

MAX14954

高度可靠、带有均衡功能的四通道PCI转接驱动器， 工作在扩展级温度范围

概述

MAX14954为四通道均衡器/转接驱动器，通过接收器的可编程输入均衡和可编程转接驱动电路改善PCI Express® (PCIe)信号完整性。输出电路重新建立板上去加重，以补偿电路板损耗。器件有优化于PCIe关键元件的布局，非常适合使用带状线、微带印刷板电路及100Ω平衡电缆的场合。

器件针对PCIe应用量身打造，每路通道都带有空闲和接收器检测。器件优化用于PCIe Gen III (8.0GT/s)和Gen II (5.0GT/s)数据率，但也可处理Gen I (2.5GT/s)信号。

MAX14954采用小尺寸、无铅、42引脚(3.5mm x 9.0mm) TQFN封装，以优化布局并减小电路空间。工作在-40°C至+85°C扩展级温度范围。

应用

- 工业/嵌入式PC
- 计算机模块
- 基板
- 测试设备
- 机架式服务器工业PC
- 医疗装置

优势和特性

- 完全集成简化使用，设计灵活
 - 优化支持PCIe Gen III (8.0GT/s)、Gen II (5.0GT/s)信号，兼容Gen I (2.5 GT/s)信号
 - 四级输入均衡，最高16dB
 - 八级输出去加重，最高9dB
- 高性能，克服有损耗通道噪声
 - 随机抖动：0.5ps_{RMS} (典型值)
 - 确定性抖动：10.5ps_{P-P} (典型值)
 - 均衡电路可支持长达30in的FR4传输距离
- 能够工作在恶劣环境的可靠方案
 - 工作在工业级温度范围：-40°C至+85°C
 - 所有引脚具有±15kV人体模式(HBM)保护
 - 顺畅的引脚排列，采用3.5mm x 9.5mm、TQFN封装，防振动/冲击

订购信息在数据资料的最后给出。

相关型号以及配合该器件使用的推荐产品，请参见：china.maximintegrated.com/MAX14954.related。

PCI Express是PCI-SIG Corp.的注册商标。

本文是英文数据资料的译文，文中可能存在翻译上的不准确或错误。如需进一步确认，请在您的设计中参考英文资料。

有关价格、供货及订购信息，请联络Maxim亚洲销售中心：10800 852 1249 (北中国区)，10800 152 1249 (南中国区)，或访问Maxim的中文网站：china.maximintegrated.com。

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Absolute Maximum Ratings

(Voltages referenced to GND.)

V _{CC}	-0.3V to +4V
All Other Pins (Note 1).....	-0.3V to (V _{CC} + 0.3V)
Continuous Current I _{N_P} /I _{N_N}	±30mA
Peak Current I _{N_P} /I _{N_N} (pulsed for 1μs, 1% duty cycle).....	±100mA

Continuous Power Dissipation (T_A = +70°C)

TQFN (derate 34.5mW/°C above +70°C).....	2759mW
Operating Temperature Range.....	-40°C to +85°C
Storage Temperature Range.....	-55°C to +150°C
Junction Temperature.....	+150°C
Lead Temperature (soldering, 10s).....	+300°C
Soldering Temperature (reflow).....	+260°C

Note 1: All I/O pins are clamped by internal diodes.

Package Thermal Characteristics (Note 2)

TQFN

Junction-to-Ambient Thermal Resistance (θ _{JA})	29°C/W	Junction-to-Case Thermal Resistance (θ _{JC})	2°C/W
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Note 2: Package thermal resistances were obtained using the method described in JEDEC specification JESD51-7, using a four-layer board. For detailed information on package thermal considerations, refer to china.maximintegrated.com/thermal-tutorial.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Electrical Characteristics

(V_{CC} = +3.0V to +3.6V, C_{CL} = 200nF coupling capacitor on each output, R_L = 50Ω on each output, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at V_{CC} = +3.3V and T_A = +25°C.) (Note 3)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
DC PERFORMANCE							
Power-Supply Range	V _{CC}			3.0		3.6	V
Supply Current	I _{CC}	EN = V _{CC}	OEQ2 = GND, OEQ1 = GND, OEQ0 = GND		205	260	mA
			OEQ2 = GND, OEQ1 = GND, OEQ0 = V _{CC}		212	270	
			OEQ2 = GND, OEQ1 = V _{CC} , OEQ0 = GND		214	270	
			OEQ2 = GND, OEQ1 = V _{CC} , OEQ0 = V _{CC}		247	305	
			OEQ2 = V _{CC} , OEQ1 = GND, OEQ0 = GND		213	270	
			OEQ2 = V _{CC} , OEQ1 = GND, OEQ0 = V _{CC}		263	330	
			OEQ2 = V _{CC} , OEQ1 = V _{CC} , OEQ0 = GND		276	345	
			OEQ2 = V _{CC} , OEQ1 = V _{CC} , OEQ0 = V _{CC}		328	410	

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Electrical Characteristics (continued)

($V_{CC} = +3.0V$ to $+3.6V$, $C_{CL} = 200nF$ coupling capacitor on each output, $R_L = 50\Omega$ on each output, $T_A = -40^\circ C$ to $+85^\circ C$, unless otherwise noted. Typical values are at $V_{CC} = +3.3V$ and $T_A = +25^\circ C$.) (Note 3)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Standby Current	I_{STBY}	OEQ2 = GND, OEQ1 = GND, OEQ0 = GND		113	150	mA
		OEQ2 = GND, OEQ1 = GND, OEQ0 = V_{CC}		122	150	
		OEQ2 = GND, OEQ1 = V_{CC} , OEQ0 = GND		125	155	
		OEQ2 = GND, OEQ1 = V_{CC} , OEQ0 = V_{CC}		150	185	
		OEQ2 = V_{CC} , OEQ1 = GND, OEQ0 = GND		122	150	
		OEQ2 = V_{CC} , OEQ1 = GND, OEQ0 = V_{CC}		172	210	
		OEQ2 = V_{CC} , OEQ1 = V_{CC} , OEQ0 = GND		184	225	
		OEQ2 = V_{CC} , OEQ1 = V_{CC} , OEQ0 = V_{CC}		237	290	
Differential Input Impedance	$Z_{RX-DIFF-DC}$	DC	80	100	120	Ω
Differential Output Impedance	$Z_{TX-DIFF-DC}$	DC	80	100	120	Ω
Common-Mode Resistance to GND When Input Terminations Are Not Powered	$Z_{RX-HIGH-IMP-DC}$	$-150mV < V_{IN_CM} < 200mV$	50			k Ω
Common-Mode Resistance to GND When Input Terminations Are Powered	Z_{RX-DC}	DC	20	25	30	Ω
Output Short-Circuit Current	$I_{TX-SHORT}$	Single-ended (Note 4)	90			mA
Common-Mode Delta Between Active and Idle States	$V_{TX-CM-DC-ACTIVE-IDLE-DELTA}$				8	mV
DC Output Offset During Active State	$V_{TX-ACTIVE-DIFF-DC}$	$ V_{OUT_P} - V_{OUT_N} $			100	mV
DC Output Offset During Electrical Idle	$V_{TX-IDLE-DIFF-DC}$	$ V_{OUT_P} - V_{OUT_N} $			100	mV

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Electrical Characteristics (continued)

