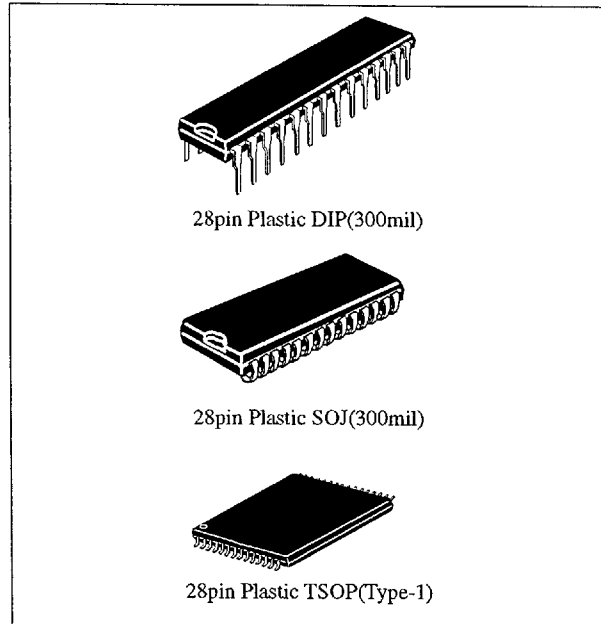# CMOS SRAM
256K-BIT(32KX8)

NKK

N341256

■ **Features**

● CMOS SRAM organized as 32,768 x 8bits

● Single +5.0V(±10%) Power Supply

● High Speed Access time : 12/15/20/25ns

● Low power operation

        Active : 180mA(max.)

        Standby : 60mA(max.)

● Package

  -28pin Plastic DIP(300mil)

  -28pin Plastic SOJ(300mil)

  -28pin Plastic TSOP(Type-1)

28pin Plastic DIP(300mil)

28pin Plastic SOJ(300mil)
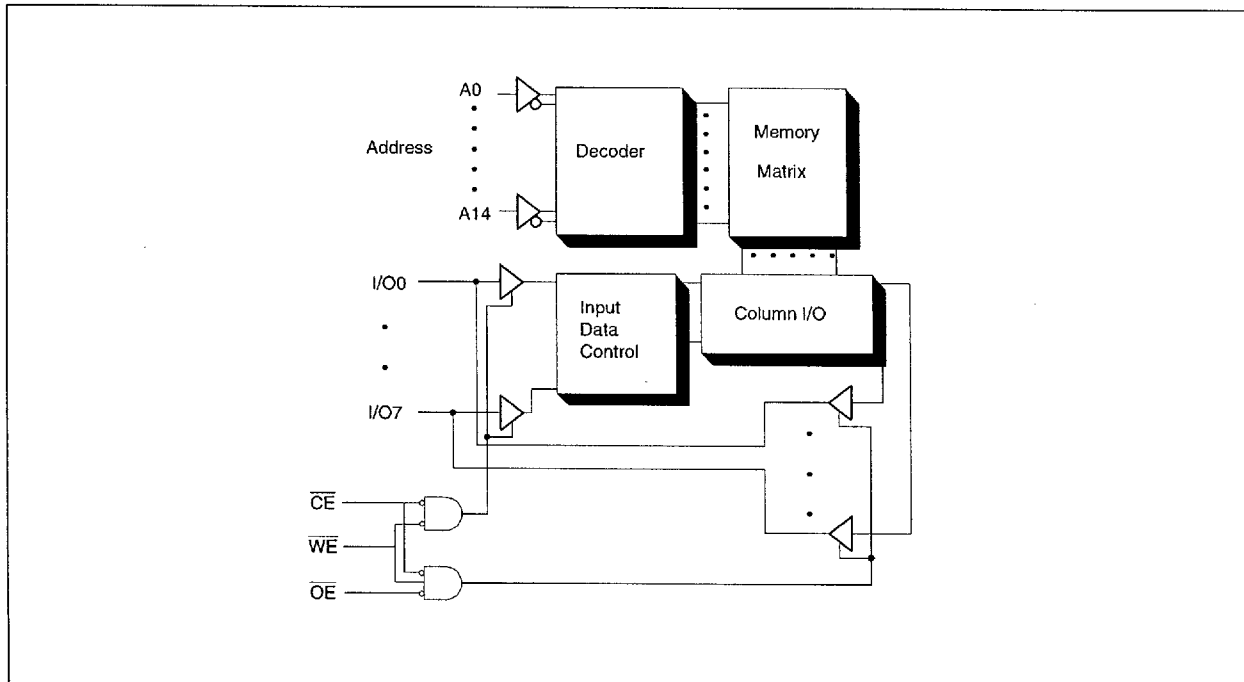
28pin Plastic TSOP(Type-1)

■ **Description**

The N341256 is a high performance CMOS static RAM organized as 32,768 x 8bits.

