

# AFE11612-SEP 具有多通道 ADC、DAC 和温度传感器的耐辐射模拟监视器和控制器

## 1 特性

- 抗辐射：
  - 在 125°C 的环境温度下，单粒子锁定 (SEL) 抗扰度高达  
LET = 43 MeV-cm<sup>2</sup>/mg
  - 单粒子功能中断 (SEFI) 的 LET 特征值高达 43 MeV-cm<sup>2</sup>/mg
  - 电离辐射总剂量 (TID) RLAT/RHA 特征值高达 20 krad(Si)
- 增强型航天塑料 (航天 EP)：
  - 符合 ASTM E595 释气规格要求
  - 供应商项目图 (VID) V62/22614
  - 军用级温度范围：-55°C 至 +125°C
  - 制造、组装和测试一体化基地
  - 金键合线，NiPdAu 铅涂层
  - 晶圆批次可追溯性
  - 延长了产品生命周期
  - 延长了产品变更通知周期
- 12 个单调性 12 位 DAC
  - 0V 至 5V 输出范围
  - DAC 关断至用户定义电平
- 16 输入 12 位 SAR ADC
  - 高采样率：500kSPS
  - 16 个单端输入或  
2 个差分输入和 12 个单端输入
  - 可编程超限报警
- 8 个 GPIO 引脚
- 内部 2.5V 基准电压
- 两个远程温度传感器
- 内部温度传感器
- 可配置的 SPI 和 I<sup>2</sup>C 接口
  - 2.7V 至 5.5V 的工作电压

## 2 应用

- 命令和数据处理 (C&DH)
- 通信负载
- 雷达成像有效载荷
- 光学成像有效载荷
- 一般模拟监视和控制

## 3 说明

AFE11612-SEP 是一款高度集成的模拟监视和控制器件，专为高密度通用监视和控制系统而设计。该器件包含 12 个 12 位数模转换器 (DAC) 和一个 16 通道 12 位模数转换器 (ADC)。该器件还包含八个通用输入和输出 (GPIO)、两个远程温度传感器通道和一个本地温度传感器通道。

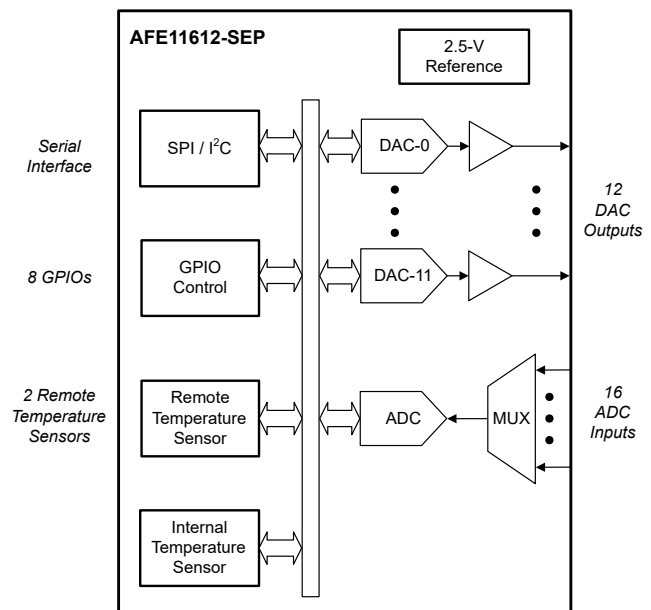
该器件具有一个 2.5V 内部基准，可将 DAC 设置为 0V 至 5V 的输出电压范围。该器件还支持通过外部基准运行。该器件支持通过 SPI 兼容接口和 I<sup>2</sup>C 兼容接口进行通信。

该器件的高集成度可显著减少组件数量并简化闭环系统设计，从而使该器件成为辐射耐受性和布板空间至关重要的高密度应用的理想选择。

### 封装信息

器件型号	封装 <sup>(1)</sup>	封装尺寸 (标称值)
AFE11612-SEP	HTQFP (64)	10.0mm × 10.0mm

(1) 要了解所有可用封装，请参见数据表末尾的封装选项附录。



简化版原理图



## 4 Device and Documentation Support

### 4.1 Trademarks

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### 4.2 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.

### 4.3 术语表



#### TI 术语表

本术语表列出并解释了术语、首字母缩略词和定义。

## 5 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

**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
AFE11612PAPSEP	ACTIVE	HTQFP	PAP	64	250	RoHS & Green	NIPDAU	Level-3-260C-168 HR	-55 to 125	AFE11612 PAPSEP	
V62/22614-01XE	ACTIVE	HTQFP	PAP	64	250	RoHS & Green	NIPDAU	Level-3-260C-168 HR		AFE11612 PAPSEP	

(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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## GENERIC PACKAGE VIEW

