Features

- **Current-controlled Output Current Source with 4 Input Channels**
- **LVDS Compatible Inputs at Channels 2, 3 and 4 with On-chip 100Ω Termination**
- **Separate Read-channel Enable**
- **Two Selectable Outputs for Grounded Laser Diodes**
- **Output Current per Channel up to 350 mA**
- **Total Output Current up to 600 mA**
- **On-chip RF Oscillator**
- **Control of 2 Different Swings and Frequencies by use of 4 External Resistors**
- **Oscillator Frequency Range from 200 MHz to 500 MHz**
- **Maximum Oscillator Current Amplitude 100 mApp**
- **Single 5V Power Supply**
- **Small Pb-free QFN24, 4 mm × 4 mm Package**

Applications

- **DVD+/-RW Dual Layer with CD-RW Capability**
- **Recordable Optical Drives**

4-Channel LVDS Laser Driver for Dual-layer Application

ATR0849

Summary

1. Description

The ATR0849 is a laser diode driver designed to operate two different grounded laser diodes for DVD-RW/DVD+RW (650 nm) and CD-RW (780 nm). The device includes four channels for four different optical power levels. The write channels (channels 2 to 4) can be controlled by fast LVDS (Low Voltage Differential Signaling).

The read channel generates a continuous output current, whereas channels 2 to 4 are designed as write channels with very fast switching speed. All channels are summed together and routed to one of the two outputs, IOUTA or IOUTB, controlled by the select input, SELA. Each write channel (channel 2 to 4) can contribute up to 350 mA to the total output current of up to 600 mA. The read channel can contribute up to 150 mA. Total gains of 100 (read channel) and 250 (channels 2, 3 and 4), are provided between each reference current input and the selected output. Although the reference inputs are current inputs, voltage control is possible by using external resistors. An on-chip RF oscillator is available to reduce laser-mode hopping noise during read mode. The oscillator current amplitude can be set independently for the two selectable outputs with two different resistors. Oscillation is enabled by a high signal at the ENOSC pin. Complete shutdown of the output currents is achieved by a low signal at the ENABLE input.

In read mode, the reference currents (I2, I3, I4) should be switched off to reduce power consumption.

In case of uncertain (balanced) enable signals, a built-in fail-safe circuit will reduce the laser diode output current to a safe value.

Figure 1-1. Block Diagram
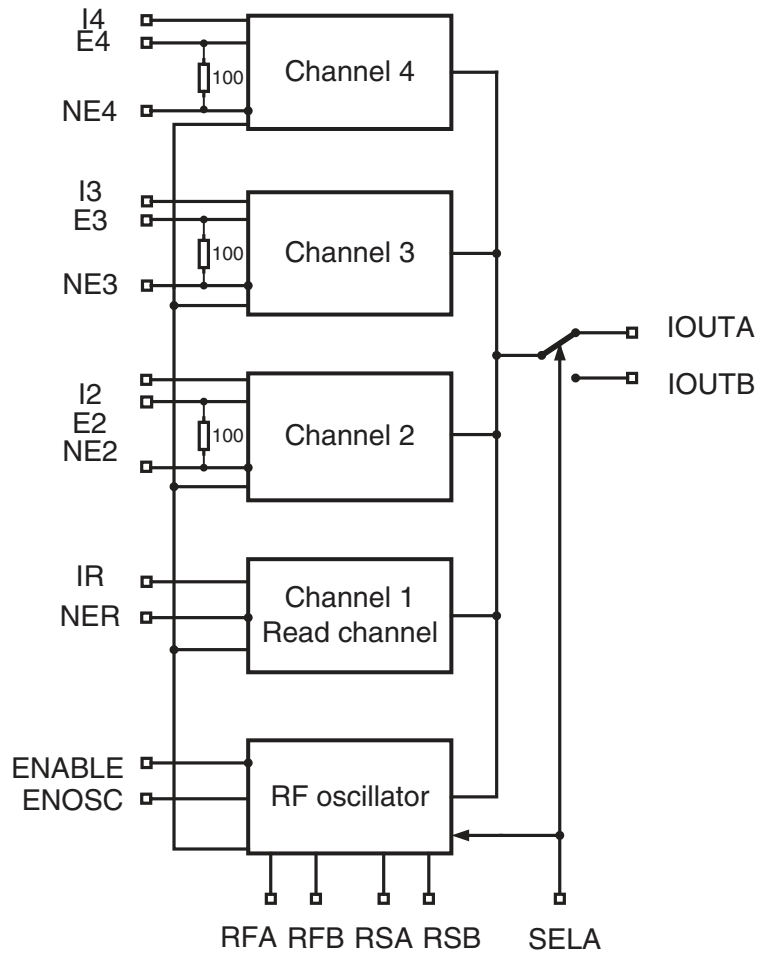
2. Pin Configuration

Figure 2-1. Pinning QFN24
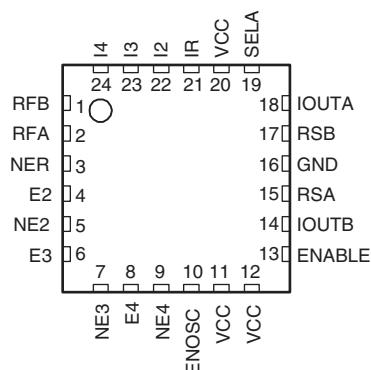
Table 2-1. Pin Description

