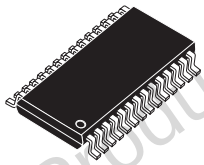
ST3237

3 to 5.5V, 250Kbps, RS-232 Transceiver with stand-by

Feature summary

- 1µA low power shutdown with receivers active
- Guaranteed data rate
  - 250Kbps (normal operation)
  - 1Mbps (very high speed operation)
- Guaranteed slew rate range
  - 6V/µs (normal operation)
  - 24V/µs (very high speed operation)
- 0.1µF external capacitors
- Flow-through pinout
- 500uA low supply current
- Meet EIA/TIA-232 specifications down to 3V
- Available in SSOP-28



SSOP

Description

The ST3237 is a 3V to 5.5V powered EIA/TIA-232 and V.28/V.24 communication interfaces high data-rate capabilities. ST3237 is a transceiver (5 drivers, 3 receivers) for fast modem applications. The device has a proprietary low-dropout transmitter output stage providing true RS-232 performance from a 3V to 5.5V supply using a dual charge pump. The device is guaranteed to run at data rates of 250Kbps in the normal operation mode and 1Mbps in the very high speed operation mode while maintaining RS-232 output levels.

Obsolete Product(s) - Obsolete Product(s)

Order codes

Part number	Temperature range	Package	Packaging
ST3237BPR	-40 to 85 °C	SSOP-28 (Tape & Reel)	1350 parts per reel

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Obsolete Product(s) - Obsolete Product(s)
Obsolete Product(s) - Obsolete Product(s)

1 Pin configuration

Figure 1. Pin description

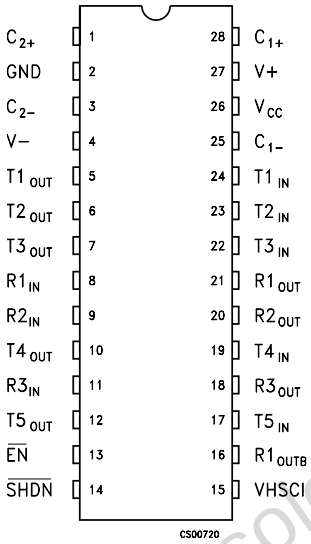


Table 1. Pin description

PIN N°	SYMBOL	NAME AND FUNCTION
1	C_2+	Positive Terminal of Inverting Charge Pump Capacitor
2	GND	Ground
3	C_2-	Negative Terminal of Inverting Charge Pump Capacitor
4	V-	5.5V Generated by the Charge Pump
5	$T1_{OUT}$	First Transmitter Output Voltage
6	$T2_{OUT}$	Second Transmitter Output Voltage
7	$T3_{OUT}$	Third Transmitter Output Voltage
8	$R1_{IN}$	First Receiver Input Voltage
9	$R2_{IN}$	Second Receiver Input Voltage
10	$T4_{OUT}$	Fourth Transmitter Output Voltage
11	$R3_{IN}$	Third Receiver Input Voltage
12	$T5_{OUT}$	Fifth Transmitter Output Voltage
13	EN	Receiver Enable, Active Low
14	SHDN	Shutdown Control, Active Low
15	VHSCI	Very High Speed Control Input. Connect to GND for normal operation; connect to VCC for 1Mbps transmission rates.
16	$R1_{OUTB}$	Non Inverting Complementary Receiver Output. Always Active.
17	$T5_{IN}$	Fifth Transmitter Input Voltage
18	$R3_{OUT}$	Third Receiver Output Voltage

Obsolete Product(s) - Obsolete Product(s)

Table 1. Pin description

PIN N°	SYMBOL	NAME AND FUNCTION
19	$T4_{IN}$	Fourth Transmitter Input Voltage
20	$R2_{OUT}$	Second Receiver Output Voltage
21	$R1_{OUT}$	First Receiver Output Voltage
22	$T3_{IN}$	Third Transmitter Input Voltage
23	$T2_{IN}$	Second Transmitter Input Voltage
24	$T1_{N}$	First Transmitter Input Voltage
25	C_1-	Negative Terminal of Voltage- Charge Pump Capacitor
26	V_{CC}	Supply Voltage
27	V+	-5.5V Generated by the Charge Pump
28	C_1+	Positive Terminal of Voltage- Charge Pump Capacitor

