

120A, 85V N-CHANNEL MOSFET

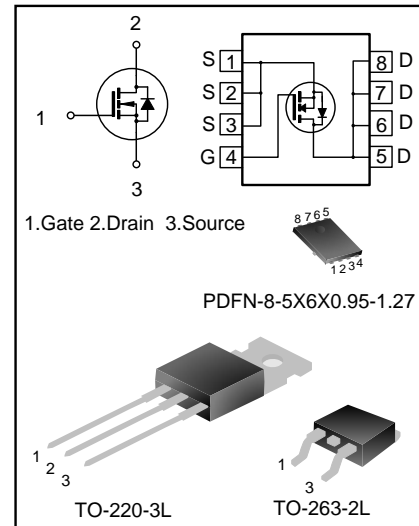
DESCRIPTION

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 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

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

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

THERMAL CHARACTERISTICS

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

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

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	$f=1MHz$	--	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	$t_{d(on)}$	$V_{DD}=40V, V_{GS}=10V, R_G=24\Omega,$ $I_D=13.3A$ (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}	$dI/dt=100A/\mu s$ (Notes 2)	--	0.12	--	μC

Notes:

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

TYPICAL CHARACTERISTICS

Figure 1. Output Characteristics

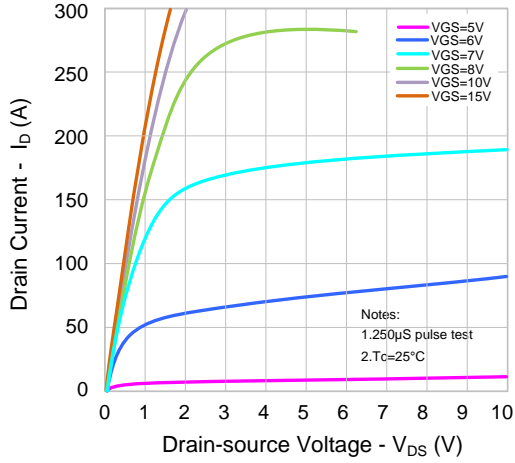


Figure 2. Transfer Characteristics

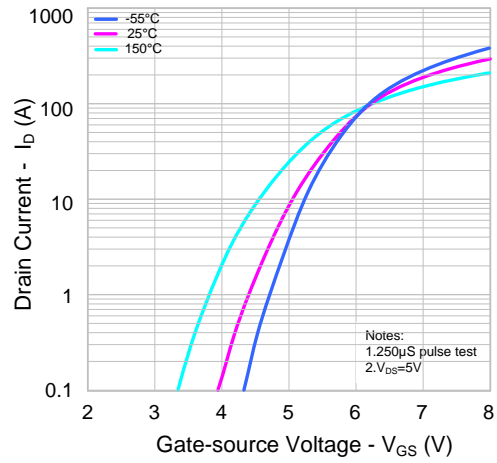


Figure 3. On-resistance vs. Drain Current

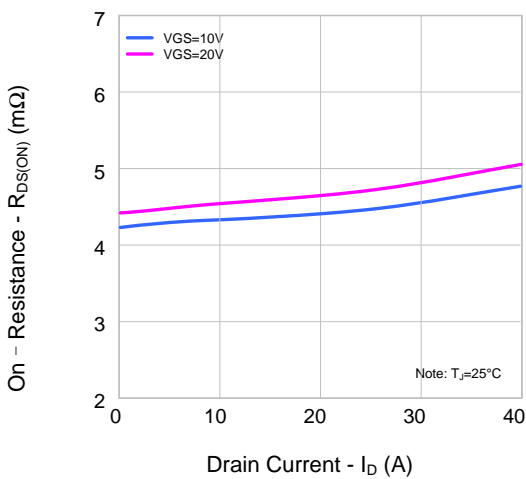


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

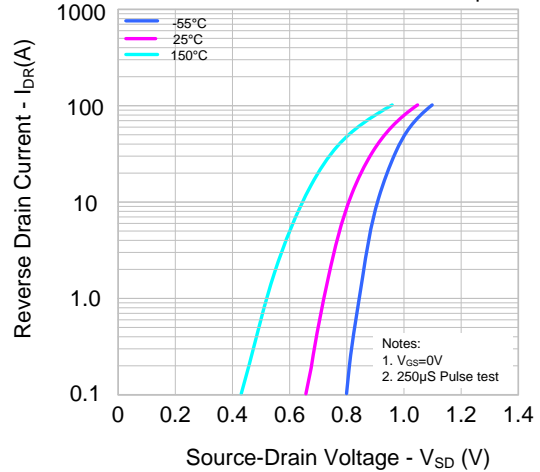


Figure 5. Capacitance Characteristics

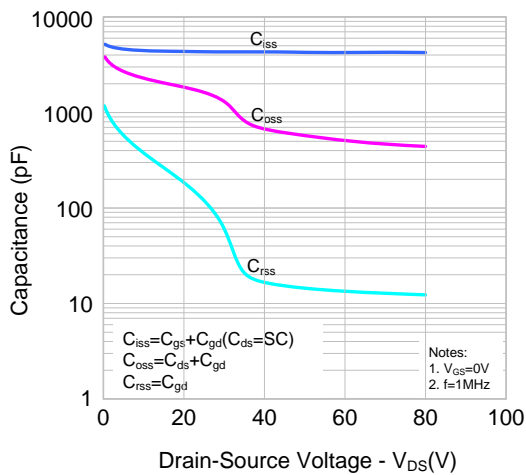
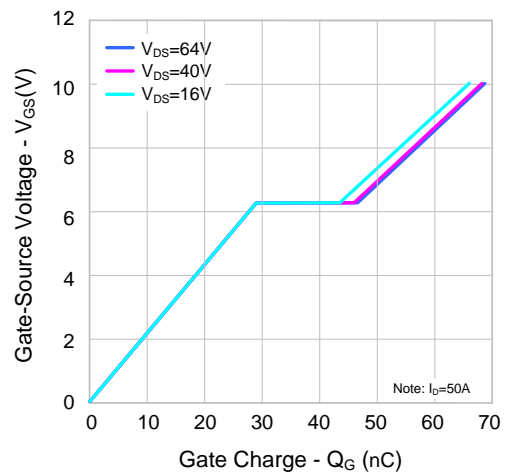
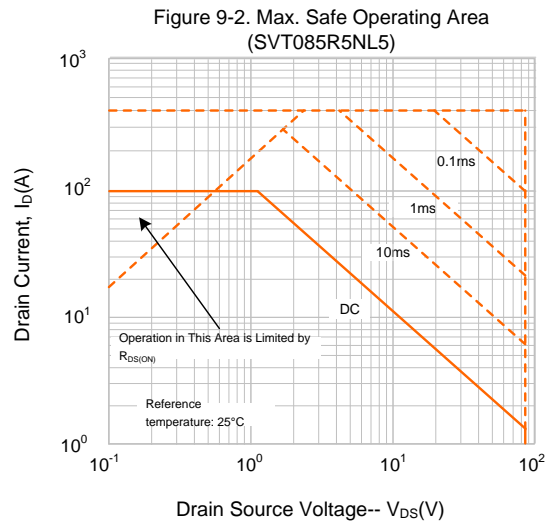
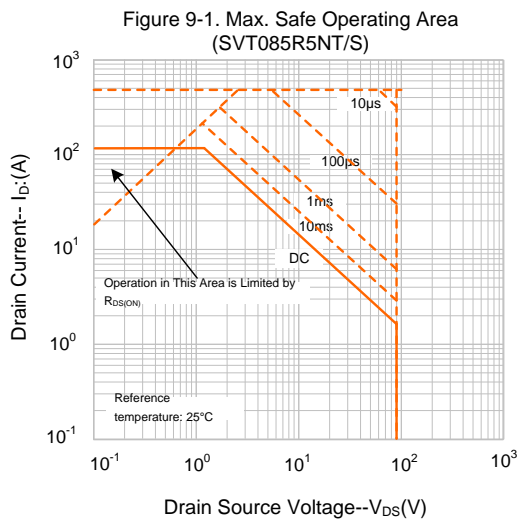
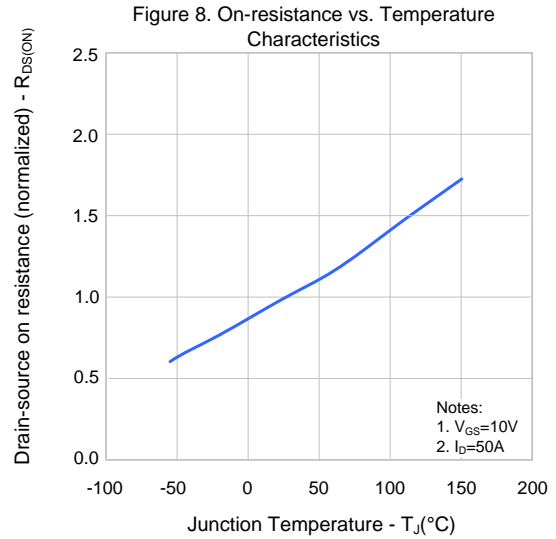
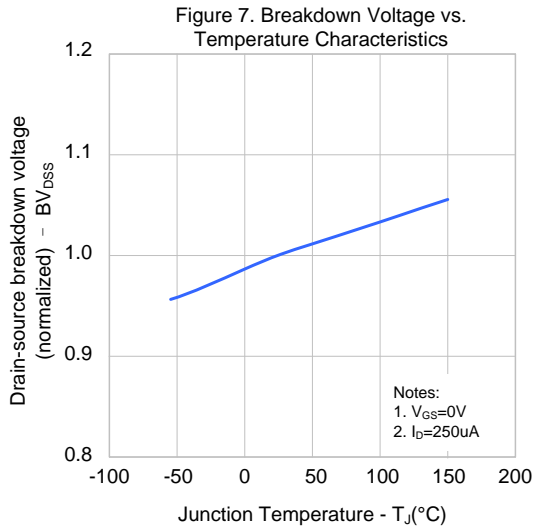


