

Selecting an LVDS Device

Chapter 3

3.0.0 SELECTING AN LVDS DEVICE

3.1.0 GENERAL

National is continually expanding its portfolio of LVDS devices. The devices listed below are current at the time this book goes to press. For the latest list of LVDS devices, contact your local National Semiconductor representative (listed on the back cover of this book). By far the best way to acquire the latest LVDS datasheet is through National's Website: <http://www.national.com>. The Web is constantly updated with new documents, whereas databooks and datasheets are printed infrequently. Applications questions should be directed to your local National Semiconductor representative or to the US National Interface Hotline: 1-408-721-8500 (8am to 5pm PST).

3.2.0 LVDS LINE DRIVERS & RECEIVERS

LVDS line drivers and receivers are used to convey information over PCB trace or cable if, (1) you only have a few channels of information to transmit, or (2) your data is already serialized. The table below summarizes National's LVDS line drivers and receivers.

LVDS Driver/Receiver Solutions

Order Number	Number of Drivers	Number of Receivers	Power Supply	Temp Range	Data Rate	Approx. I _{cc} @ 1Mbps	Max I _{cc} Disabled	Max Driver Prop Delay	Max Driver Channel Skew	Max Receiver Prop Delay	Max Receiver Channel Skew	Package	Comments	Eval Board Lit #
DS90C031TM	4	0	5	Ind	>155Mbps	21	4	3.5	1.0	—	—	16 SOIC	Ganged Enable	550061-001
DS90C031E-QML	4	0	5	Mil	>100Mbps	25	10	5.0	3.0	—	—	20 LCC	Military -883	550061-001
DS90C032TM	0	4	5	Ind	>155Mbps	11	10	—	—	6.0	1.5	16 SOIC	Ganged Enable	550061-001
DS90C032E-QML	0	4	5	Mil	>100Mbps	11	11	—	—	8.0	3.0	20 LCC	Military -883	550061-001
DS36C200M	2	2	5	Com	>155Mbps	17	10	5.5	—	9.0	—	16 SOIC	1394 Link	—
DS90C401M	2	0	5	Com	>155Mbps	21	6.5	3.5	1.0	—	—	8 SOIC		550061-001
DS90C402M	0	2	5	Com	>155Mbps	11	10	—	—	6.0	1.5	8 SOIC		550061-001
DS90LV031TM	4	0	3.3	Ind	>100Mbps	19	3	5.0	1.8	—	—	16 SOIC	Ganged Enable	550061-001
DS90LV032TM	0	4	3.3	Ind	>100Mbps	19	15	—	—	6.5	1.7	16 SOIC	Ganged Enable	550061-001
DS90LV017M	1	0	3.3	Com	>100Mbps	4	7	6.0	—	—	—	8 SOIC		550061-001
DS90LV027M	2	0	3.3	Com	>100Mbps	TBD	7	6.0	TBD	—	—	8 SOIC		550061-001
DS90LV018M	0	1	3.3	Com	>200Mbps	TBD	TBD	—	—	TBD	—	8 SOIC	Fall 1997	550061-001
DS90LV028M	0	2	3.3	Com	>200Mbps	TBD	TBD	—	—	TBD	TBD	8 SOIC	Fall 1997	550061-001
DS90LV019TM	1	1	3.3/5	Ind	>155Mbps	TBD	6	3.5	—	6.0	—	14 SOIC	Summer 1997	—
DS90LV031ATM	4	0	3.3	Ind	400Mbps	3.5	5	2.5	0.5	—	—	16 SOIC	Fall 1997	550061-001
DS90LV032ATM	0	4	3.3	Ind	400Mbps	1.5	15	—	—	3.5	0.5	16 SOIC	Fall 1997	550061-001

Note: When using drivers/receivers to transmit clock signals, multiply the clock frequency by 2 to get data rate.
Thus, a 50 MHz clock has 2-bits of information (a high bit and a low bit) for every clock period resulting in a 100 Mbps signal.

3.3.0 LVDS CHANNEL LINK SERIALIZERS/DESERIALIZERS

If you have a wide TTL bus that you wish to transmit, use one of National's Channel Link devices. Channel Link will serialize your data for you, saving you money on cables and connectors and helping you avoid complex skew problems associated with a completely parallel solution. The next table summarizes National's Channel Link devices.

Channel Link Solutions

Order Number	Mux/Demux Ratio	Transmitter/Receiver	Power Supply	Clock Frequency	Max Throughput	Package	Eval Board Order #
DS90CR211MTD	21:3	Transmitter	5	20-40MHz	840Mbps	48TSSOP	–
DS90CR212MTD	21:3	Receiver	5	20-40MHz	840Mbps	48TSSOP	–
DS90CR213MTD	21:3	Transmitter	5	20-66MHz	1.38Gbps	48TSSOP	CLINK5V21BT-66
DS90CR214MTD	21:3	Receiver	5	20-66MHz	1.38Gbps	48TSSOP	CLINK5V21BT-66
DS90CR215MTD	21:3	Transmitter	3.3	20-66MHz	1.38Gbps	48TSSOP	CLINK3V21BT-66
DS90CR216MTD	21:3	Receiver	3.3	20-66MHz	1.38Gbps	48TSSOP	CLINK3V21BT-66
DS90CR281MTD	28:4	Transmitter	5	20-40MHz	1.12Gbps	56TSSOP	–
DS90CR282MTD	28:4	Receiver	5	20-40MHz	1.12Gbps	56TSSOP	–
DS90CR283MTD	28:4	Transmitter	5	20-66MHz	1.84Gbps	56TSSOP	CLINK5V28BT-66
DS90CR284MTD	28:4	Receiver	5	20-66MHz	1.84Gbps	56TSSOP	CLINK5V28BT-66
DS90CR285MTD	28:4	Transmitter	3.3	20-66MHz	1.84Gbps	56TSSOP	CLINK3V28BT-66
DS90CR286MTD	28:4	Receiver	3.3	20-66MHz	1.84Gbps	56TSSOP	CLINK3V28BT-66

