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# LA8153QA

## Monolithic Linear IC Down Converter IC for Digital CATV

### Overview

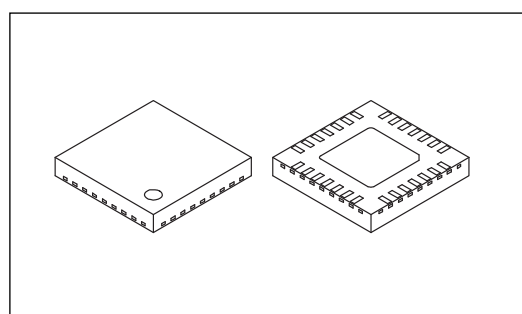
The LA8153QA is a down converter IC for digital CATV. It accepts RF input frequencies 50MHz to 150MHz. It has the power save function.

### Functions

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

### Application

- Digital Cable Set Top Boxes
- HDTV Receivers



VQFN28U

### Specifications

#### Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC \text{ max}}$	Pins 3, 6, 17, 18, 27, 28	3.6	V
Circuit voltage	V max	Pin 11	$V_{CC}$	V
Allowable power dissipation	$P_d \text{ max}$	$T_a \leq 70^\circ\text{C}$ , Mounted on a specified board. *	750	mW
Operating temperature	$T_{opr}$		-20 to +70	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

\* Specified board: 40mm  $\times$  50mm  $\times$  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 $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended Supply Voltage	$V_{CC}$	Pins 3, 6, 17, 18, 27, 28	3.3	V
Operating Supply Voltage Range	$V_{CC \text{ op}}$	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.

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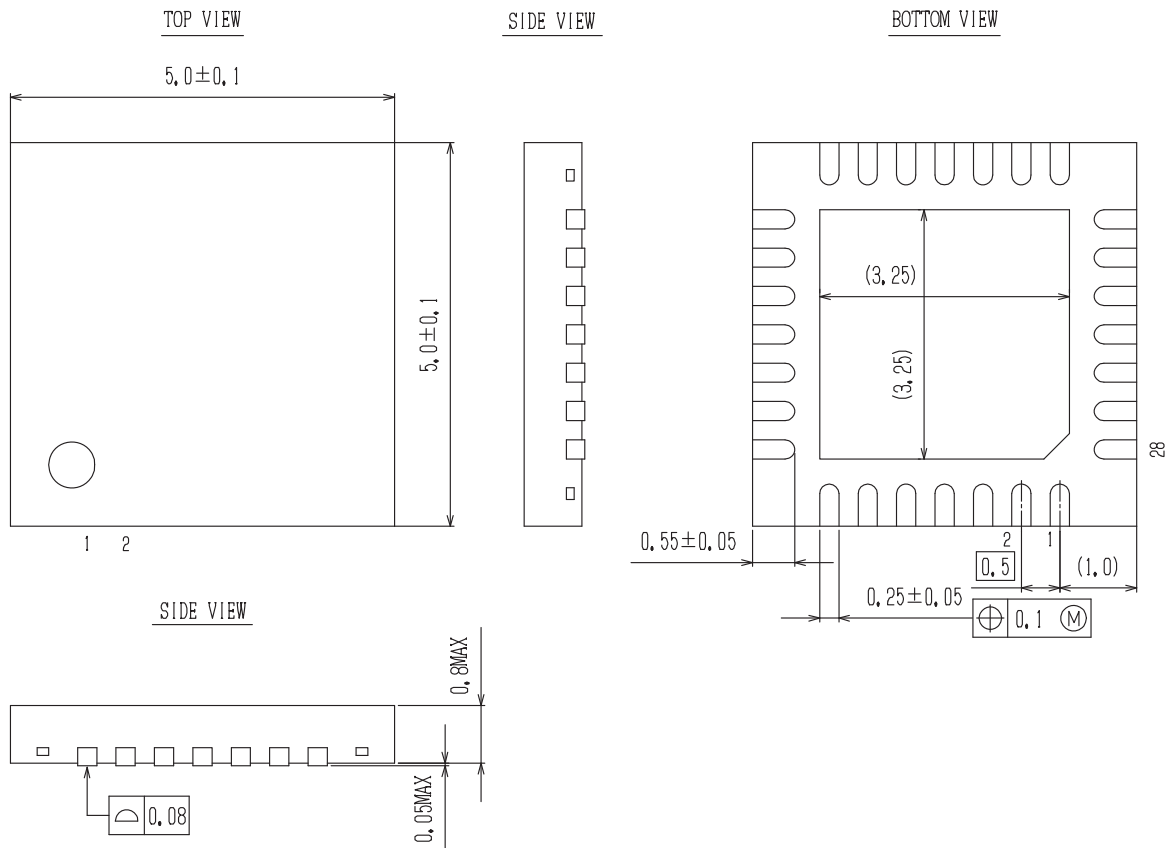
**Electrical Characteristics** at  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 3.3\text{V}$