Pin	Symbol	Type	Function
1	RFB	Analog	External resistor to GND sets frequency of oscillator B
2	RFA	Analog	External resistor to GND sets frequency of oscillator A
3	NER	Digital	Digital control of read channel (channel 1), active low
4	E2	Digital	Digital control of channel 2
5	NE2	Digital	Digital control of channel 2
6	E3	Digital	Digital control of channel 3
7	NE3	Digital	Digital control of channel 3
8	E4	Digital	Digital control of channel 4
9	NE4	Digital	Digital control of channel 4
10	ENOSC	Digital	Digital control of RF oscillator
11	VCC	Supply	+5V power supply
12	VCC	Supply	+5V power supply
13	ENABLE	Digital	Enables output current, active high
14	IOUTB	Analog	Output current source B for laser diode
15	RSA	Analog	External resistor to GND sets swing of oscillator A
16	GND	Supply	Ground, power supply
17	RSB	Analog	External resistor to GND sets swing of oscillator B
18	IOUTA	Analog	Output current source A for laser diode
19	SELA	Digital	High: selects IOUTA, RSA, RFA Low: selects IOUTB, RSB, RFB
20	VCC	Supply	+5V power supply
21	IR	Analog	Input current, bias voltage approximately GND
22	I2	Analog	Input current, bias voltage approximately GND
23	I3	Analog	Input current, bias voltage approximately GND
24	I4	Analog	Input current, bias voltage approximately GND
Paddle	GND	Supply	Ground, negative power supply

3. Absolute Maximum Ratings

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

Parameters	Symbol	Value	Unit
Supply voltage	V_{CC}	−0.5 to +6.0	V
Input voltage at any input	V_{in}	−0.5 to V_{CC} + 0.5	V
Voltage bettween LVDS inputs (E2/NE2, E3/NE3, E4/NE4)	V_{dmax}	1.7	V
Power dissipation	P_{max}	$0.7^{(1)}$ to $1^{(2)}$	W
Output voltage	V_{out}	−0.5 to V_{CC} − 1	V
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	−65 to +125	°C

Notes: 1. $R_{thJA} \leq 115$ K/W at $T_{amb} = 70°$ C

2. $R_{thJA} \leq 15$ K/W at $T_{amb} = 25°$ C

4. Thermal Resistance

Parameters	Symbol	Value	Unit
Junction ambient	R_{thJA}	125	K/W

Note: Measured with multi-layer test board (JDEC standard)

5. Recommended Operating Range

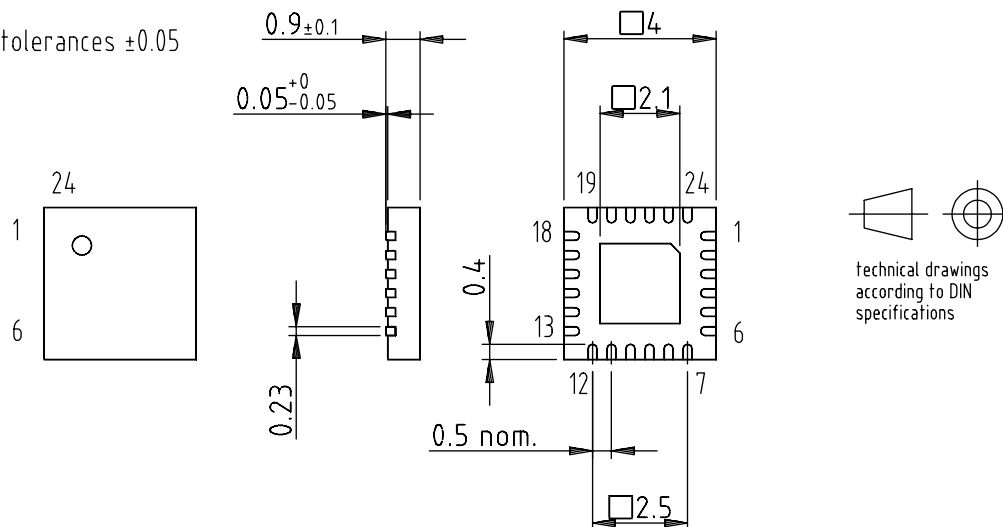| Parameters	Symbol	Value	Unit
Supply voltage	V_{CC}	4.5 to 5.5	V
Input current	$I_{IR}, I_{I2}, I_{I3}, I_{I4}$	< 1.5	mA
Voltage bettween LVDS inputs (E2/NE2, E3/NE3, E4/NE4)	V_d	0.5	V
External resistor to GND to set oscillator frequency	RFA, RFB	> 3	kΩ
External resistor to GND to set oscillator swing	RSA, RSB	> 100	Ω
Operating temperature range	T_{amb}	0 to +70	°C

6. Ordering Information

Extended Type Number	Package	Remarks
ATR0849-PFQG	Pb-free QFN24 (4 mm × 4 mm)	Taped and reeled

7. Package Information

Package: QFN 24 - 4x4
Exposed pad 2.1x2.1
(acc. JEDEC OUTLINE No. MO-220)
Dimensions in mm

Not indicated tolerances ±0.05

$0.9_{\pm0.1}$

$0.05^{+0}_{-0.05}$

□4

□2.1

0.4

0.23

0.5 nom.

□2.5

24

1

6

19

24

18

1

13

6

12

7

technical drawings
according to DIN
specifications

Drawing-No.: 6.543-5101.01-4
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