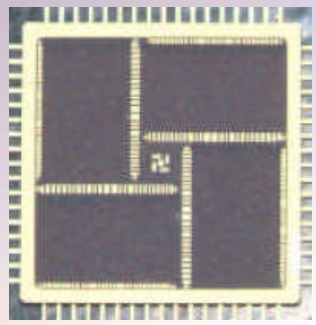
MCM and MCGA625 status

AEROSPACE Product Line



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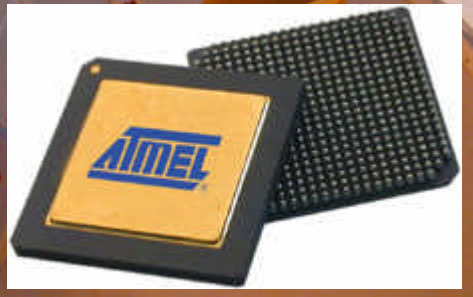
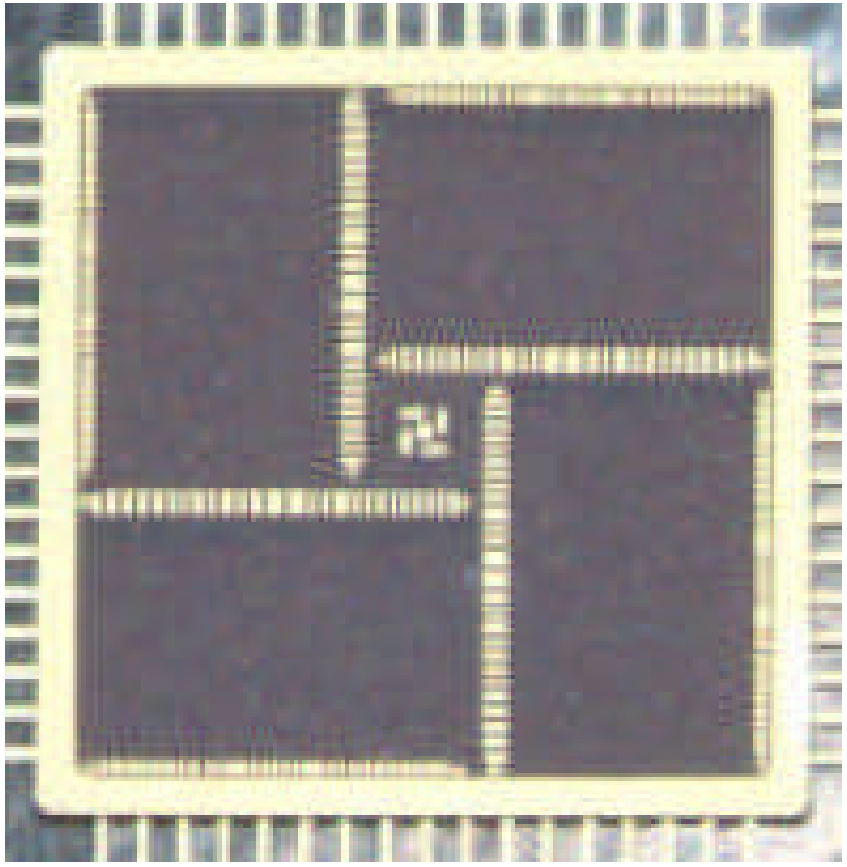


Content

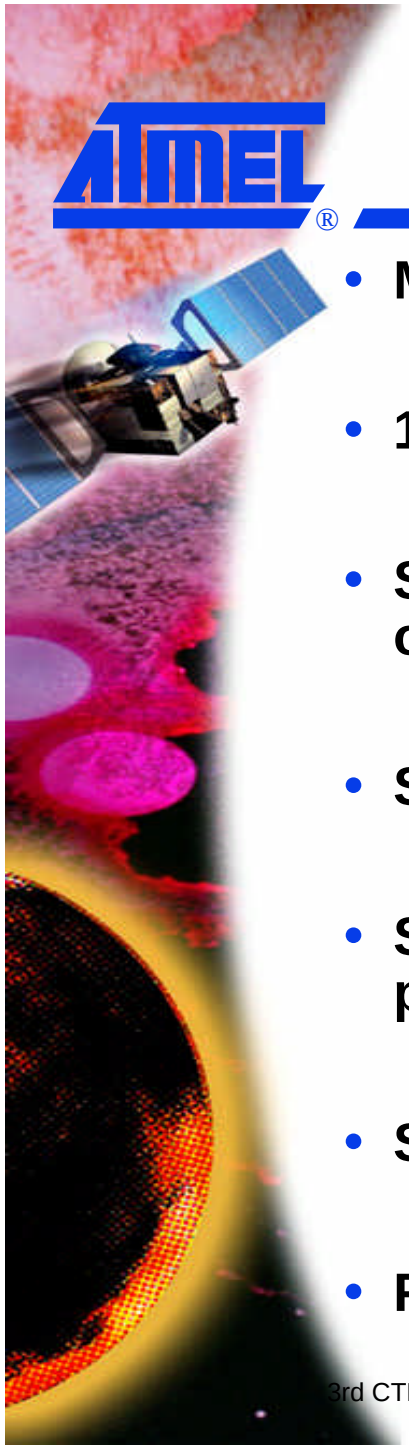
- MCM
  - Rationales
  - MCM SRAM status
  - MCM industrial capability
  - MCM spin off products
- MCGA625 contract status
- Packaging roadmap

MCM



Rationales for going MCM

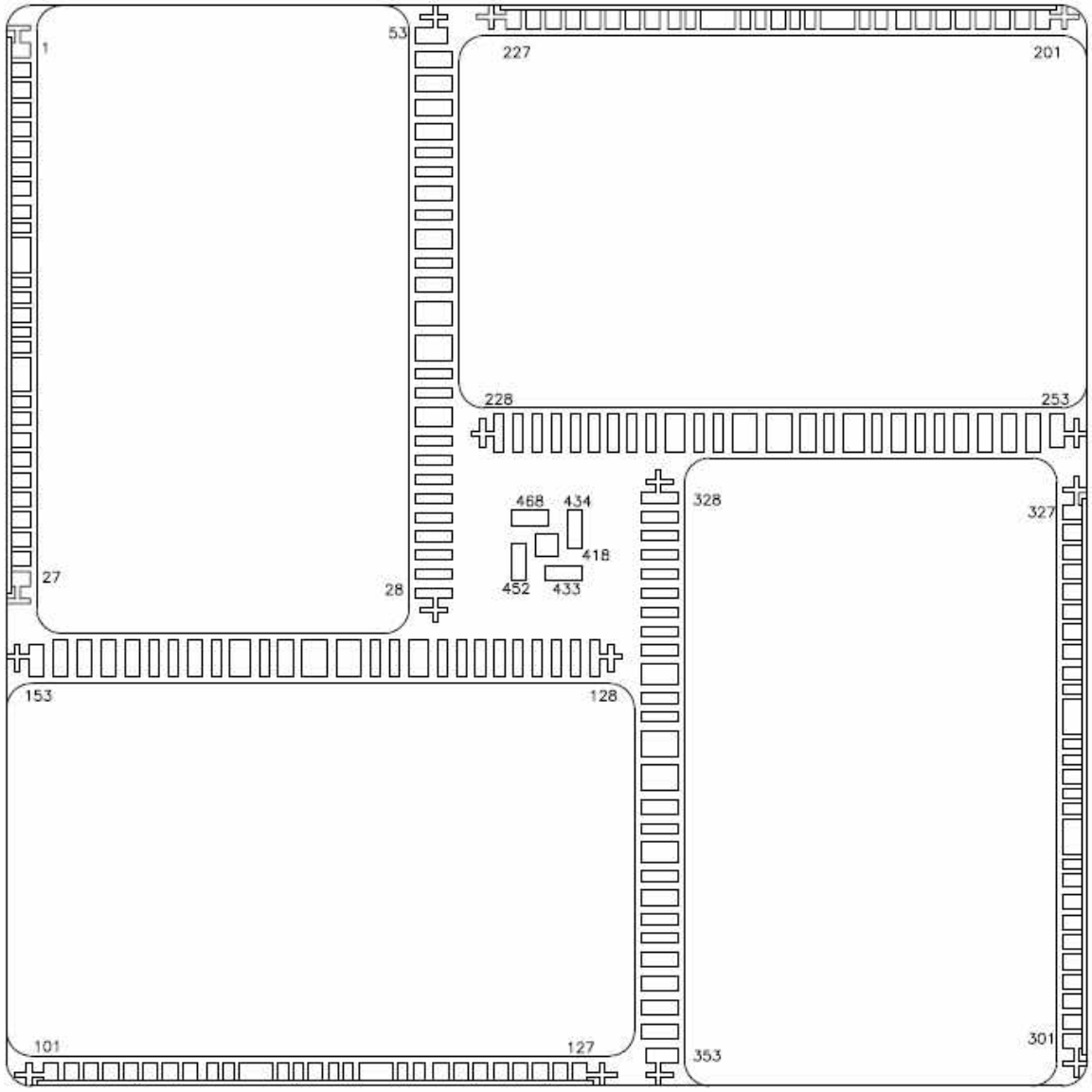
- **DSM technologies are more and more expensive making the ROI in space more questionable**
- **MCM allows:**
  - **Either to mix various technologies and/or functionalities**
  - **To bridge the time gap between the availability of the next technology products**
  - **To test the market for the next generation of products**



