ISL35411DRZ-EVALZ

ISL35411 Evaluation Board

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Description

The ISL35411DRZ-EVALZ evaluation board is a versatile stand-alone printed circuit board developed to evaluate the performance of the Intersil ISL35411 11.1Gb/s driver.

Items provided with board:

- This application note
- Power cable
- Ten jumpers

Key Features

- ISL35411 IC
- Connection to external 3.3V power supply
- On-board voltage regulator that provides the 1.2V supply to the IC
- On-board de-emphasis level adjustment using provided jumpers
- SMA connectors to access differential inputs and outputs

References

- ISL35411 Datasheet

Ordering Information

PART NUMBER	DESCRIPTION
ISL35411DRZ-EVALZ	ISL35411 evaluation board (power cable and four jumpers included)

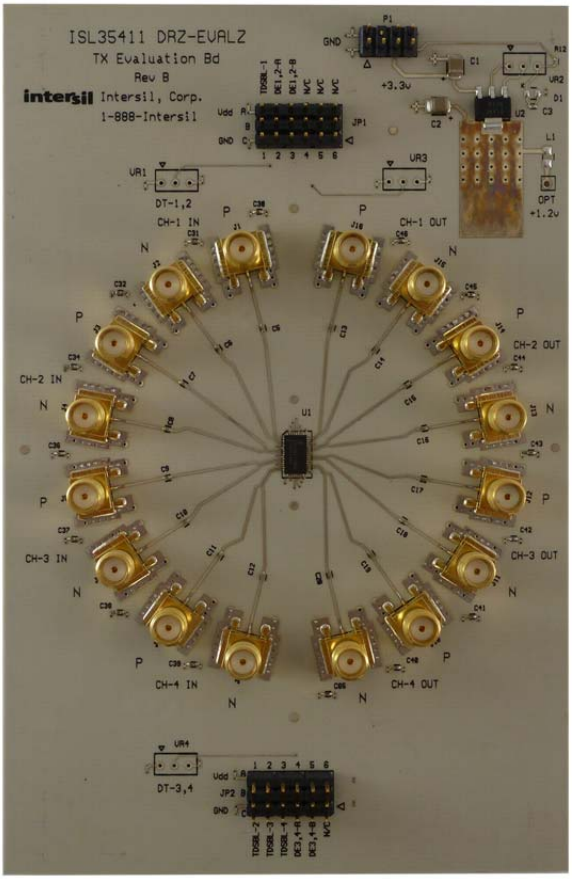

FIGURE 1. TOP OF BOARD

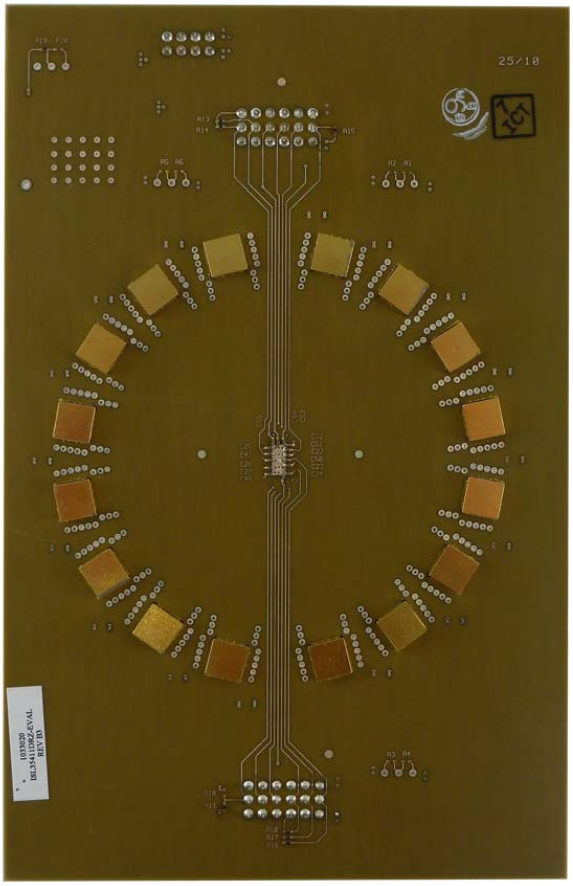

FIGURE 2. BOTTOM OF BOARD

Operation of the ISL35411DRZ-EVALZ Evaluation Board

This section describes how to setup your ISL35411DRZ-EVALZ evaluation board: making sure proper power is applied, connecting to the high-speed RF inputs and outputs and adjusting the output de-emphasis level for each channel. The board is shown in Figure 3.

