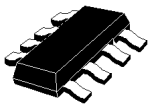
74V2T66

Dual bilateral switch

Features

- High speed:
  - t_{PD} = 0.6ns (Typ) at V_{CC} = 5V
- Compatible with TTL level
- Low power consumption
  - I_{CC} = 1mA(Max.) at T_A = 25°C
- Low "ON" resistance:
  - R_{ON} = 10Ω (Typ.) at V_{CC} = 5V $I_{I/O}$ = 1mA
- Sine wave distortion:
  - 0.04% at V_{CC} = 5.0V, f = 1KHz
- Operating voltage range:
  - V_{CC} (Opr) = 2.0V to 3.6V



SOT23-8L

Description

The 74V2T66 is an advanced high-speed CMOS dual bilateral switch fabricated in silicon gate C^2MOS technology. It achieves high speed propagation delay and very low on resistances while maintaining true CMOS low power consumption. This bilateral switch handles rail to rail analog and digital signals that may vary across the full power supply range (from GND to V_{CC})

The C input is provided to control the switch and it's compatible with standard CMOS output; the switch is ON (port I/O is connected to Port O/I) when the C input is held high and OFF (high impedance state exists between the two ports) when C is held low. It can be used in many application as Battery Powered System, Test Equipment. It's available in the commercial and extended temperature range in SOT23-8L package. All inputs and output are equipped with protection circuits against static discharge, giving them ESD immunity and transient excess voltage.

Order code

Part number	Package	Packing
74V2T66STR	SOT23-8L	Tape and reel

Contents

1 Logic symbols and I/O equivalent circuit

Figure 1. IEC logic symbols

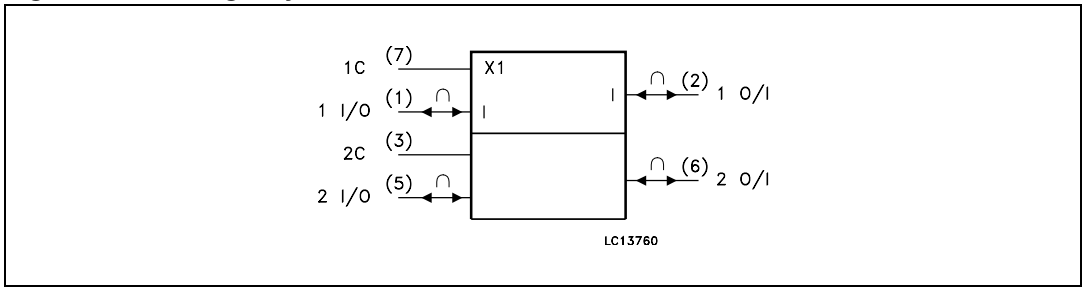
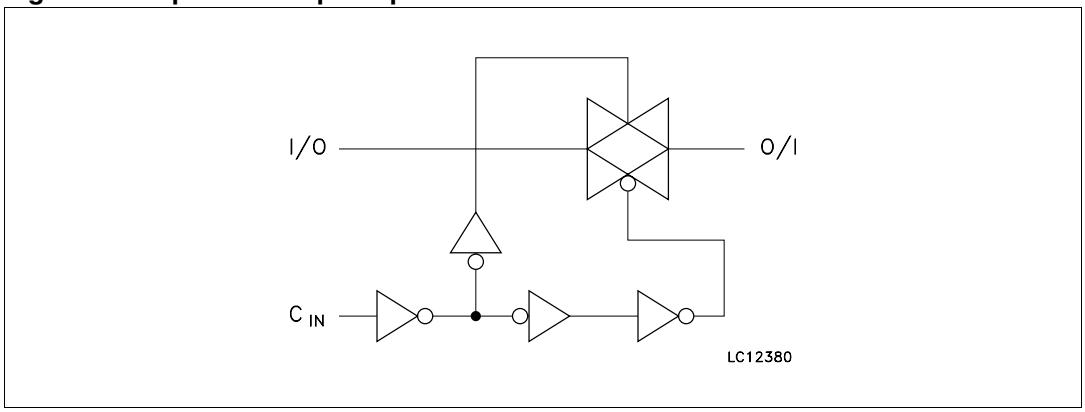


