Ordering number : ENA2293

LA8153QA

Monolithic Linear IC

Down Converter IC for Digital CATV

ON Semiconductor®

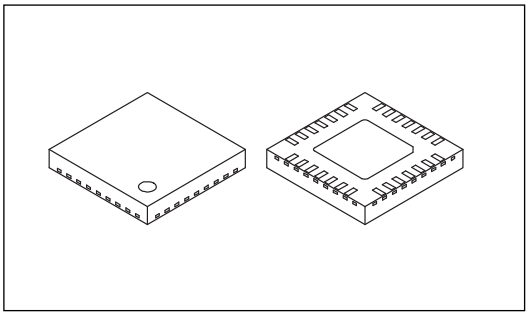
http://onsemi.com

Overview

The LA8153QA is a down converter IC for digital CATV. It accepts RF input frequencies 50MHz to 150MHz. It has the power save function.

Functions

- RF Mixer
- RF AGC amplifier
- Driver for SAW filter
- IF AGC amplifier
- IF Post amplifier for ADC
- Power save



VQFN28U

Application

- Digital Cable Set Top Boxes
- HDTV Receivers

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max	Pins 3, 6, 17, 18, 27, 28	3.6	V
Circuit voltage	V max	Pin 11	V_{CC}	V
Allowable power dissipation	Pd max	Ta ≤ 70°C, Mounted on a specified board. *	750	mW
Operating temperature	Topr		-20 to +70	°C
Storage temperature	Tstg		-55 to +150	°C

* Specified board: 40mm × 50mm × 0.8mm, FR4, 4 layer, without soldering the Exposed Die Pad to PCB.

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Recommended Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended Supply Voltage	V_{CC}	Pins 3, 6, 17, 18, 27, 28	3.3	V
Operating Supply Voltage Range	V_{CC} op	Pins 3, 6, 17, 18, 27, 28	3.2 to 3.4	V

ORDERING INFORMATION

See detailed ordering and shipping information on page 7 of this data sheet.

February, 2014

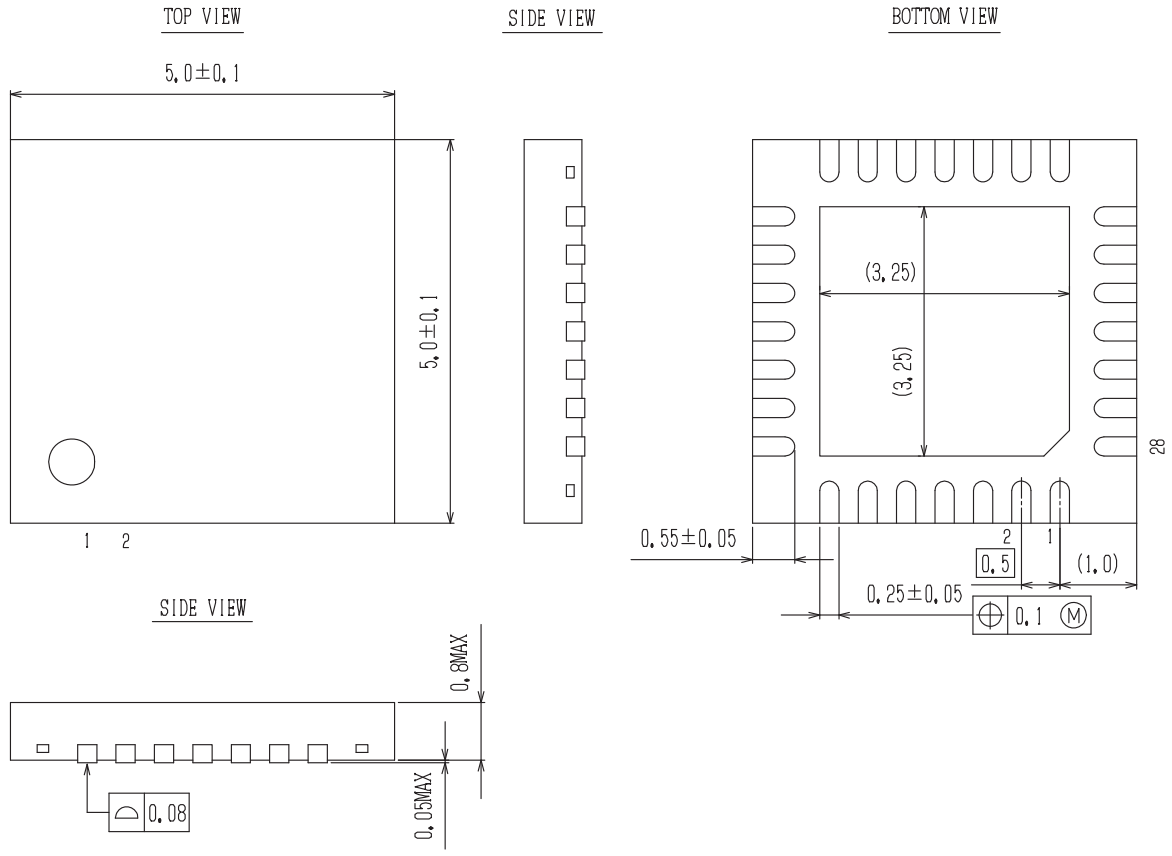
Electrical Characteristics at Ta = 25°C, V_{CC} = 3.3V