($V_{CC} = +3.0V$ to $+3.6V$, $C_{CL} = 200nF$ coupling capacitor on each output, $R_L = 50\Omega$ on each output, $T_A = -40^\circ C$ to $+85^\circ C$, unless otherwise noted. Typical values are at $V_{CC} = +3.3V$ and $T_A = +25^\circ C$.) (Note 3)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
AC PERFORMANCE (Note 4)						
Differential Input Return Loss	RLRX-DIFF	f = 0.05GHz to 1.25GHz	10			dB
		f = 1.25GHz to 2.5GHz	8			
		f = 2.5GHz to 4GHz	5			
Common-Mode Input Return Loss	RLRX-CM	f = 0.05GHz to 2.5GHz	6			dB
		f = 2.5GHz to 4GHz	4			
Differential Output Return Loss	RLTX-DIFF	f = 0.05GHz to 1.25GHz	10			dB
		f = 1.25GHz to 2.5GHz	8			
		f = 2.5GHz to 4GHz	4			
Common-Mode Output Return Loss	RLTX-CM	f = 0.05GHz to 2.5GHz	6			dB
		f = 2.5GHz to 4GHz	4			
Redriver Operation Differential Input-Signal Range	V _{RX-DIFF-PP}		100		1200	mV _{P-P}
Full-Swing Differential Output Voltage (No Deemphasis)	V _{TX-DIFF-PP}	($V_{OUT_P} - V_{OUT_N}$) , OEQ2 = GND, OEQ1 = GND, OEQ0 = GND	800		1350	mV _{P-P}
Output Deemphasis Ratio, 0dB	V _{TX-DE-RATIO-0dB}	OEQ2 = GND, OEQ1 = GND, OEQ0 = GND, Figure 1		0		dB
Output Deemphasis Ratio, 3.5dB	V _{TX-DE-RATIO-3.5dB}	OEQ2 = GND, OEQ1 = GND, OEQ0 = V _{CC} , Figure 1		3.5		dB
Output Deemphasis Ratio, 6dB	V _{TX-DE-RATIO-6dB}	OEQ2 = GND, OEQ1 = V _{CC} , OEQ0 = GND, Figure 1		6		dB
Output Deemphasis Ratio, 6dB with Higher Amplitude	V _{TX-DE-HA-RATIO-6dB}	OEQ2 = GND, OEQ1 = V _{CC} , OEQ0 = V _{CC} , Figure 1		6		dB
Output Deemphasis Ratio, 3.5dB with Preshoot	V _{TX-DE-PS-RATIO-3.5dB}	OEQ2 = V _{CC} , OEQ1 = GND, OEQ0 = GND, Figure 1		3.5		dB
Output Deemphasis Ratio, 6dB with Preshoot	V _{TX-DE-PS-RATIO-6dB}	OEQ2 = V _{CC} , OEQ1 = GND, OEQ0 = V _{CC} , Figure 1		6		dB
Output Deemphasis Ratio, 9dB with Preshoot	V _{TX-DE-PS-RATIO-9dB}	OEQ2 = V _{CC} , OEQ1 = V _{CC} , OEQ0 = GND, Figure 1		9		dB
Output Deemphasis Ratio, 9dB with Preshoot with Higher Amplitude	V _{TX-DE-PS-HA-RATIO-9dB}	OEQ2 = V _{CC} , OEQ1 = V _{CC} , OEQ0 = V _{CC} , Figure 1		9		dB
Input Equalization, 5dB	V _{RX-EQ-5dB}	INEQ1 = GND, INEQ0 = GND (Note 5)		5		dB
Input Equalization, 8dB	V _{RX-EQ-8dB}	INEQ1 = GND, INEQ0 = V _{CC} (Note 5)		8		dB
Input Equalization, 12dB	V _{RX-EQ-12dB}	INEQ1 = V _{CC} , INEQ0 = GND (Note 5)		12		dB

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Electrical Characteristics (continued)

($V_{CC} = +3.0V$ to $+3.6V$, $C_{CL} = 200nF$ coupling capacitor on each output, $R_L = 50\Omega$ on each output, $T_A = -40^\circ C$ to $+85^\circ C$, unless otherwise noted. Typical values are at $V_{CC} = +3.3V$ and $T_A = +25^\circ C$.) (Note 3)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Input Equalization, 16dB	$V_{RX-EQ-16dB}$	$INEQ1 = V_{CC}$, $INEQ0 = V_{CC}$ (Note 5)		16		dB
AC PERFORMANCE (Note 4)						
Output Common-Mode Voltage Swing Peak-to-Peak	$V_{TX-CM-AC-PP}$	$\text{Max}(V_{OUT_P} + V_{OUT_N})/2 - \text{Min}(V_{OUT_P} + V_{OUT_N})/2$			100	mV _{P-P}
Propagation Delay	t_{PD}		120	160	240	ps
Rise/Fall Time	$t_{TX-RISE-FALL}$	(Note 6)	20			ps
Rise/Fall Time Mismatch	$t_{TX-RF-MISMATCH}$	(Note 6)			5	ps
Deterministic Jitter	$t_{TX-DJ-DD}$	K28.5 pattern, AC-coupled, $R_L = 50\Omega$, data rate = 8GT/s		10.5	23.5	ps _{P-P}
Random Jitter	$t_{TX-RJ-DD}$	D10.2 pattern, no deemphasis, no preshoot, data rate = 8GT/s		0.5	1.5	ps _{RMS}
Electrical Idle Entry Delay	$t_{TX-IDLE-SET-TO-IDLE}$	From input to output, D10.2 pattern, data rate = 1GT/s		5	8	ns
Electrical Idle Exit Delay	$t_{TX-IDLE-TO-DIFF-DATA}$	From input to output, D10.2 pattern, data rate = 1GT/s		5	8	ns
Electrical Idle Detect Threshold	$V_{TX-IDLE-THRESH}$	D10.2 pattern, data rate = 1GT/s, (Note 3)	65	112	175	mV _{P-P}
		D10.2 pattern, data rate = 1GT/s to 8GT/s		112		
Output Voltage During Electrical Idle (AC)	$V_{TX-IDLE-DIFF-AC-P}$	$ V_{OUT_P} - V_{OUT_N} $			20	mV _{P-P}
Receiver Detection Pulse Amplitude	$V_{TX-RCV-DETECT}$	Voltage change in positive direction		600		mV
Receiver Detection Pulse Width				150		ns
Receiver Detection Retry Period				300		ns
CONTROL LOGIC						
Input Logic-Level Low	V_{IL}				0.6	V
Input Logic-Level High	V_{IH}		1.4			V
Input Logic Hysteresis	V_{HYST}			0.1		V
Input Pulldown Resistance	R_{PD}		200	250		k Ω
ESD PROTECTION						
ESD Voltage		Human Body Model		± 5		kV

Note 3: All units are 100% production tested at $T_A = +85^\circ C$. Specifications for all temperature limits are guaranteed by design.

Note 4: Guaranteed by design, unless otherwise noted.

Note 5: Equivalent to same amount of deemphasis driving the input.

Note 6: Rise and fall times are measured using 20% and 80% levels.

