ADS1259-Q1 汽车用，14.4kSPS，24 位模数转换器具有集成低漂移基准

1 特性

- 符合汽车应用要求
- 具有符合 AEC-Q100 的下列结果：
  - 温度等级：-40°C 至 125°C
  - 人体模型 (HBM) 静电放电 (ESD) 分类等级 2
  - 充电器件模型 (CDM) ESD 分类等级 C4B
- 可编程数据速率：10SPS 至 14.4kSPS
- 单周期稳定数字滤波器
- 高性能：
  - 1.2kSPS 时的有效位数 (ENOB) 为 21.3
  - 积分非线性 (INL)：3ppm
  - 偏移漂移：0.05μV/°C
  - 增益漂移：0.5ppm/°C
- 内部基准：2.5V，漂移 10ppm/°C
- 内部 2% 精准振荡器
- 输入信号超范围检测
- 可选校验和与冗余数据读取功能以增加数据完整性
- SPI™- 兼容接口，模式 1
- 模拟电源：5V 或者 ±2.5V
- 数字电源：2.7V 至 5V

2 应用范围

- 汽车传动
- 电动汽车

3 说明

ADS1259-Q1 是一款精密，低漂移，24 位模数转换器 (ADC)。 此器件可在数据速率高达 14.4kSPS 时执行高分辨率转换，并因此非常适合于测量宽动态范围内快速变化的信号。 一个集成的低噪声，低漂移 2.5V 基准免除了对于外部电压基准的需要，从而减少了系统成本和组件数量。

此转换器使用一个四阶、固有稳定、三角积分 (ΔΣ) 调制器，此调制器提供出色的噪声性能和线性。 此器件可将集成振荡器、外部晶振或外部时钟用作 ADC 时钟源。

一个快速响应输入超范围检测器标志是否出现一个输入超范围事件。 为了增加嘈杂汽车应用环境中的数据完整性，ADS1259-Q1 提供一个可选校验和字节与一个冗余转换数据读取功能。

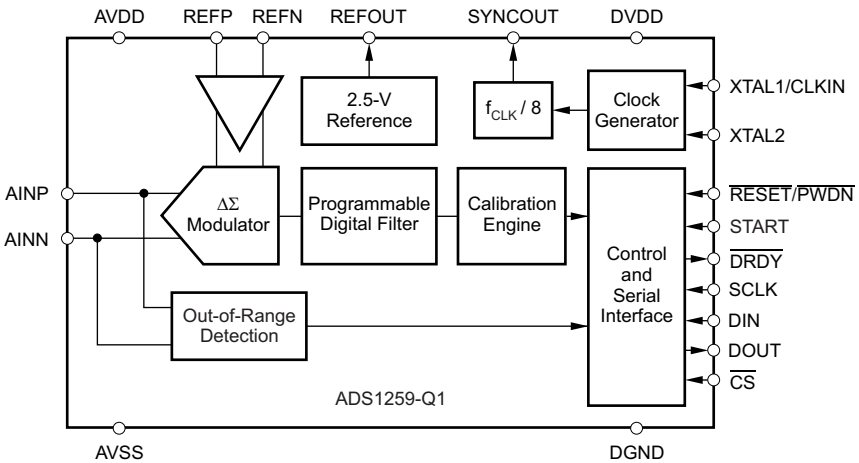
ADS1259-Q1 运行时的功率为 13mW，而在节电模式下的功耗少于 25μW。 TI 提供的 ADS1259-Q1 器件采用薄型小外形尺寸 (TSSOP)-20 封装，可在 -40°C 至 125°的温度范围内完全额定运行。

器件信息

订货编号	封装	封装尺寸
ADS1259QPWRQ1	TSSOP (20)	6.5mm x 4.4mm

空白

ADS1259-Q1 简化方框图



目录

1 特性 1
2 应用范围 1
3 说明 1
4 修订历史记录 2
5 **Terminal Configuration and Functions** 3
6 **Specifications** 4
6.1 Absolute Maximum Ratings 4
6.2 Handling Ratings 4
6.3 Recommended Operating Conditions 5
6.4 Thermal Information 5
6.5 Electrical Characteristics 6
7 **Residue** 7
8 器件文档和支持 8
8.1 Trademarks 8
8.2 Electrostatic Discharge Caution 8
8.3 Glossary 8
9 机械封装和可订购信息 9

