



SANYO Semiconductors

# DATA SHEET

## LA7784FN — Monolithic Linear IC For Digital CATV Down Converter IC

### Overview

The LA7784FN is a digital out of band tuner for CATV. It supports RF input from 50 to 280MHz and supports the DOCSIS (USA) and Euro-DOCSIS (Europe) standards.

### Functions

- RF Mixer
- RF AGC amplifier
- Driver for SAW filter
- IF AGC amplifier
- IF post amplifier for AD

### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Supply Voltage	$V_{CC}$ max	Pin 4, 12, 18, 19, 20, 21, 27, 28	6.0	V
Circuit Voltages	V max	Pin 5	$V_{CC}$	V
Circuit Current	I 10,11	Pin 10, 11 sink current	2	mA
Allowable Power Dissipation	$P_d$ max	$T_a \leq 70^\circ\text{C}$	750*	mW
Operating Temperature	$T_{opr}$		-20 to +70	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

\* On the Board 30×50×0.8mm, FR4, 4 layer.

Recommended Operating Conditions at  $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended Supply Voltage	$V_{CC}$	Pin 4, 12, 18, 19, 20, 21, 27, 28	5.0	V
Operating Supply Voltage Range	$V_{CC}$ op	Pin 4, 12, 18, 19, 20, 21, 27, 28	4.5 to 5.5	V

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**SANYO Semiconductor Co., Ltd.**

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

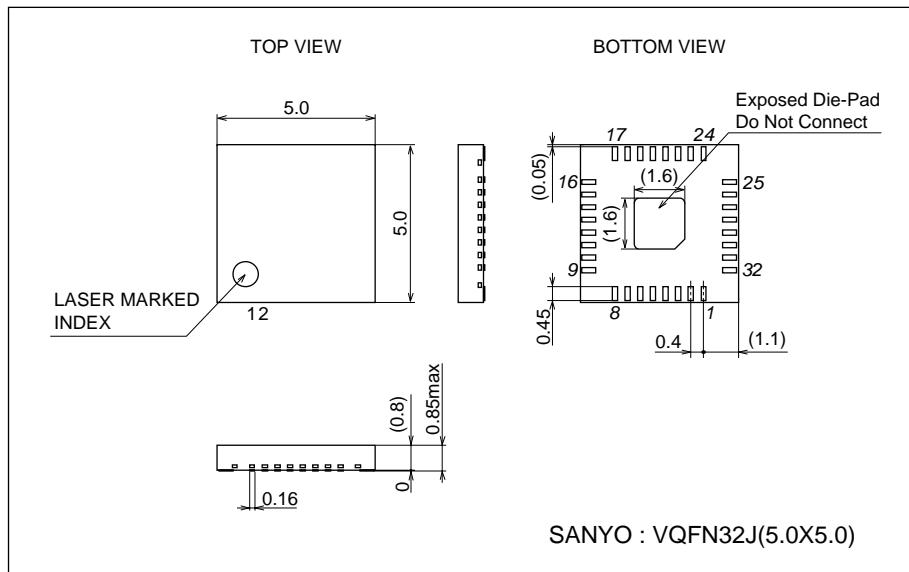
**AC Characteristics** at  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 5.0\text{V}$

Parameter	Symbol	Pin No.	Conditions	Ratings			Unit
				min	typ	max	
Circuit Current	I total	4, 12, 18, 19, 20, 21, 27, 28	No Signal	80	105	130	mA
RF Input Frequency Range	f (RF)	22, 23	$f_c : -3\text{dB}$	50		280	MHz
RF AGC Range	GR1	27, 28	$V_5 = 2.5 \text{ to } 0\text{V}$	45	53		dB
Mixer Conversion Gain	CG1	The pin 27 output for the input to pins 22 and 23. The pin 28 output for the input to pins 22 and 23.	$V_5 = 2.5\text{V}$	19	22	25	dB
Mixer Inter Modulation 1	IM3 1	The pin 27 output for the input to pins 22 and 23. The pin 28 output for the input to pins 22 and 23.	Input = $75\text{dB}\mu\text{V}$ $V_5 = 2.5\text{V}$	40	50		dB
IF Input Frequency Range	f (IF)	31, 32	$f_c : -3\text{dB}$	30		100	MHz
IF Amplifier Gain	G (AGC)	The pin 10 output for the input to pins 31 and 32. The pin 11 output for the input to pins 31 and 32.	$V_5 = 2.5\text{V}$	51	55	59	dB
IF Inter Modulation 2	IM3 2	The pin 10 output for the input to pins 31 and 32. The pin 11 output for the input to pins 31 and 32.	Output = $110\text{dB}\mu\text{V}$	40	50		dB
IF AGC Range	GR2	10, 11	IF Output Level $< \pm 1\text{dB}$	3	5		dB
IF AGC Output Level	$V_O$ (IF) 1	10	Single output		1.0		Vp-p
	$V_O$ (IF) 2	11	Single output		1.0		Vp-p

