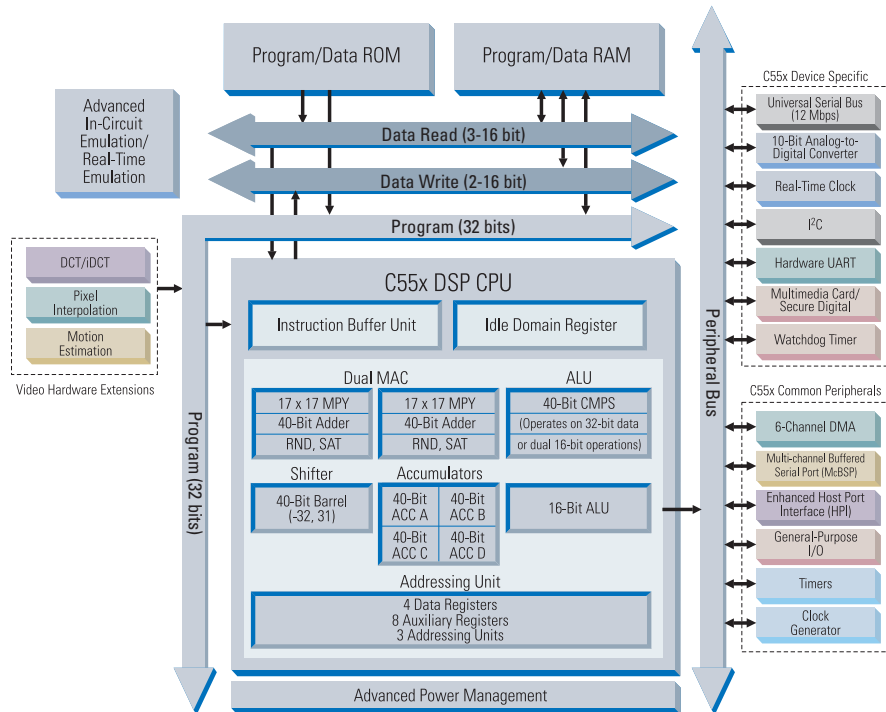


# TMS320C5000™ DSP Platform: Industry's Best Power Efficiency

Updated 1Q06

The code-compatible TMS320C5000 DSP Platform is optimized for telecom/VoIP equipment and personal and portable products such as digital music players and radios, GPS, and more.

## TMS320C55x™ DSP Generation Block Diagram



The C55x DSP core is driving digital applications ranging from portable Internet appliances to high-speed wireless to power-efficient infrastructure.

## TMS320C5000 DSP Platform Generation Comparison

| Parametric               | C54x™ Fixed-Point DSPs                         | C55x™ Fixed-Point DSPs   |
|--------------------------|--|--|
| MHz                      | 50–160   | 160–300  |
| MIPS                     | 50–160   | 320–600  |
| 16-bit MACS              | Single-MAC                                     | Dual-Mac   |
| 8-bit MACS               | Single-MAC                                     | N/A  |
| Special instructions     | N/A  | Variable length instructions (8–48 bit)  |
| Active power             | 40–117 mW                                      | 58–199 mW  |
| Standby power            | As low as 0.036 mW                             | As low as 0.12 mW  |
| Pricing (1 KU)           | U.S. \$3.38–\$28.84                            | U.S. \$4.51–\$19.38  |
| Peripherals/Coprocessors | McBSP, 16-bit HPI, 6-channel DMA, UART, Timers | McBSP, 16-bit HPI, 6-channel DMA, 16-/32-bit EMIF, USB 2.0 Full Speed, ADC, IIC, MMC/SD, UART, Video Hardware Extensions (DCT, Motion Estimation, Pixel Interpolation) |