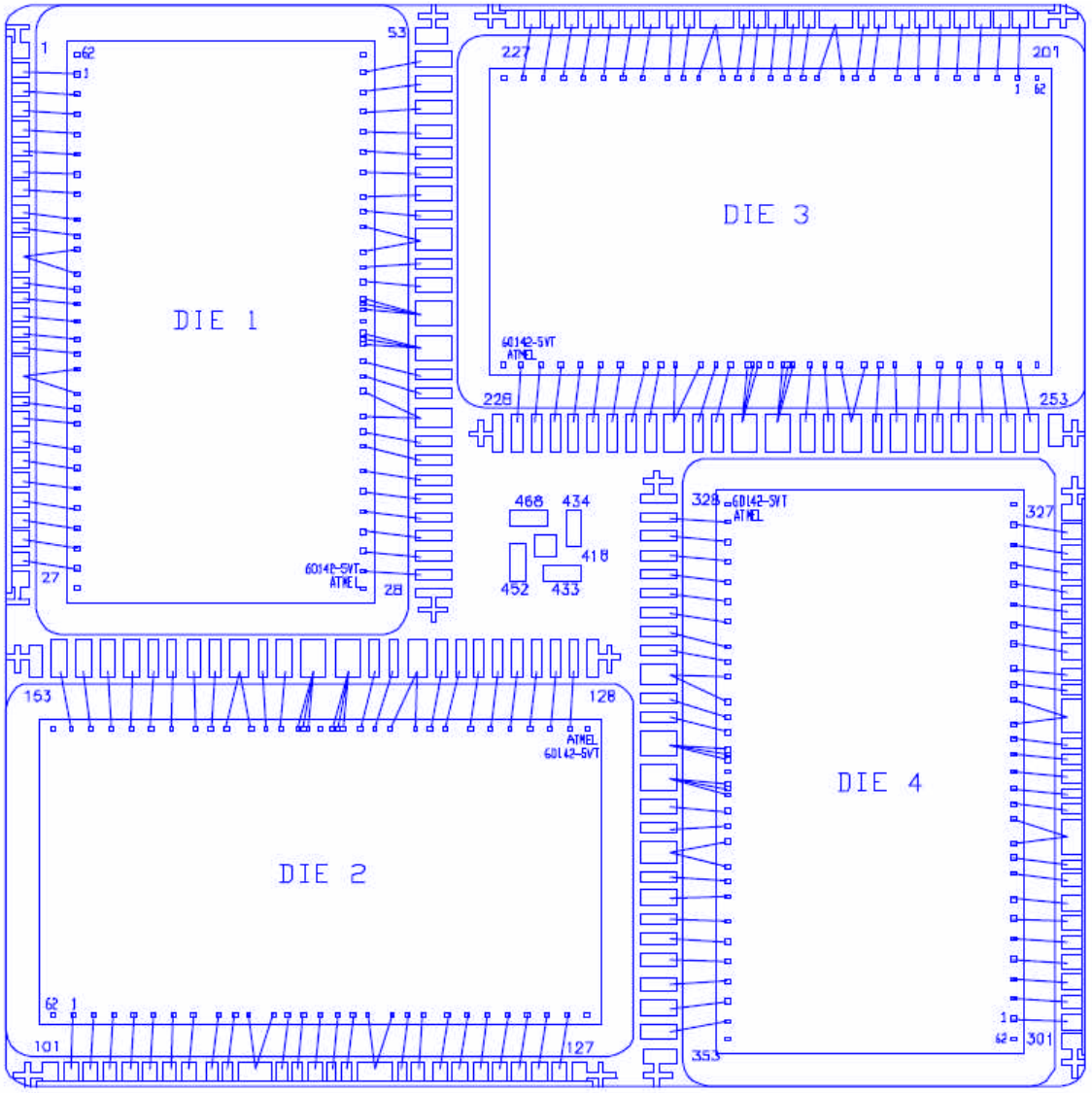
AT68166F/FT MCM SRAM description

- MQFPF_T68 package, 4 of 512Kx8 SRAM AT60142F/FT
- 1 sided cavity Kyocera package
- Same die bonding as all other products (Cyanat Ester) in one pass
- Same wire bonding (32µm Al wire) in one pass
- Same sealing process: 1 Kovar lid with Au.Sn. (80/20) pre-form
- Samples delivered
- FM with Atmel qualification July 06

