

# ACT-F4M32A High Speed 128 Megabit Sector Erase FLASH Multichip Module

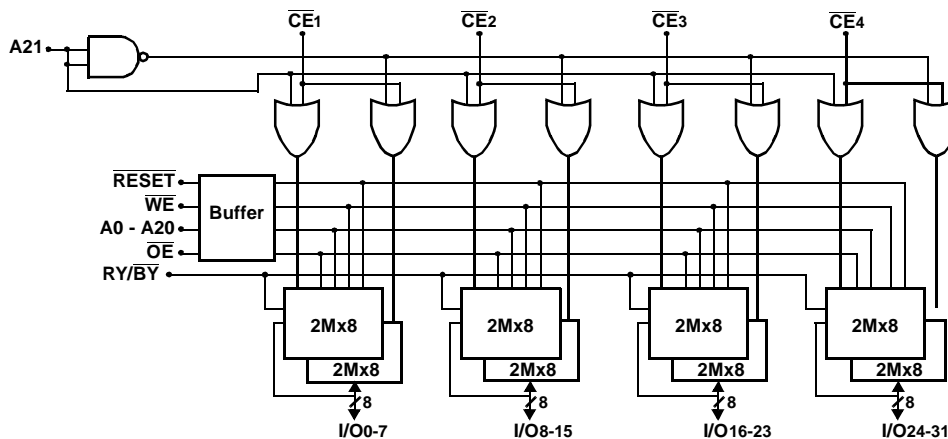
Advanced



## Features

- 8 Low Voltage/Power AMD 2M x 8 FLASH Die in One MCM Package
- Overall Configuration is 4M x 32
- +5V Power Supply / +5V Programming Operation
- Access Times of 100, 120 and 150 ns
- Erase/Program Cycles – 100,000 Minimum (+25°C)
- Sector erase architecture (Each Die)
  - 32 uniform sectors of 64 Kbytes each
  - Any combination of sectors can be erased. Also supports full chip erase
  - Sector group protection is user definable
- Embedded Erase Algorithms – Automatically pre-programs and erases the die or any sector
- Embedded Program Algorithms – Automatically programs and verifies data at specified address
- Ready/Busy output (RY/BY) – Hardware method for detection of program or erase cycle completion
- Hardware RESET pin – Resets internal state machine to the read mode
- Erase Suspend/Resume – Supports reading or programming data to a sector not being erased
- Packaging – Hermetic Ceramic
  - 68-Lead, Low Profile CQFP(F1), 1.56"SQ x .140"max
  - 68-Lead, Dual-Cavity CQFP(F2), 0.88"SQ x .20"max (.18 max thickness available, contact factory for details)  
(Drops into the 68 Lead JEDEC .99"SQ CQFJ footprint)
- Internal Decoupling Capacitors for Low Noise Operation
- Commercial, Industrial and Military Temperature Ranges
- MIL-PRF-38534 Compliant MCMs Available

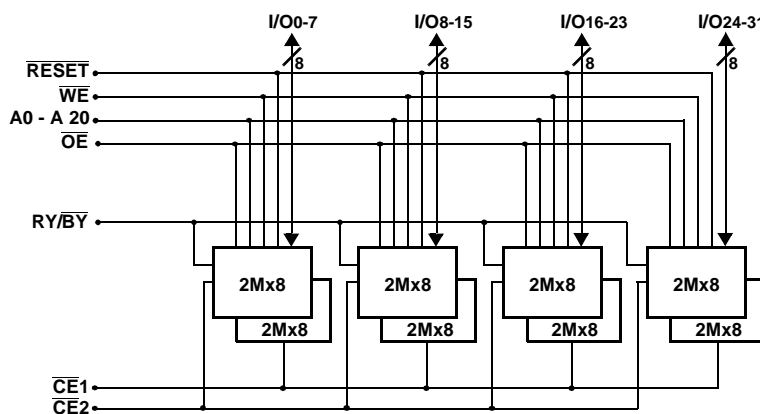
### Block Diagram – CQFP(F1)



#### Pin Description

I/O0-31	Data I/O
A0-21	Address Inputs
WE	Write Enables
CE1-4	Chip Enables
OE	Output Enable
RESET	Reset
RY/BY	Ready/Busy
VCC	Power Supply
GND	Ground
NC	Not Connected

