Ordering number : EN8094A

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 Ta = 25°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	Pd max	Ta≤70°C	750*	mW
Operating Temperature	Topr		-20 to +70	°C
Storage Temperature	Tstg		-55 to +150	°C

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

Recommended Operating Conditions at Ta = 25°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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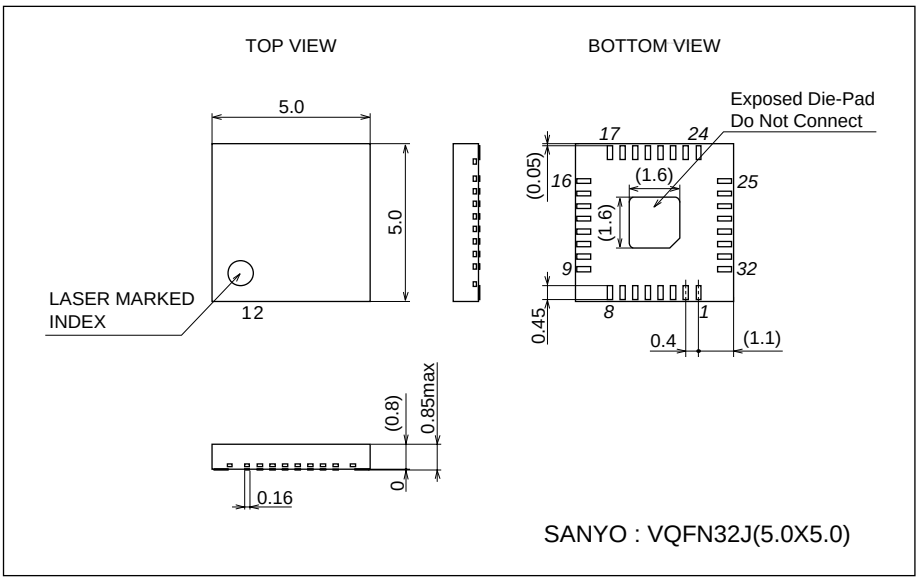
AC Characteristics at Ta = 25°C, V_{CC} = 5.0V

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	fc : -3dB	50		280	MHz
RF AGC Range	GR1	27, 28	V5 = 2.5 to 0V	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.	V5 = 2.5V	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 = 75dBμV V5 = 2.5V	40	50		dB
IF Input Frequency Range	f (IF)	31, 32	fc : -3dB	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.	V5 = 2.5V	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 = 110dBμV	40	50		dB
IF AGC Range	GR2	10, 11	IF Output Level < ±1dB	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

