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# TDA18204HN

Cable pre-processor and low-power silicon tuner

Rev. 2 — 12 July 2013

Product short data sheet

## 1. General description

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TDA18204HN is a cable pre-processor coupled with a low-power silicon tuner to address the front-end part of cable modems and gateways.

The cable pre-processor allows for smooth signal processing by a wideband receiver connected to its output. It inputs single ended cable signal and provides amplification, tilt compensation in the 42 MHz to 1 GHz bandwidth, low-pass filtering to reject signals above 1 GHz and provides a balanced output signal.

The low-power silicon tuner can be used for the battery-powered “emergency call” function of the Cable gateways. It provides a single channel reception using as little power as possible. The output signal of the low-power silicon tuner section is a low-IF signal, interfacing a narrowband ADC at system level.

TDA18204HN copes with all cable standards worldwide and interfaces ideally to NXP Full Spectrum Transceiver (FST) product family to make the full multi-stream RF front end of a cable receiver or cable modem in a very small form factor, while providing with no additional component the low-power path for VoIP in battery operated mode.

## 2. Features and benefits

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- RF front end for FST family of products
- Very low-Noise Figure (NF); 3.9 dB typical
- Very low-power consumption; 360 mW in wideband application
- Direct interfacing to the cable with single ended input
- Covers all cable standards worldwide
- Input frequency range up to 1 GHz
- Gain control to provide a stable output power irrespective of the input power
- Cable tilt correction to provide a flat output spectrum whatever the distance from the cable head-end to the user
- Balanced output to drive directly a high-performance ADC like the one implemented in NXP FST products
- Narrowband low-power silicon tuner
- Additional outputs for optional standalone tuners or Loop-Through (LT)



### 3. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
<b>Cable pre-processor</b>							
$V_{CC}$	supply voltage		3.13	3.3	3.47	V	
$I_{CC}$	supply current	Standby mode	-	6	-	mA	
		Standby mode with LT ON	-	52	-	mA	
		operation mode	[1]	-	109	-	mA
$f_{RF}$	RF frequency	channel edge	42	-	1002	MHz	
NF	noise figure	maximum gain; $f = 500$ MHz	-	3.9	-	dB	
$G_{V(max)}$	maximum voltage gain	$f = 500$ MHz	-	41	-	dB	
$G_{V(min)}$	minimum voltage gain		-	-17	-	dB	
$\alpha_{gtc}$	gain tilt compensation	setting 1	[2]	-	+15.5	-	dB
		setting 2	[2]	-	+10.5	-	dB
		setting 3	[2]	-	+5.5	-	dB
		setting 4	[2]	-	+3.5	-	dB
		setting 5	[2]	-	0	-	dB
		setting 6	[2]	-	-4.5	-	dB
		setting 7	[2]	-	-8	-	dB
CTB	composite triple beat	135 channels at 75 dB $\mu$ V, flat plan. worst case in frequency range	[3]	-	-60	-	dB
CSO	composite second-order distortion	135 channels at 75 dB $\mu$ V, flat plan. worst case in frequency range	[3]	-	-57	-	dB
<b>Low-power silicon tuner</b>							
$f_{RF}$	RF frequency	channel edge	42	-	1002	MHz	
$NF_{tun}$	tuner noise figure	maximum gain	-	4.3	-	dB	
$\varphi_n$	phase noise	worst case in the RF range					
		10 kHz	-	-90	-	dBc/Hz	
		100 kHz	-	-100	-	dBc/Hz	
P	power dissipation		-	560	-	mW	
$\alpha_{image}$	image rejection		-	62	-	dB	

[1] Without GPO and LTO.

[2] A positive tilt correction (for instance: +15 dB) means that the Tilt EQ compensates for a low-pass effect on the cable. A negative tilt correction means that the Tilt EQ compensates for a high-pass effect on the cable.  $\alpha_{gtc}$  value is normalized with setting 5 as a reference.

[3] NTSC 135 frequency plan.

