



SANYO Semiconductors

## DATA SHEET

# LA7784

Monolithic Linear IC  
Downconverter IC  
for Digital CATV

## Overview

The LA7784 is a downconverter IC for digital CATV. It accepts RF input frequencies from 50 to 150MHz and supports the DOCSIS (USA) and Euro-DOCSIS (Europe) standards.

## Features

- RF Mixer.
- Attenuation control for RF Mixer.
- Driver for SAW filter.
- IF AGC amplifier.
- IF Driver amplifier for ADC.

## Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC \text{ max}}$	Pin 8, 14, 19, 20, 21, 22, 26, 27	6.0	V
Circuit voltages	$V \text{ max}$	Pin 9	$V_{CC}$	V
Circuit current	$I_{12, 13}$	Pin 12, 13 sink current	2	V
Allowable power dissipation	$P_d \text{ max}$	$T_a \leq 70^\circ\text{C}$	900*	mA
Operating temperature range	$T_{opr}$		-20 to +70	mW
Storage temperature range	$T_{stg}$		-55 to +150	$^\circ\text{C}$

\* On the board (114.3×76.1×1.6mm)

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

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	$V_{CC}$	Pin 8, 14, 19, 20, 21, 22, 26, 27	5.0	V
Operating supply voltage range	$V_{CC \text{ op}}$	Pin 8, 14, 19, 20, 21, 22, 26, 27	4.5 to 5.5	V

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# LA7784

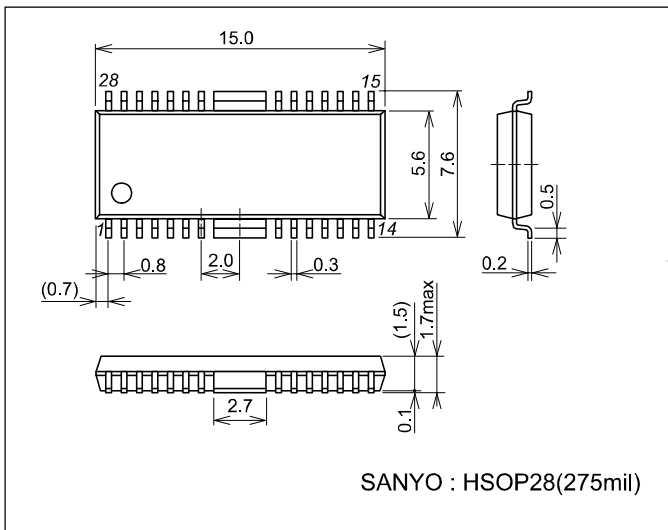
**AC Characteristics** at  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 3.3\text{V}$

Parameter	Symbol	Pin No.	Conditions	Ratings			Unit
				min	typ	max	
Circuit current	$I_{\text{total}}$	8, 14, 19, 20, 21, 22, 26, 27	No Signal	80	105	130	mA
RF input frequency range	$f_{(\text{RF})}$	23, 24	$f_c: -3\text{dB}$	50		150	MHz
RF AGC range	GR1	26, 27	$V_9 = 2.5 \text{ to } 0\text{V}$	45	53		dB
Mixer conversion gain	CG1	26/23, 24 27/23, 24	$V_9 = 2.5\text{V}$	19	22	25	dB
Mixer inter modulation 1	IM3 1	26/23, 24 27/23, 24	Input = $75\text{dB}\mu$ $V_9 = 2.5\text{V}$	40	50		dB
IF input frequency range	$f_{(\text{IF})}$	4, 5	$f_c: -3\text{dB}$	30		100	MHz
IF amplifier gain	$G_{(\text{AGC})}$	12/4, 5 13/4, 5	$V_9 = 2.5\text{V}$	51	55	59	dB
IF inter modulation 2	IM3 2	12/4, 5 13/4, 5	Output = $110\text{dB}\mu$	40	50		dB
Range	GR2	12, 13	IF Output Level $< \pm 1\text{dB}$	3	5		dB
IF AGC output level	$V_{O(\text{IF}) 1}$	12	Single output		1.0		Vp-p
IF output level	$V_{O(\text{IF}) 2}$	13	Single output		1.0		Vp-p

