

HB56C19 Series

1,048,576-Word x 9-Bit High Density Dynamic RAM Module

DESCRIPTION

The HB56C19 is a 1M x 9 static column mode dynamic RAM module, mounted nine 1-Mbit DRAM (HM511002JP) sealed in SOJ package. An outline of the HB56C19 is 30-pin single in-line package having Lead types (HB56C19A, HB56C19AT), socket type (HB56C19B). Therefore, the HB56C19 makes high density mounting possible without surface mount technology. The HB56C19 provides common data inputs and outputs and also provides separate I/O on parity bit for parity check. Its module board has decoupling capacitors beneath each SOJ.

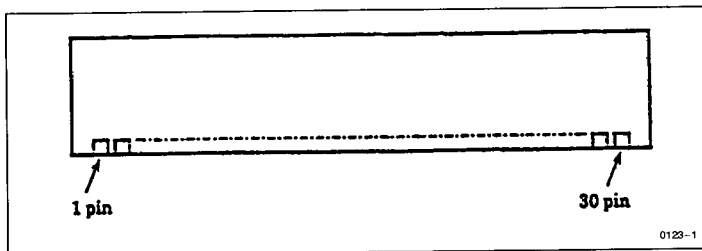
FEATURES

- 30-pin Single In-line Package
Lead Pitch2.54mm
- Single 5V ($\pm 10\%$) Supply
- High Speed
Access Time80 ns/100 ns/120 ns (max)
- Low Power Dissipation
Active Mode3465 mW/2970 mW/2475 mW (max)
Standby Mode99 mW (max)
- Static Column Mode Capability
- 512 Refresh Cycle(8 ms)
- 2 Variations of Refresh
RAS Only Refresh
CAS Before RAS Refresh
- TTL Compatible

ORDERING INFORMATION

Access Time	Package		
	30-pin SIP Lead Type	30-pin SIP Low Profile Lead Type	30-pin SIMM Socket Type
80 ns	HB56C19A-8A	HB56C19AT-8A	HB56C19B-8A
100 ns	HB56C19A-10A	HB56C19AT-10A	HB56C19B-10A
120 ns	HB56C19A-12A	HB56C19AT-12A	HB56C19B-12A

PIN OUT



PIN DESCRIPTION

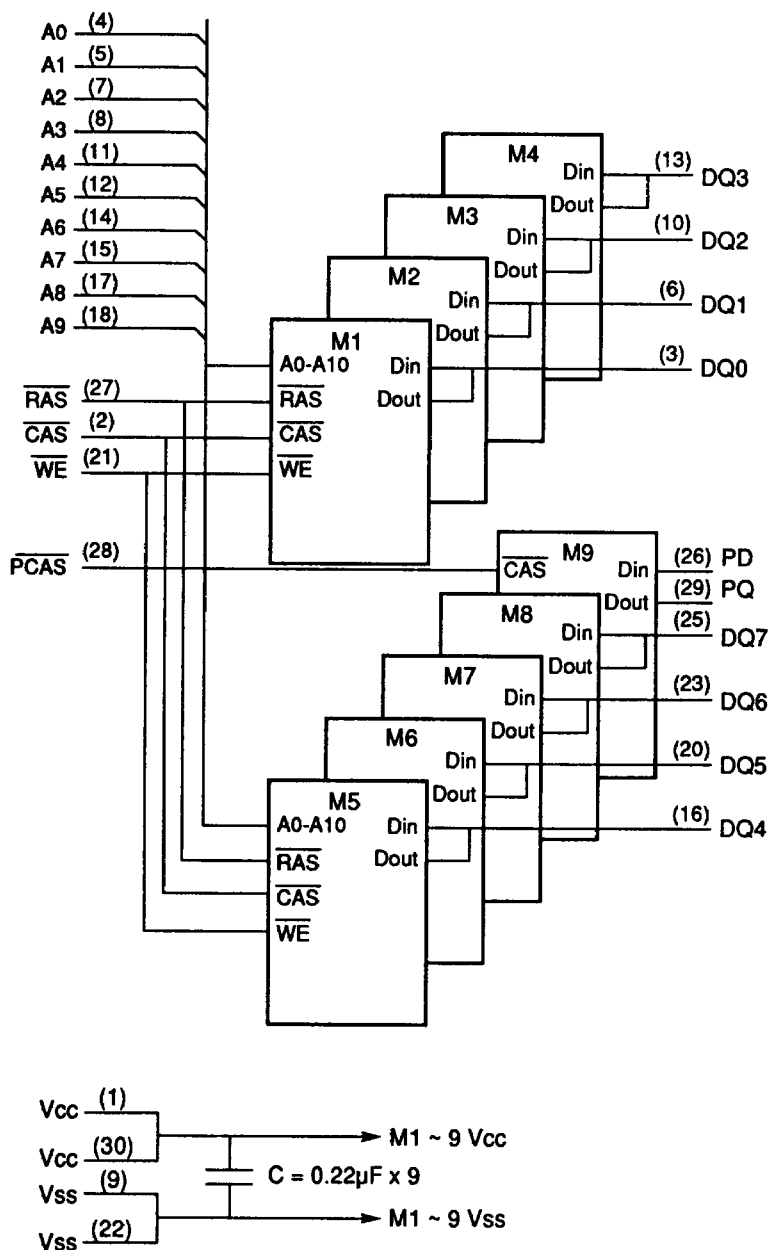
Pin No.	Pin Name	Pin No.	Pin Name
1	V _{CC}	16	DQ ₄
2	$\overline{CS}$	17	A ₈
3	DQ ₀	18	A ₉
4	A ₀	19	NC
5	A ₁	20	DQ ₅
6	DQ ₁	21	$\overline{WE}$
7	A ₂	22	V _{SS}
8	A ₃	23	DQ ₆
9	V _{SS}	24	NC
10	DQ ₂	25	DQ ₇
11	A ₄	26	PQ
12	A ₅	27	RAS
13	DQ ₃	28	$\overline{PCS}$
14	A ₆	29	PD
15	A ₇	30	V _{CC}

