

120A, 85V N-CHANNEL MOSFET

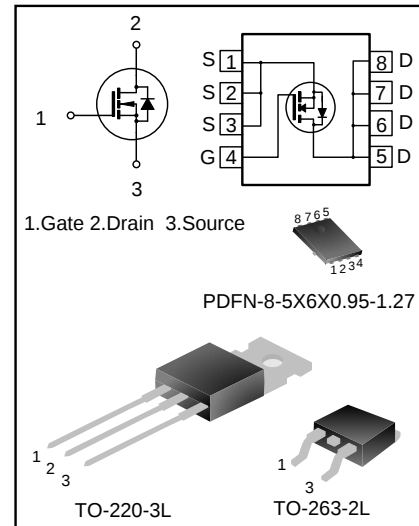
DESCRIPTION

The SVT085R5NT/S/L5 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, $R_{DS(on)(typ.)}=4.5m\Omega@V_{GS}=10V$
- Low gate charge
- Low C_{rss}
- 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

ABSOLUTE MAXIMUM RATINGS (UNLESS OTHERWISE NOTED, $T_c=25^{\circ}C$)

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

ELECTRICAL CHARACTERISTICS (UNLESS OTHERWISE NOTED, $T_c=25^{\circ}\text{C}$)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	85	--	--	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=85V, V_{GS}=0V$	--	--	1.0	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	--	4.0	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=50A$	--	4.5	5.5	m Ω
Gate Resistance	R_G	$f=1\text{MHz}$	--	1.9	--	Ω
Input Capacitance	C_{iss}	$f=1\text{MHz}, V_{GS}=0V,$ $V_{DS}=40V$	--	4281	--	pF
Output Capacitance	C_{oss}		--	669	--	
Reverse Transfer Capacitance	C_{rss}		--	17	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=40V, V_{GS}=10V, R_G=24\Omega,$ $I_D=13.3A$ (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}	$I_S=20A, V_{GS}=0V,$	--	59	--	ns
Reverse Recovery Charge	Q_{rr}	$dI_F/dt=100A/\mu s$ (Notes 2)	--	0.12	--	μC

Notes:

1. $L=0.5\text{mH}, I_{AS}=36A, V_{DD}=64V, R_G=10\Omega$, starting $T_J=25^{\circ}\text{C}$;
2. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;
3. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