## TMS320C55x™ DSP Generation

| Part Number                     | RAM<br>(Bytes) | ROM<br>(Bytes) | DMA  | DAT/PRO<br>(ADDR)<br>(Words) | USB | ADC | UART | I <sup>2</sup> C | RTC | McBSP <sup>2</sup> | MMC/<br>SD | Voltage (V) |     | COM     | Timers <sup>3</sup> | MHz | MIPS | Packaging            | 1 KU<br>(\$U.S.) <sup>1</sup> |
|---------------------------------|----------------|----------------|------|------------------------------|-----|-----|------|------------------|-----|--------------------|------------|-------------|-----|---------|---------------------|-----|------|----------------------|-------------------------------|
|                                 |                |                |      |                              |     |     |      |                  |     |                    |            | Core        | I/O |         |                     |     |      |                      |                               |
| TMS320VC5501GZZ300 <sup>3</sup> | 32K            | 32K            | 6 ch | 8M                           | –   | –   | Y    | Y                | –   | 2                  | –          | 1.26        | 3.3 | HPI8    | 3 <sup>6</sup>      | 300 | 600  | 201 BGA <sup>7</sup> | 4.51                          |
| TMS320VC5501PGF300 <sup>3</sup> | 32K            | 32K            | 6 ch | 8M                           | –   | –   | Y    | Y                | –   | 2                  | –          | 1.26        | 3.3 | HPI8    | 3 <sup>6</sup>      | 300 | 600  | 176 LQFP             | 4.51                          |
| TMS320VC5502GZZ200 <sup>3</sup> | 64K            | 32K            | 6 ch | 8M                           | –   | –   | Y    | Y                | –   | 3                  | –          | 1.26        | 3.3 | HPI16/8 | 3 <sup>6</sup>      | 200 | 400  | 201 BGA <sup>7</sup> | 7.14                          |
| TMS320VC5502PGF200 <sup>3</sup> | 64K            | 32K            | 6 ch | 8M                           | –   | –   | Y    | Y                | –   | 3                  | –          | 1.26        | 3.3 | HPI16/8 | 3 <sup>6</sup>      | 200 | 400  | 176 LQFP             | 7.14                          |
| TMS320VC5502PGF300 <sup>3</sup> | 64K            | 32K            | 6 ch | 8M                           | –   | –   | Y    | Y                | –   | 3                  | –          | 1.26        | 3.3 | HPI16/8 | 3 <sup>6</sup>      | 300 | 600  | 176 LQFP             | 9.18                          |
| TMS320VC5502GZZ300 <sup>3</sup> | 64K            | 32K            | 6 ch | 8M                           | –   | –   | Y    | Y                | –   | 3                  | –          | 1.26        | 3.3 | HPI16/8 | 3 <sup>6</sup>      | 300 | 600  | 201 BGA <sup>7</sup> | 9.18                          |
| TMS320VC5503GHH                 | 64K            | 64K            | 6 ch | 8M                           | –   | –   | –    | Y                | Y   | 3                  | –          | 1.6         | 3.3 | HPI16   | 2 <sup>6</sup>      | 200 | 400  | 179 BGA <sup>7</sup> | 6.77                          |
| TMS320VC5503PGE                 | 64K            | 64K            | 6 ch | 8M                           | –   | –   | –    | Y                | Y   | 3                  | –          | 1.6         | 3.3 | HPI16   | 2 <sup>6</sup>      | 200 | 400  | 144 LQFP             | 6.77                          |
| TMS320VC5507GHH                 | 128K           | 64K            | 6 ch | 8M                           | Y   | Y   | –    | Y                | Y   | 3                  | –          | 1.6         | 3.3 | HPI16   | 2 <sup>6</sup>      | 200 | 400  | 179 BGA <sup>7</sup> | 10.72                         |
| TMS320VC5507PGE                 | 128K           | 64K            | 6 ch | 8M                           | Y   | Y   | –    | Y                | Y   | 3                  | –          | 1.6         | 3.3 | HPI16   | 2 <sup>6</sup>      | 200 | 400  | 144 LQFP             | 10.72                         |
| TMS320VC5509AGHH <sup>5</sup>   | 256K           | 64K            | 6 ch | 8M                           | Y   | Y   | –    | Y                | Y   | 3                  | Y          | 1.6         | 3.3 | HPI16   | 2 <sup>6</sup>      | 200 | 400  | 179 BGA <sup>7</sup> | 16.43                         |
| TMS320VC5509APGE <sup>5</sup>   | 256K           | 64K            | 6 ch | 8M                           | Y   | Y   | –    | Y                | Y   | 3                  | Y          | 1.6         | 3.3 | HPI16   | 2 <sup>6</sup>      | 200 | 400  | 144 LQFP             | 16.43                         |
| TMS320VC5510AGGW1               | 320K           | 32K            | 6 ch | 8M                           | –   | –   | –    | –                | –   | 3                  | –          | 1.6         | 3.3 | HPI16   | 2                   | 160 | 320  | 240 BGA <sup>7</sup> | 16.48                         |
| TMS320VC5510AGGW2               | 320K           | 32K            | 6 ch | 8M                           | –   | –   | –    | –                | –   | 3                  | –          | 1.6         | 3.3 | HPI16   | 2                   | 200 | 400  | 240 BGA <sup>7</sup> | 19.38                         |

<sup>1</sup> Prices are quoted in U.S. dollars and represent year 2006 suggested resale pricing. All prices are subject to change. Customers are advised to obtain the most current and complete pricing information from TI prior to placing orders. TI may verify final pricing prior to accepting any order.

