混合信号微控制器

特性

- 低电源电压范围，**1.8V** 至 **3.6V**
- 超低功耗
- **5** 种节能模式
- 从待机模式唤醒
- 锁频环 **(FLL+)**
- **16** 位精简指令集 **(RISC)** 架构
- 具有 **3** 个或 **5** 个捕获**/**比较寄存器的 **16** 位 **Timer_A**
- 用于驱动 **96** 段 **LCD** 的集成型 **LCD** 驱动器
- 片载比较器
- 欠压检测器
- 电源电压监控器**/**监视器**-**可编程电平检测
- 串行板上编程、无需外部编程电压、由安全熔丝实现的可编程代码保护
- 闪存器件中的引导加载程序

说明

德州仪器 (TI) MSP430 系列超低功耗微控制器包含几个器件，这些器件特有面向多种应用的不同外设集。 为了在便携式测量应用中延长电池使用寿命，对这种与五种低功率模式组合使用的架构进行了优化。 该器件具有一个强大的 16 位 RISC CPU，16 位寄存器，和有助于大大提高编码效率的常数发生器。 数控振荡器 (DCO) 可在不到 6μs 的时间里实现从低功耗模式至运行模式的唤醒。

MSP430F417 是一款微控制器配置，此配置具有一个或者两个内置 16 位定时器、一个比较器、96 LCD 驱动能力、和 48 个 I/O 引脚。

典型应用包括传感器系统，此传感器系统可捕获模拟信号、将之转换为数字值，随后对数据进行处理并传送至一个主机系统。 比较器和定时器使得此配置非常适合应用于工业用仪表、计数器应用和手持式仪表。

ORDERING INFORMATION(1)

PRODUCT	PACKAGE DESIGNATOR	PACKAGE	ORDERABLE PART NUMBER	PACKAGE QUANTITY
MSP430F417	TD	Bare die in waffle pack(2)	MSP430F417TDE1	100
			MSP430F417TDE2	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.

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.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of the Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

Copyright © 2012, Texas Instruments Incorporated

English Data Sheet: SLAS891

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.

BARE DIE INFORMATION

DIE THICKNESS	BACKSIDE FINISH	BACKSIDE POTENTIAL	BOND PAD METALLIZATION COMPOSITION	BOND PAD THICKNESS
11 mils.	Silicon with backgrind	Floating	AlCu/TiN	800 nm

Copyright © 2012, Texas Instruments Incorporated

Table 1. Bond Pad Coordinates in Microns

DESCRIPTION	PAD NUMBER	X MIN	Y MIN	X MAX	Y MAX
DVCC	1	91.95	2586.7	166.95	2661.7
P6.3	2	91.95	2470.75	166.95	2545.75
P6.4	3	91.95	2356.7	166.95	2431.7
P6.5	4	91.95	2241.7	166.95	2316.7
P6.6	5	91.95	2126.7	166.95	2201.7
P6.7	6	91.95	2011.7	166.95	2086.7
N/C	7	91.95	1896.7	166.95	1971.7
XIN	8	91.95	1483.4	166.95	1558.4
XOUT	9	91.95	1251.25	166.95	1326.25
AVSS2	10	91.95	1129.05	166.95	1204.05
N/C	11	91.95	1008.45	166.95	1083.45
P5.1/S0	12	91.95	896.5	166.95	971.5
P5.0/S1	13	91.95	787.45	166.95	862.45
P4.7/S2	14	91.95	674.2	166.95	749.2
P4.6/S3	15	91.95	559.6	166.95	634.6
P4.5/S4	16	91.95	440.95	166.95	515.95
P4.4/S5	17	264.05	91.95	339.05	166.95
P4.3/S6	18	376.5	91.95	451.5	166.95
P4.2/S7	19	905.5	91.95	980.5	166.95
P4.1/S8	20	1007.6	91.95	1082.6	166.95
P4.0/S9	21	1109.7	91.95	1184.7	166.95
P3.7/S10	22	1211.8	91.95	1286.8	166.95
P3.6/S11	23	1313.9	91.95	1388.9	166.95
P3.5/S12	24	1416	91.95	1491	166.95
P3.4/S13	25	1518.1	91.95	1593.1	166.95
P3.3/S14	26	1620.2	91.95	1695.2	166.95
P3.2/S15	27	1722.3	91.95	1797.3	166.95
P3.1/S16	28	1824.4	91.95	1899.4	166.95
P3.0/S17	29	1926.5	91.95	2001.5	166.95
P2.7/S18	30	2290.1	91.95	2365.1	166.95
P2.6/CAOUT/S19	31	2392.3	91.95	2467.3	166.95
P2.5/TA1CLK/S20	32	2494.4	91.95	2569.4	166.95
P2.4/TA1.4/S21	33	2681.55	263.5	2756.55	338.5
P2.3/TA1.3/S22	34	2681.55	737.3	2756.55	812.3
P2.2/TA1.2/S23	35	2681.55	839.4	2756.55	914.4
COM0	36	2681.55	941.5	2756.55	1016.5
P5.2/COM1	37	2681.55	1044.05	2756.55	1119.05
P5.3/COM2	38	2681.55	1146.15	2756.55	1221.15
P5.4/COM3	39	2681.55	1248.25	2756.55	1323.25
R03	40	2681.55	1350.35	2756.55	1425.35
P5.5/R13	41	2681.55	1452.45	2756.55	1527.45
P5.6/R23	42	2681.55	1554.55	2756.55	1629.55
P5.7/R33	43	2681.55	1656.65	2756.55	1731.65
P2.1/TA1.1	44	2681.55	1758.75	2756.55	1833.75
P2.0/TA0.2	45	2681.55	1860.85	2756.55	1935.85
P1.7/CA1	46	2681.55	2228.25	2756.55	2303.25
P1.6/CA0	47	2681.55	2341.95	2756.55	2416.95