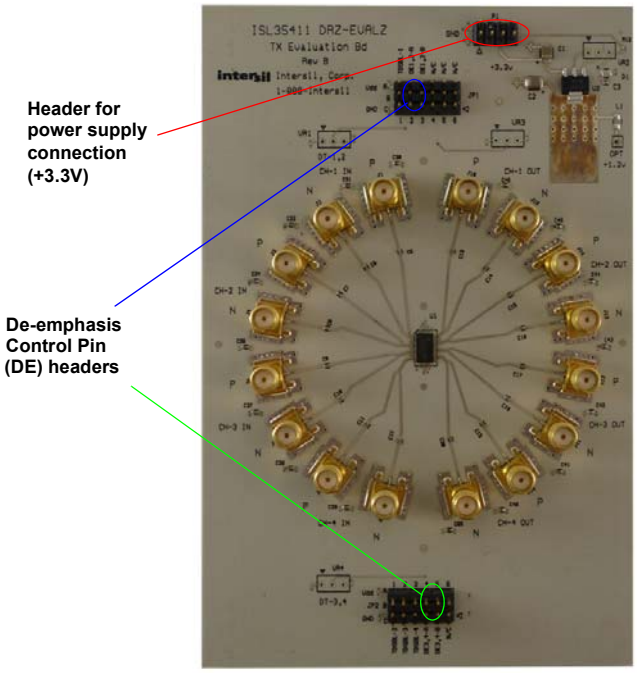

FIGURE 3. ISL35411DRZ-EVALZ EVALUATION BOARD

Power Supply

The board needs to be powered by an external +3.3V power supply via the power header located at the top of the board using the power cable provided. The red lead of the power cable should be connected to the +3.3V output of the external power supply while the black lead should be connected to the ground (-) terminal.

Typical current consumption of the board when the output de-emphasis level is set to 0dB (see Table 1) is 200mA when no input signals are applied; and 220mA when a signal is applied to any one of the four high-speed inputs. Total board current will be approximately 280mA if all four channels are active simultaneously with the output de-emphasis levels set to 0dB.

High-Speed Data I/O Interface Connectors

The ISL35411 Driver is intended to be used at the transmit end of lossy differential copper channels. The four channels of the ISL35411 make it well-suited for high-density applications with parallel channels. The ISL35411 is optimized for use in conjunction with the Intersil ISL36411 quad lane extender at the far end of the lossy channel.

The differential input(s) of the ISL35411 should be connected to a high-speed data stream source, such as a pattern generator. This connection should be made using the input SMA connectors labeled on the board. We recommend using phase (time-delay)-matched cables for each differential input to preserve the fidelity of the differential signal. The output SMA connectors provide access to the output differential signal(s) of the ISL35411 and can be connected with phase-matched cables to the channel to be driven. Make sure proper torque (5 in-lbs) is applied to the SMA connectors for reliable measurements and to prevent damage to the connectors.

The ISL35411DRZ-EVALZ evaluation board is designed to minimize parasitic board effects for transparent evaluation of the ISL35411's high-speed performance. Due to the extremely low-loss nature of the evaluation board's high-speed traces, all unused channels on the board should be terminated at the input and output SMA connections with 50Ω loads to minimize reflections, which can corrupt the performance of neighboring channels.

Output De-Emphasis Setting Control

The output driver of each channel on the ISL35411 is capable of providing seven different levels (0 to 6) of adjustable output de-emphasis. The available output de-emphasis levels range from 0dB (DE level = 0) to 4dB (DE level = 6). The de-emphasis levels of Channels 1 and 2 are controlled simultaneously by the de-emphasis control pin headers (DE) located at JP1 on the north-side of the board and highlighted in blue in Figure 3. The de-emphasis levels of Channels 3 and 4 are controlled simultaneously by the de-emphasis control pin headers (DE) located at JP2 on the south-side of the board and highlighted in green in Figure 3. Output de-emphasis levels are set by positioning jumpers on the appropriate header as illustrated in Figure 4. For both sets of headers, DE-A and DE-B can each be set to one of three values (VDD, GND, or Floating). Table 1 gives the jumper positions required to achieve various de-emphasis levels. As an example, Figure 4 depicts the jumper positions that set the output de-emphasis level to 3dB (DE-A = GND and DE-B = V_{DD}).