### Block Diagram – CQFP(F2)



#### Pin Description

I/O0-31	Data I/O
A0-20	Address Inputs
WE	Write Enable
CE1,2	Chip Enables
OE	Output Enable
RESET	Reset
RY/BY	Ready/Busy
VCC	Power Supply
GND	Ground
NC	Not Connected

## General Description

Utilizing AMD's Sector Erase Flash Memory Die, the ACT-F4M32A is a high speed, 128 megabit CMOS flash multichip module (MCM) designed for full temperature range, military, space, or high reliability applications.

The ACT-F4M32A consists of eight high-performance AMD Am29F016 16Mbit (16,777,216 bit) memory die. Each die contains 8 separately write or erase sector groups of 256Kbytes (A sector group consists of 4 adjacent sectors of 64Kbytes each).

The command register is written by bringing  $\overline{WE}$  to a logic low level ( $V_{IL}$ ), while  $\overline{CE}$  is low and  $\overline{OE}$  is high ( $V_{IH}$ ). Reading is accomplished by chip Enable ( $\overline{CE}$ ) and Output Enable ( $\overline{OE}$ ) being logically active. Access time grades of 100ns, 120ns and 150ns maximum are standard.

The ACT-F4M32A is offered in two different hermetically sealed co-fired 68 lead ceramic packages. This allows operation in a military environment temperature range of  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ .

The ACT-F4M32A can be programmed (both read and write functions) in-system using the +5.0V VCC power supply. A 12.0V VPP is not required for programming or erase operations. The end of program or erase is detected by the RY/BY pin, Data Polling of DQ7, or by the Toggle bit (DQ6).

The ACT-F4M32A also has a hardware  $\overline{RESET}$  pin. When this pin is driven low, execution of any Embedded Program Algorithm or Embedded Erase Algorithm will be terminated.

Each block can be independently erased and programmed 100,000 times at  $+25^{\circ}\text{C}$ .

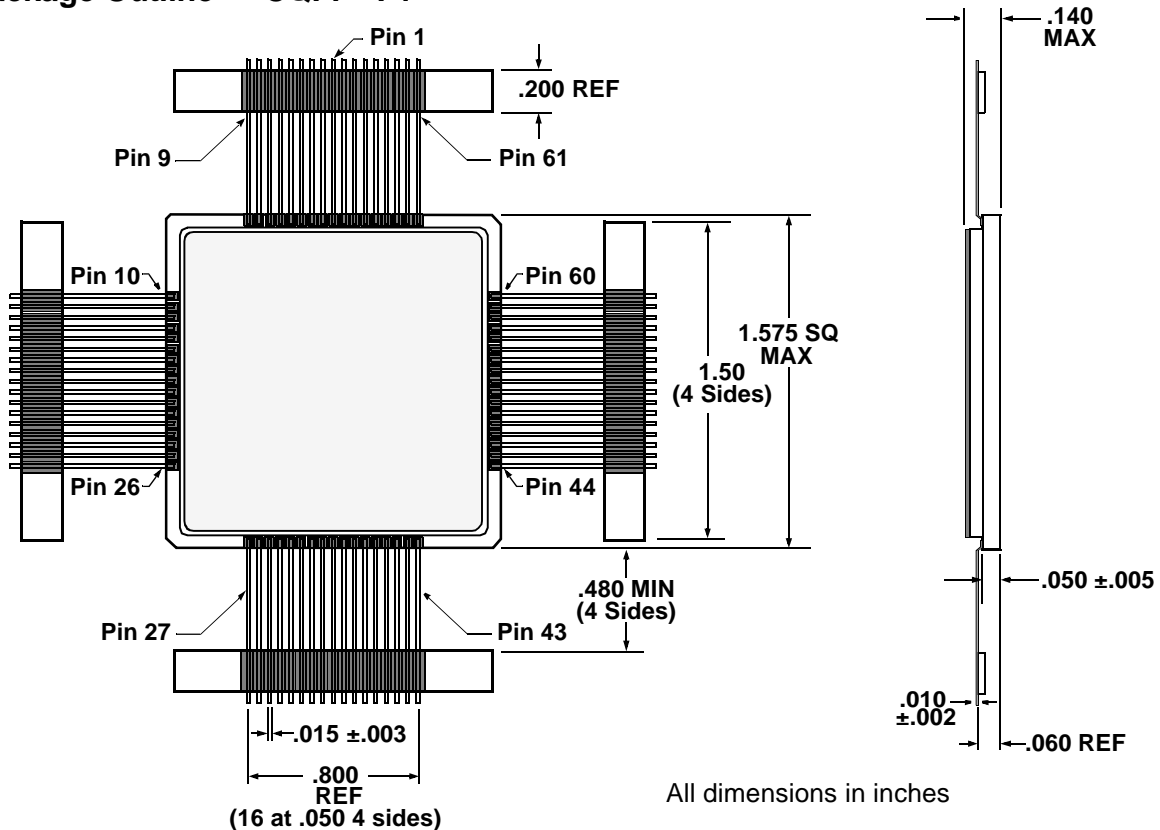
For Detail Information regarding the operation of the Am29F016 Sector Erase Flash Memory, see the AMD datasheet (Publication 18805).

