

## Features

- 405 nm, 650 nm and 780 nm Wavelengths Supported
- Blu-ray/HD-DVD x5, CD-R/RW x52, DVD-R/RW x16
- Adjustment of Mode and Gain by Setting Internal Register via Two-wire Interface (TWI)
- 200 MHz Channel Bandwidth
- Paraphase Outputs
- Internal Reference Voltage Generation
- Fast Settling Time
- Low Offset Voltage
- Power-down Mode
- Pb-free Optical 12-pin Package

## Applications

- Blu-ray/HD-DVD
- DVD+RW with CD-RW Capability
- DVD-RW with CD-RW Capability
- DVD-RAM with CD-RW Capability
- Recordable Optical Data Storage Devices

## 1. Description

The ATR1841 is a front monitor diode (FMD) which controls the laser power of the optical pickup for Blu-ray/HD-DVD, DVD and CD drives in one IC.

With the Two-wire Interface (TWI) it is possible to fit the laser power for Blu-ray/HD-DVD, DVD and CD. Two bits are used to set the mode/gain level and 6 additional bits are used for gain trimming, within  $\pm 6$  dB. Entering sleep mode is also controlled via the TWI.

The integrated PIN diode and the high speed amplifier with low output impedance ensures stable driver performance.

All output channels are set to tri-state during sleep mode.

Due to its small package size the ATR1841 is especially suited for applications with low height requirements like SLIM and Ultra-SLIM drives.



## Front Monitor Diode for Blu-ray/HD-DVD/ DVD/CD with TWI

## ATR1841

## Summary

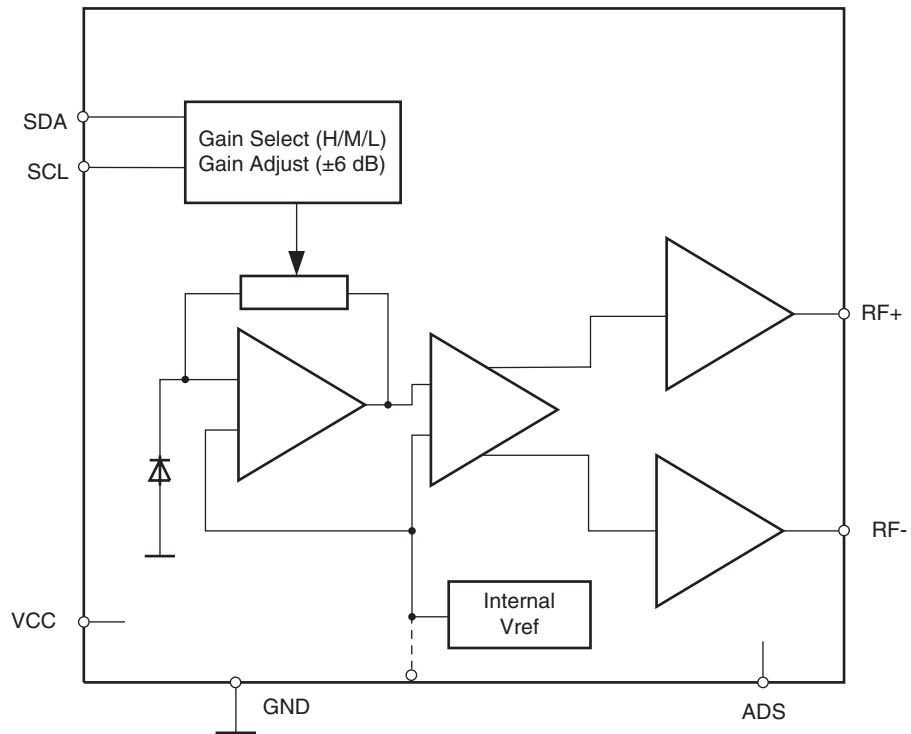
## Preliminary

**NOTE:** This is a summary document. The complete document is currently not available. For more information, please contact your local Atmel sales office.

9103AS–DVD–08/07



**Figure 1-1.** Block Diagram



## 2. Pin Configuration

Figure 2-1. Pinning QFN12L

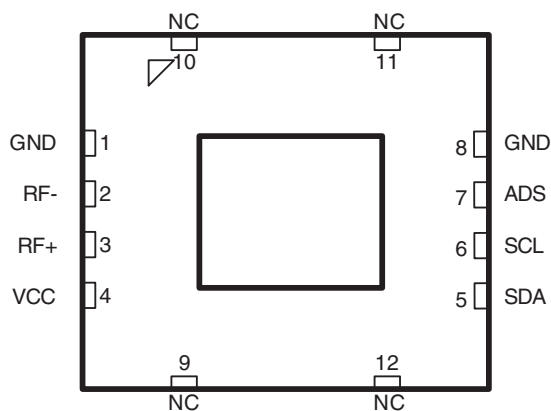


Table 2-1. Pin Description

Pin	Symbol	Type	Function
1	GND	Supply	Ground
2	RF-	Analog	Negative output
3	RF+	Analog	Positive output
4	VCC	Supply	Power supply
5	SDA	Digital	TWI serial data
6	SCL	Digital	TWI serial clock
7	ADS	Analog	TWI slave address select
8	GND	Supply	Ground
9	NC		Not connected
10	NC		Not connected
11	NC		Not connected
12	NC		Not connected

