NS6168 Dual MIPI DSI to Dual 12.8Gbps HSMT Automotive Serializer

Introduction

The NS6168 serializer chip is compliant to Automotive Wired High-Speed Media Transmission (HSMT) standard. Pairing with a compatible HSMT deserializer, the NS6168 is used for transmission of forward video and bidirectional audio and control data. The NS6168 converts a single or dual MIPI DSI inputs to HSMT output, and transmits the output to the paired deserializer over a single or dual HSMT links. Each HSMT link operates at a data rate up to 12.8Gbps in the forward direction and 100Mbps in the backward direction. The NS6168 supports 15 meters Coaxial cable or 8 meters Shielded Twisted Pair (STP) cable at 12.8Gbps. The NS6168 is AEC-Q100 Grade 2 certified with automotive temperature range of -40℃ to +105℃, and compliant with ISO 10605 and IEC 61000-4-2 ESD standards.

The NS6168 is ISO 26262 ASIL-B certified and supports I2C and SPI control ports, flexible GPIO with trigger mode, constant latency mode and oversample mode, tunneled UART, forward and backward audio channels, a built-in ADC, temperature sensor, and an extensive set of diagnostics for functional safety.

Applications

- High-resolution Automotive Navigation System

- Central Information Display (CID)

- Digital Instrument Clusters

- Rear Seat Entertainment (RSE)

