HN62435 Series

262144-word × 16-bit/524288-word × 8-bit CMOS Mask Programmable ROM

HITACHI

ADE-203-472B (Z)
Rev. 2.0
Jun. 11, 1997

Description

The Hitachi HN62435 series is a 4-Mbit CMOS mask programmable ROM organized either as 262144-word × 16-bit or as 524288-word × 8-bit. As it has realized high speed access 120 ns, it is the most suitable to the program and data memory for micro computer system. It has package variations of standard 40-pin plastic DIP, standard 40-pin plastic SOP and standard 44-pin plastic TSOPII.

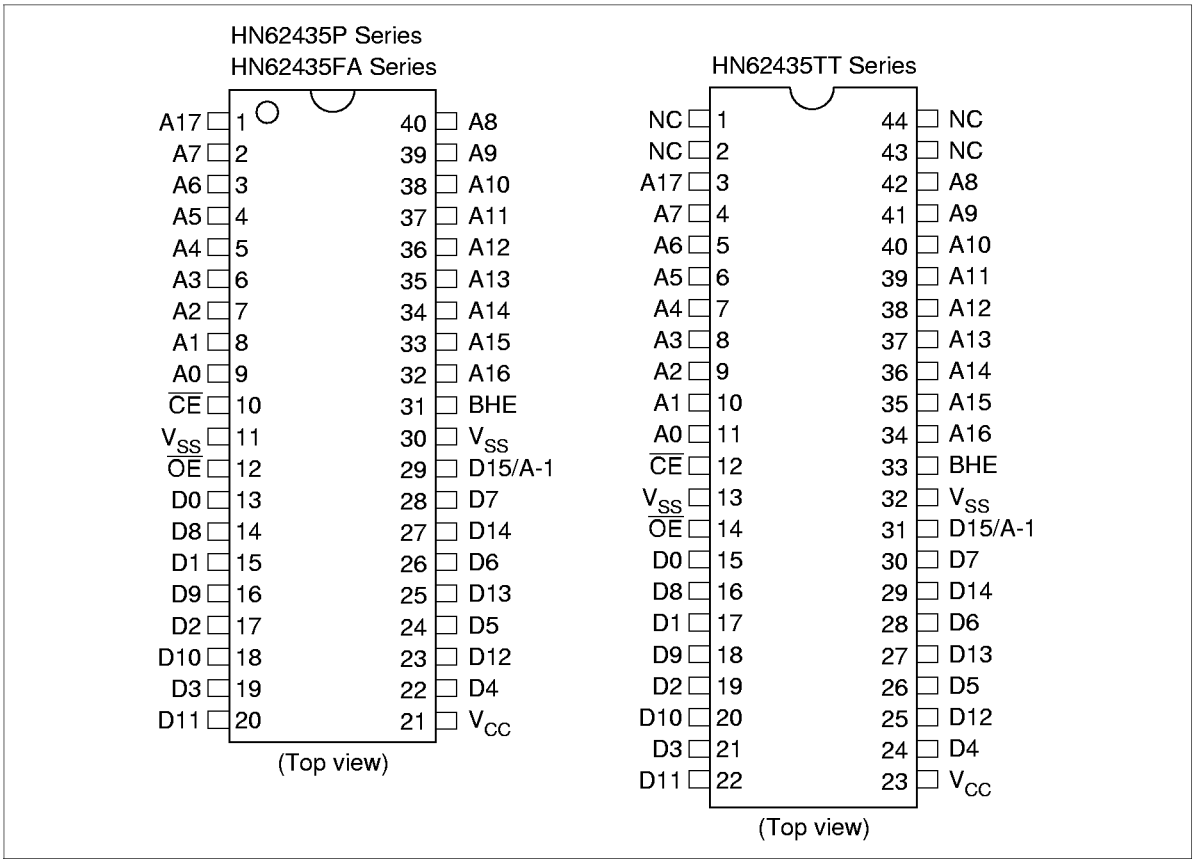
Features

- Single 5 V supply: 5.0 V ± 10%
- Access time: 120 ns (max)
- Power dissipation
  - — Active: 275 mW (max)
  - — Standby: 165 µW (max)
- Byte-wide or word-wide data organization with byte/word selection (BHE)
- Three-state data output for wired or-tying
- Directly TTL compatible all inputs and outputs