Obsolete Product(s) - Obsolete Product(s)
Obsolete Product(s) - Obsolete Product(s)

2 Absolute maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CC}	Supply voltage	-0.3 to 6	V
V+	Doubled voltage terminal	-0.3 to 7	V
V-	Inverted voltage terminal	0.3 to -7	V
V+ +|V-|		13	V
T_{IN}	Transmitter Input voltage range	-0.3 to 6	V
$\overline{SHDN}$, $\overline{EN}$		-0.3 to 6	V
VHSCI	Very high speed control input	-0.3 to (V_{CC} +0.3)	V
R_{IN}	Receiver input voltage range	±25	V
T_{OUT}	Transmitter output voltage range	±13.2	V
R_{OUT} R_{OUTB}	Receiver output voltage range	-0.3 to (V_{CC} + 0.3)	V
t_{SHORT}	Short circuit duration on T_{OUT} (one at a time)	Continuous	
T_{STG}	Storage temperature range	-65 to 150	°C

Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied. V+ and V- can have a maximum magnitude of +7V, but their absolute addition can not exceed 13 V.

Obsolete Product(s) - Obsolete Product(s)
Obsolete Product(s) - Obsolete Product(s)

3 Electrical characteristics

Table 3. **Electrical characteristics** (C_1 - C_4 = 0.1µF, V_{CC} = 3V to 5.5V, T_A = -40 to 85°C, unless otherwise specified. Typical values are referred to T_A = 25°C)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{SUPPLY}	V_{CC} power supply current	No load V_{CC} = 3V or 5.0V T_A = 25°C		0.5	2	mA
I_{SHDN}	Shutdown supply current	SHDN=GNDT_A = 25°C		1	10	µA

Table 4. **Logic input** (C_1 - C_4 = 0.1µF, V_{CC} = 3V to 5.5V, T_A = -40 to 85°C, unless otherwise specified. Typical values are referred to T_A = 25°C)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{TIL}	Input logic threshold low (1)	T-IN, VHSCI, $\overline{EN}$, $\overline{SHDN}$			0.8	V
V_{TIH}	Input logic threshold high (1)	V_{CC} = 3.3V V_{CC} = 5V	2 2.4			V V
I_{IL}	Input leakage current	T-IN, VHSCI, $\overline{EN}$, $\overline{SHDN}$		±0.01	±1.0	µA
I_{OL}	Output leakage current	Receiver disabled		±0.05	±10	µA
V_{OL}	Output voltage low	I_{OUT} = 1.6mA			0.4	V
V_{OH}	Output voltage high	I_{OUT} = -1mA	V_{CC}-0.6	V_{CC}-0.1		V

1. Transmitter input hysteresis is typically 250mV

Table 5. **Transmitter** (C_1 - C_4 = 0.1µF tested at 3.3V±10%, V_{CC} = 3V to 5.5V, T_A = -40 to 85°C, unless otherwise specified. Typical values are referred to T_A = 25°C)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{TOUT}	Output voltage swing	All transmitter outputs are loaded with 3KΩ to GND	±5	±5.4		V
R_{TOUT}	Transmitter output resistance	V_{CC} = V+ = V- = 0VV_{OUT} = ±2V		3000		W
I_{SC}	Output short circuit current			±25	±60	mA

Obsolete Product(s) - Obsolete Product(s)

Table 6. **Receiver** (C_1 - C_4 = 0.1µF tested at 3.3V±10%, V_{CC} = 3V to 5.5V, T_A = -40 to 85°C, unless otherwise specified. Typical values are referred to T_A = 25°C)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{RIN}	Receiver input voltage operating range		-25		25	V
V_{RIL}	RS-232 input threshold low	T_A = 25°C, V_{CC} = 3.3V T_A = 25°C, V_{CC} = 5V	0.6 0.8	1.2 1.5		V V
V_{RIH}	RS-232 input threshold high	T_A = 25°C, V_{CC} = 3.3V T_A = 25°C, V_{CC} = 5V		1.5 1.8	2.4 2.4	V V
V_{RIHYS}	Input hysteresis			0.3		V
R_{RIN}	Input resistance	T_A = 25°C	3	5	7	KΩ