Figure 1. Output Characteristics

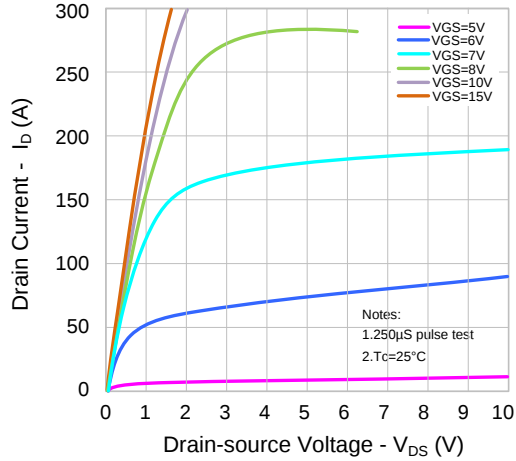


Figure 2. Transfer Characteristics

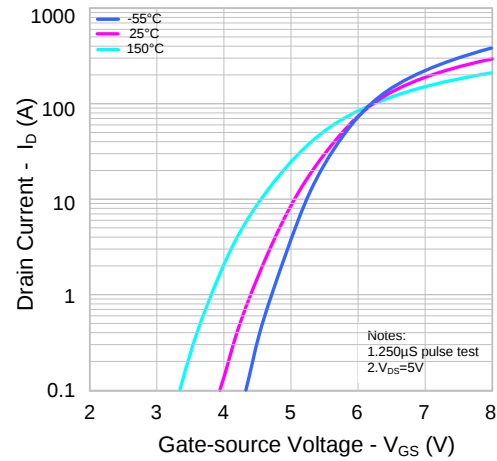


Figure 3. On-resistance vs. Drain Current

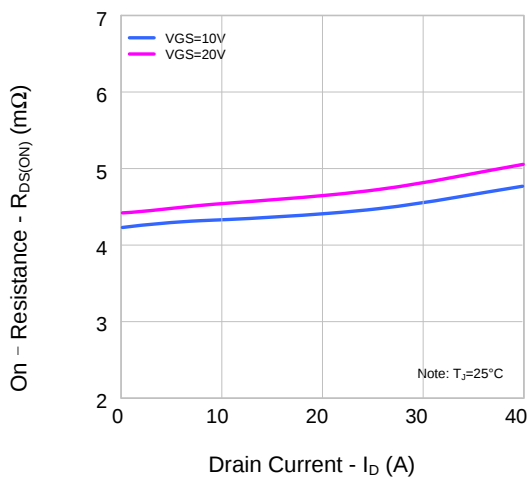


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

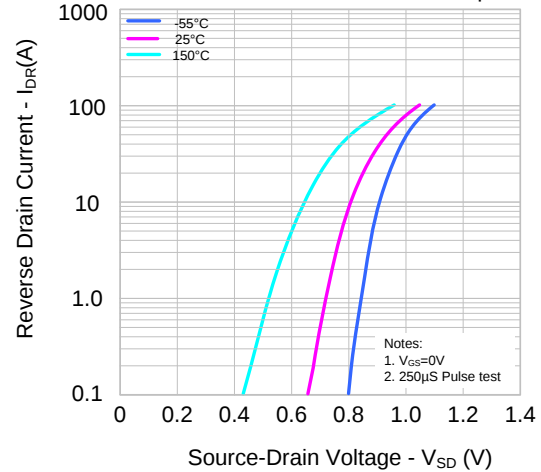


Figure 5. Capacitance Characteristics

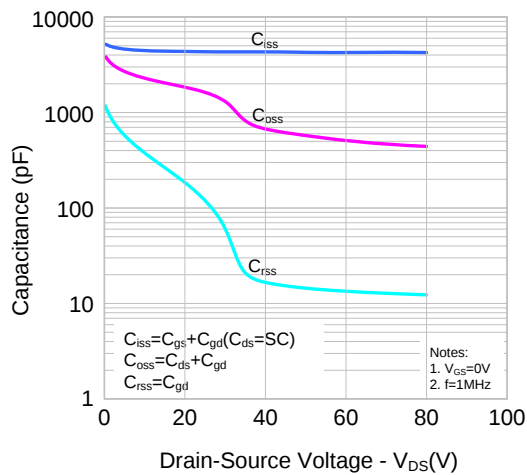
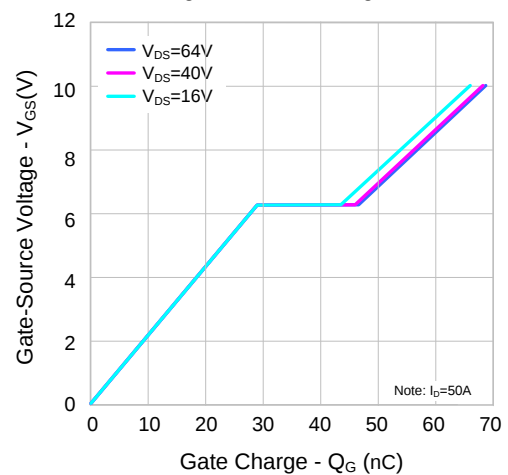


Figure 6. Gate Charge



TYPICAL CHARACTERISTICS (CONTINUED)