**Package Dimensions**

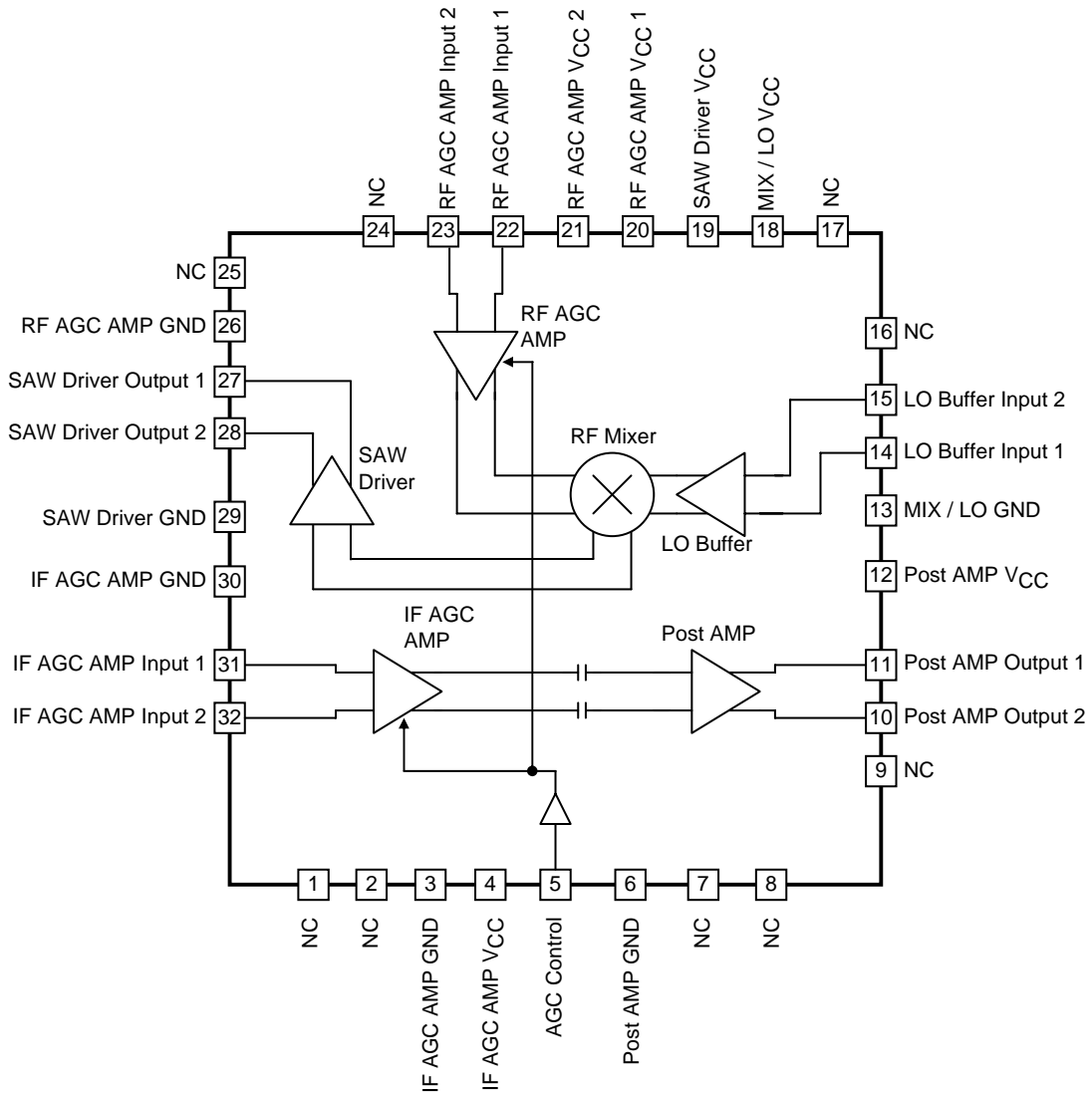
unit : mm

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## Block Diagram and Pin Assignment