Writing to this device is accomplished when the write enable ($\overline{WE}$) and the chip select ($\overline{CE}$) inputs are both Low.
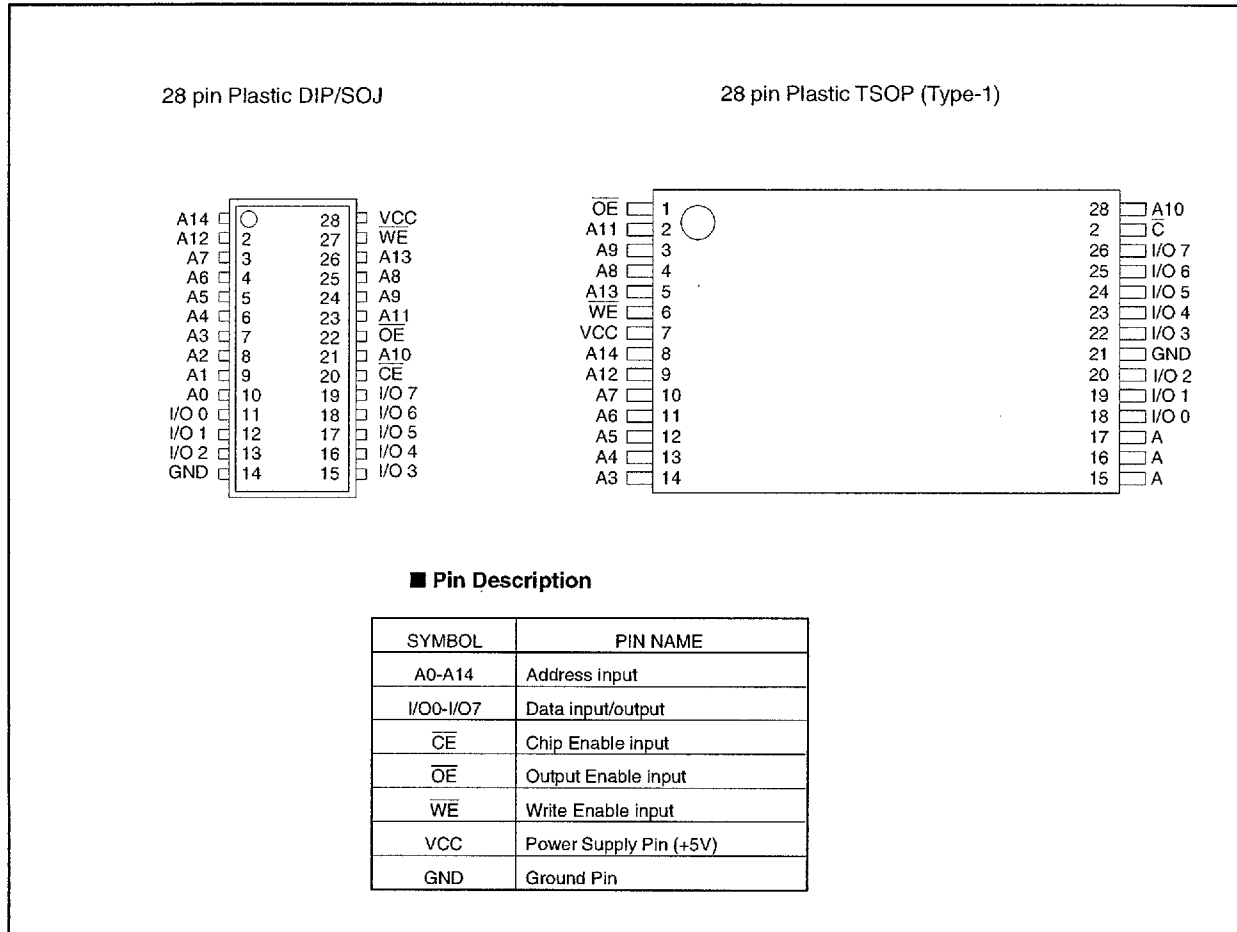
Reading is accomplished when $\overline{WE}$ is High and $\overline{CE}$ and the output enable ($\overline{OE}$) are both Low.