Ordering Information

Type No.	Access time	Package
HN62435P-12	120 ns	600 mil 40-pin plastic DIP (DP-40)
HN62435FA-12	120 ns	525 mil 40-pin plastic SOP (FP-40D)
HN62435TT-12	120 ns	400 mil 44-pin plastic TSOPII (TTP-44D)

Pin Arrangement

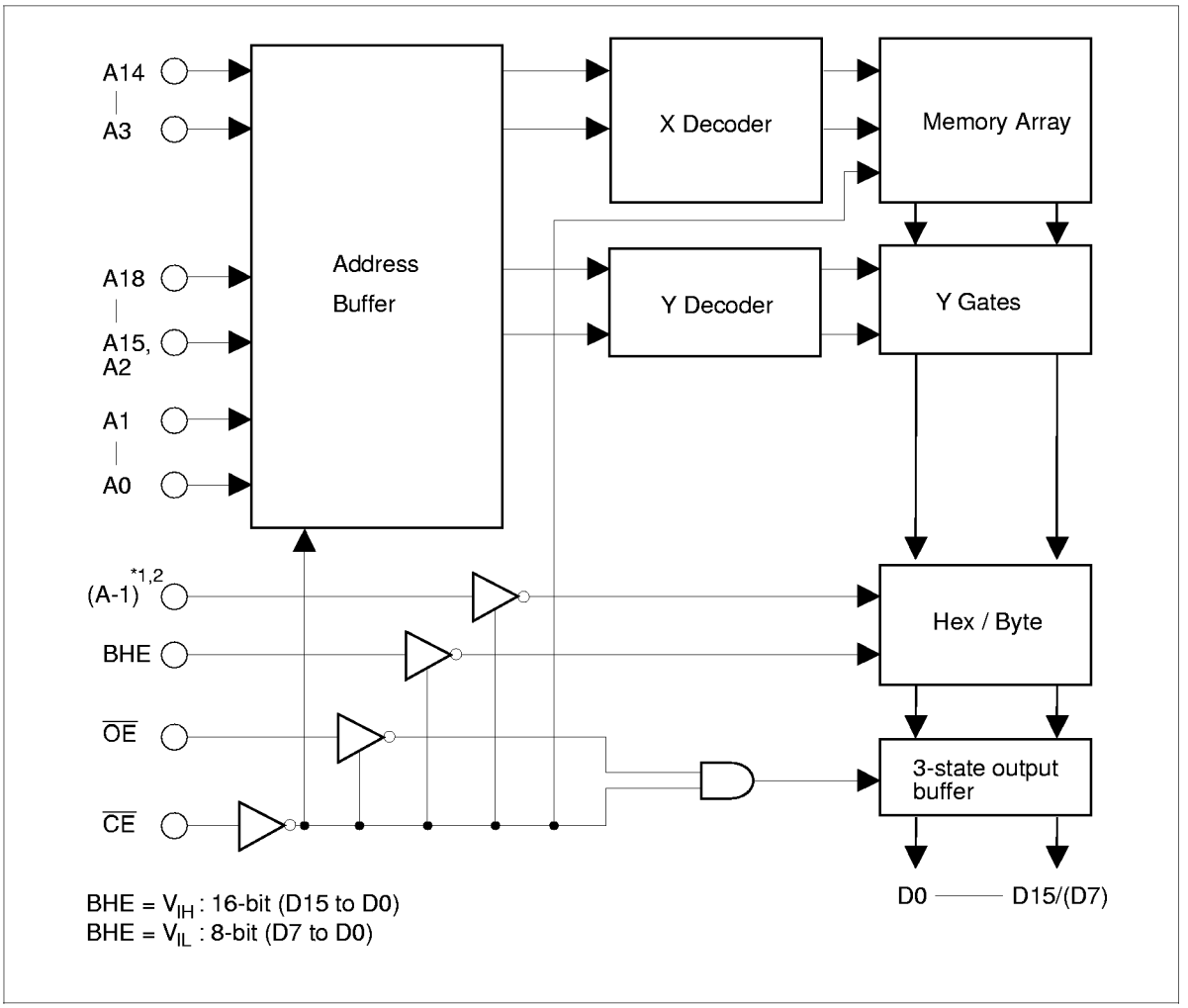


Pin Description

Pin name	Function
A-1, A0 to A17	Address input
D0 to D15	Data output
$\overline{OE}$	Output enable
$\overline{CE}$	Chip enable
BHE	Byte/word selection
V_{cc}	Power supply
V_{ss}	Ground
NC	No connection

Block Diagram

Notes: 1. A-1 is least significant address.
2. When BHE is 'low', D14 to D8 goes the high impedance state, and D15 should be A-1.



