

HB56A19 Series

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

DESCRIPTION

The HB56A19 is a 1M x 9 dynamic RAM module, mounted nine 1-Mbit DRAM (HM511000JP) sealed in SOJ package. An outline of the HB56A19 is 30-pin single in-line package having Lead types (HB56A19A, HB56A19AT), Socket type (HB56A19B). Therefore, the HB56A19 makes high density mounting possible without surface mount technology. The HB56A19 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.

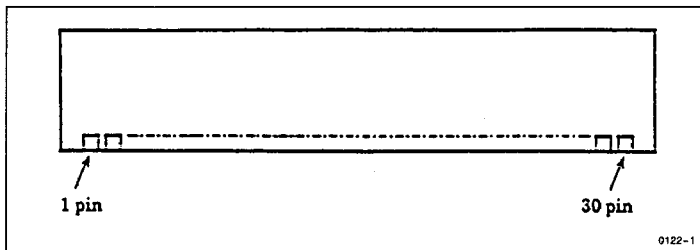
FEATURES

- 30-pin Single In-line Package
 - Lead Pitch 2.54mm
- Single 5V ($\pm 10\%$) Supply
- High Speed
 - Access Time 60 ns/70 ns/80 ns/100 ns/120 ns (max)
- Low Power Dissipation
 - Active Mode 4455 mW/3960 mW/3465 mW/2970 mW/2475 mW (max)
 - Standby Mode 99 mW (max)
- Fast Page 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
60 ns	HB56A19A-6H	HB56A19AT-6H	HB56A19B-6H
70 ns	HB56A19A-7H	HB56A19AT-7H	HB56A19B-7H
80 ns	HB56A19A-8A	HB56A19AT-8A	HB56A19B-8A
100 ns	HB56A19A-10A	HB56A19AT-10A	HB56A19B-10A
120 ns	HB56A19A-12A	HB56A19AT-12A	HB56A19B-12A

PIN OUT



Pin No.	Pin Name	Pin No.	Pin Name
1	V _{CC}	16	DQ ₄
2	CAS	17	A ₈
3	DQ ₀	18	A ₉
4	A ₀	19	NC
5	A ₁	20	DQ ₅
6	DQ ₁	21	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	PCAS
14	A ₆	29	PD
15	A ₇	30	V _{CC}

PIN DESCRIPTION

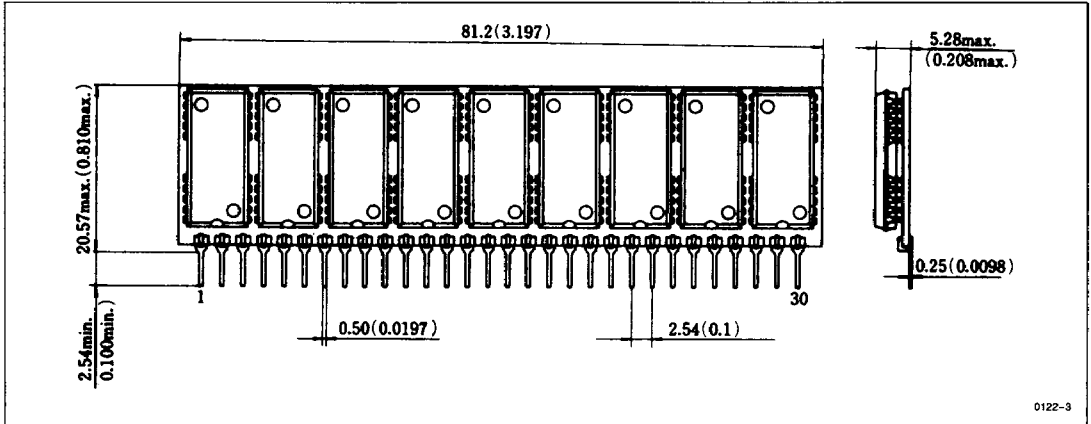
Pin Name	Function
A ₀ –A ₉	Address Input
A ₀ –A ₈	Refresh Address Input
RAS	Row Address Strobe
CAS, PCAS	Column Address Strobe
WE	Read/Write Enable
DQ ₀ –DQ ₇	Data-in/Data-out
PD	Parity Data-in
PQ	Parity Data-out
V _{CC}	Power Supply (+ 5V)
V _{SS}	Ground
NC	Non-Connection