The N341256 operates from a single +5.0V power supply and all inputs are fully TTL compatible.

■ **Functional Block Diagram**

9012498 0000223 416

■ Pin Configuration

28 pin Plastic DIP/SOJ

```
A14  □ 1        28 □ VCC
A12  □ 2        27 □ WE
A7   □ 3        26 □ A13
A6   □ 4        25 □ A8
A5   □ 5        24 □ A9
A4   □ 6        23 □ A11
A3   □ 7        22 □ OE
A2   □ 8        21 □ A10
A1   □ 9        20 □ CE
A0   □ 10       19 □ I/O 7
I/O 0 □ 11      18 □ I/O 6
I/O 1 □ 12      17 □ I/O 5
I/O 2 □ 13      16 □ I/O 4
GND  □ 14       15 □ I/O 3
```

28 pin Plastic TSOP (Type-1)

```
OE   □ 1        28 □ A10
A11  □ 2        2  □ C
A9   □ 3        26 □ I/O 7
A8   □ 4        25 □ I/O 6
A13  □ 5        24 □ I/O 5
WE   □ 6        23 □ I/O 4
VCC  □ 7        22 □ I/O 3
A14  □ 8        21 □ GND
A12  □ 9        20 □ I/O 2
A7   □ 10       19 □ I/O 1
A6   □ 11       18 □ I/O 0
A5   □ 12       17 □ A
A4   □ 13       16 □ A
A3   □ 14       15 □ A
```

■ Pin Description

SYMBOL	PIN NAME
A0-A14	Address input
I/O0-I/O7	Data input/output
CE	Chip Enable input
OE	Output Enable input
WE	Write Enable input
VCC	Power Supply Pin (+5V)
GND	Ground Pin

■ Mode Selection Table

OE	WE	CE	I/O	MODE
X	X	High	High Impedance	Standby
Low	High	Low	Data out	Read
X	Low	Low	Data in	rite
High	High	Low	High Impedance	Output disable

■ Absolute Maximum Ratings

Symbol	Rating	Value	Unit
VTERM	Terminal Voltage with Respect to GND	-0.5 to 7.0	V
TA	Operating Temperature	0 to 70	°C
TBIAS	Temperature Under Bias	-55 to 125	°C
TSTG	Storage Temperature	-55 to 125	°C
PT	Power Dissipation	1.0	W
IOUT	DC Output Current	50	mA

NOTICE
Stress greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indication in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

■ Recommended Operating Conditions

Recommended Operating Temperature and Supply Voltage

Ambient Temperature	GND	VCC
0°C to 70°C	0V	5.0V ± 10%

Recommended DC Operating Conditions

Symbol	Parameter	Min.	Typ.	Max.	Unit
VCC	Supply Voltage	4.5	5.0	5.5	V
GND	Supply Voltage	0	0	0	V
VIH	Input High Voltage	2.2	-	VCC + 0.5	V
VIL	Input Low Voltage	-0.5	-	0.8	V

Notes : VIL(min) = -3.0V for pulse width less than 20ns.

■ Capacitance

(TA = +25°C, f = 1.0MHz)

Symbol	Parameter	Condition	Max.	Unit
CIN	Input Capacitance	VIN = 0V	8	pF
COUT	Output Capacitance	VOUT = 0V	8	pF

■ DC Electrical Characteristics

(Vcc = 5.0V ± 10%, TA = 0 to +70°C, VLC ≤ 0.2V, VHC ≥ VCC - 0.2V)

