

TENTATIVE TOSHIBA MOS DIGITAL INTEGRATED CIRCUIT SILICON GATE CMOS
131,072-WORD BY 8-BIT CMOS STATIC RAM

DESCRIPTION

The TC55V8128BJ/BFT is a 1,048,576 bits high speed static random access memory organized as 131,072 words by 8 bits using CMOS technology, and operated from a single 3.3V supply. Toshiba's CMOS technology and advanced circuit form provide high speed feature.

The TC55V8128BJ/BFT has low power feature with device control using chip enable ($\overline{CE}$), and has output enable ($\overline{OE}$) for fast memory access. The TC55V8128BJ/BFT is suitable for use in cache memory where high speed is required, and high speed storage. All inputs and outputs are directly LVTTL compatible.

The TC55V8128BJ/BFT is packaged in 32-pin plastic SOJ and TSOP(0.8mm pitch) with 400 mil width for high density surface assembly.

FEATURES

- Fast access time :

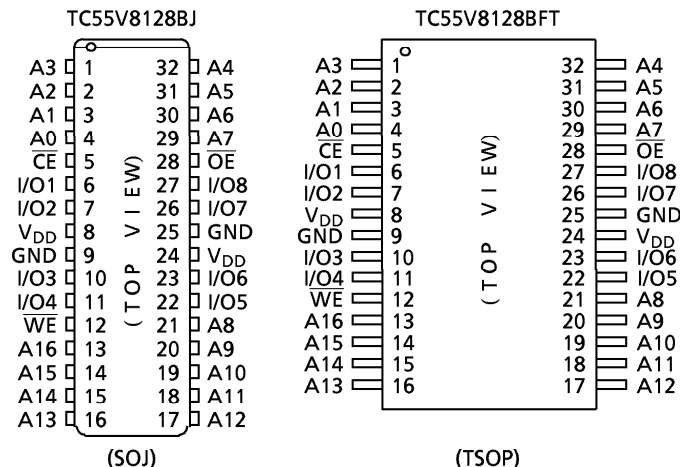
TC55V8128BJ/BFT-10	10ns (MAX)
TC55V8128BJ/BFT-12	12ns (MAX)
TC55V8128BJ/BFT-15	15ns (MAX)
- Low power dissipation

Cycle Time	10	12	15	20	ns
Operation (MAX)	200	160	140	120	mA

Standby : 2mA (MAX)
- 3.3V single power supply : $3.3V \pm 0.3V$
- Fully static operation
- All Inputs and Outputs : LVTTL compatible
- Output buffer control : $\overline{OE}$
- Package :

SOJ32-P-400-1.27A (BJ)	(Weight : 1.22gm Typ)
TSOP II 32-P-400-0.80C (BFT)	(Weight : 0.34gm Typ)