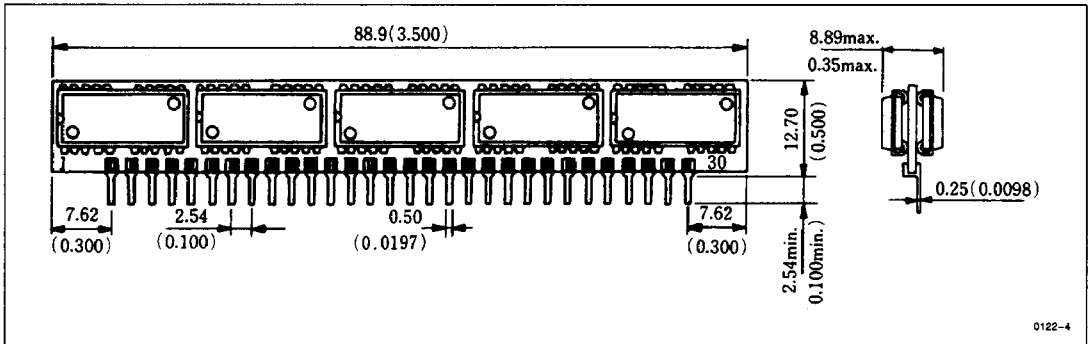


■ PHYSICAL OUTLINE

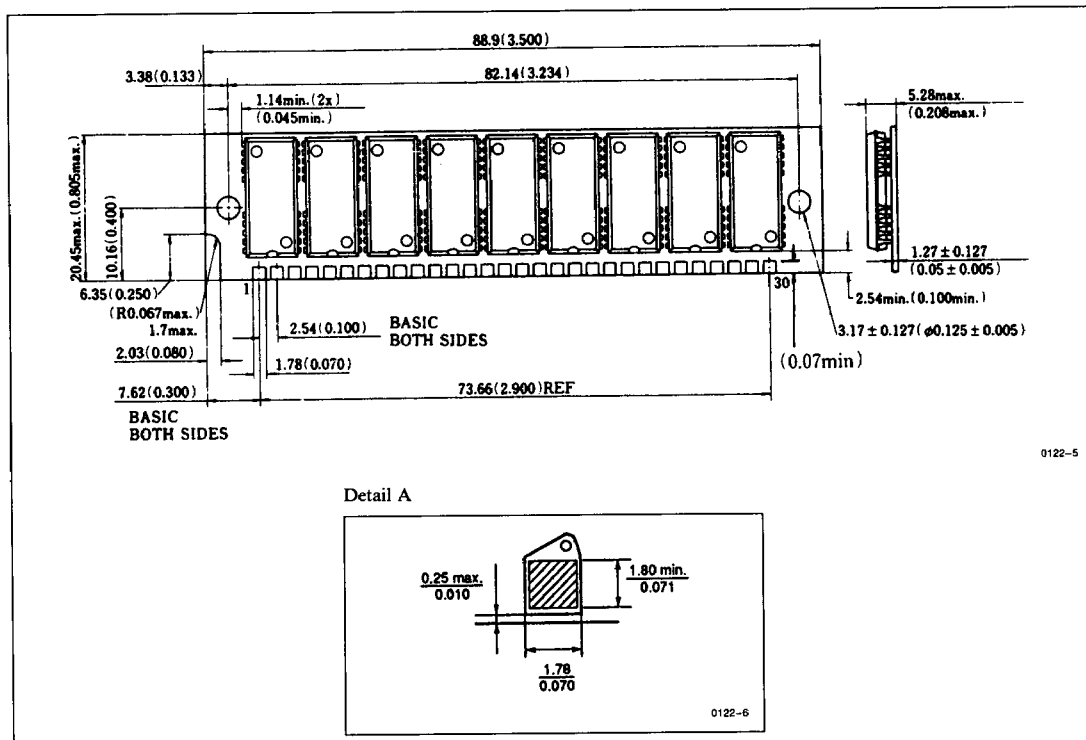
• HB56A19A Series



• HB56A19AT Series



• HB56A19B Series



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

■ ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Voltage on Any Pin Relative to V_{SS}	Input	-1.0 to $+7.0$	V
	Output	-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	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 $+70^\circ\text{C}$)

