带集成时钟恢复器的 LMH1228 12G UHD-SDI 双路输出电缆驱动器

1 特性

- 支持 ST-2082-1 (12G)、ST-2081-1 (6G)、ST-424 (3G)、ST-292 (HD) 和 ST-259 (SD)
- 与 DVB-ASI 和 AES10 (MADI) 兼容
- 集成时钟恢复器锁定为 11.88Gbps、5.94Gbps、2.97Gbps、1.485Gbps 或 1.001 分频子速率和 270Mbps 的 SMPTE 速率
- 集成眼图张开度监视器 (EOM)
- 双路差分输出电缆驱动器
- 片上 75Ω 终端和回损补偿网络
- 自适应 PCB 输入均衡器
- 时钟恢复型 100Ω 环回输出
- 75Ω 输出端的自动压摆率控制
- 75Ω 输出端的自动预加重和输出振幅
- 100Ω 输出端的可编程去加重和输出振幅
- 75Ω 和 100Ω 输出端的极性反转
- 没有输入信号时自动进入省电工作模式
  - 功耗：25mW（典型值）
- 通过使能引脚进行断电控制
- 2.5V 单电源
  - 功耗：305mW（典型值）
- 可通过引脚、SPI 或 SMBus 接口进行编程
- 工作温度范围：–40°C 至 +85°C
- 5mm × 5mm 32 引脚 WQFN 封装

2 应用

- 兼容 SMPTE 的串行数字接口
- UHDTV/4K/8K/HDTV/SDTV 视频
- 广播视频路由器、交换机、分布式放大器和监视器
- 数字视频处理和编辑

3 说明

LMH1228 器件是一款带有时钟恢复器的 12G UHD-SDI 低功耗双路输出电缆驱动器。它支持高达 11.88Gbps 的 SMPTE 视频速率，因此可为 4K/8K 应用实现超高清视频非常重要。时钟和数据恢复 (CDR) 电路多种多样，因此片上时钟恢复器可自动检测并锁定到高达 11.88Gbps 的各种 SMPTE 视频速率。主机端上的其他时钟恢复型 100Ω 驱动器输出可用于监控或信号分配用途。

片上时钟恢复器可减弱高频抖动并使用纯净的低抖动时钟完全重新生成数据。此时钟恢复器具有内置环路滤波器，且不需要任何输入参考时钟。LMH1228 还具有内部眼图张开度监视器和可编程引脚，可实现 CDR 锁定指示、输入信号检测或硬件干扰，从而为系统诊断和板启动提供支持。

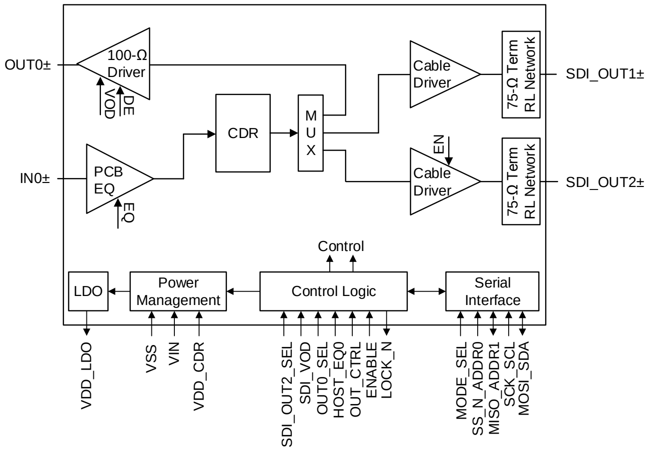
LMH1228 由 2.5V 单电源供电运行。它采用小尺寸 5mm × 5mm 32 引脚 WQFN 封装。LMH1228 与 LMH1208（12G 双路电缆驱动器）引脚兼容。

器件信息(1)

器件型号	封装	封装尺寸（标称值）
LMH1228	WQFN (32)	5.00mm × 5.00mm

(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。

简化框图



English Data Sheet: SNLS575

目录

4 修订历史记录

Changes from Revision A (June 2017) to Revision B **Page**

- *在机械、封装和可订购信息* 部分增加了封装图 4

Changes from Original (March 2017) to Revision A **Page**

- 已更改 基于更新的特性数据，将功耗的典型值从 315mW 更改为 305mW 1

5 器件和文档支持

5.1 文档支持

5.1.1 相关文档

如需相关文档，请参阅：

《QFN/SON PCB 连接应用报告》(SLUA271)