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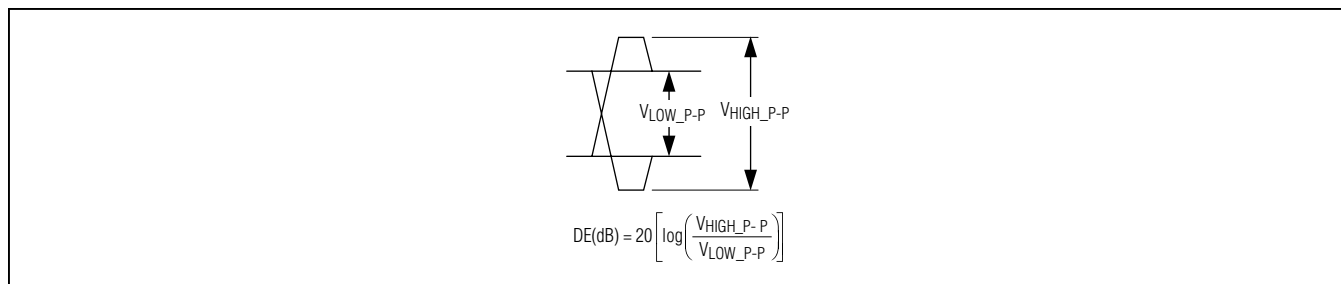
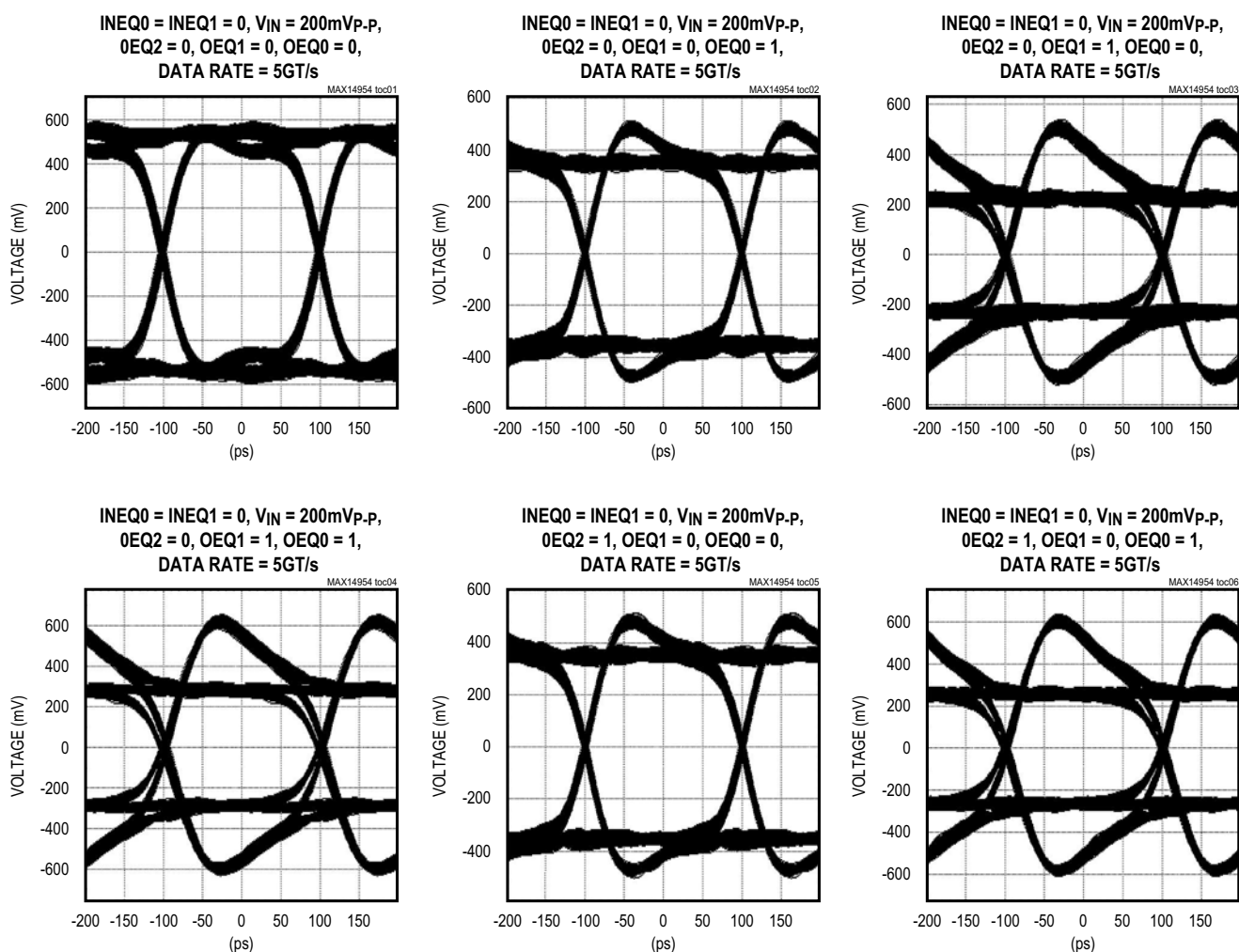


图1. 输出去加重示意图

典型工作特性

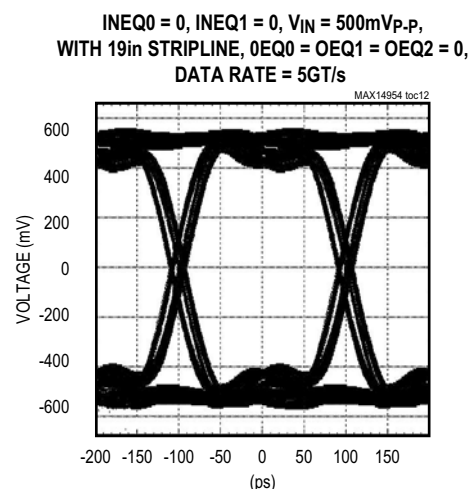
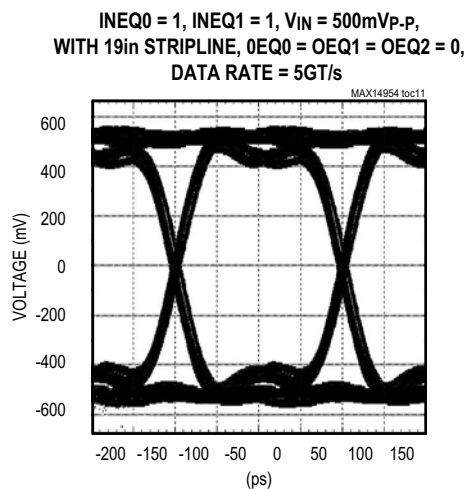
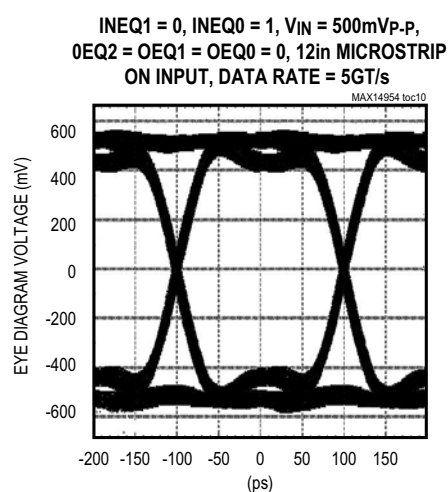
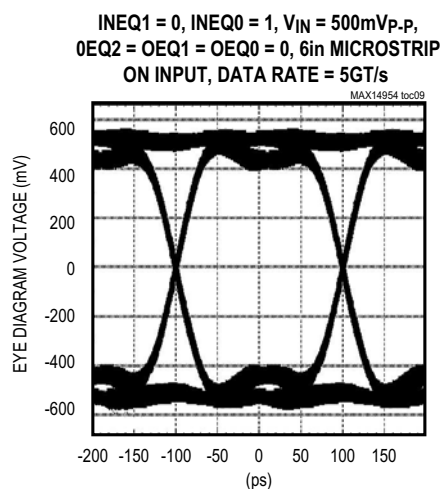
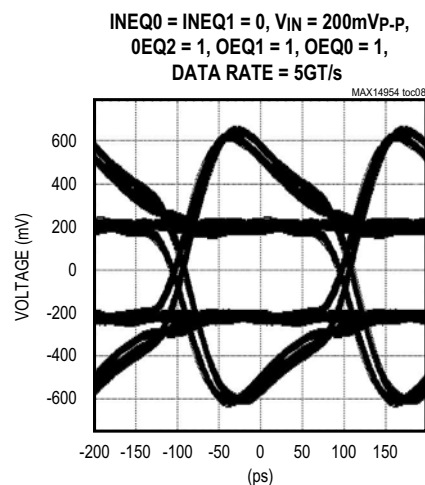
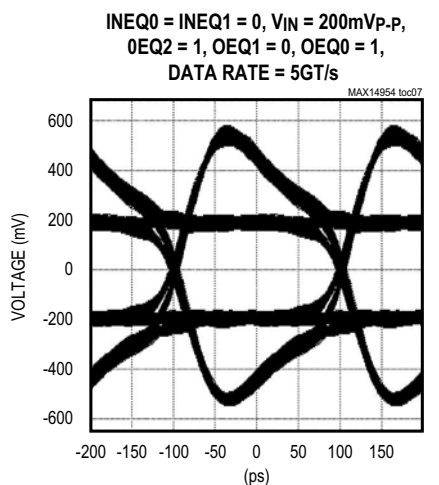
($T_A = +25^\circ\text{C}$, unless otherwise noted.)



