#### **Features**

- Three Selectable Outputs
- All Outputs Can Be Used Either for Standard (5V) or High Voltage (9V)
- Maximum Output Current at All Outputs Up to 150 mA
- On-chip Low-EMI RF Oscillator With Spread-spectrum Technology
- Control of 3 Different Swings Using 3 External Resistors
- Oscillator Frequency Range from 200 MHz to 500 MHz
- Maximum Oscillator Current Amplitude 100 mApp
- On-chip High-gain Transimpedance (IV) Amplifier
- Small Green QFN24 4 mm × 4 mm Package

#### **Applications**

- HD-DVD/DVD/CD ROM Drives
- Blu-ray/DVD/CD ROM Drives
- HD-DVD/DVD/CD Player
- Blu-ray/DVD/CD Player

### 1. Description

ATR0885 is a laser diode driver designed to operate three different grounded or floating laser diodes for reading CDs ( $\lambda$  = 780 nm), DVDs ( $\lambda$  = 650 nm), and HD-DVDs/Blu-ray ( $\lambda$  = 405 nm). An on-chip, low-EMI RF oscillator is available to reduce laser mode hopping noise. The oscillator's current amplitude can be set independently for the three selectable outputs using three resistors (RSA, RSB, RSC). The frequency setting is common to all IOUT outputs via a single resistor (RF). A logic high level on the ENOSC pin enables the spread-spectrum RF oscillator. The ATR0885 also includes a fast-settling transimpedance amplifier. It is provided to interface between the front-end monitor photo diode and the adaptive laser diode power control circuit. The gain of the transimpedance amplifier can set independently for each of the three outputs using the resistors RTIA, RTIB and RTIC.



3-output Laser Driver for HD-DVD/ Blu-ray/DVD/ CD-ROM

**ATR0885** 

**Preliminary** 

Summary

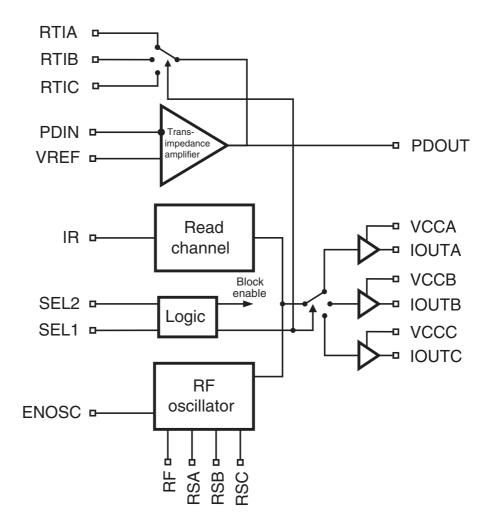
**NOTE:** This is a summary document. The complete document is available under NDA. For more information, please contact your local Atmel sales office.

4923CS-DVD-02/08





Figure 1-1. Block Diagram



# 2. Pin Configuration

Figure 2-1. Pinning QFN24

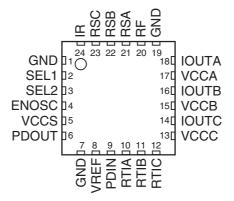


Table 2-1. Pin Description

Pin	Symbol	Туре	Function
1	GND	Supply	Ground, power supply
2	SEL1	Digital	Logic pin 1 to select IOUT/ENABLE IC
3	SEL2	Digital	Logic pin 2 to select IOUT/ENABLE IC
4	ENOSC	Digital	Digital control of RF oscillator
5	VCCS	Supply	+5V power supply for internal circuit
6	PDOUT	Analog	IV amplifier output
7	GND	Supply	Ground, power supply
8	VREF	Analog	Reference voltage input
9	PDIN	Analog	Photo-diode input
10	RTIA	Analog	External resistor defining transimpedance IOUTA
11	RTIB	Analog	External resistor defining transimpedance IOUTB
12	RTIC	Analog	External resistor defining transimpedance IOUTC
13	VCCC	Supply	+5V to +9V power supply for IOUTC
14	IOUTC	Analog	Output current source C for laser diode
15	VCCB	Supply	+5V to +9V power supply for IOUTB
16	IOUTB	Analog	Output current source B for laser diode
17	VCCA	Supply	+5V to +9V power supply for IOUTA
18	IOUTA	Analog	Output current source A for laser diode
19	GND	Supply	Ground, power supply
20	RF	Analog	External resistor to GND; sets frequency of oscillator
21	RSA	Analog	External resistor to GND; sets swing of oscillator A
22	RSB	Analog	External resistor to GND; sets swing of oscillator B
23	RSC	Analog	External resistor to GND; sets swing of oscillator C
24	IR	Analog	Input current bias; ~500Ω to ground
Paddle	GND	Supply	-