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 $+70^\circ\text{C}$, $V_{CC} = 5V \pm 10\%$, $V_{SS} = 0V$)

Parameter	Symbol	HB56A19A/AT/B										Unit	Test Conditions	Note
		-6H		-7H		-8A		-10A		-12A				
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max			
Operating Current	I _{CC1}	—	810	—	720	—	630	—	540	—	450	mA	t _{RC} = Min	1, 2
Standby Current	I _{CC2}	—	18	—	18	—	18	—	18	—	18	mA	TTL Interface RAS, CAS = V _{IH} , D _{out} = High-Z	
		—	9	—	9	—	9	—	9	—	9	mA	CMOS Interface, RAS, CAS ≥ V _{CC} - 0.2V, D _{out} = High-Z	
RAS Only Refresh Current	I _{CC3}	—	810	—	720	—	540	—	450	—	405	mA	t _{RC} = Min	2
Standby Current	I _{CC5}	—	45	—	45	—	45	—	45	—	45	mA	RAS = V _{IH} , CAS = V _{IL} , D _{out} = Enable	1
CAS Before RAS Refresh Current	I _{CC6}	—	810	—	720	—	540	—	360	—	320	mA	t _{RC} = Min	
Fast Page Mode Current	I _{CC7}	—	810	—	720	—	450	—	450	—	360	mA	t _{PC} = Min	1, 3
Input Leakage Current	I _{LI}	− 10	10	− 10	10	− 10	10	− 10	10	—	10	μA	0V ≤ V _{in} ≤ 7V	
Output Leakage Current	I _{LO}	− 10	10	− 10	10	− 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}	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	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 $\overline{CAS} = V_{IH}$.

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

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

Notes: 1. Capacitance measured with Boonton Meter or effective capacitance measuring method.
 2. $\overline{CAS} = V_{IH}$ to disable D_{out} .

• **AC Characteristics**

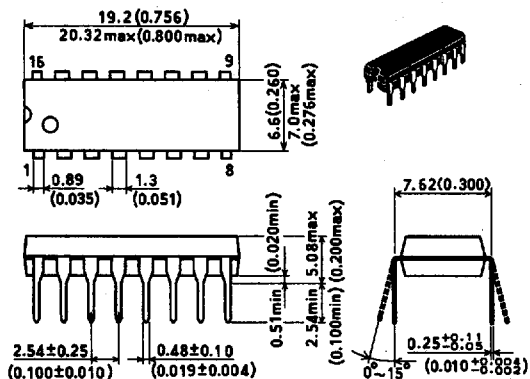
Please show at HM511000H series or HM511000A series about AC Characteristics. But don't use by Delayed Write Cycle, because the HB56A19 provides common data inputs and outputs. Please use by Early Write Cycle. ($t_{WCS} \geq t_{WCS}(\text{min})$).

