MIXED SIGNAL MICROCONTROLLER

FEATURES

- **Low Supply Voltage Range: 1.8 V to 3.6 V**
- **Ultra-Low Power Consumption**
- **Five Power-Saving Modes**
- **Ultra-Fast Wake-Up From Standby Mode**
- **16-Bit RISC Architecture**
- **Basic Clock Module Configurations**
    - **Internal Frequencies up to 16 MHz With Four Calibrated Frequencies**
    - **Internal Very-Low-Power Low-Frequency (LF) Oscillator**
    - **32-kHz Crystal**
    - **External Digital Clock Source**

- **One 16-Bit Timer_A With Three Capture/Compare Registers**
- **Up to 16 Touch-Sense Enabled I/O Pins**
- **Universal Serial Interface (USI) Supporting SPI and I^{2}C**
- **On-Chip Comparator for Analog**
- **Brownout Detector**
- **Serial Onboard Programming, No External Programming Voltage Needed, Programmable Code Protection by Security Fuse**
- **On-Chip Emulation Logic With Spy-Bi-Wire Interface**

DESCRIPTION

The Texas Instruments MSP430™ family of ultra-low-power microcontrollers consist of several devices featuring different sets of peripherals targeted for various applications. The architecture, combined with five low-power modes, is optimized to achieve extended battery life in portable measurement applications. The device features a powerful 16-bit RISC CPU, 16-bit registers, and constant generators that contribute to maximum code efficiency.

The MSP430G2252 is an ultra-low-power mixed signal microcontroller with a built-in 16-bit timer, and up to 16 I/O touch sense enabled pins and built-in communication capability using the universal serial communication interface and has a versatile analog comparator. The MSP430G2252 has a 10-bit A/D converter. Typical applications include low-cost sensor systems that capture analog signals, convert them to digital values, and then process the data for display or for transmission to a host system.

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

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MSP430G2252-DIE

This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

ORDERING INFORMATION[1]

PRODUCT	PACKAGE DESIGNATOR	PACKAGE[2]	ORDERABLE PART NUMBER	PACKAGE QUANTITY
MSP430G2252	TD	Bare die in waffle pack	MSP430G2252TDA1	100
			MSP430G2252TDA2	10

(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI web site at www.ti.com.
(2) Processing is per the Texas Instruments commercial production baseline and is in compliance with the Texas Instruments Quality Control System in effect at the time of manufacture. Electrical screening consists of DC parametric and functional testing at room temperature only. Unless otherwise specified by Texas Instruments AC performance and performance over temperature is not warranted. Visual Inspection is performed in accordance with MIL-STD-883 Test Method 2010 Condition B at 75X minimum.

BARE DIE INFORMATION

DIE THICKNESS	BACKSIDE FINISH	BACKSIDE POTENTIAL	BOND PAD METALLIZATION COMPOSITION	BOND PAD THICKNESS
11 mils.	Silicon with backgrind	Floating	AlCu (0.5%)	800 nm