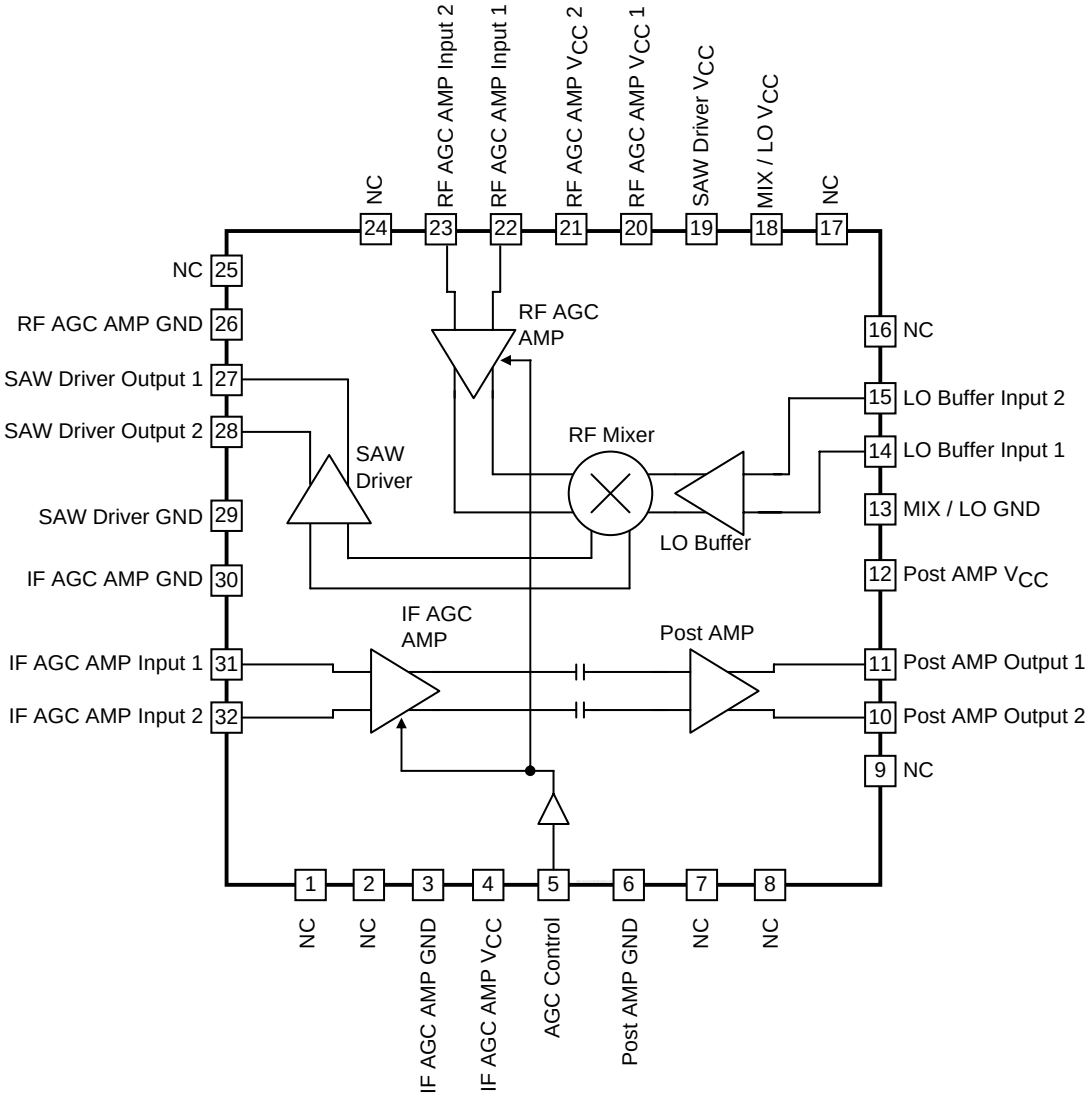
Package Dimensions

unit : mm

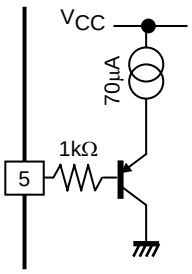
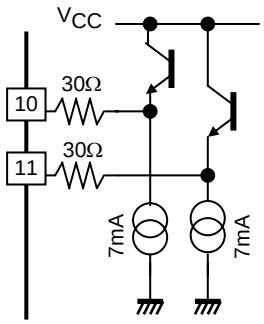
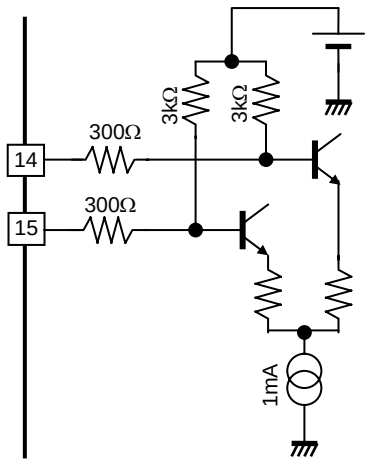
3308