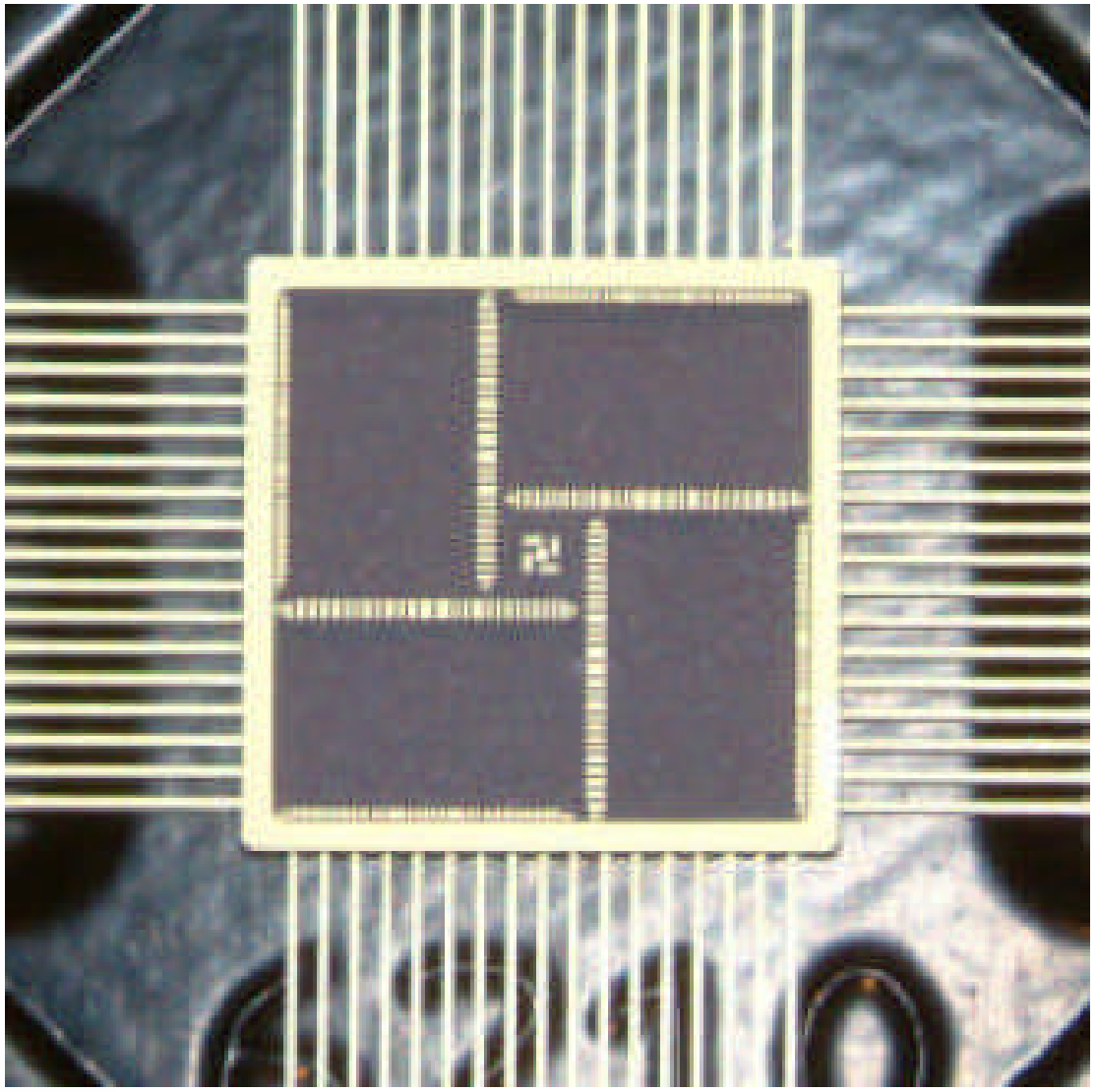
MCM SRAM: cavity layout



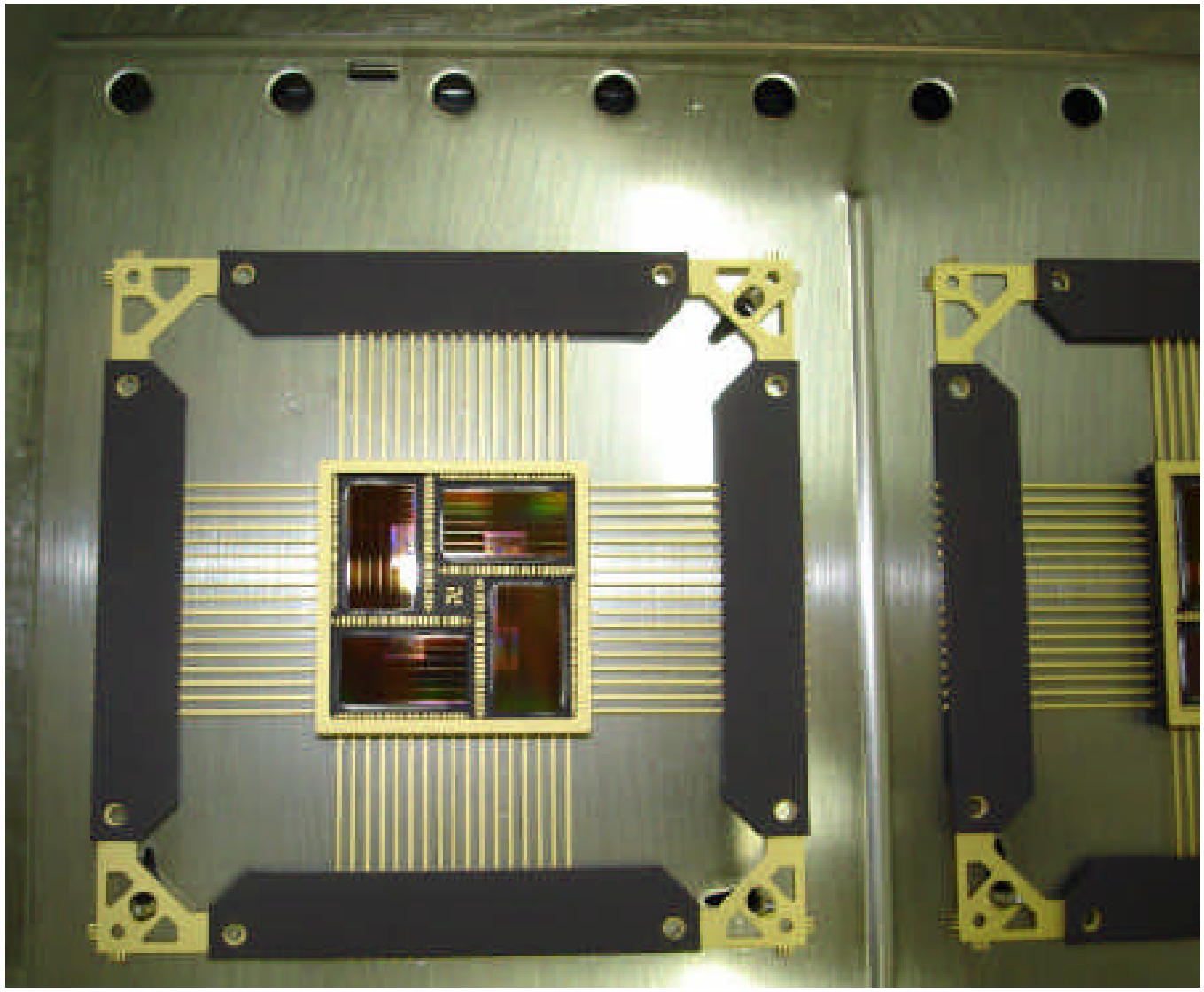
MCM SRAM: bonding diagram



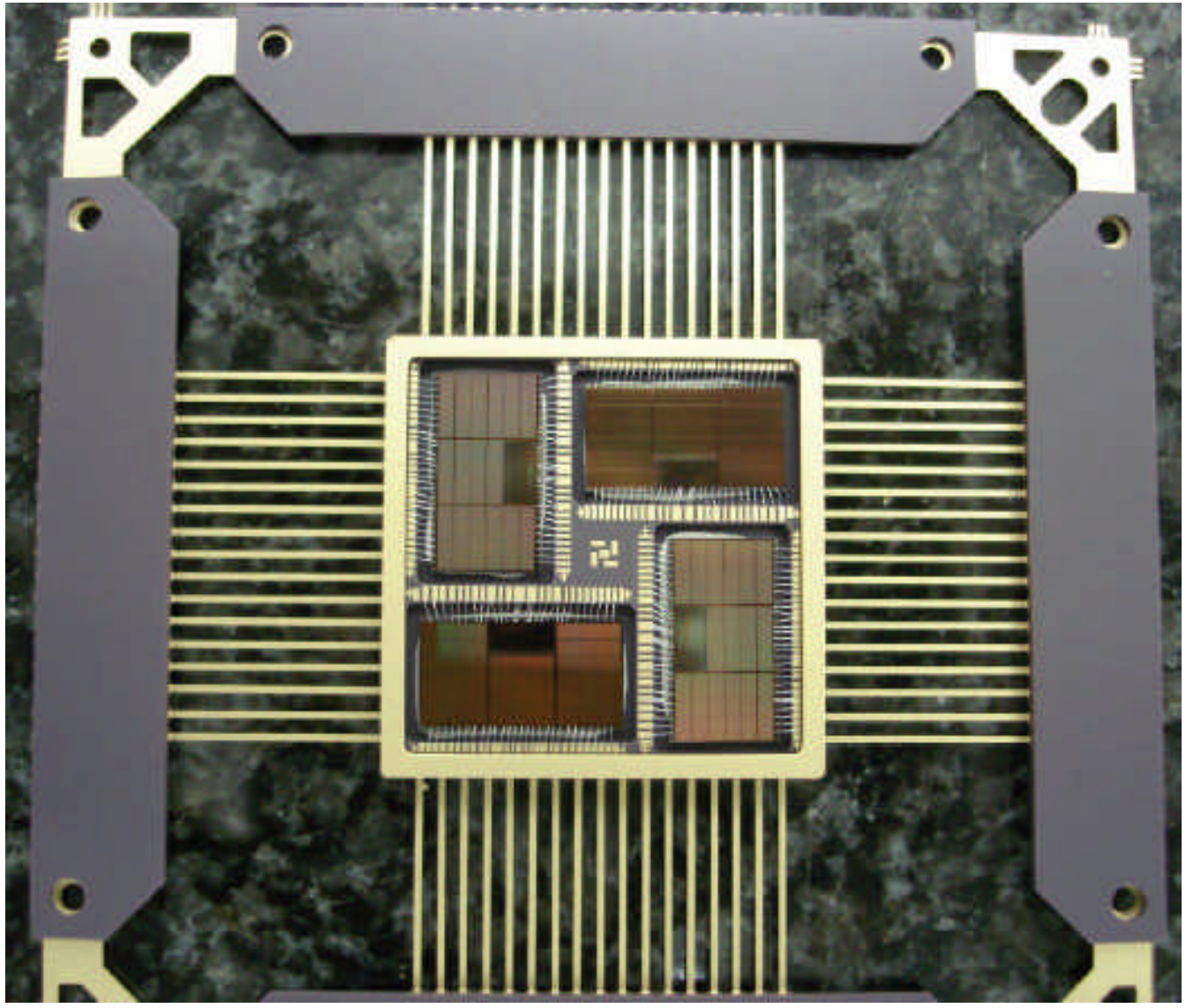
MCM SRAM: raw material



MCM with die bonded

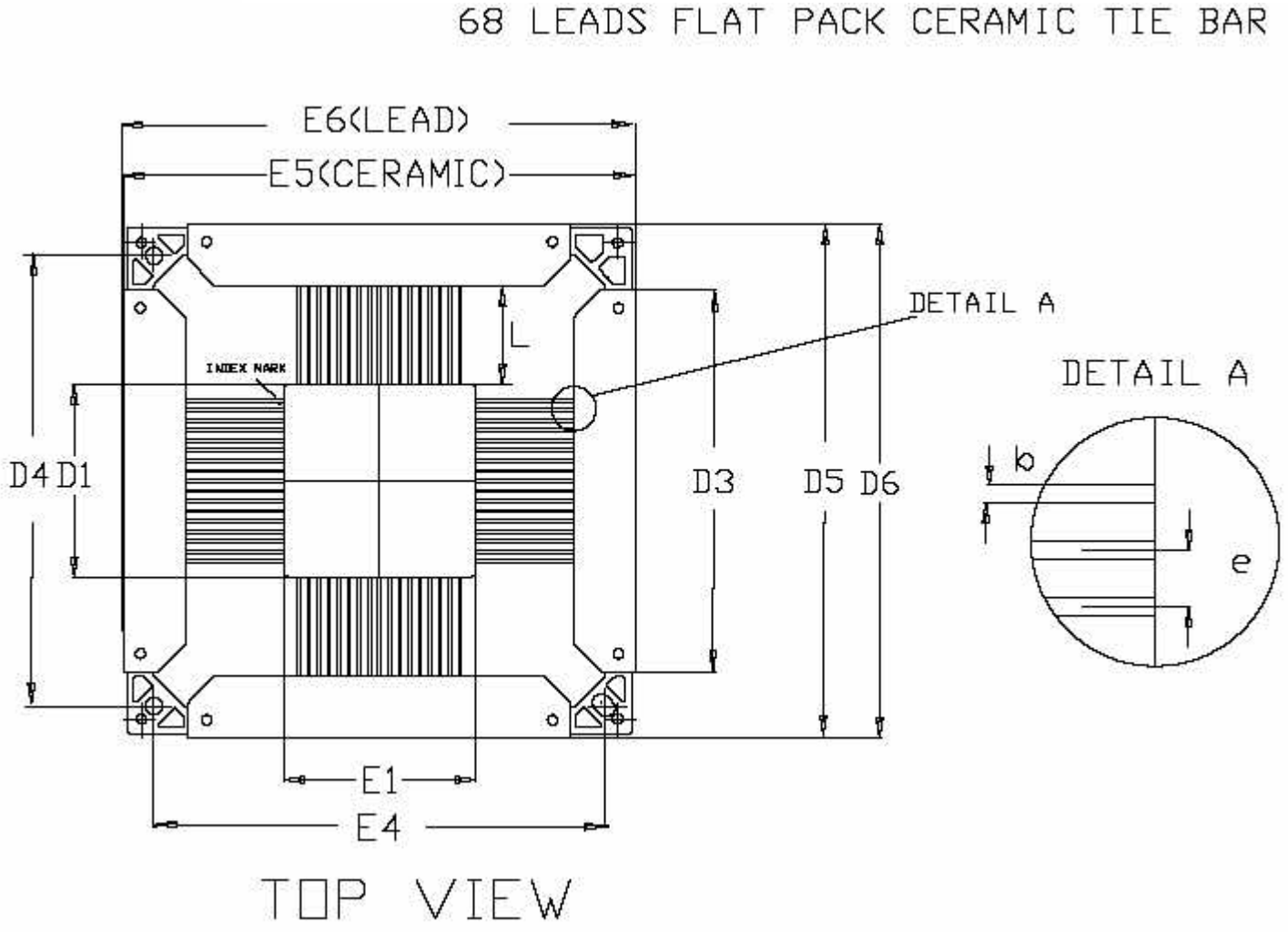


MCM with wire bonding

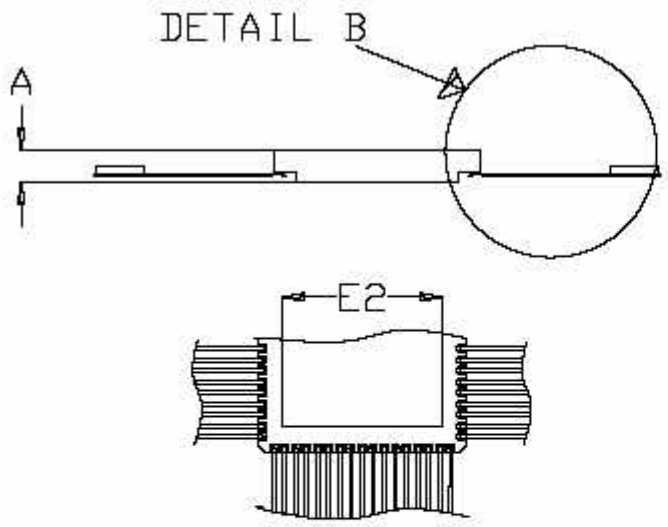


MCM sample in its packing

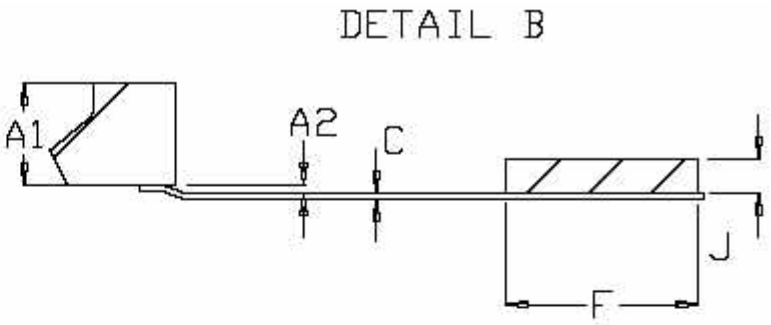
MCM SRAM: outline (1)



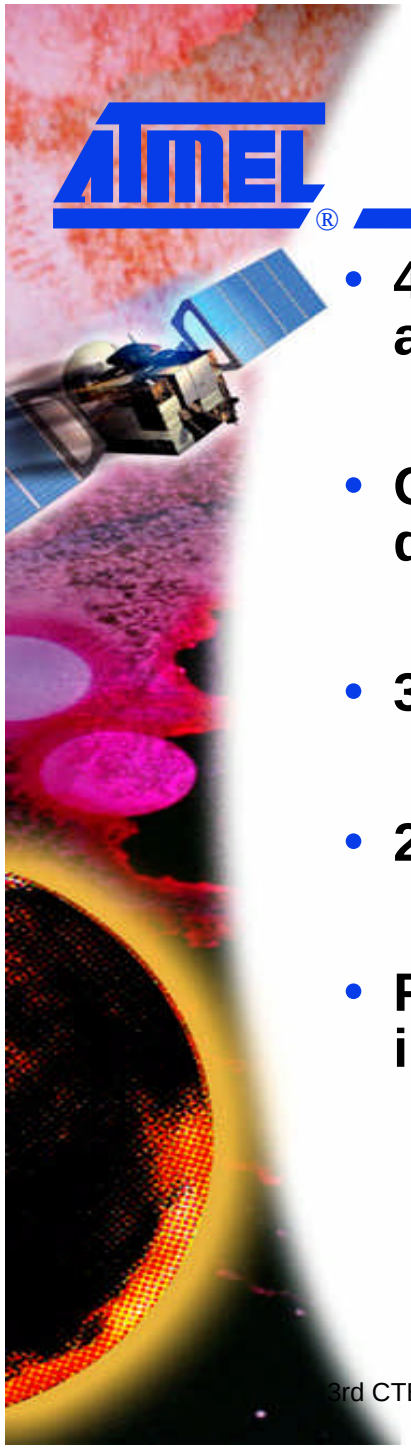
MCM SRAM: outline (2)



