LMH1219 Low Power 12G UHD Adaptive Cable Equalizer with Integrated Reclocker

1 Features

- Supports ST-2082-1(12G), ST-2081-1(6G), ST-424(3G), ST-292(HD), and ST-259(SD)
- Supports SFF8431 (SFP+) for SMPTE 2022-5/6
- Compatible with DVB-ASI and AES10 (MADI)
- Integrated Reference-Less Reclocker Locks to SMPTE and 10GbE Rate: 11.88 Gbps, 5.94 Gbps, 2.97 Gbps, 1.485 Gbps, or Divide-by-1.001 Sub-Rates, 270 Mbps and 10.3125 Gbps
- Adaptive Cable Equalizer at Input 0 (IN0)
- Cable Reach (Belden 1694A):
  - 75 m at 11.88 Gbps (4Kp60 UHD)
  - 120 m at 5.94 Gbps (UHD)
  - 200 m at 2.97 Gbps (FHD)
  - 280 m at 1.485 Gbps (HD)
  - 600 m at 270 Mbps (SD)
- Adaptive Board Trace Equalizer at Input 1 (IN1)
- Low Power: 250 mW (Typical)
- Power Saving Mode: 27 mW
- Integrated Input Return Loss Network
- 2:1 Input Mux, 1:2 Fanout Output with De-Emphasis
- Supports Signal Splitter Mode (–6 dB Launch Amplitude)
- On-Chip Loop Filter Capacitor and Eye Monitor
- Powers from Single 2.5 V with On-Chip 1.8 V Regulator
- Configurable by Control Pins, SPI, or SMBus Interface
- 4 mm x 4 mm 24-pin QFN Package
- Operating Temperature Range: -40°C to 85°C

2 Applications

- SMPTE Compatible Serial Digital Interface
- UHDTV/4K/8K/HDTV/SDTV Video
- Broadcast Video Routers, Switchers, Distribution Amplifiers, and Monitors
- Digital Video Processing and Editing
- 10 GbE - SDI Media Gateway

3 Description

The LMH1219 is a low-power, dual-input and dual-output, adaptive equalizer with integrated reclocker. It supports SMPTE video rates up to 11.88 Gbps and 10 GbE video over IP, enabling UHD video for 4K/8K applications. An extended reach adaptive cable equalizer at IN0 is designed to equalize data transmitted over 75 Ω coaxial cable and operates over a wide range of data rates from 125 Mbps to 11.88 Gbps. An adaptive board trace equalizer at IN1 is SFF-8431 compatible and supports both SMPTE and 10 GbE data rates.

The integrated reclocker attenuates high frequency jitter and provides the best signal integrity. High input jitter tolerance of the reclocker improves timing margin. The reclocker has a built-in loop filter, and operates without the need of a precision input reference clock. A non-disruptive eye monitor allows real time measurement of the serial data to simplify system debug and accelerate board bring-up.

The integrated 2:1 Mux and 1:2 Fanout provide flexibility for multiple video signals. The output drivers offer programmable de-emphasis to compensate board trace losses at its outputs. The integrated return loss network meets stringent SMPTE specifications across all data rates. The typical power consumption of LMH1219 is 250 mW. In the absence of input signal, power is further reduced to 27 mW.

The LMH1219 is pin compatible to LMH1226 (12G UHD reclocker) and LMH0324 (3G adaptive cable equalizer).

Device Information(1)

PART NUMBER	PACKAGE	BODY SIZE (NOM)
LMH1219	QFN (24)	4 mm x 4 mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

Simplified Block Diagram

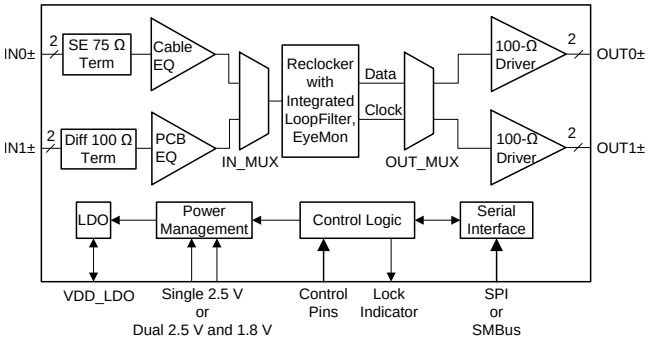


Table of Contents

4 Revision History

Changes from Original (February 2016) to Revision A	Page
• Product Preview to Production Data Release	1

5 Device and Documentation Support

5.1 Community Resources

The following links connect to TI community resources. Linked contents are provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's Terms of Use.