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典型工作特性(续)

(TA = +25°C, unless otherwise noted.)

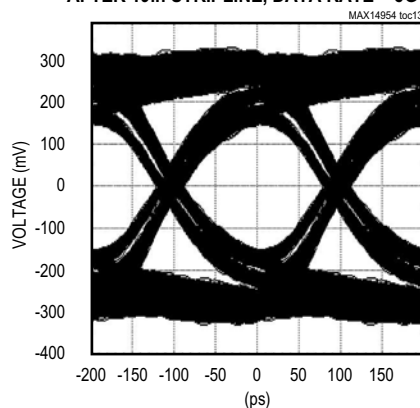


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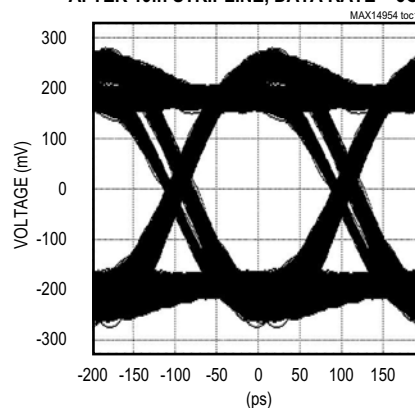
典型工作特性(续)

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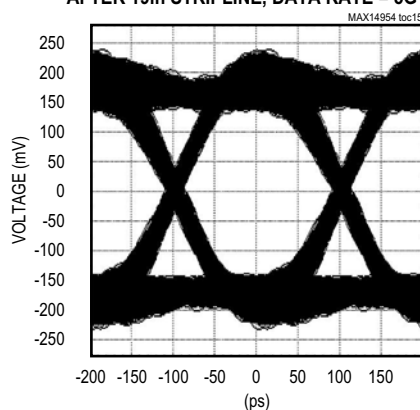
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0EQ2 = 0, OEQ1 = 0, OEQ0 = 1, OUTPUT
AFTER 19in STRIPLINE, DATA RATE = 5GT/s



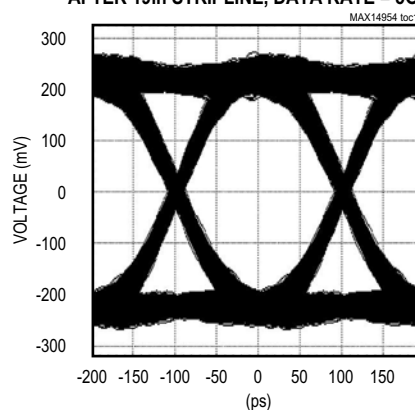
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AFTER 19in STRIPLINE, DATA RATE = 5GT/s



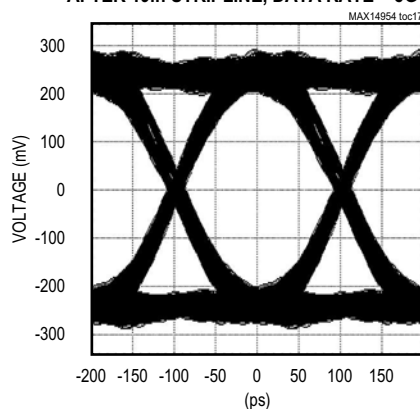
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AFTER 19in STRIPLINE, DATA RATE = 5GT/s



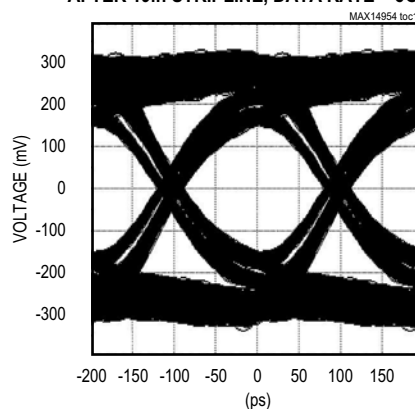
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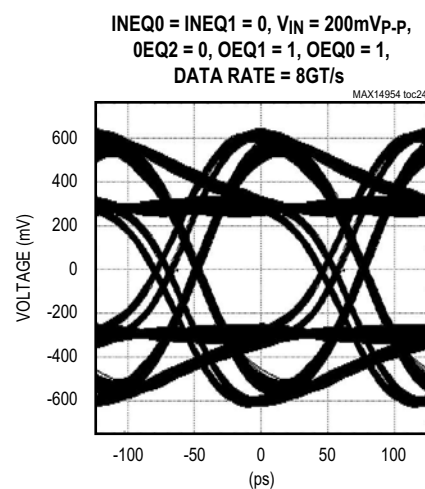
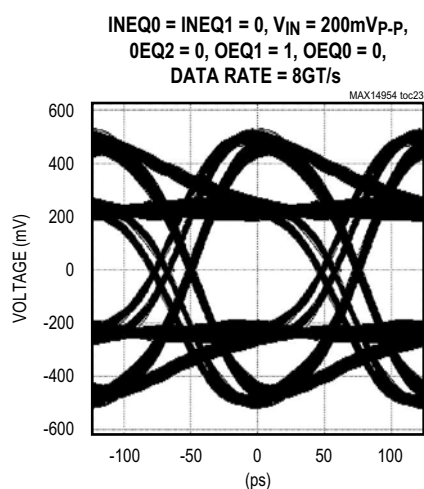
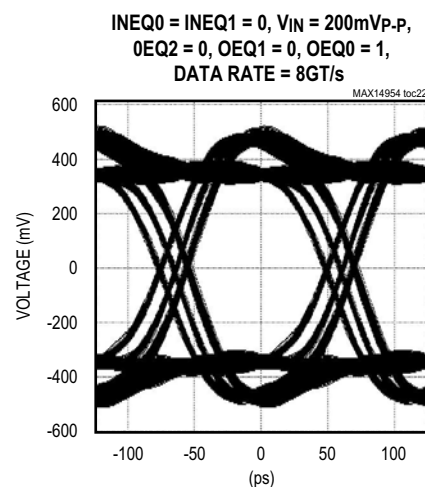
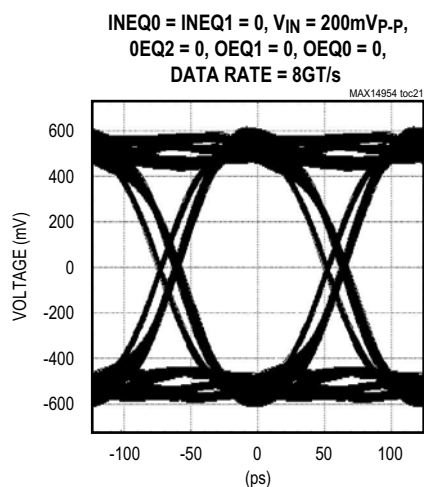
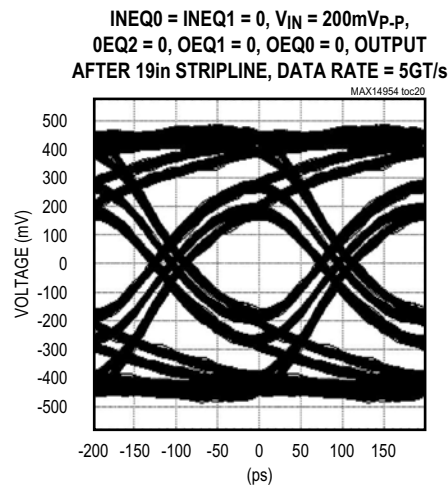
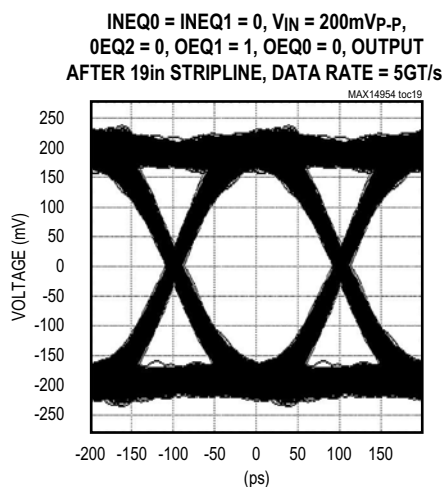
INEQ0 = INEQ1 = 0, VIN = 200mVp-p,
0EQ2 = 1, OEQ1 = 0, OEQ0 = 1, OUTPUT
AFTER 19in STRIPLINE, DATA RATE = 5GT/s