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## Pin Functions

Pin number	Pin name	Equivalent circuit
1, 2	NC (Connect to GND)	
3	IF AGC AMP GND	
4	IF AGC AMP V <sub>CC</sub>	
5	AGC Control	
6	Post AMP GND	
7, 8, 9	NC (Connect to GND)	
10, 11	Post AMP Output	
12	Post AMP V <sub>CC</sub>	
13	MIX/LO GND	
14, 15	LO Buffer Input	
16, 17	NC (Connect to GND)	
18	Mixer/LO V <sub>CC</sub>	
19	SAW Driver V <sub>CC</sub>	

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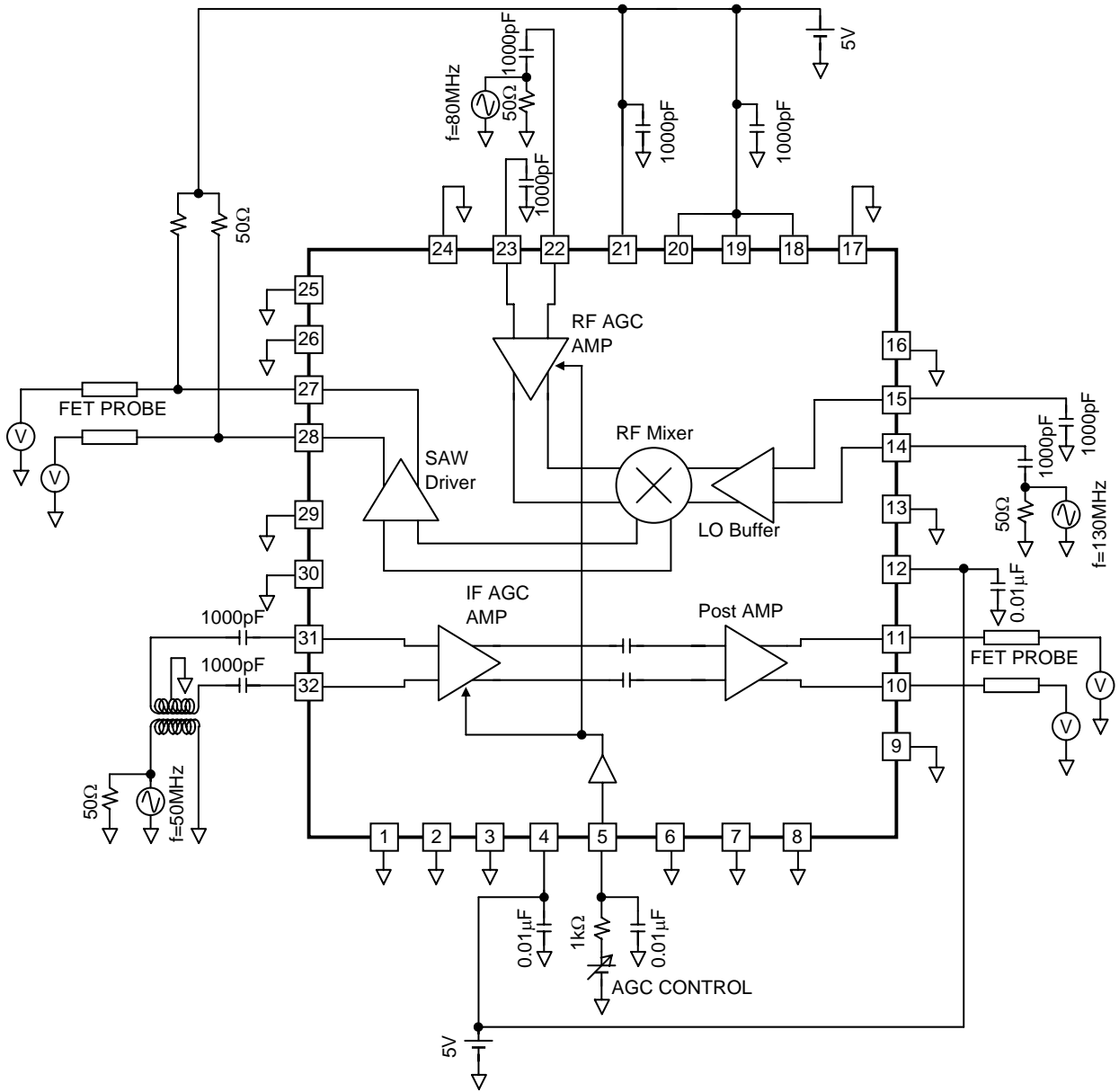
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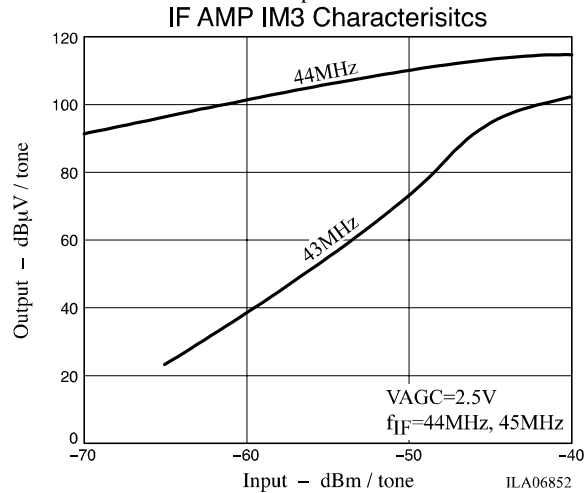
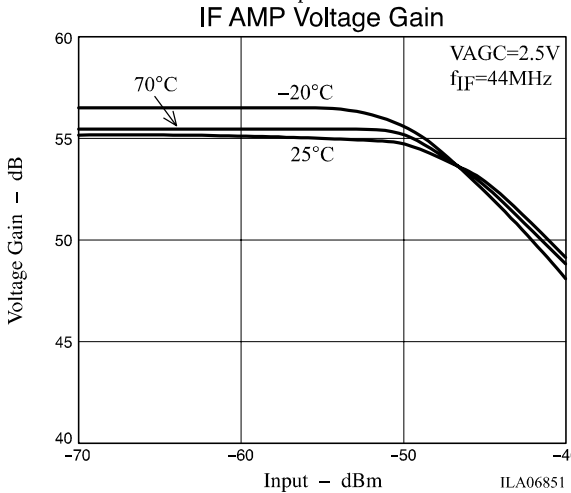
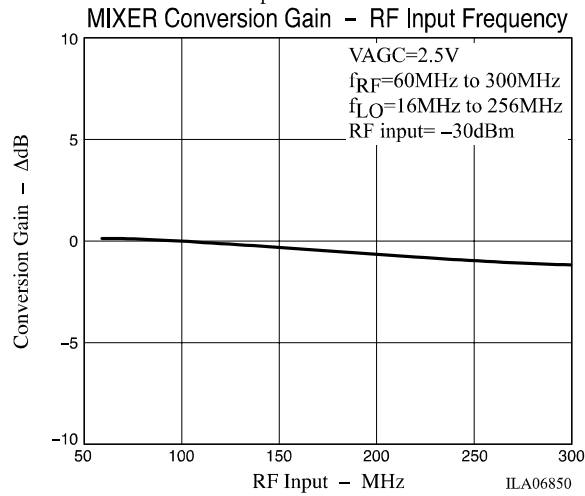
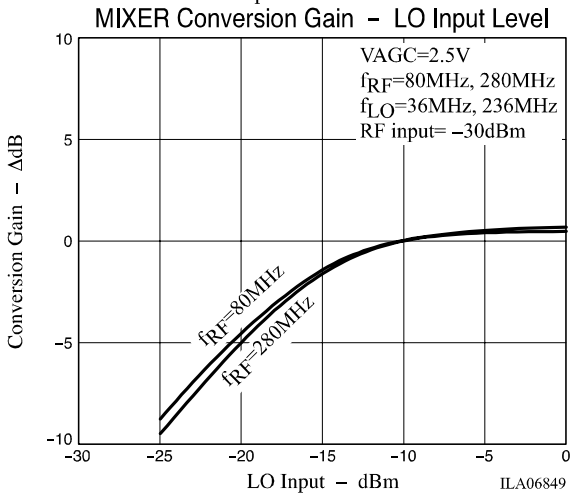
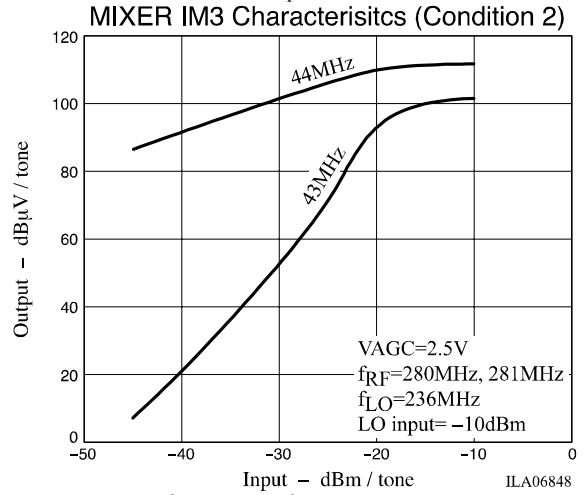
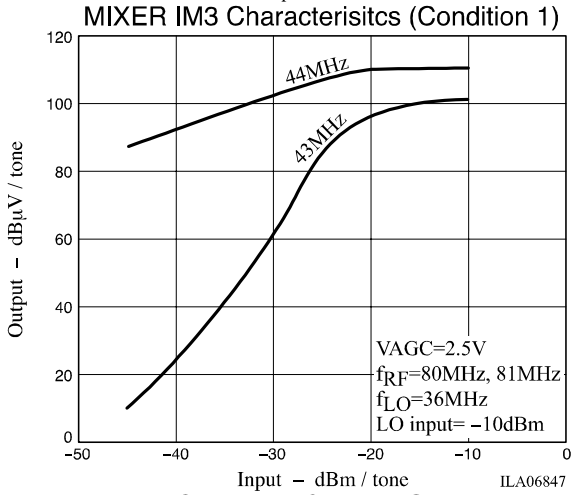
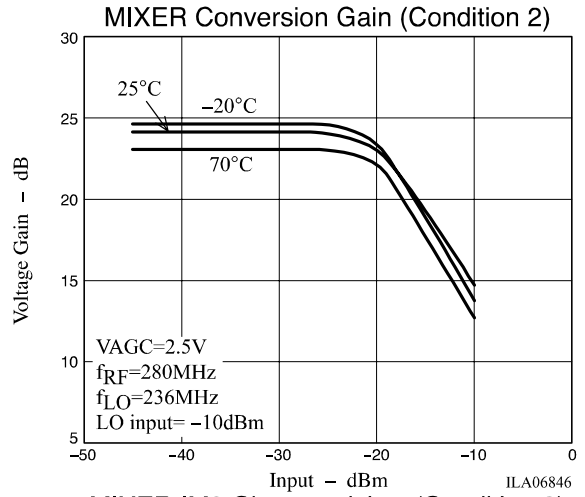