T-90-20

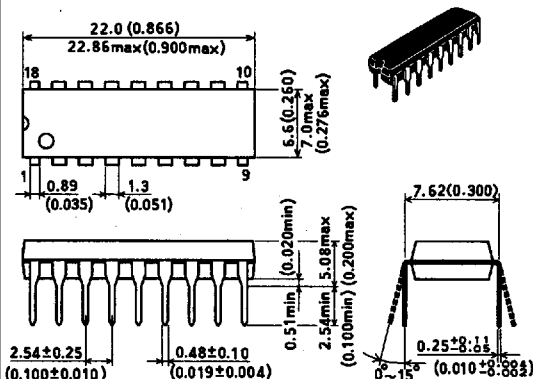
Unit: mm (inch) Scale 3/2

• Dual-in-line Plastic

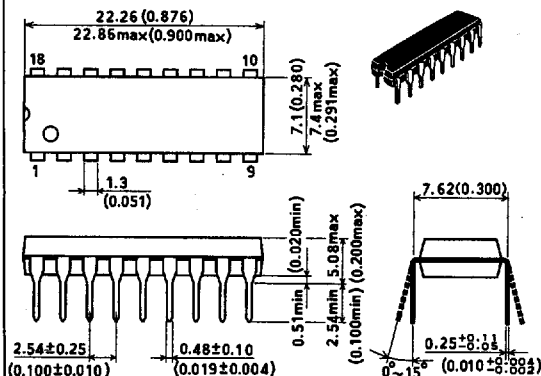
• DP-16B



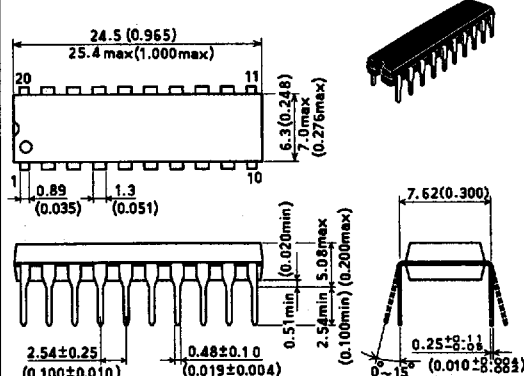
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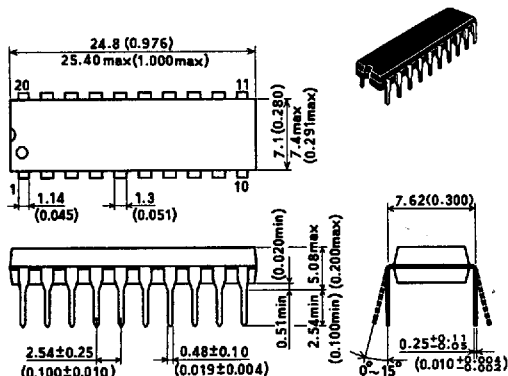
• DP-18C