PIN DESCRIPTION

Pin Name	Function
A ₀ -A ₉	Address Input
A ₀ -A ₈	Refresh Address Input
$\overline{RAS}$	Row Address Strobe
$\overline{CS}$	Chip Select
$\overline{PCS}$	Parity Chip Select
$\overline{WE}$	Read/Write Enable
DQ ₀ -DQ ₇	Data-in/Data-out
PD	Parity Data-in
PQ	Parity Data-out
V _{CC}	Power Supply (+ 5V)
V _{SS}	Ground
NC	Non-Connection



■ BLOCK DIAGRAM



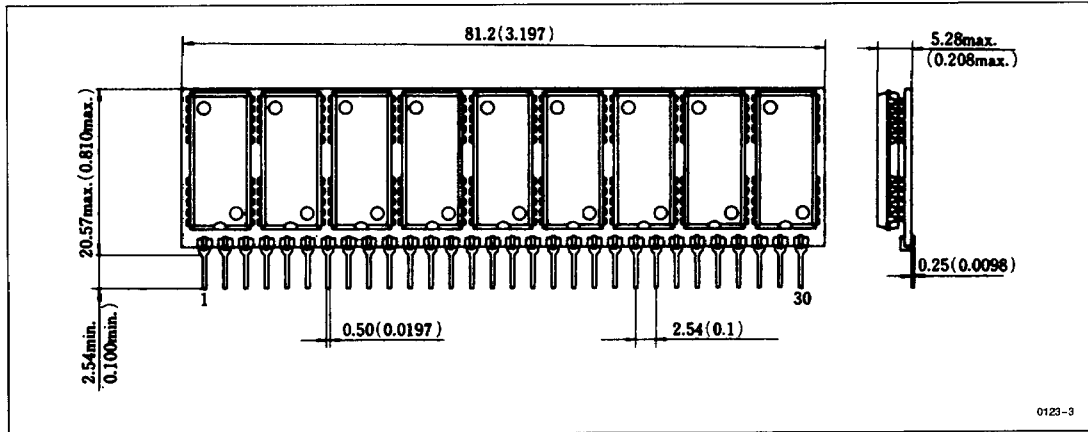
0123-2



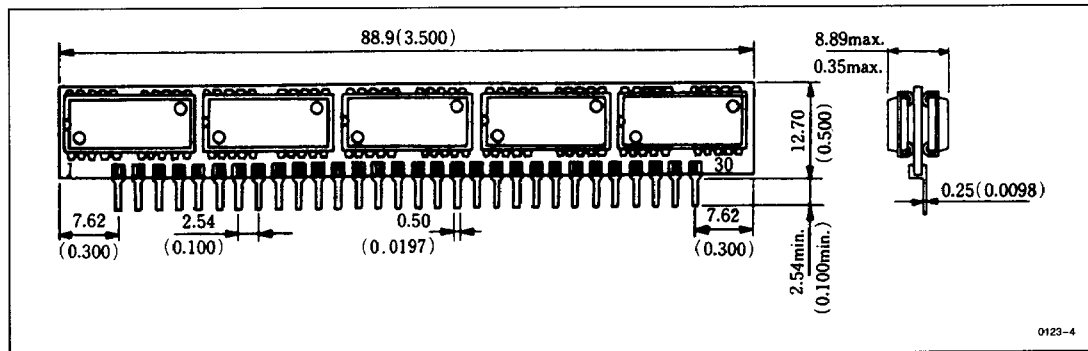
■ PHYSICAL OUTLINE

Unit: $\frac{\text{mm}}{(\text{inch})}$

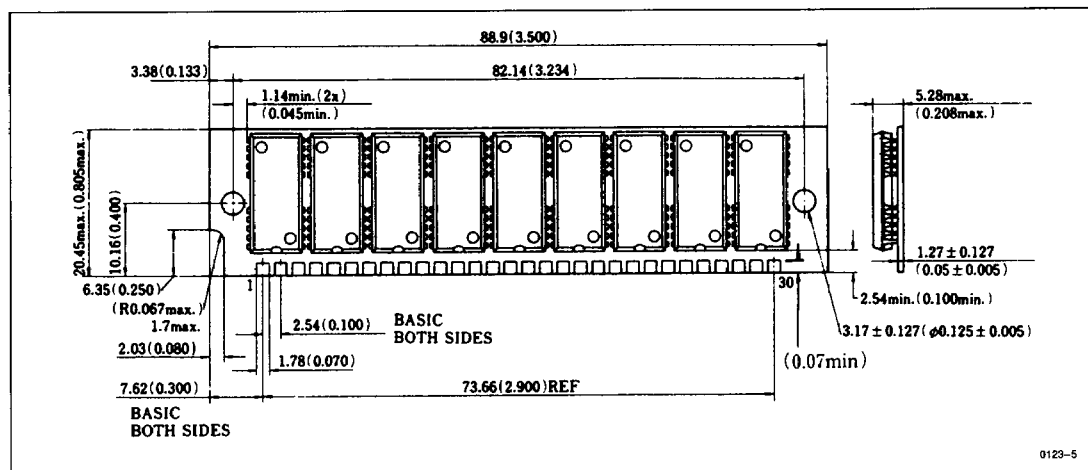
• HB56C19A Series



• HB56C19AT Series



• HB56C19B Series



Note: 1. The plating of the contact finger is solder coat.



■ ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Voltage on Any Pin Relative to V_{SS}	V_T	-1.0 to +7.0	V
Supply Voltage Relative to V_{SS}	V_{CC}	-1.0 to +7.0	V
Short Circuit Output Current	I_{out}	50	mA
Power Dissipation	P_T	9.0	W
Operating Temperature	T_{opr}	0 to +70	°C
Storage Temperature	T_{stg}	-55 to +125	°C

■ ELECTRICAL CHARACTERISTICS

• Recommended DC Operating Conditions ($T_A = 0$ to +70°C)

Parameter	Symbol	Min	Typ	Max	Unit	Note
Supply Voltage	V_{SS}	0	0	0	V	
	V_{CC}	4.5	5.0	5.5	V	1
Input High Voltage	V_{IH}	2.4	—	5.5	V	1
Input Low Voltage	V_{IL}	-1.0	—	0.8	V	1

Note: 1. All voltage referenced to V_{SS} .• DC Electrical Characteristics ($T_A = 0$ to +70°C, $V_{CC} = 5V \pm 10\%$, $V_{SS} = 0V$)