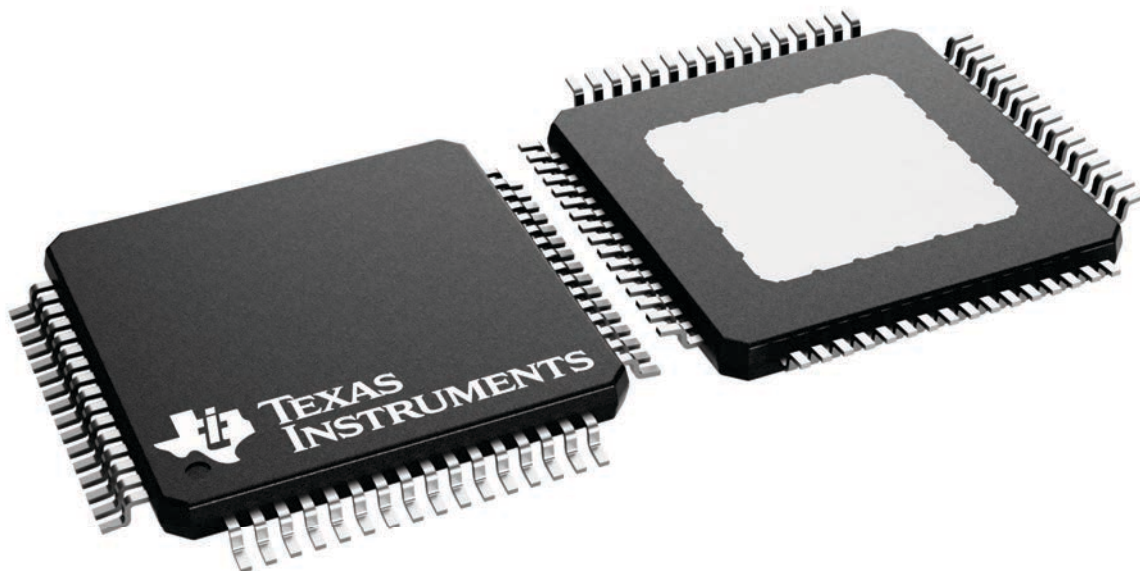
**PAP 64**

**HTQFP - 1.2 mm max height**

10 x 10, 0.5 mm pitch

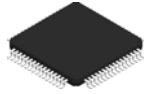
QUAD FLATPACK

This image is a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.



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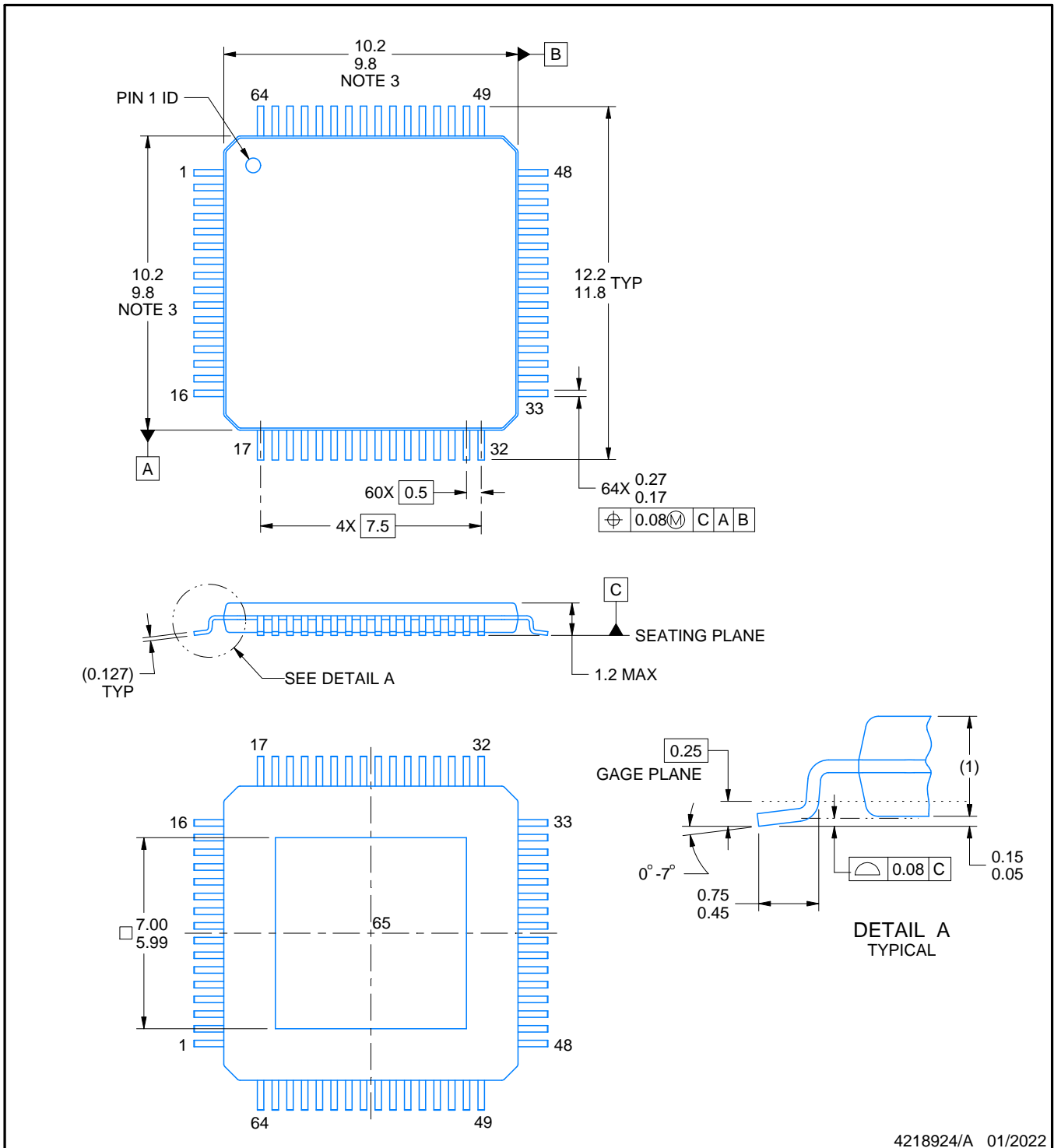
# PAP0064G