## **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	Pin	Symbol	Value	Unit
Supply voltage		V <sub>VCCS</sub>	-0.5 to +6.0	V
Supply voltage output stages (VCCA, VCCB, VCCC)		V <sub>VCCH</sub>	-0.5 to +9.5	V
Input voltage		V <sub>PDIN</sub>	-0.5 to V <sub>cc</sub> +0.5	V
Differential voltage	8, 9	$V_{\mathrm{diff}\_8,9}$	10.51	V
Power dissipation		P <sub>max</sub>	0.7 <sup>(1)</sup> to 1 <sup>(2)</sup>	W
Output voltage		V <sub>out</sub>	-0.5 to V <sub>cch</sub> -1	V
Junction temperature		T <sub>j</sub>	150	°C
Storage temperature		T <sub>stg</sub>	-65 to +125	°C

Notes: 1.  $R_{thJA} \le 115 \text{ K/W} \text{ at } T_{amb} = 70^{\circ}\text{C}$ 

2.  $R_{thJA} \leq 115 \text{ K/W at } T_{amb} = 25^{\circ}\text{C}$ 

Electrostatic sensitive device. Observe precautions for handling.



### **Thermal Resistance**

Parameters	Symbol	Value	Unit
Junction ambient	R <sub>thJA</sub>	50 <sup>(1)</sup>	K/W

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

# **Recommended Operating Conditions**

Parameters	Symbol	Value	Unit
Supply voltage	V <sub>VCCS</sub>	4.5 to 5.5	V
High supply voltage (VCCA, VCCB, VCCC)	V <sub>VCCH</sub>	V <sub>VCCS</sub> to 9.0	V
Input current	I <sub>IR</sub>	< 2	mA
Output voltage range	V <sub>PDOUT</sub>	0.8 to (V <sub>VCCS</sub> - 1.8)	V
External resistor to GND to set oscillator frequency	RF	> 3	kΩ
External resistor to GND to set oscillator swing	RS1, RS2, RS3	> 100	Ω
Operating temperature range	T <sub>amb</sub>	0 to +70	°C
Transimpedance resistor	R <sub>TI</sub>	1 to 50	kΩ
Total capacitance at PDIN	C <sub>PD</sub>	< 15	pF
Load resistance	R <sub>Load</sub>	> 5	kΩ
Load capacitance	C <sub>Load</sub>	< 30	pF
Reference voltage	V <sub>REF</sub>	1.6 to 3.0	V

## **Ordering Information**

Extended Type Number	Package	Remarks
ATR0885-PFQW	Green QFN24 (4 mm × 4 mm)	Taped and reeled

## **Package Information**

Package: QFN 24 - 4 x 4 Exposed pad 2.6 x 2.6

(acc. JEDEC OUTLINE No. MO - 220)

Dimensions in mm

 $0.9 \pm 0.1$ □ 4 Not indicated tolerances ±0.05 +0 0.05-0.05 □ 2.6 24 ψυυυυ 0 according to DIN 6 specifications 12 0.5 nom. □ 2.5 Drawing-No.: 6.543-5101.02-4

Issue: 1; 03.06.05

# **Revision History**

Please note that the following page numbers referred to in this section refer to the specific revision mentioned, not to this document.

Revision No.	History
4923CC-DVD-02/08	Put datasheet in a new template
492300-040-02/00	Pin Description table (page 3): Function of Pin 2 and 3 changed



#### Headquarters

Atmel Corporation

2325 Orchard Parkway San Jose, CA 95131 USA

Tel: 1(408) 441-0311 Fax: 1(408) 487-2600

#### International

Atmel Asia

Room 1219 Chinachem Golden Plaza 77 Mody Road Tsimshatsui East Kowloon Hong Kong

Tel: (852) 2721-9778 Fax: (852) 2722-1369 Atmel Europe

France

Le Krebs 8, Rue Jean-Pierre Timbaud BP 309 78054 Saint-Quentin-en-Yvelines Cedex

Tel: (33) 1-30-60-70-00 Fax: (33) 1-30-60-71-11 Atmel Japan

9F, Tonetsu Shinkawa Bldg. 1-24-8 Shinkawa Chuo-ku, Tokyo 104-0033 Japan

Tel: (81) 3-3523-3551 Fax: (81) 3-3523-7581

#### **Product Contact**

Web Site

www.atmel.com

**Technical Support** 

Sales Contact

dvd\_ldd@atmel.com www.atmel.com/contacts

Literature Requests

www.atmel.com/literature

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