## Pin Numbers & Functions

68 Pins — CQFP							
Pin #	Function	Pin #	Function	Pin #	Function	Pin #	Function
1	GND	18	GND	35	$\overline{OE}$	52	GND
2	$\overline{CE1}$	19	I/O <sub>8</sub>	36	$\overline{CE4}$	53	I/O <sub>23</sub>
3	A <sub>5</sub>	20	I/O <sub>9</sub>	37	A <sub>17</sub>	54	I/O <sub>22</sub>
4	A <sub>4</sub>	21	I/O <sub>10</sub>	38	A <sub>18</sub>	55	I/O <sub>21</sub>
5	A <sub>3</sub>	22	I/O <sub>11</sub>	39	A <sub>19</sub>	56	I/O <sub>20</sub>
6	A <sub>2</sub>	23	I/O <sub>12</sub>	40	A <sub>20</sub>	57	I/O <sub>19</sub>
7	A <sub>1</sub>	24	I/O <sub>13</sub>	41	A <sub>21</sub>	58	I/O <sub>18</sub>
8	A <sub>0</sub>	25	I/O <sub>14</sub>	42	$\overline{RESET}$	59	I/O <sub>17</sub>
9	RY/ $\overline{BY}$	26	I/O <sub>15</sub>	43	NC	60	I/O <sub>16</sub>
10	I/O <sub>0</sub>	27	V <sub>CC</sub>	44	I/O <sub>31</sub>	61	V <sub>CC</sub>
11	I/O <sub>1</sub>	28	A <sub>11</sub>	45	I/O <sub>30</sub>	62	A <sub>10</sub>
12	I/O <sub>2</sub>	29	A <sub>12</sub>	46	I/O <sub>29</sub>	63	A <sub>9</sub>
13	I/O <sub>3</sub>	30	A <sub>13</sub>	47	I/O <sub>28</sub>	64	A <sub>8</sub>
14	I/O <sub>4</sub>	31	A <sub>14</sub>	48	I/O <sub>27</sub>	65	A <sub>7</sub>
15	I/O <sub>5</sub>	32	A <sub>15</sub>	49	I/O <sub>26</sub>	66	A <sub>6</sub>
16	I/O <sub>6</sub>	33	A <sub>16</sub>	50	I/O <sub>25</sub>	67	$\overline{WE}$
17	I/O <sub>7</sub>	34	$\overline{CE2}$	51	I/O <sub>24</sub>	68	$\overline{CE3}$