Table 7. **Timing characteristics** (C1 - C4 = 0.1mF tested at 3.3V±10%, VCC = 3V to 5.5V, TA = -40 to 85°C, unless otherwise specified. Typical values are referred to TA = 25°C)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
D_R	Maximum data rate	R_L = 3KΩC_L= 1000pF one transmitter switching, VHSCI=GND	250			Kbps
		R_L = 3KΩC_L= 250pF one transmitter switching, VHSCI=V_{CC} V_{CC}= 3 to 5.55V	1000			Kbps
t_{PHLR} t_{PLHR}	Propagation delay input to output	R_{IN} to R_{OUT}, C_L = 150pF		0.15		µs
t_{T_SKEW}	Transmitter skew	$\|t_{PHL} - t_{TLH}\|$, VHSCI=GND		100		ns
		$\|t_{PHL} - t_{TLH}\|$, VHSCI=V_{CC}		60		ns
t_{R_SKEW}	Receiver skew	$\|t_{PHL} - t_{TLH}\|$		50		ns
t_{OER}	Receiver output enable time	Normal operation		80		ns
t_{ODR}	Receiver output disable time	Normal operation		130		ns
S_{RT}	Transition slew rate	T_A = 25°C R_L = 3 to 7KΩ V_{CC} = 3.3V measured from +3V to -3V or -3V to +3V C_L = 150pF to 1000pF, VHSCI=GND C_L = 150pF to 1000pF, VHSCI=V_{CC} C_L = 150pF to 2500pF, VHSCI=GND	6 24 4		30 150 30	V/µs V/µs V/µs

Note: Transmitter Skew is measured at the transmitter zero cross points

Obsolete Product(s) - Obsolete Product(s)