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典型工作特性(续)

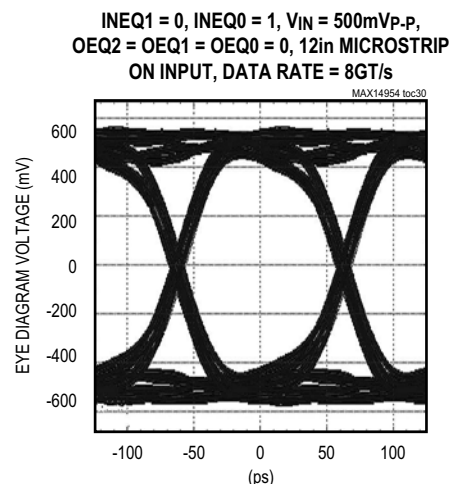
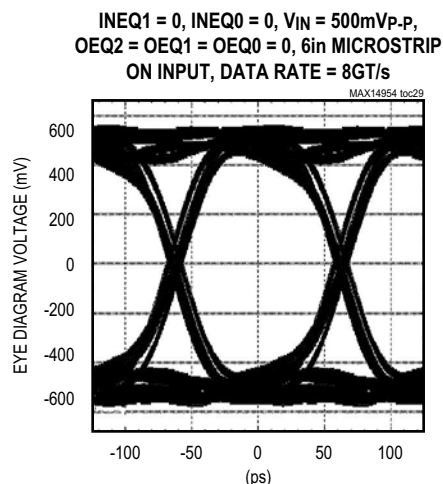
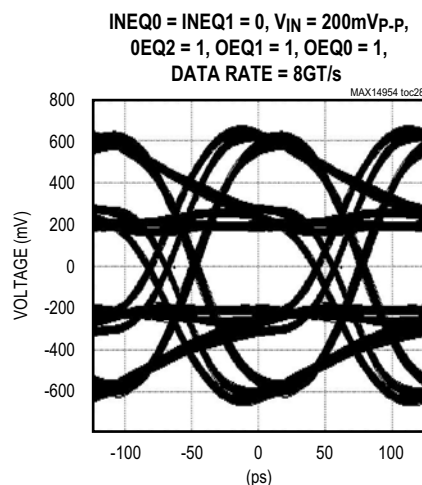
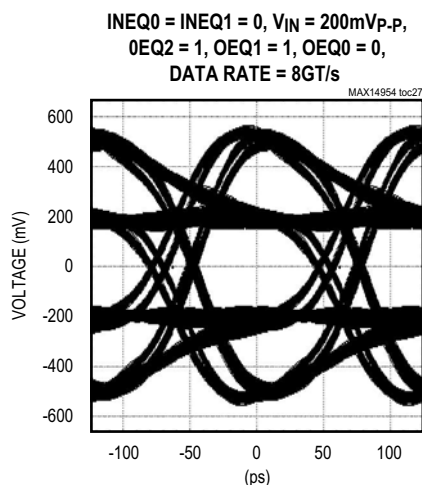
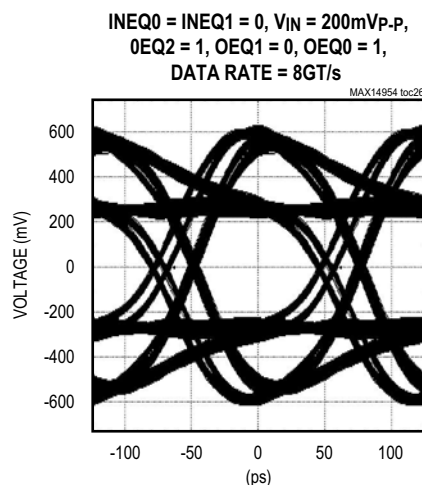
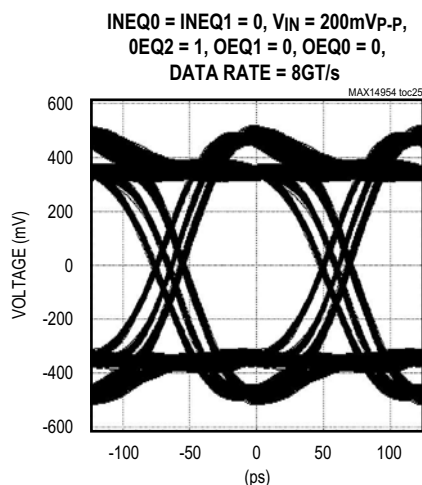
(TA = +25°C, unless otherwise noted.)