BOTTOM VIEW

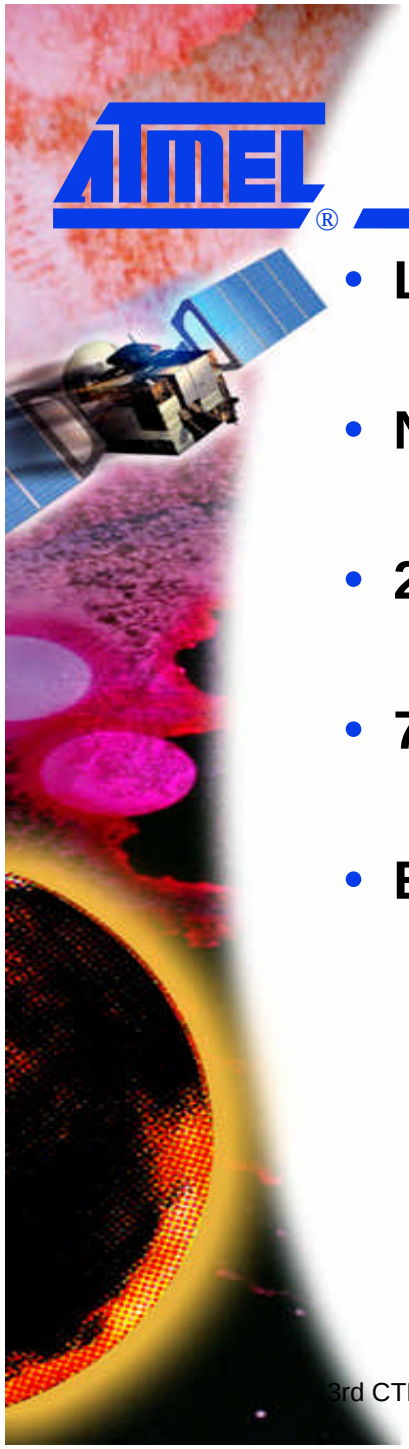


	mm		inch	
	min	max	min	max
E1/D1	24.14 REF		.950 REF	
E2	18.30	19.00	.720	.748
D3	42.67	43.69	1.680	1.720
E4/D4	54.36 REF		2.140 REF	
E5/D5	63.38 REF		2.495 REF	
E6/D6	/	64.14	/	2.525
J	0.76	1.02	.030	.040
L	12.00 REF		.472 REF	
F	7.62 REF		.300 REF	
C	0.18	0.25	.007	.010
A	3.72	4.70	.146	.185
A1	2.72	3.41	.107	.134
A2	0.20	BSC	.008	BSC
e	1.27	BSC	.050	BSC
b	0.33	0.43	.013	.017



16Mb SRAM MCM: AT68166F/FT (1)