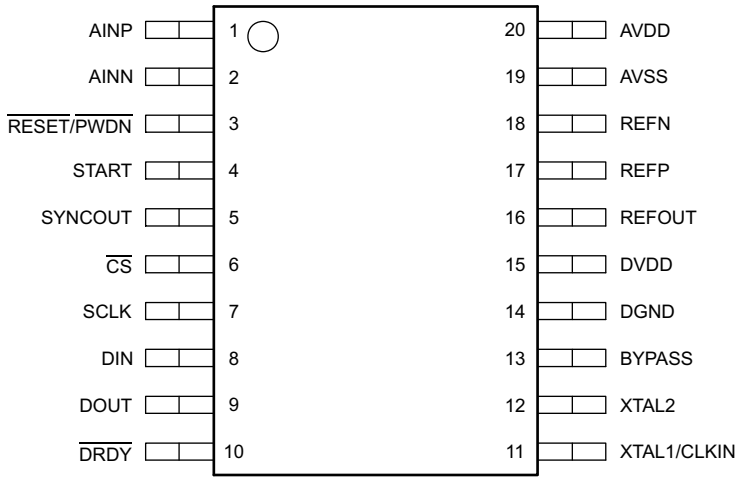
4 修订历史记录

日期	修订版本	注释
2014 年 3 月	*	最初发布版本

Copyright © 2014, Texas Instruments Incorporated

5 Terminal Configuration and Functions

20-Terminal TSSOP
PW Package
(Top View)



Terminal Functions

TERMINAL		TYPE	DESCRIPTION
NO.	NAME		
1	AINP	Analog input	Positive analog input
2	AINN	Analog input	Negative analog input
3	$\overline{\text{RESET}}/\overline{\text{PWDN}}$	Digital input	Reset or power down; reset is active-low; hold low for power down.
4	START	Digital input	Start conversions, active-high
5	SYNCOUT	Digital output	Sync clock output ($f_{(CLK)}$ / 8)
6	$\overline{\text{CS}}$	Digital input	SPI chip-select, active-low
7	SCLK	Digital input	SPI clock input
8	DIN	Digital input	SPI data input
9	DOUT	Digital output	SPI data output
10	$\overline{\text{DRDY}}$	Digital output	Data-ready output, active-low
11	XTAL1/CLKIN	Digital input	Internal oscillator: DGND External clock: clock input Crystal oscillator: external crystal1
12	XTAL2	Digital	External crystal2, otherwise no connection
13	BYPASS	Analog	Core voltage bypass. Connect a 1-µF capacitor to DGND.
14	DGND	Digital	Digital ground
15	DVDD	Digital	Digital power supply
16	REFOUT	Analog output	Positive internal reference output. Connect a 1-µF capacitor, C_{REFOUT}, to AVSS.
17	REFP	Analog input	Positive reference input. Connect a 1-µF capacitor, C_{REFIN}, to REFN.(1)
18	REFN	Analog input	Negative reference input(1)
19	AVSS	Analog	Negative analog power supply and negative internal reference output
20	AVDD	Analog	Positive analog power supply

(1) Leave unused reference inputs unconnected or tie to AVDD.

Copyright © 2014, Texas Instruments Incorporated

6 Specifications

6.1 Absolute Maximum Ratings(1)

over operating ambient temperature range (unless otherwise noted)

		MIN	MAX	UNIT
AVDD to AVSS		–0.3	7	V
AVSS to DGND		–2.8	0.3	V
DVDD to DGND		–0.3	7	V
Analog input voltage	AINN, AINP, REFN, REFP	AVSS – 0.3	AVDD + 0.3	V
Digital input voltage	$\overline{CS}$, DIN, $\overline{RESET}$/$\overline{PDWN}$, SCLK, START, XTAL1/CLKIN	DGND – 0.3	DVDD + 0.3	V
Input current, continuous	Any terminal except supply terminals	–10	10	mA
Operating junction temperature, T_J		–40	150	°C

(1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

6.2 Handling Ratings

		MIN	MAX	UNIT
T_{stg}	Storage temperature range	–60	150	°C
$V_{(ESD)}$(1)	Human-body model (HBM) ESD stress voltage(2)	–2	2	kV
	Charged-device model (CDM) ESD stress voltage(2)	–1	1	kV

(1) Electrostatic discharge (ESD) to measure device sensitivity or immunity to damage caused by assembly-line electrostatic discharges into the device.
(2) Meets or exceeds the passing level per AEC-Q100.

