

AFE3256 用于数字 X 射线平板检测器的 256 通道模拟前端

1 特性

- 256 通道
- 片上 16 位 ADC
- 高性能：
 - 噪声：440 个电子 RMS (1.2pC 输入电荷范围)
 - 低相关噪声
 - 全通道积分非线性：16 位时为 ± 2 LSB
 - 扫描时间： $< 16\mu\text{s}$ 至 $204.8\mu\text{s}$
- 集成：
 - 可编程满量程输入电荷量范围：0.3pC 至 12.5pC，分辨率为 0.3pC
 - 内部时序发生器 (TG)
 - 内置相关双采样器
 - 软件可编程电子或空穴积分模式
 - 流水线式“集成和读取”，用于提高集成期间的吞吐量数据读取
 - 串行 LVDS 输出
 - 片上温度传感器
- 简单电源方案：
 - 单个 1.85V 电源供电
- 多种功率模式，功耗范围为 1mW/通道至 2mW/通道
- 省电模式：睡眠和待机
- 分箱模式支持
- 定制 Chip-On-Film (COF) 封装

2 应用

- 平板 X 射线探测器
- 电荷量检测器
- 电容量测量

3 说明

AFE3256 是一款 256 通道模拟前端 (AFE)，旨在满足基于平板检测器 (FPD) 的数字 X 射线系统的要求。此器件包括 256 个集成器、带双电源的相关双采样器 (CDS) 和 256:2 模拟多路复用器。该器件还具有两个 16 位逐次逼近寄存器 (SAR) 模数转换器 (ADC)。来自 ADC 的串行数据采用低压差分信令 (LVDS) 格式。

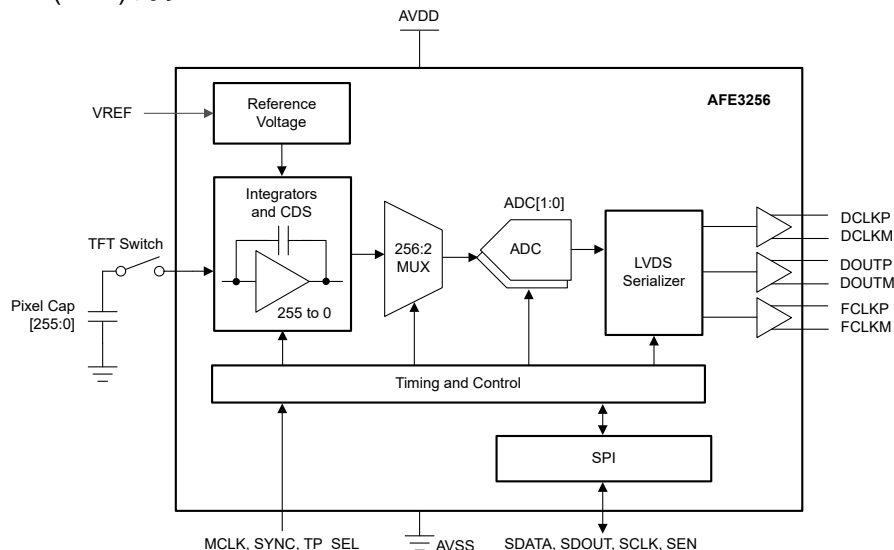
该器件通常也称为读出集成电路 (ROIC)，可使用多种功耗模式和系统内调试选项等特性来优化整体系统性能。

睡眠和待机模式能够大幅降低功耗，这对于电池供电型系统至关重要。

封装信息

器件型号	封装 ⁽¹⁾	封装尺寸 ⁽²⁾
AFE3256	TFU (COF, 320)	38mm × 28mm

- (1) 如需了解所有可用封装，请参阅数据表末尾的封装选项附录。
 (2) 封装尺寸 (长 × 宽) 为标称值，并包括引脚 (如适用)。



AFE3256 方框图



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4 Revision History

注：以前版本的页码可能与当前版本的页码不同

DATE	REVISION	NOTES
October 2023	*	Initial release

5 Device and Documentation Support

5.1 Documentation Support

5.1.1 Related Documentation

For related documentation, see the following:

- Texas Instruments, [TPS7A8300 2- \$\mu\$ A, 6- \$\mu\$ VRMS, RF, LDO Voltage Regulator data sheet](#)
- Texas Instruments, [REF70 2 ppm/ \$^{\circ}\$ C Maximum Drift, 0.23 ppm-p 1/f Noise, Precision Voltage Reference data sheet](#)