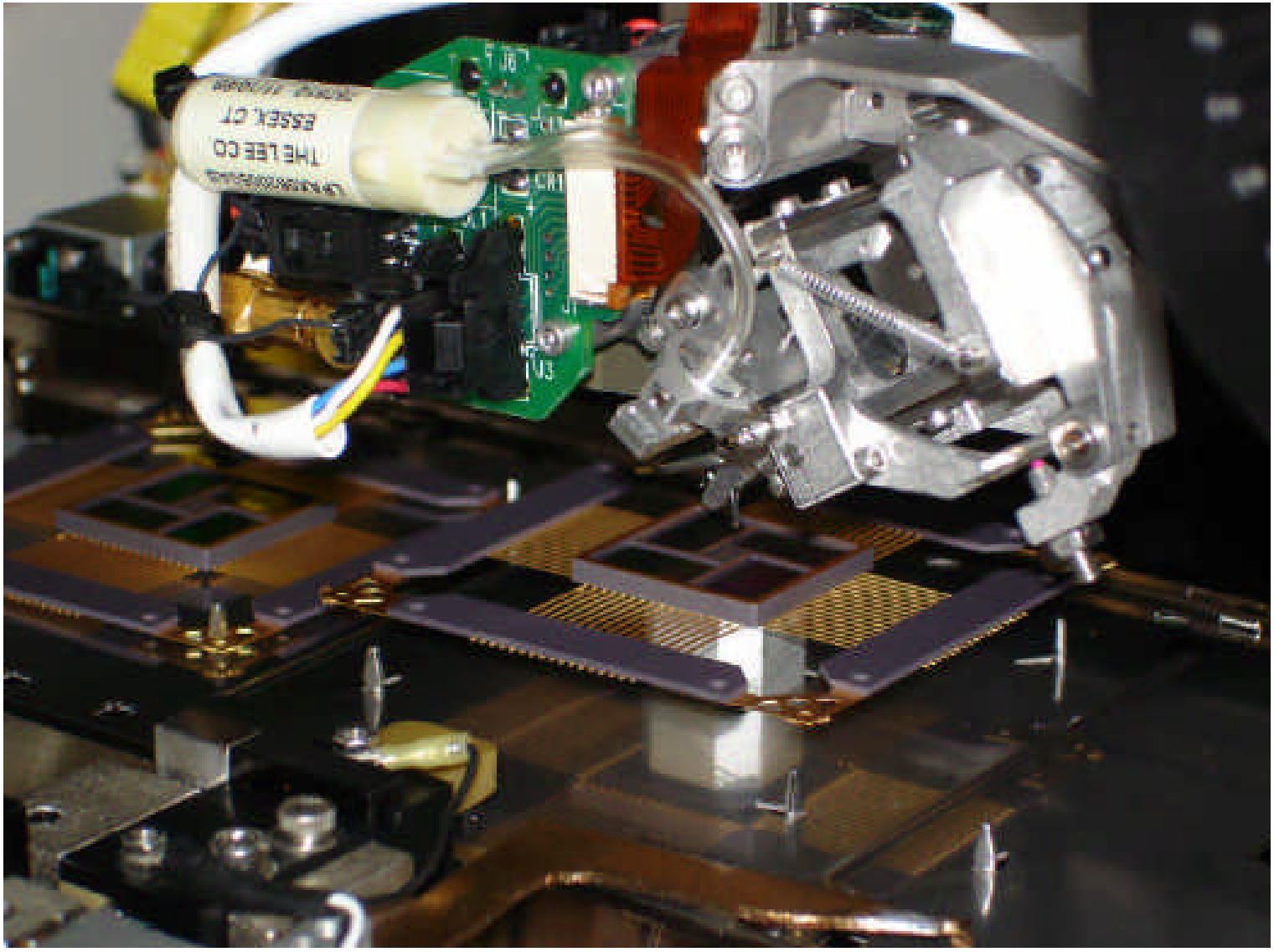
- 4 off 512Kx8 SRAM die (F and/or FT) which can be used as either 1 off 512Kx32, 2 off 512Kx16, or 4 off 512Kx8
- QFP68 pins, 1 sided cavity package for optimized power dissipation
- 3.3+/-0.3V specification, w.o. or w. 5V tolerant Inputs
- 25 ns address access time sampled
- Further improvements will bring the speed down to 20 ns in a first step, and later on, to 15-17 ns



16Mb SRAM MCM: AT68166F/FT (2)

- **Latch up immune, tested up to 300Krads**
- **No MBU**
- **2.5 mA stand by current**
- **720/680 mA @ 15/17 ns & 3.3V**
- **ESCC & QML V (5962-06229 available for 25 ns 5V Tol)**

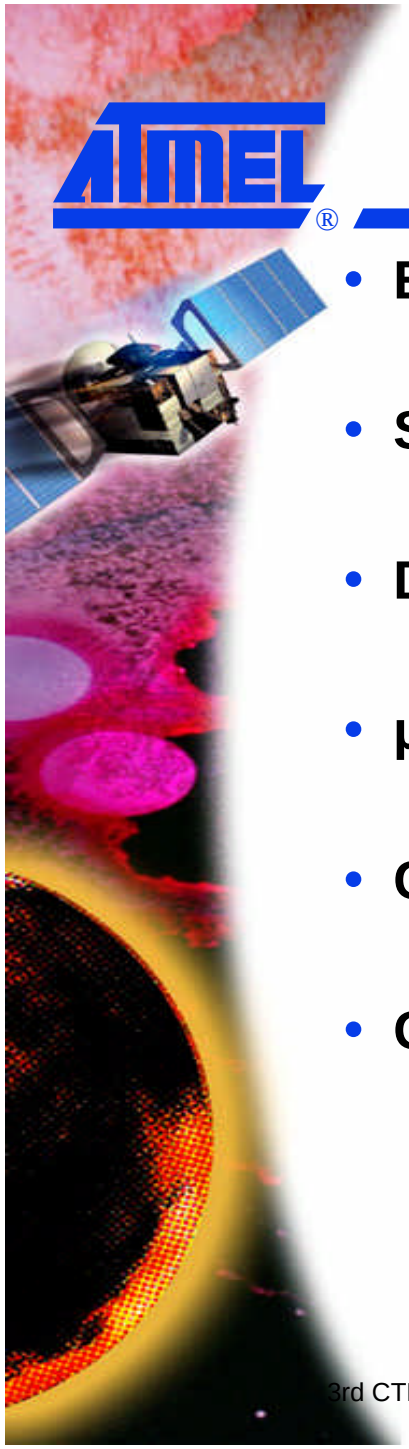
MCM wire bonder



MCM industrial capability

- **Die bonding:**
  - **ESEC type MICRON equipment**
  - **Allows for any rotation for each die**
  - **Up to 4 different types of die**
  - **Cavity size: 70x70mm max**

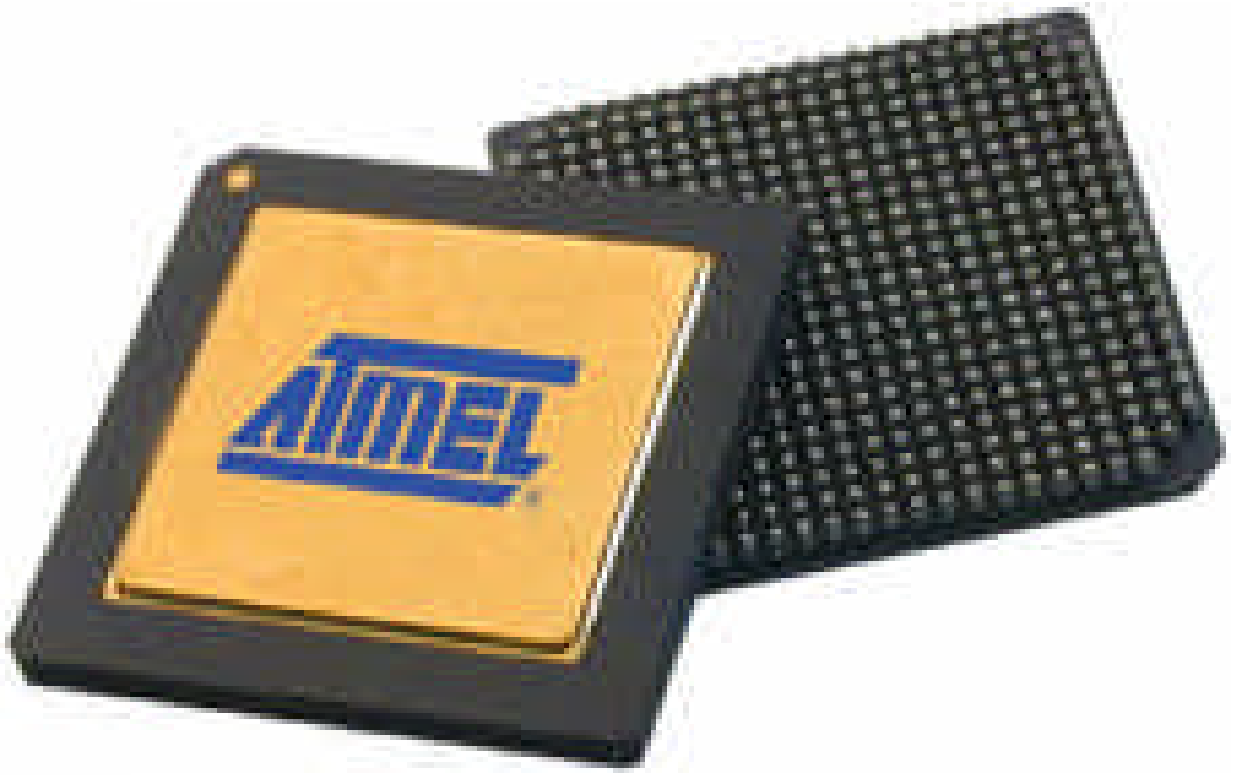
- **Wire bonding:**
  - **Kulicke & Sofa KS8060 equipment**
  - **Allows for any rotation for each die**
  - **32µm Al wire bonding**
  - **63.5 x 63.5 mm for automatic bonding**