Copyright © 2014, Texas Instruments Incorporated

6.3 Recommended Operating Conditions

over operating ambient temperature range (unless otherwise noted)

		MIN	NOM	MAX	UNIT
POWER SUPPLY					
Analog power supply	AVDD to AVSS	4.75	5.0	5.25	V
	AVSS to DGND	–2.6	–2.5	0	V
Digital power supply	DVDD to DGND	2.7	3.3	5.25	V
ANALOG INPUTS					
Absolute input voltage	AINP or AINN	AVSS – 0.1		AVDD + 0.1	V
Differential input voltage(1)	$V_{(IN)} = (V_{(AINP)} – V_{(AINN)})$	$–V_{ref}$		V_{ref}	V
VOLTAGE REFERENCE INPUTS					
Reference input voltage	$V_{ref} = (V_{(REFP)} – V_{(REFN)})$	0.5	2.5	AVDD – AVSS + 0.2	V
Absolute negative reference voltage	REFN	AVSS – 0.1	AVSS	REFP – 0.5	V
Absolute positive reference voltage	REFP	REFN + 0.5	AVSS + 2.5	AVDD + 0.1	V
EXTERNAL CLOCK SOURCES ($f_{(CLK)}$)					
Crystal oscillator	Frequency	2	7.3728	8	MHz
External clock	Frequency	0.1	7.3728	8	MHz
	Duty cycle	40%		60%	
DIGITAL INPUTS					
High-level input voltage, V_{IH}		0.8 DVDD		DVDD	V
Low-level input voltage, V_{IL}		DGND		0.2 DVDD	V
TEMPERATURE RANGE					
Operating ambient temperature, T_A		–40		125	°C

(1) Excluding the effects of offset and gain error.

6.4 Thermal Information

THERMAL METRIC(1)		PW (20 TERMINALS)	UNIT
$R_{\theta JA}$	Junction-to-ambient thermal resistance	86.9	°C/W
$R_{\theta JC(top)}$	Junction-to-case (top) thermal resistance	21	°C/W
$R_{\theta JB}$	Junction-to-board thermal resistance	39.1	°C/W
ψ_{JT}	Junction-to-top characterization parameter	0.8	°C/W
ψ_{JB}	Junction-to-board characterization parameter	38.4	°C/W
$R_{\theta JC(bot)}$	Junction-to-case (bottom) thermal resistance	N/A	°C/W

(1) For more information about traditional and new thermal metrics, see the *IC Package Thermal Metrics* application report, SPRA953.