PIN CONNECTION



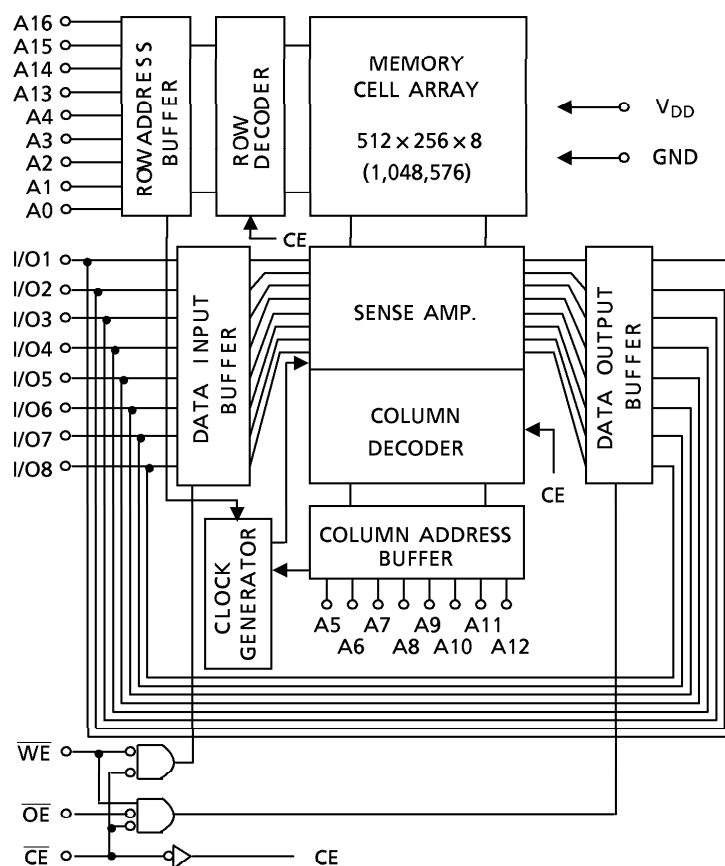
PIN NAMES

A0 to A16	Address Inputs
I/O1 to I/O8	Data Inputs / Outputs
$\overline{CE}$	Chip Enable Input
$\overline{WE}$	Write Enable Input
$\overline{OE}$	Output Enable Input
V _{DD}	Power (+ 3.3V)
GND	Ground

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BLOCK DIAGRAM



MAXIMUM RATINGS

SYMBOL	RATING	VALUE	UNIT
V_{DD}	Power Supply Voltage	-0.5 to 4.6	V
V_{IN}	Input Terminal Voltage	-0.5 * to 4.6	V
$V_{I/O}$	Input/Output Terminal Voltage	-0.5 * to $V_{DD} + 0.5^{**}$	V
P_D	Power Dissipation	0.85	W
T_{solder}	Soldering Temperature (10s)	260	°C
T_{strg}	Storage Temperature	-65 to 150	°C
T_{opr}	Operating Temperature	-10 to 85	°C

* : -1.5V with a pulse width of 20% · tRC min (4ns max)

** : $V_{DD} + 1.5V$ with a pulse width of 20% · tRC min (4ns max)

DC RECOMMENDED OPERATING CONDITIONS ($T_a = 0^\circ$ to 70°C)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT
V_{DD}	Power Supply Voltage	3.0	3.3	3.6	V
V_{IH}	Input High Voltage	2.0	–	$V_{DD} + 0.3^{**}$	V
V_{IL}	Input Low Voltage	-0.3^*	–	0.8	V

* : -1.0V with a pulse width of $20\% \cdot t_{RC}$ min (4ns max)** : $V_{DD} + 1.0\text{V}$ with a pulse width of $20\% \cdot t_{RC}$ min (4ns max)DC and OPERATING CHARACTERISTICS ($T_a = 0^\circ$ to 70°C , $V_{DD} = 3.3\text{V} \pm 0.3\text{V}$)

SYMBOL	PARAMETER	TEST CONDITION		MIN	TYP	MAX	UNIT
I _{IL}	Input Leakage Current (Except A8, $\overline{\text{OE}}$ pin)	V _{IN} = 0 to V _{DD}		– 1	–	1	μA
I _{LO}	Output Leakage Current	$\overline{\text{CE}}$ = V _{IH} or $\overline{\text{WE}}$ = V _{IL} or $\overline{\text{OE}}$ = V _{IH} V _{OUT} = 0 to V _{DD}		– 1	–	1	μA
I _I (A8, $\overline{\text{OE}}$)	Input Leakage Current	V _{IN} = 0 to V _{DD}		– 1	–	10	μA
V _{OH}	Output High Voltage	I _{OH} = – 2mA		2.4	–	–	V
		I _{OH} = – 100μA		V _{DD} – 0.2	–	–	
V _{OL}	Output Low Voltage	I _{OL} = 2mA		–	–	0.4	
		I _{OL} = 100μA		–	–	0.2	
I _{DDO}	Operating Current	$\overline{\text{CE}}$ = V _{IL} , I _{out} = 0mA Other Inputs = V _{IH} / V _{IL}	tcycle = 10ns	–	–	200	mA
			tcycle = 12ns	–	–	160	
			tcycle = 15ns	–	–	140	
			tcycle = 20ns	–	–	120	
I _{DDS 1}	Standby Current	$\overline{\text{CE}}$ = V _{IH} , Other Inputs = V _{IH} / V _{IL}		–	–	20	mA
I _{DDS 2}		$\overline{\text{CE}}$ = V _{DD} – 0.2V Other Inputs = V _{DD} – 0.2V or 0.2V		–	–	2	