5.2 接收文档更新通知

要接收文档更新通知，请导航至 ti.com 上的器件产品文件夹。点击 [订阅更新](#) 进行注册，即可每周接收产品信息更改摘要。有关更改的详细信息，请查看任何已修订文档中包含的修订历史记录。

5.3 支持资源

[TI E2E™ 中文支持论坛](#) 是工程师的重要参考资料，可直接从专家处获得快速、经过验证的解答和设计帮助。搜索现有解答或提出自己的问题，获得所需的快速设计帮助。

链接的内容由各个贡献者“按原样”提供。这些内容并不构成 TI 技术规范，并且不一定反映 TI 的观点；请参阅 TI 的 [使用条款](#)。

5.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.

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5.5 静电放电警告



静电放电 (ESD) 会损坏这个集成电路。德州仪器 (TI) 建议通过适当的预防措施处理所有集成电路。如果不遵守正确的处理和安装程序，可能会损坏集成电路。

ESD 的损坏小至导致微小的性能降级，大至整个器件故障。精密的集成电路可能更容易受到损坏，这是因为非常细微的参数更改都可能会导致器件与其发布的规格不相符。

5.6 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。

6 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
AFE3256TFU	ACTIVE	COF	TFU	320	30	Non-RoHS & Non-Green	AU	N / A for Pkg Type	0 to 70	AFE3256	Samples
AFE3256TFV	ACTIVE	COF	TFV	315	36	Non-RoHS & Non-Green	AU	N / A for Pkg Type	0 to 70	AFE3256	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.

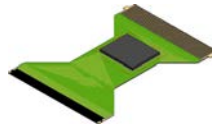
(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(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.

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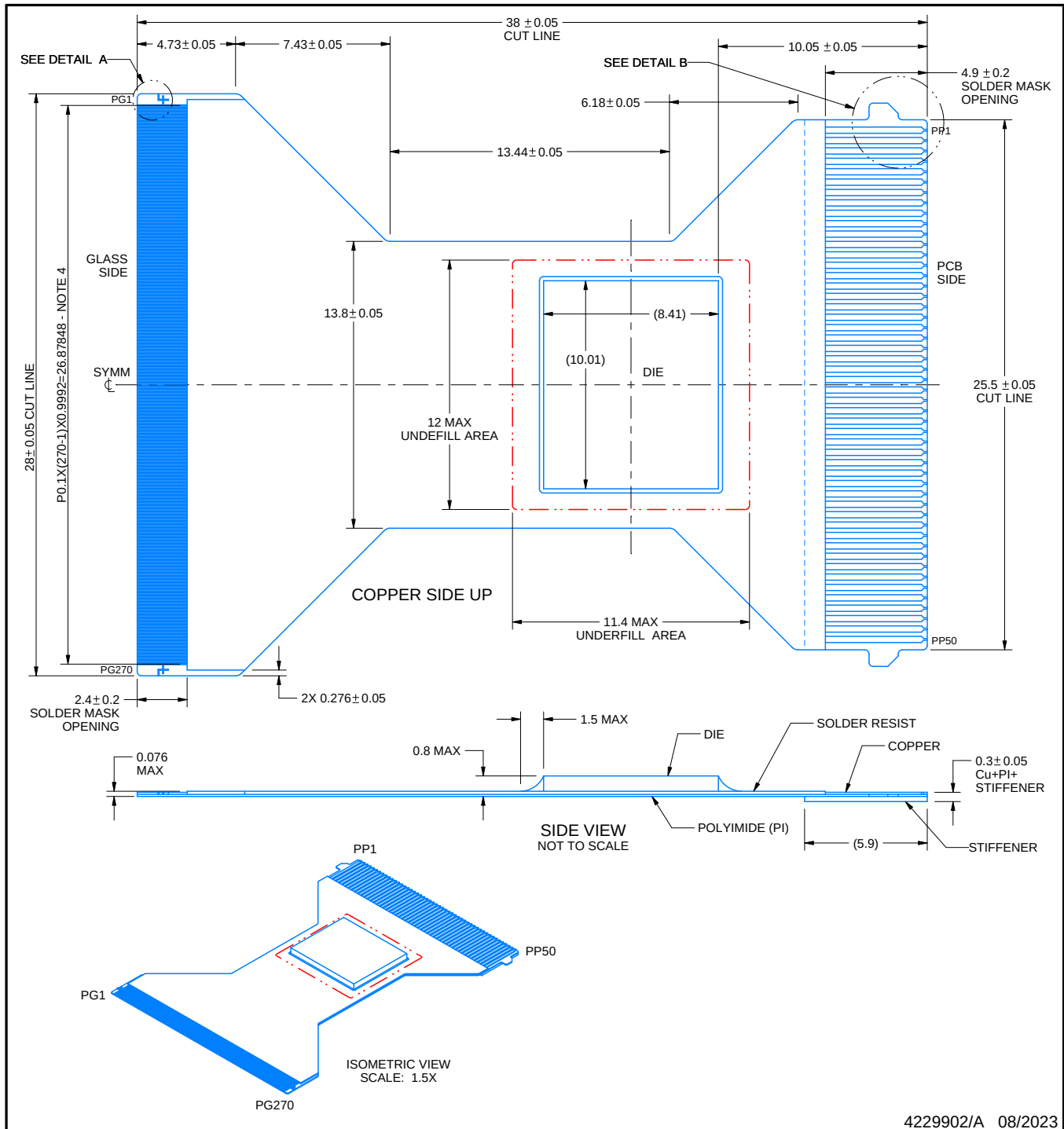
TFU0320A



