TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

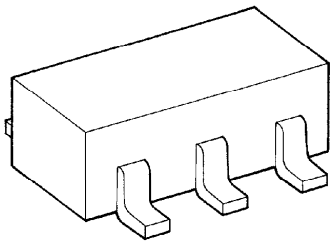
TC7SZ05F, TC7SZ05FU

INVERTER (OPEN DRAIN)

FEATURES

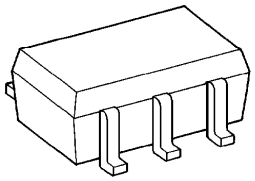
- High Output Drive : ±24 mA (Typ.) (V_{CC} = 3 V)
- Super High Speed Operation : t_{PD} = 2.4 ns (Typ.) (V_{CC} = 5 V, 50 pF)
- Operation Voltage Range : $V_{CC\,(opr)}$ = 1.8~5.5 V
- Supply Voltage Data Retention : V_{CC} = 1.5~5.5 V
- 5 V Toleratnt Function

TC7SZ05F



SSOP5-P-0.95

TC7SZ05FU



SSOP5-P-0.65A

Weight
SSOP5-P-0.95 : 0.016 g (Typ.)
SSOP5-P-0.65A : 0.006 g (Typ.)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage Range	V_{CC}	−0.5~6	V
DC Input Voltage	V_{IN}	−0.5~6	V
DC Output Voltage	V_{OUT}	−0.5~6	V
Input Diode Current	I_{IK}	±20	mA
Output Diode Current	I_{OK}	±20	mA
DC Output Current	I_{OUT}	±50	mA
DC V_{CC} / Ground Current	I_{CC}	±50	mA
Power Dissipation	P_D	200	mW
Storage Temperature	T_{stg}	−65~150	°C
Lead Temperature (10 s)	T_L	260	°C

DC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION		V_{CC} (V)	Ta = 25°C			Ta = −40~85°C		UNIT
					MIN.	TYP.	MAX.	MIN.	MAX.	
High-Level Input Voltage	V_{IH}			1.8	0.88 × V_{CC}	—	—	0.88 × V_{CC}	—	V
				2.3~5.5	0.75 × V_{CC}	—	—	0.75 × V_{CC}	—	
Low-Level Input Voltage	V_{IL}			1.8	—	—	0.12 × V_{CC}	—	0.12 × V_{CC}	V
				2.3~5.5	—	—	0.25 × V_{CC}	—	0.25 × V_{CC}	
High Level Output Leakage	I_{LKG}	V_{IN} = V_{IL}		1.8~5.5	—	—	±5	—	±10	μA
Low-Level Output Voltage	V_{OL}	V_{IN} = V_{IH}	I_{OL} = 100 μA	1.8	—	0	0.1	—	0.1	V
				2.3	—	0	0.1	—	0.1	
				3.0	—	0	0.1	—	0.1	
				4.5	—	0	0.1	—	0.1	
			I_{OL} = 8 mA	2.3	—	0.1	0.3	—	0.3	V
			I_{OL} = 16 mA	3.0	—	0.15	0.4	—	0.4	
			I_{OL} = 24 mA	3.0	—	0.22	0.55	—	0.55	
			I_{OL} = 32 mA	4.5	—	0.22	0.55	—	0.55	
Input Leakage Current	I_{IN}	V_{IN} = 5.5 V or GND		0~5.5	—	—	±1	—	±10	μA
Power Off Leakage Current	I_{OFF}	V_{IN} or V_{OUT} = 5.5 V		0.0	—	—	1	—	10	μA
Quiescent Supply Current	I_{CC}	V_{IN} = V_{CC} or GND		5.5	—	—	2	—	20	μA

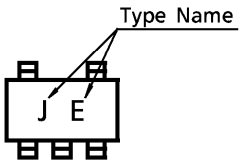
AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3$ ns)