Consult Factory for Special order: Pin 9 -NC

### Package Outline — CQFP "F1"



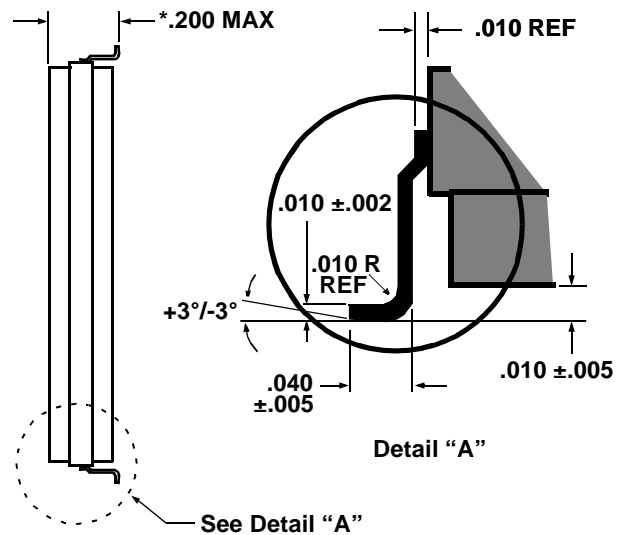
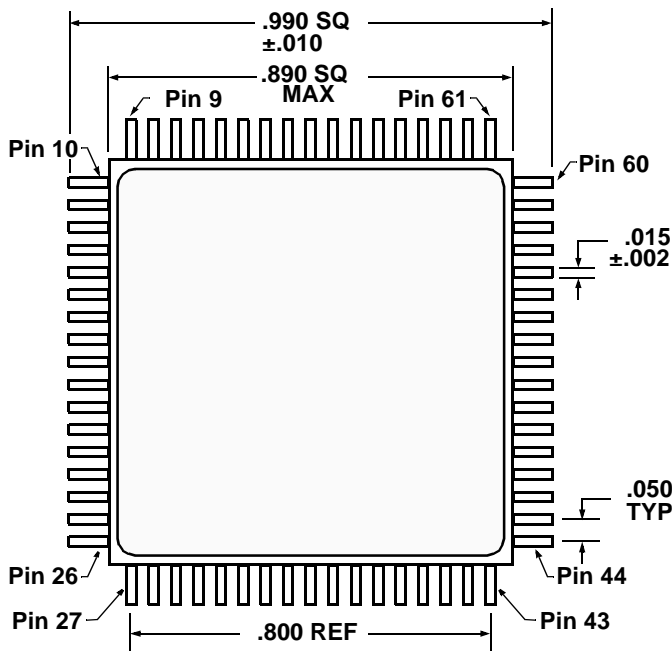
## Pin Numbers & Functions

68 Pins — Dual-Cavity CQFP (Standard Configuration)							
Pin #	Function	Pin #	Function	Pin #	Function	Pin #	Function
1	GND	18	GND	35	$\overline{OE}$	52	GND
2	NC	19	I/O <sub>8</sub>	36	$\overline{CE}_2$	53	I/O <sub>23</sub>
3	A <sub>5</sub>	20	I/O <sub>9</sub>	37	A <sub>17</sub>	54	I/O <sub>22</sub>
4	A <sub>4</sub>	21	I/O <sub>10</sub>	38	RY/ $\overline{BY}$	55	I/O <sub>21</sub>
5	A <sub>3</sub>	22	I/O <sub>11</sub>	39	NC	56	I/O <sub>20</sub>
6	A <sub>2</sub>	23	I/O <sub>12</sub>	40	NC	57	I/O <sub>19</sub>
7	A <sub>1</sub>	24	I/O <sub>13</sub>	41	A <sub>18</sub>	58	I/O <sub>18</sub>
8	A <sub>0</sub>	25	I/O <sub>14</sub>	42	A <sub>19</sub>	59	I/O <sub>17</sub>
9	$\overline{RESET}$	26	I/O <sub>15</sub>	43	A <sub>20</sub>	60	I/O <sub>16</sub>
10	I/O <sub>0</sub>	27	V <sub>CC</sub>	44	I/O <sub>31</sub>	61	V <sub>CC</sub>
11	I/O <sub>1</sub>	28	A <sub>11</sub>	45	I/O <sub>30</sub>	62	A <sub>10</sub>
12	I/O <sub>2</sub>	29	A <sub>12</sub>	46	I/O <sub>29</sub>	63	A <sub>9</sub>
13	I/O <sub>3</sub>	30	A <sub>13</sub>	47	I/O <sub>28</sub>	64	A <sub>8</sub>
14	I/O <sub>4</sub>	31	A <sub>14</sub>	48	I/O <sub>27</sub>	65	A <sub>7</sub>
15	I/O <sub>5</sub>	32	A <sub>15</sub>	49	I/O <sub>26</sub>	66	A <sub>6</sub>
16	I/O <sub>6</sub>	33	A <sub>16</sub>	50	I/O <sub>25</sub>	67	$\overline{WE}$
17	I/O <sub>7</sub>	34	$\overline{CE}_1$	51	I/O <sub>24</sub>	68	NC