TI E2E™ Online Community ***TI's Engineer-to-Engineer (E2E) Community.*** Created to foster collaboration among engineers. At e2e.ti.com, you can ask questions, share knowledge, explore ideas and help solve problems with fellow engineers.

Design Support ***TI's Design Support*** Quickly find helpful E2E forums along with design support tools and contact information for technical support.

5.2 Trademarks

E2E is a trademark of Texas Instruments.

5.3 Electrostatic Discharge Caution

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

5.4 Glossary

SLYZ022 — *TI Glossary*.

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

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
LMH1219RTWR	ACTIVE	WQFN	RTW	24	3000	Green (RoHS & no Sb/Br)	CU SN	Level-3-260C-168 HR	-40 to 85	L1219A2	Samples
LMH1219RTWT	ACTIVE	WQFN	RTW	24	250	Green (RoHS & no Sb/Br)	CU SN	Level-3-260C-168 HR	-40 to 85	L1219A2	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.

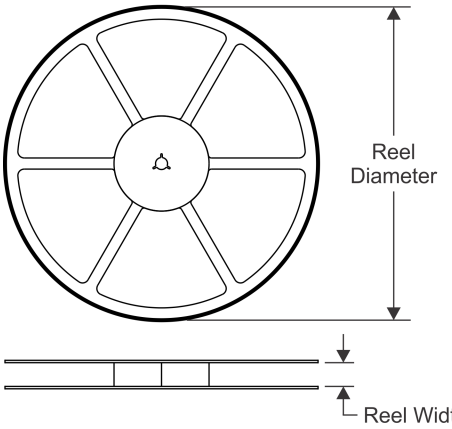
(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(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.

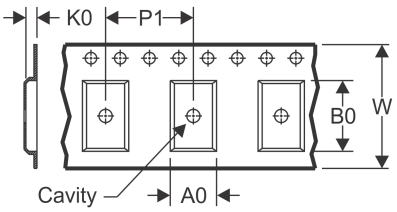
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

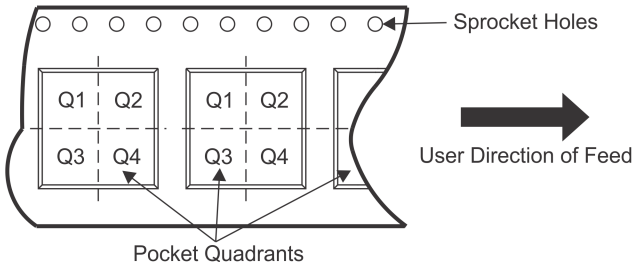


TAPE DIMENSIONS



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

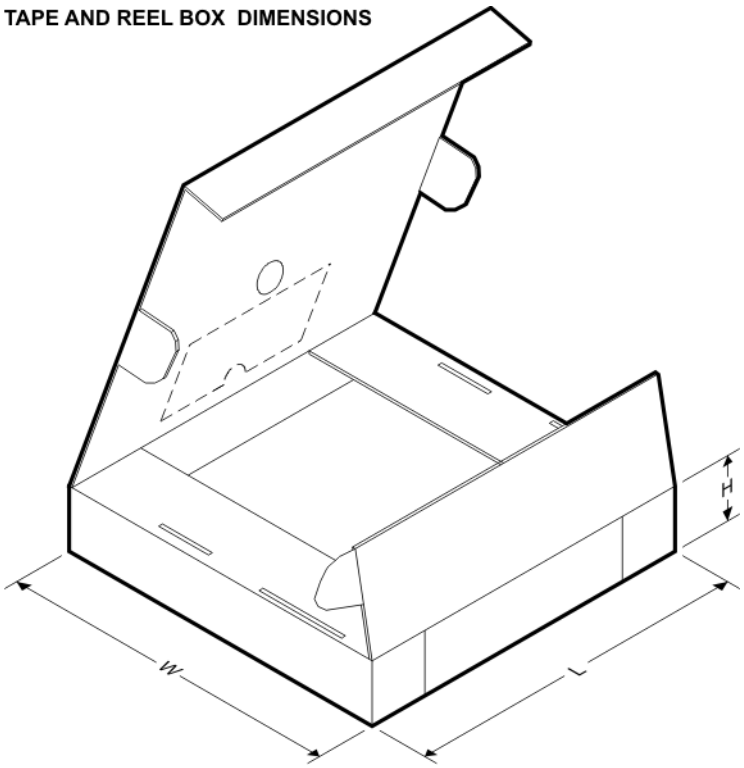
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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
LMH1219RTWR	WQFN	RTW	24	3000	330.0	12.4	4.3	4.3	1.3	8.0	12.0	Q1
LMH1219RTWT	WQFN	RTW	24	250	178.0	12.4	4.3	4.3	1.3	8.0	12.0	Q1