CHARACTERISTIC	SYMBOL	TEST CONDITION		Ta = 25°C			Ta = −40~85°C		UNIT
			V_{CC} (V)	MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time	t_{PZL}	C_L = 50 pF, R_L = 500 Ω	1.8	1.5	4.6	10.5	1.5	11.0	ns
			2.5 ± 0.2	0.8	3.0	7.0	0.8	7.5	
			3.3 ± 0.3	0.8	2.4	5.0	0.8	5.2	
			5.0 ± 0.5	0.5	1.9	4.3	0.5	4.5	
	t_{PLZ}	C_L = 50 pF, R_L = 500 Ω	1.8	1.5	4.1	10.5	1.5	11.0	
			2.5 ± 0.2	0.8	2.5	7.0	0.8	7.5	
			3.3 ± 0.3	0.8	2.1	5.0	0.8	5.2	
			5.0 ± 0.5	0.5	1.2	4.3	0.5	4.5	
Input Capacitance	C_{IN}		0~5.5	—	4	—	—	—	pF
Power Dissipation Capacitance	C_{PD}	(Note 1)	3.3	—	3.6	—	—	—	pF
			5.5	—	6.5	—	—	—	

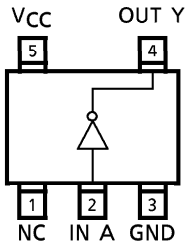
(Note 1) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.
Average operating current can be obtained by the equation.

$$I_{CC\,(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$$

MARKING



PIN ASSIGNMENT (TOP VIEW)