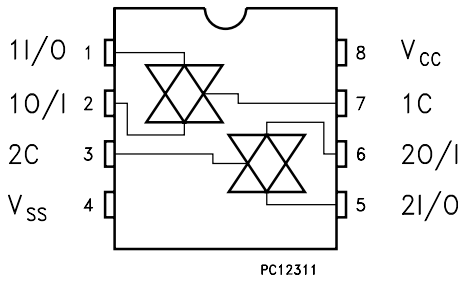
Figure 2. Input and output equivalent circuit



2 Pin settings

2.1 Pin connection

Figure 3. Pin connection (top through view)



2.2 Pin description

Table 1. Pin description

Pin N°	Symbol	Name and function
1, 5	1I/O, 2I/O	Independent Input/Output
2, 6	1O/I, 2O/I	Independent Output/Input
7, 3	1C, 2C	Enable Input (Active HIGH)
4	GND	Ground (0V)
8	V_{CC}	Positive Supply Voltage

2.3 Truth table

Table 2. Truth table

Control	Switch Function
H	ON
L	OFF (1)

1. High impedance state

3 Maximum rating

stressing the device above the rating listed in the “absolute maximum ratings” table may cause permanent damage to the device. these are stress ratings only and operation of the device at these or any other conditions above those indicated in the operating sections of this specification is not implied. exposure to absolute maximum rating conditions for extended periods may affect device reliability. refer also to the STMicroelectronics sure program and other relevant quality documents.

Table 3. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CC}	Supply voltage	-0.5 to +7.0	V
V_I	DC input voltage	-0.5 to V_{CC} + 0.5	V
V_{IC}	DC control input voltage	-0.5 to +7.0	V
V_O	DC output voltage	-0.5 to V_{CC} + 0.5	V
I_{IK}	DC input diode current	± 20	mA
I_{IK}	DC control input diode current	- 20	mA
I_{OK}	DC output diode current	± 20	mA
I_O	DC output current	± 50	mA
I_{CC} or I_{GND}	DC V_{CC} or ground current	± 50	mA
T_{stg}	Storage temperature	-65 to +150	°C
T_L	Lead temperature (10 sec)	300	°C

3.1 Recommended operating conditions

Table 4. Recommended operating conditions

Symbol	Parameter	Value	Unit
V_{CC}	Supply voltage	4.5 to 5.5	V
V_I	Input voltage	0 to V_{CC}	V
V_{IC}	Control input voltage	0 to 5.5	V
V_O	Output voltage	0 to V_{CC}	V
T_{op}	Operating temperature	-55 to 125	°C
dt/dv	Input rise and fall time (1) V_{CC} = 5.0V	0 to 20	ns/V

1. V_{IN} from 0.8V to 2V on control pin

4 Electrical characteristics

Table 5. DC characteristics

Symbol	Parameter	Test condition		Value							Unit
		V_{CC} (V)		T_A = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
V_{IH}	High level input voltage	5.0(1)		2			2		2		V
V_{IL}	Low level input voltage	5.0(1)				0.8		0.8		0.8	V
R_{ON}	ON resistance	5.0(1)	$V_{IC} = V_{IH}$ $V_{I/O} = V_{CC}$ to GND $I_{I/O} \leq 1mA$		12	17		20		24	Ω
R_{ON}	ON resistance	5.0(1)	$V_{IC} = V_{IH}$ $V_{I/O} = V_{CC}$ or GND $I_{I/O} \leq 1mA$		10	14		18		20	Ω
I_{OFF}	Input/output leakage current (SWITCH OFF)	5.5	$V_{OS} = V_{CC}$ to GND $V_{IS} = V_{CC}$ to GND $V_{IC} = V_{IL}$			±0.1		± 1		± 1	µA
I_{IZ}	Switch input leakage current (switch on, output open)	5.5	$V_{OS} = V_{CC}$ to GND $V_{IC} = V_{IH}$			±0.1		± 1		± 5	µA
I_{IN}	Control input leakage current	0 to 5.5	V_{IC} = 5.5V or GND			± 0.1		± 1.0		± 1.0	µA
I_{CC}	Quiescent supply current	5.5	$V_I = V_{CC}$ or GND			1		10		20	µA

1. Voltage range is 5V ± 0.5V

Table 6.