Parameter	Symbol	Pin No.	Conditions	Ratings			Unit
				min	typ	max	
Circuit Current	$I_{total}$	3, 6, 17, 18, 27, 28	No Signal	77	100	130	mA
Power Save Current	$I_{ps}$	3, 6, 17, 18, 27, 28	No Signal	17	23	32	mA
RF Input Frequency Range	$f(\text{RF})$	8, 9	$f_c = -3\text{dB}$	50		150	MHz
RF AGC Range	GR1	27, 28	$V_{11}=2.5$ to $0\text{V}$	40	48		dB
Mixer Conversion Gain	CG1	27 / 8 28 / 8	$V_{11}=2.5\text{V}$	23	26	29	dB
Mixer Inter Modulation 1	IM3 (1)	27 / 8 28 / 8	Input= $70\text{dB}\mu\text{V}$ $V_{11}=2.5\text{V}$	40	50		dB
IF Input Frequency Range	$f(\text{IF})$	23, 24	$f_c = -3\text{dB}$	30		100	MHz
IF Amplifier Gain	G(AGC)	19 / 23, 24 20 / 23, 24	$V_{11}=2.5\text{V}$	50	54	58	dB
IF Inter Modulation 2	IM3(2)	19 / 23, 24 20 / 23, 24	Output= $105\text{dB}\mu\text{V}$ ( $99\text{dB}\mu\text{V}$ / tone)	50	60		dB
IF AGC Range	GR2	19, 20	IF Output Level $< \pm 1\text{dB}$	3	5		dB
IF AGC Output Level	$V_{O(\text{IF})1}$	19	Single output		0.5		Vp-p
IF AGC Output Level	$V_{O(\text{IF})2}$	20	Single output		0.5		Vp-p

