

To all our customers

Regarding the change of names mentioned in the document, such as Mitsubishi Electric and Mitsubishi XX, to Renesas Technology Corp.

The semiconductor operations of Hitachi and Mitsubishi Electric were transferred to Renesas Technology Corporation on April 1st 2003. These operations include microcomputer, logic, analog and discrete devices, and memory chips other than DRAMs (flash memory, SRAMs etc.) Accordingly, although Mitsubishi Electric, Mitsubishi Electric Corporation, Mitsubishi Semiconductors, and other Mitsubishi brand names are mentioned in the document, these names have in fact all been changed to Renesas Technology Corp. Thank you for your understanding. Except for our corporate trademark, logo and corporate statement, no changes whatsoever have been made to the contents of the document, and these changes do not constitute any alteration to the contents of the document itself.

Note : Mitsubishi Electric will continue the business operations of high frequency & optical devices and power devices.

Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

PRELIMINARY

Notice : This is not a final specification.
Some parametric limits are subject to change.

MITSUBISHI LSIs M5M29GB/T320WG 33,554,432-BIT (4,194,304-WORD BY 8-BIT / 2,097,152-WORD BY16-BIT) CMOS 3.3V-ONLY, BLOCK ERASE FLASH MEMORY

DESCRIPTION

The MITSUBISHI Mobile FLASH M5M29GB/T320WG are 3.3V-only high speed 33,554,432-bit CMOS boot block Flash Memories with alternating BGO (Back Ground Operation) feature. The BGO feature of the device allows Program or Erase operations to be performed in one bank while the device simultaneously allows Read operations to be performed on the other bank. This BGO feature is suitable for mobile and personal computing, and communication products. The M5M29GB/T320WG are fabricated by CMOS technology for the peripheral circuits and DINOR(Divided bit line NOR) architecture for the memory cells, and are available in 6 x 8 balls CSP(0.8mm ball pitch) .