Consult Factory for Special order: Pin 38 -NC

### Package Outline — Dual-Cavity CQFP "F2"

#### Top View



\*.180 MAX available, call factory for details

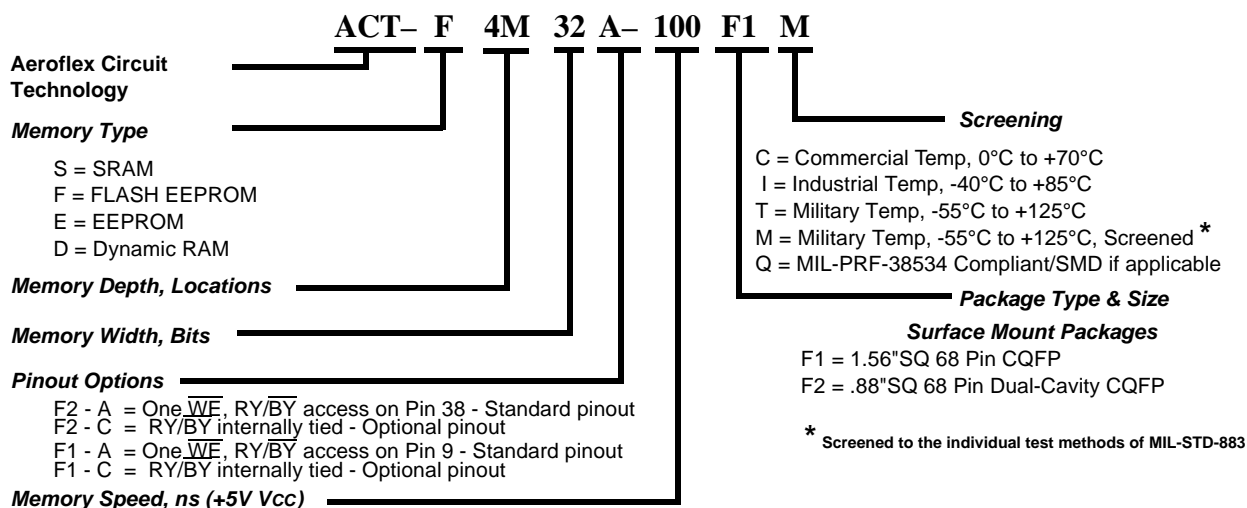
All dimensions in inches



## Ordering Information

Model Number	Screening	Speed	Package
ACT-F4M32C-100F1C	Commercial (0°C to +70°C)	100 ns	1.56"sq CQFP
ACT-F4M32A-100F2C	Commercial (0°C to +70°C)	100 ns	.88"sq CQFP
ACT-F4M32C-100F2C	Commercial (0°C to +70°C)	100 ns	.88"sq CQFP
ACT-F4M32A-100F1C	Commercial (0°C to +70°C)	100 ns	1.56"sq CQFP
ACT-F4M32C-100F1I	Industrial (-40°C to +85°C)	100 ns	1.56"sq CQFP
ACT-F4M32A-100F2I	Industrial (-40°C to +85°C)	100 ns	.88"sq CQFP
ACT-F4M32C-100F2I	Industrial (-40°C to +85°C)	100 ns	.88"sq CQFP
ACT-F4M32A-100F1I	Industrial (-40°C to +85°C)	100 ns	1.56"sq CQFP
ACT-F4M32C-100F1M	Military (-55°C to +125°C)	100 ns	1.56"sq CQFP
ACT-F4M32A-100F2M	Military (-55°C to +125°C)	100 ns	.88"sq CQFP
ACT-F4M32C-100F2M	Military (-55°C to +125°C)	100 ns	.88"sq CQFP
ACT-F4M32A-100F1M	Military (-55°C to +125°C)	100 ns	1.56"sq CQFP

## Part Number Breakdown



Specifications subject to change without notice

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