<sup>3</sup> 3 = Two general-purpose timers and one 32-bit DSP/BIOS™ kernel counter; 2 = Two general-purpose timers.

<sup>2</sup> Multi-channel buffered serial port (McBSP).

<sup>4</sup> Extended temperature device, –40 to 85°C case temperature operation.

<sup>5</sup> JTAG disconnect option.

<sup>6</sup> Plus 1 additional programmable watchdog timer.

<sup>7</sup> MicroStar BGA™ package.

Note: All devices include software PLL.

Note: Enhanced plastic and Military DSP versions are available for selected DSPs.

## TMS320C54x™ DSP Generation – Single-Core DSP Products

| Part Number                  | RAM<br>(Bytes) | ROM<br>(Bytes) | DAT/PRO<br>(ADDR) (Bytes) | McBSP | Voltage (V) |     |          | COM | Timers | DMA | MHz | MIPS                 | Packaging | 1 KU<br>(\$U.S.) <sup>1</sup> |
|------------------------------|----------------|----------------|---------------------------|-------|-------------|-----|----------|-----|--------|-----|-----|----------------------|-----------|-------------------------------|
|                              |                |                |                           |       | Core        | I/O | Core     |     |        |     |     |                      |           |                               |
| TMS320C54CSTPGE <sup>2</sup> | 80K            | 256K           | 128K/16M                  | 2     | 1.5         | 3.3 | HPI 8/16 | 2   | 6      | 120 | 120 | 144 LQFP             | 8.31      |                               |
| TMS320C54CSTGGU <sup>2</sup> | 80K            | 256K           | 128K/16M                  | 2     | 1.5         | 3.3 | HPI 8/16 | 2   | 6      | 120 | 120 | 144 BGA <sup>3</sup> | 8.31      |                               |
| TMS320VC5401PGE50            | 16K            | 8K             | 128K/2M                   | 2     | 1.8         | 3.3 | HPI 8    | 2   | 6      | 50  | 50  | 144 LQFP             | 3.38      |                               |
| TMS320VC5401GGU50            | 16K            | 8K             | 128K/2M                   | 2     | 1.8         | 3.3 | HPI 8    | 2   | 6      | 50  | 50  | 144 BGA <sup>3</sup> | 3.38      |                               |
| TMS320VC5402PGE100           | 32K            | 8K             | 128K/2M                   | 2     | 1.8         | 3.3 | HPI 8    | 2   | 6      | 100 | 100 | 144 LQFP             | 5.37      |                               |
| TMS320VC5402GGU100           | 32K            | 8K             | 128K/2M                   | 2     | 1.8         | 3.3 | HPI 8    | 2   | 6      | 100 | 100 | 144 BGA <sup>3</sup> | 5.37      |                               |
| TMS320VC5402APGE16           | 32K            | 32K            | 128K/16M                  | 3     | 1.6         | 3.3 | HPI 8    | 1   | 6      | 160 | 160 | 144 LQFP             | 10.63     |                               |
| TMS320VC5402AGGU16           | 32K            | 32K            | 128K/16M                  | 3     | 1.6         | 3.3 | HPI 8    | 1   | 6      | 160 | 160 | 144 BGA <sup>3</sup> | 10.63     |                               |
| TMS320VC5404PGE              | 32K            | 128K           | 128K/16M                  | 3     | 1.5         | 3.3 | HPI 8/16 | 2   | 6      | 120 | 120 | 144 LQFP             | 7.79      |                               |
| TMS320VC5404GGU              | 32K            | 128K           | 128K/16M                  | 3     | 1.5         | 3.3 | HPI 8/16 | 2   | 6      | 120 | 120 | 144 BGA <sup>3</sup> | 7.79      |                               |
| TMS320UC5405GQW              | 16K            | 4K             | 64K/1M                    | 2     | 1.8         | 3.6 | HPI 8    | 2   | 6      | 80  | 80  | 143 BGA <sup>3</sup> | 5.60      |                               |
| TMS320VC5407PGE              | 80K            | 256K           | 128K/16M                  | 3     | 1.6         | 3.3 | HPI 8/16 | 2   | 6      | 120 | 120 | 144 LQFP             | 9.39      |                               |
| TMS320VC5407GGU              | 80K            | 256K           | 128K/16M                  | 3     | 1.6         | 3.3 | HPI 8/16 | 2   | 6      | 120 | 120 | 144 BGA <sup>3</sup> | 9.39      |                               |