LVDS Channel Link Latency

Order Number	Mux/Demux Ratio	Transmitter/Receiver	Power Supply	Clock Frequency	Max Throughput	Latency	TCCD/RCCD Clock Delay (ns)		
							Min	Typ	Max
DS90CR211MTD	21:3	Transmitter	5	20-40MHz	840Mbps	TCCD †	5.0	7.5	10.7
DS90CR212MTD	21:3	Receiver	5	20-40MHz	840Mbps	1 Clock Period + RCCD	7.6	9.0	11.9
DS90CR213MTD	21:3	Transmitter	5	20-66MHz	1.38Gbps	TCCD †	3.5	5.0	8.5
DS90CR214MTD	21:3	Receiver	5	20-66MHz	1.38Gbps	1 Clock Period + RCCD	6.4	8.0	10.7
DS90CR215MTD	21:3	Transmitter	3.3	20-66MHz	1.38Gbps	1 Clock Period + TCCD †	TBD	5.3	TBD
DS90CR216MTD	21:3	Receiver	3.3	20-66MHz	1.38Gbps	2 Clock Periods + RCCD	TBD	6.9	TBD
DS90CR281MTD	28:4	Transmitter	5	20-40MHz	1.12Gbps	TCCD †	5.0	7.5	10.7
DS90CR282MTD	28:4	Receiver	5	20-40MHz	1.12Gbps	1 Clock Period + RCCD	7.6	9.0	11.9
DS90CR283MTD	28:4	Transmitter	5	20-66MHz	1.84Gbps	TCCD †	3.5	5.0	8.5
DS90CR284MTD	28:4	Receiver	5	20-66MHz	1.84Gbps	1 Clock Period + RCCD	6.4	8.0	10.7
DS90CR285MTD	28:4	Transmitter	3.3	20-66MHz	1.84Gbps	1 Clock Period + TCCD †	TBD	5.3	TBD
DS90CR286MTD	28:4	Receiver	3.3	20-66MHz	1.84Gbps	2 Clock Periods + RCCD	TBD	6.9	TBD

† Substitute TCCD = (1/14 clock period + ≈3ns) for a more accurate transmitter latency calculation.
Contact National regarding the latency of future Channel Link devices not listed here.

3.4.0 LVDS FPD-LINK

Use National's FPD Link to convey graphics data from your PC/notebook motherboard to your flat panel displays. The next table summarizes National's FPD Link devices.

LVDS Flat Panel Display Link FPD-Link Solutions

Order Number	Color	Transmitter /Receiver	Power Supply	Max Clock Frequency	Clock Edge Strobe	Package	Eval Board Order #
DS90CF561MTD	18-bit	Transmitter	5	40MHz	Falling	48TSSOP	—
DS90CR561MTD	18-bit	Transmitter	5	40MHz	Rising	48TSSOP	—
DS90CF562MTD	18-bit	Receiver	5	40MHz	Falling	48TSSOP	—
DS90CR562MTD	18-bit	Receiver	5	40MHz	Rising	48TSSOP	—
DS90CF581MTD	24-bit	Transmitter	5	40MHz	Falling	56TSSOP	—
DS90CR581MTD	24-bit	Transmitter	5	40MHz	Rising	56TSSOP	—
DS90CF582MTD	24-bit	Receiver	5	40MHz	Falling	56TSSOP	—
DS90CR582MTD	24-bit	Receiver	5	40MHz	Rising	56TSSOP	—
DS90CF583MTD	24-bit	Transmitter	5	65MHz	Falling	56TSSOP	FLINK5V8BT-65
DS90CR583MTD	24-bit	Transmitter	5	65MHz	Rising	56TSSOP	Use 'CF583 Board
DS90CF563MTD	18-bit	Transmitter	5	65MHz	Falling	48TSSOP	FLINK5V6BT-65
DS90CR563MTD	18-bit	Transmitter	5	65MHz	Rising	48TSSOP	Use 'CF563 Board
DS90CF564MTD	18-bit	Receiver	5	65MHz	Falling	48TSSOP	FLINK5V6BT-65
DS90CR564MTD	18-bit	Receiver	5	65MHz	Rising	48TSSOP	Use 'CF564 Board
DS90CF584MTD	24-bit	Receiver	5	65MHz	Falling	56TSSOP	FLINK5V8BT-65
DS90CR584MTD	24-bit	Receiver	5	65MHz	Rising	56TSSOP	Use 'CF584 Board
DS90C363MTD	18-bit	Transmitter	3.3	65MHz	Programmable	48TSSOP	FLINK3V8BT-65
DS90CF363MTD	18-bit	Transmitter	3.3	65MHz	Falling	48TSSOP	Use 'C363 Board
DS90C383MTD	24-bit	Transmitter	3.3	65MHz	Programmable	56TSSOP	FLINK3V8BT-65
DS90CF383MTD	24-bit	Transmitter	3.3	65MHz	Falling	56TSSOP	Use 'C383 Board
DS90CF384MTD	24-bit	Receiver	3.3	65MHz	Falling	56TSSOP	FLINK3V8BT-65
DS90CF364MTD	18-bit	Receiver	3.3	65MHz	Falling	48TSSOP	FLINK3V6BT-65

Delay/skew units in ns, I_{CC} in mA.