Parameter	Symbol	Pin No.	Conditions	Ratings			Unit
				min	typ	max	
Circuit Current	Itotal	3, 6, 17, 18, 27, 28	No Signal	77	100	130	mA
Power Save Current	Ips	3, 6, 17, 18, 27, 28	No Signal	17	23	32	mA
RF Input Frequency Range	$f_{(RF)}$	8, 9	fc = -3dB	50		150	MHz
RF AGC Range	GR1	27, 28	V11=2.5 to 0V	40	48		dB
Mixer Conversion Gain	CG1	27 / 8 28 / 8	V11=2.5V	23	26	29	dB
Mixer Inter Modulation 1	IM3 (1)	27 / 8 28 / 8	Input=70dBμV V11=2.5V	40	50		dB
IF Input Frequency Range	$f_{(IF)}$	23, 24	fc = -3dB	30		100	MHz
IF Amplifier Gain	$G_{(AGC)}$	19 / 23, 24 20 / 23, 24	V11=2.5V	50	54	58	dB
IF Inter Modulation 2	IM3(2)	19 / 23, 24 20 / 23, 24	Output=105dBμV (99dBμV / tone)	50	60		dB
IF AGC Range	GR2	19, 20	IF Output Level < ±1dB	3	5		dB
IF AGC Output Level	$V_O(IF)1$	19	Single output		0.5		Vp-p
IF AGC Output Level	$V_O(IF)2$	20	Single output		0.5		Vp-p

