

# TS256MLQ64V6U

240PIN DDR2 667 Unbuffered DIMM 0.72"  
2GB With 128Mx8 CL5

## Description

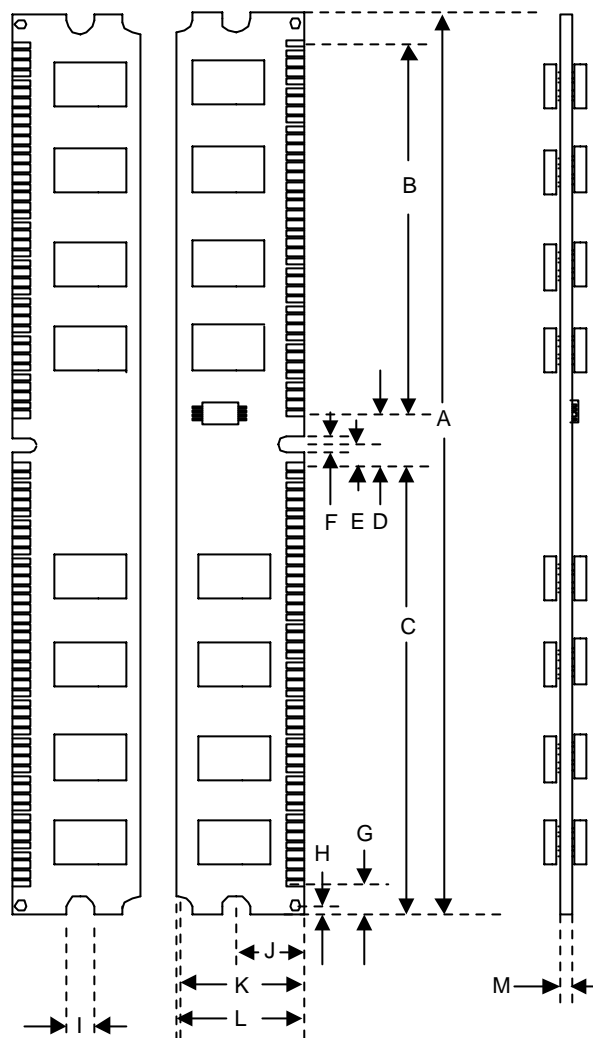
The TS256MLQ64V6U is a 256M x 64bits DDR2-667 Unbuffered DIMM. The TS256MLQ64V6U consists of 16pcs 128Mx8bits DDR2 SDRAMs FBGA packages and a 2048 bits serial EEPROM on a 240-pin printed circuit board. The TS256MLQ64V6U is a Dual In-Line Memory Module and is intended for mounting into 240-pin edge connector sockets.

Synchronous design allows precise cycle control with the use of system clock. Data I/O transactions are possible on both edges of DQS. Range of operation frequencies, programmable latencies allow the same device to be useful for a variety of high bandwidth, high performance memory system applications.

## Features

- RoHS compliant products.
- JEDEC standard 1.8V  $\pm$  0.1V Power supply
- VDDQ=1.8V  $\pm$  0.1V
- Max clock Freq: 333MHZ; 667Mb/S/Pin.
- Posted CAS
- Programmable CAS Latency: 3, 4, 5
- Programmable Additive Latency :0, 1, 2, 3 and 4
- Write Latency (WL) = Read Latency (RL)-1
- Burst Length: 4, 8(Interleave/nibble sequential)
- Programmable sequential / Interleave Burst Mode
- Bi-directional Differential Data-Strobe (Single-ended data-strobe is an optional feature)
- Off-Chip Driver (OCD) Impedance Adjustment
- MRS cycle with address key programs.
- On Die Termination
- Refresh: Auto Refresh and Self Refresh  
Average Refresh Period:  
7.8us at lower then T<sub>CASE</sub> 85 °C
- Serial presence detect with EEPROM