Copyright © 2014, Texas Instruments Incorporated

6.5 Electrical Characteristics

Minimum and maximum specifications are at T_A = –40°C to 125°C. Typical specifications are at T_A = 25°C, AVDD = 2.5 V, AVSS = –2.5 V, DVDD = 3.3 V, external $f_{(CLK)}$ = 7.3728 MHz, external V_{ref} = 2.5 V, and $f_{(DATA)}$ = 60 SPS (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
ANALOG INPUTS					
Differential input impedance			120		kΩ
Common-mode input impedance			500		kΩ
SYSTEM PERFORMANCE					
Resolution (no missing codes)		24			Bits
Data rate, $f_{(DATA)}$		10		14,400	SPS
Noise (input referred)	Shorted inputs, See SBAS424 for more information.		0.7		μV_{RMS}
Integral nonlinearity, INL	Best-fit method	–10	±3	10	ppm
Offset voltage (input referred)		–250	±40	250	µV
Offset voltage after calibration(1)			±1		µV
Offset drift	T_A = –40°C to 125°C		0.05	0.25	µV/°C
Gain error(2)		–0.5%	±0.05%	0.5%	
Gain error after calibration(1)			±0.0002%		
Gain drift	T_A = –40°C to 125°C		0.5	2.5	ppm/°C
Normal-mode rejection ratio, NMRR			See SBAS424.		
Common-mode rejection ratio, CMRR	60 Hz, ac(3)	100	120		dB
AVDD, AVSS power-supply rejection ratio, PSRR	60 Hz, ac(3)	85	95		dB
DVDD power supply-rejection ratio, PSRR	60 Hz, ac(3)	85	110		dB
OUT-OF-RANGE DETECTION					
Threshold level	AVSS + 150 mV ≤ $V_{(AINP)}$, $V_{(AINN)}$ ≤ AVDD – 150 mV		±105		%FSR
Threshold level accuracy	AVSS + 150 mV ≤ $V_{(AINP)}$, $V_{(AINN)}$ ≤ AVDD – 150 mV		±0.5		%FSR
VOLTAGE REFERENCE INPUTS					
Average reference input current	AVSS ≤ $V_{(REFP)}$, $V_{(REFN)}$ ≤ AVDD		350		nA
Average reference input current drift			0.2		nA/°C
INTERNAL VOLTAGE REFERENCE					
Reference output voltage	$V_{(REFOUT)}$ = (REFOUT – AVSS)		2.5		V
Accuracy	T_A = 25°C	–0.4%		0.4%	
Temperature drift	T_A = –40°C to 125°C		10	40	ppm/°C
Drive current (sink and source)		–10		10	mA
Load regulation			10		µV/mA
Turn-on settling time	±0.001% settling, C_{REFIN} = 1 µF, C_{REFOUT} = 1 µF		1		s
Long-term stability	0 to 1000 hours		70		ppm
Thermal hysteresis			30		ppm
CLOCK SOURCE ($f_{(CLK)}$)					
Internal oscillator frequency			7.3728		MHz
Internal oscillator accuracy		–2%	±0.2%	2%	
External crystal oscillator start-up time(4)	18-pF load capacitors		20		ms
DIGITAL INPUTS AND OUTPUTS (DVDD = 2.7 V to 5.25 V)					
High-level output voltage, V_{OH}	I_{OH} = 1 mA	0.8 DVDD			V
	I_{OH} = 8 mA		0.75 DVDD		
Low-level output voltage, V_{OL}	I_{OL} = 1 mA			0.2 DVDD	V
	I_{OL} = 8 mA		0.2 DVDD		
Input hysteresis			0.1		V
Input leakage	0 < $V_{(DIGITAL\ INPUT)}$ < DVDD	–10		10	µA

(1) Calibration accuracy is on the level of noise (signal and ADC), reduced by the effect of 16-reading averaging.
(2) Excludes internal reference error.
(3) $f_{(DATA)}$ = 14.4 kSPS. Placing a notch of the digital filter at 60 Hz (setting $f_{(DATA)}$ = 10 SPS or 60 SPS) further improves the common-mode rejection and power-supply rejection of this input frequency.
(4) External crystal start-up time can vary with crystal manufacturer and over temperature.

Copyright © 2014, Texas Instruments Incorporated

Electrical Characteristics (continued)

Minimum and maximum specifications are at T_A = –40°C to 125°C. Typical specifications are at T_A = 25°C, AVDD = 2.5 V, AVSS = –2.5 V, DVDD = 3.3 V, external $f_{(CLK)}$ = 7.3728 MHz, external V_{ref} = 2.5 V, and $f_{(DATA)}$ = 60 SPS (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
POWER SUPPLY					
Absolute analog supply current (AVDD, AVSS)	Operating (internal reference enabled)		2.3	5	mA
	Standby mode (internal reference enabled)		200		µA
	Standby mode (internal reference disabled)		1		
	Power-down mode		1		
Digital supply current (DVDD)	Operating (internal oscillator(5))		500	700	µA
	Standby mode (internal oscillator)		160	300	
	Power-down mode (external CLKIN, SCLK stopped, digital inputs maintained at V_{IH} or V_{IL} voltage levels)		1	10	
Power dissipation	Operating (internal reference enabled, internal oscillator)		13	28	mW
	Standby mode (internal reference enabled, internal oscillator)		1.5		
	Standby mode (internal reference disabled, internal oscillator)		0.5		
	Power-down mode		10		µW

(5) Internal oscillator current: 40 µA (typ.)

7 Residue

See SBAS424 for any information on the ADS1259-Q1 device that is not covered in the foregoing sections.

Copyright © 2014, Texas Instruments Incorporated

8 器件文档和支持

8.1 Trademarks

SPI is a trademark of Motorola.
All other trademarks are the property of their respective owners.

8.2 Electrostatic Discharge Caution

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.

8.3 Glossary

SLYZ022 — *TI Glossary*.

This glossary lists and explains terms, acronyms and definitions.