CAPACITANCE ($T_a = 25^\circ\text{C}$, $f = 1.0\text{MHz}$)

SYMBOL	PARAMETER	TEST CONDITION	MAX	UNIT
C_{IN}	Input Capacitance	$V_{IN} = \text{GND}$	6	pF
$C_{I/O}$	Input/Output Capacitance	$V_{I/O} = \text{GND}$	8	pF

NOTE : This parameter is periodically sampled and is not 100% tested.

OPERATING MODE

MODE	$\overline{\text{CE}}$	$\overline{\text{OE}}$	$\overline{\text{WE}}$	I/O1 to I/O8	POWER
Read	L	L	H	Output	I_{DDO}
Write	L	X	L	Input	I_{DDO}
Outputs Disable	L	H	H	High Impedance	I_{DDO}
Standby	H	X	X	High Impedance	I_{DDS}

X : H or L

AC CHARACTERISTICS ($T_a = 0^\circ$ to 70°C ⁽¹⁾, $V_{DD} = 3.3\text{V} \pm 0.3\text{V}$)**READ CYCLE**

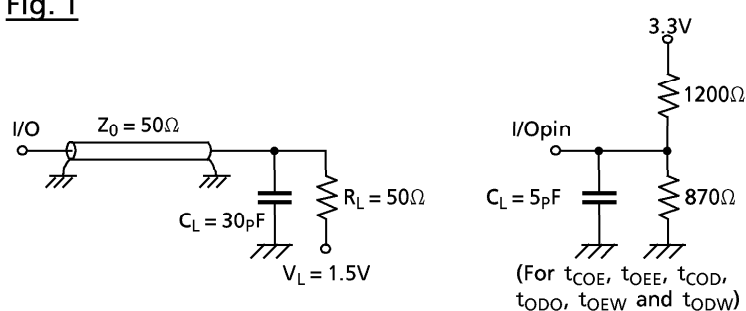
SYMBOL	PARAMETER	TC55V8128BJ/BFT-10		TC55V8128BJ/BFT-12		TC55V8128BJ/BFT-15		UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	
t_{RC}	Read Cycle Time	10	–	12	–	15	–	ns
t_{ACC}	Address Access Time	–	10	–	12	–	15	
t_{CO}	$\overline{CE}$ Access Time	–	10	–	12	–	15	
t_{OE}	$\overline{OE}$ Access Time	–	5	–	6	–	8	
t_{OH}	Output Data Hold Time from Address Change	3	–	3	–	3	–	
t_{COE}	Output Enable Time from $\overline{CE}$	3	–	3	–	3	–	
t_{OEE}	Output Enable Time from $\overline{OE}$	1	–	1	–	1	–	
t_{COD}	Output Disable Time from $\overline{CE}$	–	6	–	7	–	8	
t_{ODO}	Output Disable Time from $\overline{OE}$	–	6	–	7	–	8	