Copyright © 2012, Texas Instruments Incorporated

Table 1. Bond Pad Coordinates in Microns (continued)

DESCRIPTION	PAD NUMBER	X MIN	Y MIN	X MAX	Y MAX
P1.5/TA0CLK/ACLK	48	2681.55	2464.1	2756.55	2539.1
P1.4/TA1.0	49	2456.25	2781.15	2531.25	2856.15
P1.3/TA1.0/SVSOUT	50	2350	2781.15	2425	2856.15
P1.2/TA0.1	51	2245.35	2781.15	2320.35	2856.15
P1.1/TA0.0/MCLK	52	2092	2781.15	2167	2856.15
P1.0/TA0.0	53	1991	2781.15	2066	2856.15
TDO/TDI	54	1803.2	2781.15	1878.2	2856.15
TDI/TCLK	55	1401.45	2766.8	1476.45	2841.8
TMS	56	1209.6	2781.15	1284.6	2856.15
TCK	57	1105.85	2781.15	1180.85	2856.15
RST/NMI	58	1003.75	2781.15	1078.75	2856.15
P6.0	59	842.45	2781.15	917.45	2856.15
P6.1	60	721.45	2781.15	796.45	2856.15
P6.2	61	600.45	2781.15	675.45	2856.15
AVSS1	62	475.95	2781.15	550.95	2856.15
DVSS	63	373.75	2781.15	448.75	2856.15
AVCC	64	260.9	2781.15	335.9	2856.15

Copyright © 2012, Texas Instruments Incorporated

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
MSP430F417TDE1	ACTIVE			0	100	RoHS & Green	Call TI	N / A for Pkg Type			Samples
MSP430F417TDE2	ACTIVE			0	10	RoHS & Green	Call TI	N / A for Pkg Type			Samples

(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.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

重要声明和免责声明

TI 提供技术和可靠性数据（包括数据表）、设计资源（包括参考设计）、应用或其他设计建议、网络工具、安全信息和其他资源，不保证没有瑕疵且不做出任何明示或暗示的担保，包括但不限于对适销性、某特定用途方面的适用性或不侵犯任何第三方知识产权的暗示担保。

这些资源可供使用 TI 产品进行设计的熟练开发人员使用。您将自行承担以下全部责任：(1) 针对您的应用选择合适的 TI 产品，(2) 设计、验证并测试您的应用，(3) 确保您的应用满足相应标准以及任何其他安全、安保或其他要求。这些资源如有变更，恕不另行通知。TI 授权您仅可将这些资源用于研发本资源所述的 TI 产品的应用。严禁对这些资源进行其他复制或展示。您无权使用任何其他 TI 知识产权或任何第三方知识产权。您应全额赔偿因在这些资源的使用中对 TI 及其代表造成的任何索赔、损害、成本、损失和债务，TI 对此概不负责。

TI 提供的产品受 TI 的销售条款 (https:www.ti.com.cn/zh-cn/legal/termsofsale.html) 或 ti.com.cn 上其他适用条款/TI 产品随附的其他适用条款的约束。TI 提供这些资源并不会扩展或以其他方式更改 TI 针对 TI 产品发布的适用的担保或担保免责声明。

邮寄地址：上海市浦东新区世纪大道 1568 号中建大厦 32 楼，邮政编码：200122
Copyright © 2021 德州仪器半导体技术（上海）有限公司