## Package Dimensions

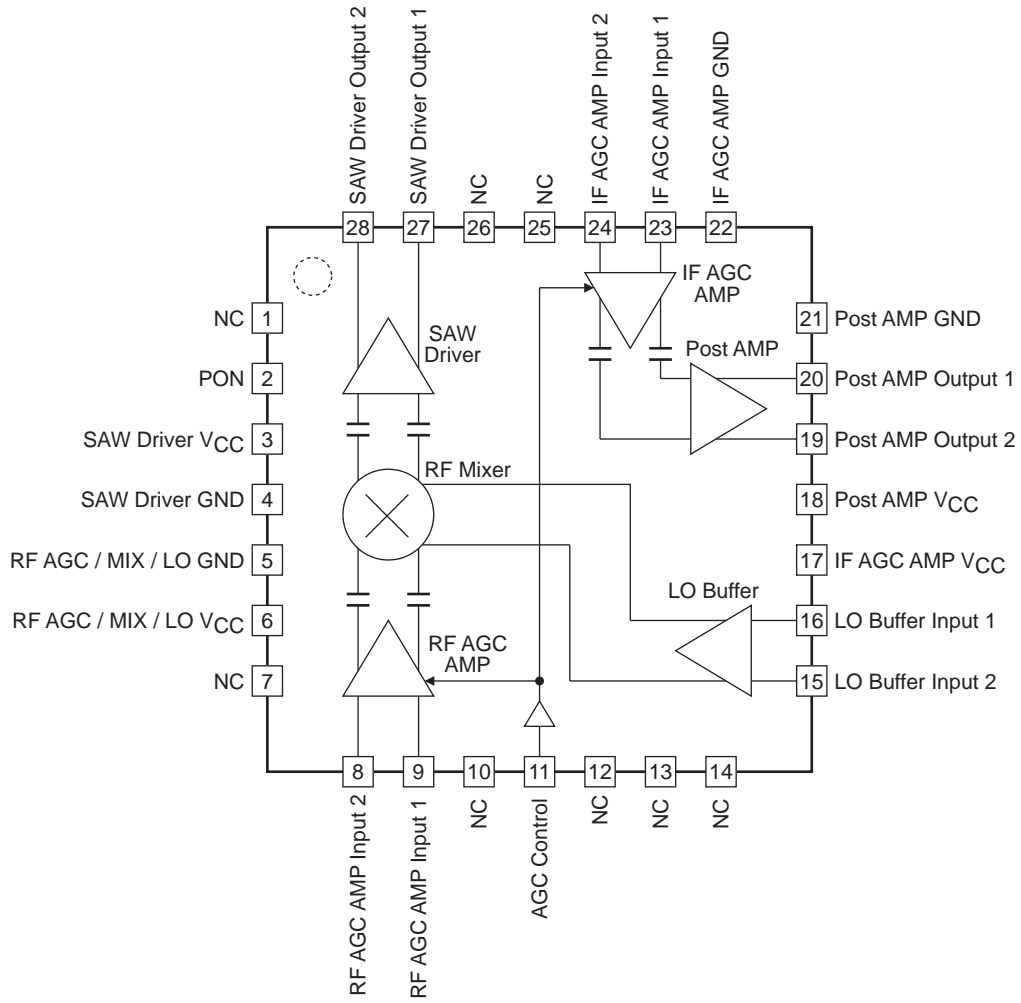
unit : mm

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



# LA8153QA

## Pin Assignment and Block Diagram



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**Pin Description** at  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 3.3\text{V}$

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	1.35V	RF AGC Amplifier Input	
9	1.35V		
10	-	NC (connect to GND)	
11	-	AGC Control	
12, 13, 14	-	NC (connect to GND)	
15	1.6V	LO Buffer Inputs	
16	1.6V		
17	3.3V	IF AGC Amplifier $V_{CC}$	
18	3.3V	Post Amplifier $V_{CC}$	
19	1.0V	Post Amplifier Outputs	
20	1.0V		