WRITE CYCLE

SYMBOL	PARAMETER	TC55V8128BJ/BFT-10		TC55V8128BJ/BFT-12		TC55V8128BJ/BFT-15		UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	
t_{WC}	Write Cycle Time	10	–	12	–	15	–	ns
t_{WP}	Write Pulse Width	7	–	8	–	9	–	
t_{CW}	Chip Enable to End of Write	8	–	8	–	12	–	
t_{AW}	Address Valid to End of Write	8	–	8	–	11	–	
t_{AS}	Address Set Up Time	0	–	0	–	0	–	
t_{WR}	Write Recovery Time	0	–	0	–	0	–	
t_{DS}	Data Set Up Time	6	–	7	–	8	–	
t_{DH}	Data Hold Time	0	–	0	–	0	–	
$t_{OE\overline{W}}$	Output Enable Time from $\overline{WE}$	1	–	1	–	1	–	
$t_{OD\overline{W}}$	Output Disable Time from $\overline{WE}$	–	6	–	7	–	8	

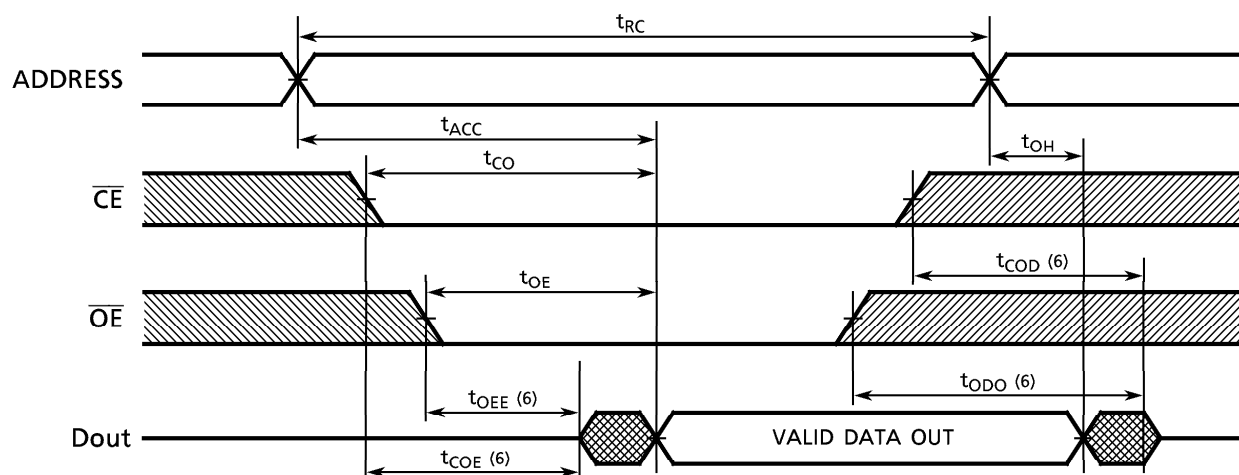
AC TEST CONDITIONS

Input Pulse Level	3.0V/0.0V
Input Pulse Rise and Fall Time	2ns
Input Timing Measurement Reference Level	1.5V
Output Timing Measurement Reference Level	1.5V
Output Load	Fig. 1