PACKAGE OUTLINE

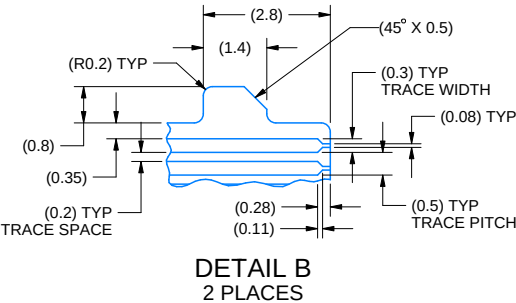
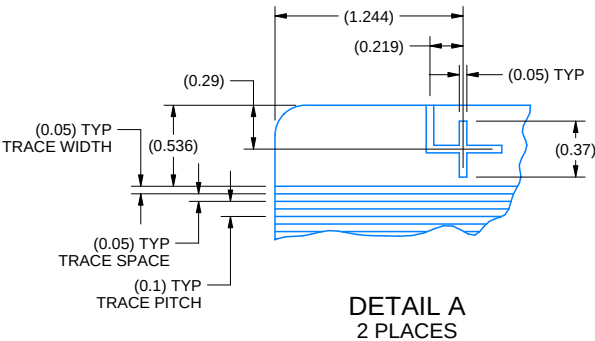
COF - 0.8 mm max height

CHIP ON FLEX



NOTES:

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. Flip chip application only.
4. The shrink factor of the COF on the glass side is 0.9992.