| TMS320VC5409PGE-80           | 64K            | 32K            | 128K/16M                  | 3     | 1.8         | 3.3 | HPI 8/16 | 1   | 6      | 80  | 80  | 144 LQFP             | 8.32      |                               |
| TMS320VC5409GGU-80           | 64K            | 32K            | 128K/16M                  | 3     | 1.8         | 3.3 | HPI 8/16 | 1   | 6      | 80  | 80  | 144 BGA <sup>3</sup> | 8.32      |                               |
| TMS320VC5409PGE100           | 64K            | 32K            | 128K/16M                  | 3     | 1.8         | 3.3 | HPI 8/16 | 1   | 6      | 100 | 100 | 144 LQFP             | 10.22     |                               |
| TMS320VC5409GGU100           | 64K            | 32K            | 128K/16M                  | 3     | 1.8         | 3.3 | HPI 8/16 | 1   | 6      | 100 | 100 | 144 BGA <sup>3</sup> | 10.22     |                               |
| TMS320VC5409APGE12           | 64K            | 32K            | 128K/16M                  | 3     | 1.5         | 3.3 | HPI 8/16 | 1   | 6      | 120 | 120 | 144 LQFP             | 12.07     |                               |
| TMS320VC5409AGGU12           | 64K            | 32K            | 128K/16M                  | 3     | 1.5         | 3.3 | HPI 8/16 | 1   | 6      | 120 | 120 | 144 BGA <sup>3</sup> | 12.07     |                               |
| TMS320VC5409APGE16           | 64K            | 32K            | 128K/16M                  | 3     | 1.6         | 3.3 | HPI 8/16 | 1   | 6      | 160 | 160 | 144 LQFP             | 13.37     |                               |
| TMS320VC5409AGGU16           | 64K            | 32K            | 128K/16M                  | 3     | 1.6         | 3.3 | HPI 8/16 | 1   | 6      | 160 | 160 | 144 BGA <sup>3</sup> | 13.37     |                               |
| TMS320VC5410PGE100           | 128K           | 32K            | 128K/16M                  | 3     | 2.5         | 3.3 | HPI 8    | 1   | 6      | 100 | 100 | 144 LQFP             | 28.84     |                               |
| TMS320VC5410GGW100           | 128K           | 32K            | 128K/16M                  | 3     | 2.5         | 3.3 | HPI 8    | 1   | 6      | 100 | 100 | 176 BGA <sup>3</sup> | 28.84     |                               |
| TMS320VC5410APGE12           | 128K           | 32K            | 128K/16M                  | 3     | 1.5         | 3.3 | HPI 8/16 | 1   | 6      | 120 | 120 | 144 LQFP             | 14.50     |                               |
| TMS320VC5410AGGU12           | 128K           | 32K            | 128K/16M                  | 3     | 1.5         | 3.3 | HPI 8/16 | 1   | 6      | 120 | 120 | 144 BGA <sup>3</sup> | 14.50     |                               |
| TMS320VC5410APGE16           | 128K           | 32K            | 128K/16M                  | 3     | 1.6         | 3.3 | HPI 8/16 | 1   | 6      | 160 | 160 | 144 LQFP             | 16.05     |                               |
| TMS320VC5410AGGU16           | 128K           | 32K            | 128K/16M                  | 3     | 1.6         | 3.3 | HPI 8/16 | 1   | 6      | 160 | 160 | 144 BGA <sup>3</sup> | 16.05     |                               |
| TMS320VC5416PGE120           | 256K           | 32K            | 128K/16M                  | 3     | 1.5         | 3.3 | HPI 8/16 | 1   | 6      | 120 | 120 | 144 LQFP             | 24.16     |                               |
| TMS320VC5416GGU120           | 256K           | 32K            | 128K/16M                  | 3     | 1.5         | 3.3 | HPI 8/16 | 1   | 6      | 120 | 120 | 144 BGA <sup>3</sup> | 24.16     |                               |
| TMS320VC5416PGE160           | 256K           | 32K            | 128K/16M                  | 3     | 1.6         | 3.3 | HPI 8/16 | 1   | 6      | 160 | 160 | 144 LQFP             | 26.84     |                               |
| TMS320VC5416GGU160           | 256K           | 32K            | 128K/16M                  | 3     | 1.6         | 3.3 | HPI 8/16 | 1   | 6      | 160 | 160 | 144 BGA <sup>3</sup> | 26.84     |                               |

<sup>1</sup> Prices are quoted in U.S. dollars and represent year 2006 suggested resale pricing. All prices are subject to change. Customers are advised to obtain the most current and complete pricing information from TI prior to placing orders. TI may verify final pricing prior to accepting any order.