Symbol	Parameter	Test condition		Value							Unit
		V_{CC} (V)		T_A = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
t_{PD}	Delay time	5.0(1)			0.6	0.7		1.0		2.0	ns
t_{PLZ} t_{PHZ}	Output disable time	5.0(1)	R_L = 500 Ω		6.0	7.5		9.0		10.0	ns
t_{PZL} t_{PZH}	Output enable time	5.0(1)	R_L = 1 KΩ		2.5	4.0		5.0		7.0	ns

1. Voltage range is 5.0V ± 0.5V

Table 7. Capacitive characteristics

Symbol	Parameter	Test condition	Value							Unit
			T_A = 25°C			-40 to 85°C		-55 to 125°C		
			Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
C_{IN}	Input capacitance			4	10		10		10	pF
$C_{I/O}$	Output capacitance			10						pF
C_{PD}	Power dissipation capacitance(1)			3						pF

1. C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/2$(per switch)

Table 8. Analog switch characteristics (GND = 0V; T_A = 25°C)

Symbol	Parameter	Test Condition			Value	Unit
		V_{CC} (V)	V_{IN} (V_{p-p})		Typ.	
	Sine wave distortion (THD)	5.0(1)	4	f_{IN} = 1 KHz R_L = 10 KΩ, C_L = 50 pF	0.04	%
f_{MAX}	Frequency Response (Switch ON)	5.0(1)	Adjust f_{IN} voltage to obtain 0 dBm at V_{OS}. Increase f_{IN} Frequency until dB meter reads -3dB R_L = 50Ω, C_L = 10 pF		180	MHz
	Feedthrough Attenuation (Switch OFF)	5.0(1)	V_{IN} is centered at $V_{CC}/2$ Adjust f_{IN} Voltage to obtained 0dBm at V_{IS} R_L = 600Ω, C_L = 50 pF, f_{IN} = 1MHz sine wave		-60	dB
	Crosstalk (Control Input to Signal Output)	5.0(1)	R_L = 600Ω, C_L = 50 pF, f_{IN} = 1MHz square wave tr = tf = 2.0ns		60	mV
	Crosstalk Between Switches	5.0(1)	R_L = 600Ω, C_L = 50 pF, f_{IN} = 1MHz sine wave		-60	dB

1. Voltage range is 5.0V ± 0.5V

5 Switching caracteristics test circuit

Figure 4.

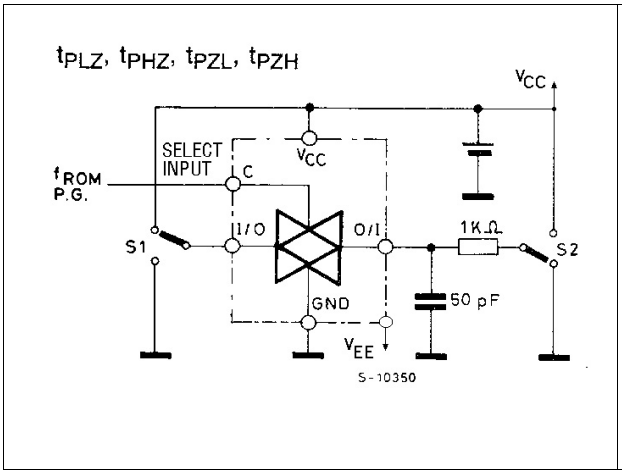


Figure 5.