### 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
Storage temperature	$T_{stg}$	–40 to +100	°C
Soldering temperature QFN_Open package	$T_{sol}$	260	°C

### 4. Recommended Operating Conditions

Parameters	Symbol	Value	Unit
Supply voltage	$V_{CC}$	4.5 to 5.5	V
Operating temperature range	$T_{amb}$	–10 to +80	°C

### 5. Electrical Characteristics: General

$V_{CC} = 5V$ ,  $T_{amb} = 25^{\circ}C$ ,  $\lambda = 405\text{ nm}/780\text{ nm}/650\text{ nm}$

Output load:  $R_{load} = 10\text{ k}\Omega$ ,  $C_{load} = 20\text{ pF}$

No.	Parameters	Test Conditions	Pin	Symbol	Min.	Typ.	Max.	Unit	Type*
<b>1</b>	<b>DC Specifications, Power Supply</b>								
1.1	Supply current			$I_{CC}$		28	30	mA	A
1.2	Supply current (standby mode)			$I_{CC}$			0.5	mA	A
1.3	$V_{REF\_INT}$					1.65		V	A
1.4	$TCV_{REF\_INT}$					15		$\mu V/^{\circ}C$	C
1.5	Maximum output voltage			$V_{out}$	$V_{CC} - 0.9$			V	C
1.6	Minimum output voltage			$V_{out}$			0.3	V	C
1.7	Power supply rejection ratio	Low-frequency (10 kHz), inclusive application/ flexboard		PSRR		–45		dB	C
1.8	Power supply rejection ratio	High-frequency (100 kHz), inclusive application/ flexboard		PSRR		–45		dB	C
<b>2</b>	<b>Output Offset Voltage</b>								
2.1	Output offset	$V_{REF} - V_{RF+}$ , $V_{REF} - V_{RF-}$		$V_{OFF1}$	–20	0	+20	mV	C
2.2	Offset drift			$dV_{OFF}/dT$	–25		+25	$\mu V/^{\circ}C$	C

\*) Type means: A = 100% tested, B = 100% correlation tested, C = Characterized on samples, D = Design parameter

## 6. Two-wire Interface (TWI)

### 6.1 Slave Address

MSB						(ADS)	LSB
0	0	1	1	1	0	<b>0</b>	R/W = 0
0	0	1	1	1	0	<b>1</b>	R/W = 0

Pin ADS = low (GND)

Pin ADS = high ( $V_{CC}$ )

### 6.2 Data

MSB							LSB
m1	m2	g1	g2	g3	g4	g5	g6

### 6.3 Mode Setting

The first two bits select the mode/gain level.

**Table 6-1.** Mode Selection Register

m1	m2	Mode Select
1	1	High gain
1	0	Middle gain
0	1	Low gain
0	0	Sleep

### 6.4 Gain Setting

The last six bits are used to finely adjust the gain by  $\pm 6$  dB

**Table 6-2.** Gain Selection Register

g1	g2	g3	g4	g5	g6	Gain
1	1	1	1	1	1	+6 dB
...						...
1	0	0	0	0	0	0 dB
...						...
0	0	0	0	0	0	-6 dB

## 7. Applications Recommendation

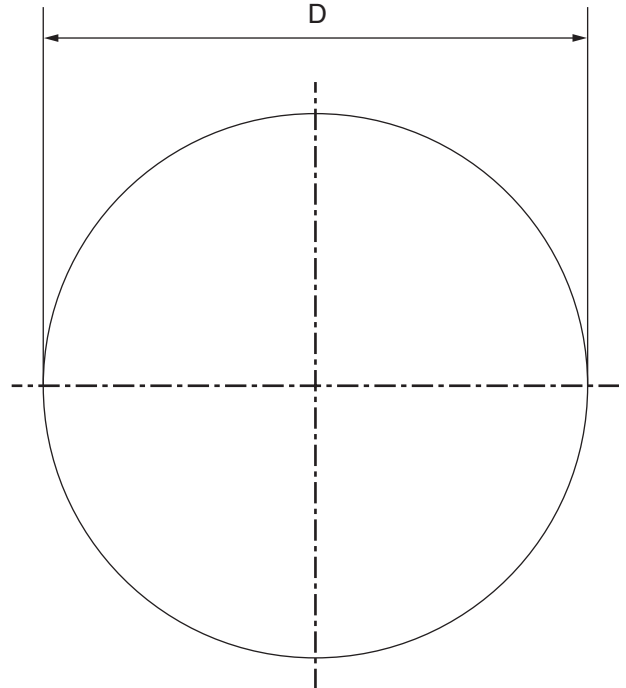
To achieve the best performance VCC needs to be blocked using a high quality capacitor ( $C = 100 \text{ nF}$ ) as close to IC/pin as possible.