4 Application circuit

Figure 2. Application circuits

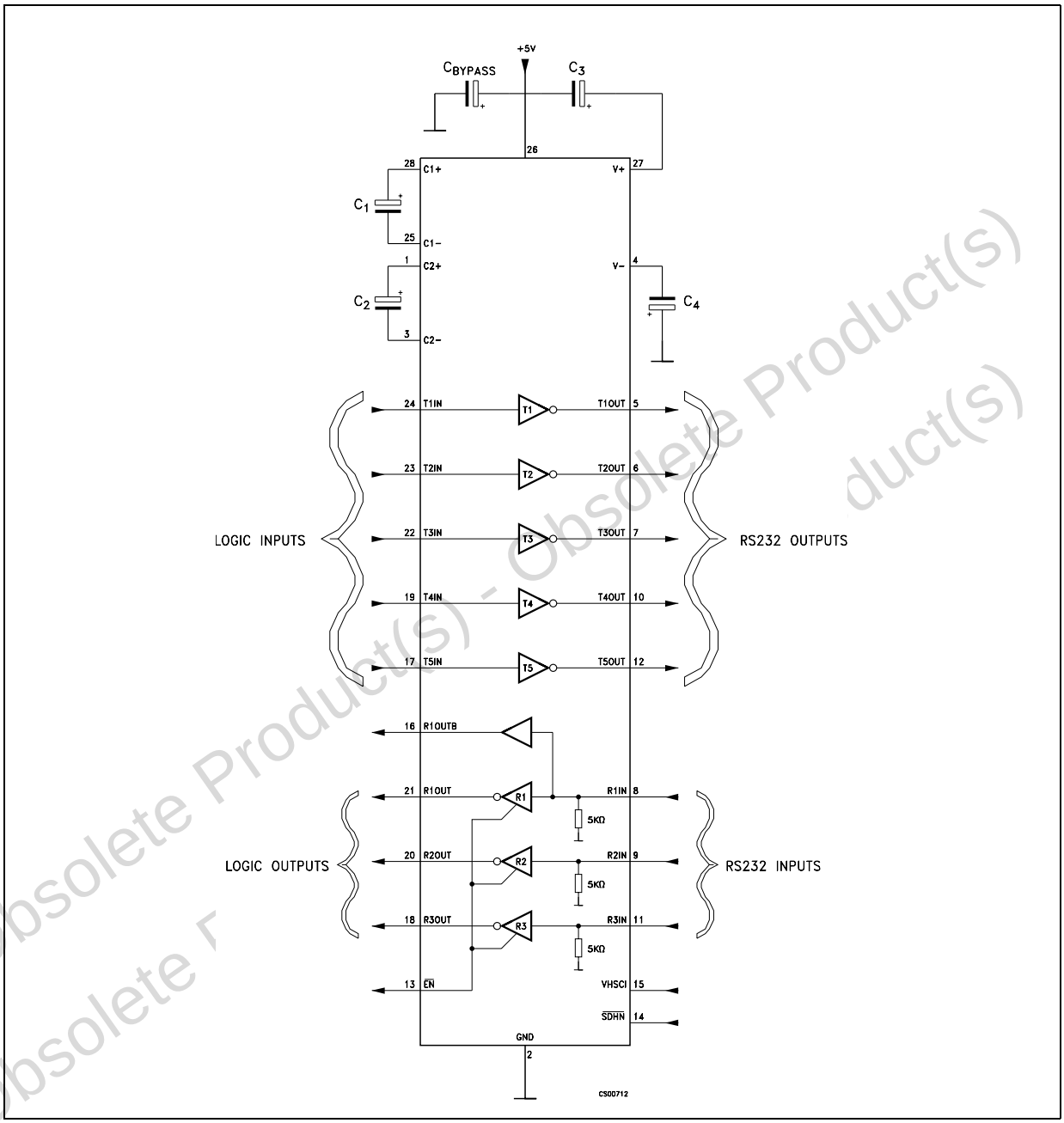


Table 8. Capacitance value (µF)

V_{CC}	C1	C2	C3	C4	Cbypass
3.0 to 3.6	0.1	0.1	0.1	0.1	0.1
4.5 to 5.5	0.047	0.33	0.33	0.33	0.1
3.0 to 5.5	0.1	0.47	0.47	0.47	0.1

Obsolete Product(s) - Obsolete Product(s)

5 Typical performance characteristics

(unless otherwise specified T_J = 25°C)

