

Product Brief

Highlights

- HDMI video and audio streams into a MIPI® Camera Serial Interface (CSI) enabling Application Processors with a MIPI CSI-2 interface to accept HDMI sources as an input stream.
- Ideal for mobile and CE solutions requiring HDMI source as input.
- Support for common 3D formats and compatible protocols with the HDMI 1.4 standard.
- Support for up to 1920 x 1200@24 bpp video resolution at refresh rates of 60 fps.
- Video de-Interlacing and scaling.
- YCbCr to RGB and RGB to YCbCr format conversion.
- I²S and SLIMbus® audio support.
- Applications include smart TVs, smart monitors, smart set-top boxes and Digital Media Adapters (DMAs).

TC358749 Camera Serial Interface Converter Chipset (HDMI to MIPI® CSI) with De-Interlacing, Scaling and Format Conversion

Description

The Toshiba TC358749XBG is a High Definition Multimedia Interface (HDMI) to Mobile Industry Processor Interface (MIPI) Camera Serial Interface Type 2 (CSI-2) converter chipset with de-interlacing, video, scaling and video format conversion. The TC358749XBG enables a Host processor with a MIPI CSI-2 interface to accept HDMI video and audio streams and process them as an incoming data source.

The Toshiba TC358749XBG bridge chip enables an HDMI video stream to be converted to a format that can be processed by the Application Processor as a CSI-2 video stream. HDMI audio stream is also supported and can be transmitted over I²S or over a MIPI SLIMbus.

The maximum resolution supported is 1920 x 1200@24 bpp at a refresh rate of 60 fps, limited by 4 Gbps (4 lanes x 1.0 Gbps) maximum bandwidth.

The Toshiba TC358749XBG is a follow on part to the Toshiba TC358743XBG adding video de-interlacing, video scaling, video format conversion and MIPI SLIMbus audio support.

It is designed with clock and power management circuitry to support low-power states.

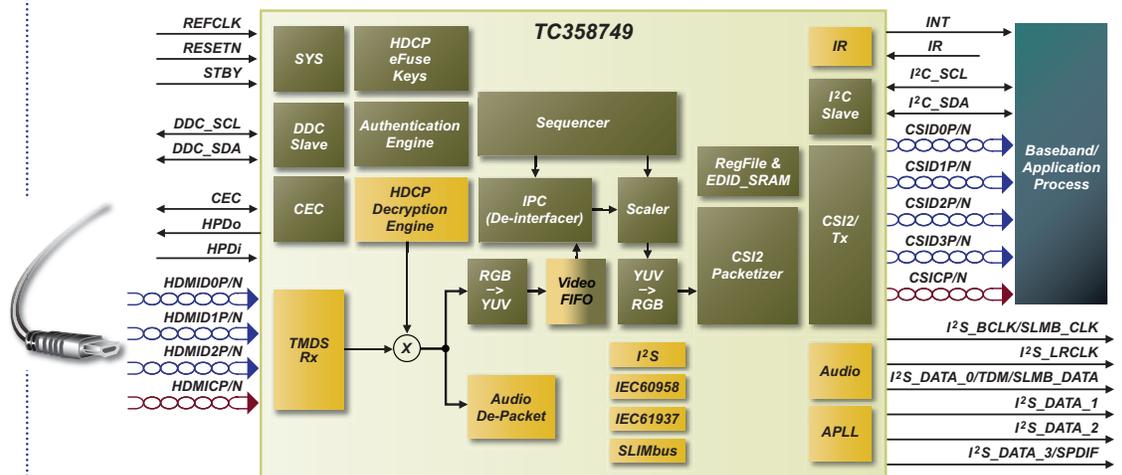
The Toshiba TC358749XBG is an 80-pin device package with a size of 7.0 x 7.0 mm, 0.65 mm ball pitch and 1.0 mm maximum height designed for a non-HDI Board.

Features

HDMI-RX Interface

- HDMI 1.4
 - Video formats (Up to 1920 x 1200@60 fps)
 - RGB, YCbCr 4:4:4 24-bpp@60 fps
 - YCbCr 4:2:2 24-bpp@60 fps
 - Audio Support
 - 3D support
 - HDCP 1.4 support
 - DDC support
 - EDID support
 - Embedded 1K-byte SRAM (EDID_SRAM)
 - Maximum HDMI clock speed: 165 MHz
- Does not support audio return path and HDMI Ethernet channels

TC358749 Block Diagram



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CSI-2 TX Interface

- MIPI CSI-2 compliant (Version 1.01 Revision 0.04 – 2 April 2009)
- Supports up to 1 Gbps per data lane
- Supports up to 4 data lanes

I²C Slave Interface

- Support for normal (100 KHz), fast mode (400 KHz), and ultra-fast mode (2 MHz)

Audio Output Interface

- I²S Audio Interface
 - Up to 4 data lanes for 8-channel data
 - Supports IEC 60958 & IEC 61937 (HBR support) digital audio formats
- TDM (Time Division Multiplexed) Audio Interface
 - Fixed to 8 channels
- S/P-DIF Audio Interface
 - Supports 2 channels (any 2 of the total 8)
- MIPI SLIMbus Audio Interface
 - Up to 8-channel data (2, 4, 6 or 8)

Video Processing

- Input/Output format support includes:
 - RGB or YCbCr 4:2:2
 - Interlaced or progressive
 - 2D or 3D
 - Supports up to 165 MHz PClk including 640x480, 720x480, 720x576, 1280x720, 1920x1080 and 1920x1200 video resolutions

- Scaling:
 - Hardware performs scaling automatically based on input and output frame size
 - Special handling of 3D formats frame packing, side-by side and top and bottom to avoid boundary artifacts.

Color Space Conversion

- RGB ⇌ YCbCr
- Both color space converters can be enabled/disabled independent of each other.

Infrared (IR)

- Support NEC infrared (IR) protocol.

System

- Internal core has two power domains (VDDC1 and VDDC2)
 - VDDC1 is “always-on” power domain
 - VDDC2, AVDD33, AVDD12, and VDD_MIPI can be shut-off during deep sleep mode

Power Supply Inputs

- Core and MIPI D-PHY: 1.2V
- I/O: 1.8V – 3.3V
- HDMI, audio and analog PLL: 3.3V

Package

- TC358749XBG package for non-HDI board:
 - 80-pin, 7.0 x 7.0 mm, 0.65 mm ball pitch and 1.0 mm maximum height

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