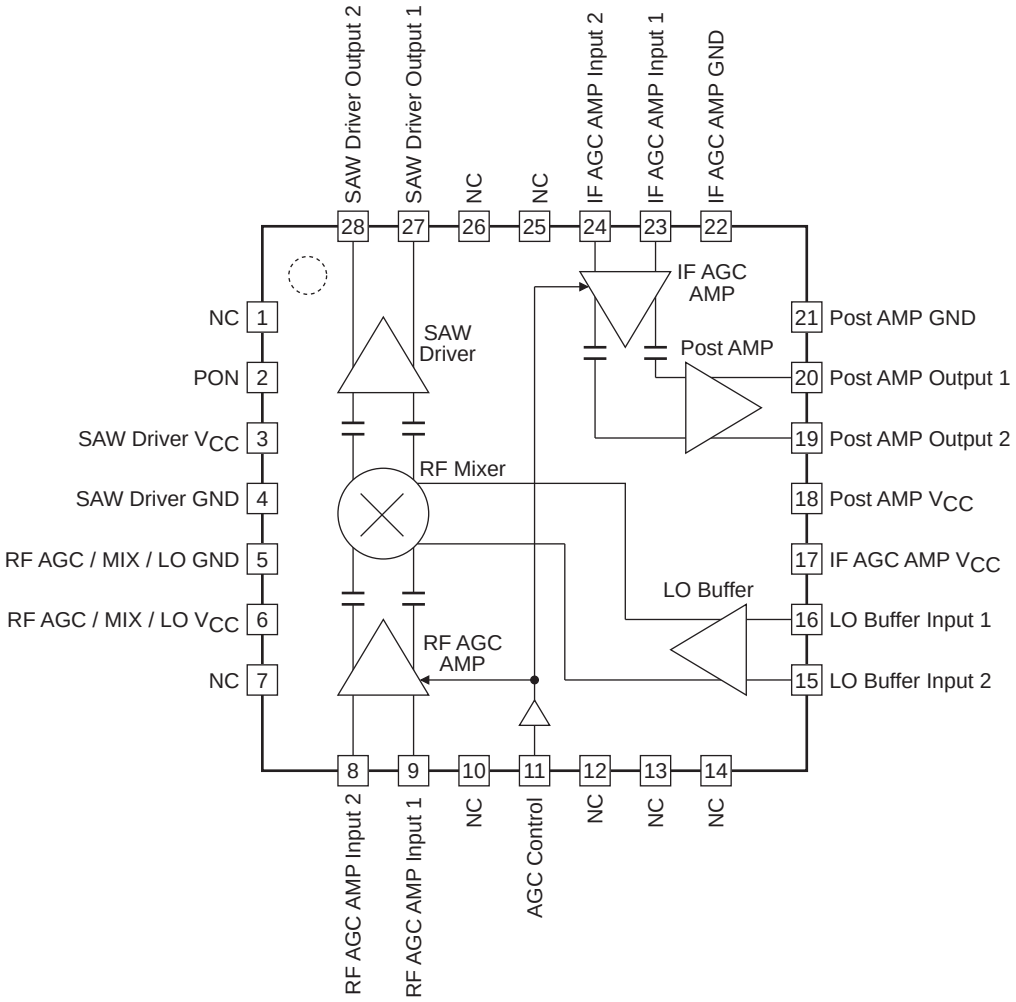
Package Dimensions

unit : mm

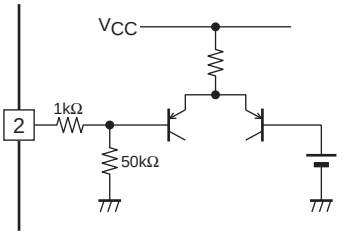
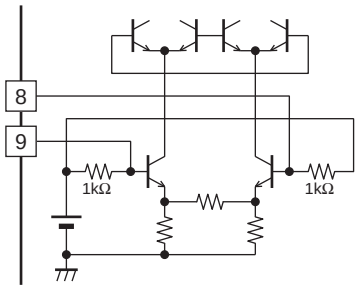
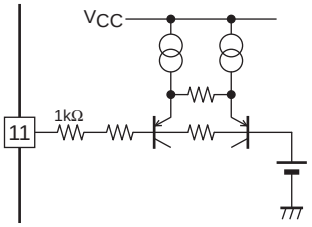
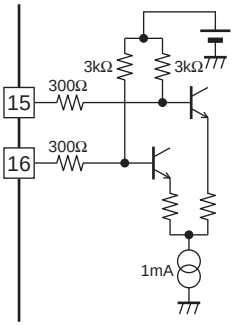
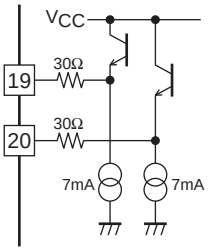
VQFN28 5x5, 0.5P / VQFN28U
CASE 508AV
ISSUE O