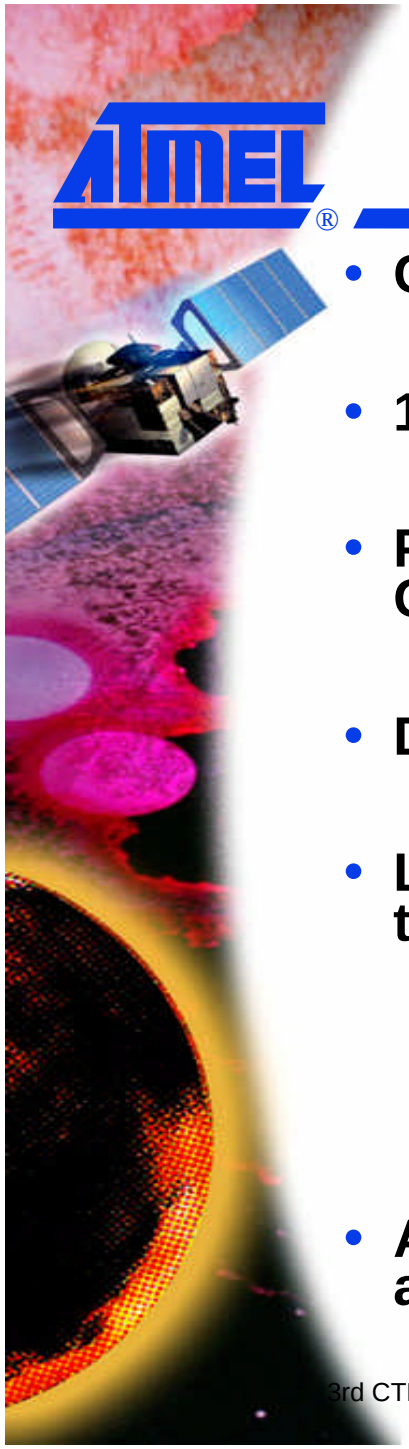


MCM spin off products

- EEPROM
- SRAM and EEPROM
- DPR & FIFO
- µP with caches
- Customized
- Guidelines:
  - Low die count
  - Heterogeneous die MCM size must remain within the limit of the main chip (processor and caches should result in a package size of the processor's one)

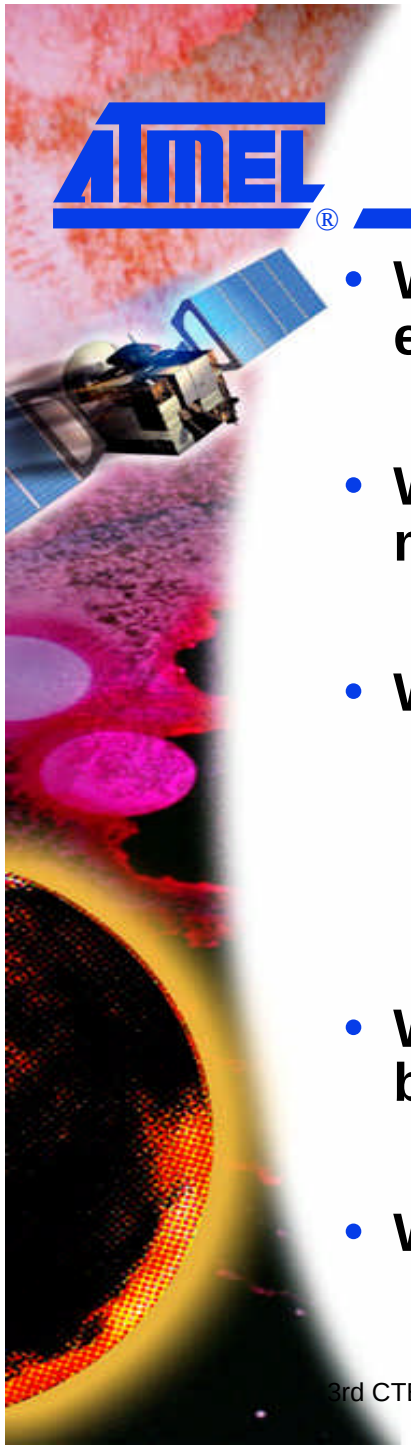
MCGA625





MCGA625 contract status

- CTB-HYB-DAD 3.14.03 kicked off in December 05
- 1 mm pitch 625 MCGA
- Package design completed and samples received at Grenoble
- Daisy chain proposal sent and agreed by Astrium Velizy
- List of beta customers approved by the ESA contract technical officer:
  - SES
  - ASTRIUM
  - A2S
- A joint evaluation plan to be coordinated by Astrium and approved by end of May



MCGA625 contract content

- **Work package 1: Design and specify an MCGA625 with embedded daisy chain of connections Completed**
- **Work package 2: Check the feasibility of the SCI mounting on the CLGA Just started**
- **Work package 3:**
  - **Procure prototypes and define the screening flow (test socket insertion, burn-in temperature…)**
  - **Deliver daisy chain to beta customers**
- **Work package 4: Develop a cavity compatible with the biggest ATC18RHA ASIC size, the ATC18RHA95_504**
- **Work package 5: Final report**

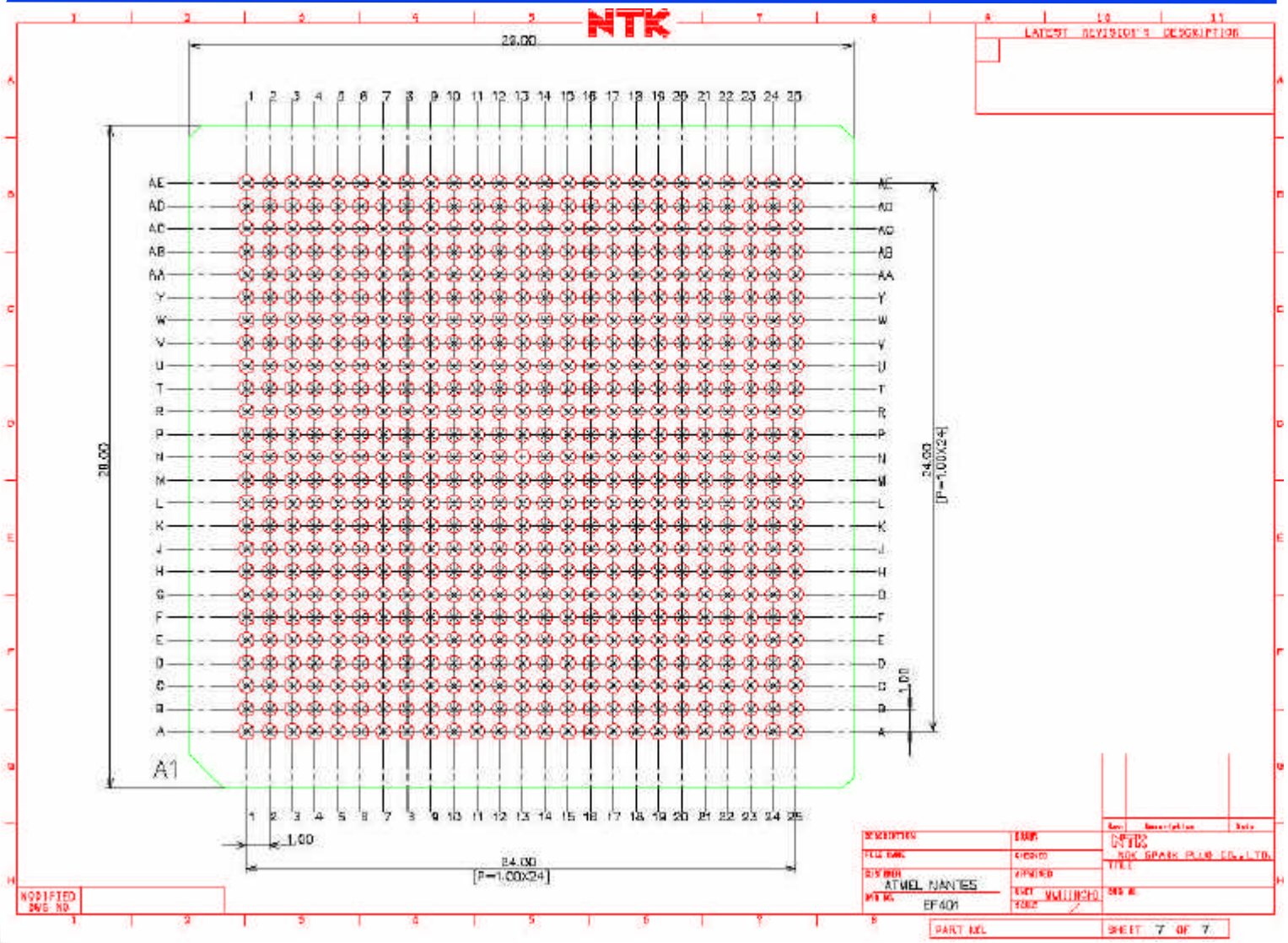
MCGA625 sampling plan

- **Alcatel Alenia Space:**
  - **Alcatel Alenia Space, Toulouse , France** **8#**
  - **Alcatel Alenia Space, Roma, Italy** **8#**
  - **Alcatel Alenia Space, Charlerois, Belgium** **8#**
- **Astrium, in Velizy, France** **16#**
- **Saab Ericsson Space** **16#**
- **TOTAL** **56#**