- Head Units and HMI Modules

- Rear View and Side Mirror Displays

Features

- Single or dual MIPI DSI inputs
    - 24/30-bit RGB, 16/20/24-bit YUV422, and loosely packed 18-bit RGB and 20-bit YUV422
    - D-PHY v1.2 up to 2.5Gbps/lane and up to 4 lanes/ port
    - Supports superframe unpacking capability
- HSMT link for system and power flexibility
    - Supports two HSMT links
    - 2.0, 3.2, 4.0, or 6.4Gbps forward-link rates (NRZ)
    - 8.0 or 12.8Gbps forward-link rates (PAM4)
    - 100Mbps backward-link rate
- Supports multiple resolutions (such as 3088x1728/2880x1880) with 24-bit color depth
- Robust communication in automotive environment
    - Backward channel adaptive equalization
    - RS-FEC for protection of forward video and bidirectional control data
    - Video data error correction and retransmission
- Digital audio with I2S and TDM interface
    - Supports forward-direction 7.1 HD audio and up to 192kHz sample rate
    - Supports backward-direction 8 channels at 48kHz sample rate or 2 channels at 192kHz sample rate
- Supports bulk and tunneling modes I2C (master up to 833Kbps, slave up to 1Mbps)
- Supports SPI (master/slave up to 50Mbps), UART (Tx/Rx), GPIO, and interrupt for touch-screen and other use cases
- Functional safety
    - AEC Q100 Grade-2 and ISO 26262 ASIL-B
    - CRC protection of control data over I2C and SPI
- Video watermark and test pattern generation
- Supports line fault detection and voltage monitor
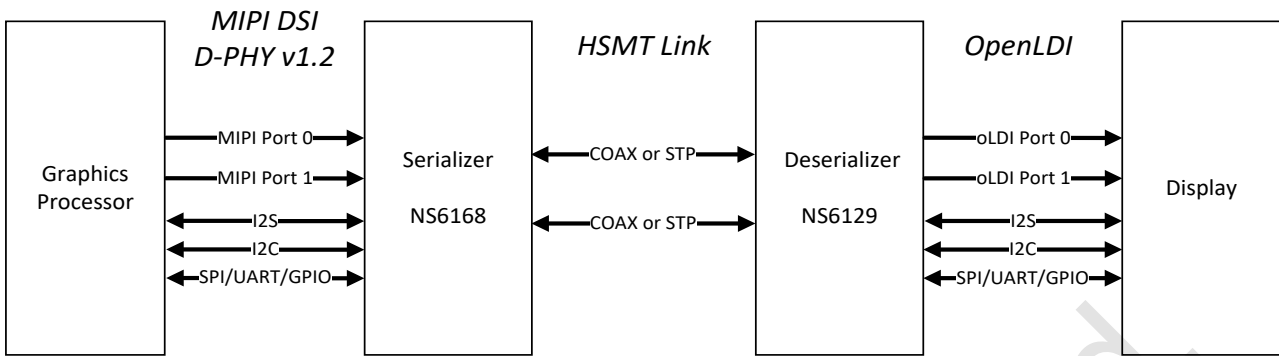- Programmble spread spectrum for EMI reduction
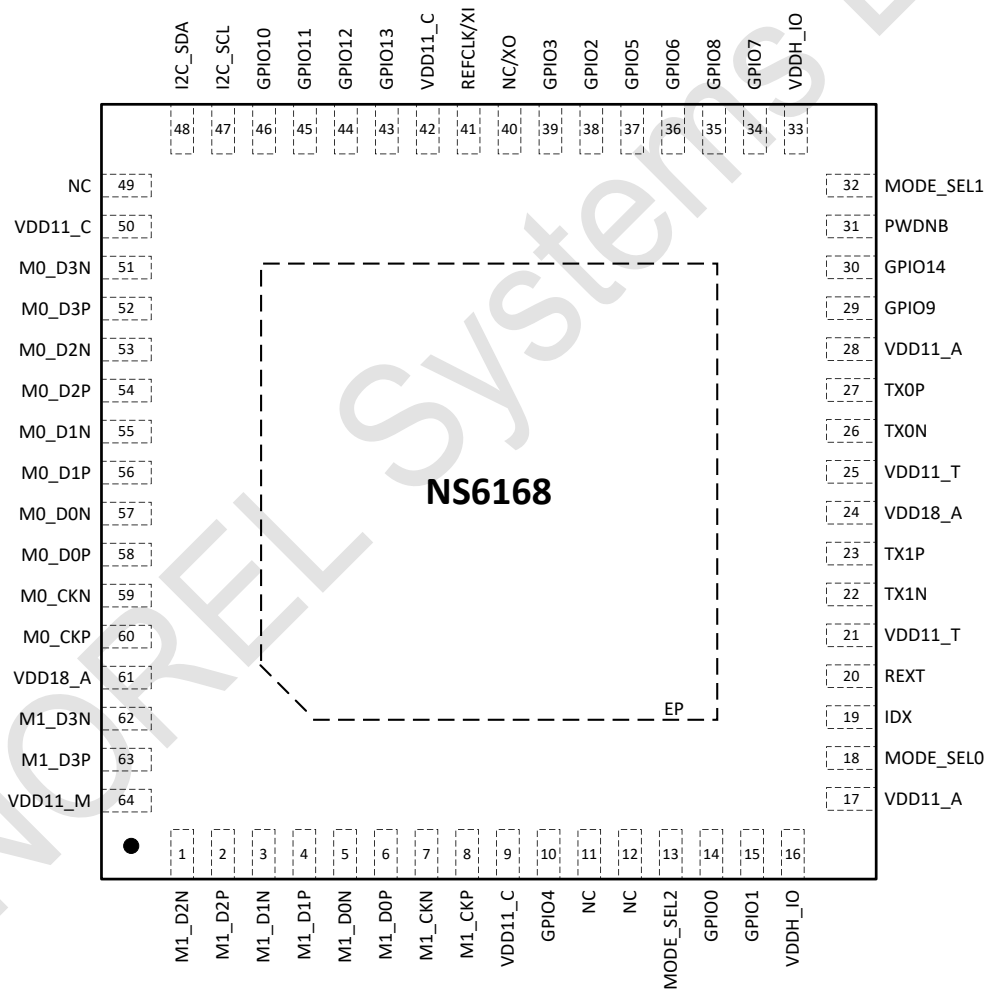- 9mm x 9mm 64-pin QFN package

Figure 1. Application Example

Figure 2. NS6168 Pinout

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