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.cn 上的器件产品文件夹。单击右上角的*通知我* 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 社区资源

下列链接提供到 TI 社区资源的连接。链接的内容由各个分销商“按照原样”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》。

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设计支持 ***TI 参考设计支持*** 可帮助您快速查找有帮助的 E2E 论坛、设计支持工具以及技术支持的联系信息。

5.4 商标

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5.5 静电放电警告

ESD 可能会损坏该集成电路。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措施和安装程序，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 出口管制提示

接收方同意：如果美国或其他适用法律限制或禁止将通过本协议的披露方获得的任何产品或技术数据（其中包括软件）（见美国、欧盟和其他出口管理条例之定义）、或者其他适用国家条例限制的任何受管制产品或此项技术的任何直接产品出口或再出口至任何目的地，那么在没有事先获得美国商务部和其他相关政府机构授权的情况下，接收方不得在知情的情况下，以直接或间接的方式将其出口。

5.7 Glossary

SLYZ022 — *TI Glossary*.

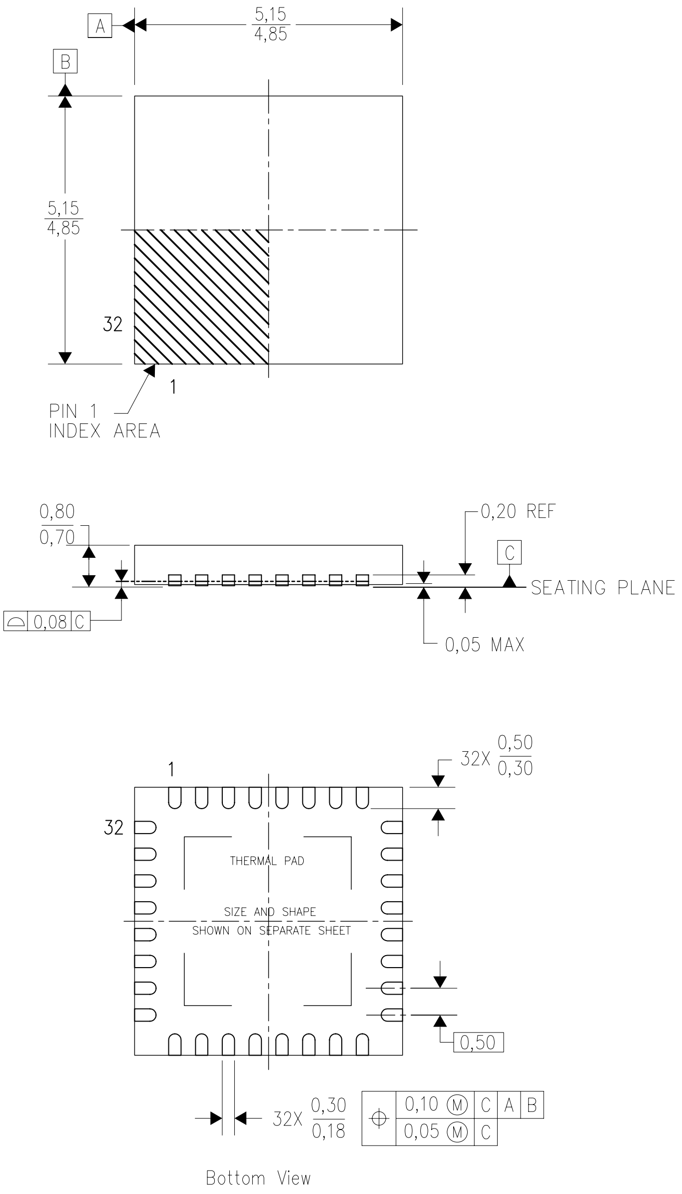
This glossary lists and explains terms, acronyms, and definitions.

