

带 INH 和 WAKE 引脚的 TCAN1043A-Q1 低功耗故障保护 CAN FD 收发器

1 特性

- 符合面向汽车应用的 AEC Q100 标准
- 符合 ISO 11898-2:2016 物理层标准的要求
- V_{SUP} 工作范围：4.5V 至 28V
- V_{IO} 电平转换支持 1.8V、2.5V、3.3V 和 5V MCU
- 工作模式：
 - 正常模式
 - 静音模式
 - 低功耗待机模式
 - 低功耗睡眠模式
- 可预测未上电时的行为
 - 高阻抗 CAN 总线和逻辑终端（运行总线或应用上无负载）
 - 在 CAN 总线和 RXD 终端上实现上电/断电无干扰运行
- 保护特性：±58V 总线容错、42V 负载突降支持、IEC ESD 保护、热关断保护、TXD 显性状态超时、电源端子上的欠压保护
- 扩展总线故障检测功能
- 采用 SOT (14) 封装、SOIC (14) 封装以及无引线 VSON (14) 封装，具有改善的自动光学检测 (AOI) 功能

2 应用

- 车身电子装置和照明
- 汽车网关
- 高级驾驶辅助系统 (ADAS)
- 信息娱乐系统与仪表组
- 混合动力、电动和动力总成系统
- 个人交通工具 - 电动自行车
- 工业运输

3 说明

TCAN1043A-Q1 (TCAN1043A) 是一款高速控制器局域网 (CAN) 收发器，满足 ISO 11898-2:2016 高速 CAN 规范的物理层要求。该器件支持传统 CAN 和 CAN FD（数据速率高达 8 兆位/秒 (Mbps)）。

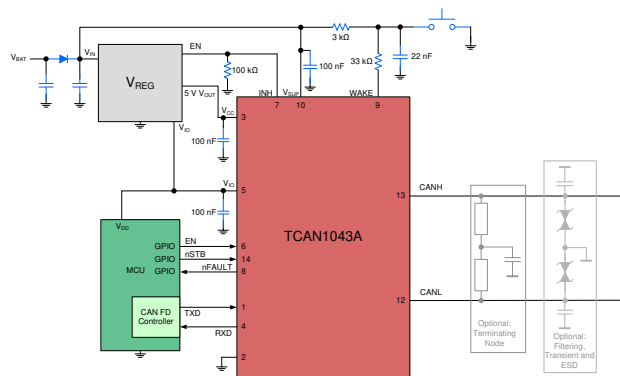
TCAN1043A-Q1 可以通过 INH 输出引脚选择性地启用节点上可能存在的各种电源，从而在整个系统级别减少电池电流消耗。这使得在超低电流睡眠模式中，功率传送到除该器件以外的所有系统组件，而该器件则仍然处于低功耗状态，并对 CAN 总线进行监控。检测到唤醒事件时，该器件通过将 INH 输出驱动至高电平来启动节点。

TCAN1043A-Q1 包括通过 V_{IO} 端子实现的内部逻辑电平转换功能，允许直接连接到 1.8V、2.5V、3.3V 或 5V 控制器。该收发器包括许多保护和诊断功能，其中包括欠压检测、热关断 (TSD)、驱动器显性超时 (TXD DTO) 和 ±58V 总线故障保护。

器件信息

器件型号	封装 ⁽¹⁾	封装尺寸 (标称值)
TCAN1043A-Q1	SOT (DYY)	4.20mm x 2.00mm
	SOIC (D)	9.90mm x 3.91mm
	VSON (DMT)	4.50mm x 3.00mm