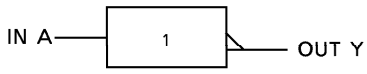


TRUTH TABLE

A	Y
L	* H
H	L

* : High Impedance

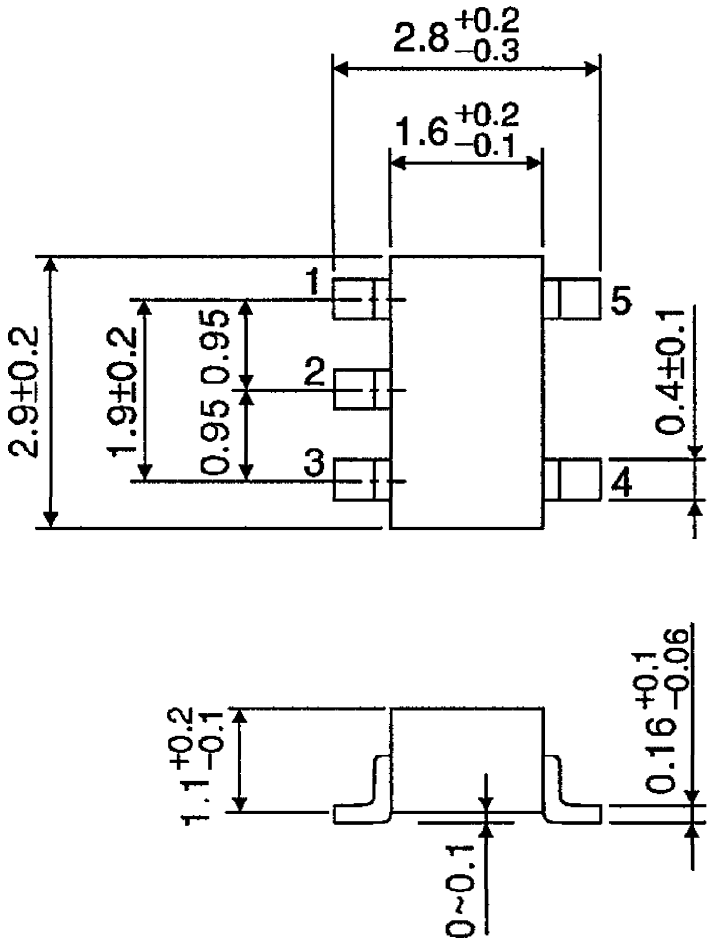
LOGIC DIAGRAM



OUTLINE DRAWING

SSOP5-P-0.95

Unit : mm

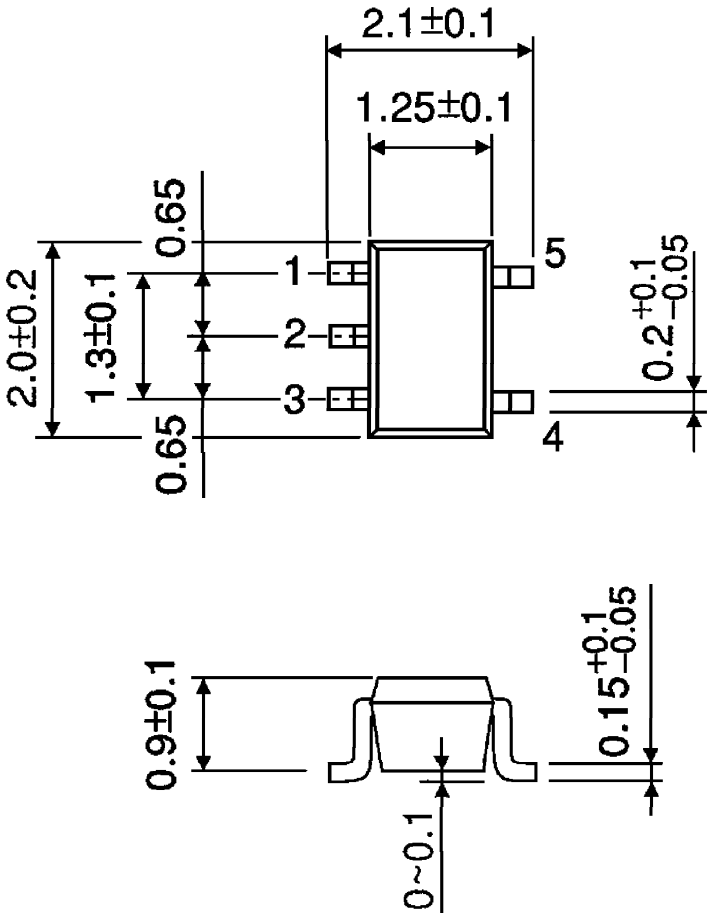


Weight : 0.016 g (Typ.)

OUTLINE DRAWING

SSOP5-P-0.65A

Unit : mm



Weight : 0.006 g (Typ.)

Tape Packing Specifications for 5-pin Ultra Super-Mini (USV) Package

Scope

This specification provides the packaging requirements for 5-pin Ultra Super Mini type transistors, FETs, diodes, L-MOS logics for use in automatic placement machines.

1. Product Naming System

Type of package for shipment is classified by a symbol suffixed to a product name. The method of classification is as below. (this method, however, does not apply to products of which electrical characteristics differ from the TOSHIBA standard specifications.)

[Example]

TC7S00FU (TE85L)

- TE85L: Indicates the specifications.
- TC7S00FU: Indicates EIAJ registration No. or TOSHIBA's House No.

2. Tape Dimensions

2.1 Accumulated pitch tolerance is ±0.2 mm/10 pitch.

2.2 The tape material is plastic.

2.3 The tape dimensions are per Figure 1.

Unit: mm

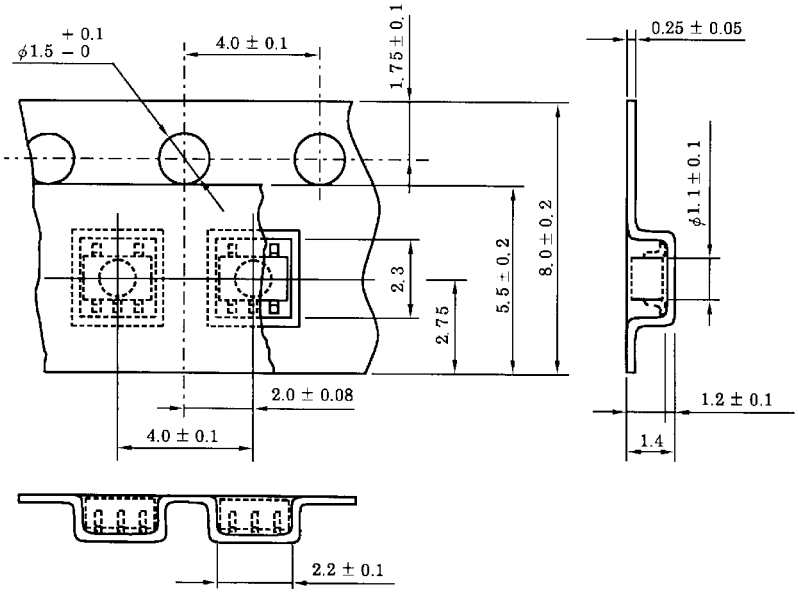


Figure 1

961001EAA1

2.4 Related Matters

2.4.1 Missing Devices

Except for the leader and trailer portions of the tape there shall be no consecutive missing parts. The maximum number of missing parts cannot exceed 0.2% per reel.