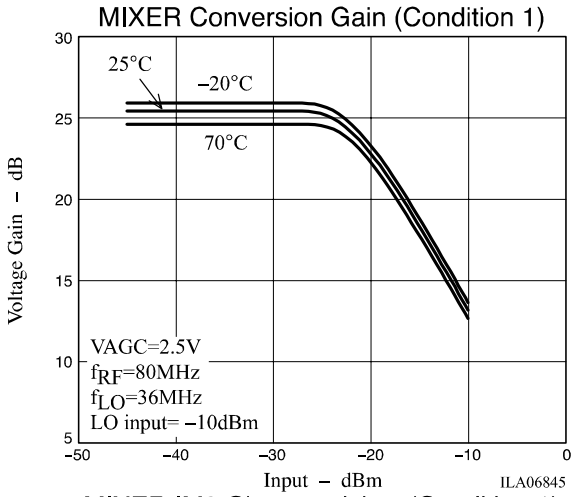
Pin number	Pin name	Equivalent circuit
20, 21	RF AGC AMP $V_{CC}$	
22, 23	RF AGC AMP Input	
24, 25	NC (Connect to GND)	
26	RF AGC AMP GND	
27, 28	SAW Driver Output	
29	SAW Driver GND	
30	IF AGC AMP GND	
31, 32	IF AGC AMP Input	

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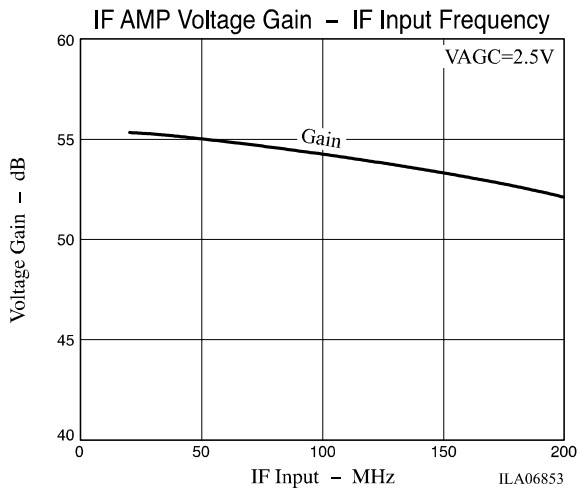
## Test Circuit



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