6 机械、封装和可订购信息

以下页面包含机械、封装和可订购信息。这些信息是指定器件的最新可用数据。数据如有变更，恕不另行通知，且不会对此文档进行修订。如欲获取此数据表的浏览器版本，请参阅左侧的导航。

MECHANICAL DATA

RTV (S-PWQFN-N32) PLASTIC QUAD FLATPACK NO-LEAD



Bottom View

4206245/C 10/11

NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5–1994.
- B. This drawing is subject to change without notice.
- C. Quad Flatpack, No–Leads (QFN) package configuration.
- D. The package thermal pad must be soldered to the board for thermal and mechanical performance.
- E. See the additional figure in the Product Data Sheet for details regarding the exposed thermal pad features and dimensions.
- F. Falls within JEDEC MO–220.

www.ti.com

THERMAL PAD MECHANICAL DATA

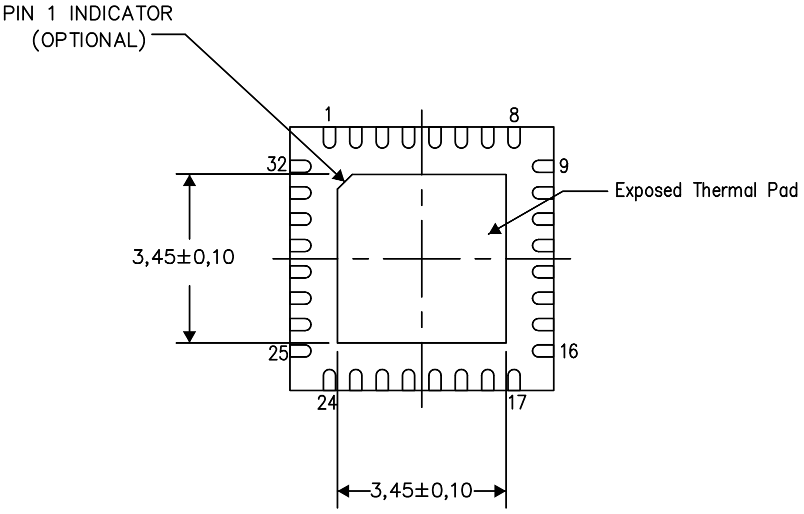
RTV (S-PWQFN-N32) PLASTIC QUAD FLATPACK NO-LEAD

THERMAL INFORMATION

This package incorporates an exposed thermal pad that is designed to be attached directly to an external heatsink. The thermal pad must be soldered directly to the printed circuit board (PCB). After soldering, the PCB can be used as a heatsink. In addition, through the use of thermal vias, the thermal pad can be attached directly to the appropriate copper plane shown in the electrical schematic for the device, or alternatively, can be attached to a special heatsink structure designed into the PCB. This design optimizes the heat transfer from the integrated circuit (IC).

For information on the Quad Flatpack No-Lead (QFN) package and its advantages, refer to Application Report, QFN/SON PCB Attachment, Texas Instruments Literature No. SLUA271. This document is available at www.ti.com.

The exposed thermal pad dimensions for this package are shown in the following illustration.