Block Diagram and Pin Assignment



Pin Functions

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

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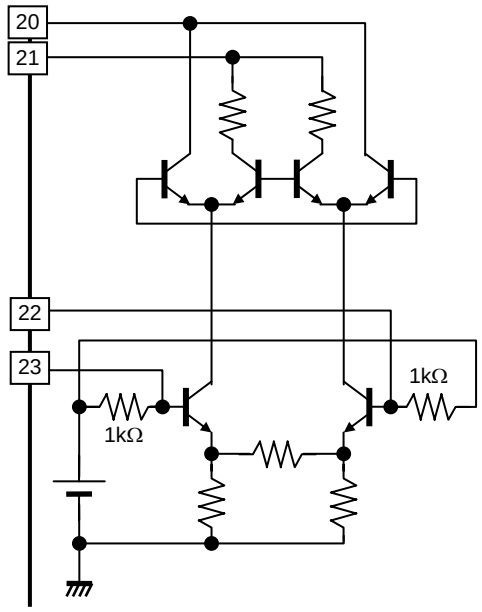
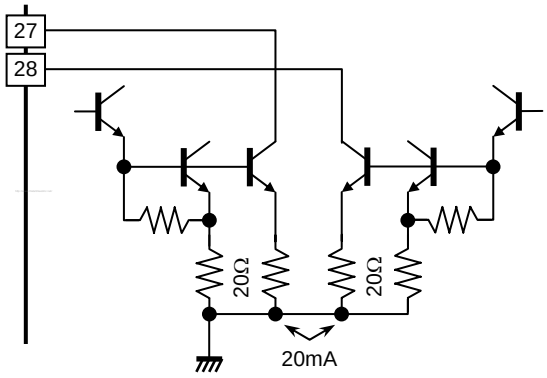
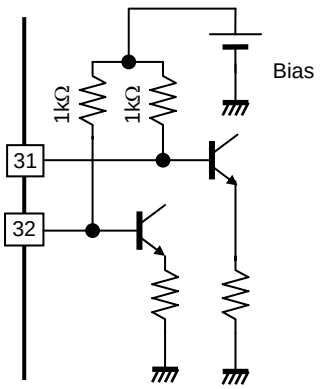
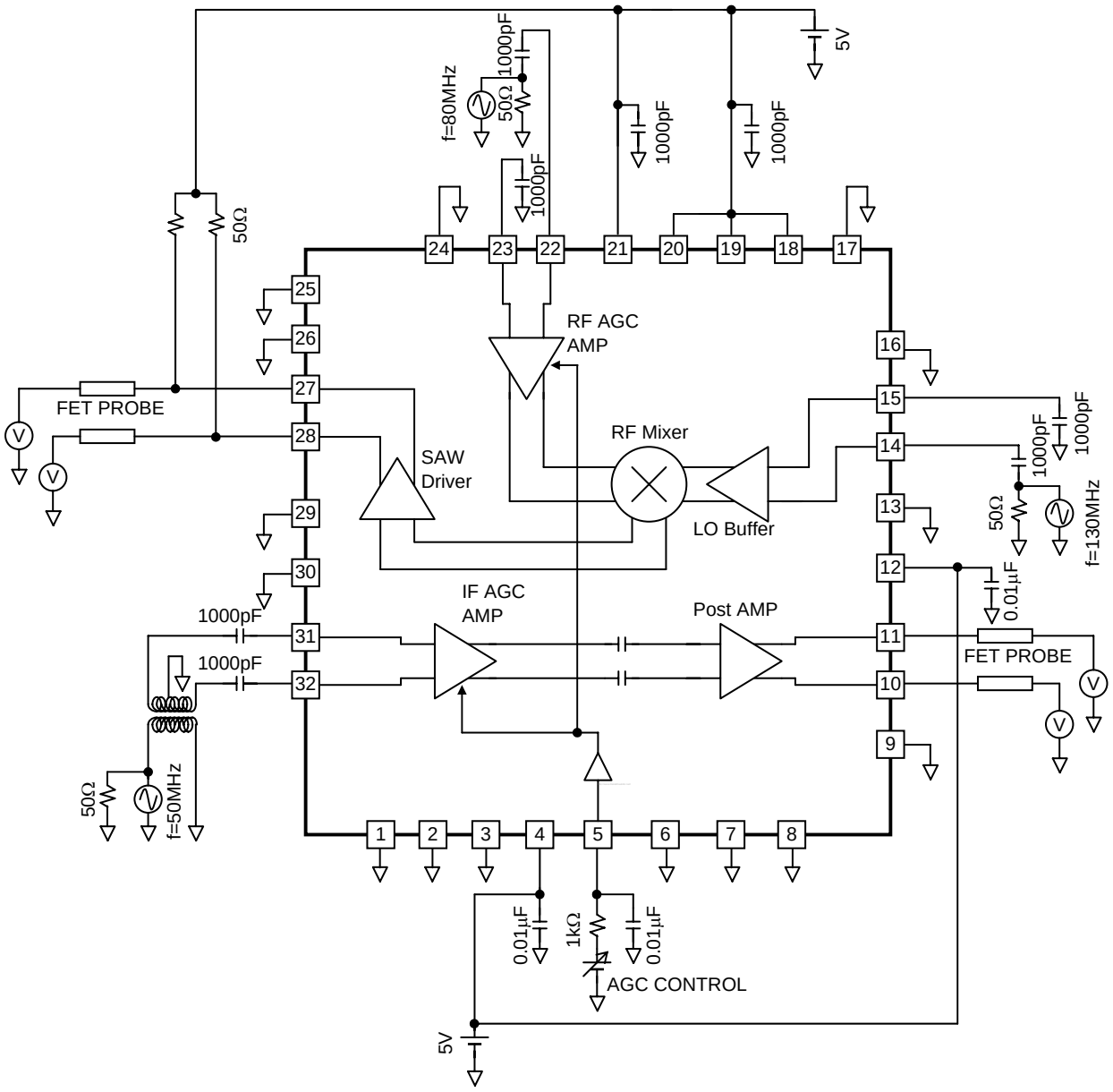
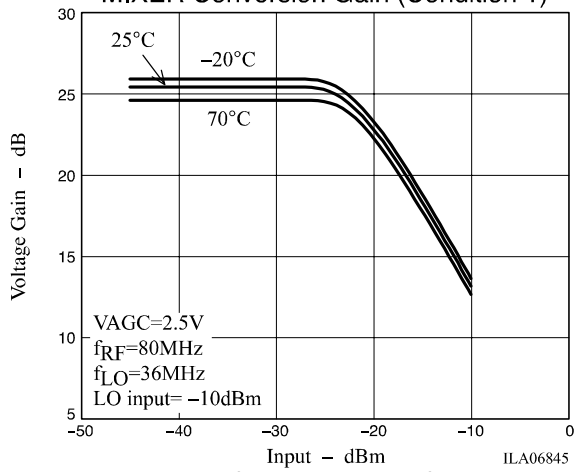
Pin number	Pin name	Equivalent circuit
20, 21	RF AGC AMP V_{CC}	
22, 23	RF AGC AMP Input	
24, 25	NC (Connect to GND)	
26	RF AGC AMP GND	
27, 28	SAW Driver Output	
29	SAW Driver GND	
30	IF AGC AMP GND	
31, 32	IF AGC AMP Input	