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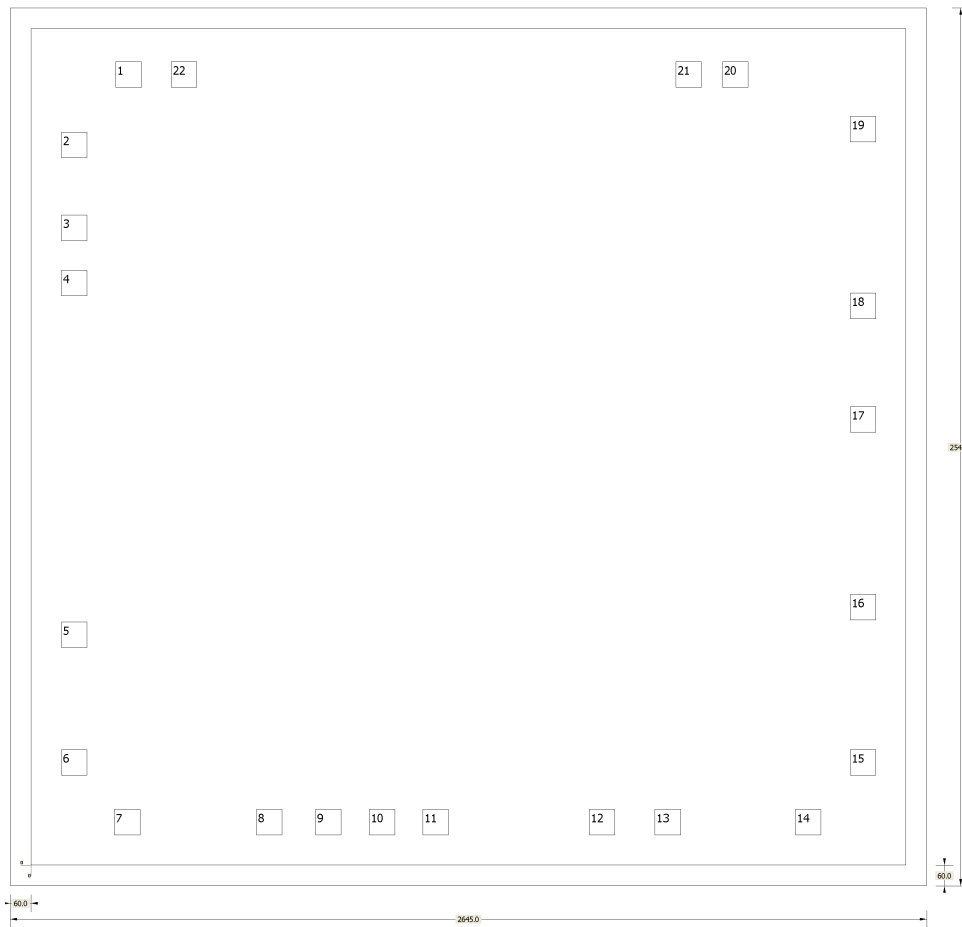
Table 1. Bond Pad Coordinates in Microns[1]

DESCRIPTION	PAD NUMBER	X MIN	Y MIN	X MAX	Y MAX
DVCC	1	244	2253.65	319	2328.65
P1.0/TA0CLK/ACLK/A0/CA0	2	87.4	2050.15	162.4	2125.15
P1.1/TA0.0/A1/CA1	3	87.4	1810.15	162.4	1885.15
P1.2/TA0.1/A2/CA2	4	87.4	1650.15	162.4	1725.15
P1.3/ADC10CLK/CAOUT/VREF-/VEREF-/A3/CA3	5	87.4	630.15	162.4	705.15
P1.4/TA0.2/SMCLK/A4/VREF+/VEREF+/CA4/TCK	6	87.4	260.15	162.4	335.15
P1.5/TA0.0/SCLK/A5/CA5/TMS	7	240.15	87.4	315.15	162.4
P2.0	8	650.15	87.4	725.15	162.4
P2.1	9	820.15	87.4	895.15	162.4
P2.2	10	976.15	87.4	1051.15	162.4
P2.3	11	1130.15	87.4	1205.15	162.4
P2.4	12	1610.15	87.4	1685.15	162.4
P2.5	13	1800.15	87.4	1875.15	162.4
P1.6/TA0.1/SDO/SCL/A6/CA6/TDI/TCLK	14	2204.85	87.4	2279.85	162.4
P1.7/SDI/SDA/CAOUT/A7/CA7/TDO/TDI	15	2362.6	260.15	2437.6	335.15
RST BAR/NMI/SBWTDIO	16	2362.6	710.15	2437.6	785.15
TEST/SBWTCK	17	2362.6	1254.8	2437.6	1329.8
XOUT/P2.7	18	2362.6	1583.85	2437.6	1658.85
XIN/P2.6/TA0.1	19	2362.6	2096.15	2437.6	2171.15
DVSS	20	1994.8	2253.65	2069.8	2328.65
DVSS	21	1859.8	2253.65	1934.8	2328.65
DVCC	22	404	2253.65	479	2328.65

(1)   Substrate is floating.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
MSP430G2252TDA1	LIFEBUY			0	100	RoHS & Green	Call TI	N / A for Pkg Type	25 to 25		
MSP430G2252TDA2	LIFEBUY			0	10	RoHS & Green	Call TI	N / A for Pkg Type	25 to 25		

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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