



TDA18204HN

Cable pre-processor and low-power silicon tuner

Rev. 2 — 12 July 2013

Product short data sheet

1. General description

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

- 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
Cable pre-processor						
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
α_{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 μ V, flat plan. worst case in frequency range	[3] -	-60	-	dB
CSO	composite second-order distortion	135 channels at 75 dB μ V, flat plan. worst case in frequency range	[3] -	-57	-	dB
Low-power silicon tuner						
f_{RF}	RF frequency	channel edge	42	-	1002	MHz
NF _{tun}	tuner noise figure	maximum gain	-	4.3	-	dB
φ_n	phase noise	worst case in the RF range				
		10 kHz	-	-90	-	dBc/Hz
		100 kHz	-	-100	-	dBc/Hz
P	power dissipation		-	560	-	mW
α_{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. α_{gtc} value is normalized with setting 5 as a reference.

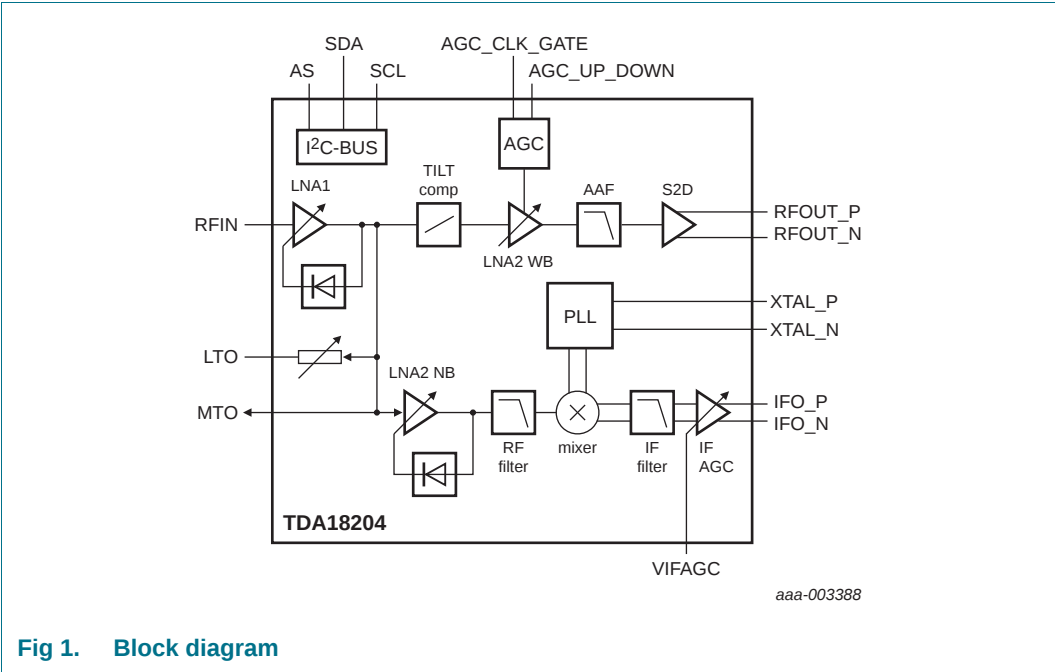
[3] NTSC 135 frequency plan.

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



6. Limiting values

Table 3. Limiting values
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V _{CC}	supply voltage		−0.3	+3.6	V
V _I	input voltage	V _{CC} < 3.3 V	−0.3	V _{CC} + 0.3	V
		V _{CC} > 3.3 V	−0.3	+3.6	V
T _{stg}	storage temperature		−40	+150	°C
T _j	junction temperature		-	150	°C
V _{ESD}	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 ^[1]	20130712	Product short data sheet	-	-

[1] Revision 1 is not available.

9. Legal information

9.1 Data sheet status

Document status ^{[1][2]}	Product status ^[3]	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.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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