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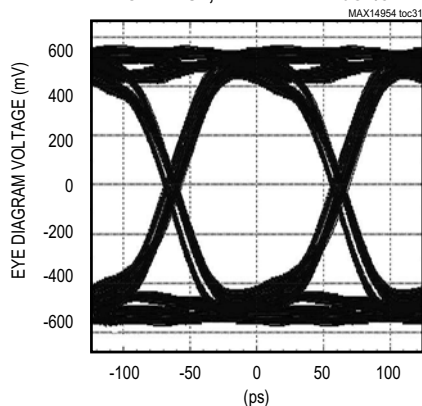


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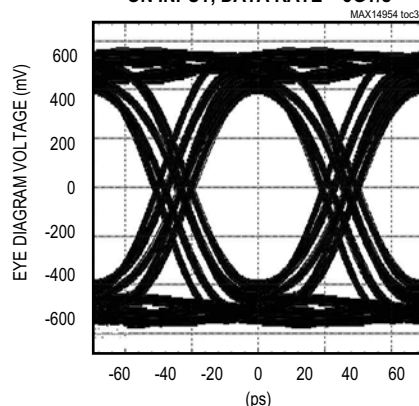
典型工作特性(续)

(TA = +25°C, unless otherwise noted.)

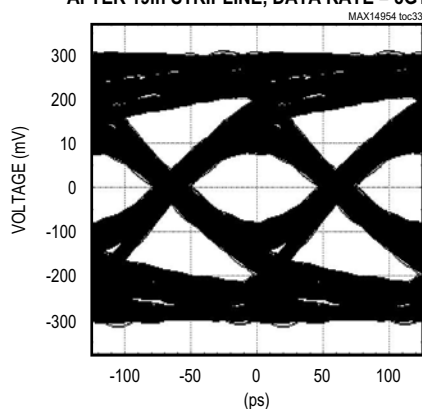
INEQ1 = 1, INEQ0 = 0, VIN = 500mVp-p,
OEQ2 = OEQ1 = OEQ0 = 0, 18in MICROSTRIP
ON INPUT, DATA RATE = 8GT/s



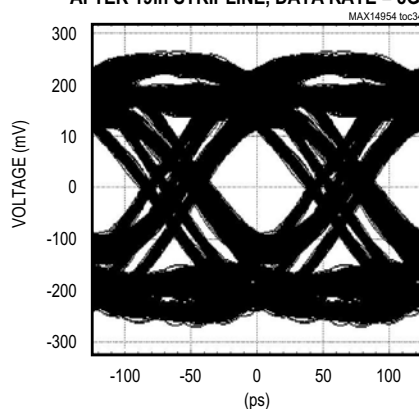
INEQ1 = 1, INEQ0 = 1, VIN = 500mVp-p,
OEQ2 = OEQ1 = OEQ0 = 0, 24in MICROSTRIP
ON INPUT, DATA RATE = 8GT/s



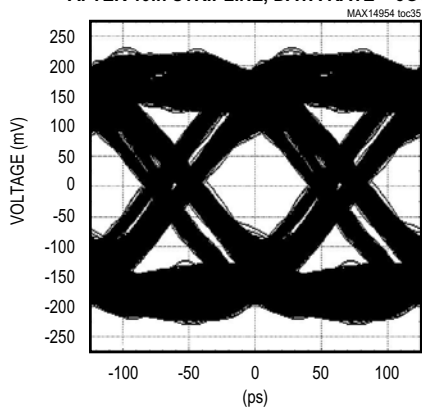
INEQ0 = INEQ1 = 0, VIN = 200mVp-p,
OEQ2 = 0, OEQ1 = 0, OEQ0 = 1, OUTPUT
AFTER 19in STRIPLINE, DATA RATE = 8GT/s



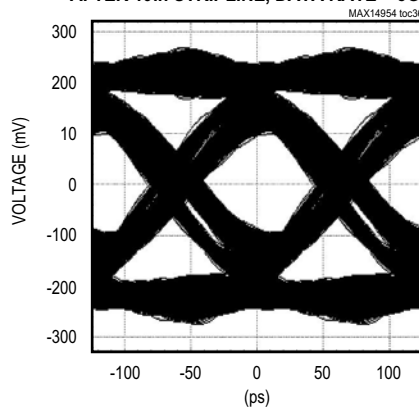
INEQ0 = INEQ1 = 0, VIN = 200mVp-p,
OEQ2 = 1, OEQ1 = 1, OEQ0 = 1, OUTPUT
AFTER 19in STRIPLINE, DATA RATE = 8GT/s



INEQ0 = INEQ1 = 0, VIN = 200mVp-p,
OEQ2 = 1, OEQ1 = 1, OEQ0 = 0, OUTPUT
AFTER 19in STRIPLINE, DATA RATE = 8GT/s



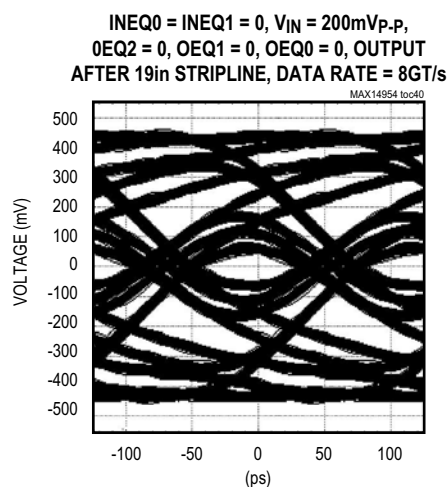
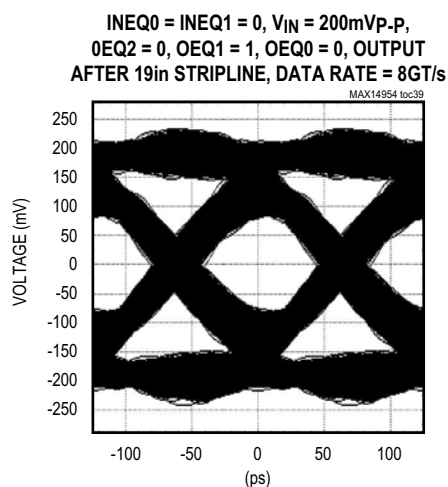
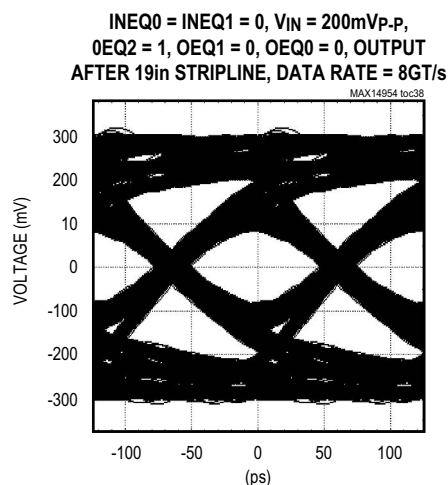
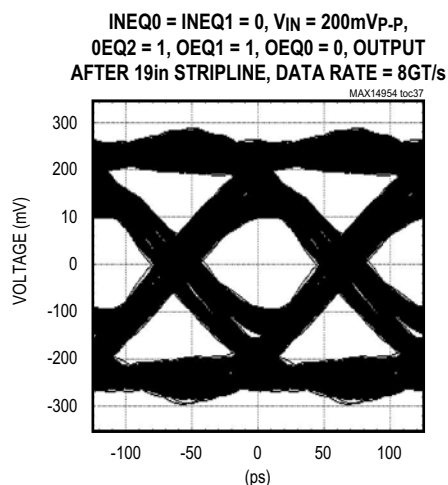
INEQ0 = INEQ1 = 0, VIN = 200mVp-p,
OEQ2 = 1, OEQ1 = 0, OEQ0 = 1, OUTPUT
AFTER 19in STRIPLINE, DATA RATE = 8GT/s



高度可靠、带有均衡功能的四通道PCI转接驱动器， 工作在扩展级温度范围

典型工作特性(续)