2.4.2 Electric Characteristics

Electric Characteristics of taping devices are shown in individual Technical Data.

3. Reel

3.1 The reel dimensions are per Figure 2.

Unit: mm

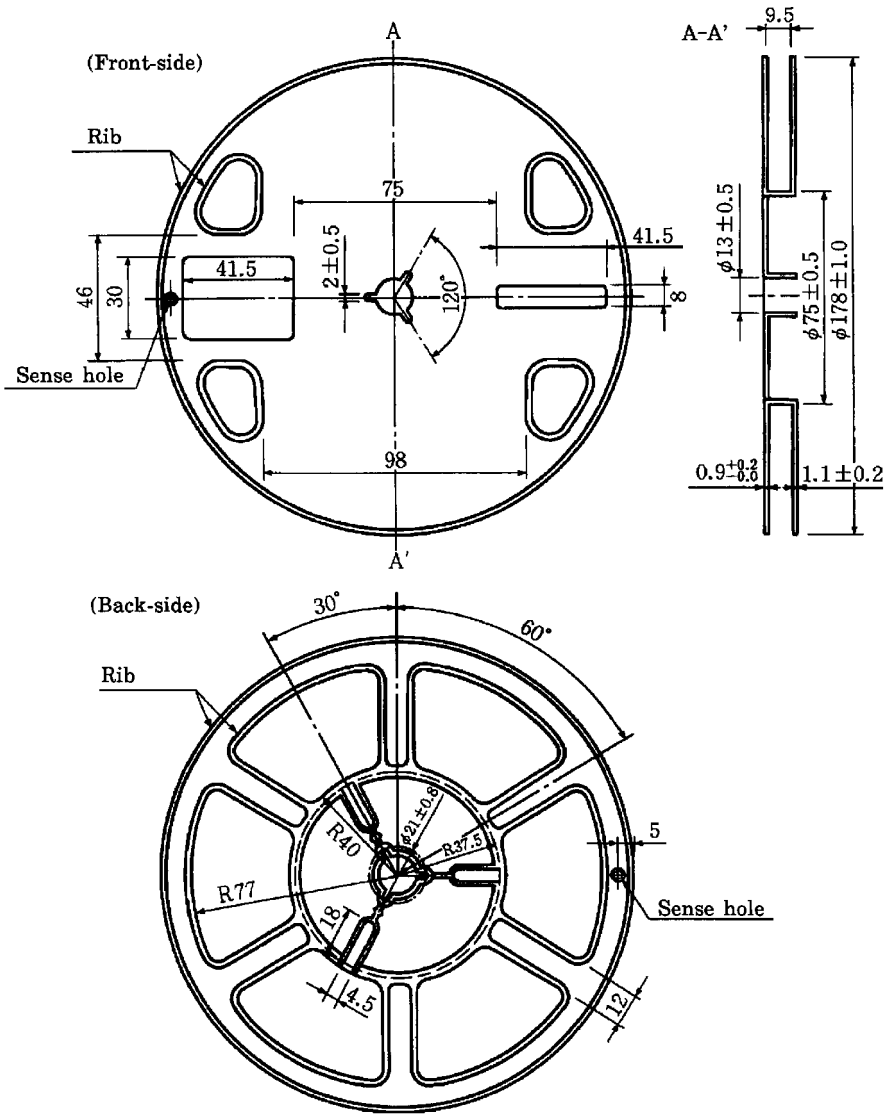


Figure 2

3.2 The reel material is plastic.

4. Packed System

4.1 Packed parts quantity

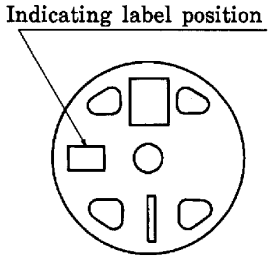
3000 pcs per reel.

4.2 Indication System

[Example] TC7S00FU (TE85L)

P/N:

TYPE	TC7S00FU		
ADDC	(TE85L)	Q'TY	3,000 pcs
NOTE			



On special occasion ADD CODE, PART No. etc. are often indicated in indicating label of the reel.