Figure 7. Breakdown Voltage vs. Temperature Characteristics

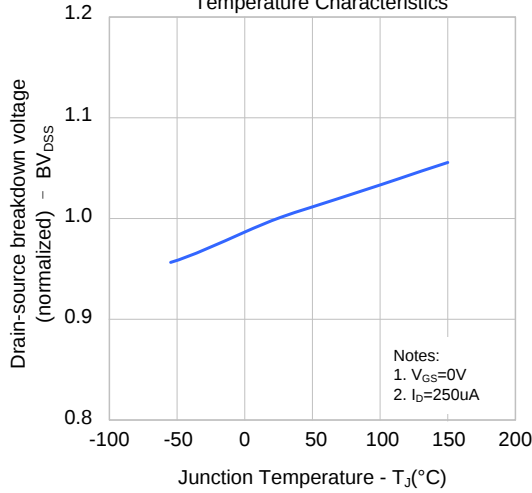


Figure 8. On-resistance vs. Temperature Characteristics

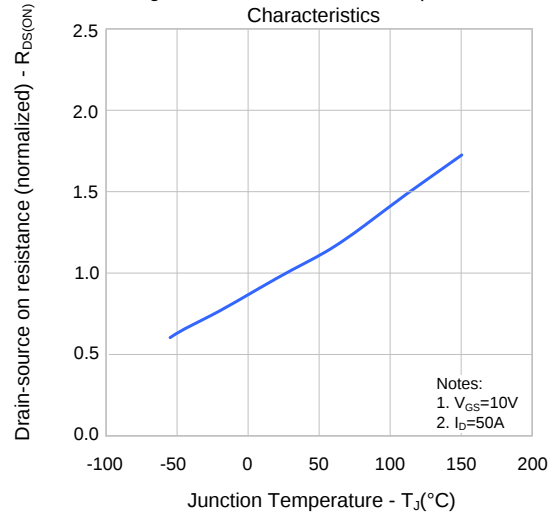


Figure 9-1. Max. Safe Operating Area (SVT085R5NT/S)

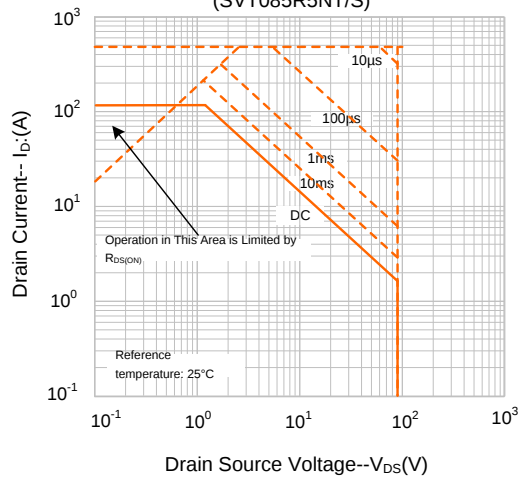
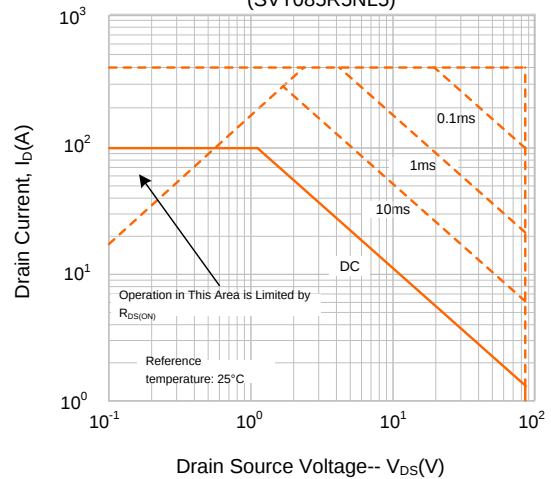
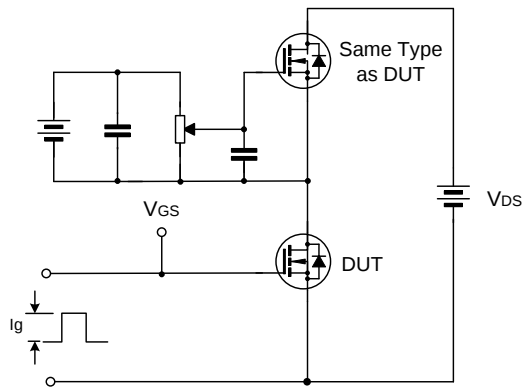