Operation Table

					Data output		Address input	
Mode	**$\overline{CE}$**	**$\overline{OE}$**	**BHE**	**D15/A-1**	**D0-D7**	**D8-D15**	**LSB**	**MSB**
Standby	H	×*1	×	×	High-Z	High-Z	—	—
Output disable	L	H	×	×	High-Z	High-Z	—	—
Read (16-bit)	L	L	H	Dout	D0 to D7	D8 to D15	A0	A17
Read (8-bit)	L	L	L	L	D0 to D7	High-Z	A-1	A17
Read (8-bit)	L	L	L	H	D8 to D15	High-Z	A-1	A17

Note: 1. ×: Don't care.

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Power supply voltage relative to V_{SS}	V_{CC}	–0.3 to +7.0	V
All input and output voltage relative to V_{SS}	Vin, Vout	–0.3 to V_{CC} +0.3	V
Operating temperature range	Topr	0 to +70	°C
Storage temperature range	Tstg	–55 to +125	°C
Temperature range under bias	Tbias	–20 to +85	°C

DC Operating Conditions (Ta = 0 to +70°C)

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage	V_{CC}	4.5	5.0	5.5	V
	V_{SS}	0	0	0	V
Input high voltage	V_{IH}	2.2	—	V_{CC} + 0.3	V
Input low voltage	V_{IL}	–0.3	—	0.8	V

DC Characteristics (V_{CC} = 5.0 V ± 10%, V_{SS} = 0 V, Ta = 0 to +70°C)

Parameter	Symbol	Min	Max	Unit	Test conditions
Operating V_{CC} current	I_{CC}	—	50	mA	V_{CC} = 5.5 V, I_{DOUT} = 0 mA, t_{RC} = 120 ns
Standby V_{CC} current	I_{SB1}	—	30	µA	V_{CC} = 5.5 V, $\overline{CE} \geq V_{CC}$ –0.2 V
	I_{SB2}	—	3	mA	V_{CC} = 5.5 V, $\overline{CE} \geq$ 2.2 V
Input leakage current	$\|I_{IL}\|$	—	10	µA	Vin = 0 to V_{CC}
Output leakage current	$\|I_{OL}\|$	—	10	µA	$\overline{CE}$ = 2.2 V, V_{OUT} = 0 to V_{CC}
Output high voltage	V_{OH}	2.4	—	V	I_{OH} = –205 µA
Output low voltage	V_{OL}	—	0.4	V	I_{OL} = 1.6 mA

Capacitance (V_{CC} = 5.0 V ± 10%, V_{SS} = 0 V, Ta = 25°C, Vin = 0 V, f = 1 MHz)

Parameter	Symbol	Min	Max	Unit
Input capacitance	Cin	—	10	pF
Output capacitance	Cout	—	15	pF

AC Characteristics (V_{CC} = 5.0 V ± 10%, V_{SS} = 0 V, Ta = 0 to +70°C)

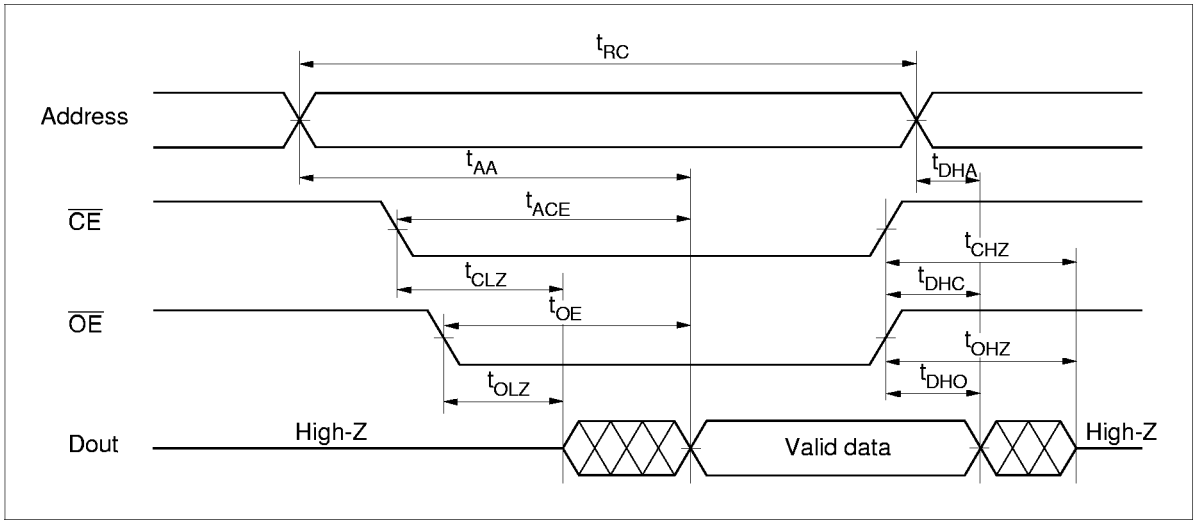
- Input pulse levels: 0.6 to 2.4 V
- Input rise and fall time: 5 ns
- Input and output timing reference levels: 1.5 V
- Output load: 1TTL + C_L = 100 pF (including jig)