<sup>2</sup> Client side telephony (CST) software bundle information on page 11 of the 3Q 2005 DSP Selection Guide (SSDV004Q).

<sup>3</sup> MicroStar BGA™ package.

Note: Enhanced plastic and Military DSP versions are available for selected DSPs.

Note: All devices include software PLL.

## TMS320C54x™ DSP Generation – Multicore DSP Products

| Part Number                       | RAM<br>(Bytes) | ROM<br>(Bytes) | DAT/PRO<br>(ADDR) (Bytes) | McBSP | Voltage (V) |     | COM    | Timers | DMA | MHz     | MIPS | Packaging | 1 KU<br>(\$U.S.) <sup>1</sup> |
|-----------------------------------|----------------|----------------|---------------------------|-------|-------------|-----|--------|--------|-----|---------|------|-----------|-------------------------------|
|                                   |                |                |                           |       | Core        | I/O |        |        |     |         |      |           |                               |
| TMS320VC5420PGE200 <sup>2,3</sup> | 400K           | –              | 128K/512K                 | 6     | 1.8         | 3.3 | HPI 16 | 2      | 12  | 2 × 100 | 200  | 144 LQFP  | 59.25                         |
| TMS320VC5420GGU200 <sup>2,3</sup> | 400K           | –              | 128K/512K                 | 6     | 1.8         | 3.3 | HPI 16 | 2      | 12  | 2 × 100 | 200  | 144 BGA   | 59.25                         |
| TMS320VC5421PGE200 <sup>2</sup>   | 512K           | 8K             | 128K/512K                 | 6     | 1.8         | 3.3 | HPI 16 | 2      | 12  | 2 × 100 | 200  | 144 LQFP  | 60.70                         |
| TMS320VC5421GGU200 <sup>2</sup>   | 512K           | 8K             | 128K/512K                 | 6     | 1.8         | 3.3 | HPI 16 | 2      | 12  | 2 × 100 | 200  | 144 BGA   | 60.70                         |

<sup>1</sup> Prices are quoted per unit in U.S. dollars at 1 KU quantities. Prices represent year 2006 suggested resale pricing.

<sup>2</sup> Multicore devices (VC542x = 2)

<sup>3</sup> Internal bootloader not available on VC5420 DSP

Note: All devices include software PLL.

Note: Enhanced plastic and Military DSP versions are available for selected DSPs.