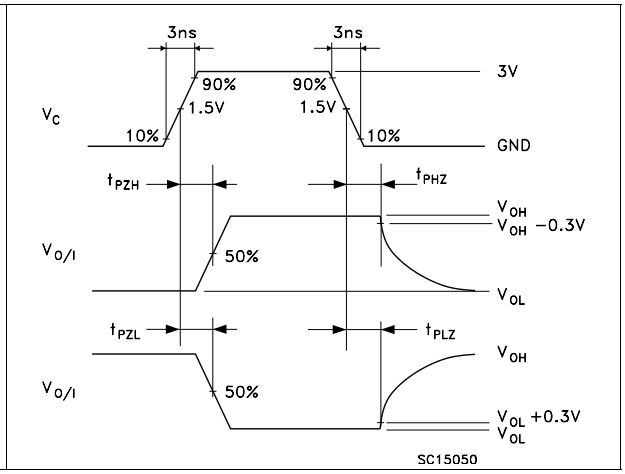


Figure 6. Feedthrough attenuation

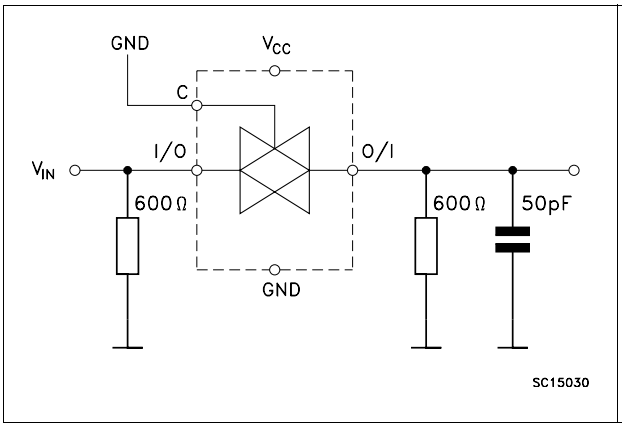


Figure 7. Bandwidth attenuation

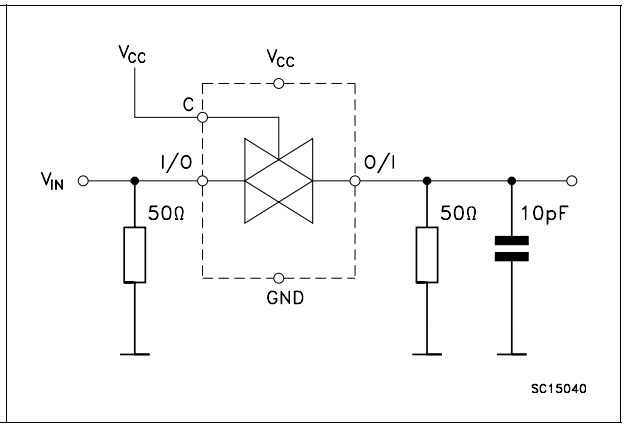


Figure 8. C_{I-O}, $C_{I/O}$

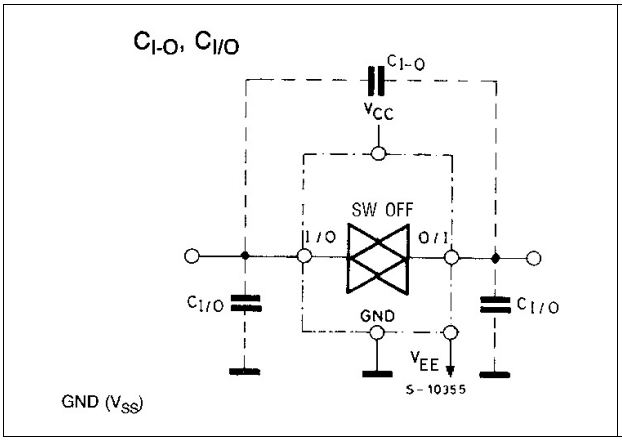


Figure 9. Maximum control frequency

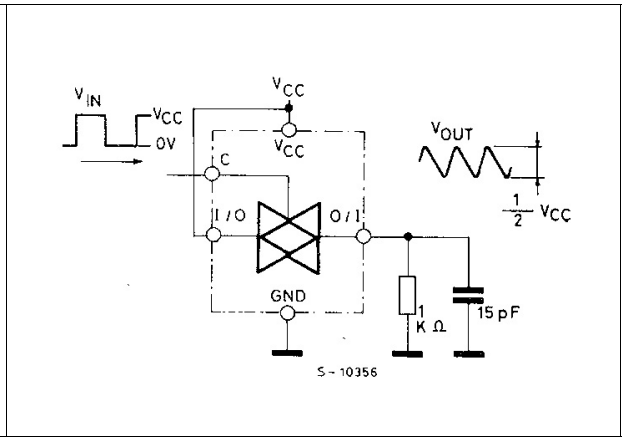


Table 9. Crosstalk (control to output)