		HN62435-12			
Parameter	**Symbol**	**Min**	**Max**	**Unit**	Notes
Read cycle time	t_{RC}	120	—	ns	
Address access time	t_{AA}	—	120	ns	3
$\overline{CE}$ access time	t_{ACE}	—	120	ns	3
$\overline{OE}$ access time	t_{OE}	—	60	ns	3
BHE access time	t_{BHE}	—	120	ns	
Output hold time from address change	t_{DHA}	0	—	ns	2
Output hold time from $\overline{CE}$	t_{DHC}	0	—	ns	2
Output hold time from $\overline{OE}$	t_{DHO}	0	—	ns	2
Output hold time from BHE	t_{DHB}	0	—	ns	
$\overline{CE}$ to output in high-Z	t_{CHZ}	—	60	ns	1
$\overline{OE}$ to output in high-Z	t_{OHZ}	—	60	ns	1
BHE to output in high-Z	t_{BHZ}	—	60	ns	1
$\overline{CE}$ to output in low-Z	t_{CLZ}	5	—	ns	4
$\overline{OE}$ to output in low-Z	t_{OLZ}	5	—	ns	4
BHE to output in low-Z	t_{BLZ}	5	—	ns	

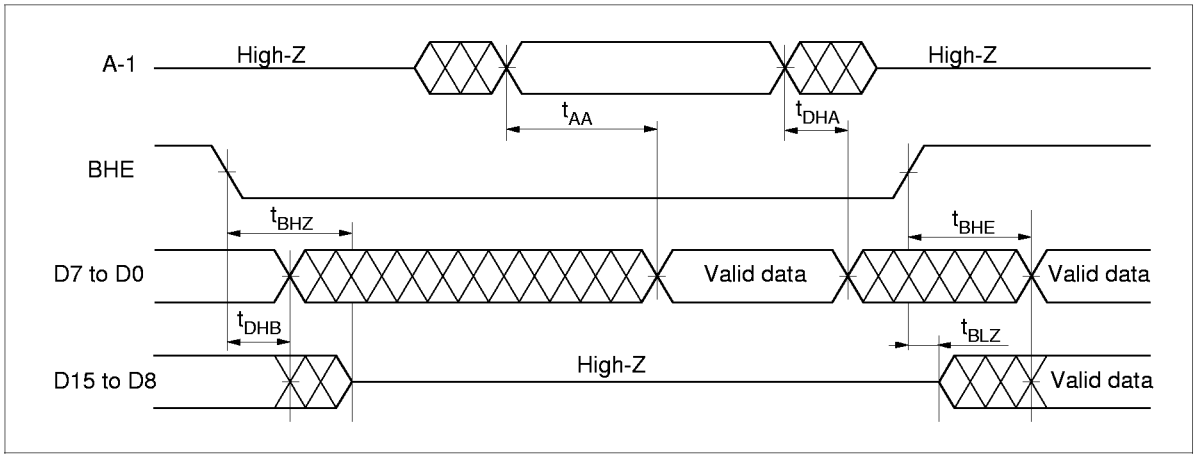
Notes: 1. t_{CHZ}, t_{OHZ} and t_{BHZ} are defined as the time at which the output achieves the open circuit conditions and are not referred to output voltage levels.
2. t_{DHA}, t_{DHC}, t_{DHO}: Determined by faster.
3. t_{AA}, t_{ACE}, t_{OE}: Determined by slower.
4. t_{CLZ}, t_{OLZ}: Determined by slower.
5. $\overline{CE}$ and $\overline{OE}$ are enable A18 to A0 are valid.
6. D15/A-1 pin is in the output state when BHE is high, $\overline{CE}$ and $\overline{OE}$ are enable. Therefore, the input signals of opposite phase to the output must be applied to them.
7. This device is used ATD (Address Transient Detector). Therefore, transfer either $\overline{CE}$ or address (A0 to A17) after power up to 4.5 V.