(1) 如需了解所有可用封装，请参阅数据表末尾的可订购产品附录。



简化版原理图



4 Pin Configuration and Functions

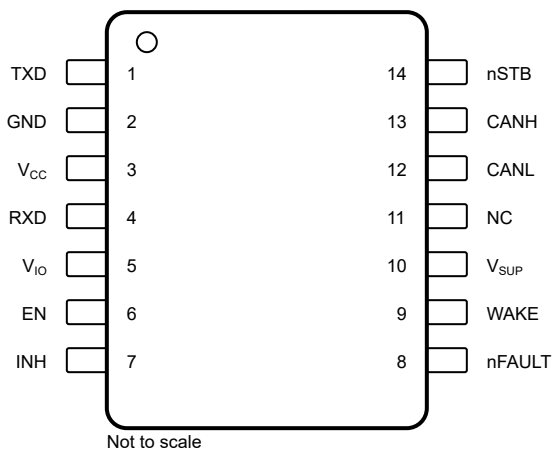


图 4-1. D and DYY Packages, 14 Pin (SOIC) and (SOT), Top View

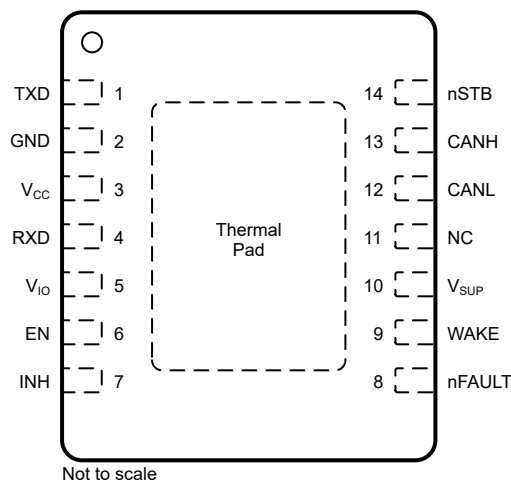


图 4-2. DMT Package, 14 Pin (VSON), Top View

PINS		TYPE	DESCRIPTION
NAME	NO.		
TXD	1	Digital Input	CAN transmit data input, integrated pull-up
GND	2	GND	Ground connection
V _{CC}	3	Supply	5 V transceiver supply
RXD	4	Digital Output	CAN receive data output, tri-state when $V_{IO} < UV_{IO}$
V _{IO}	5	Supply	I/O supply voltage
EN	6	Digital Input	Enable input for mode control, integrated pull-down
INH	7	High Voltage Output	Inhibit pin to control system voltage regulators and supplies, high-voltage
nFAULT	8	Digital Output	Fault output, inverted logic
WAKE	9	High Voltage Input	Local WAKE input terminal, high voltage
V _{SUP}	10	Supply	High-voltage supply from battery
NC	11	—	No connect, not internally connected
CANL	12	Bus IO	Low-level CAN bus input/output line
CANH	13	Bus IO	High-level CAN bus input/output line
nSTB	14	Digital	Standby mode control input, integrated pull-down
Thermal Pad	—	—	Connect the thermal pad to the printed circuit board (PCB) ground plane for thermal relief

5 Device and Documentation Support

5.1 Documentation Support

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™ 支持论坛](#) 是工程师的重要参考资料，可直接从专家获得快速、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可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

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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
PTCAN1043ADMTRQ1	ACTIVE	VSON	DMT	14	3000	Non-RoHS & Non-Green	Call TI	Call TI	-40 to 150		Samples
PTCAN1043ADRQ1	ACTIVE	SOIC	D	14	2500	Non-RoHS & Non-Green	Call TI	Call TI	-40 to 150		Samples
PTCAN1043ADYYRQ1	ACTIVE	SOT-23-THN	DYY	14	3000	Non-RoHS & Non-Green	Call TI	Call TI	-40 to 150		Samples
TCAN1043ADMTRQ1	PREVIEW	VSON	DMT	14	3000	Non-RoHS & Non-Green	Call TI	Call TI	-40 to 150		
TCAN1043ADRQ1	PREVIEW	SOIC	D	14	2500	Non-RoHS & Non-Green	Call TI	Call TI	-40 to 150		
TCAN1043ADYYRQ1	PREVIEW	SOT-23-THN	DYY	14	3000	Non-RoHS & Non-Green	Call TI	Call TI	-40 to 150		