Parameter	Symbol	HB56C19A/AT/B						Unit	Test Conditions	Note
		-8A		-10A		-12A				
		Min	Max	Min	Max	Min	Max			
Operating Current	I _{CC1}	—	630	—	540	—	450	mA	t _{RC} = Min	1, 2
Standby Current	I _{CC2}	—	18	—	18	—	18	mA	TTL Interface RAS, CAS = V _{IH} , D _{out} = High-Z	
		—	9	—	9	—	9	mA	CMOS Interface RAS, CAS ≥ V _{CC} - 0.2V, D _{out} = High-Z	
RAS Only Refresh Current	I _{CC3}	—	540	—	450	—	405	mA	t _{RC} = Min	2
Standby Current	I _{CC5}	—	45	—	45	—	45	mA	RAS = V _{IH} , CS = V _{IL} , D _{out} = Enable	1
CAS Before RAS Refresh Current	I _{CC6}	—	540	—	450	—	360	mA	t _{RC} = Min	
Static Column Mode Current	I _{CC9}	—	540	—	450	—	360	mA	Static Column Mode t _{PC} = Min	1, 3
Input Leakage Current	I _{LI}	-10	10	-10	10	-10	10	μA	0V ≤ V _{in} ≤ 7V	
Output Leakage Current	I _{LO}	-10	10	-10	10	-10	10	μA	0V ≤ V _{out} ≤ 7V, D _{out} = Disable	
Output High Voltage	V _{OH}	2.4	V _{CC}	2.4	V _{CC}	2.4	V _{CC}	V	I _{out} = -5 mA	
Output Low Voltage	V _{OL}	0	0.4	0	0.4	0	0.4	V	I _{out} = 4.2 mA	

Notes: 1. I_{CC} depends on output load condition when the device is selected, I_{CC} max is specified at the output open condition.2. Address can be changed less than three times while $\overline{RAS} = V_{IL}$.3. Address can be changed once or less while $\overline{CS} = V_{IH}$.

• **Capacitance** ($T_A = 25^\circ\text{C}$, $V_{CC} = 5\text{V} \pm 10\%$)

Parameter	Symbol	Typ	Max	Unit	Note
Input Capacitance (Address)	C_{I1}	—	60	pF	1
Input Capacitance (Clock)	C_{I2}	—	75	pF	1, 2
Input/Output Capacitance (DQ_0 – DQ_7)	$C_{I/O}$	—	17	pF	1, 2
Input Capacitance (PD)	C_{I3}	—	10	pF	1
Output Capacitance (PQ)	C_O	—	12	pF	1, 2

Notes: 1. Capacitance measured with Boonton Meter or effective capacitance measuring method.

2. $\overline{CS} = V_{IH}$ to disable D_{out} .

• **AC Characteristics**

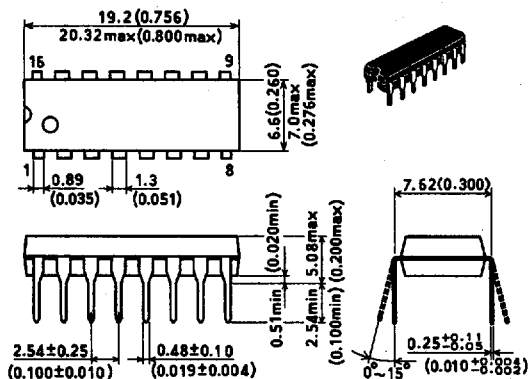
Please show at HM511002A series about AC Characteristics. But don't use by Delayed Write Cycle, because the HB56C19 provides common data inputs and outputs. Please use by Early Write Cycle. ($t_{WCS} \geq t_{WCS}(\text{min})$).