Timing Waveforms

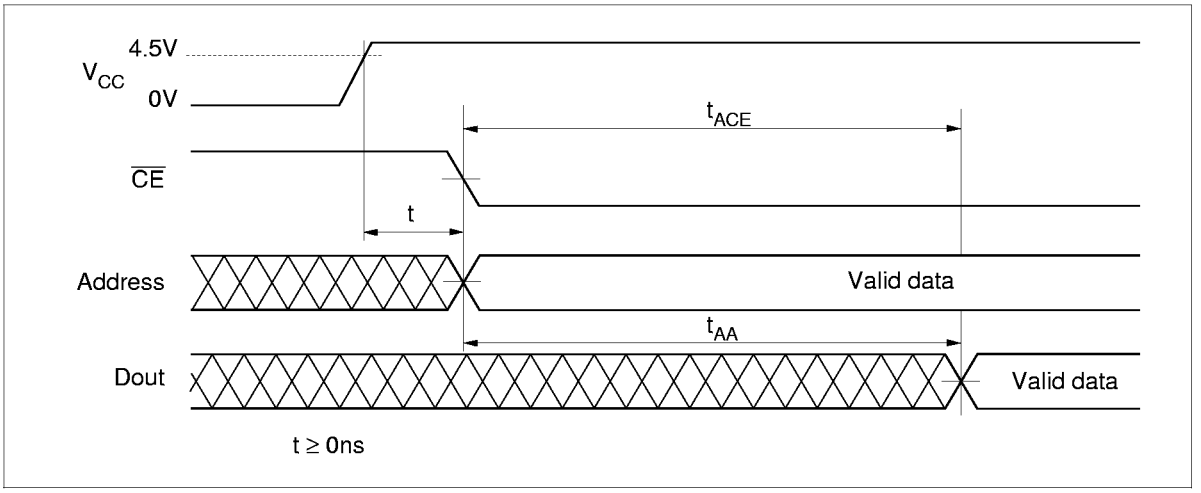
Word Mode (BHE = 'V_{IH}') **or Byte Mode** (BHE = 'V_{IL}')*[2, 3, 4]



Word Mode, Byte Mode Switch*[5, 6]