Symbol	Parameter	N341256 -12	N341256 -15	N341256 -20	N341256 -25	Unit
ICC	Dynamic Operating Current $\overline{CE}$ ≤ VIL, VCC = max, f = fmax, IOUT = 0mA VIN ≥ VIH or ≤ VIL	180	170	160	150	mA
ISB	Standby Power Supply Current (TTL level) $\overline{CE}$ ≥ VIH, VCC = max, f = fmax, VIN ≥ VIH or ≤ VIL	60	50	40	35	mA
ISB1	Full Standby Power Supply Current (CMOS level) $\overline{CE}$ ≥ VHC, VCC = max, f = 0, VIN ≥ VHC or ≤ VLC	10	10	10	10	mA

DC Electrical Characteristics(1)

(Vcc = 5.0V ± 10%)

Symbol	Parameter	Test Condition	N341256 Min.	N341256 Max.	Unit
I ILI I	Input Leakage Current	VCC = max, VIN = GND to VCC	-	5	μA
I ILO I	Output Leakage Current	VCC = max, $\overline{CE}$ ≥ VIH, VOUT = GND to VCC	-	5	μA
VOL	Output low voltage	IOL = 8mA, VCC = min	-	0.4	V
		IOL = 10mA, VCC = min	-	0.5	V
VOH	Output high voltage	IOH = -4mA, VCC = min	2.4	-	V

■ AC Test Conditions

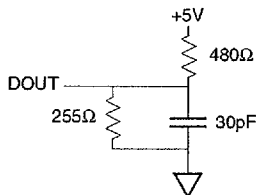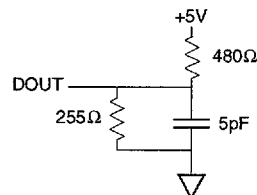| Input pulse levels	GND to 3V
Input rise and fall times	5ns
Input timing reference levels	1.5V
Output timing reference levels	1.5V
Output load	See figure 1 and 2

Figure 1. Output load Equivalent

Figure 2. Output load Equivalent
(for tLZCE, tHZCE, tLZWE, tHZWE, tLZOE, tHZOE)

■ 9012498 0000226 125 ■

■ AC Electrical Characteristics

(Vcc = 5.0V ± 10%, TA = 0 to +70°C)

Description	Symbol	N341256-12		N341256-15		N341256-20		N341256-25		Unit
Read Cycle		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Read Cycle time	t_{RC}	12		15		20		25		ns
Address access time	t_{AA}		12		15		20		25	ns
Chip enable access time	t_{ACE}		12		15		20		25	ns
Output hold from address change	t_{OH}	3		3		3		3		ns
Chip enable to output in low-Z	t_{LZCE}	5		5		5		5		ns
Chip disable to output high-Z	t_{HZCE}		5		5		5		10	ns
Chip enable ti power up time	t_{PU}	0		0		0		0		ns
Chip enable ti power down time	t_{PD}		12		15		20		25	ns
Output enable access time	t_{AOE}		6		8		10		12	ns
Output enable to output in low-Z	t_{LZOE}	0		0		0		0		ns
Output disable to output in high-Z	t_{HZOE}		5		5		5		10	ns

Note : tLZCE, tHZCE, tLZOE, tHZOE, tPU and tPD are simulated values.

(Vcc = 5.0V ± 10%, TA = 0 to +70°C)

| Description	Symbol	N341256-12		N341256-15		N341256-20		N341256-25		Unit
Write Cycle		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Write Cycle time	t_{WC}	12		15		20		25		ns
Chip enable to end of write	t_{CW}	10		12		13		15		ns
Address valid to end of write	t_{AW}	10		12		13		15		ns
Address set-up time	t_{AS}	0		0		0		0		ns
Address hold from end of write	t_{AH}	0		0		0		0		ns
Write pulse width	t_{WP}	10		11		12		15		ns
Data set-up time	t_{DS}	7		8		9		10		ns
Data hold time	t_{DH}	0		0		0		0		ns
Write disable to output in low-Z	t_{LZWE}	0		0		0		0		ns
Write enable to output in high-Z	t_{HZWE}		3		3		3		5	ns

Note : tLZWE and tLZWE are simulated values.