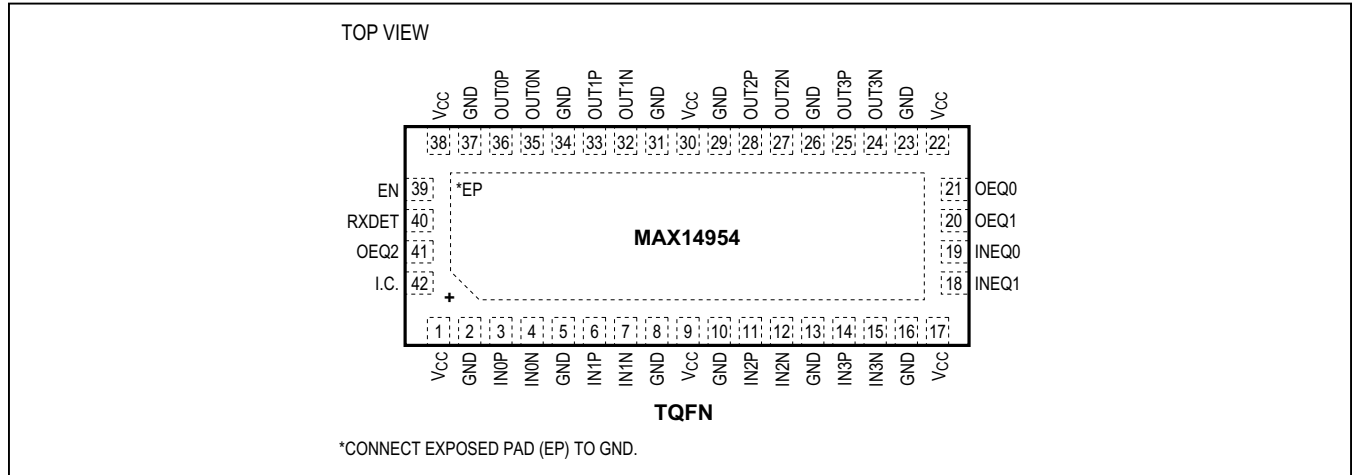
(TA = +25°C, unless otherwise noted.)



MAX14954

高度可靠、带有均衡功能的四通道PCI转接驱动器，
工作在扩展级温度范围

引脚配置



引脚说明

引脚	名称	功能
1, 9, 17, 22, 30, 38	V _{CC}	电源输入，利用1μF和0.1μF并联电容将V _{CC} 旁路至GND，电容尽量靠近器件放置。
2, 5, 8, 10, 13, 16, 23, 26, 29, 31, 34, 37	GND	地。
3	IN0P	通道0同相输入。
4	IN0N	通道0反相输入。
6	IN1P	通道1同相输入。
7	IN1N	通道1反相输入。
11	IN2P	通道2同相输入。
12	IN2N	通道2反相输入。
14	IN3P	通道3同相输入。
15	IN3N	通道3反相输入。
18	INEQ1	输入均衡控制MSB，INEQ1具有250kΩ (典型值)内部下拉电阻。
19	INEQ0	输入均衡控制LSB，INEQ0具有250kΩ (典型值)内部下拉电阻。
20	OEQ1	输出去加重控制第1位，OEQ1具有250kΩ (典型值)内部下拉电阻。
21	OEQ0	输出去加重控制LSB，OEQ0具有250kΩ (典型值)内部下拉电阻。
24	OUT3N	通道3反相输出。
25	OUT3P	通道3同相输出。
27	OUT2N	通道2反相输出。
28	OUT2P	通道2同相输出。
32	OUT1N	通道1反相输出。
33	OUT1P	通道1同相输出。

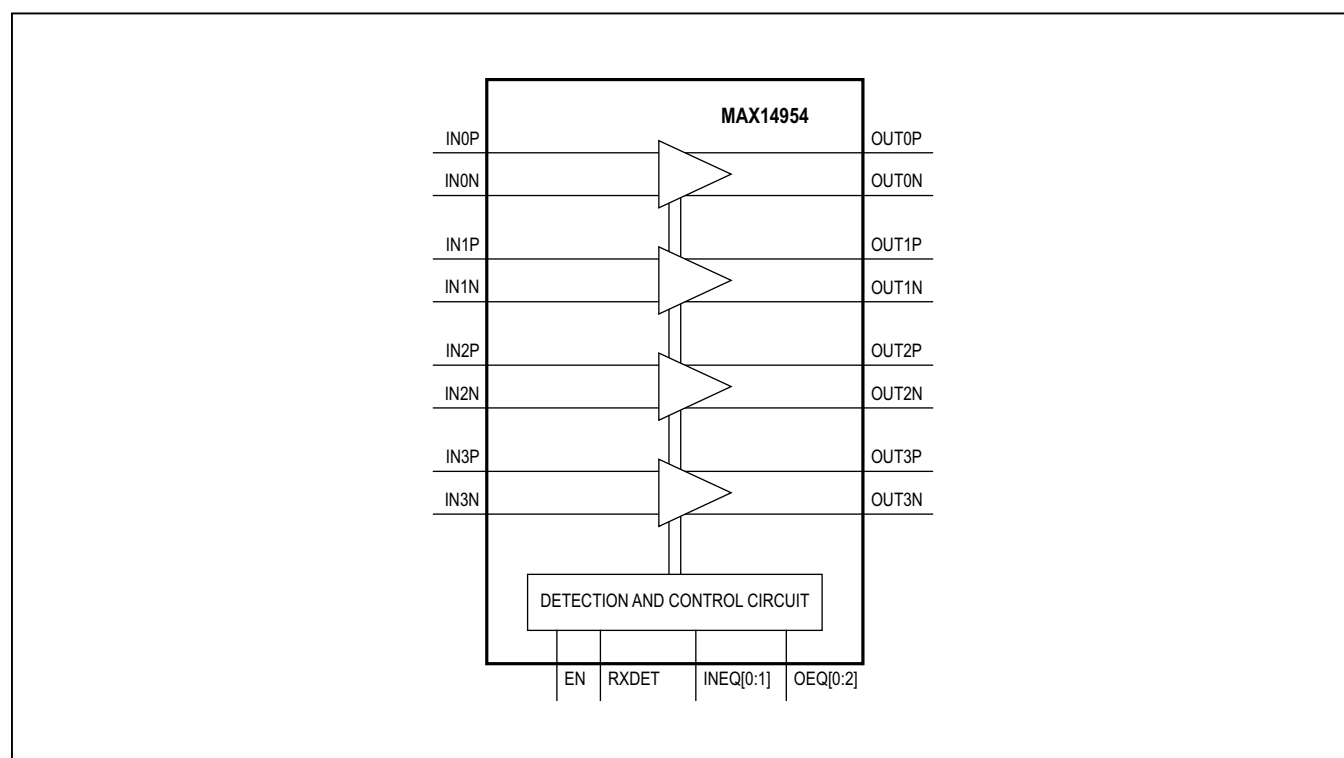
MAX14954

高度可靠、带有均衡功能的四通道PCI转接驱动器，工作在扩展级温度范围

引脚说明(续)

引脚	名称	功能
35	OUT0N	通道0反相输出。
36	OUT0P	通道0同相输出。
39	EN	使能输入。EN为低电平时，器件处于待机模式；EN为高电平时，器件处于常规工作模式。EN具有250k Ω (典型值)内部下拉电阻。
40	RXDET	接收器检测控制位。RXDET为高电平时，启动接收器检测功能；RXDET为低电平时，器件处于常规模式。RXDET具有250k Ω (典型值)内部下拉电阻。
41	OEQ2	输出去加重控制MSB，OEQ2具有250k Ω (典型值)内部下拉电阻。
42	I.C.	内部连接引脚。
—	EP	裸焊盘，内部连接至GND。将EP连接至较大的接地区域，以改善散热和对地的热传导。