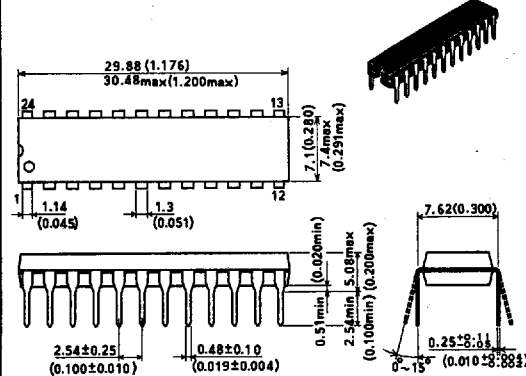
• DP-20N



• DP-20NA



• DP-20NC

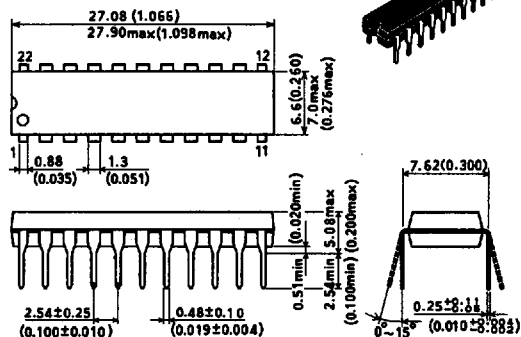


• Dual-In-line Plastic

HITACHI/ LOGIC/ARRAYS/MEM

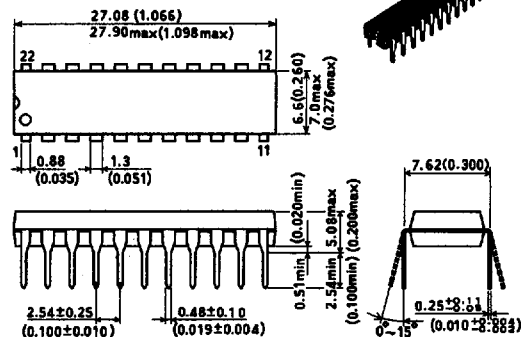
Unit: mm (inch) Scale 3/2

• DP-22N

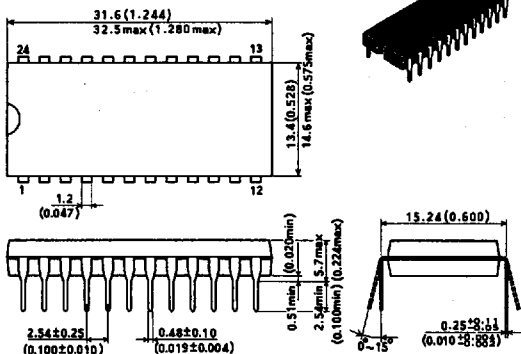


• DP-22NB

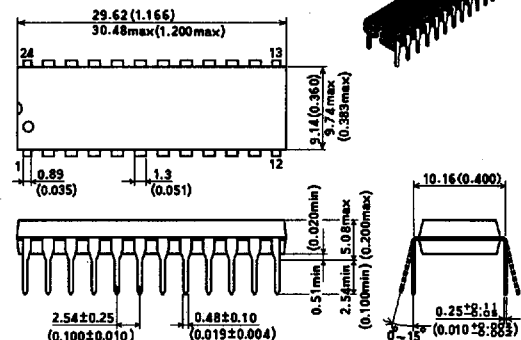
T-90-20



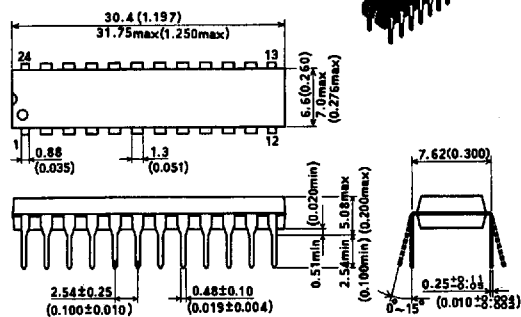
• DP-24



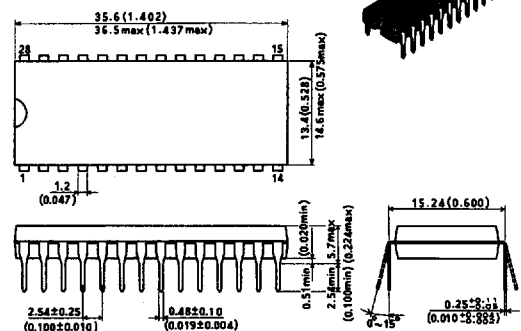
• DP-24A



• DP-24N



• DP-28