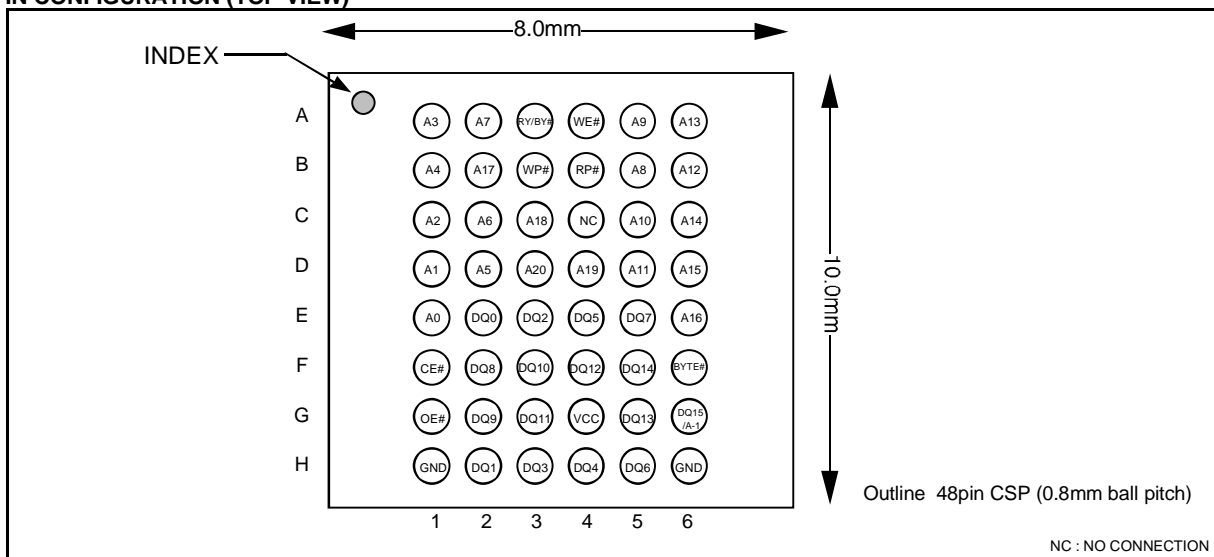
FEATURES

- Organization 2,097,152 word x 16bit
..... 4,194,304 word x 8 bit
- Supply voltage Vcc = 2.7 ~ 3.6V
- Access time 80ns (Vcc=3.0~3.6V)
..... 90ns (Vcc=2.7~3.6V)
- Power Dissipation
 - Read 72 mW (Max. at 5MHz)
 - (After Automatic Power saving) 0.33μW (typ.)
 - Program/Erase 126mW (Max.)
 - Standby 0.33μW (typ.)
 - Deep power down mode 0.33μW (typ.)
- Auto program for Bank(I) and Bank(II)
 - Program Time 4ms (typ.)
 - Program Unit
 - (Byte Program) 1word/1byte
 - (Page Program) 128word/256byte
- Auto program for Bank(III) and Bank(IV)
 - Program Time 4ms (typ.)
 - Program Unit 128word/256byte
- Auto Erase
 - Erase time 40 ms (typ.)
 - Erase Unit
 - Bank(I) Boot Block 4Kword/8Kbyte x 2
 - Parameter Block 4Kword/8Kbyte x 6
 - Main Block 32Kword/64Kbyte x 7
 - Bank(II) Main Block 32Kword/64Kbyte x 8
 - Bank(III) Main Block 32Kword/64Kbyte x 24
 - Bank(IV) Main Block 32Kword/64Kbyte x 24
- Program/Erase cycles 100Kcycles
- Boot Block
 - M5M29GB320WG Bottom Boot
 - M5M29GT320WG Top Boot
- Other Functions
 - Soft Ware Command Control
 - Selective Block Lock
 - Erase Suspend/Resume
 - Program Suspend/Resume
 - Status Register Read
 - Alternating Back Ground Program/Erase Operation Between Bank(I) ,Bank(II),Bank(III) and Bank(IV)
- Package
 - 8mm x 10mm CSP (Chip Scale Package)
 - 6 x 8 balls, 0.8mm ball pitch

APPLICATION

Code Strage
Digital Cellular Phone
Telecommunication
Mobile Computing Machine
PDA (Personal Digital Assistance)
Car Navigation System
Video Game Machine

PIN CONFIGURATION (TOP VIEW)



PRELIMINARY

Notice : This is not a final specification.
Some parametric limits are subject to change.

MITSUBISHI LSIs
M5M29GB/T320WG
33,554,432-BIT (4,194,304-WORD BY 8-BIT / 2,097,152-WORD BY 16-BIT)
CMOS 3.3V-ONLY, BLOCK ERASE FLASH MEMORY

Keep safety first in your circuit designs!

-Mitsubishi Electric Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of non-flammable material or (iii) prevention against any malfunction or mishap.

Notes regarding these materials

-These materials are intended as a reference to assist our customers in the selection of the Mitsubishi semiconductor product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Mitsubishi Electric Corporation or a third party.

-Mitsubishi Electric Corporation assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.

-All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by Mitsubishi Electric Corporation without notice due to product improvements or other reasons. It is therefore recommended that customers contact Mitsubishi Electric Corporation or an authorized Mitsubishi Semiconductor product distributor for the latest product information before purchasing a product listed herein.

The information described here may contain technical inaccuracies or typographical errors. Mitsubishi Electric Corporation assumes no responsibility for any damage, liability, or other loss rising from these inaccuracies or errors.

Please also pay attention to information published by Mitsubishi Electric Corporation by various means including the Mitsubishi Semiconductor home page (<http://www.mitsubishichips.com>).

-When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithms, please be sure to evaluate all information as a total system before making a final decision on the applicability of the information and products. Mitsubishi Electric Corporation assumes no responsibility for any damage, liability or other loss resulting from the information contained herein.

-Mitsubishi Electric Corporation semiconductors are not designed or manufactured for use in a device or system that is used under circumstances in which human life is potentially at stake. Please contact Mitsubishi Electric Corporation or an authorized Mitsubishi Semiconductor product distributor when considering the use of a product contained herein for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.

-The prior written approval of Mitsubishi Electric Corporation is necessary to reprint or reproduce in whole or in part these materials.

-If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license from the Japanese government and cannot be imported into a country other than the approved destination.

Any diversion or reexport contrary to the export control laws and regulations of Japan and/or the country of destination is prohibited.

-Please contact Mitsubishi Electric Corporation or an authorized Mitsubishi Semiconductor product distributor for further details on these materials or the products contained therein.

Copyright 2002 Mitsubishi Electric Corporation. All rights reserved.

Rev.0.2_48a_bazz