Pin Assignment and Block Diagram

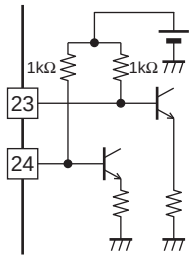
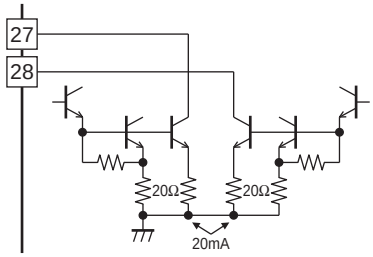


Pin Description at Ta = 25°C, V_{CC} = 3.3V

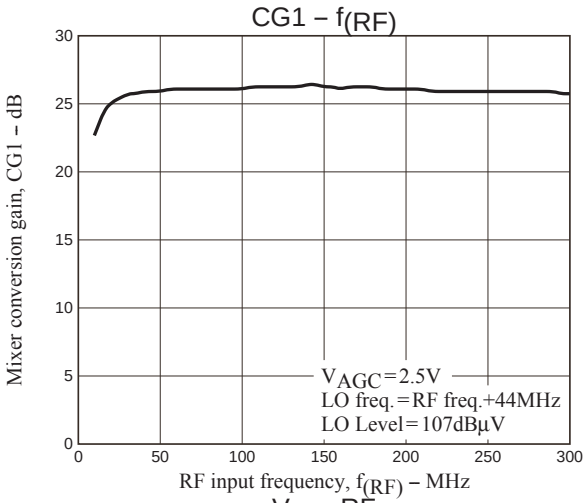
Pin No.	Pin voltage	Description	Equivalent circuit
1	–	NC (connect to GND)	
2	0.3V	PON	
3	3.3V	SAW Driver V_{CC}	
4	0V	SAW Driver GND	
5	0V	RF AGC / MIX / LO GND	
6	3.3V	RF AGC / MIX / LO V_{CC}	
7	–	NC (connect to GND)	
8 9	1.35V 1.35V	RF AGC Amplifier Input	
10	–	NC (connect to GND)	
11	–	AGC Control	
12, 13, 14	–	NC (connect to GND)	
15 16	1.6V 1.6V	LO Buffer Inputs	
17	3.3V	IF AGC Amplifier V_{CC}	
18	3.3V	Post Amplifier V_{CC}	
19 20	1.0V 1.0V	Post Amplifier Outputs	

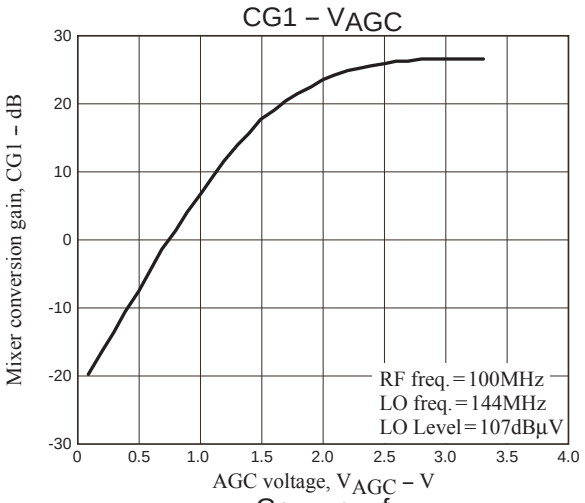
Continued on next page.

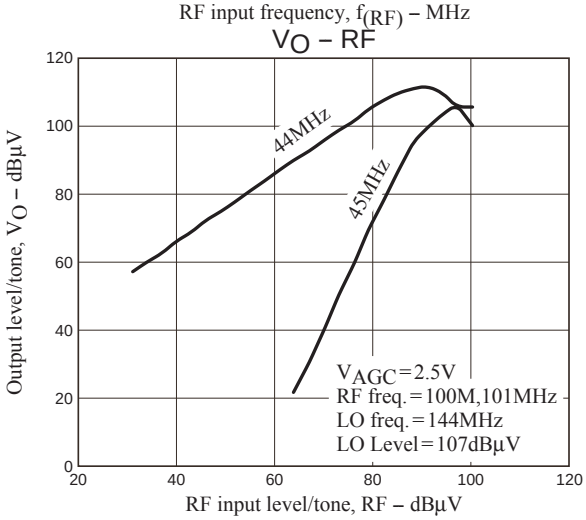
Continued from preceding page.