T-90-20

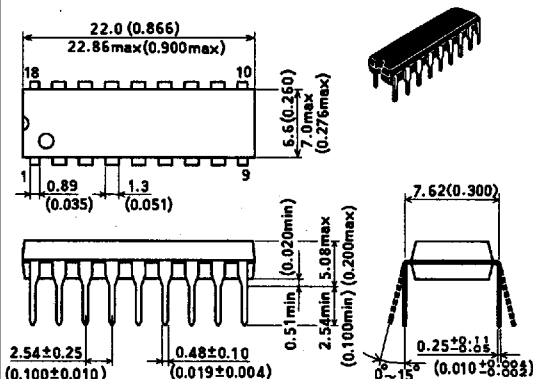
Unit: mm (inch) Scale 3/2

• Dual-in-line Plastic

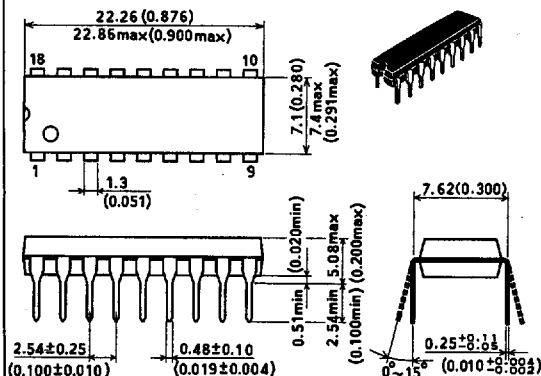
• DP-16B



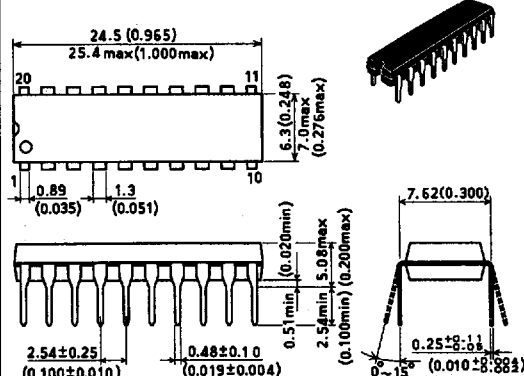
• DP-18B



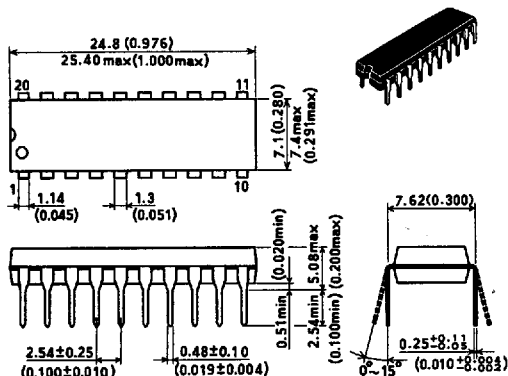
• DP-18C



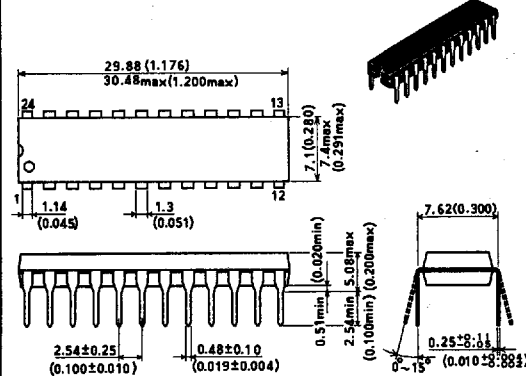
• DP-20N



• DP-20NA



• DP-20NC

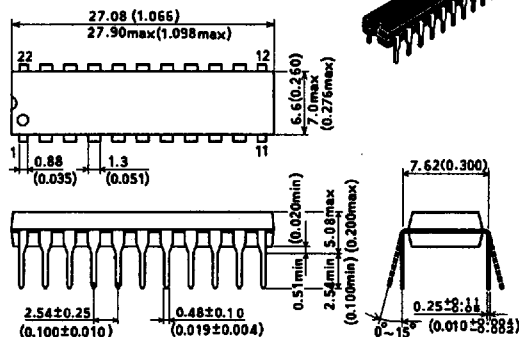


• Dual-In-line Plastic