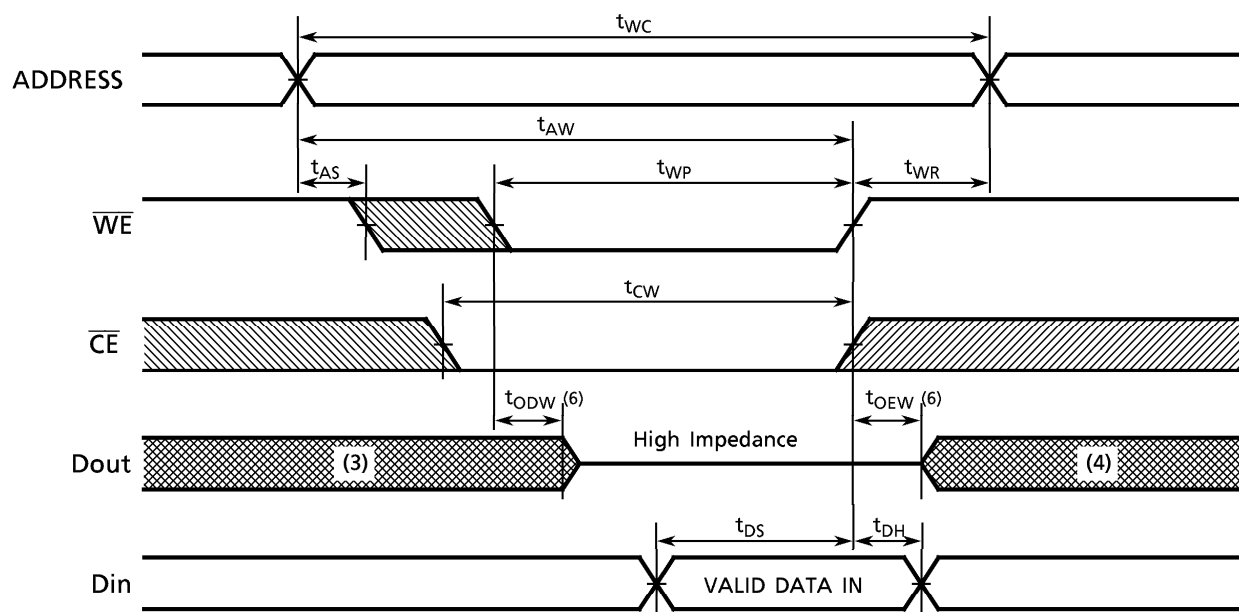
Fig. 1

TIMING WAVEFORMS

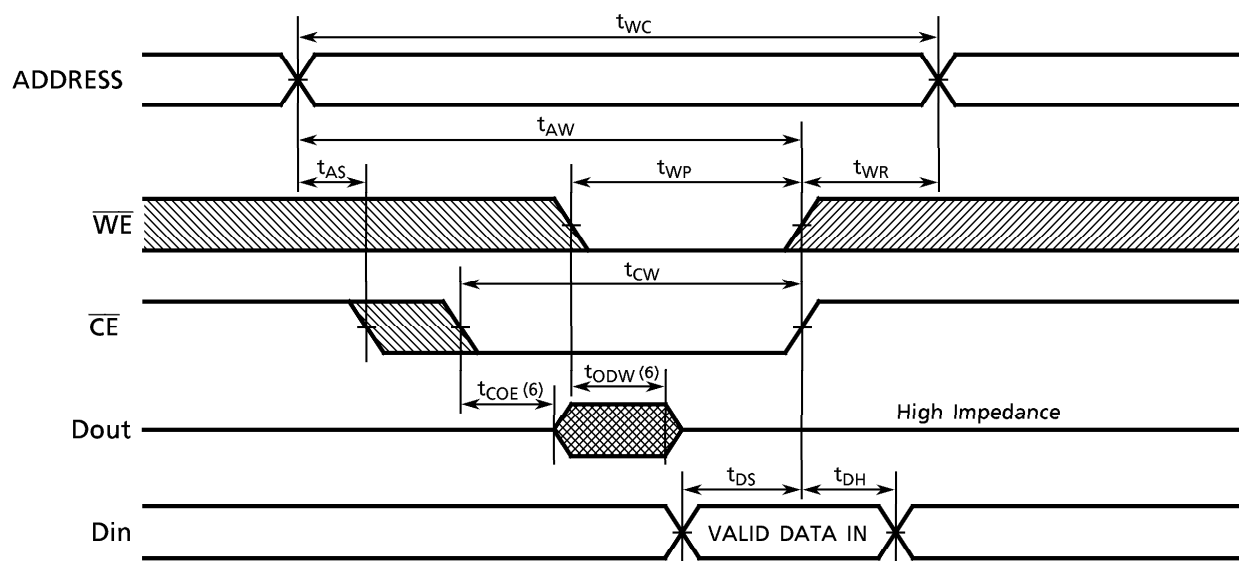
READ CYCLE (2)