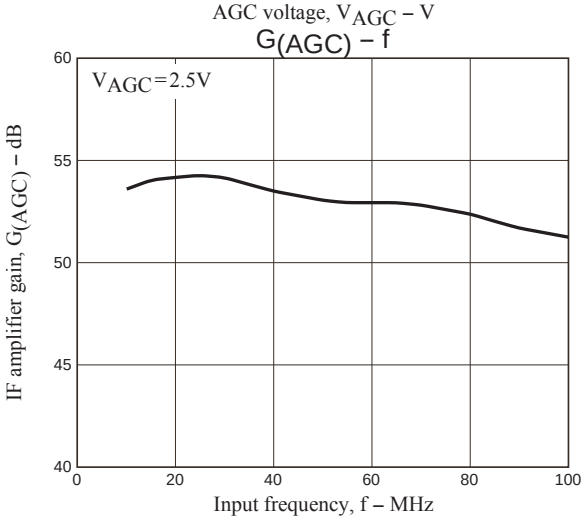
Pin No.	Pin voltage	Description	Equivalent circuit
21	0V	Post Amplifier GND	
22	0V	IF AGC Amplifier GND	
23 24	2.5V 2.5V	IF AGC Amplifier Inputs	
25, 26	–	NC (connect to GND)	
27 28	2.4V 2.4V	SAW Driver Outputs	

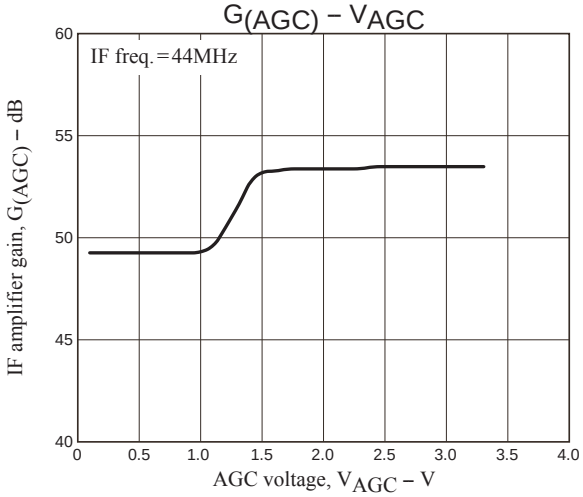
AC Characteristics at Ta = 25°C, V_{CC} = 3.3V

