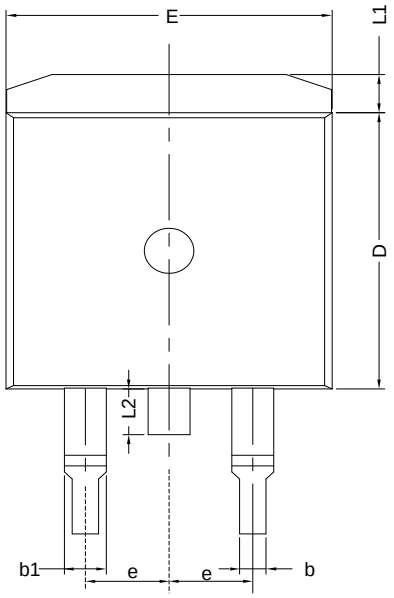
TO-220-3L **UNIT: mm**

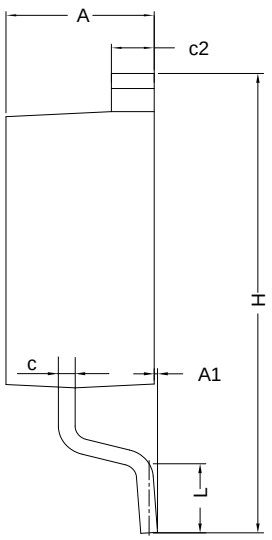




SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	1.00	1.30	1.50
A2	1.80	2.40	2.80
b	0.60	0.80	1.00
b1	1.00	—	1.60
c	0.30	—	0.70
D	15.10	15.70	16.10
D1	8.10	9.20	10.00
E	9.60	9.90	10.40
e	2.54BSC		
H1	6.10	6.50	7.00
L	12.60	13.08	13.60
L1	—	—	3.95
ϕP	3.40	3.70	3.90
Q	2.60	—	3.20

TO-263-2L **UNIT: mm**

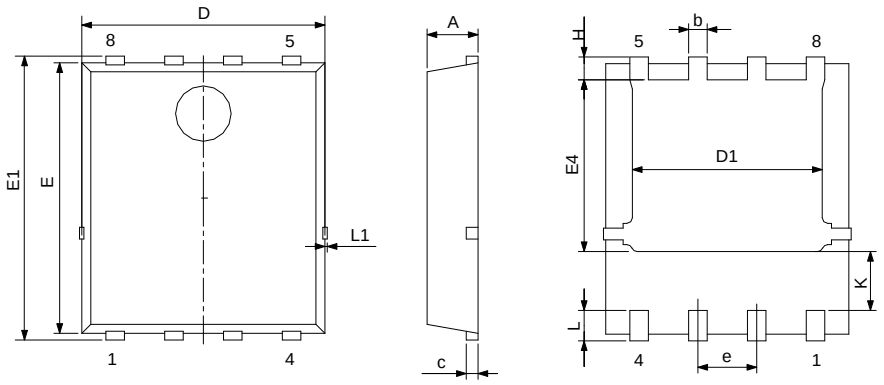




SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.30	4.57	4.72
A1	0	0.10	0.25
b	0.71	0.81	0.91
b1	1.17	—	1.50
c	0.30	—	0.60
c2	1.17	1.27	1.37
D	8.50	—	9.35
E	9.80	—	10.45
e	2.54BSC		
H	14.70	—	15.75
L	2.00	2.30	2.74
L1	1.12	1.27	1.42
L2	—	—	1.75

PACKAGE OUTLINE (CONTINUED)

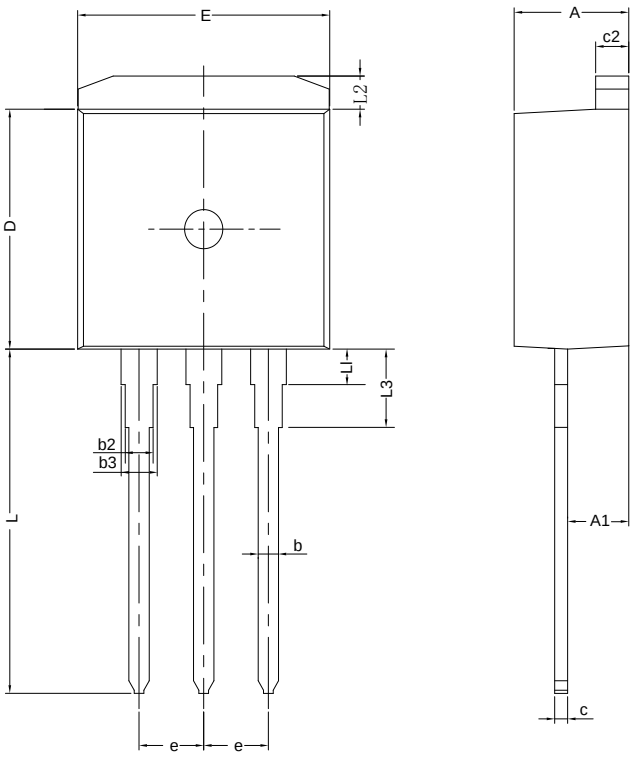
PDFN-8-5X6X0.95-1.27 **UNIT: mm**



Top View Side View Bottom View

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.90	—	1.20
c	0.154	0.25	0.354
D	4.80	—	5.40
E	5.66	—	6.06
D1	3.76	—	4.30
E1	5.90	—	6.35
b	0.30	—	0.55
K	1.10	1.30	1.50
e	1.07	1.27	1.37
E4	3.34	—	3.92
L	0.30	0.60	0.71
L1	—	—	0.12
H	0.40	—	0.71

TO-262L-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	0.88
b2	0.90	1.01	1.08
b3	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	1.40	1.50	1.60
L2	1.12	—	1.42
L3	3.00	3.20	3.40

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**

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Copyright:	HANGZHOU SILAN MICROELECTRONICS CO.,LTD	Website:	http: //www.silan.com.cn

Rev.: 1.8

Revision History:

1. Add package of SVT085R5NKL(TO-262L-3L)
2. Update typical test circuit and important notice
3. Update curve template

Rev.: 1.7

Revision History:

1. Update Electrical schematic and typical test circuit

Rev.: 1.6

Revision History:

1. Modify Electrical characteristics and curves

Rev.: 1.5

Revision History:

1. Modify Electrical characteristics

Rev.: 1.4

Revision History:

1. Add the package outline of PDFN-8-5X6X0.95-1.27

Rev.: 1.3

Revision History:

1. Update the Electrical characteristics
2. Update Fig 5 and 6

Rev.: 1.2

Revision History:

1. Update the package outline of TO-220-3L

Rev.: 1.1

Revision History:

1. Add TO-263-2L

Rev.: 1.0

Revision History:

1. First release