HITACHI/ LOGIC/ARRAYS/MEM

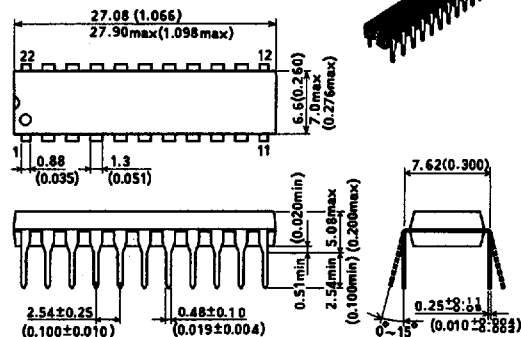
Unit: mm (inch) Scale 3/2

• DP-22N

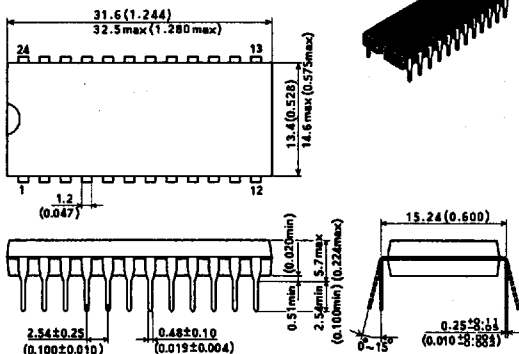


• DP-22NB

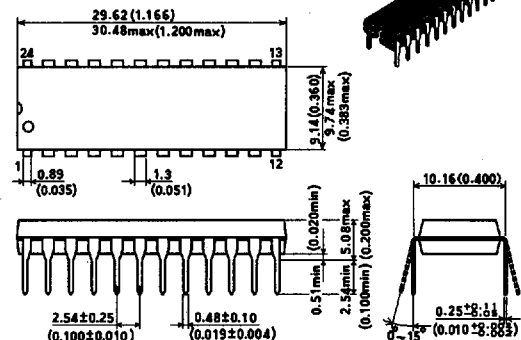
T-90-20



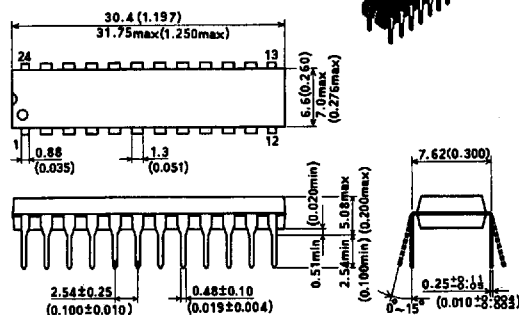
• DP-24



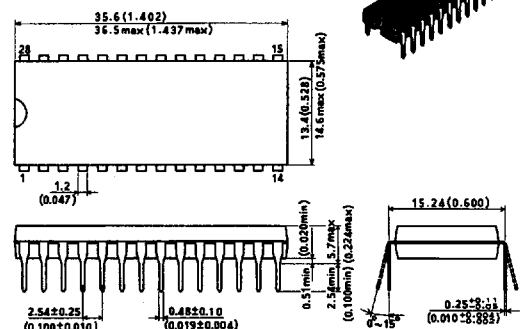
• DP-24A



• DP-24N



• DP-28

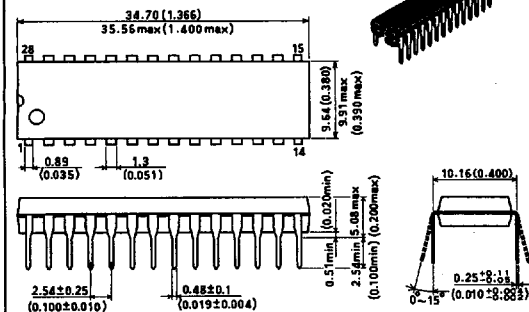


• Dual-in-line Plastic