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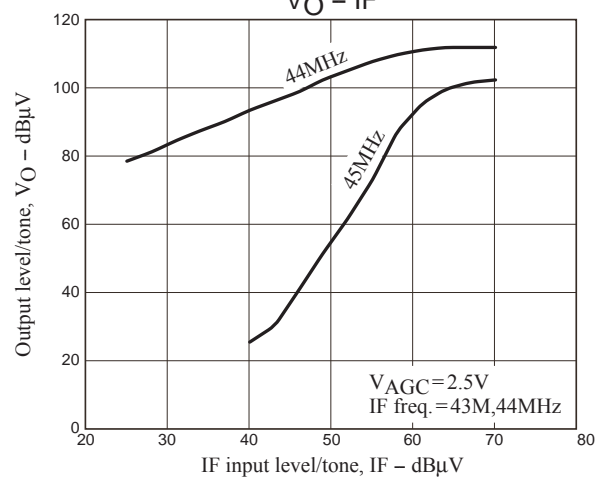
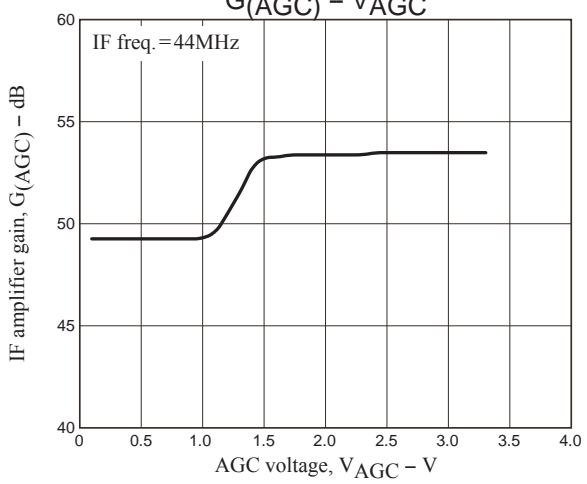
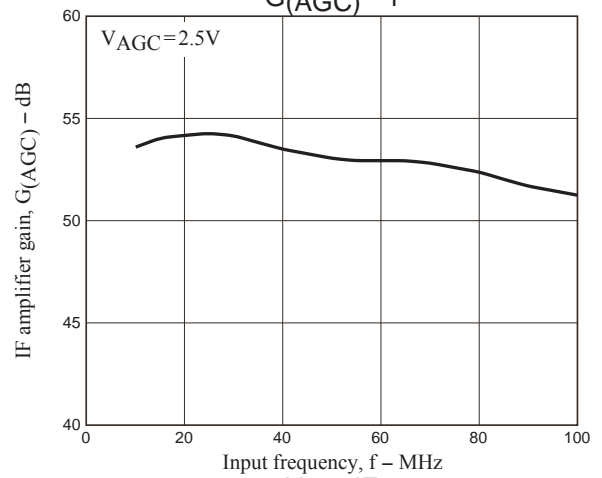
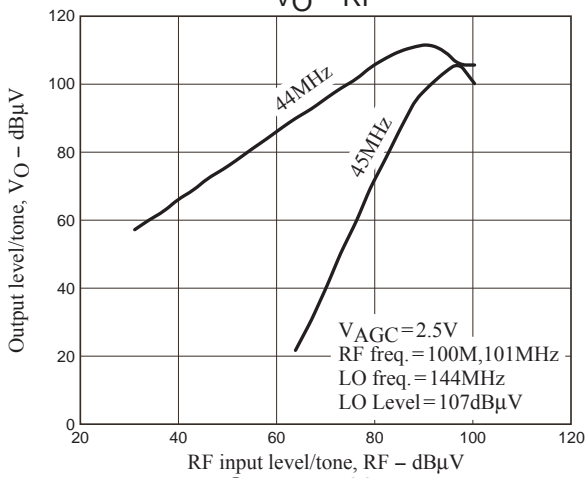
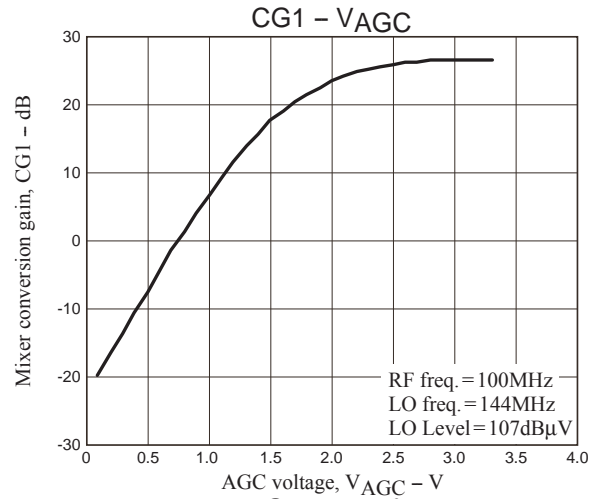
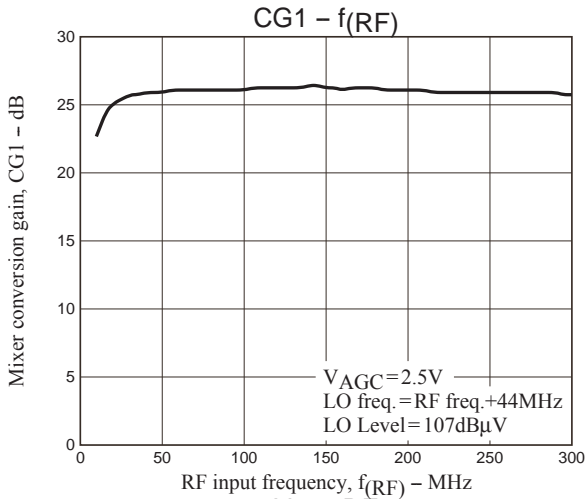
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Pin No.	Pin voltage	Description	Equivalent circuit
21	0V	Post Amplifier GND	
22	0V	IF AGC Amplifier GND	
23 24	2.5V 2.5V	IF AGC Amplifier Inputs	
25, 26	–	NC (connect to GND)	
27 28	2.4V 2.4V	SAW Driver Outputs	