Copyright © 2014, Texas Instruments Incorporated

9 机械封装和可订购信息

以下页中包括机械封装和可订购信息。 这些信息是针对指定器件可提供的最新数据。 这些数据会在无通知且不对本文档进行修订的情况下发生改变。 要获得这份数据表的浏览器版本，请查阅左侧导航栏。

Copyright © 2014, Texas Instruments Incorporated

重要声明

德州仪器(TI) 及其下属子公司有权根据 JESD46 最新标准, 对所提供的产品和服务进行更正、修改、增强、改进或其它更改， 并有权根据 JESD48 最新标准中止提供任何产品和服务。客户在下订单前应获取最新的相关信息, 并验证这些信息是否完整且是最新的。所有产品的销售都遵循在订单确认时所提供的TI 销售条款与条件。

TI 保证其所销售的组件的性能符合产品销售时 TI 半导体产品销售条件与条款的适用规范。仅在 TI 保证的范围内，且 TI 认为 有必要时才会使用测试或其它质量控制技术。除非适用法律做出了硬性规定，否则没有必要对每种组件的所有参数进行测试。

TI 对应用帮助或客户产品设计不承担任何义务。客户应对其使用 TI 组件的产品和应用自行负责。为尽量减小与客户产品和应 用相关的风险，客户应提供充分的设计与操作安全措施。

TI 不对任何 TI 专利权、版权、屏蔽作品权或其它与使用了 TI 组件或服务的组合设备、机器或流程相关的 TI 知识产权中授予 的直接或隐含权限作出任何保证或解释。TI 所发布的与第三方产品或服务有关的信息，不能构成从 TI 获得使用这些产品或服 务的许可、授权、或认可。使用此类信息可能需要获得第三方的专利权或其它知识产权方面的许可，或是 TI 的专利权或其它 知识产权方面的许可。

对于 TI 的产品手册或数据表中 TI 信息的重要部分，仅在没有对内容进行任何篡改且带有相关授权、条件、限制和声明的情况 下才允许进行复制。TI 对此类篡改过的文件不承担任何责任或义务。复制第三方的信息可能需要服从额外的限制条件。

在转售 TI 组件或服务时，如果对该组件或服务参数的陈述与 TI 标明的参数相比存在差异或虚假成分，则会失去相关 TI 组件 或服务的所有明示或暗示授权，且这是不正当的、欺诈性商业行为。TI 对任何此类虚假陈述均不承担任何责任或义务。

客户认可并同意，尽管任何应用相关信息或支持仍可能由 TI 提供，但他们将独力负责满足与其产品及在其应用中使用 TI 产品 相关的所有法律、法规和安全相关要求。客户声明并同意，他们具备制定与实施安全措施所需的全部专业技术和知识，可预见 故障的危险后果、监测故障及其后果、降低有可能造成人身伤害的故障的发生机率并采取适当的补救措施。客户将全额赔偿因 在此类安全关键应用中使用任何 TI 组件而对 TI 及其代理造成的任何损失。

在某些场合中，为了推进安全相关应用有可能对 TI 组件进行特别的促销。TI 的目标是利用此类组件帮助客户设计和创立其特 有的可满足适用的功能安全性标准和要求的终端产品解决方案。尽管如此，此类组件仍然服从这些条款。

TI 组件未获得用于 FDA Class III（或类似的生命攸关医疗设备）的授权许可，除非各方授权官员已经达成了专门管控此类使 用的特别协议。

只有那些 TI 特别注明属于军用等级或"增强型塑料"的 TI 组件才是设计或专门用于军事/航空应用或环境的。购买者认可并同 意，对并非指定面向军事或航空航天用途的 TI 组件进行军事或航空航天方面的应用，其风险由客户单独承担，并且由客户独 力负责满足与此类使用相关的所有法律和法规要求。

TI 已明确指定符合 ISO/TS16949 要求的产品，这些产品主要用于汽车。在任何情况下，因使用非指定产品而无法达到 ISO/TS16949 要求，TI不承担任何责任。