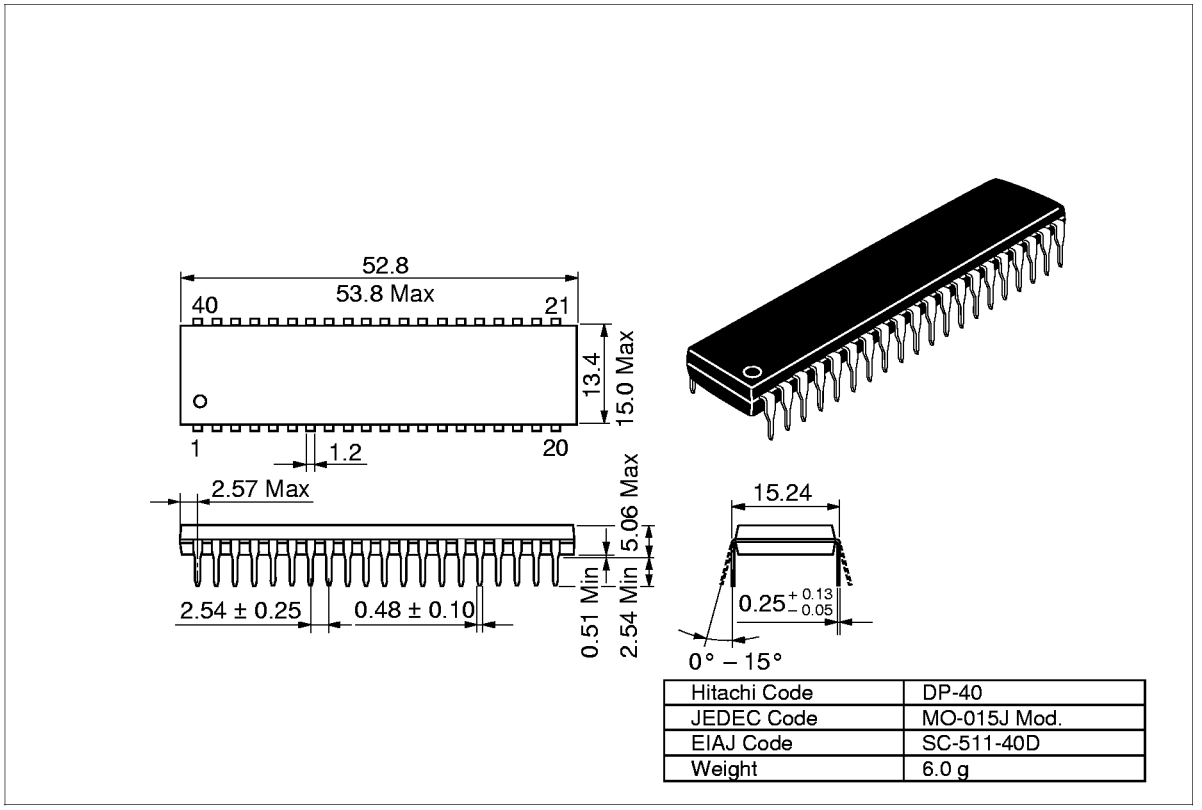


Power Up Sequence[*7]



Package Dimensions

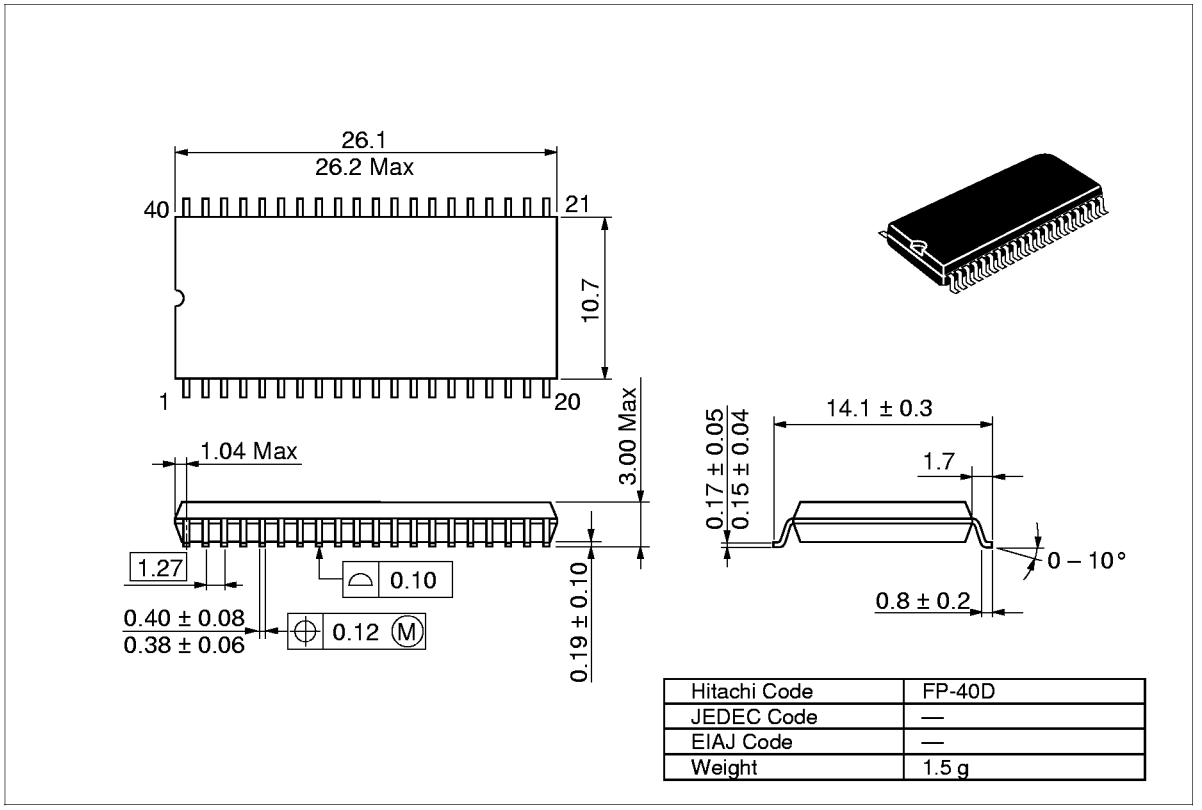
HN62435P Series (DP-40) Unit: mm



Hitachi Code	DP-40
JEDEC Code	MO-015J Mod.
EIAJ Code	SC-511-40D
Weight	6.0 g

Package Dimensions (cont.)