功能框图



高度可靠、带有均衡功能的四通道PCI转接驱动器，工作在扩展级温度范围

详细说明

MAX14954四通道均衡器/转接驱动器支持Gen III (8.0GT/s)、Gen II (5.0GT/s)和Gen I (2.5GT/s) PCIe数据率。器件含有四路相同的驱动器，每个通道都具有空闲/接收检测功能，以及均衡/去加重/预冲，用以补偿电路板损耗。可编程输入均衡电路降低确定性抖动，改善信号完整性。器件输出具有可编程输出去加重/预冲功能，优化关键PCIe元件的布局，支持更长的带状线、微带线或电缆传输。

可编程输入均衡

可编程输入均衡有两个控制位：INEQ1和INEQ0 (表1)。

表1. 输入均衡

INEQ1	INEQ0	INPUT EQUALIZATION (dB)
0	0	5
0	1	8
1	0	12
1	1	16

可编程输出去加重/预冲

可编程输出去加重有三个控制位：OEQ2、OEQ1和OEQ0。设置去加重/预冲比：0dB、3.5dB、6dB和9dB (表2)。

表2. 输出去加重/预冲

OEQ2	OEQ1	OEQ0	OUTPUT DEEMPHASIS/ PRESHOOT RATIO (dB)
0	0	0	0
0	0	1	3.5
0	1	0	6
0	1	1	6 (peak-to-peak swing is 1.2V)
1	0	0	3.5
1	0	1	6
1	1	0	9 (peak-to-peak swing is 0.9V)
1	1	1	9 (peak-to-peak swing is 1.0V)

接收器检测

器件在每个通道都带有接收器检测功能。初始上电时，如果EN为高电平，启动接收器检测功能。EN为高电平时，可在RXDET输入的上升或下降沿启动接收器检测功能。在此期间，器件保持低功耗待机模式，即使EN为高电平也将禁止输出。连续监测每个通道的接收器，直到检测到通道接收的有效信号。如果一个通道检测到接收信号，将另一通道的重试时间限制至100ms(典型值)。每路通道接收器检测功能使能后，使能输入共模匹配电阻和空闲状态检测(表3)。

空闲状态检测

器件具有空闲状态检测功能，避免把噪声信号转接驱动到输出端。当差分输入下降到空闲状态检测门限 $V_{TX-IDLE-THRESH}$ 的下限时，禁止输出。差分输入信号高于空闲状态门限 $V_{TX-IDLE-THRESH}$ 的上限时，器件打开输出并转接驱动信号。空闲状态和转接驱动模式之间的输出共模电压略有差异。

表3. 接收器检测输入功能

RXDET	EN	DESCRIPTION
X	0	Receiver detection is inactive.
X	1	Following a rising edge of the EN signal, indefinite retries until receiver detects at least one channel. Retries stop after 100ms (typ) if any channel receiver is detected.
Rising/falling edge	1	Initiates receiver detection.

X = 无关。

高度可靠、帶有均衡功能的四通道PCI转接驱动器，
工作在扩展级温度范围

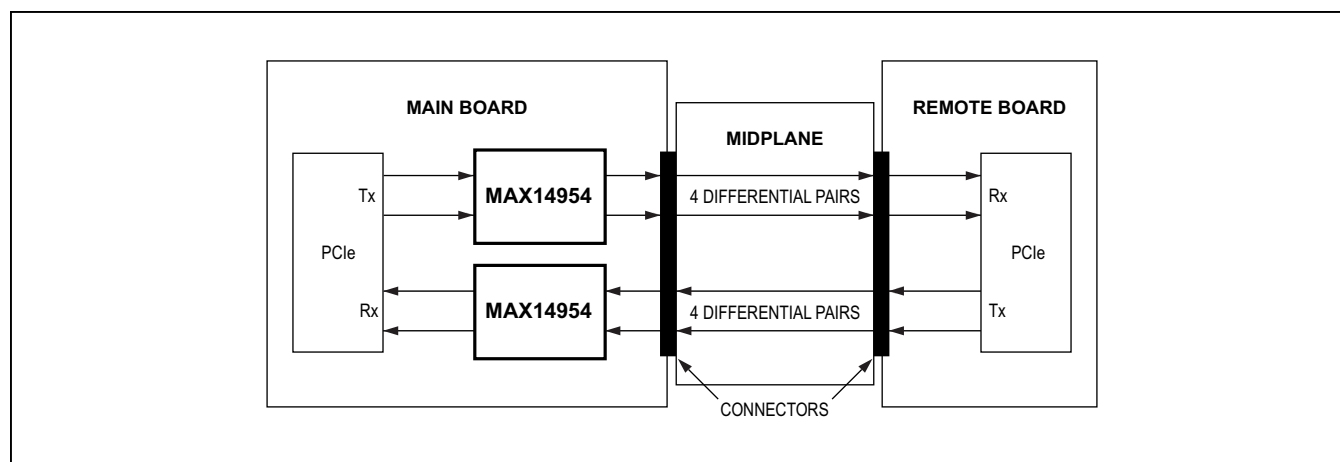


图2. 典型应用框图

应用信息

图2所示是使用两片MAX14954的典型应用，两片器件均焊接在主板上，独立设置输入和输出均衡，以优化性能。MAX14954 Rx均衡器设置为接收通过两组连接器和中间层带状线输入的远端电路板有损信号。Rx部分的输出具有很小或没有输出均衡。Tx部分使用高质量信号，并驱动至输出(去加重)。

布局

电路板布局和设计对器件性能的影响非常显著。采用良好的高频设计技术,包括尽可能降低接地电感,采用阻抗受控的数据信号传输线等。电源去耦电容须尽量靠近 V_{CC} 安装, V_{CC} 必须始终连接到电源区域。建议在不同电路板层布置接收器和发送器信号,使串扰降至最小。

裸焊盘封装

带裸焊盘的42引脚TQFN封装为器件散热提供了极低的热阻通路。器件裸焊盘必须焊接到电路板的接地区域，以改善散热和接地连接。关于裸焊盘封装的更多信息，请参考应用笔记862：*HFAN-08.1: Thermal Considerations of QFN and Other Exposed-Paddle Packages*。

电源排序

小心：请勿超出绝对最大额定值，如果工作条件超出器件的额定值，将会造成器件永久损坏。

建议对所有器件提供适当的供电顺序。任何情况下，需要先施加GND和V_{CC}，然后再施加信号，特别是在信号没有限流的条件下。

订购信息

器件	温度范围	引脚-封装
MAX14954ETO+	-40°C至+85°C	42 TQFN-EP*

+表示无铅(Pb)/符合RoHS标准的封装。

*EP = 裸焊盘。

芯片信息

PROCESS: BiCMOS

封装信息

如需最近的封装外形信息和焊盘布局(占位面积), 请查询china.maximintegrated.com/packages。请注意, 封装编码中的“+”、“#”或“-”仅表示RoHS状态。封装图中可能包含不同的尾缀字符, 但封装图只与封装有关, 与RoHS状态无关。

封装类型	封装编码	外形编号	焊盘布局 编号
42 TQFN-EP	T423590+1	21-0181	90-0078

MAX14954

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修订历史

修订号	修订日期	说明	修改页
0	11/12	最初版本。	—

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17

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