4.3 Part orientation in the carrier tape shall be as shown in Figure 3.

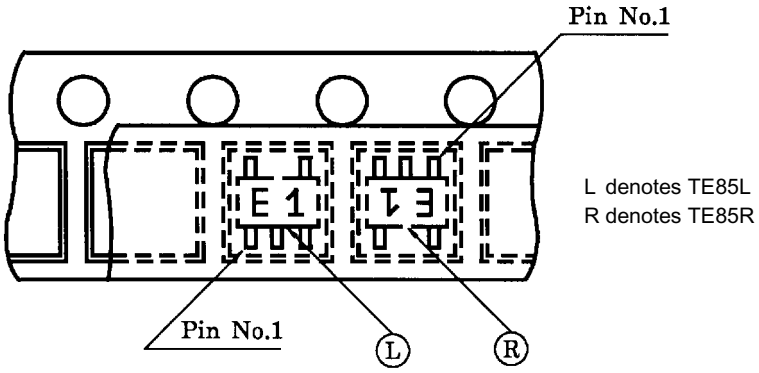
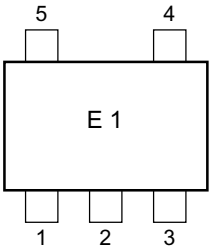


Figure 3

Pin 1 exists on the left below of the marking.

[Example] Top View



5. The leader and trailer portion of the tape shall be as shown in Figure 4.

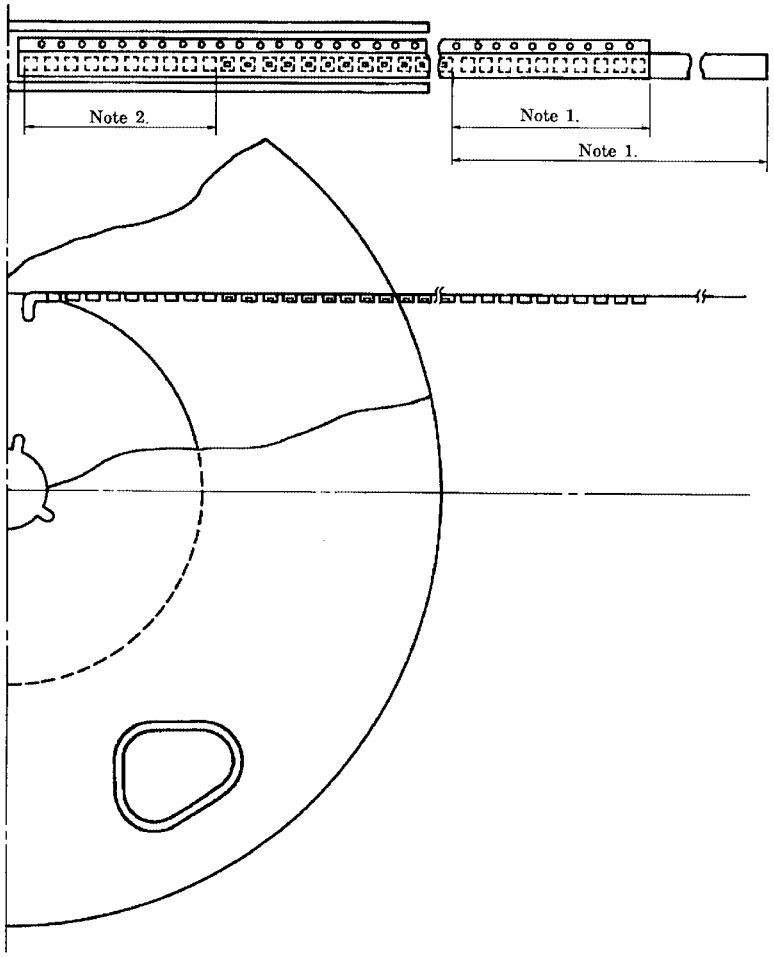


Figure 4

Note1: The leader portion shall consist of a piece of cover tape minimum length of 300 mm and a piece of carrier tape with empty portion of 100 mm minimum.

Note2: The trailer portion shall consist of an empty carrier of more than 10 cavities.