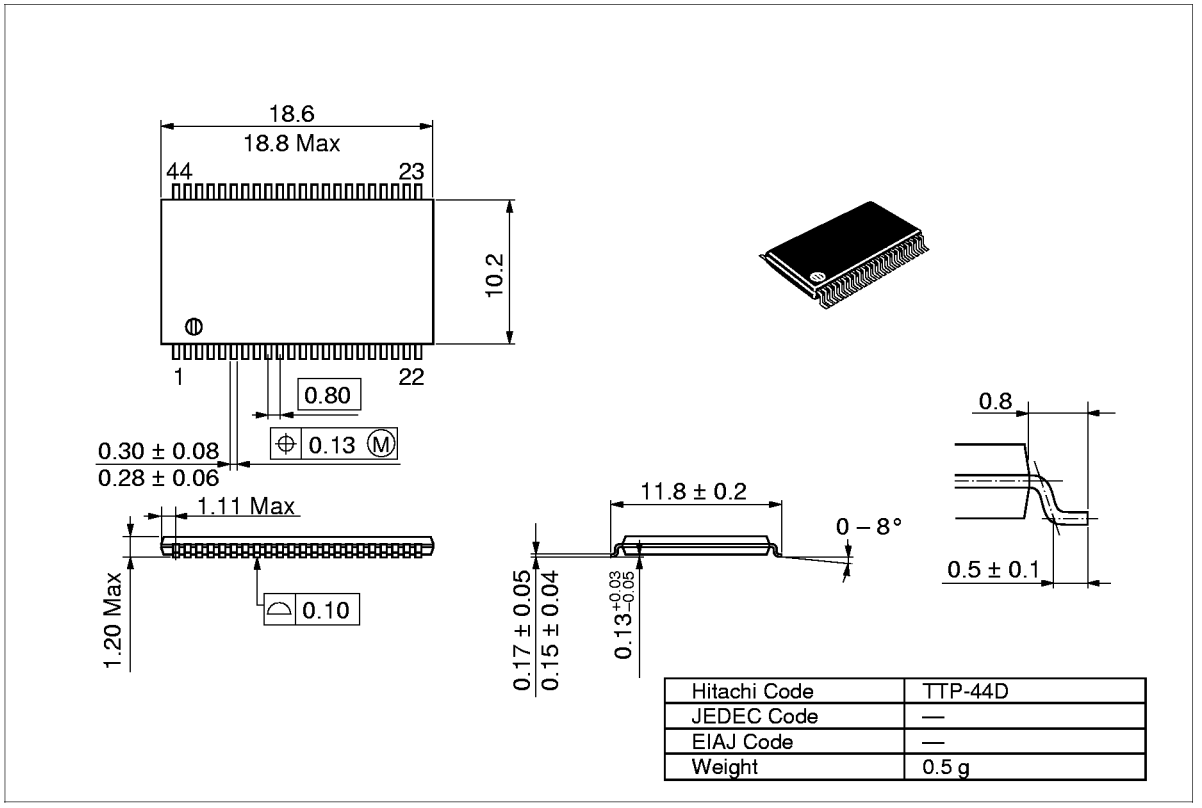
HN62435FB Series (FP-40D) Unit: mm



Hitachi Code	FP-40D
JEDEC Code	—
EIAJ Code	—
Weight	1.5 g

Package Dimensions (cont.)

HN62435TT Series (TTP-44D) Unit: mm



Hitachi Code	TTP-44D
JEDEC Code	—
EIAJ Code	—
Weight	0.5 g

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Revision Record

Rev.	Date	Contents of Modification	Drawn by	Approved by
1.0	Nov. 16, 1995	Initial issue	M. Shirai	H. Moriuchi
2.0	Jun. 11, 1997	Change of format Deletion of HN62435-15 Series Operation Table Deletion of Note 2 Capacitance Deletion of Note AC Characteristics Addition of Note 7 Timing Waveforms Addition of Power Up Sequence		