To all our customers

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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

M5M29GB/T320WG

PRELIMINARY

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

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) .

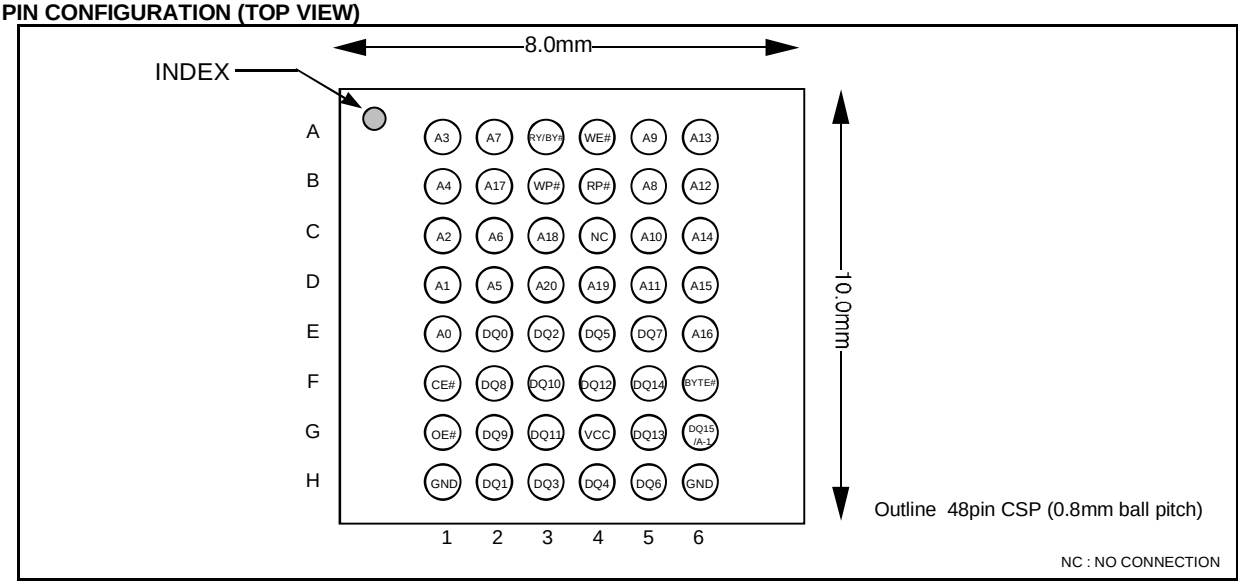
FEATURES

- Organization ..... 2,097,152 word x 16bit
  ..... 4,194,304 word x 8 bit
- Supply voltage ..... V_{CC} = 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)



Outline 48pin CSP (0.8mm ball pitch)

NC : NO CONNECTION

RENESAS
Renesas Technology Corp.

PRELIMINARY

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