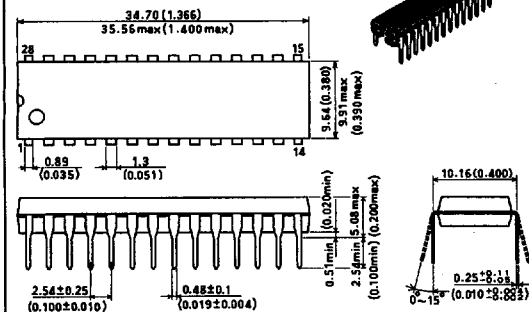


• Dual-in-line Plastic

HITACHI/ LOGIC/ARRAYS/MEM

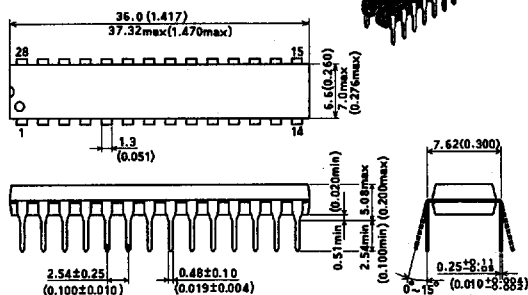
Unit: mm (inch) Scale 3/2

• DP-28C

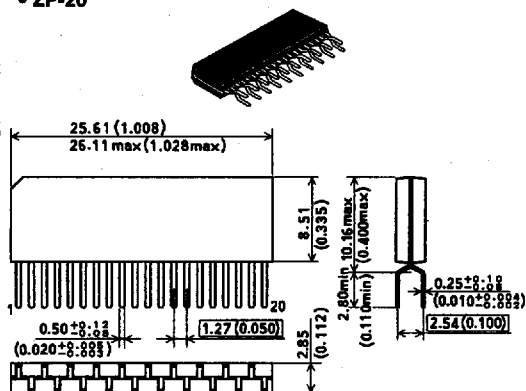


• DP-28N

T-90-20

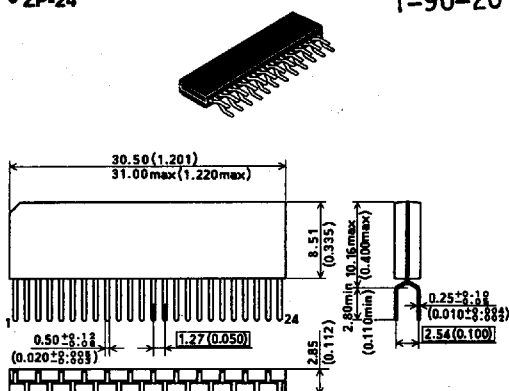


• ZP-20

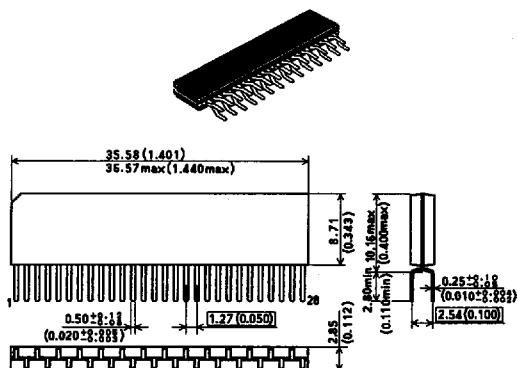


• ZP-24

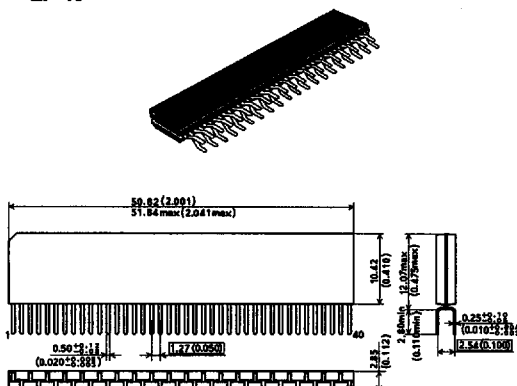
T-90-20



• ZP-28



• ZP-40



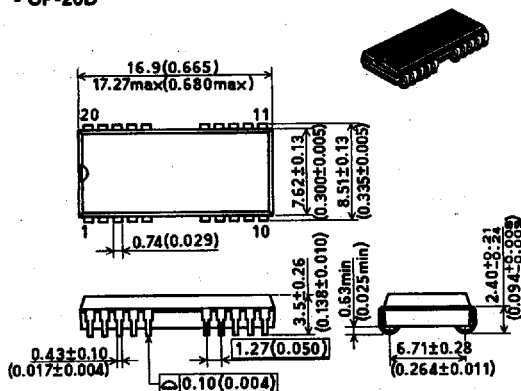
• Flat Package (J-bend Leads)