### 4. Ordering information

Table 2. Ordering information

Type number	Package		
	Name	Description	Version
TDA18204HN/C1	HVQFN36	plastic thermal enhanced very thin quad flat package; no leads; 36 terminals; body 6 × 6 × 0.85 mm	SOT1092-3

### 5. Block diagram

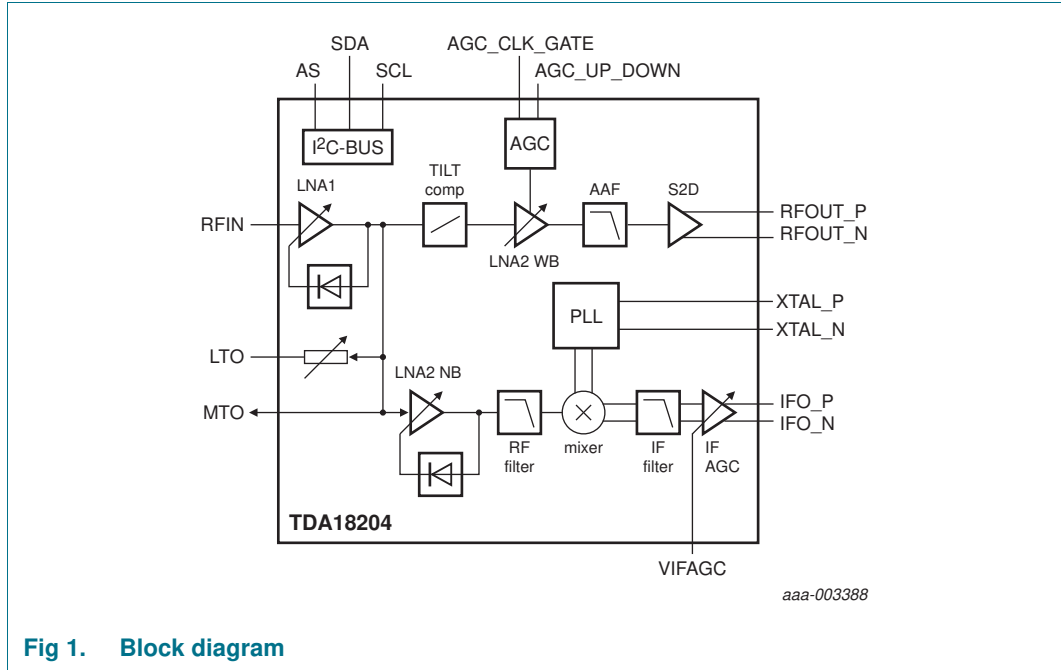


Fig 1. Block diagram

### 6. Limiting values

Table 3. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit	
V <sub>CC</sub>	supply voltage		-0.3	+3.6	V	
V <sub>I</sub>	input voltage	V <sub>CC</sub> < 3.3 V	-0.3	V <sub>CC</sub> + 0.3	V	
		V <sub>CC</sub> > 3.3 V	-0.3	+3.6	V	
T <sub>stg</sub>	storage temperature		-40	+150	°C	
T <sub>j</sub>	junction temperature		-	150	°C	
V <sub>ESD</sub>	electrostatic discharge voltage	EIA/JESD22-A114 (HBM)	[1]	-2	+2	kV
		EIA/JESD22-C101-C (FCDM)	[2]	0.75	-	kV

[1] It withstands class 3A of JEDEC standard.

[2] It withstands class IV of JEDEC standard.

### 7. Abbreviations

Table 4. Abbreviations

Acronym	Description
AAF	Anti Aliasing Filter
ADC	Analog-to-Digital Converter
AGC	Automatic Gain Control



**Table 4.** Abbreviations ...continued

Acronym	Description
CTRL	ConTRoLer
Det	Detector
DOCSIS	Data Over Cable Service Interface Specification
FCDM	Field-induced Charged Device Model
FST	Full Spectrum Transceiver
GPO	General-Purpose Output
HBM	Human Body Model
IC	Integrated Circuit
LNA	Low Noise Amplifier
LT	Loop-Through
LTO	Loop-Through Output
MTO	Multi-Tuners Output
NB	Narrow Band
NF	Noise Figure
PCB	Printed-Circuit Board
RF	Radio Frequency
S2D	Single-to-Differential
SCL	Serial CLock
SDA	Serial Data
STB	Set-Top Box
TiltEQ	Tilt Equalizer
TOP	Take-Over Point
VoIP	Voice over IP
WB	Wide Band

## 8. Revision history

**Table 5.** Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
TDA18204HN_SDS v.2 <sup>[1]</sup>	20130712	Product short data sheet	-	-

[1] Revision 1 is not available.

## 9. Legal information

### 9.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
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