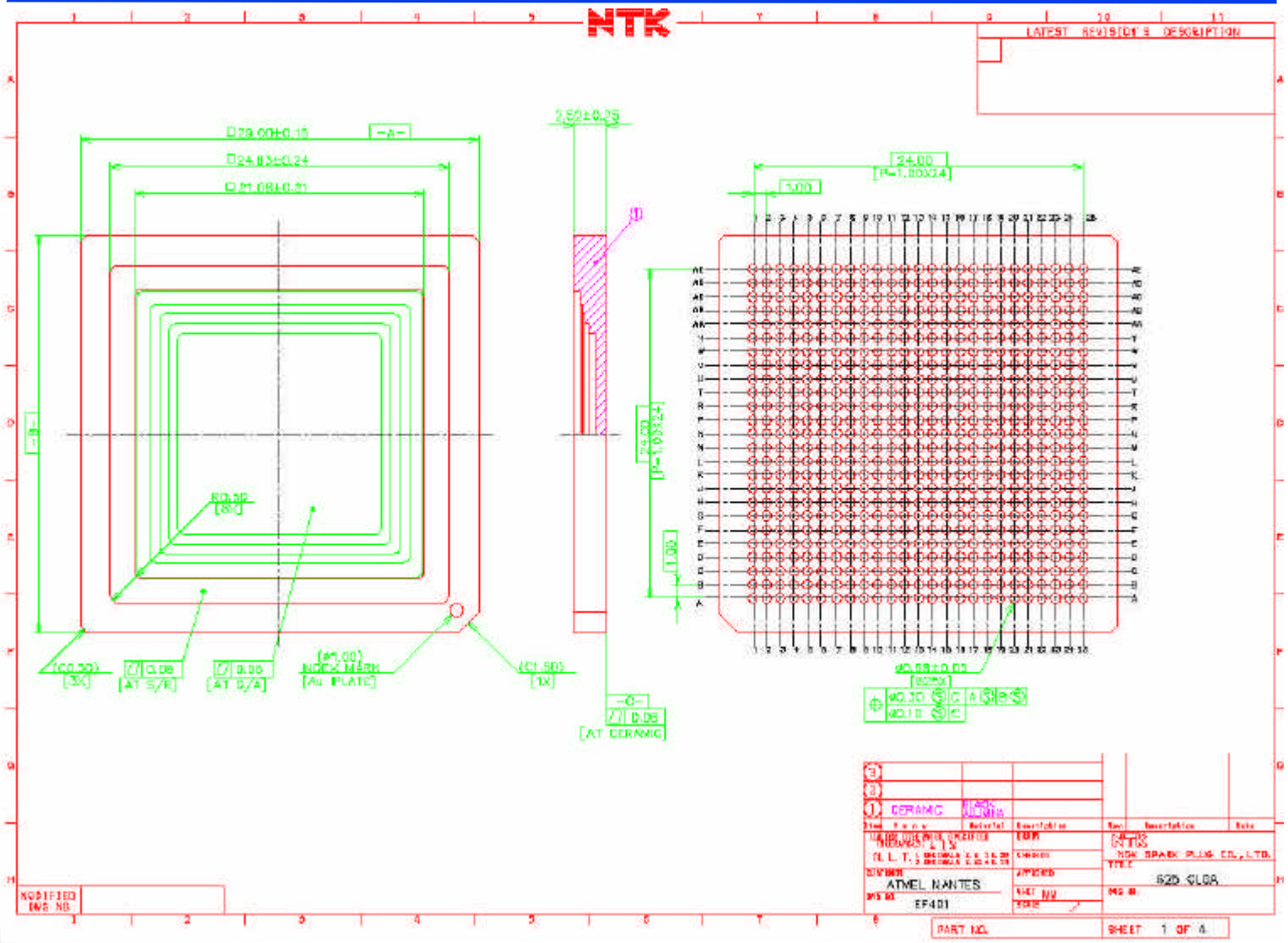
Schedule

	01/06	02/06	03/06	04/06	05/06	06/06	07/06	08/06	09/06	10/06	11/06	12/06	01/07
Work package 1													
Definition of LGA & SCI	=												
Fabrication of SCI	===	===	===	===									
Fabrication of LGA	===	===	===	===									
Work package 2													
Reflow profile definition	===												
Centering tool design	===												
SCI attachment					==	=							
RX inspection						=							
Report validation						==	=						
Electrical tests							==						
Work package 3													
Daisy chain assembly								==					
Daisy chain test									==				
Daisy chain sent to beta										=			
Work package 4													
New cavity design				===	===	===	===	===	===	===	===		
Work package 5													
Final report												===	===