	产品		应用
数字音频	www.ti.com.cn/audio	通信与电信	www.ti.com.cn/telecom
放大器和线性器件	www.ti.com.cn/amplifiers	计算机及周边	www.ti.com.cn/computer
数据转换器	www.ti.com.cn/dataconverters	消费电子	www.ti.com/consumer-apps
DLP® 产品	www.dlp.com	能源	www.ti.com/energy
DSP - 数字信号处理器	www.ti.com.cn/dsp	工业应用	www.ti.com.cn/industrial
时钟和计时器	www.ti.com.cn/clockandtimers	医疗电子	www.ti.com.cn/medical
接口	www.ti.com.cn/interface	安防应用	www.ti.com.cn/security
逻辑	www.ti.com.cn/logic	汽车电子	www.ti.com.cn/automotive
电源管理	www.ti.com.cn/power	视频和影像	www.ti.com.cn/video
微控制器 (MCU)	www.ti.com.cn/microcontrollers		
RFID 系统	www.ti.com.cn/rfidsys		
OMAP应用处理器	www.ti.com/omap		
无线连通性	www.ti.com.cn/wirelessconnectivity	德州仪器在线技术支持社区	www.deyisupport.com

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 © 2014, 德州仪器半导体技术（上海）有限公司

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
ADS1259QPWRQ1	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	AD1259Q1	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) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(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/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish 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.

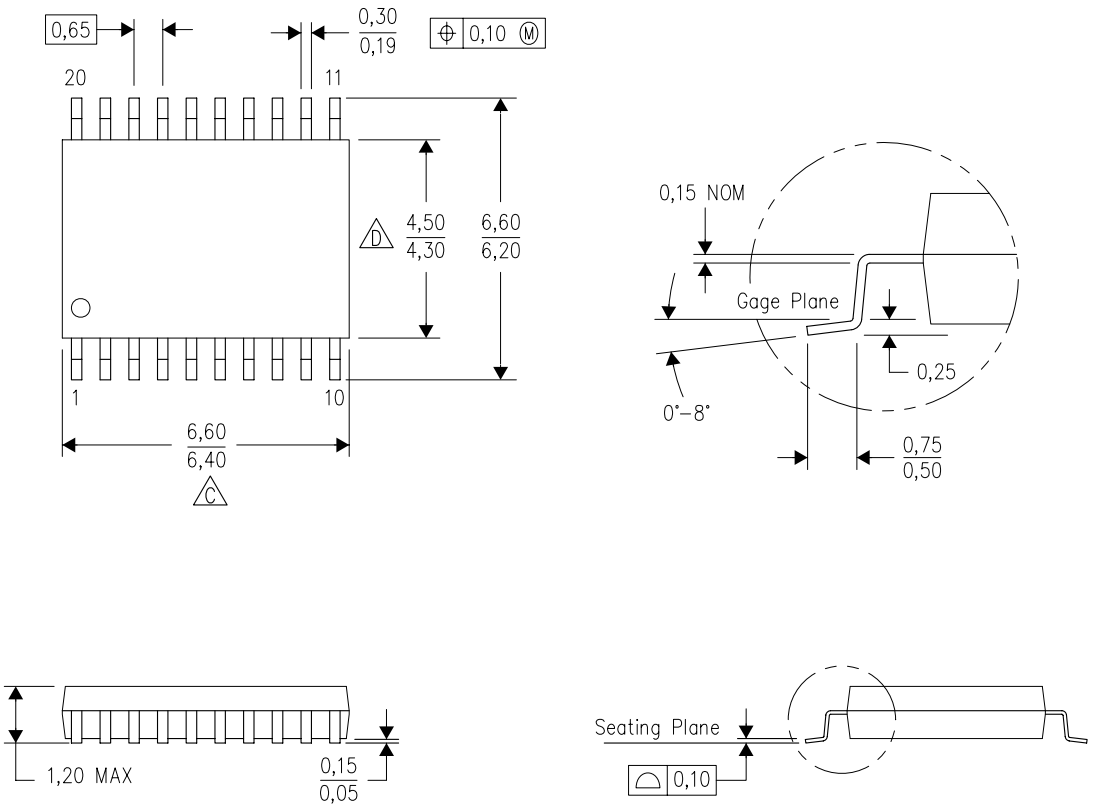
OTHER QUALIFIED VERSIONS OF ADS1259-Q1 :