Bottom View

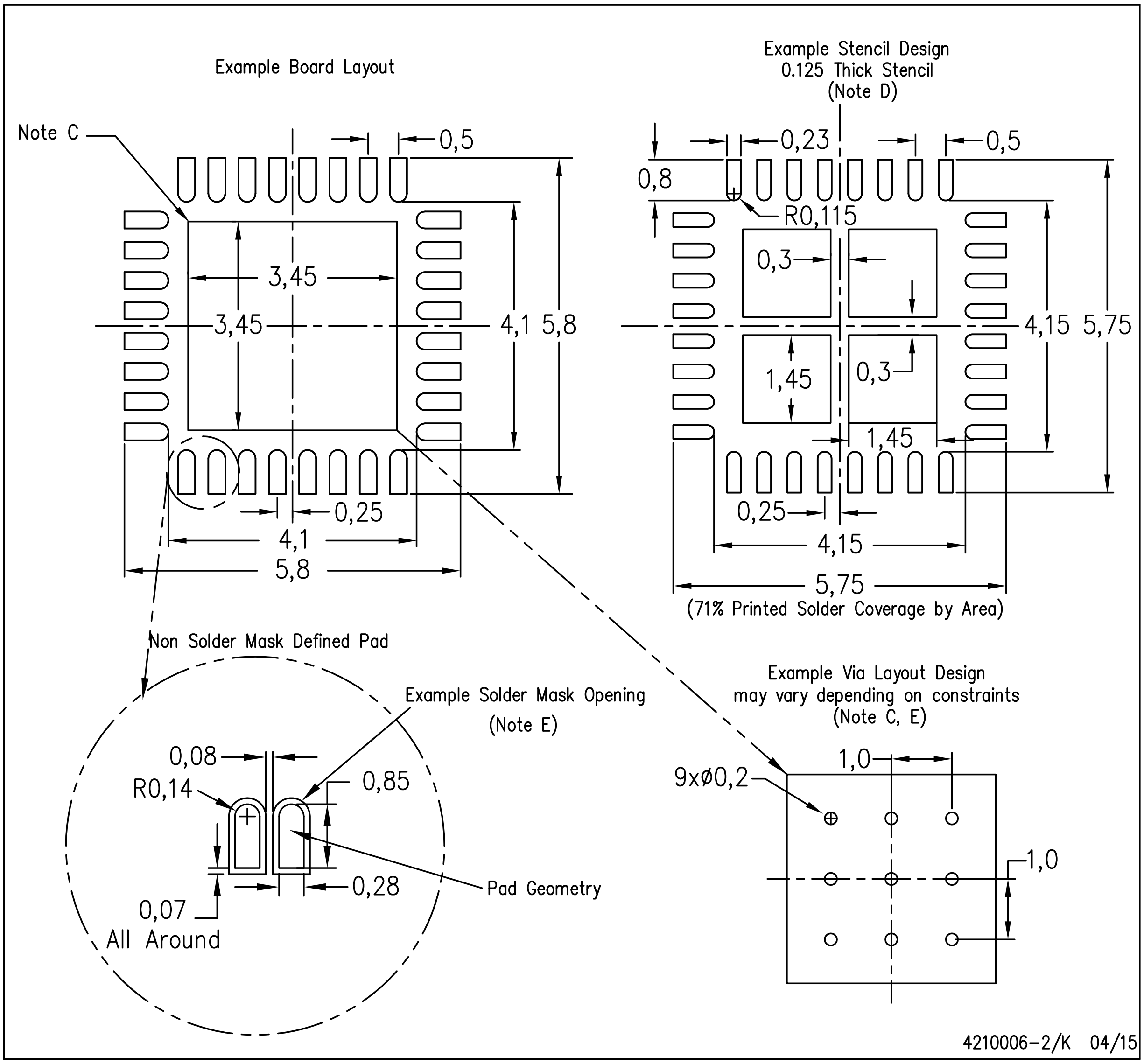
Exposed Thermal Pad Dimensions

4206250-2/Q 05/15

NOTE: All linear dimensions are in millimeters

LAND PATTERN DATA

RTV (S-PWQFN-N32) PLASTIC QUAD FLATPACK NO-LEAD



NOTES:

A. All linear dimensions are in millimeters.

B. This drawing is subject to change without notice.

C. This package is designed to be soldered to a thermal pad on the board. Refer to Application Note, Quad Flat-Pack Packages, Texas Instruments Literature No. SCBA017, SLUA271, and also the Product Data Sheets for specific thermal information, via requirements, and recommended board layout. These documents are available at www.ti.com <http://www.ti.com>.

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 stencil design considerations.

E. Customers should contact their board fabrication site for recommended solder mask tolerances and via tenting recommendations for vias placed in the thermal pad.

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package | Pins	Package qty | Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
LMH1228RTVR	Active	Production	WQFN (RTV) | 32	1000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	L1228
LMH1228RTVR.A	Active	Production	WQFN (RTV) | 32	1000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	L1228
LMH1228RTVR.B	Active	Production	WQFN (RTV) | 32	1000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	L1228
LMH1228RTVT	Active	Production	WQFN (RTV) | 32	250 | SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	L1228
LMH1228RTVT.A	Active	Production	WQFN (RTV) | 32	250 | SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	L1228
LMH1228RTVT.B	Active	Production	WQFN (RTV) | 32	250 | SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	L1228
LMH1228RTVTG4	Active	Production	WQFN (RTV) | 32	250 | SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	L1228
LMH1228RTVTG4.A	Active	Production	WQFN (RTV) | 32	250 | SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	L1228
LMH1228RTVTG4.B	Active	Production	WQFN (RTV) | 32	250 | SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	L1228

(1) **Status:** For more details on status, see our product life cycle.

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

(4) **Lead finish/Ball material:** Parts 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.