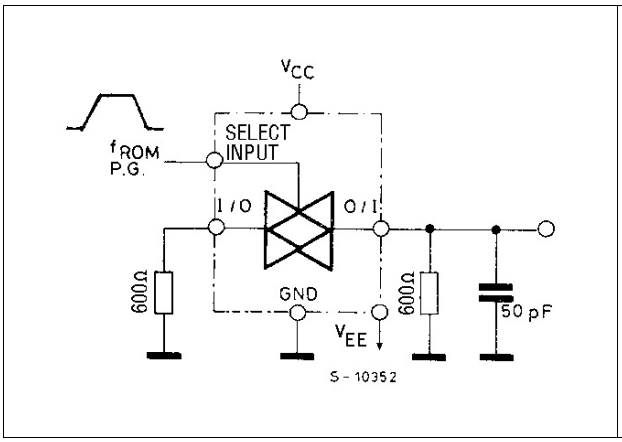


Figure 10. Channel resistance (R_{ON})

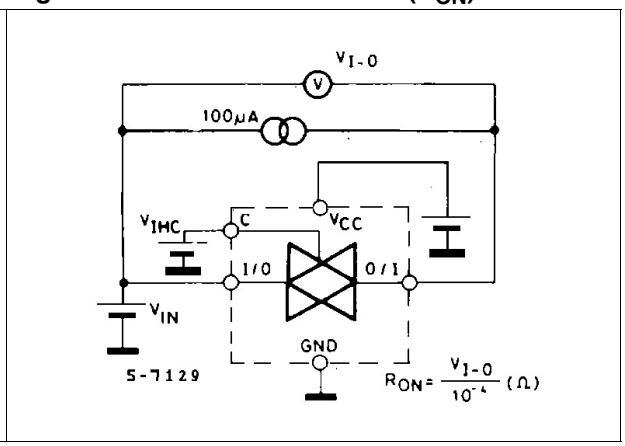
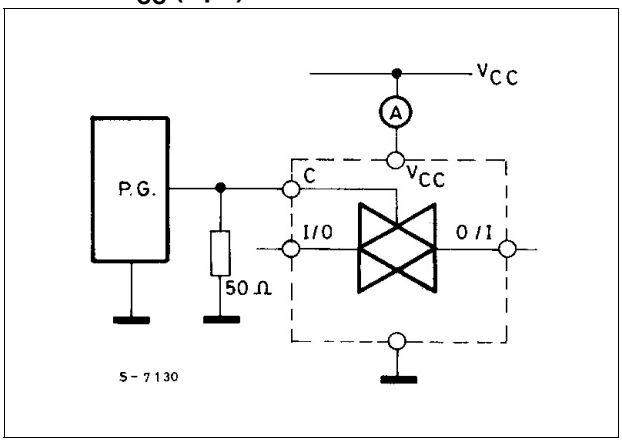


Table 10. I_{CC} (Opr.)