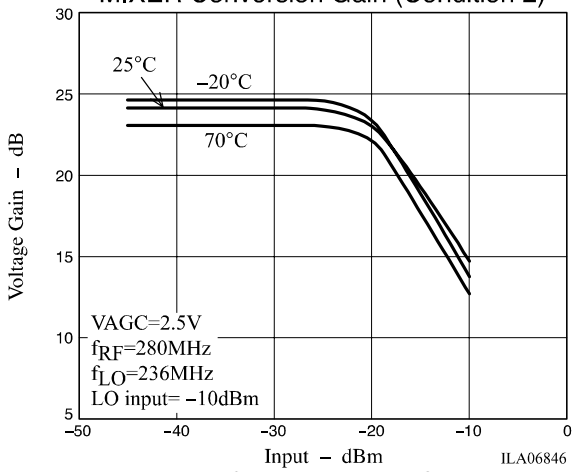
Test Circiut



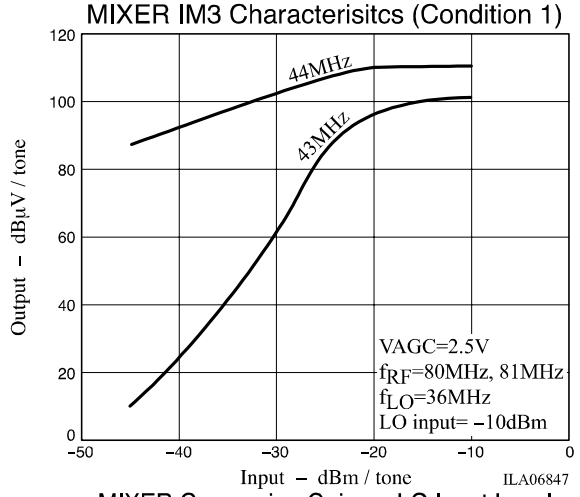
MIXER Conversion Gain (Condition 1)