(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

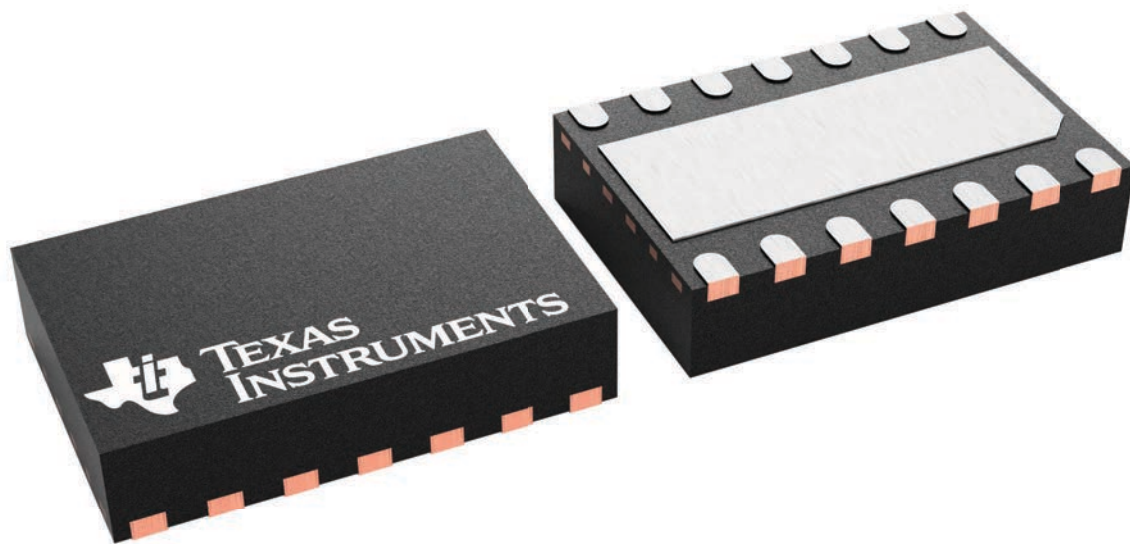
DMT 14

VSON - 0.9 mm max height

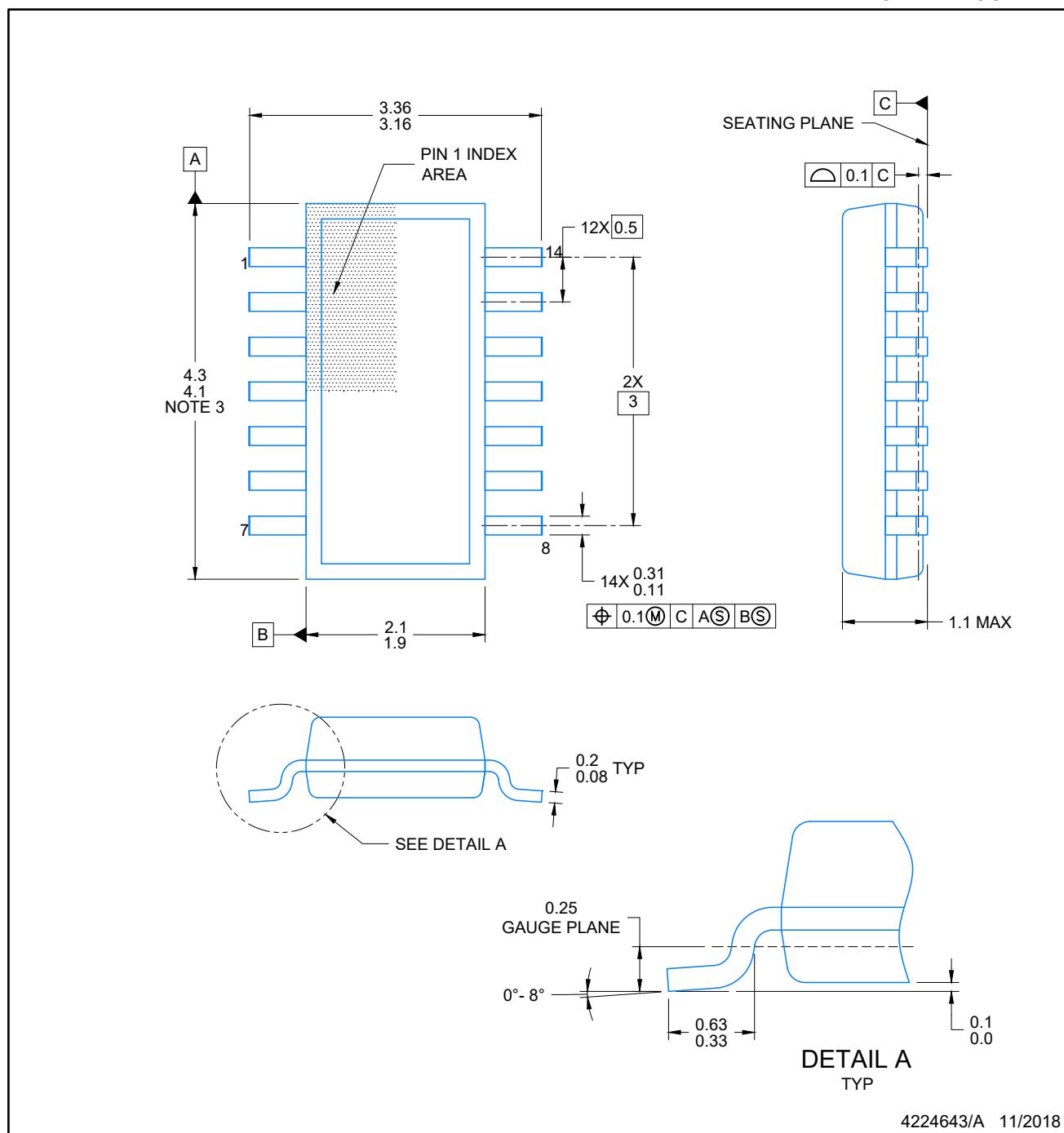
3 x 4.5, 0.65 mm pitch