## • Placement



PCB: 09-2980

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## Dimensions

| Side | Millimeters | Inches      |
|------|-------------|-------------|
| A    | 133.35±0.15 | 5.250±0.006 |
| B    | 55          | 2.165       |
| C    | 63          | 2.480000    |
| D    | 5           | 0.197       |
| E    | 2.5         | 0.0980      |
| F    | 1.5±0.10    | 0.059±0.039 |
| G    | 5.175       | 0.204       |
| H    | 2.2         | 0.867       |
| I    | 4           | 0.157       |
| J    | 10          | 0.394       |
| K    | 17.8        | 0.701       |
| L    | 18.3±0.15   | 0.72±0.006  |
| M    | 1.27±0.10   | 0.050±0.004 |

(Refer Placement)

## Pin Identification

| Symbol          | Function                            |
|-----------------|-------------------------------------|
| A0~A13, BA0~BA2 | Address input                       |
| DQ0~DQ63        | Data Input / Output.                |
| DQS0~DQS8       | Data strobe                         |
| /DQS0~/DQS8     | Differential Data strobe            |
| CK0, /CK0       |                                     |
| CK1, /CK1       | Clock Input.                        |
| CK2, /CK2       |                                     |
| CKE0, CKE1      | Clock Enable Input.                 |
| ODT0, ODT1      | On-die termination control line     |
| /CS0, /CS1      | Chip Select Input.                  |
| /RAS            | Row Address Strobe                  |
| /CAS            | Column Address Strobe               |
| /WE             | Write Enable                        |
| DM0~DM8         | Data-in Mask                        |
| VDD             | +1.8 Voltage power supply           |
| VDDQ            | +1.8 Voltage Power Supply for DQS   |
| VREF            | Power Supply for Reference          |
| VDDSPD          | Serial EEPROM Positive Power Supply |
| SA0~SA2         | Address select for EEPROM           |
| SCL             | Serial PD Clock                     |
| SDA             | Serial PD Add/Data input/output     |
| VSS             | Ground                              |
| NC              | No Connection                       |

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## Pinouts:

| Pin No | Pin Name | Pin No | Pin Name | Pin No | Pin Name | Pin No | Pin Name | Pin No | Pin Name | Pin No | Pin Name |
|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|
| 01     | VREF     | 41     | VSS      | 81     | DQ33     | 121    | VSS      | 161    | NC       | 201    | VSS      |
| 02     | VSS      | 42     | NC       | 82     | VSS      | 122    | DQ4      | 162    | NC       | 202    | DM4      |
| 03     | DQ0      | 43     | NC       | 83     | /DQS4    | 123    | DQ5      | 163    | VSS      | 203    | NC       |
| 04     | DQ1      | 44     | VSS      | 84     | DQS4     | 124    | VSS      | 164    | NC       | 204    | VSS      |
| 05     | VSS      | 45     | NC       | 85     | VSS      | 125    | DM0      | 165    | NC       | 205    | DQ38     |
| 06     | /DQS0    | 46     | NC       | 86     | DQ34     | 126    | NC       | 166    | VSS      | 206    | DQ39     |
| 07     | DQS0     | 47     | VSS      | 87     | DQ35     | 127    | VSS      | 167    | NC       | 207    | VSS      |
| 08     | VSS      | 48     | NC       | 88     | VSS      | 128    | DQ6      | 168    | NC       | 208    | DQ44     |
| 09     | DQ2      | 49     | NC       | 89     | DQ40     | 129    | DQ7      | 169    | VSS      | 209    | DQ45     |
| 10     | DQ3      | 50     | VSS      | 90     | DQ41     | 130    | VSS      | 170    | VDDQ     | 210    | VSS      |
| 11     | VSS      | 51     | VDDQ     | 91     | VSS      | 131    | DQ12     | 171    | CKE1     | 211    | DM5      |
| 12     | DQ8      | 52     | CKE0     | 92     | /DQS5    | 132    | DQ13     | 172    | VDD      | 212    | NC       |
| 13     | DQ9      | 53     | VDD      | 93     | DQS5     | 133    | VSS      | 173    | NC       | 213    | VSS      |
| 14     | VSS      | 54     | BA2      | 94     | VSS      | 134    | DM1      | 174    | NC       | 214    | DQ46     |
| 15     | /DQS1    | 55     | NC       | 95     | DQ42     | 135    | NC       | 175    | VDDQ     | 215    | DQ47     |
| 16     | DQS1     | 56     | VDDQ     | 96     | DQ43     | 136    | VSS      | 176    | A12      | 216    | VSS      |
| 17     | VSS      | 57     | A11      | 97     | VSS      | 137    | CK1      | 177    | A9       | 217    | DQ52     |
| 18     | NC       | 58     | A7       | 98     | DQ48     | 138    | /CK1     | 178    | VDD      | 218    | DQ53     |
| 19     | NC       | 59     | VDD      | 99     | DQ49     | 139    | VSS      | 179    | A8       | 219    | VSS      |
| 20     | VSS      | 60     | A5       | 100    | VSS      | 140    | DQ14     | 180    | A6       | 220    | CK2      |
| 21     | DQ10     | 61     | A4       | 101    | SA2      | 141    | DQ15     | 181    | VDDQ     | 221    | /CK2     |
| 22     | DQ11     | 62     | VDDQ     | 102    | NC       | 142    | VSS      | 182    | A3       | 222    | VSS      |
| 23     | VSS      | 63     | A2       | 103    | VSS      | 143    | DQ20     | 183    | A1       | 223    | DM6      |
| 24     | DQ16     | 64     | VDD      | 104    | /DQS6    | 144    | DQ21     | 184    | VDD      | 224    | NC       |
| 25     | DQ17     | 65     | VSS      | 105    | DQS6     | 145    | VSS      | 185    | CK0      | 225    | VSS      |
| 26     | VSS      | 66     | VSS      | 106    | VSS      | 146    | DM2      | 186    | /CK0     | 226    | DQ54     |
| 27     | /DQS2    | 67     | VDD      | 107    | DQ50     | 147    | NC       | 187    | VDD      | 227    | DQ55     |
| 28     | DQS2     | 68     | NC       | 108    | DQ51     | 148    | VSS      | 188    | A0       | 228    | VSS      |
| 29     | VSS      | 69     | VDD      | 109    | VSS      | 149    | DQ22     | 189    | VDD      | 229    | DQ60     |
| 30     | DQ18     | 70     | A10/AP   | 110    | DQ56     | 150    | DQ23     | 190    | BA1      | 230    | DQ61     |
| 31     | DQ19     | 71     | BA0      | 111    | DQ57     | 151    | VSS      | 191    | VDDQ     | 231    | VSS      |
| 32     | VSS      | 72     | VDDQ     | 112    | VSS      | 152    | DQ28     | 192    | /RAS     | 232    | DM7      |
| 33     | DQ24     | 73     | /WE      | 113    | /DQS7    | 153    | DQ29     | 193    | /CS0     | 233    | NC       |
| 34     | DQ25     | 74     | /CAS     | 114    | DQS7     | 154    | VSS      | 194    | VDDQ     | 234    | VSS      |
| 35     | VSS      | 75     | VDDQ     | 115    | VSS      | 155    | DM3      | 195    | ODT0     | 235    | DQ62     |
| 36     | /DQS3    | 76     | /CS1     | 116    | DQ58     | 156    | NC       | 196    | A13      | 236    | DQ63     |
| 37     | DQS3     | 77     | ODT1     | 117    | DQ59     | 157    | VSS      | 197    | VDD      | 237    | VSS      |
| 38     | VSS      | 78     | VDDQ     | 118    | VSS      | 158    | DQ30     | 198    | VSS      | 238    | VDDSPD   |
| 39     | DQ26     | 79     | VSS      | 119    | SDA      | 159    | DQ31     | 199    | DQ36     | 239    | SA0      |
| 40     | DQ27     | 80     | DQ32     | 120    | SCL      | 160    | VSS      | 200    | DQ37     | 240    | SA1      |