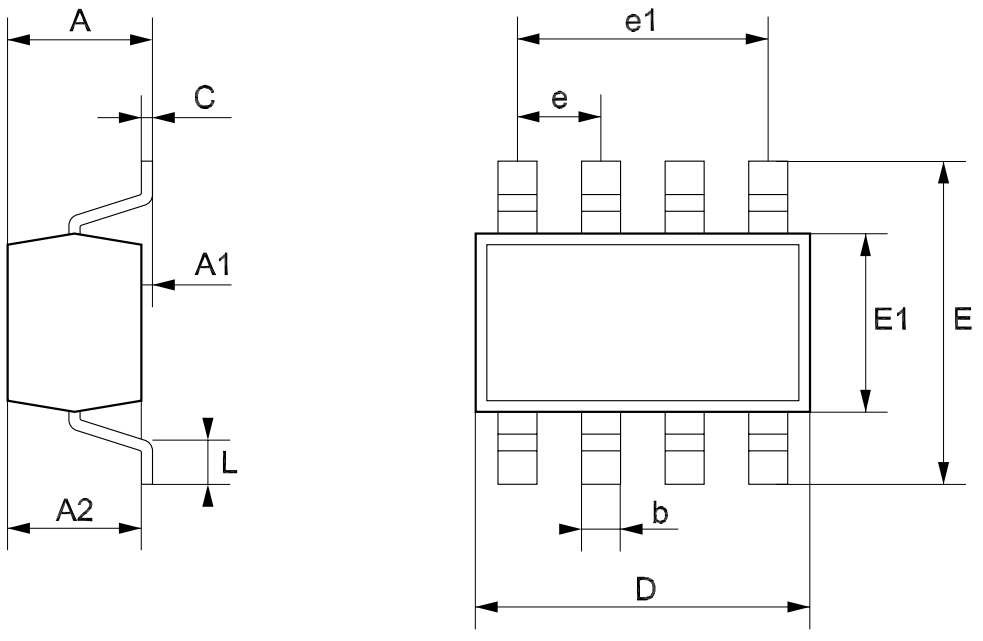


6 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

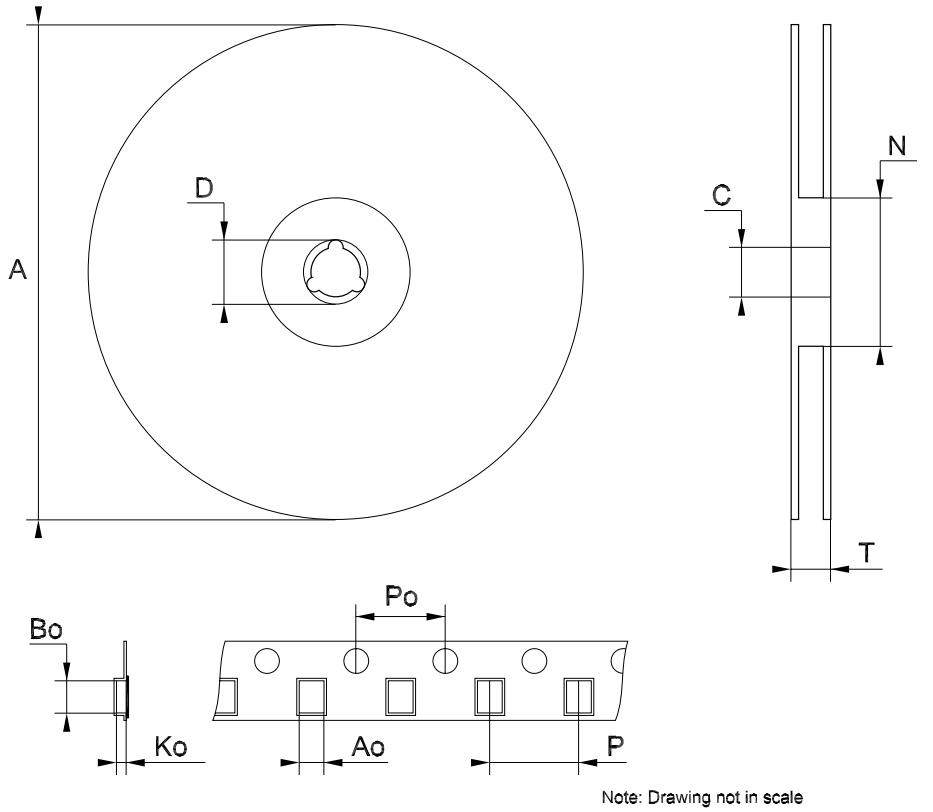
SOT23-8L MECHANICAL DATA

DIM.	mm.			mils		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	0.90		1.45	35.4		57.1
A1	0.00		0.15	0.0		5.9
A2	0.90		1.30	35.4		51.2
b	0.22		0.38	8.6		14.9
C	0.09		0.20	3.5		7.8
D	2.80		3.00	110.2		118.1
E	2.60		3.00	102.3		118.1
E1	1.50		1.75	59.0		68.8
e	0	.65			25.6	
e1		1.95			76.7	
L	0.35		0.55	13.7		21.6



Tape & Reel SOT23-xL MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			180			7.086
C	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
T			14.4			0.567
Ao	3.13	3.23	3.33	0.123	0.127	0.131
Bo	3.07	3.17	3.27	0.120	0.124	0.128
Ko	1.27	1.37	1.47	0.050	0.054	0.0.58
Po	3.9	4.0	4.1	0.153	0.157	0.161
P	3.9	4.0	4.1	0.153	0.157	0.161



Note: Drawing not in scale

7 Revision history

Table 11. Revision history

Date	Revision	Changes
31-Jan-2007	4	Document reformatted, Typo in R_{ON} value

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