## OMAP™ Processors

| Part Number   | CPU        | Frequency<br>(MHz) | RAM<br>(Bytes)    | ROM<br>(Bytes) | External<br>Memory I/F                          | DMA   | Timers                  | Serial Ports   | Misc  | Voltage (V) |                               | Packaging                            | 1 KU<br>(\$U.S.) <sup>1</sup> |
|---------------|------------|--------------------|-------------------|----------------|---|-------|-------------------------|--|---|-------------|-------------------------------|--------------------------------------|-------------------------------|
|               |            |                    |                   |                |   |       |                         |  |   | Core        | I/O                           |                                      |                               |
| OMAP5910JGZG2 | C55x       | 150                | 160K              | 32K            | SDRAM <sup>3</sup> ,<br>ASYN <sup>3</sup>       | 6 Ch  | 3 GP,<br>1 WDT          | 2 McBSP <sup>3</sup> ,<br>2 MCSI <sup>3</sup>  | 3 Video HW Accel,<br>14 GPIO <sup>3</sup> , MMU   | 1.6         | 1.8/<br>2.75/3.3 <sup>4</sup> | 289 BGA <sup>5</sup> ,<br>12 × 12 mm | 24.89                         |
|               | ARM9TDMI   | 150                | 192K <sup>2</sup> |                | SDRAM,<br>ASYN <sup>3</sup>                     | 9 Ch  | 1 OS,<br>3 GP,<br>1 WDT | 3 Host or 2 Host/<br>1 Function USB 1.1,<br>1 McBSP, $\mu$ wire, I <sup>2</sup> C,<br>HDQ, 3 UARTs (1 IrDA) <sup>2</sup> | LCD, Camera, MMC/SD,<br>RTC, Keypad,<br>10 GPIO, MMU  |             |                               |                                      |                               |
| OMAP5910JGDY2 | C55x       | 150                | 160K              | 32K            | SDRAM <sup>3</sup> ,<br>ASYN <sup>3</sup>       | 6 Ch  | 3 GP,<br>1 WDT          | 2 McBSP <sup>3</sup> ,<br>2 MCSI <sup>3</sup>  | 3 Video HW Accel,<br>14 GPIO <sup>3</sup> , MMU   | 1.6         | 1.8/<br>2.75/3.3 <sup>4</sup> | 289 BGA <sup>5</sup> ,<br>19 × 19 mm | 25.83                         |
|               | ARM9TDMI   | 150                | 192K <sup>2</sup> |                | SDRAM,<br>ASYN <sup>3</sup>                     | 9 Ch  | 1 OS,<br>3 GP,<br>1 WDT | 3 Host or 2 Host/<br>1 Function USB 1.1,<br>1 McBSP, $\mu$ wire, I <sup>2</sup> C,<br>HDQ, 3 UARTs (1 IrDA) <sup>2</sup> | LCD, Camera, MMC/SD,<br>RTC, Keypad,<br>10 GPIO, MMU  |             |                               |                                      |                               |
| OMAP5912ZZG   | C55x       | 192                | 160K              | 32K            | SDRAM <sup>3</sup> ,<br>NAND Flash <sup>3</sup> | 6 Ch  | 4 GP,<br>1 WDT          | 2 McBSP <sup>3</sup> ,<br>2 MCSI <sup>3</sup> , 3 UARTs <sup>3</sup>   | 4 Video HW Accel,<br>24 KByte I-Cache   | 1.6         | 1.8/<br>2.75/3.3 <sup>4</sup> | 289 BGA,<br>12 × 12 mm               | 26.14                         |
|               | ARM926EJ-S | 192                | 256K <sup>2</sup> |                | SDRAM,<br>ASYN <sup>3</sup>                     | 17 Ch | 1 OS,<br>3 GP,<br>1 WDT | Host/Function USB 1.1,<br>USB On-the-Go (OTG),<br>1 McBSP, $\mu$ wire, I <sup>2</sup> C,<br>HDQ, SPI, V-Link             | Self-Powered RTC, LCD,<br>CompactFlash, Camera,<br>2 MMC/SD, Keyboard,<br>DPLL, PWT/PWL, 2 LED<br>Pulse Generators, SoSSI |             |                               | Lead free                            |                               |
| OMAP5912ZDY   | C55x       | 192                | 160K              | 32K            | SDRAM <sup>3</sup> ,<br>NAND Flash <sup>3</sup> | 6 Ch  | 4 GP,<br>1 WDT          | 2 McBSP <sup>3</sup> ,<br>2 MCSI <sup>3</sup> , 3 UARTs <sup>3</sup>   | 4 Video HW Accel,<br>24 KByte I-Cache   | 1.6         | 1.8/<br>2.75/3.3 <sup>4</sup> | 289 BGA,<br>19 × 19 mm               | 26.14                         |
|               | ARM926EJ-S | 192                | 256K <sup>2</sup> |                | SDRAM,<br>ASYN <sup>3</sup>                     | 17 Ch | 1 OS,<br>3 GP,<br>1 WDT | Host/Function USB 1.1,<br>USB-On-the-Go (OTG),<br>1 McBSP, $\mu$ wire, I <sup>2</sup> C,<br>HDQ, SPI, V-Link             | Self-Powered RTC, LCD,<br>CompactFlash, Camera,<br>2 MMC/SD, Keyboard,<br>DPLL, PWT/PWL, 2 LED<br>Pulse Generators, SoSSI |             |                               | Lead free                            |                               |

<sup>1</sup> Prices are quoted in U.S. dollars and represent year 2006 suggested resale pricing. All prices are subject to change. Customers are advised to obtain the most current and complete pricing information from TI prior to placing orders. TI may verify final pricing prior to accepting any order.

<sup>2</sup> Shared with the C55x™ CPU.

<sup>3</sup> Shared with the ARM9.

<sup>4</sup> External memory interfaces may use 1.8-, 2.75- or 3.3-V nominal.

<sup>5</sup> MicroStar BGA™ package options – GZG: 12 × 12 mm (OMAP5910JGZG2) or GDY: 19 × 19 mm (OMAP5910JGDY2)

Note: Enhanced plastic and Military DSP versions are available for selected DSPs.

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