# PACKAGE OUTLINE

PowerPAD™ TQFP - 1.2 mm max height

PLASTIC QUAD FLATPACK



4218924/A 01/2022

**NOTES:**

PowerPAD is a trademark of Texas Instruments.

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs.
4. Strap features may not be present.
5. Reference JEDEC registration MS-026.

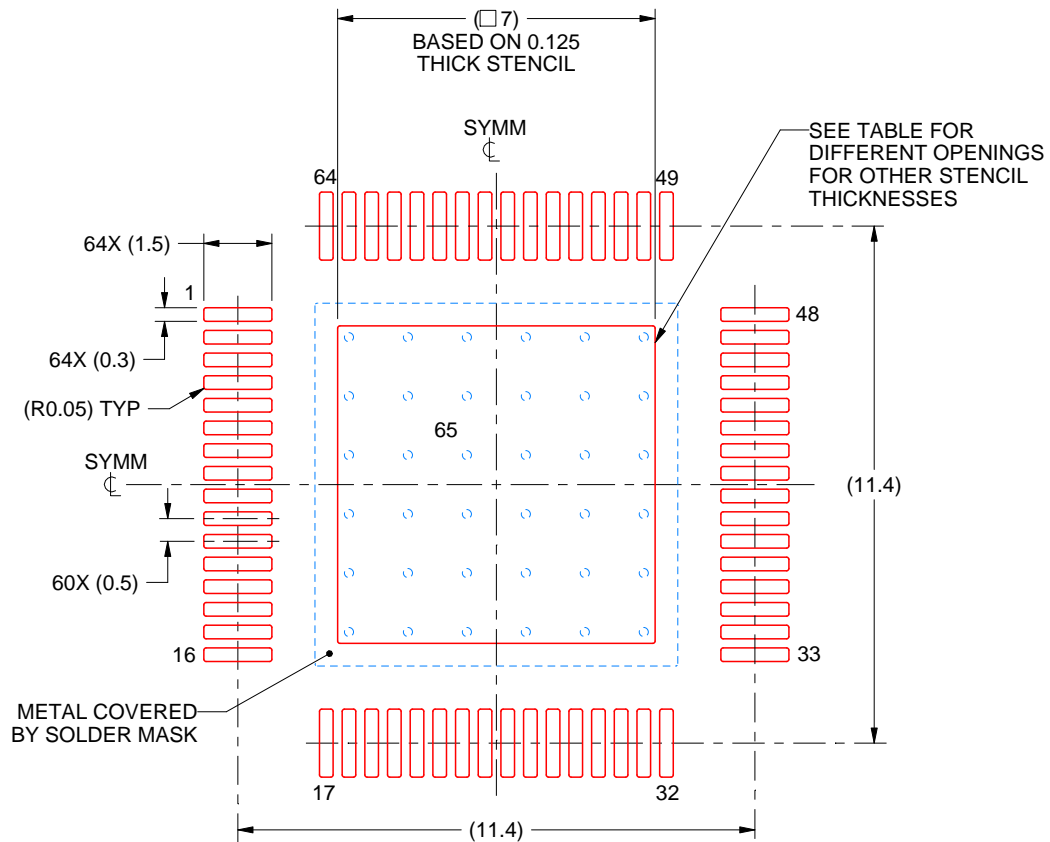


# EXAMPLE STENCIL DESIGN

PAP0064G

PowerPAD™ TQFP - 1.2 mm max height

PLASTIC QUAD FLATPACK



**SOLDER PASTE EXAMPLE**  
 EXPOSED PAD  
 100% PRINTED SOLDER COVERAGE BY AREA  
 SCALE:6X

STENCIL THICKNESS	SOLDER STENCIL OPENING
0.1	7.83 X 7.83
0.125	7.0 X 7.0 (SHOWN)
0.15	6.39 X 6.39
0.175	5.92 X 5.92

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NOTES: (continued)

- 11. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
- 12. Board assembly site may have different recommendations for stencil design.



## 重要声明和免责声明

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