## 8. Photo Diode Arrangement

**Figure 8-1.** Photo Diode Arrangement

Dimensions		
D	500.0	$\mu\text{m}$

Photo diode is symmetrically centered to the center of the chip and package



## 9. Ordering Information

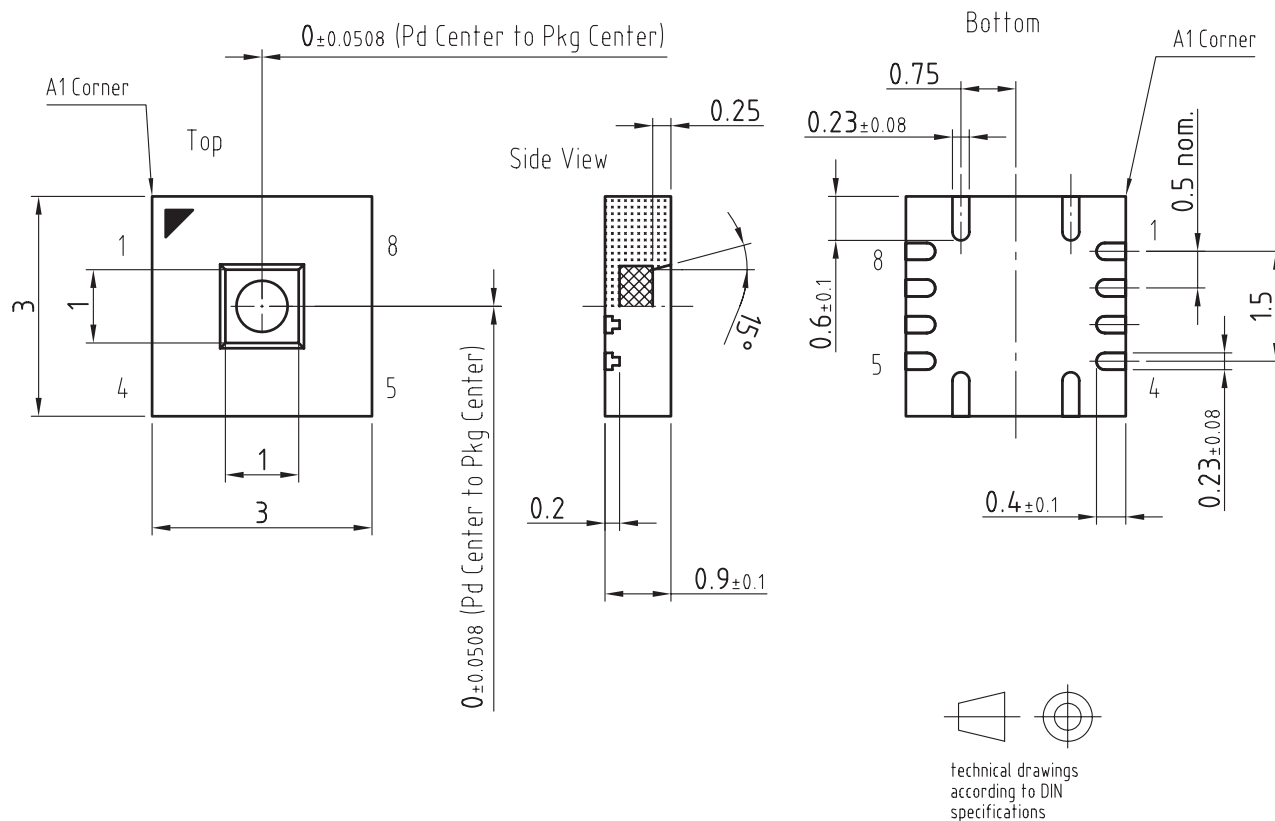
Extended Type Number	Package	Remarks
ATR1841-P1QN	QFN_OPEN_3x3_8L	Taped and reeled, Pb-free

## 10. Package Information

Package: QFN\_OPEN\_3x3\_8L\_W1x1

Dimensions in mm

Not indicated tolerances  $\pm 0.05$



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