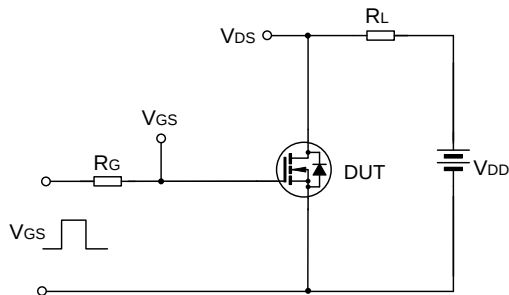
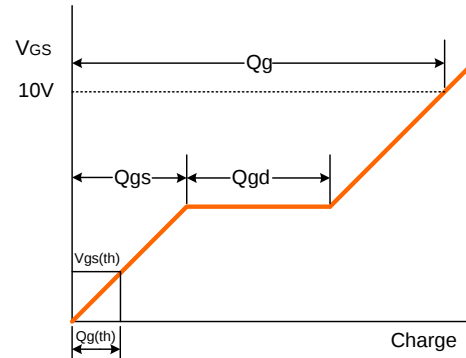
Figure 9-2. Max. Safe Operating Area (SVT085R5NL5)



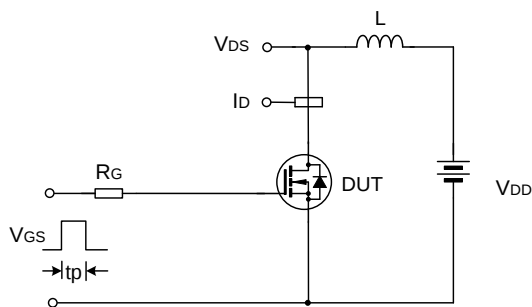
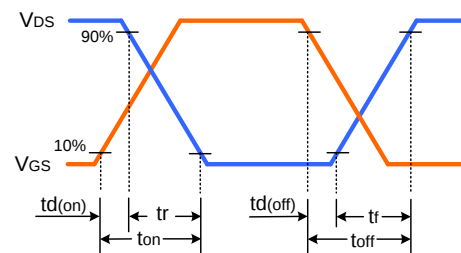
TYPICAL TEST CIRCUIT



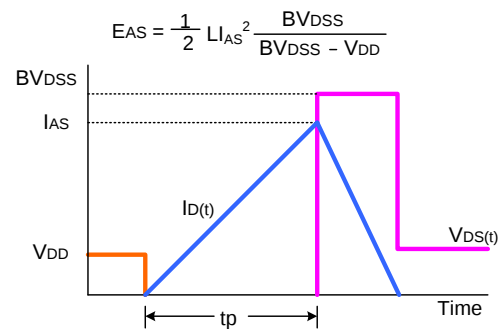
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



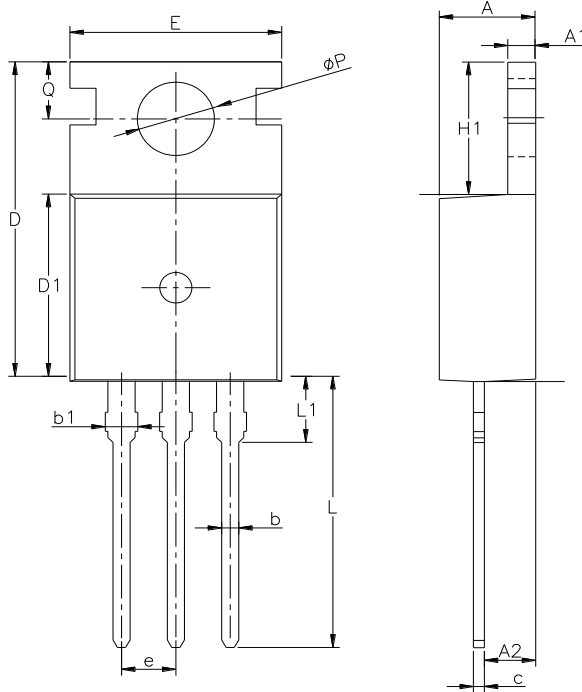
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