■ AC Timing Waveforms

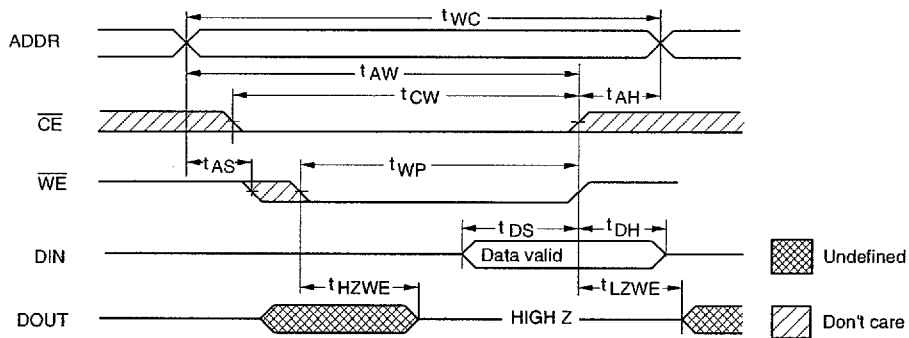### Read Cycle No.1
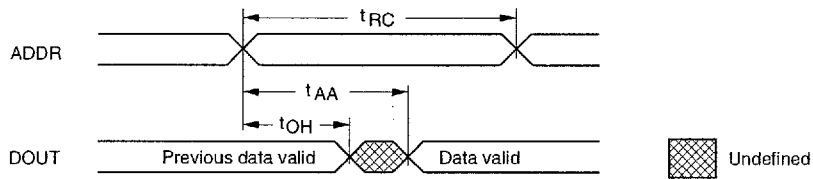
Read Cycle No.2
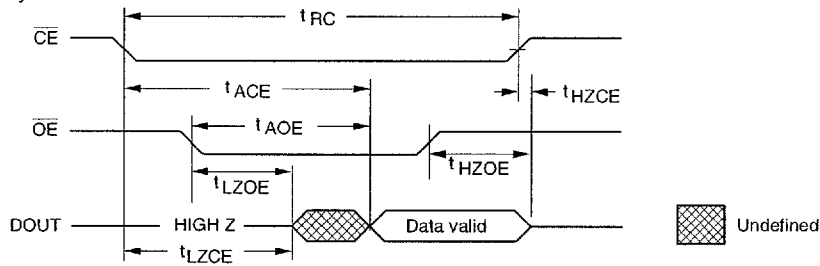
Write Cycle No.1 (Write Enable Controlled)

Write Cycle No.2 (Chip Enable Controlled)