Figure 3. Input voltage range T_J =25°C

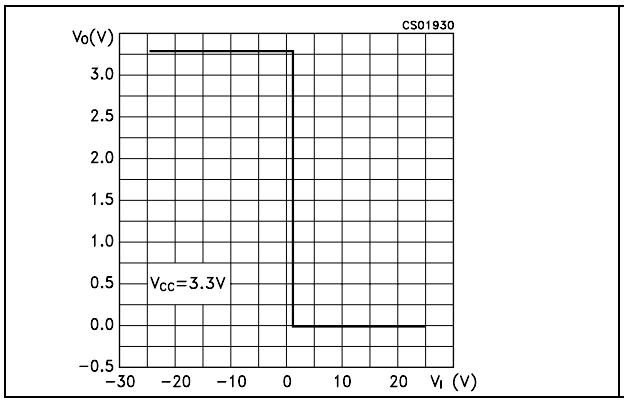


Figure 4. Transfer characteristics for transmitter

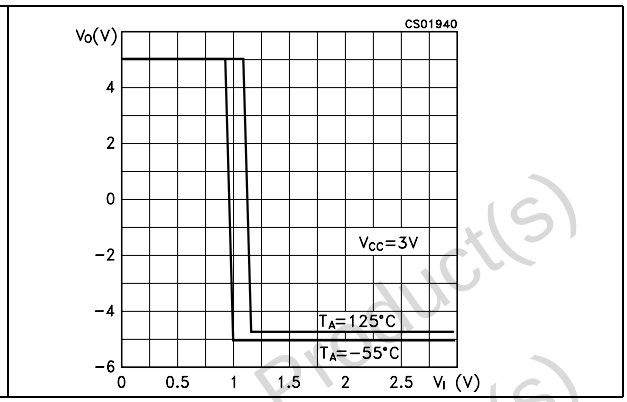


Figure 5. Transfer characteristics for receiver

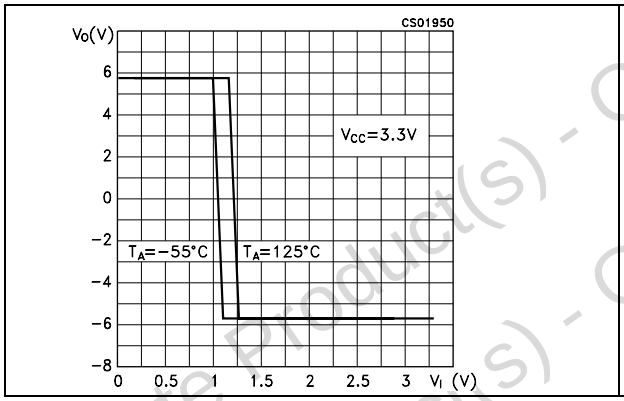


Figure 6. Transfer characteristics for received

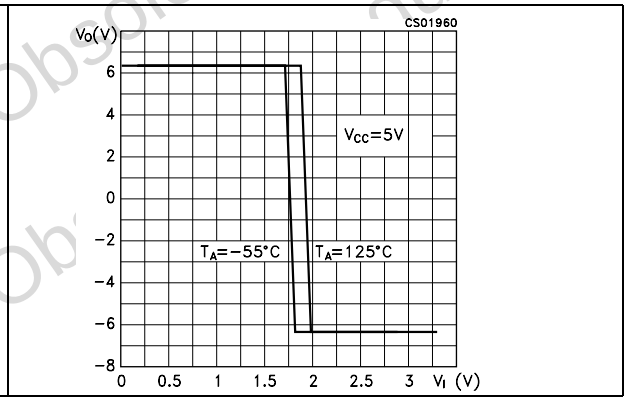


Figure 7. Output current vs output high voltage

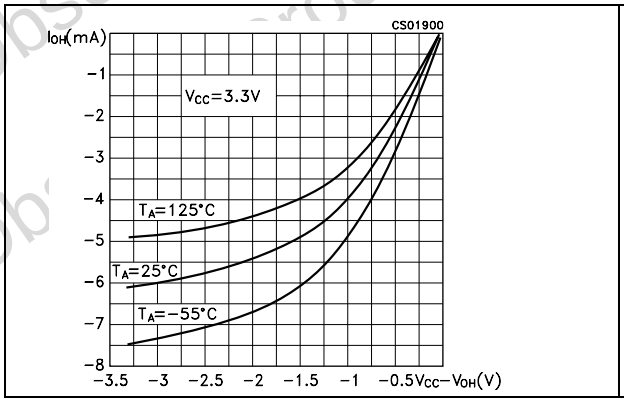
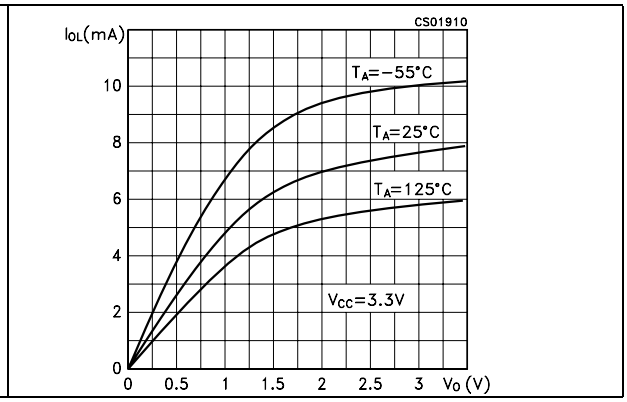
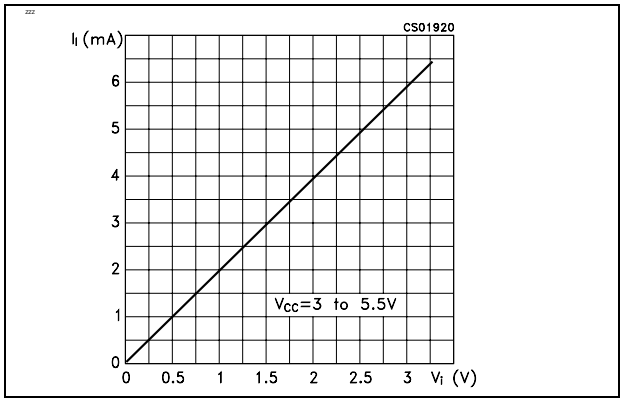


