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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	°C

* On the board (114.3×76.1×1.6mm)

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.

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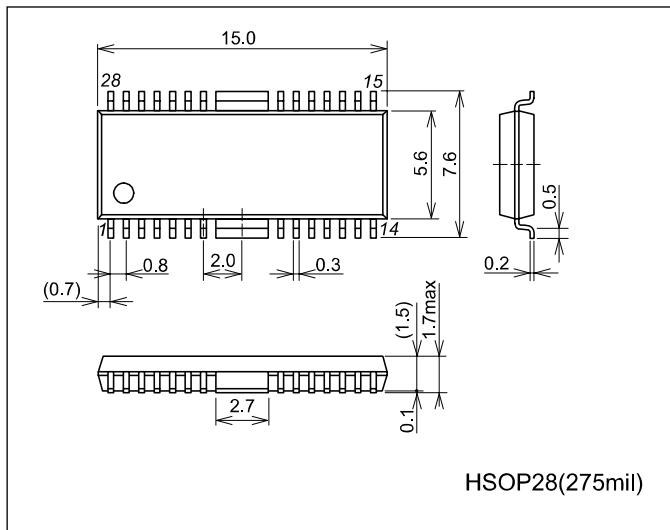
AC Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 3.3\text{V}$

Parameter	Symbol	Pin No.	Conditions	Ratings			Unit
				min	typ	max	
Circuit current	I_{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	$V_9 = 2.5$ to 0V	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

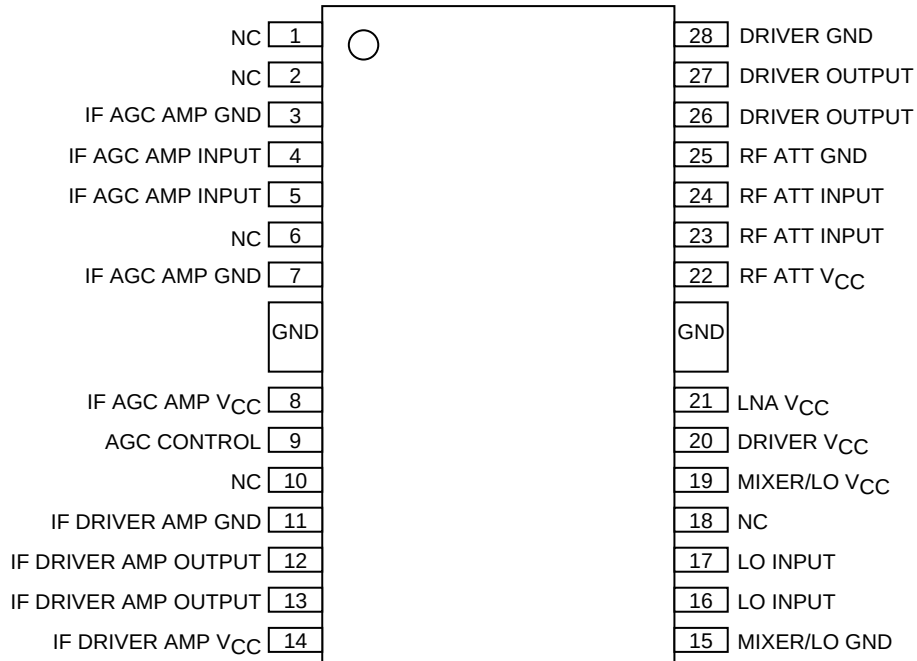
Package Dimensions

unit: mm

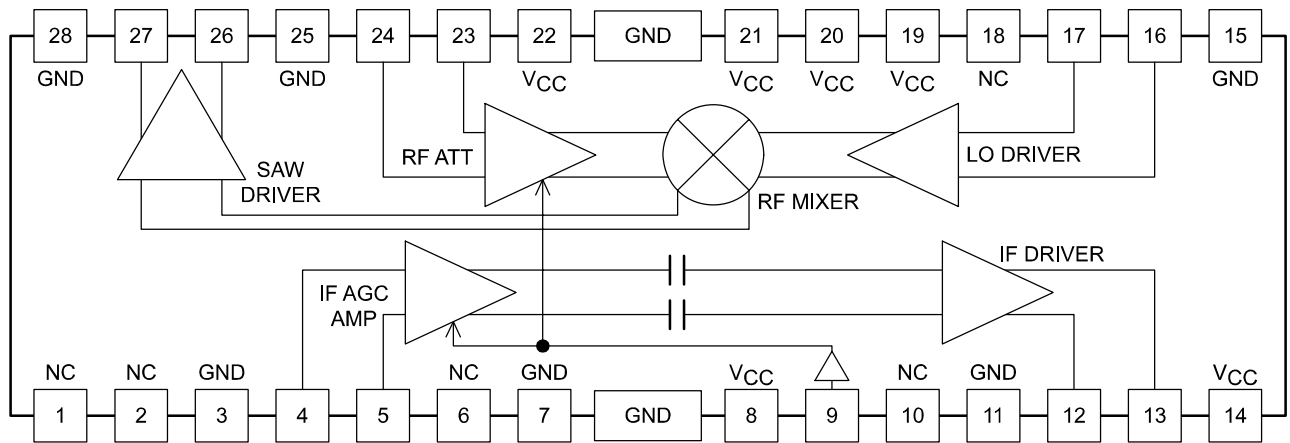
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Pin Assignment