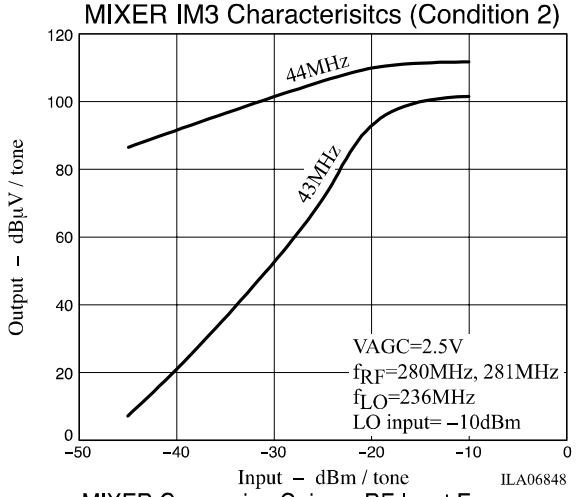
MIXER Conversion Gain (Condition 2)



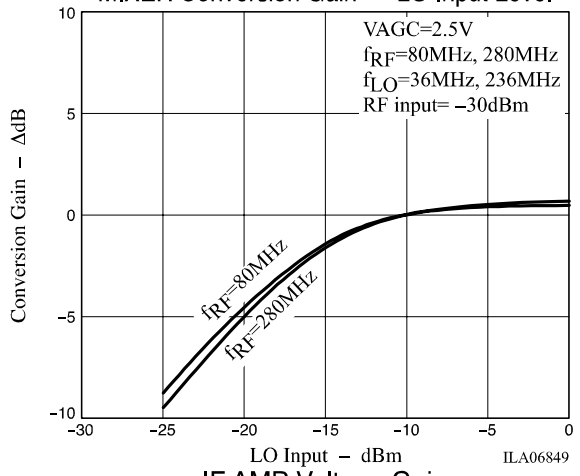
MIXER IM3 Characterisitcs (Condition 1)



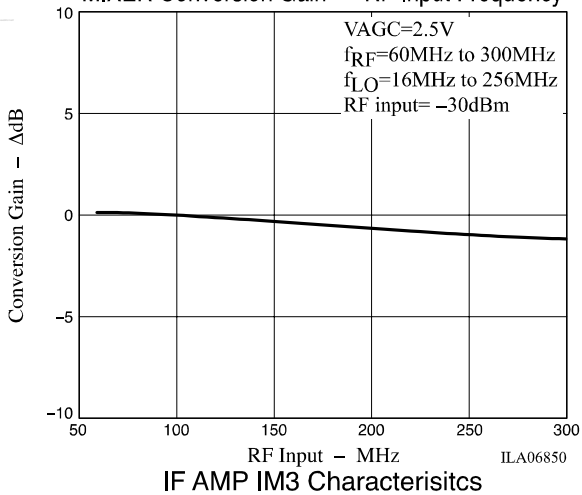
MIXER IM3 Characterisitcs (Condition 2)



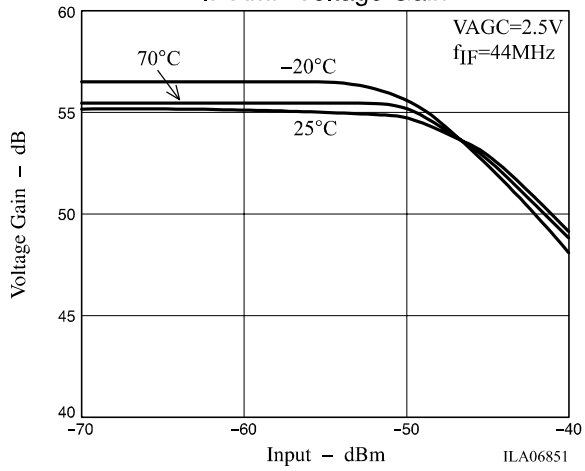
MIXER Conversion Gain – LO Input Level



MIXER Conversion Gain – RF Input Frequency



IF AMP Voltage Gain



IF AMP IM3 Characterisitcs