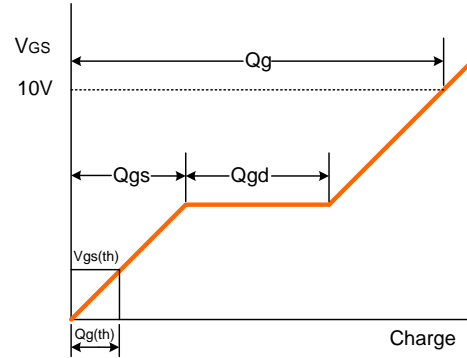
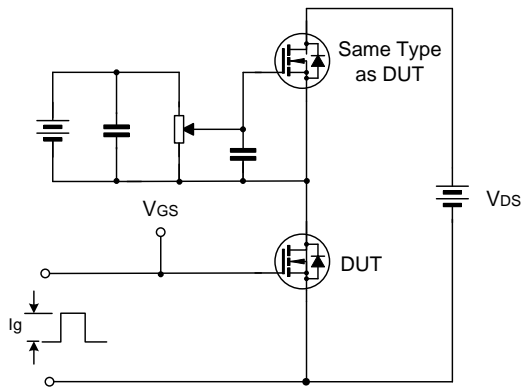
Figure 6. Gate Charge



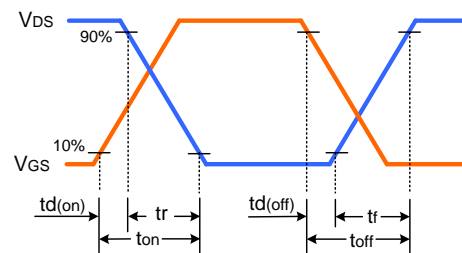
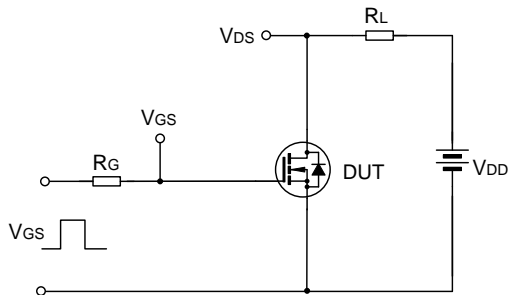
TYPICAL CHARACTERISTICS (CONTINUED)



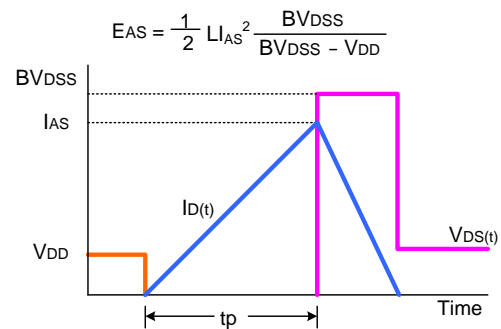
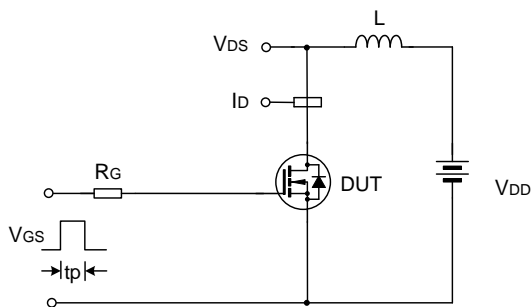
TYPICAL TEST CIRCUIT



Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

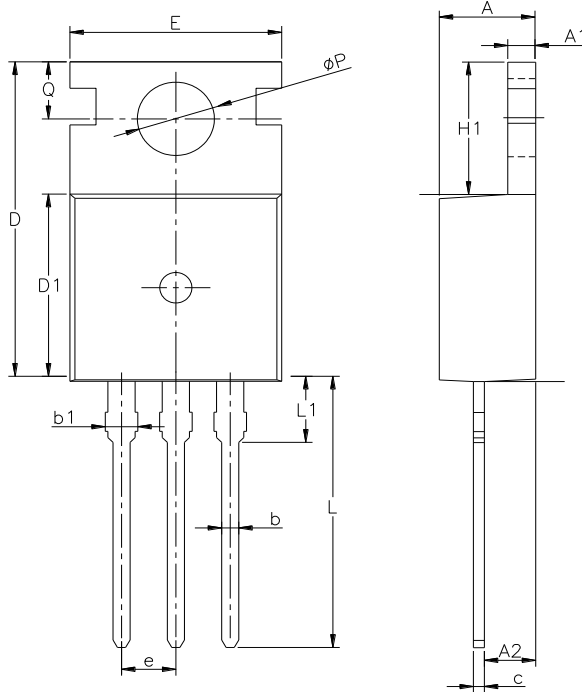


Unclamped Inductive Switching Test Circuit & Waveform

PACKAGE OUTLINE

TO-220-3L

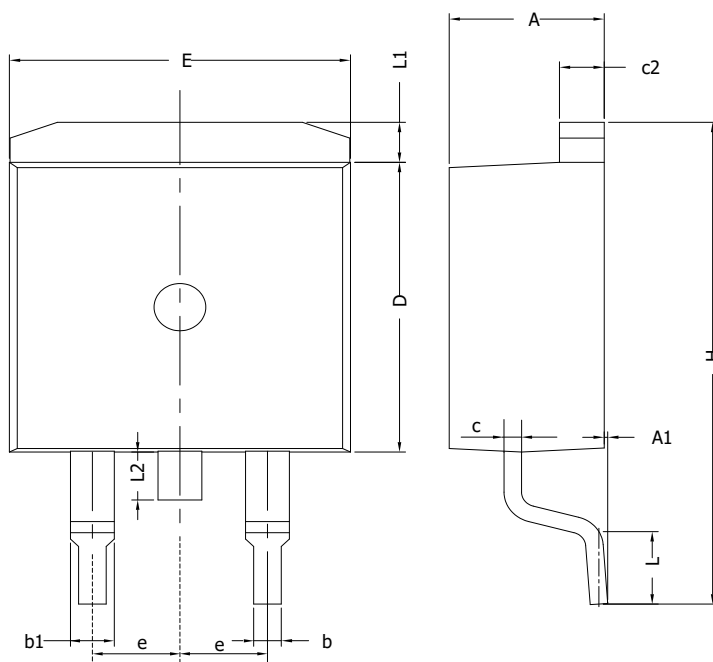
UNIT: mm



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

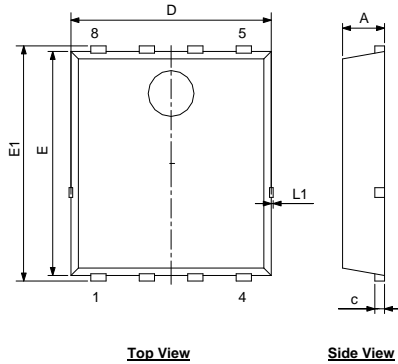


SYMBOL	MIN	NOM	MAX
A	4.30	4.57	4.72
A1	0	0.10	0.25
b	0.71	0.81	0.91
c	0.30	---	0.60
c2	1.17	1.27	1.37
D	8.50	---	9.35
E	9.80	---	10.45
e	2.54BSC		
H	14.70	---	15.75
L	2.00	2.30	2.74
L1	1.12	1.27	1.42
L2	---	---	1.75

PACKAGE OUTLINE(CONTINUED)

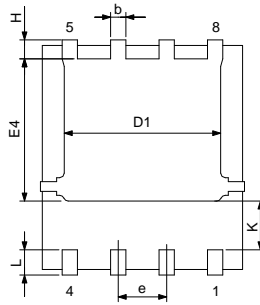
PDFN-8-5X6X0.95-1.27

UNIT: mm

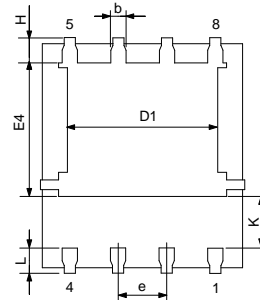


Top View

Side View



Bottom View (X)



Bottom View (N)

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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- 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.
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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
-