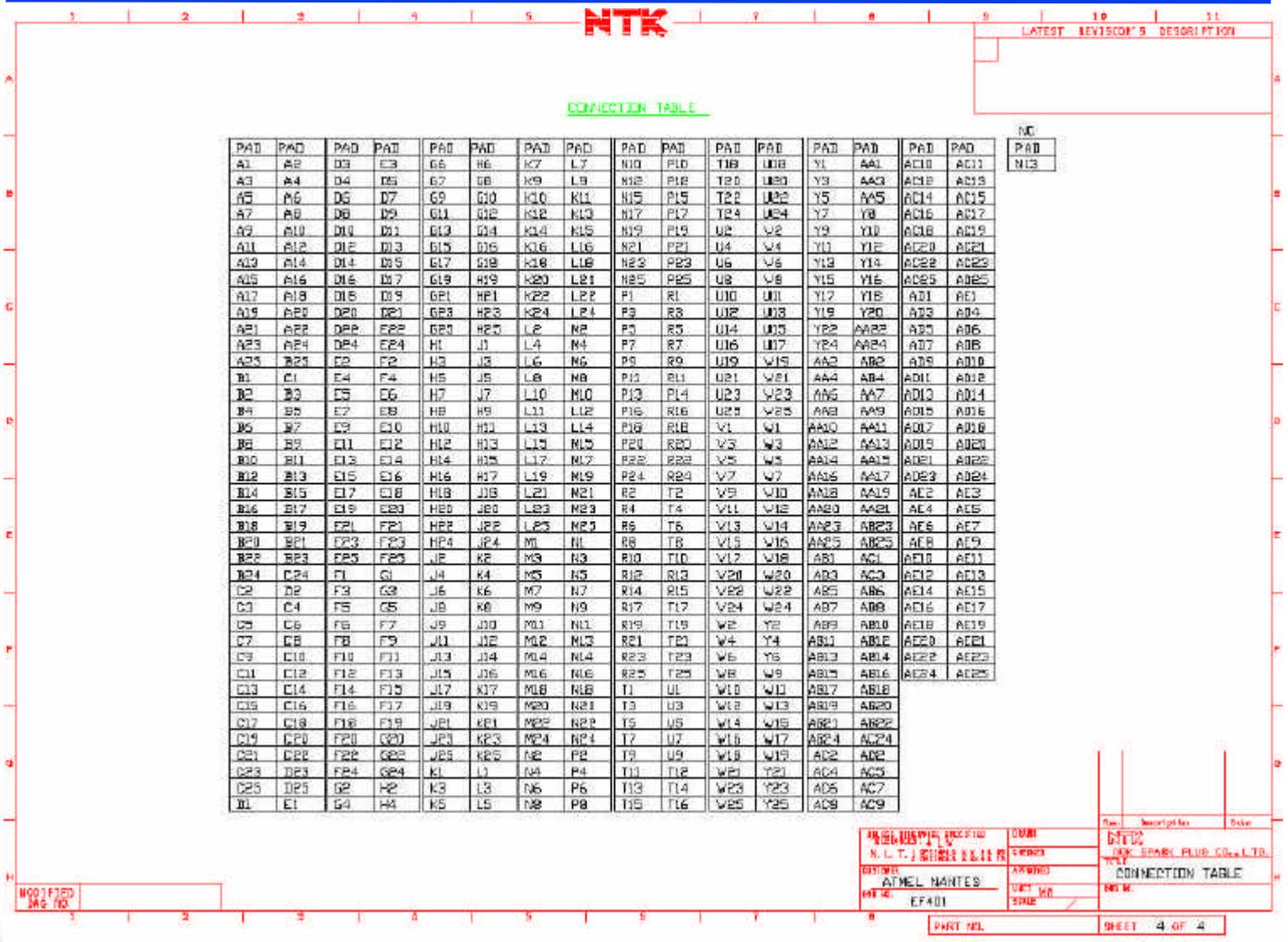
MCGA625 bottom view



MCGA625 top view



Daisy chain connection table



NTK

CONNECTION TABLE

PAD	PAD	PAD	PAD	PAD	PAD	PAD	PAD	PAD	PAD	PAD	PAD	PAD	PAD	PAD	PAD
A1	A2	D3	E3	G6	H6	K7	L7	N10	P10	T18	U18	Y1	AA1	AC10	AC11
A3	A4	D4	D5	G7	G8	K9	L9	N12	P12	T20	U20	Y3	AA3	AC12	AC13
A5	A6	D6	D7	G9	G10	K10	K11	N15	P15	T22	U22	Y5	AA5	AC14	AC15
A7	A8	D8	D9	G11	G12	K12	K13	N17	P17	T24	U24	Y7	Y8	AC16	AC17
A9	A10	D10	D11	G13	G14	K14	K15	N19	P19	U2	V2	Y9	Y10	AC18	AC19
A11	A12	D12	D13	G15	G16	K16	L16	N21	P21	U4	V4	Y11	Y12	AC20	AC21
A13	A14	D14	D15	G17	G18	K18	L18	N23	P23	U6	V6	Y13	Y14	AC22	AC23
A15	A16	D16	D17	G19	H19	K20	L21	N25	P25	U8	V8	Y15	Y16	AC25	AD25
A17	A18	D18	D19	GP1	HP1	K22	L22	P1	R1	U10	U11	Y17	Y18	AD1	AE1
A19	AP0	D20	D21	GP3	H23	K24	L24	P3	R3	U12	U13	Y19	Y20	AD3	AD4
AP1	AP2	DP2	E22	GP5	H25	L2	M2	P5	R5	U14	U15	Y20	AA22	AD5	AD6
AP3	AP4	DP4	EP4	H1	J1	L4	M4	P7	R7	U16	U17	YP4	AAP4	AD7	AD8
AP5	B25	E2	F2	H3	J3	L6	M6	P9	R9	U19	V19	AA2	AB2	AD9	AD10
B1	C1	E4	F4	H5	J5	L8	M8	P11	R11	U21	V21	AA4	AB4	AD11	AD12
B2	B3	E5	E6	H7	J7	L10	M10	P13	P14	U23	V23	AA6	AA7	AD13	AD14
B4	B5	E7	E8	H8	H9	L11	L12	P16	R16	U25	V25	AA8	AA9	AD15	AD16
B6	B7	E9	E10	H10	H11	L13	L14	P18	R18	V1	W1	AA10	AA11	AD17	AD18
B8	B9	E11	E12	H12	H13	L15	M15	P20	R20	V3	W3	AA12	AA13	AD19	AD20
B10	B11	E13	E14	H14	H15	L17	M17	P22	R22	V5	W5	AA14	AA15	AD21	AD22
B12	B13	E15	E16	H16	H17	L19	M19	P24	R24	V7	W7	AA16	AA17	AD23	AD24
B14	B15	E17	E18	H18	J18	L21	M21	R2	T2	V9	V10	AA18	AA19	AE2	AE3
B16	B17	E19	E20	HP0	J20	L23	M23	R4	T4	V11	V12	AA20	AA21	AE4	AE5
B18	B19	F21	FP1	HP2	J22	L25	M25	R6	T6	V13	V14	AA23	AB23	AE6	AE7
B20	BP1	D23	F23	HP4	J24	M1	N1	R8	T8	V15	V16	AA25	AB25	AE8	AE9
BP2	BP3	FP5	F25	JP	K2	M3	N3	R10	T10	V17	V18	AB1	AC1	AE10	AE11
B24	C24	F1	G1	J4	K4	M5	N5	R12	R13	V20	W20	AB3	AC3	AE12	AE13
C2	D2	F3	G3	J6	K6	M7	N7	R14	R15	V22	W22	AB5	AB6	AE14	AE15
C3	C4	F5	G5	J8	K8	M9	N9	R17	T17	V24	W24	AB7	AB8	AE16	AE17
C5	C6	F6	F7	J9	J10	M11	N11	R19	T19	W2	Y2	AB9	AB10	AE18	AE19
C7	C8	F8	F9	J11	J12	M12	N13	R21	T21	W4	Y4	AB11	AB12	AE20	AE21
C9	C10	F10	F11	J13	J14	M14	N14	R23	T23	W6	Y6	AB13	AB14	AE22	AE23
C11	C12	F12	F13	J15	J16	M16	N16	R25	T25	W8	W9	AB15	AB16	AE24	AE25
C13	C14	F14	F15	J17	K17	M18	N18	T1	U1	W10	W11	AB17	AB18		
C15	C16	F16	F17	J19	K19	M20	N21	T3	U3	W12	W13	AB19	AB20		
C17	C18	F18	F19	JP1	KP1	M22	N22	T5	U5	W14	W15	AB21	AB22		
C19	CP0	F20	G20	JP3	K23	M24	N24	T7	U7	W16	W17	AB24	AC24		
C21	CP2	F22	G22	JP5	K25	M2	P2	T9	U9	W18	W19	AC2	AD2		
C23	DP3	FP4	GP4	K1	L1	M4	P4	T11	T12	W21	Y21	AC4	AC5		
C25	DP5	G2	H2	K3	L3	M6	P6	T13	T14	W23	Y23	AC6	AC7		
D1	E1	G4	H4	K5	L5	M8	P8	T15	T16	W25	Y25	AC8	AC9		

NC

PAD
N13

LATEST REVISION'S DESCRIPTION

MODIFIED DWG NO

ATMEL NANTES

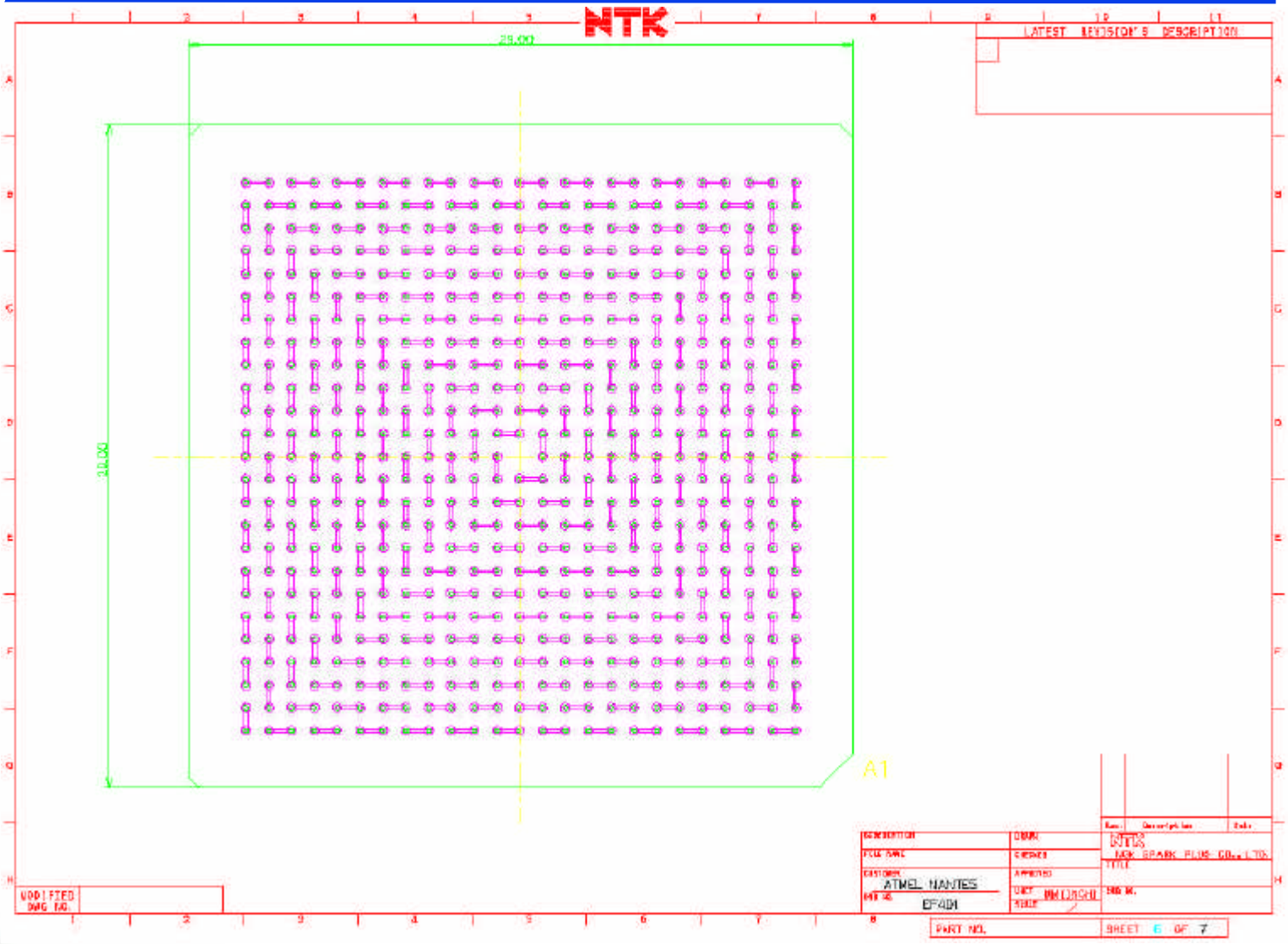
EF401

CONNECTION TABLE

PART NO.

SHEET 4 OF 4

MCGA625 daisy chain physical layout



Ceramic packages offering and roadmap