3D PLUS SPACE MEMORY MODULE P/N DECODER

	1	2	3	4	5	6	7	8	9	10	11	12	13
3D	XX	000X	00	X	X	0	000	X	X	X	X	00	X

Ex: 3DFN32G08US2845 IS R00M

1 Type

SR: Static RAM
SD: Synchronous DRAM
1D: DDR1
2D: DDR2
3D: DDR3
4D: DDR4
PO: PROM
EE: EEPROM
FR: FRAM
FS: Flash SPI
MN: MNEMOSYNE
MR: MRAM
FN: Flash NAND
FO: Flash NOR
SS: Smart NAND Flash System

2 Density

nnnK: nnn Kilobit **nnnM**: nnn Megabit **nnnG**: nnn Gigabit **nnnT**: nnn Terabit

3 Bus width

01: x1 bit **08**: x8 bits **32:** x32 bits **48**: x48 bits **72**: x72 bits **nn**: xnn bits
04: x4 bits **16**: x16 bits **40**: x40 bits **64**: x64 bits **80**: x80 bits

4 Voltage supply

C: 5.00 V **V**: 3.30 V **S:** 2.80 V **T**: 2.50 V **U**: 1.80 V **W**: 1.50 V
Y: 1.35 V **L**: 1.20 V

For dual voltage modules, the lowest voltage supply is used.

5 Package

B: BGA **C**: Connector **F:** Flat Pack **J**: QFJ **L**: LGA **P**: PGA
Q: QFP **S**: SOP

6 Stacked layers

1: 1 layer **2**: 2 layers **4:** 4 layers **8**: 8 layers **A**: 10 layers **n**: n layers

7 Control Features

nnn: Product Flyer or Datasheet number

8 Temperature range

C: +0 °C to +70 °C
I: -40 °C to +85 °C
M: -55 °C to +125 °C
S: Specific

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Capital de 1 554 867 euros
RCS Versailles B 402 523 088
TVA FR 77402523088

9 Screening level

N: Commercial grade

B: Industrial grade

S: Space grade

10 Screening and LAT options

: The Space grade is derived from the ESA Qualified Quality Grade for Space applications (Category 1 hybrid Manufacturer as per ECSS-Q-ST-60-05C).

1: The Space grade is derived from the ESA Qualified Quality Grade for Space applications (Category 1 hybrid Manufacturer as per ECSS-Q-ST-60-05C and ECSS-Q-ST-60-13C).

P1: For Space grade modules, screening and qualification flow compliant with PEM-INST-001 Level 1 (for microcircuit plastic encapsulated only). The EEE-INST-002 can be applied as well on demand for other components than microcircuit plastic encapsulated

P2: For Space grade modules, screening and qualification flow compliant with PEM-INST-001 Level 2 (for microcircuit plastic encapsulated only). The EEE-INST-002 can be applied as well on demand for other components than microcircuit plastic encapsulated

H: Burn-in is performed according to MIL-STD-883 on industrial grade modules

C: Custom screening as per Custom Product Detail Specification

11 Radiation assurance for space grade modules

A: Generic radiation data available

R: Specific radiation data tested

12 Speed/access time

00: N/A	MRAM	FRAM	DDR1 X X	
	40: 40 ns	**60: 60 ns**	**X**	**X**
		55: 55 ns	**5: 200 MHz**	**C: CL3**

SRAM	SDRAM	DDR2 X X		DDR3 X X	
10: 10 ns	**60: 6.0 ns**	**X**	**X**	**X**	**X**
12: 12 ns	**70: 7.0 ns**	**4: 200 MHz**	**A: CL =3**	**H: 667 MHz**	**9: CL=9**
15: 15 ns	**75: 7.5 ns**	**6: 333 MHz**	**E: CL =5**		

13 Coating,tinning, shielding options

: No option by default

L: SnPb termination

A: "ARATHANE" finish

M: "MAPSIL" finish

T: Tantalum shielding

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OVERVIEW

Our Radiation Tolerant SPI NOR Flash are latchup immune, 3.3 V powered memories featuring small pin count and serial interface. They also offer no bad block, high endurance and long time data retention. They are offered in SOP package for high resistance Surface Mount (SMT) assembly and for withstanding harsh thermal and mechanical environments.

This product line is split into two sub-families:

- QSPI modules offering high density and high speed (up to 133 MHz)
- TMR modules offering SEU immunity (due to to the triple modular redundancy) and better TID tolerance through an integrated switch.

First released in 2018, 3D PLUS SPI NOR Flash are used as configuration memory for SRAM-based FPGAs or as boot/program memory for leading processors. These memory modules have been used on missions such as **EMIT** and **others**.

KEY FEATURES



Up to 133 MHz for QSPI, 50 MHz for TMR modules

Small footprint

Radiation tolerance for QSPI modules:

TID > 20 krad(Si)

SEL LET_{th} > 62.5 MeV.cm²/mg

SEU LET_{th} > 15.0 MeV.cm²/mg; σ_{sat} = 7.5e-11 cm²/bit

Available in all 3D PLUS screening and qualification options:

Commercial (C)

Industrial (I)

Space qualified (S)



20 years data retention

100, 000 erase/program cycles

Radiation tolerance for TMRed modules:

TID > 20 krad (Si) mode ON

TID > 40 krad(Si) mode OFF

SEL LET_{th} > 62.5 MeV.cm²/mg

SEU Immune by TMR

Long life cycle products with proven reliability in Space

No pure tin guarantee

Large and worldwide flight heritage

LINE UP

LINE UP

Each 3D PLUS standard product and SiP solution are defined by a specific part number based on the *part number decoder* provided below. The ordering information consist as a minimum of the following 3 items for fully define a product:

- The product's Part Number
- The temperature range
- The screening level

For High Reliability products or SiPs for Aerospace applications, a Source Control Drawing (SCD#) referenced 3DPA-xxxx is available for each product. It shall be used for its procurement in addition to other ordering information.