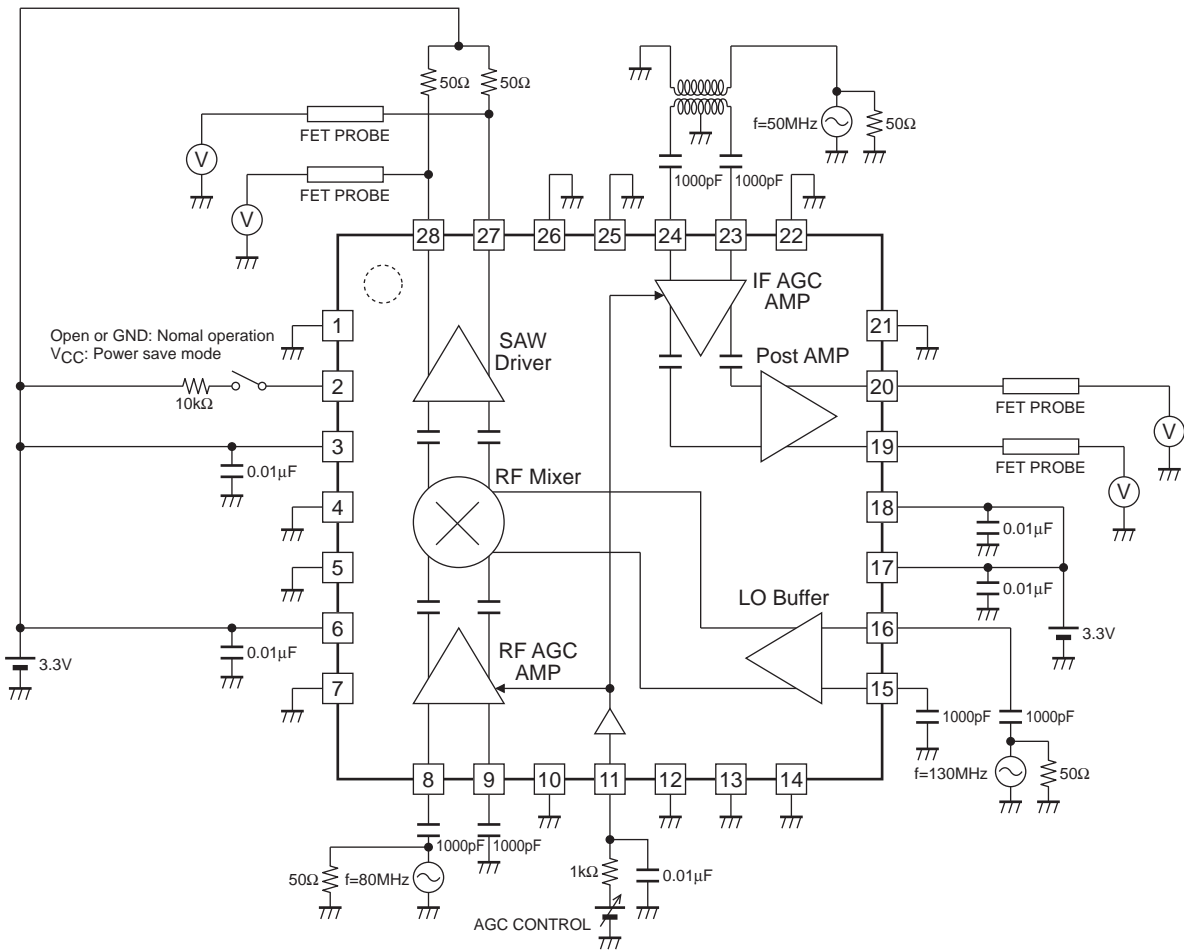
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AC Characteristics at  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 3.3\text{V}$



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## Test Circuit



## Attention

Electrostatic capacity of some pins is  $\pm 100V$  under the condition of  $C = 200pF$  and  $R = 0\Omega$ , 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

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