Figure 8. Output current vs output low voltage



Obsolete Product(s) - Obsolete Product(s)

Figure 9. Receiver input resistance



Obsolete Product(s) - Obsolete Product(s)
Obsolete Product(s) - Obsolete Product(s)

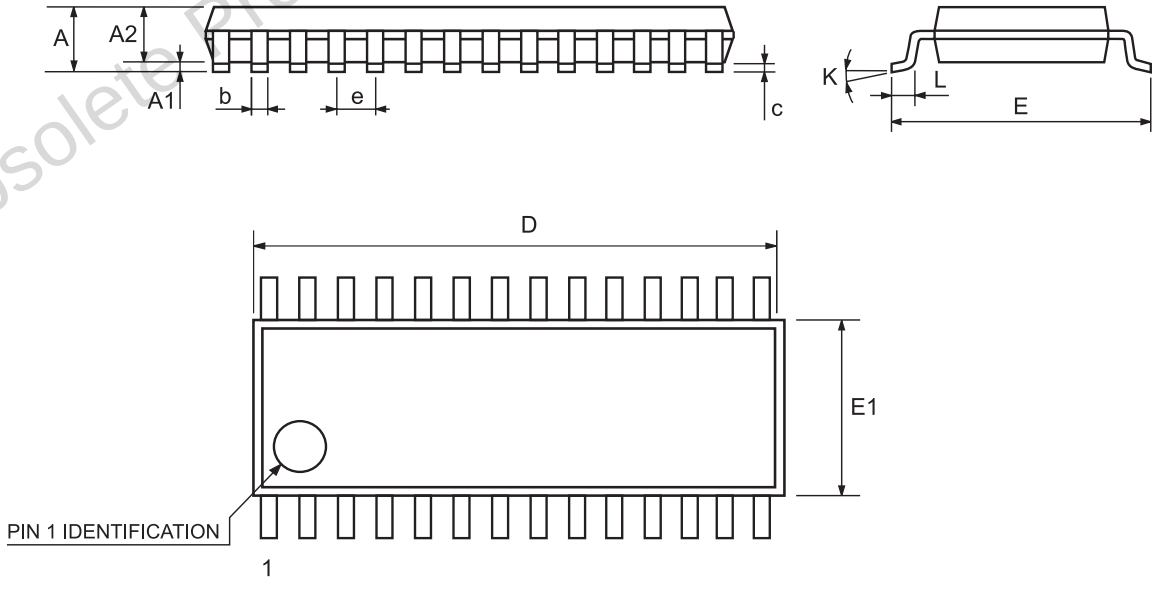
6 Package mechanical data

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.