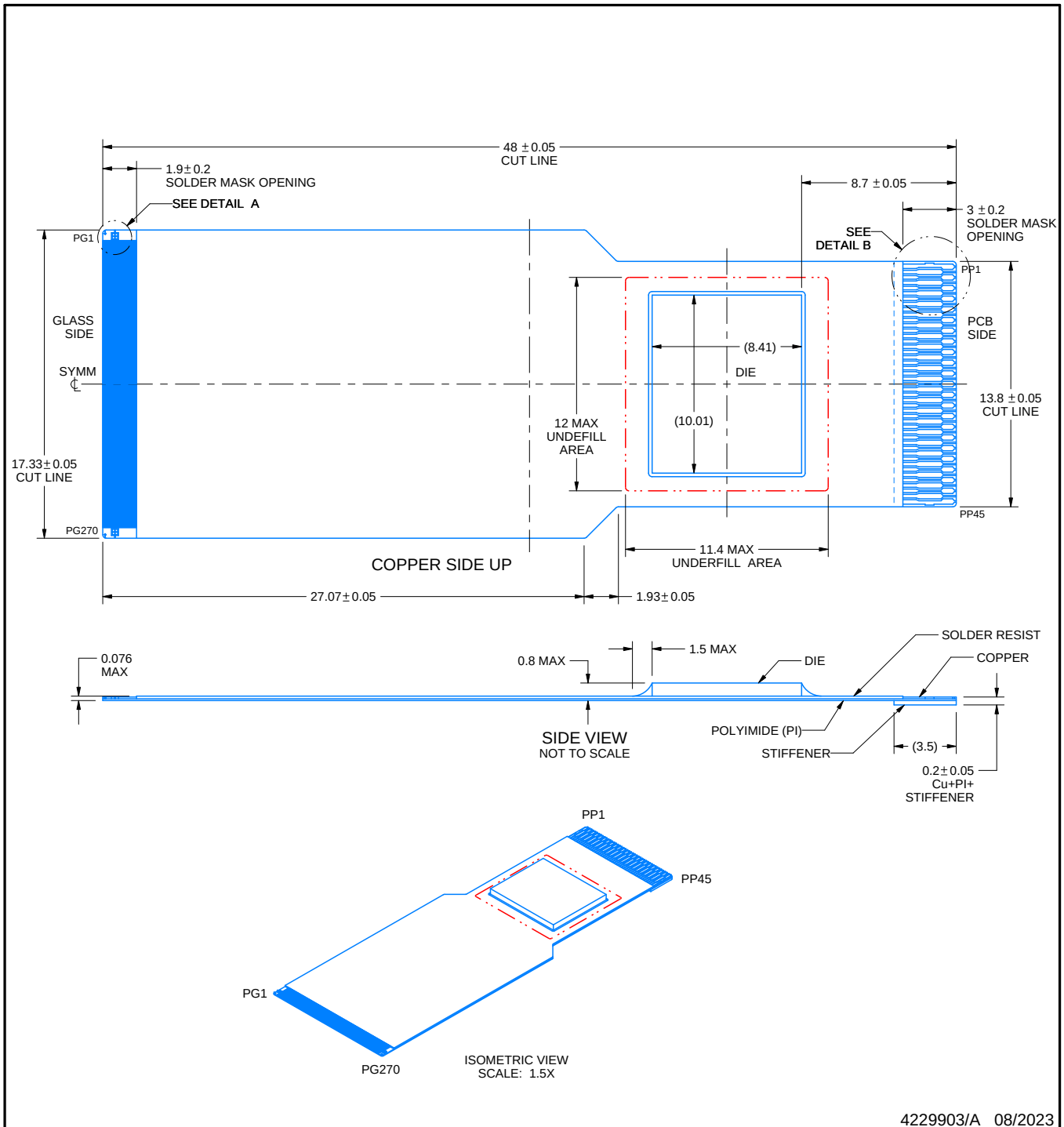
TFV0315A



PACKAGE OUTLINE

COF - 0.8 mm max height

CHIP ON FLEX



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NOTES:

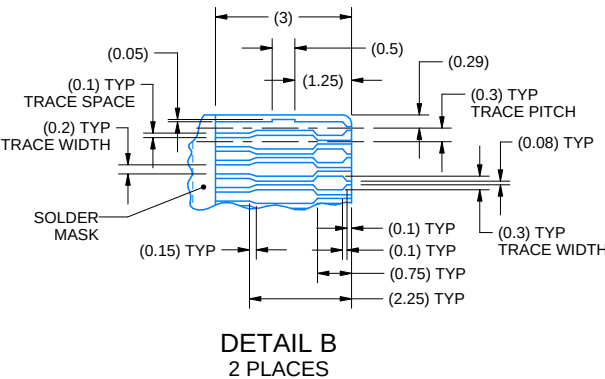
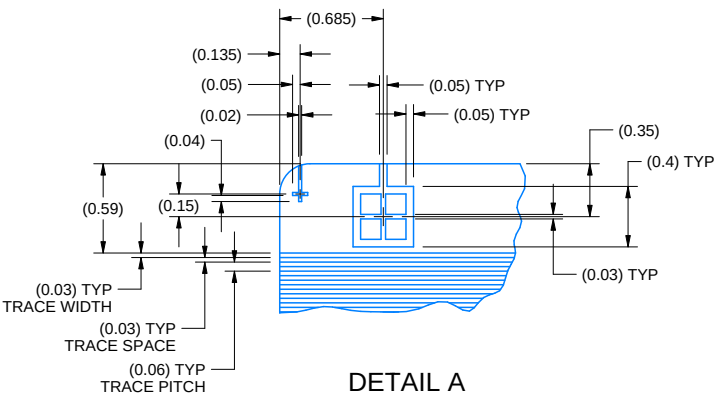
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Flip chip application only.
4. The shrink factor of the COF on the glass side is 0.9987.

PACKAGE OUTLINE

TFV0315A

COF - 0.8 mm max height

CHIP ON FLEX



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