9012498 0000228 TT8

■ Ordering informations

```
N3   41256          -  X X

     Device   Package  Speed
     Type

                           12
                           15      ns
                           20
                           25

                       P        Plastic DIP 300mil
                       SJ       Plastic SOJ 300mil
                       TS       Plastic TSOP (Type I)

                   41256    256Kbit SRAM
                            32K X 8
```
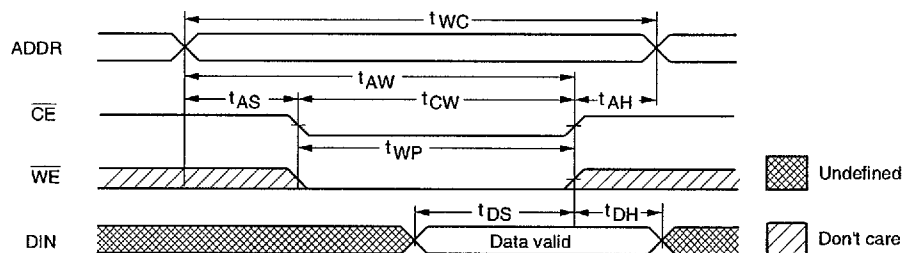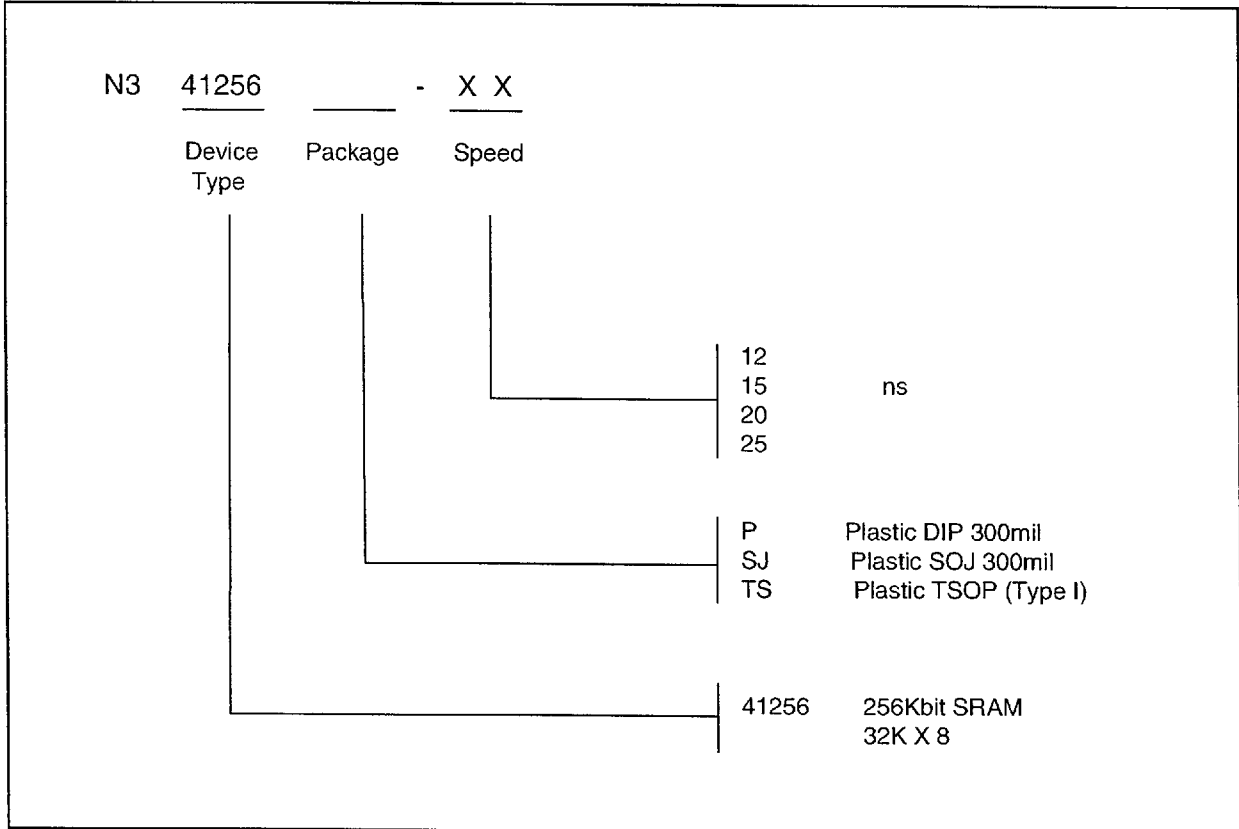
PART NO.	Access Time (ns)	Operating Current (mA)	Power down Standby Current (mA)	Package
N341256P-12	12	180	60	28Pin Plastic DIP (300mil)
N341256SJ-12	12	180	60	28Pin Plastic SOJ (300mil)
N341256TS-12	12	180	60	28Pin Plastic TSOP (Type-1)
N341256P-15	15	170	50	28Pin Plastic DIP (300mil)
N341256SJ-15	15	170	50	28Pin Plastic SOJ (300mil)
N341256TS-15	15	170	50	28Pin Plastic TSOP (Type-1)
N341256P-20	20	160	40	28Pin Plastic DIP (300mil)
N341256SJ-20	20	160	40	28Pin Plastic SOJ (300mil)
N341256TS-20	20	160	40	28Pin Plastic TSOP (Type-1)
N341256P-25	25	150	35	28Pin Plastic DIP (300mil)
N341256SJ-25	25	150	35	28Pin Plastic SOJ (300mil)
N341256TS-25	25	150	35	28Pin Plastic TSOP (Type-1)

■ Package Information

28pin Plastic DIP (300mil)