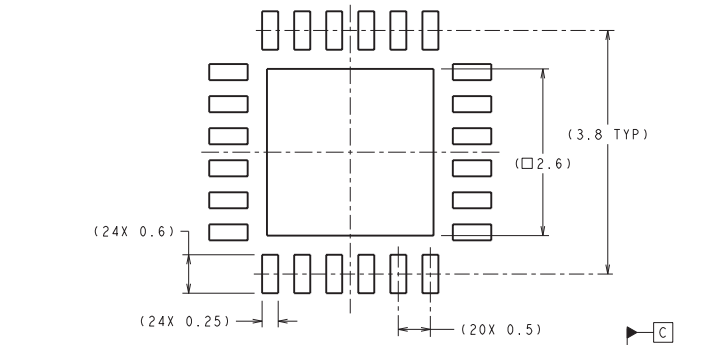
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

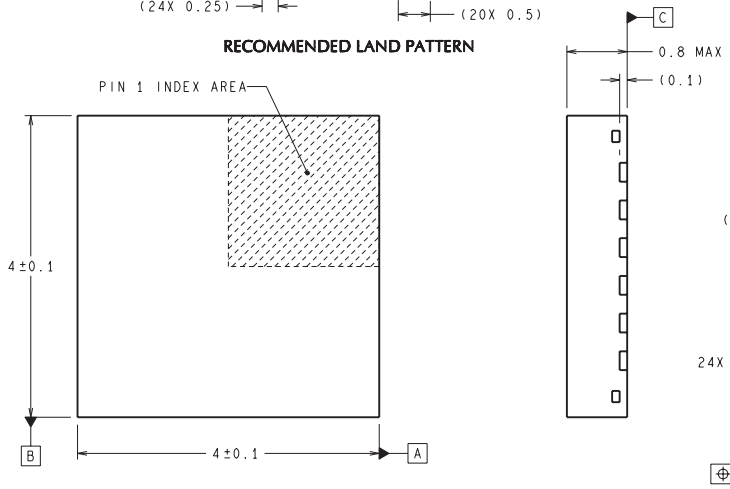
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
LMH1219RTWR	WQFN	RTW	24	3000	367.0	367.0	35.0
LMH1219RTWT	WQFN	RTW	24	250	213.0	191.0	55.0

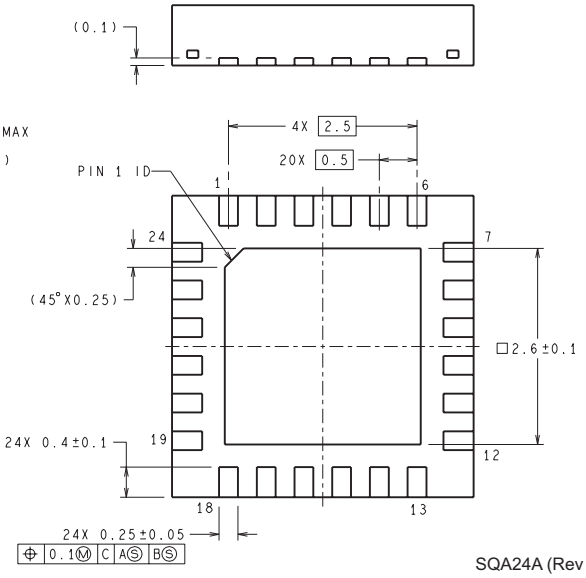
RTW0024A



RECOMMENDED LAND PATTERN

DIMENSIONS ARE IN MILLIMETERS
DIMENSIONS IN ( ) FOR REFERENCE ONLY





SQA24A (Rev B)

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