- Catalog: ADS1259

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product

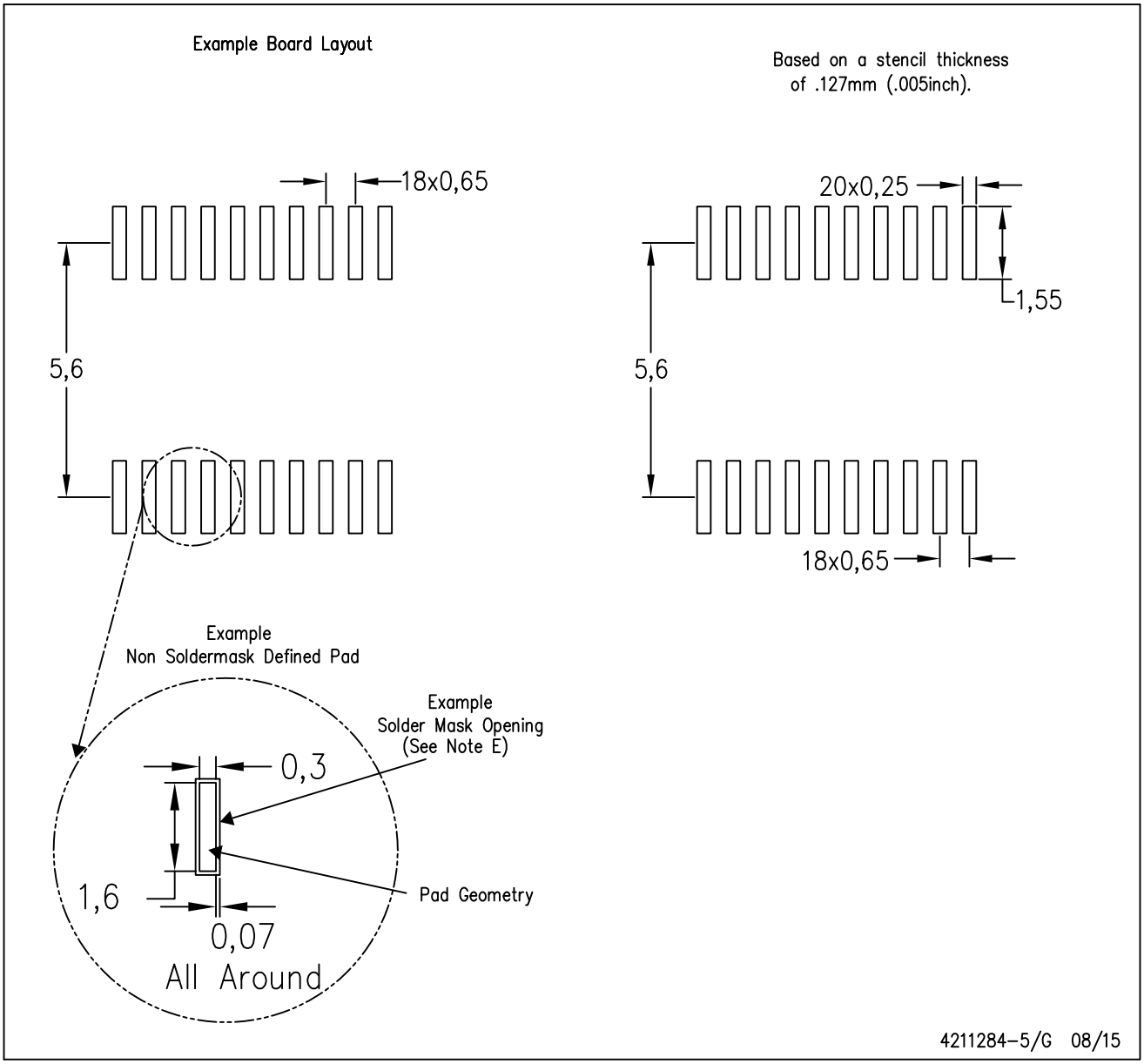
PW (R–PDSO–G20) PLASTIC SMALL OUTLINE



4040064–5/G 02/11

NOTES:
A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M–1994.
B. This drawing is subject to change without notice.
C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.
D. Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.
E. Falls within JEDEC MO–153

PW (R–PDSO–G20) PLASTIC SMALL OUTLINE



NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Publication IPC–7351 is recommended for alternate design.
D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC–7525 for other stencil recommendations.
E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

重要声明

德州仪器(TI) 及其下属子公司有权根据 JESD46 最新标准, 对所提供的产品和服务进行更正、修改、增强、改进或其它更改， 并有权根据 JESD48 最新标准中止提供任何产品和服务。客户在下订单前应获取最新的相关信息, 并验证这些信息是否完整且是最新的。所有产品的销售都遵循在订单确认时所提供的TI 销售条款与条件。