HITACHI/ LOGIC/ARRAYS/MEM

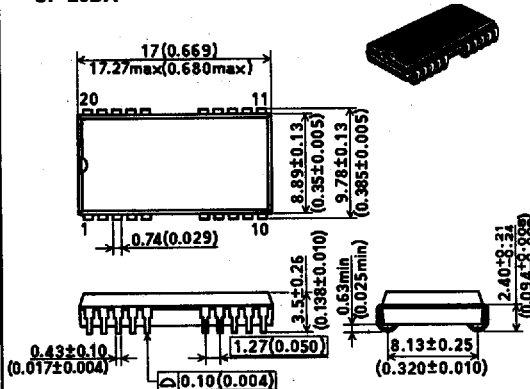
Unit: mm (inch) Scale 3/2

T-90-20

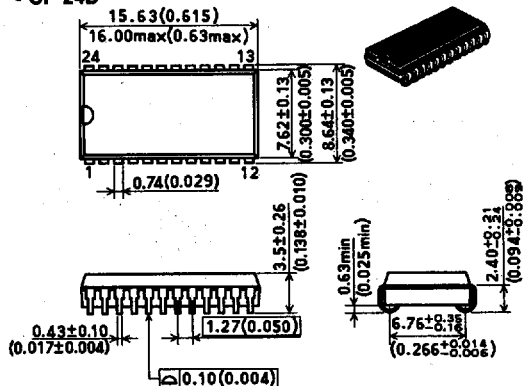
• CP-20D



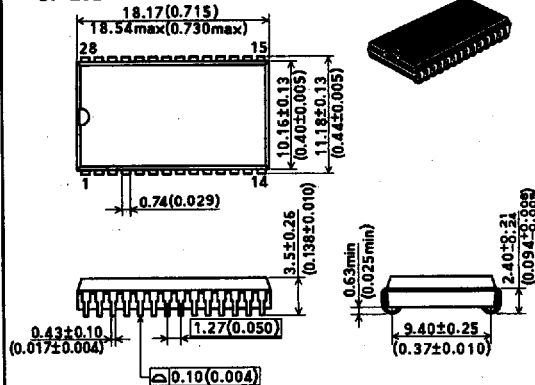
• CP-20DA



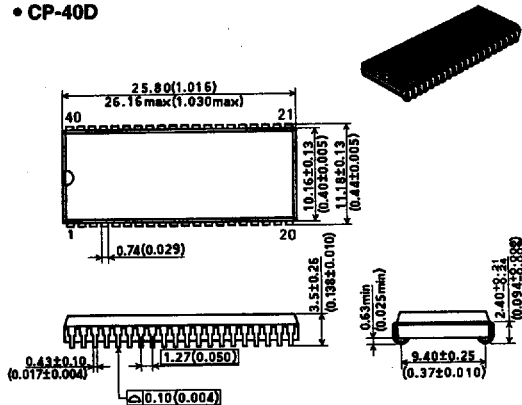
• CP-24D



• CP-28D



• CP-40D

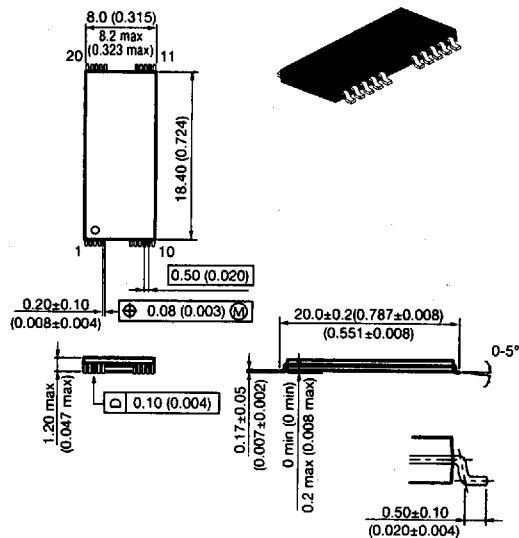


• TSOP (Thin Small Outline Package)

HITACHI/ LOGIC/ARRAYS/MEM

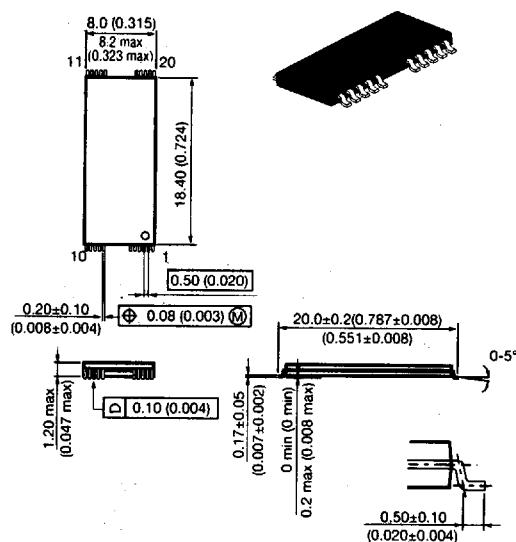
Unit: mm (inch) Scale 3/2

• TFP-20DA

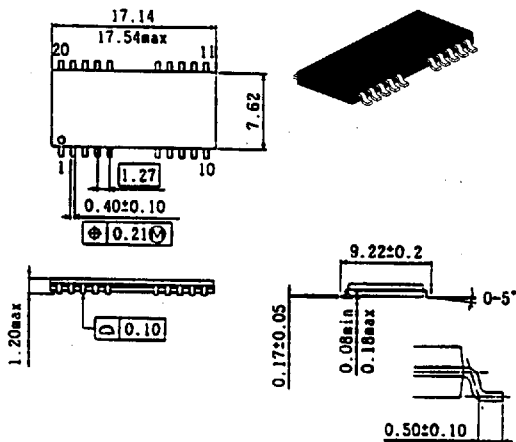


• TFP-20DAR

T-90-20



• TTP-20D



• TTP-20DR

