

**NEC**

NEC Electronics Inc.

 **$\mu$ PD42S64400, 42S65400****16,777,216 x 4-Bit****Dynamic CMOS RAM****Preliminary**

September 1993

**Description**

The  $\mu$ PD42S64400 and  $\mu$ PD42S65400 are 64M-bit dynamic RAMs organized as 16,777,216 words by 4 bits. They are designed to operate from a single +3.3-volt power supply and have an optional fast-page mode.

Advanced polycide technology minimizes silicon areas and provides high storage cell capacity, high performance, and high reliability. A single-transistor dynamic storage cell and advanced CMOS circuitry throughout ensure minimum power dissipation, while an on-chip circuit internally generates the negative voltage substrate bias—automatically and transparently.

The three-state outputs are controlled by  $\overline{\text{CAS}}$  independent of  $\overline{\text{RAS}}$ . After a valid read or read-modify-write cycle, data is held on the outputs by maintaining  $\overline{\text{CAS}}$  low. Data outputs return to high impedance when  $\overline{\text{CAS}}$  goes high. Fast-page read and write cycles can be executed by cycling  $\overline{\text{CAS}}$ .

Refreshing may be accomplished by a  $\overline{\text{CAS}}$  before  $\overline{\text{RAS}}$  cycle that internally generates the refresh address. Refreshing can also be accomplished by  $\overline{\text{RAS}}$ -only refresh cycles or by normal read or write cycles during a 256-ms refresh period.

Two versions of the 16M x 4-bit DRAM are available. The  $\mu$ PD42S64400 uses 8192 combinations of  $A_0 - A_{12}$  for

$\overline{\text{RAS}}$ -only refreshing and 4096 address combinations of  $A_0 - A_{11}$  to perform  $\overline{\text{CAS}}$  before  $\overline{\text{RAS}}$  and hidden refreshing of the memory during a 256-ms period. The  $\mu$ PD42S65400 uses 4096 address combinations of  $A_0 - A_{11}$  during a 256-ms period for all refresh modes.

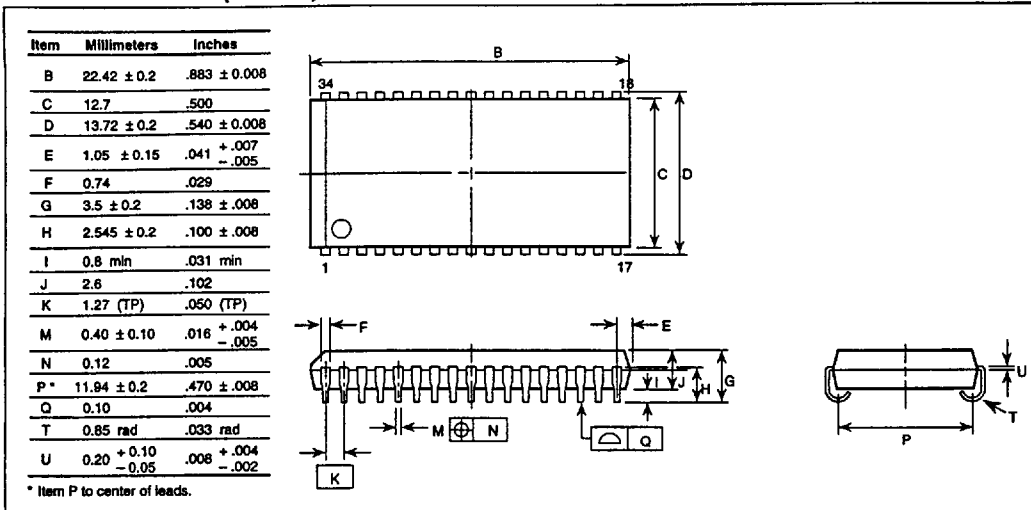
The  $\mu$ PD42S64400 and  $\mu$ PD42S65400 are available in a 34-pin plastic SOJ and 34-pin plastic TSOP.