HITACHI/ LOGIC/ARRAYS/MEM

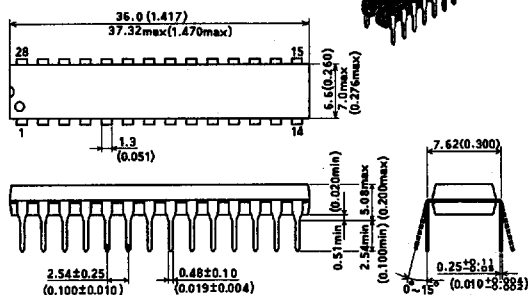
Unit: mm (inch) Scale 3/2

• DP-28C

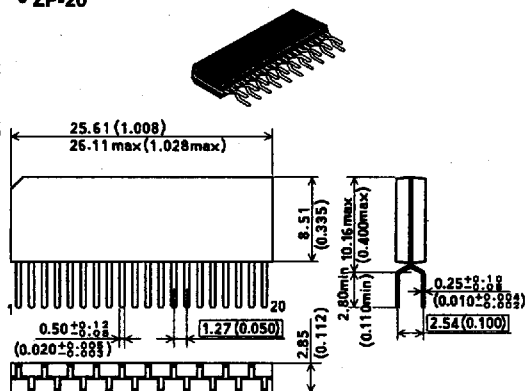


• DP-28N

T-90-20

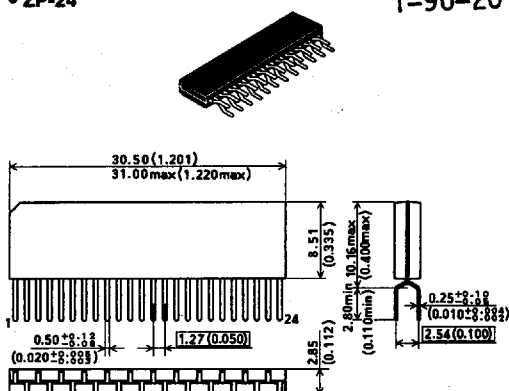


• ZP-20

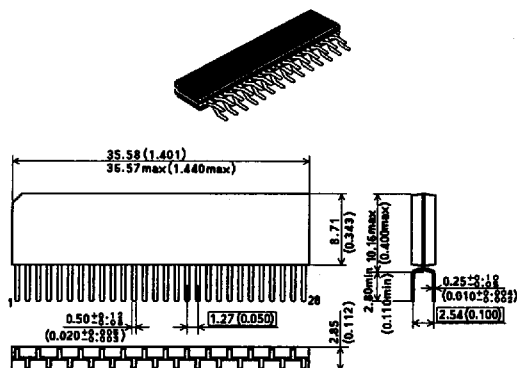


• ZP-24

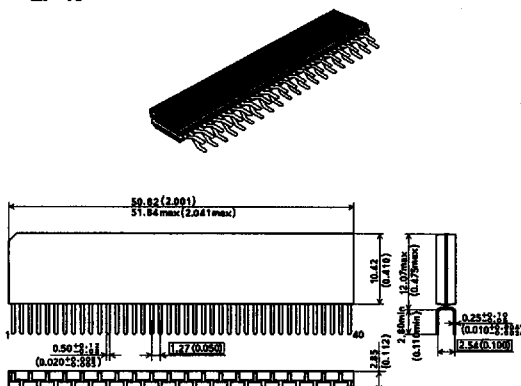
T-90-20



• ZP-28



• ZP-40



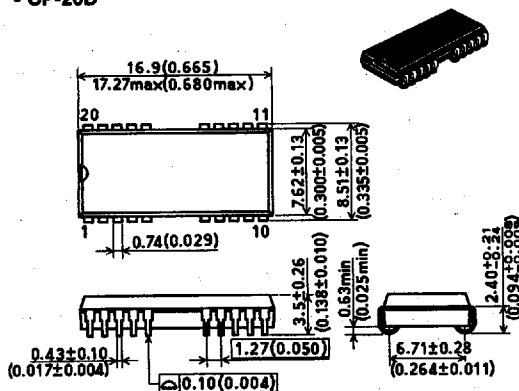
• Flat Package (J-bend Leads)