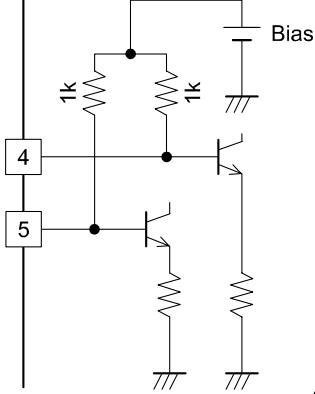
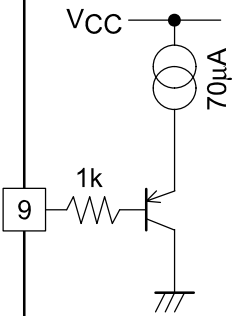
Block Diagram



OMB05021

Pin Description

(unit: Ω)

Pin Number	Description	Equivalent circuit
1	No Connection	
2	No Connection	
3	AGC Amp GND	
4 5	AGC Amp Input	 OMP05090
6	No Connection	
7	AGC Amp GND	
8	AGC Amp V_{CC}	
9	AGC Control	 OMP05091
10	No Connection	
11	Post Amp GND	

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(unit: Ω)

Pin Number	Description	Equivalent circuit
12 13	Post Amp Outputs	
14	Post Amp V_{CC}	
15	Mixer/LO GND	
16 17	LO Input	
18	No Connection	
19	Mixer/LO V_{CC}	
20	Driver V_{CC}	

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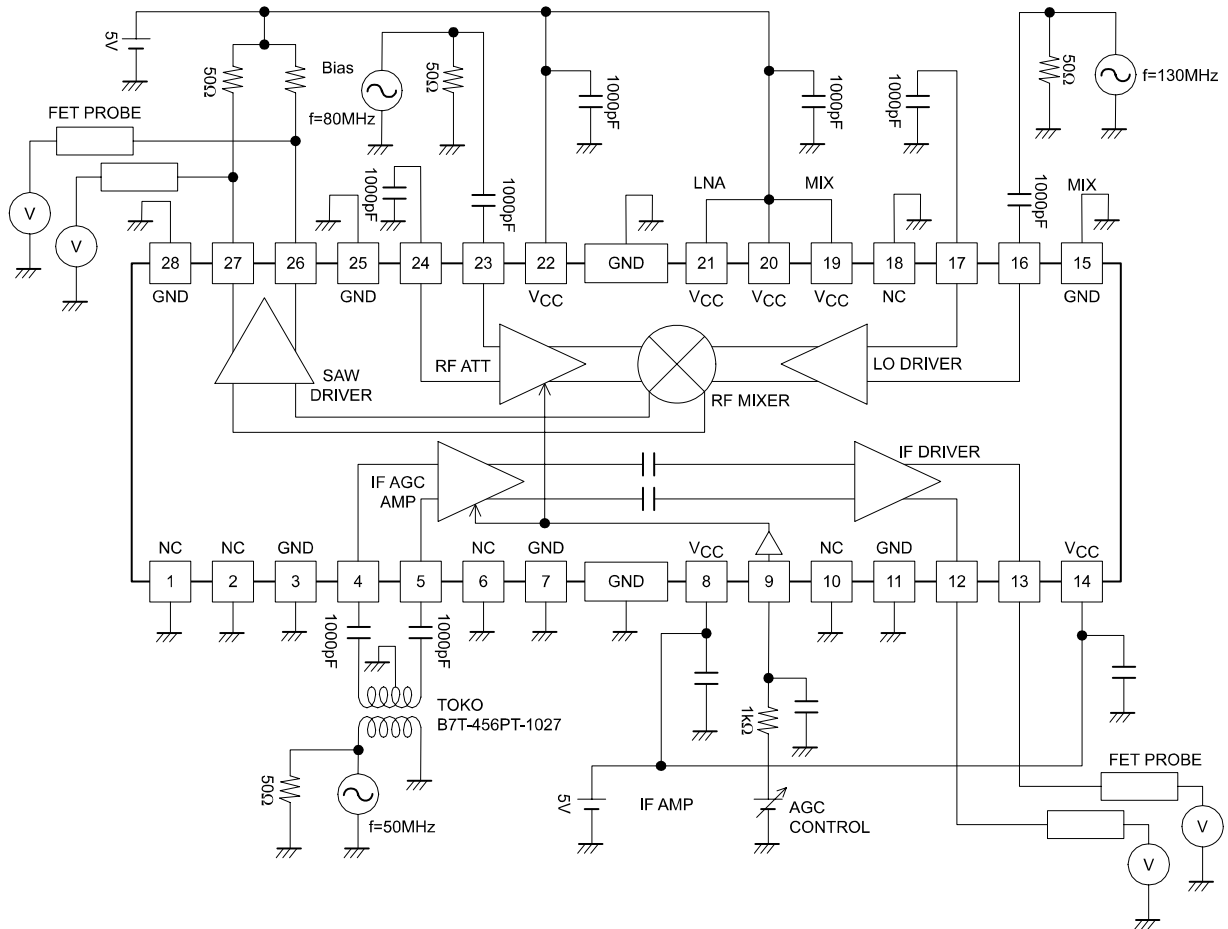
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(unit: Ω)

Pin Number	Description	Equivalent circuit
21 22	LNA VCC	OMP05094
23 24	LNA Inputs	
25	LNA GND	
26 27	Driver Outputs	OMP05095
28	Driver Gnd	

Test Circuit



OMB05022

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