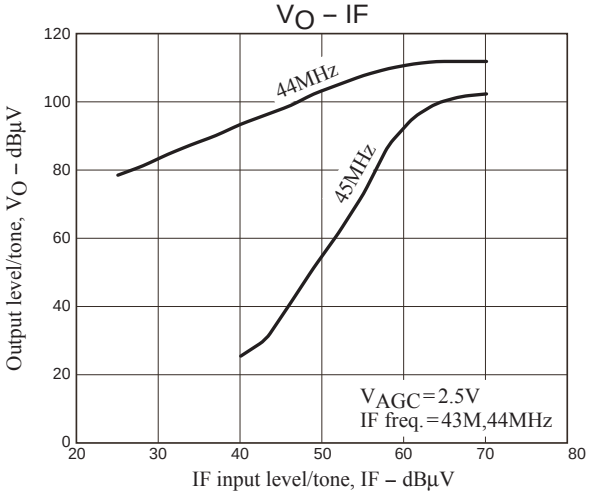




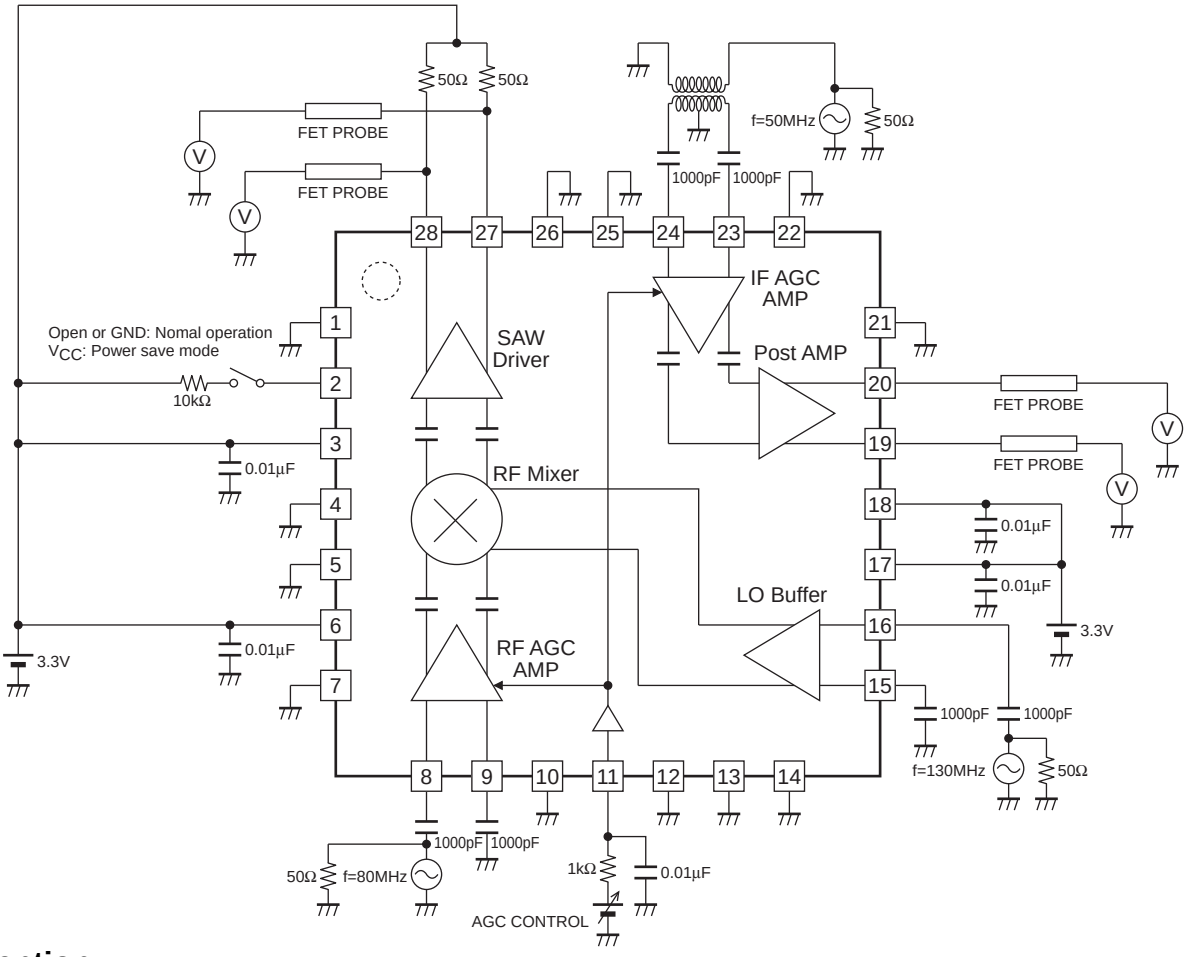








Test Circuit



Attention

Electrostatic capacity of some pins is ±100V under the condition of C = 200pF and R = 0Ω, so please handle carefully enough.

ORDERING INFORMATION

Device	Package	Shipping (Qty / Packing)
LA8153QA-WH	VQFN28 5x5, 0.5P / VQFN28U (Pb-Free / Halogen Free)	2000 / Tape & Reel