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SSOP28 MECHANICAL DATA

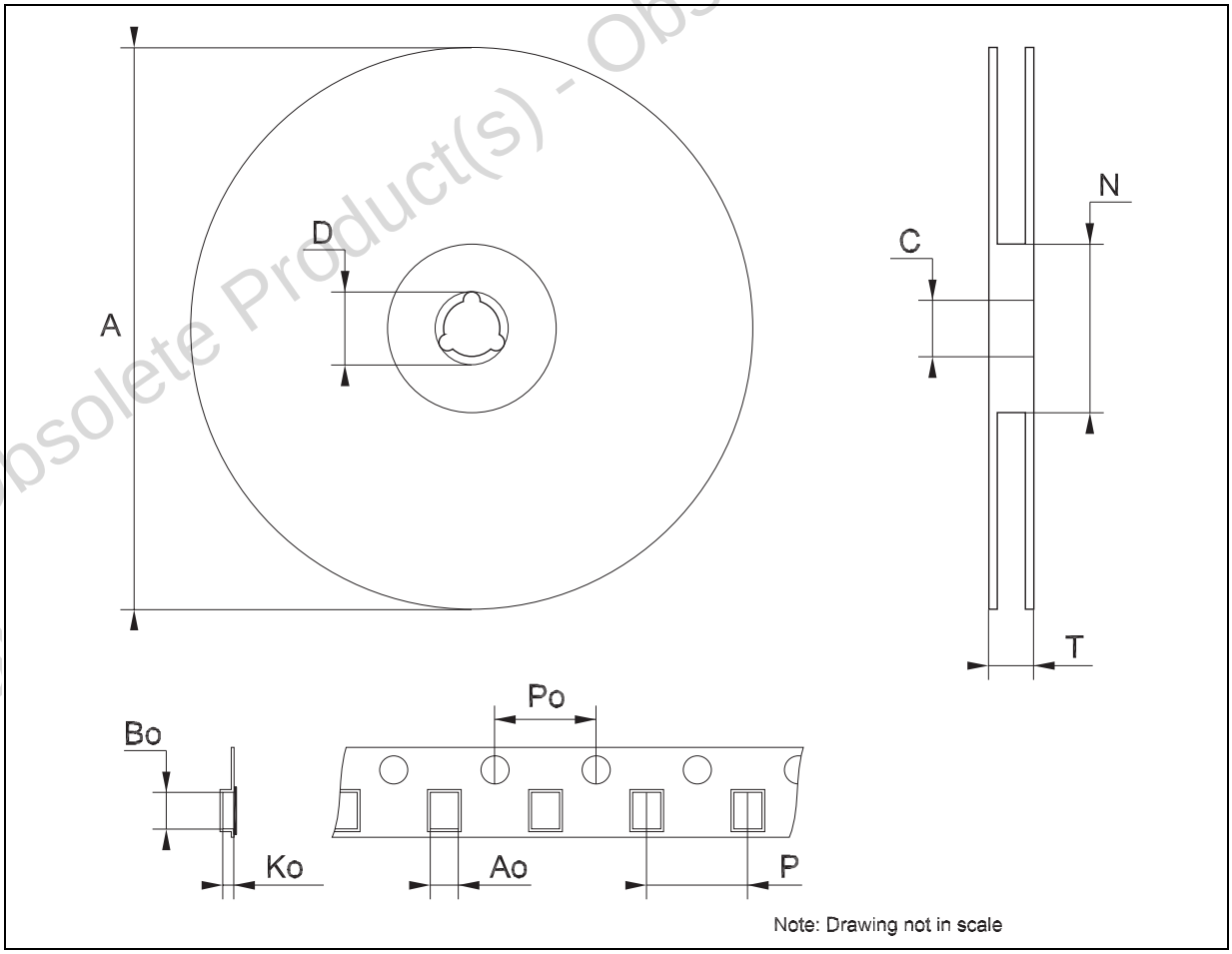
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			2			0.079
A1	0.050			0.002		
A2	1.65	1.75	1.85	0.065	0.069	0.073
b	0.22		0.38	0.009		0.015
c	0.09		0.25	0.004		0.010
D	9.9	10.2	10.5	0.390	0.402	0.413
E	7.4	7.8	8.2	0.291	0.307	0.323
E1	5	5.3	5.6	0.197	0.209	0.220
e		0.65 BSC			0.0256 BSC	
K	0°		10°	0°		10°
L	0.55	0.75	0.95	0.022	0.030	0.037



Obsolete Product(s) - Obsolete Product(s)

Tape & Reel SSOP28 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			330			12.992
C	12.8		13.2	0.504		0.519
D	20.2			0.795		
N	60			2.362		
T			22.4			0.882
Ao	8.4		8.6	0.331		0.339
Bo	10.7		10.9	0.421		0.429
Ko	2.9		3.1	0.114		0.122
Po	3.9		4.1	0.153		0.161
P	11.9		12.1	0.468		0.476



Note: Drawing not in scale

Obsolete Product(s) - Obsolete Product(s)

7 Revision history

Table 9. Revision history

Date	Revision	Description of Changes
21-Mar-2005	5	TSSOP has been removed.
24-Mar-2006	6	Order codes has been updated and new template.
25-Oct-2006	7	Order codes has been updated.
16-Jan-2007	8	The D_R min. value on *Table 7.* has been corrected: 100kbps ==> 1000kbps.

Obsolete Product(s) - Obsolete Product(s)
Obsolete Product(s) - Obsolete Product(s)

Obsolete Product(s) - Obsolete Product(s)

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