PLASTIC SMALL OUTLINE - NO LEAD

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

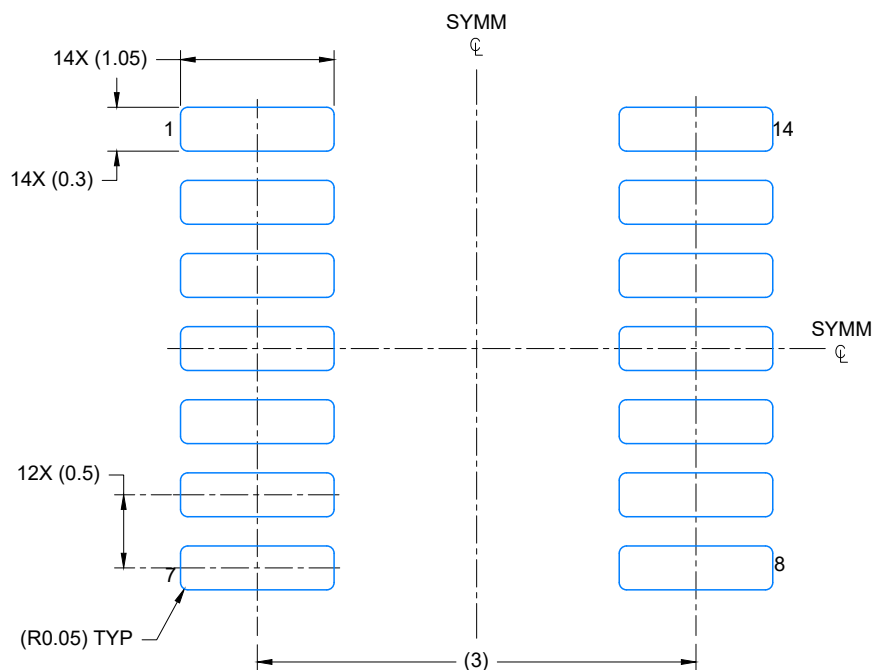


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NOTES:

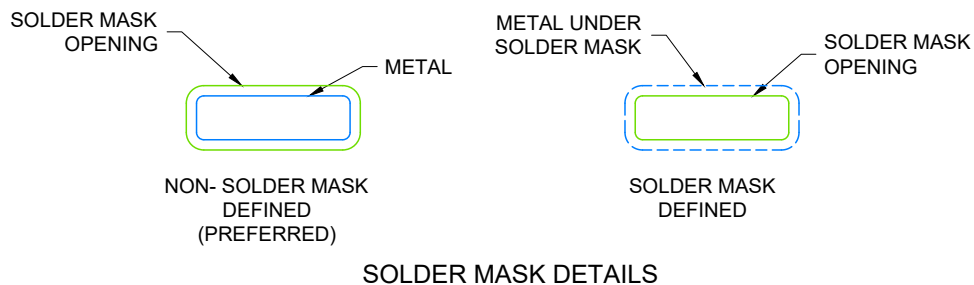
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.50 per side.



LAND PATTERN EXAMPLE

EXPOSED METAL SHOWN

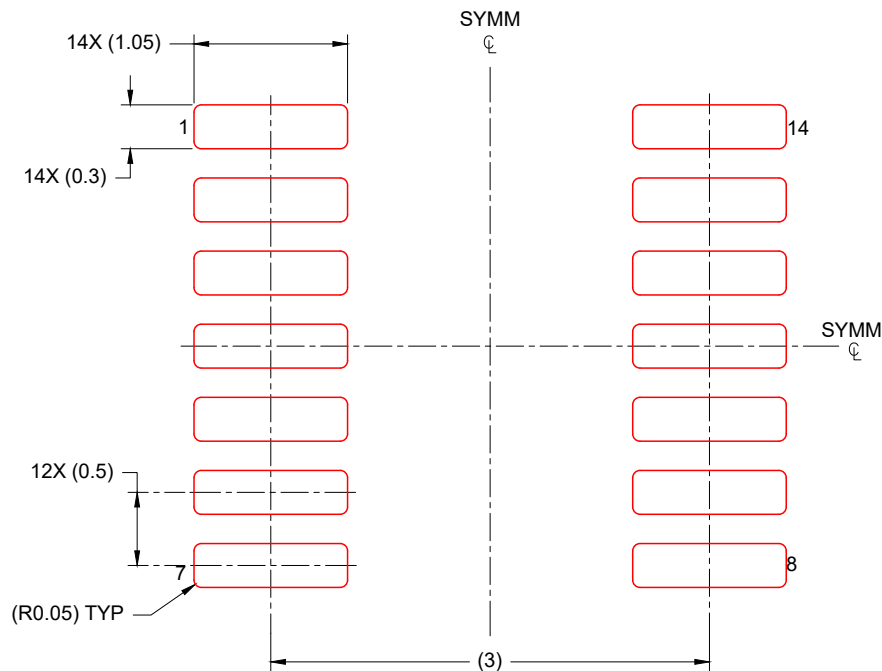
SCALE: 20X



4224643/A 11/2018

NOTES: (continued)

5. Publication IPC-7351 may have alternate designs.
6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.



SOLDER PASTE EXAMPLE
 BASED ON 0.125 mm THICK STENCIL
 SCALE: 20X

4224643/A 11/2018

NOTES: (continued)

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

D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



4040047-5/M 06/11

NOTES:

- A. All linear dimensions are in inches (millimeters).
- 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 0.006 (0,15) each side.
- D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AB.

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