## Package Dimensions

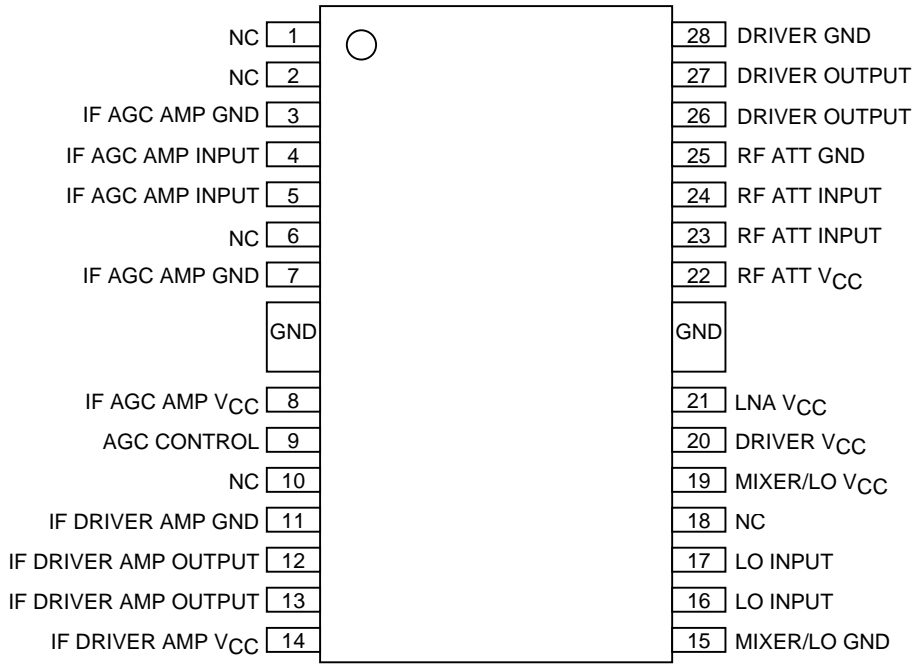
unit: mm

3222A

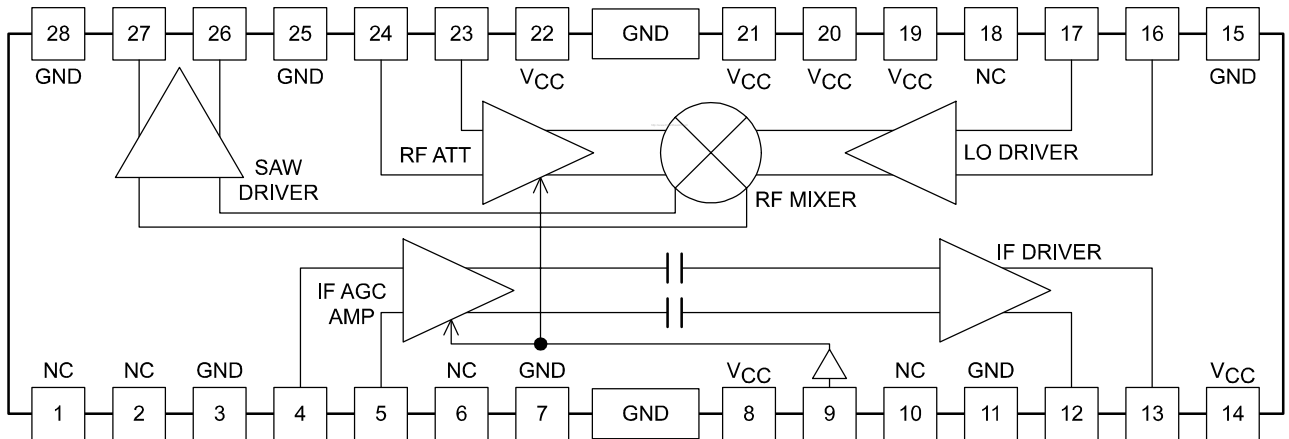


# LA7784

## Pin Assignment



## Block Diagram

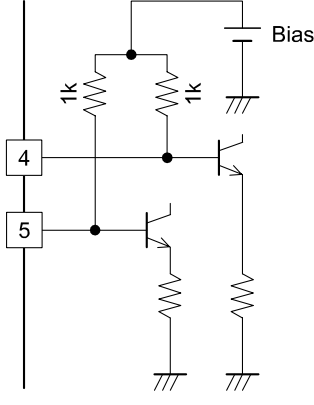
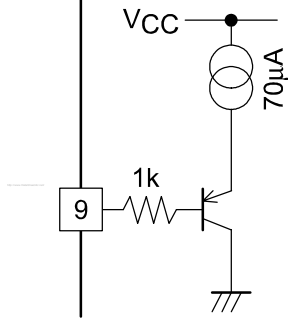


OMB05021

# LA7784

## Pin Description

(unit:  $\Omega$ )

Pin Number	Description	Equivalent circuit
1	No Connection	
2	No Connection	
3	AGC Amp GND	
4 5	AGC Amp Input	 <p style="text-align: right; font-size: small;">OMP05090</p>
6	No Connection	
7	AGC Amp GND	
8	AGC Amp V <sub>CC</sub>	
9	AGC Control	 <p style="text-align: right; font-size: small;">OMP05091</p>
10	No Connection	
11	Post Amp GND	