TO-220-3L

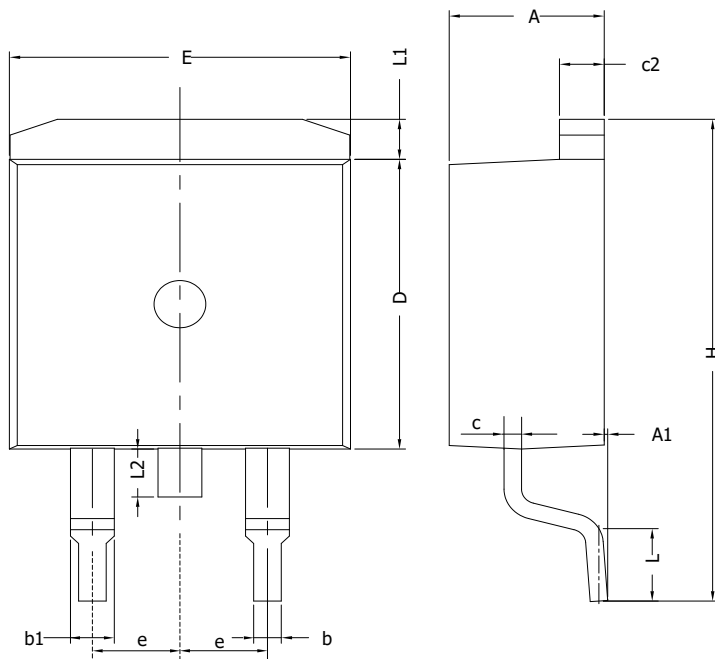
UNIT: mm



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-263-2L

UNIT: mm

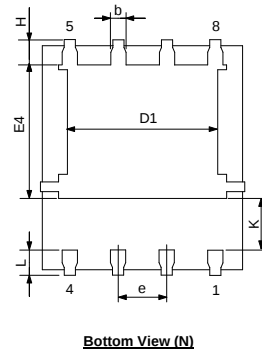
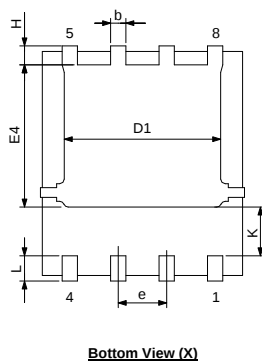
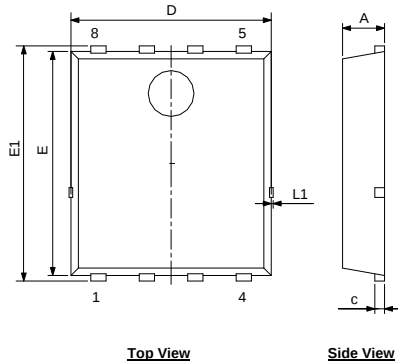


SYMBOL	MIN	NOM	MAX
A	4.30	4.57	4.72
A1	0	0.10	0.25
b	0.71	0.81	0.91
c	0.30	---	0.60
c2	1.17	1.27	1.37
D	8.50	---	9.35
E	9.80	---	10.45
e	2.54BSC		
H	14.70	---	15.75
L	2.00	2.30	2.74
L1	1.12	1.27	1.42
L2	---	---	1.75

PACKAGE OUTLINE(CONTINUED)

PDFN-8-5X6X0.95-1.27

UNIT: mm



SYMBOL	X			N		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.10	1.30	0.90	0.95	1.00
c	0.154	0.254	0.354	0.21	0.25	0.34
D	4.90	5.20	5.50	4.80	4.90	5.00
E	5.56	5.86	6.16	5.70	5.75	5.80
D1	3.80	4.10	4.30	3.91	4.01	4.11
E1	5.85	6.15	6.45	5.90	6.00	6.10
b	0.20	0.40	0.60	0.35	0.45	0.55
K	1.10	1.30	1.50	1.10	--	--
e	1.07	1.27	1.37	1.17	1.27	1.37
E4	3.52	3.72	3.92	3.34	3.44	3.54
L	0.36	0.66	0.76	0.51	0.61	0.71
L1	--	--	0.12	--	--	0.10
H	0.30	0.50	0.70	0.51	0.61	0.71

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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