ITEM	MILLIMETERS	INCHES
A	35.00 ± 0.20	1.378 ± 0.008
B	7.20 ± 0.10	0.283 ± 0.004
C	2.54 TYP.	0.10 TYP.
D	0.45 ± 0.08	0.018 ± 0.003
E	1.40 ± 0.20	0.055 ± 0.008
F	7.00 +0.70 / -0.50	0.276 +0.028 / -0.008
G	4.00 +0.40 / -0.20	0.157 +0.016 / -0.008
H	3.00 ± 0.30	0.118 ± 0.012
I	3.30 +0.20 / -0.0	0.130 +0.008 / -0.0
J	0.70 ± 0.20	0.028 ± 0.008
K	9.44 ± 0.50	0.372 ± 0.020
L	8.10 ± 0.10	0.319 ± 0.004
M	15°	15°
N	0.25 ± 0.05	0.010 ± 0.002
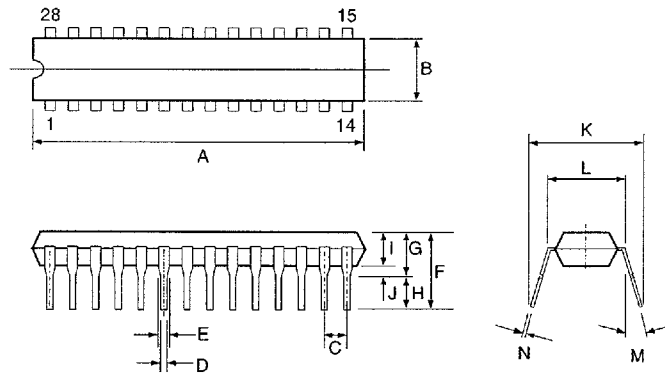
28pin Plastic SOJ (300mil)

ITEM	MILLIMETERS	INCHES
A	18.10 ± 0.10	0.713 ± 0.004
B	7.60 ± 0.10	0.299 ± 0.004
C	1.27 TYP.	0.05 TYP.
D	0.46 ± 0.08	0.018 ± 0.003
E	0.71	0.028
F	3.43 +0.10 / -0.30	0.135 +0.004 / -0.012
G	0.63 MIN.	0.025 MIN.
H	2.60 ± 0.10	0.102 ± 0.004
I	8.60 +0.10 / -0.20	0.339 +0.004 / -0.008
J	6.85 ± 0.15	0.270 ± 0.006
K	2.35 ± 0.10	0.093 ± 0.006
L	0.25	0.010
M	7°	7°

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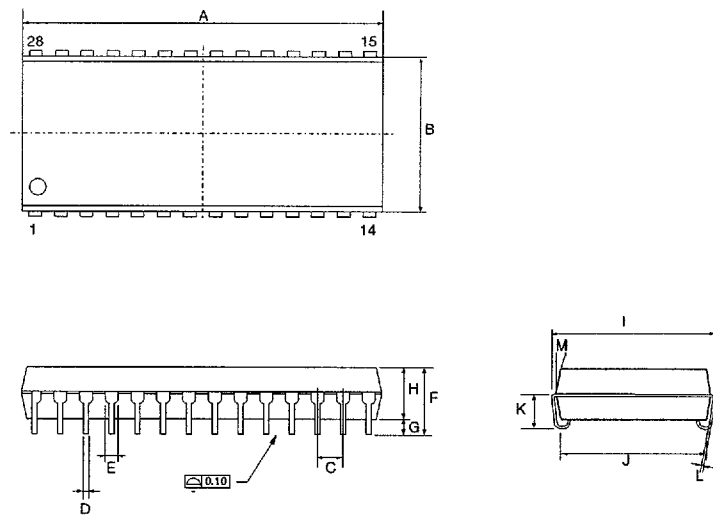
28pin Plastic TSOP (Type 1)

ITEM	MILLIMETERS	INCHES
A	13.40 BSC.	0.528 BSC.
B	11.80 BSC.	0.465 BSC.
C	8.00 BSC.	0.1315 BSC.
D	0.10 to 0.21	0.004 to 0.008
E	0.22 ± 0.05	0.009 ± 0.002
F	0.55 BSC.	0.0217 BSC.
G	0.05 to 0.15	0.002 to 0.006
H	1.00 ± 0.05	0.039 ± 0.002
I	1.20 MAX.	0.047 MAX.
J	0.55 $^{+0.15}_{-0.05}$	0.022 $^{+0.006}_{-0.002}$
K	0 to 6°	0 to 6°

9012498 0000231 592