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# LA7784

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(unit:  $\Omega$ )

Pin Number	Description	Equivalent circuit
12 13	Post Amp Outputs	<p style="text-align: right; font-size: small;">OMP05092</p>
14	Post Amp $V_{CC}$	
15	Mixer/LO GND	
16 17	LO Input	<p style="text-align: right; font-size: small;">OMP05093</p>
18	No Connection	
19	Mixer/LO $V_{CC}$	
20	Driver $V_{CC}$	

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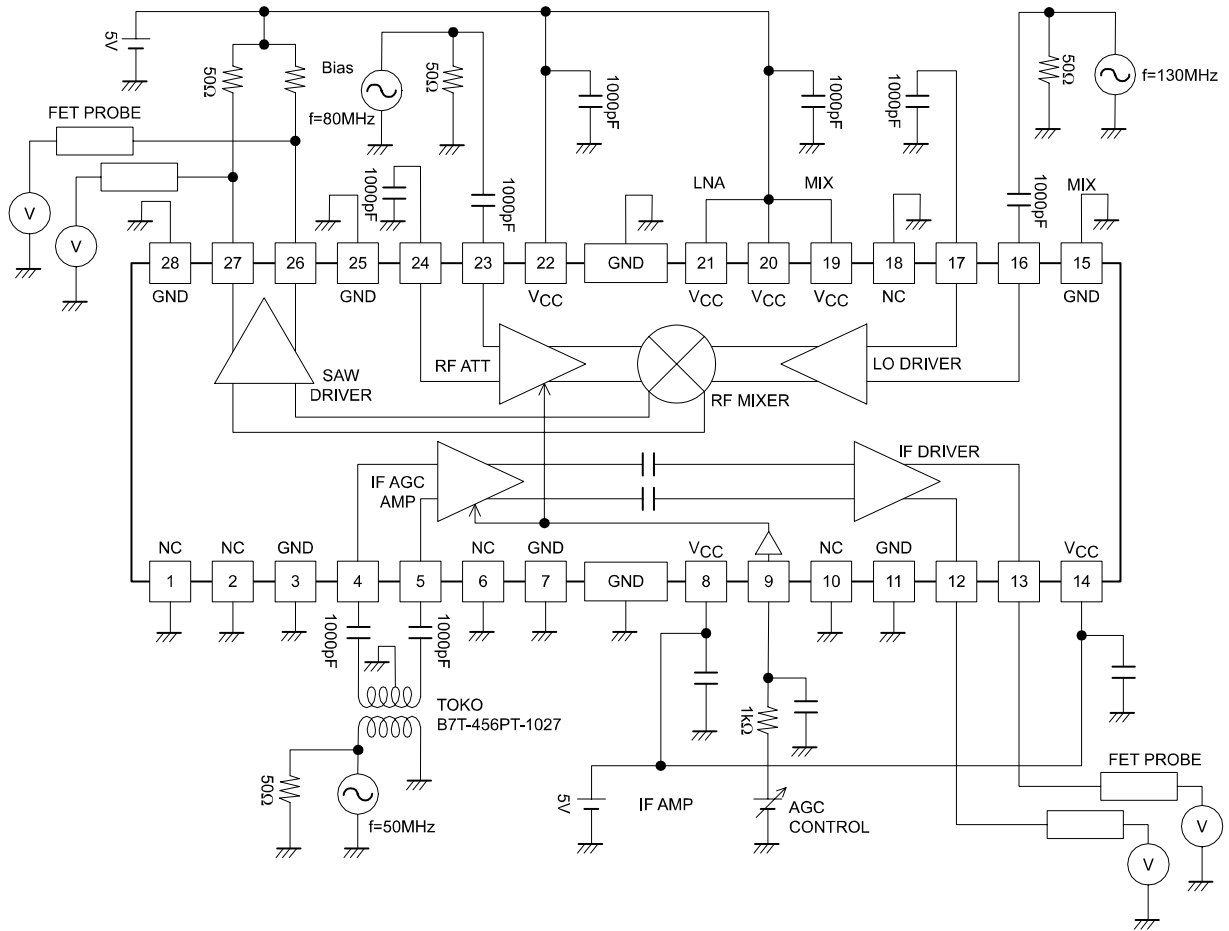
# LA7784

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(unit:  $\Omega$ )

Pin Number	Description	Equivalent circuit
21 22	LNA V <sub>CC</sub>	<p style="text-align: right; margin-top: 10px;">OMP05094</p>
23 24	LNA Inputs	
25	LNA GND	
26 27	Driver Outputs	<p style="text-align: right; margin-top: 10px;">OMP05095</p>
28	Driver Gnd	

Test Circuit



OMB05022

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