WRITE CYCLE 1 (5) ($\overline{WE}$ Controlled)



WRITE CYCLE 2 (5) ($\overline{\text{CE}}$ Controlled)

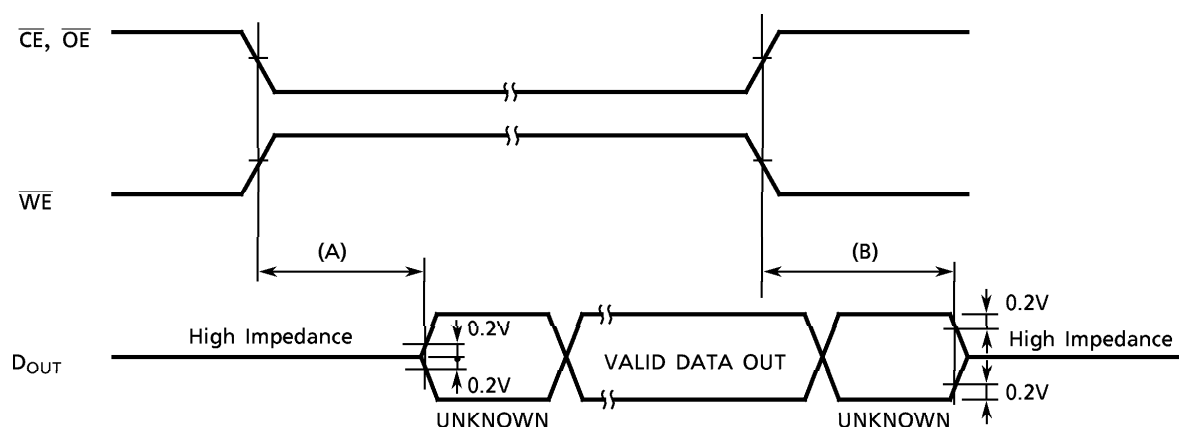


NOTE :

1. The operating temperature (T_a) is guaranteed with transverse air flow exceeding 400 linear feet per minute.
2. $\overline{WE}$ is High for Read Cycle.
3. Assuming that $\overline{CE}$ Low transition occurs coincident with or after $\overline{WE}$ Low transition, Outputs remain in a high impedance state.
4. Assuming that $\overline{CE}$ High transition occurs coincident with or prior $\overline{WE}$ High transition, Outputs remain in a high impedance state.
5. Assuming that $\overline{OE}$ is High for Write Cycle, Outputs are in a high impedance state during this period.
6. These parameters are specified as follows and measured by using the load shown in Fig. 1.

(A) $t_{COE}, t_{OEE}, t_{OE\overline{W}}$ Output Enable Time

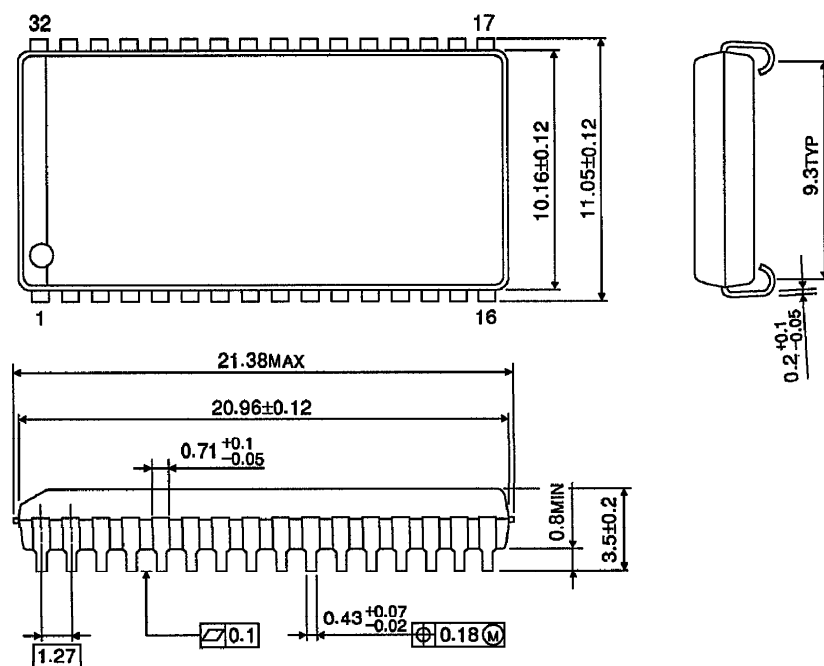
(B) $t_{COD}, t_{ODO}, t_{OD\overline{W}}$ Output Disable Time