TI 保证其所销售的组件的性能符合产品销售时 TI 半导体产品销售条件与条款的适用规范。仅在 TI 保证的范围内，且 TI 认为 有必要时才会使用测试或其它质量控制技术。除非适用法律做出了硬性规定，否则没有必要对每种组件的所有参数进行测试。

TI 对应用帮助或客户产品设计不承担任何义务。客户应对其使用 TI 组件的产品和应用自行负责。为尽量减小与客户产品和应 用相关的风险，客户应提供充分的设计与操作安全措施。

TI 不对任何 TI 专利权、版权、屏蔽作品权或其它与使用了 TI 组件或服务的组合设备、机器或流程相关的 TI 知识产权中授予 的直接或隐含权限作出任何保证或解释。TI 所发布的与第三方产品或服务有关的信息，不能构成从 TI 获得使用这些产品或服 务的许可、授权、或认可。使用此类信息可能需要获得第三方的专利权或其它知识产权方面的许可，或是 TI 的专利权或其它 知识产权方面的许可。

对于 TI 的产品手册或数据表中 TI 信息的重要部分，仅在没有对内容进行任何篡改且带有相关授权、条件、限制和声明的情况 下才允许进行复制。TI 对此类篡改过的文件不承担任何责任或义务。复制第三方的信息可能需要服从额外的限制条件。

在转售 TI 组件或服务时，如果对该组件或服务参数的陈述与 TI 标明的参数相比存在差异或虚假成分，则会失去相关 TI 组件 或服务的所有明示或暗示授权，且这是不正当的、欺诈性商业行为。TI 对任何此类虚假陈述均不承担任何责任或义务。

客户认可并同意，尽管任何应用相关信息或支持仍可能由 TI 提供，但他们将独力负责满足与其产品及在其应用中使用 TI 产品 相关的所有法律、法规和安全相关要求。客户声明并同意，他们具备制定与实施安全措施所需的全部专业技术和知识，可预见 故障的危险后果、监测故障及其后果、降低有可能造成人身伤害的故障的发生机率并采取适当的补救措施。客户将全额赔偿因 在此类安全关键应用中使用任何 TI 组件而对 TI 及其代理造成的任何损失。

在某些场合中，为了推进安全相关应用有可能对 TI 组件进行特别的促销。TI 的目标是利用此类组件帮助客户设计和创立其特 有的可满足适用的功能安全性标准和要求的终端产品解决方案。尽管如此，此类组件仍然服从这些条款。

TI 组件未获得用于 FDA Class III（或类似的生命攸关医疗设备）的授权许可，除非各方授权官员已经达成了专门管控此类使 用的特别协议。

只有那些 TI 特别注明属于军用等级或“增强型塑料”的 TI 组件才是设计或专门用于军事/航空应用或环境的。购买者认可并同 意，对并非指定面向军事或航空航天用途的 TI 组件进行军事或航空航天方面的应用，其风险由客户单独承担，并且由客户独 力负责满足与此类使用相关的所有法律和法规要求。

TI 已明确指定符合 ISO/TS16949 要求的产品，这些产品主要用于汽车。在任何情况下，因使用非指定产品而无法达到 ISO/TS16949 要求，TI不承担任何责任。

	产品		应用
数字音频	www.ti.com.cn/audio	通信与电信	www.ti.com.cn/telecom
放大器和线性器件	www.ti.com.cn/amplifiers	计算机及周边	www.ti.com.cn/computer
数据转换器	www.ti.com.cn/dataconverters	消费电子	www.ti.com/consumer-apps
DLP® 产品	www.dlp.com	能源	www.ti.com/energy
DSP - 数字信号处理器	www.ti.com.cn/dsp	工业应用	www.ti.com.cn/industrial
时钟和计时器	www.ti.com.cn/clockandtimers	医疗电子	www.ti.com.cn/medical
接口	www.ti.com.cn/interface	安防应用	www.ti.com.cn/security
逻辑	www.ti.com.cn/logic	汽车电子	www.ti.com.cn/automotive
电源管理	www.ti.com.cn/power	视频和影像	www.ti.com.cn/video
微控制器 (MCU)	www.ti.com.cn/microcontrollers		
RFID 系统	www.ti.com.cn/rfidsys		
OMAP应用处理器	www.ti.com/omap		
无线连通性	www.ti.com.cn/wirelessconnectivity	德州仪器在线技术支持社区	www.deyisupport.com

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2016, Texas Instruments Incorporated