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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 mA_{pp}*
- *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 ($\lambda = 780 \text{ nm}$), DVDs ($\lambda = 650 \text{ nm}$), and HD-DVDs/Blu-ray ($\lambda = 405 \text{ nm}$). 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 be 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

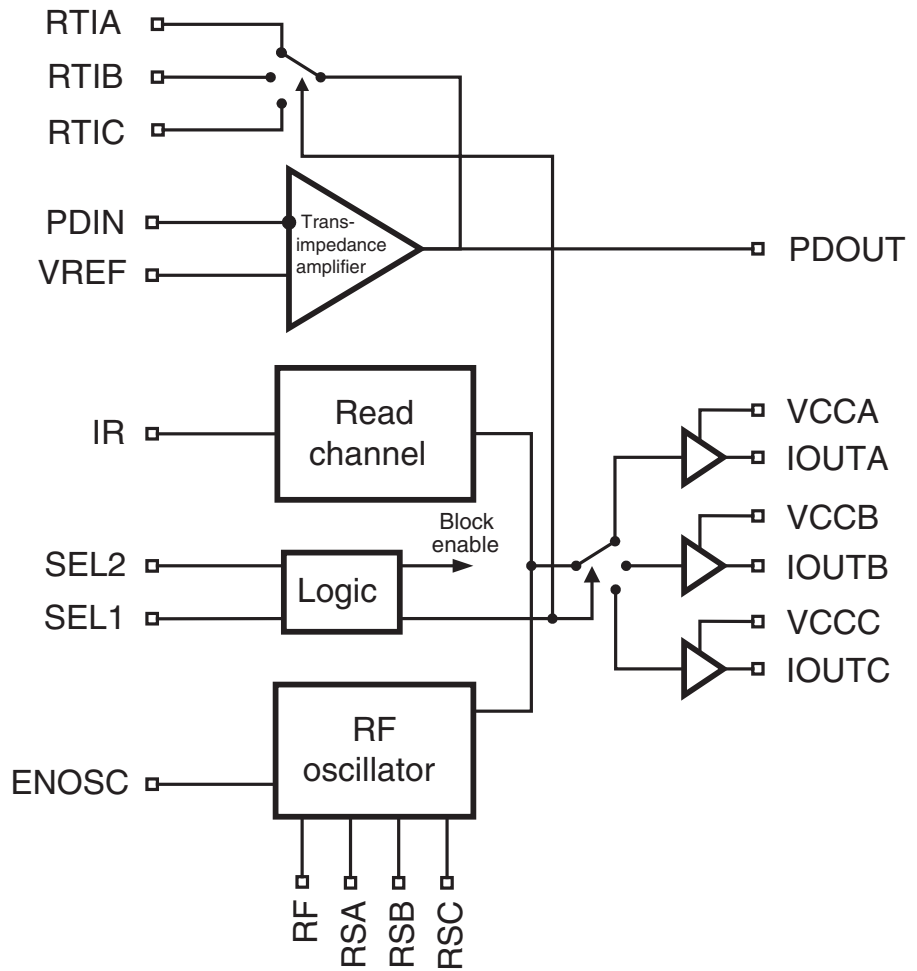
Summary

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

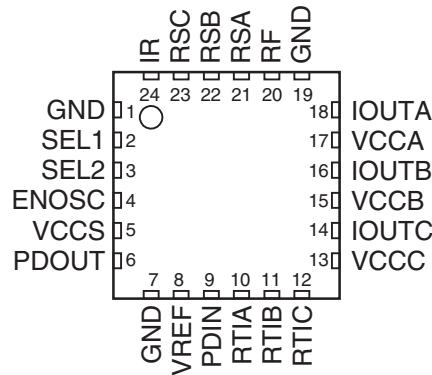


Table 2-1. Pin Description

| Pin | Symbol | Type | 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 | - |

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 | Pin | Symbol | Value | Unit |
|---|------|-----------------|--|------|
| Supply voltage | | V_{VCCS} | -0.5 to +6.0 | V |
| Supply voltage output stages (VCCA, VCCB, VCCC) | | V_{VCCCH} | -0.5 to +9.5 | V |
| Input voltage | | V_{PDIN} | -0.5 to $V_{CC}+0.5$ | V |
| Differential voltage | 8, 9 | $V_{diff_8,9}$ | 10.5I | V |
| Power dissipation | | P_{max} | 0.7 ⁽¹⁾ to 1 ⁽²⁾ | W |
| Output voltage | | V_{out} | -0.5 to $V_{cch}-1$ | V |
| Junction temperature | | T_j | 150 | °C |
| Storage temperature | | T_{stg} | -65 to +125 | °C |

- Notes: 1. $R_{thJA} \leq 115$ K/W at $T_{amb} = 70^\circ\text{C}$
 2. $R_{thJA} \leq 115$ K/W at $T_{amb} = 25^\circ\text{C}$

Electrostatic sensitive device.
 Observe precautions for handling.



4. Thermal Resistance

| Parameters | Symbol | Value | Unit |
|------------------|------------|-------------------|------|
| Junction ambient | R_{thJA} | 50 ⁽¹⁾ | K/W |

- Note: 1. Measured with multi-layer test board (JDEC standard)

5. Recommended Operating Conditions

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

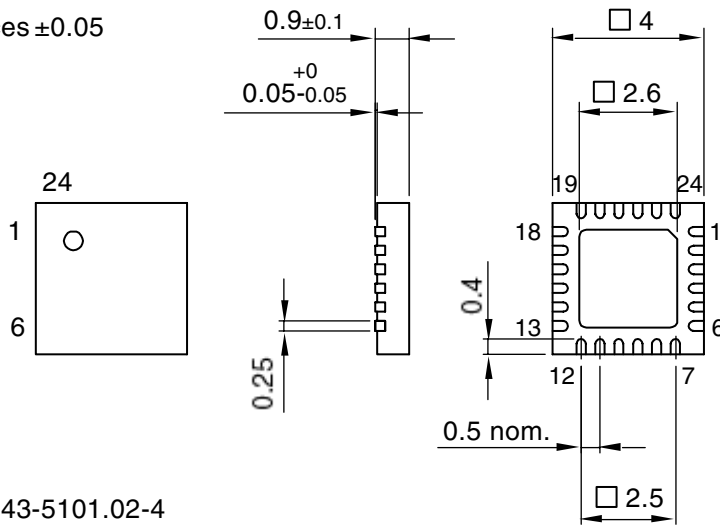
6. Ordering Information

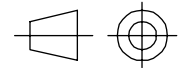
| <i>Extended Type Number</i> | <i>Package</i> | <i>Remarks</i> |
|-----------------------------|---------------------------|------------------|
| ATR0885-PFQW | Green QFN24 (4 mm × 4 mm) | Taped and reeled |

7. Package Information

Package: QFN 24 - 4 x 4
 Exposed pad 2.6 x 2.6
 (acc. JEDEC OUTLINE No. MO - 220)
 Dimensions in mm

Not indicated tolerances ±0.05




 technical drawings
 according to DIN
 specifications

Drawing-No.: 6.543-5101.02-4
 Issue: 1; 03.06.05

8. Revision History

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

| <i>Revision No.</i> | <i>History</i> |
|---------------------|--|
| 4923CC-DVD-02/08 | <ul style="list-style-type: none"> Put datasheet in a new template Pin Description table (page 3): Function of Pin 2 and 3 changed |



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