PACKAGE DIMENSIONS

Plastic SOJ (SOJ32-P-400-1.27A)

Unit in mm

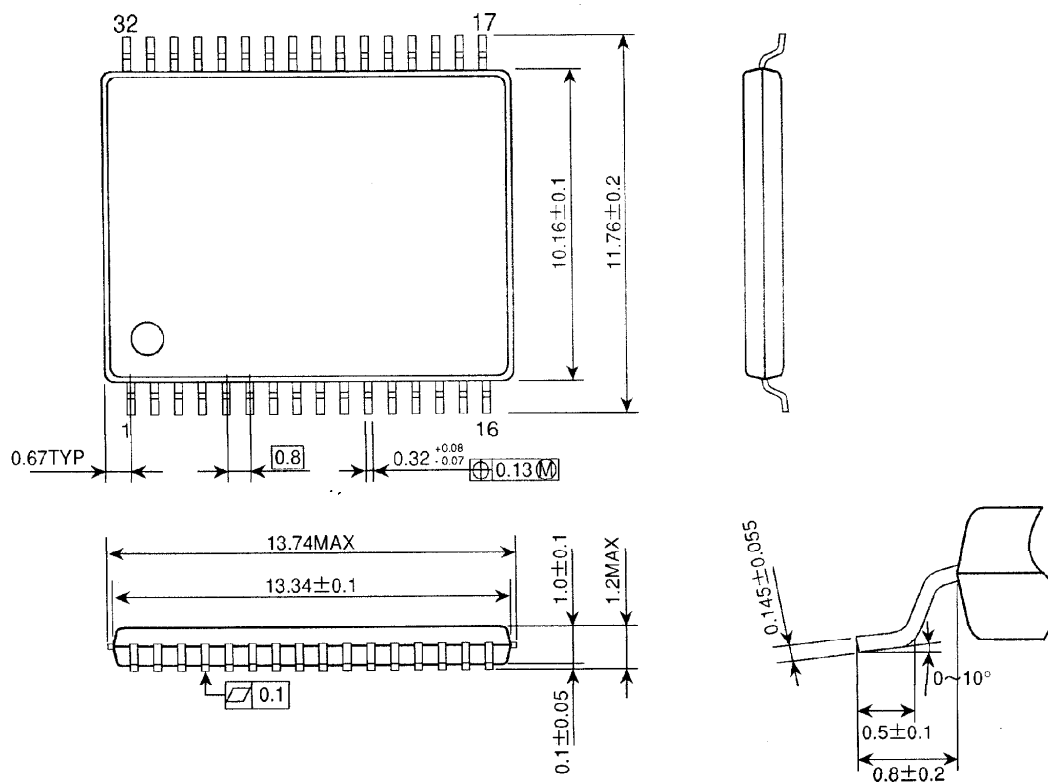


Weight : 1.22g (Typ)

PACKAGE DIMENSIONS

Plastic TSOP (TSOPII 32-P-400-0.80C)

Units in mm



Weight: 0.34 g (typ)