**Features**

- 16,777,216 x 4-bit organization
- Single +3.3-volt power supply
- Fast-page option
- Low power dissipation: 0.72 mW (max) standby
- $\overline{\text{CAS}}$  before  $\overline{\text{RAS}}$  refresh and self-refresh cycles
- Multiplexed address inputs
- On-chip substrate bias generator
- TTL-compatible inputs and outputs
- Nonlatched, three-state outputs
- Low input capacitance
- 34-pin plastic SOJ and TSOP packaging

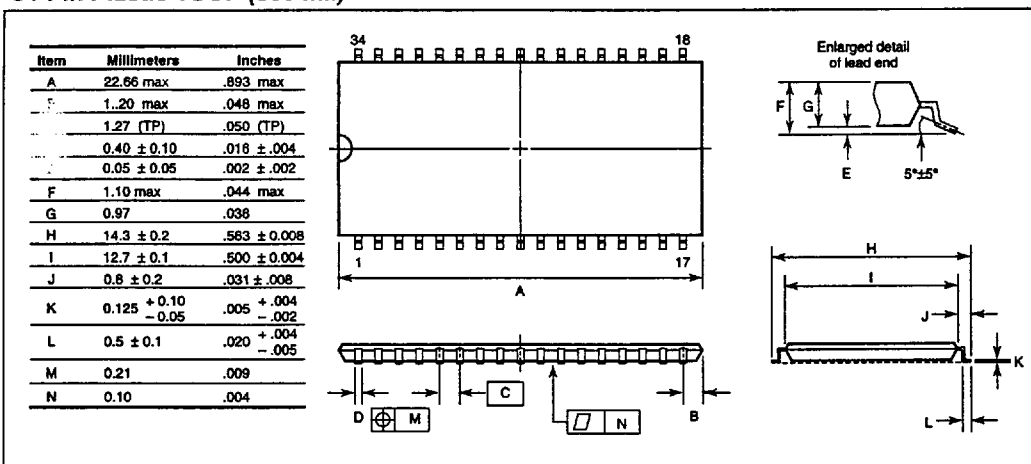
**Ordering Information**

Part Number	Access Time (max)	R/W Cycle (max)	Fast-Page Cycle (max)	Active Power (max)	Package
$\mu$ PD42S64400LG-A50	50 ns	90 ns	35 ns	360 mW	34-pin plastic SOJ
-A60	60 ns	110 ns	40 ns	324 mW	
-A70	70 ns	130 ns	45 ns	288 mW	
-A80	80 ns	150 ns	50 ns	252 mW	
$\mu$ PD42S64400G7-A50	50 ns	90 ns	35 ns	360 mW	34-pin plastic TSOP
-A60	60 ns	110 ns	40 ns	324 mW	
-A70	70 ns	130 ns	45 ns	288 mW	
-A80	80 ns	150 ns	50 ns	252 mW	
$\mu$ PD42S65400LG-A50	50 ns	90 ns	35 ns	468 mW	34-pin plastic SOJ
-A60	60 ns	110 ns	40 ns	396 mW	
-A70	70 ns	130 ns	45 ns	360 mW	
-A80	80 ns	150 ns	50 ns	324 mW	
$\mu$ PD42S65400G7-A50	50 ns	90 ns	35 ns	468 mW	34-pin plastic TSOP
-A60	60 ns	110 ns	40 ns	396 mW	
-A70	70 ns	130 ns	45 ns	360 mW	
-A80	80 ns	150 ns	50 ns	324 mW	

**μPD42S64400, 42S65400****34-Pin Plastic SOJ (500-mil)****SOJ or TSOP**

V <sub>CC</sub>	1	34	V <sub>SS</sub>
I/O <sub>1</sub>	2	33	I/O <sub>8</sub>
I/O <sub>2</sub>	3	32	I/O <sub>7</sub>
I/O <sub>3</sub>	4	31	I/O <sub>6</sub>
I/O <sub>4</sub>	5	30	I/O <sub>5</sub>
NC	6	29	V <sub>SS</sub>
V <sub>CC</sub>	7	28	CAS
WE	8	27	OE
RAS	9	26	NC
NC	10	25	A <sub>12</sub>
A <sub>0</sub>	11	24	A <sub>11</sub>
A <sub>1</sub>	12	23	A <sub>10</sub>
A <sub>2</sub>	13	22	A <sub>9</sub>
A <sub>3</sub>	14	21	A <sub>8</sub>
A <sub>4</sub>	15	20	A <sub>7</sub>
A <sub>5</sub>	16	19	A <sub>6</sub>
V <sub>CC</sub>	17	18	V <sub>SS</sub>

A <sub>0</sub> to A <sub>11</sub> (A <sub>12</sub> )	Address inputs
I/O <sub>1</sub> to I/O <sub>8</sub>	Data inputs/outputs
RAS	Row address strobe
CAS	Column address strobe
WE	Write enable
OE	Output enable
V <sub>CC</sub>	Supply voltage
V <sub>SS</sub>	Ground
NC	No connection

**34-Pin Plastic TSOP (500 mil)****NEC****NEC Electronics Inc.**

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