

THLD6481

Octal 32GBaud PAM4/NRZ VCSEL Driver

General Description

The THLD6481 is a high performance linear Octal VCSEL Driver for optical links with data rates up to 32GBaud PAM4/NRZ.

The THLD6481 provides a two-wire serial interface which allows digital programmable control of bias and modulation currents.

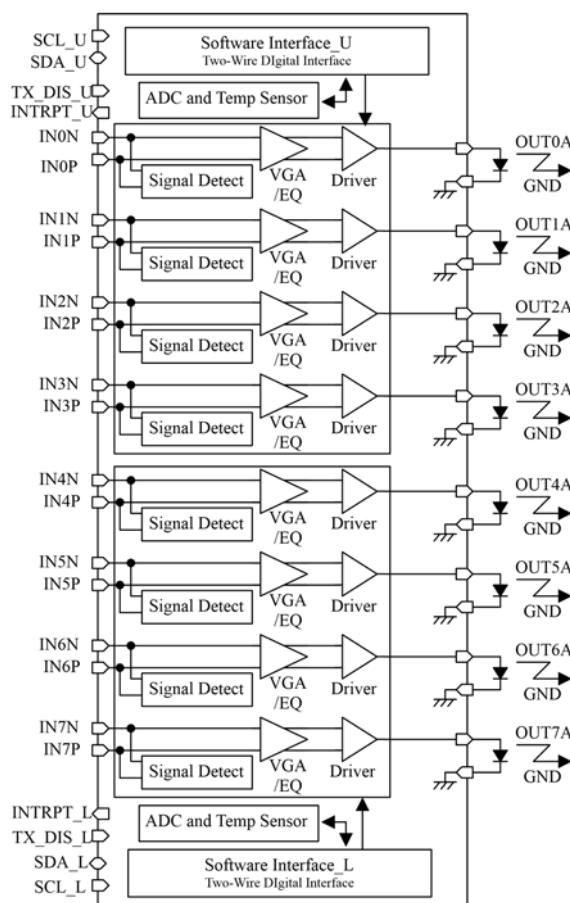
Applications

PCI Express 6.0 Optical Modules for MMF links

Features

- Octal 32GBaud PAM4/NRZ VCSEL Driver
- ZERO EYE SKEW®
- Ultra-low Power: 180mW/Ch typical
- Programmable bias and modulation current
- Broad input dynamic range with optional AGC
- Optional equalization
- Individual Channel Programmability
- Digital Diagnostic Monitoring Interface
- Programmable LOS Threshold and Hysteresis
- Alarm Pin to flag LOS on any channel
- Support PCI Express 6.0 Low Power States
- Supports 0 °C to +95 °C die temperature

Block Diagram



Chip Dimensions

Die Thickness: 108 μm $\pm$ 12.5 μm , Pad Material: Aluminum. Data Base Size: 3800 x 3600.

Table 1 Die Detail. All Dimensions in μm .

Part Number	Minimum Die Size	Maximum Die Size	Pad Openings	Pad opening for GND pads next OUT pads
THLD6481	3870 x 3670	3920 x 3720	70 x 70 square	81 x 60 rectangular

Absolute Maximum Ratings**Table 2 Absolute Maximum Ratings**

Parameter	Min	Typ	Max	Unit
Core Power Supply Voltage (VCC25)	-0.3	-	4.0	V
VCSEL Driver Power Supply Voltage (VCC33)	-0.3	-	4.0	V
OUTA Output Voltage	-0.3	-	VCC33+0.3	V
LVC MOS Input/Output Voltage	-0.3	-	VCC33+0.3	V
CML Receiver Input Voltage	-0.3	-	VCC25+0.3	V
ESD Rating	HBM at high-speed pins	± 500	-	V
	HBM at all other pins	± 2000	-	V
Storage Temperature	-55	-	125	$^{\circ}\text{C}$
Junction Temperature	-40	-	125	$^{\circ}\text{C}$

Recommended Operating Conditions**Table 3 Recommended Operating Conditions**

Parameter	Min	Typ	Max	Unit
Core Power Supply Voltage (VCC25)	2.4	2.5	2.6	V
VCSEL Driver Power Supply Voltage (VCC33)	3.1	3.3	3.6	V
Supply that external resistors are pulled up to on SDA and SCL	3.1	3.3	3.6	V
Die Temperature measured at the backside of the die	0	-	95	$^{\circ}\text{C}$

Performance Specification**Table 4 VCSEL Driver DC / AC Specifications**

Over recommended operating supply and temperature range unless otherwise specified

Symbol	Parameter	Condition	Min	Typ	Max	Unit
ICC _{W33}	3.3V Active Supply Current	Normal state	-	45	-	mA
ICC _{W25}	2.5V Active Supply Current	Normal state	-	11	-	mA
I _{BIAS-RANGE}	Output Bias Current Range	VCSEL _R = 80 Ω	-	2.5 to 10	-	mA
I _{MOD-RANGE}	Output Modulation Current Range	-	-	0 to 6	-	mA
THD	Total Harmonic Distortion @1GHz	-	-	2.5	-	%
B _{RATE}	PAM4/NRZ Input Data Rate	-	1	-	32	GBaud
V _{IN-DIFF-PP}	AC Coupled Differential Input Peak to Peak Signal	-	800	-	1000	mVppd
R _{RX-DIFF-DC}	DC Differential Input Impedance	-	80	-	120	Ω
EQ	Input Equalization Gain (AC Gain 64 settings selectable per channel)	-	-	0 to 8	-	dB
T _{LOS}	LOS Assert/De-assert Timing (from occurrence of LOS on any port to assertion)	-	-	-	1	μs

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6. Despite our utmost efforts to improve the quality and reliability of the product, faults will occur with a certain small probability, which is inevitable to a semi-conductor product. Therefore, you are encouraged to have sufficiently redundant or error preventive design applied to the use of the product so as not to have our product cause any social or public damage.
7. Please note that this product is not designed to be radiation-proof.
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