HITACHI/ LOGIC/ARRAYS/MEM

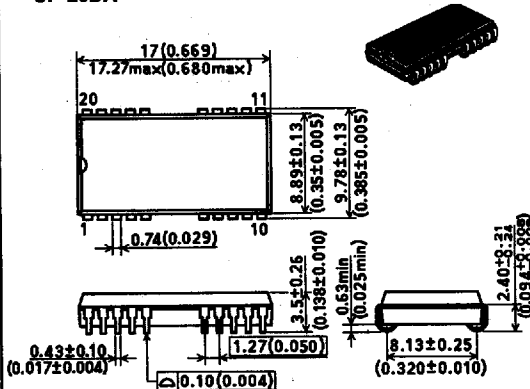
Unit: mm (inch) Scale 3/2

T-90-20

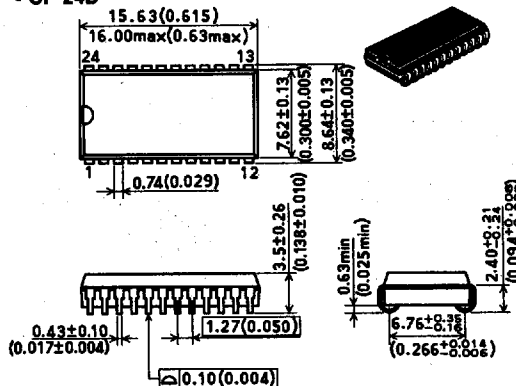
• CP-20D



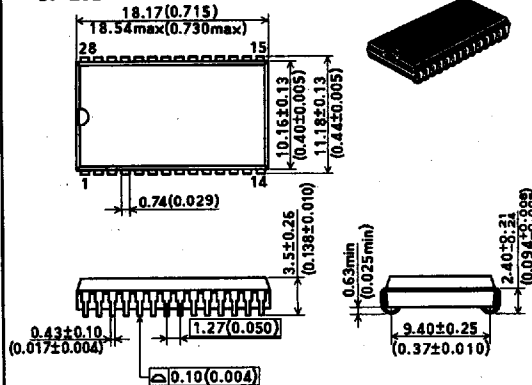
• CP-20DA



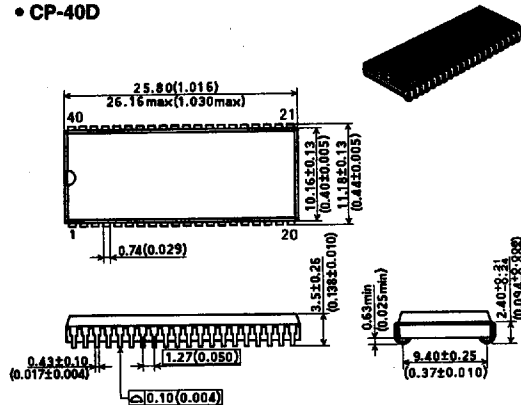
• CP-24D



• CP-28D



• CP-40D

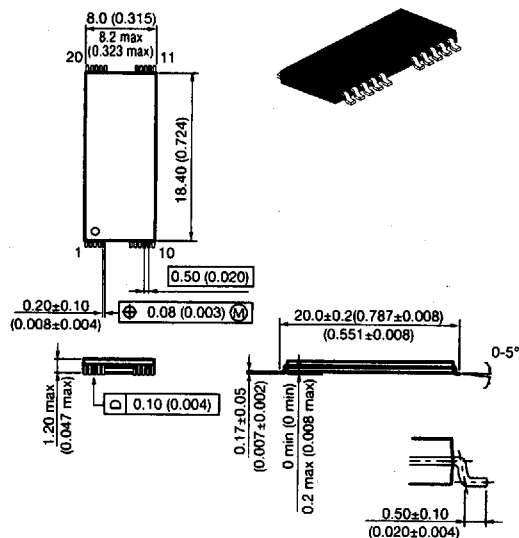


• TSOP (Thin Small Outline Package)

HITACHI/ LOGIC/ARRAYS/MEM

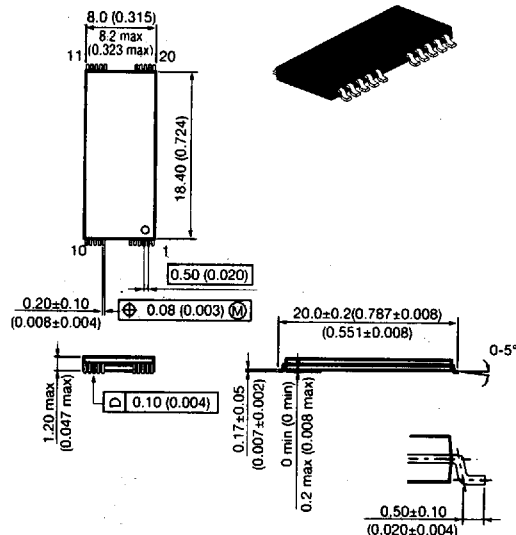
Unit: mm (inch) Scale 3/2

• TFP-20DA

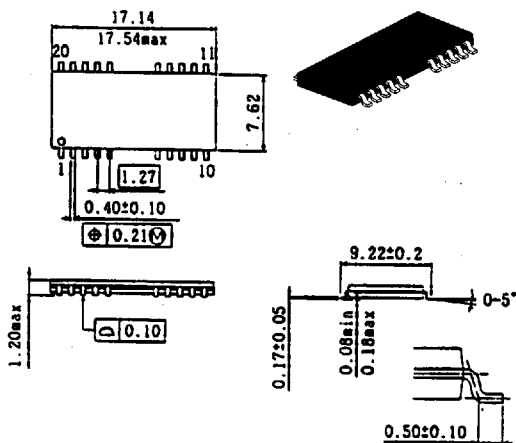


• TFP-20DAR

T-90-20



• TTP-20D



• TTP-20DR