TABLE 1. JUMPER POSITIONS FOR OUTPUT DE-EMPHASIS SETTINGS

DE-A	DE-B	DE LEVEL	DE LEVEL (dB)
No jumper	No jumper	0	0
No jumper	Jumper to GND	1	0.6
No jumper	Jumper to VDD	2	1.1
Jumper to GND	No jumper	3	1.6
Jumper to GND	Jumper to GND	4	2.3
Jumper to GND	Jumper to VDD	5	3.0
Jumper to VDD	No jumper	6	4.0

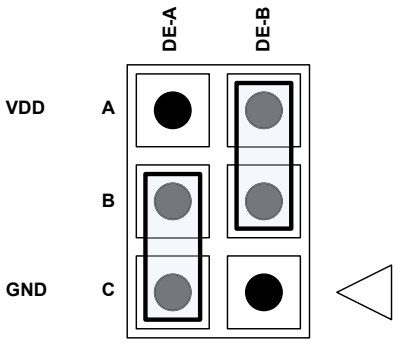

FIGURE 4. JUMPER CONFIGURATION FOR 3dB OUTPUT DE-EMPHASIS

Transmit Disable

The ISL35411 provides an independent transmit disable feature for each of its channels. With this feature, idle and/or unused channels on the ISL35411 can be made to enter a low power standby mode. Entry into this mode is controlled by each channel's respective TDSBL pin. The TDSBL-1 pin (for Channel 1) is located at header JP1 on the north-side of the board. The TDSBL pins for the remaining channels are located at header JP2 on the south-side of the board. By using a jumper to tie a given TDSBL pin to VDD (as shown in Figure 5), the corresponding channel on the ISL35411 is disabled. While disabled, all internal circuitry associated with the channel is powered down, and the channel is incapable of driving any high-speed signal applied to its input. If the TDSBL pin is left floating (no jumper installed), the respective channel is enabled and is capable of driving high-speed data.

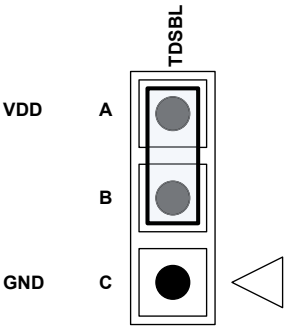

FIGURE 5. JUMPER INSTALLED FOR TRANSMIT DISABLE

Baseline Performance

The eye diagrams in Figure 6 show the typical high-speed performance of the ISL35411DRZ-EVALZ evaluation board. Figure 6A shows the output of a single channel at 10.3125Gb/s with no output de-emphasis (DE level = 0dB). Figure 6B shows the output of a single channel at 10.3125Gb/s with maximum output de-emphasis (DE level = 4dB). The output de-emphasis supplied by the ISL35411 can be used to precompensate the signal for subsequent frequency-dependent channel loss. Figure 6C shows the eye diagram of a waveform that has been transmitted from the output of the ISL35411 with maximum de-emphasis (DE level = 4dB) across a 22-inch long trace on an FR408 circuit board. The trace loss at 5GHz is approximately -8dB. The open eye diagram in Figure 6C illustrates the channel equalization capabilities of the ISL35411's output de-emphasis feature.

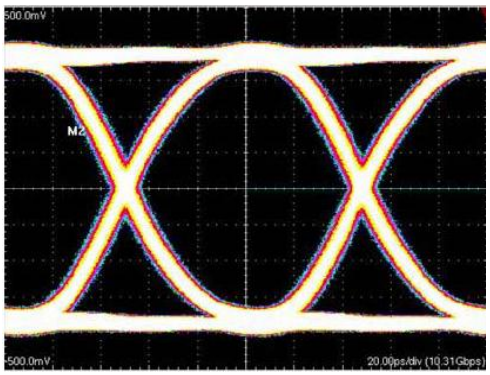

FIGURE 6A. 10.3125Gb/s EYE DIAGRAM AT ISL35411DRZ-EVALZ EVALUATION BOARD OUTPUT (OUTPUT LEVEL = 0dB)

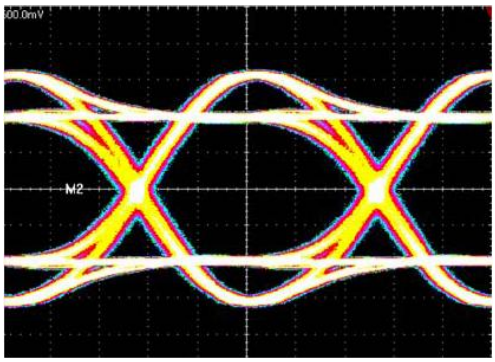

FIGURE 6B. 10.3125Gb/s EYE DIAGRAM AT ISL35411DRZ-EVALZ EVALUATION BOARD OUTPUT (OUTPUT LEVEL = 4dB)

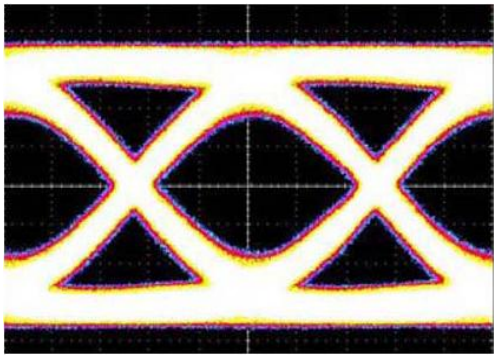

FIGURE 6C. 10.3125Gb/s EYE DIAGRAM AFTER TRANSMISSION FROM ISL35411 ACROSS 22-in. FR408 TRACE (OUTPUT DE-LEVEL = 4dB)