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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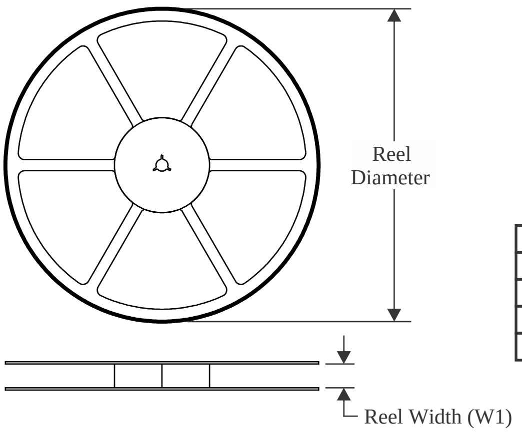
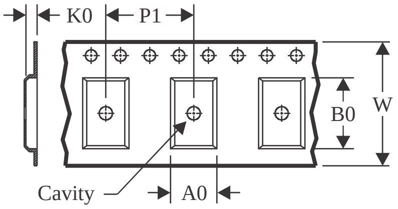
TAPE AND REEL INFORMATION

REEL DIMENSIONS

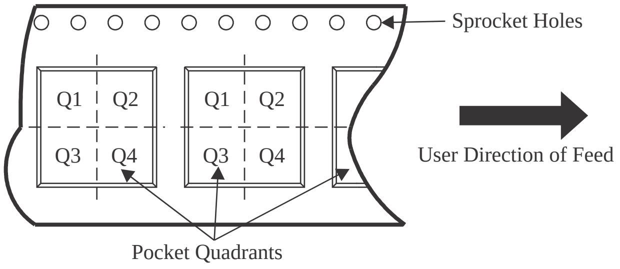


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

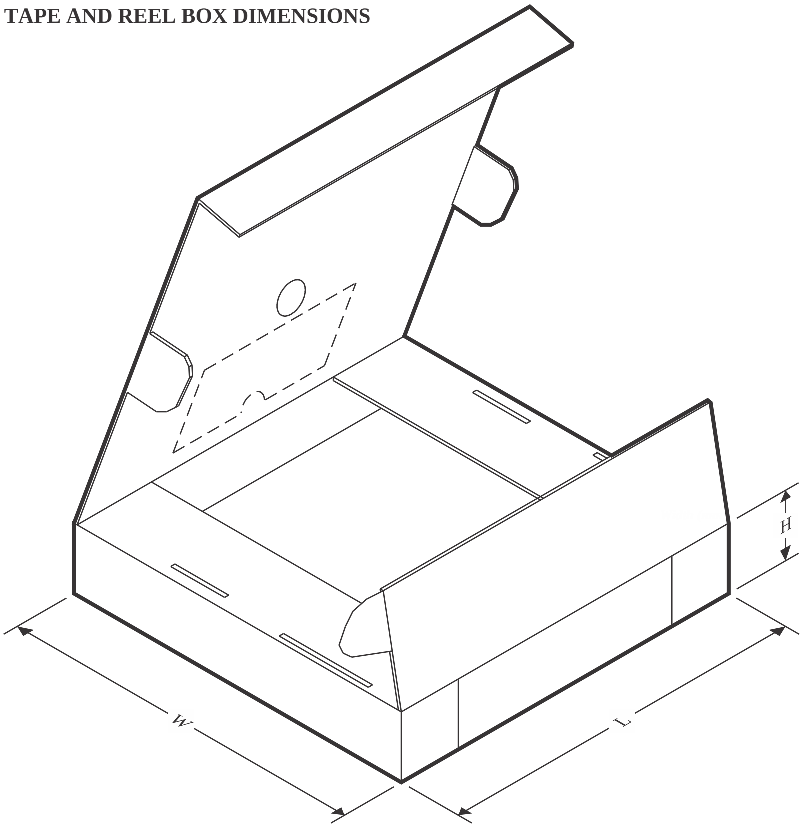
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
LMH1228RTVR	WQFN	RTV	32	1000	180.0	12.4	5.3	5.3	1.1	8.0	12.0	Q2
LMH1228RTVT	WQFN	RTV	32	250	180.0	12.4	5.3	5.3	1.1	8.0	12.0	Q2
LMH1228RTVTG4	WQFN	RTV	32	250	180.0	12.4	5.3	5.3	1.1	8.0	12.0	Q2

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
LMH1228RTVR	WQFN	RTV	32	1000	182.0	182.0	20.0
LMH1228RTVT	WQFN	RTV	32	250	182.0	182.0	20.0
LMH1228RTVTG4	WQFN	RTV	32	250	182.0	182.0	20.0

重要通知和免责声明