FIGURE 6. 10.3125Gb/s EYE DIAGRAM AFTER TRANSMISSION FROM ISL35411 ACROSS 22-in. FR408 TRACE (OUTPUT DE-LEVEL = 4dB)

ISL35411DRZ-EVALZ Evaluation Board Schematic

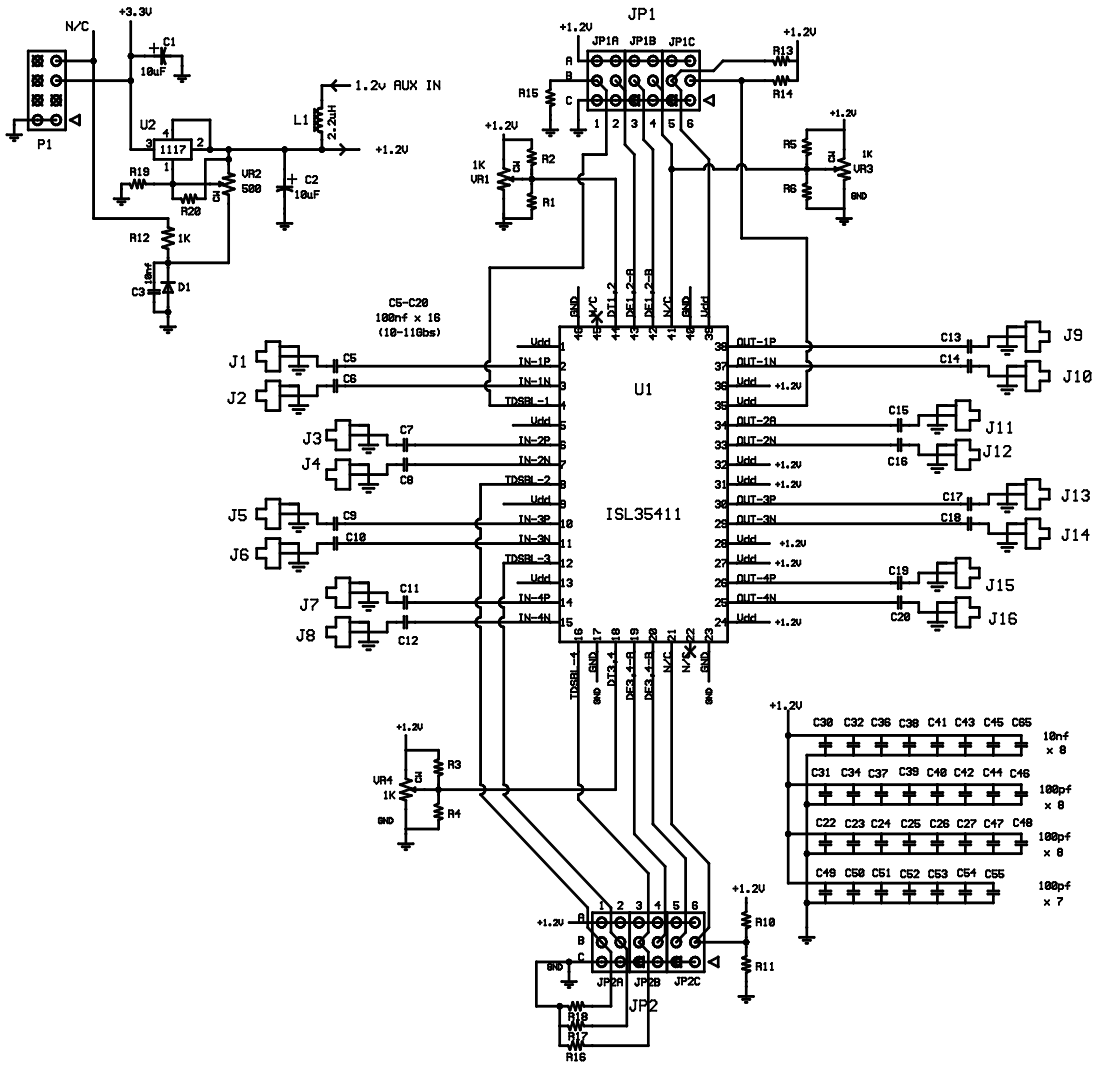

FIGURE 7. ISL35411DRZ-EVALZ SCHEMATIC

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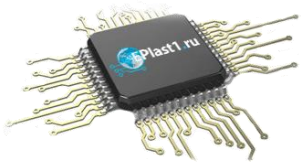

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