



3 V Operation Filter for FM Multiplex Broadcasting Reception

Overview

The LV3403M is a filter IC for FM multiplex broadcasting reception which is used in combination with demodulation-error correction IC (LC72703). The use of switched capacitor filter (SCF) technique obviates the need for frequency adjustment and ensures stable operation.

Functions

- 76 kHz BPF (Gaussian filter)
- 54 kHz HPF
- 125 kHz LPF
- Anti-aliasing filter
- Limiter circuit

Features

- No adjustments needed due to SCF-used configuration.
- Few external components needed.

Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\ max}$		6	V
Maximum input voltage	$V_{IN\ max}$	SIG.IN, CLK IN pin	-0.3 to $V_{CC} + 0.3$	V
Allowable power dissipation	$P_d\ max$		180	mW
Operating temperature	T_{opr}		-20 to +70	°C
Storage temperature	T_{stg}		-55 to +125	°C

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

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		3	V
Operating supply voltage range	$V_{CC\ op}$		2.7 to 4.5	V
Input voltage range	V_{IN}	Base band signal equivalent to FM: 100% modulation	200 to 300	mVrms
		$f_{IN} = 76\ kHz$, CW	8 to 30	mVrms
Clock frequency	f_{CK}	Rectangular wave	3.60	MHz
Clock input voltage	V_{CK}	Rectangular wave	1.0 to V_{CC}	V _{p-p}

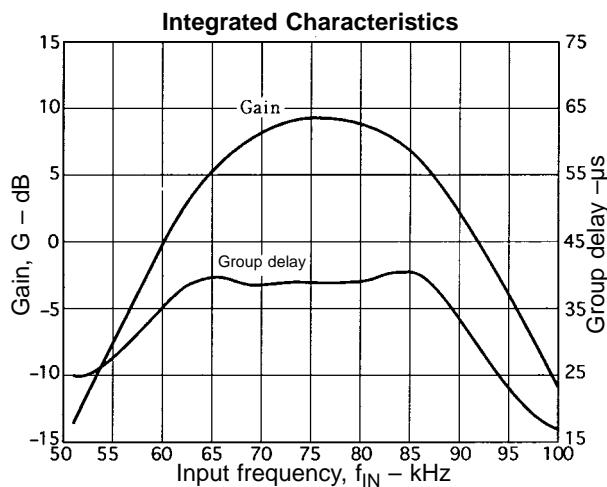
LV3403M

Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 3\text{ V}$, $f_{CK} = 3.6\text{ MHz}$, $V_{CK} = 1\text{ Vp-p}$

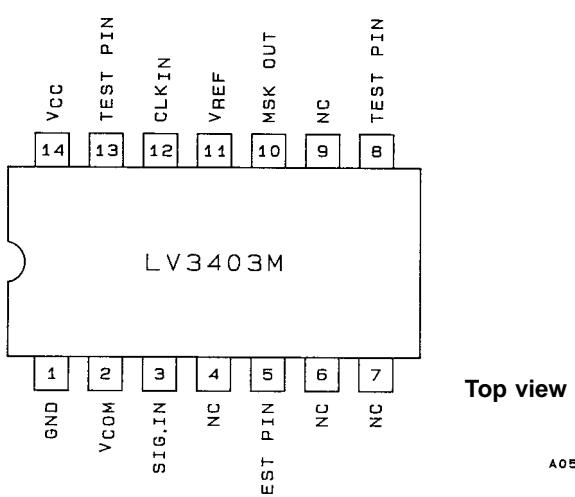
Parameter	Symbol	Conditions	min	typ	max	Unit
Current drain	I_{CC0}	Current on pin 14 when $V_{IN} = \text{no signal}$	3.5	5	6.5	mA
SCF block common voltage	V_2	Voltage on pin 2 when $V_{IN} = \text{no signal}$	1.2	1.4	1.6	V
Input signal resistance	R_{IN3}	Pin 3 input resistance	36			k Ω
Clock input resistance	R_{IN12}	Pin 12 input resistance		5		k Ω
[MSK Output]						
Input sensitivity	V_{3S}	$f_{IN} = 76\text{ kHz}$, the input level at which MSK output is the same frequency when CW is applied			4	mVrms
Output high-level voltage	V_{10H}	$V_{IN} = 76\text{ kHz}$, 4 mVrms, CW	2.5			V
Output low-level voltage	V_{10L}	$V_{IN} = 76\text{ kHz}$, 4 mVrms, CW			0.4	V

Reference Characteristics

Parameter	Ratings	Unit
AAF cut-off frequency	300	kHz
HPF corner frequency	54	kHz
LPF cut-off frequency	125	kHz
BPF center frequency	76	kHz
BPF -3 dB frequency	19	kHz
Difference in maximum group delay within band	± 5	μs



Pin Assignment



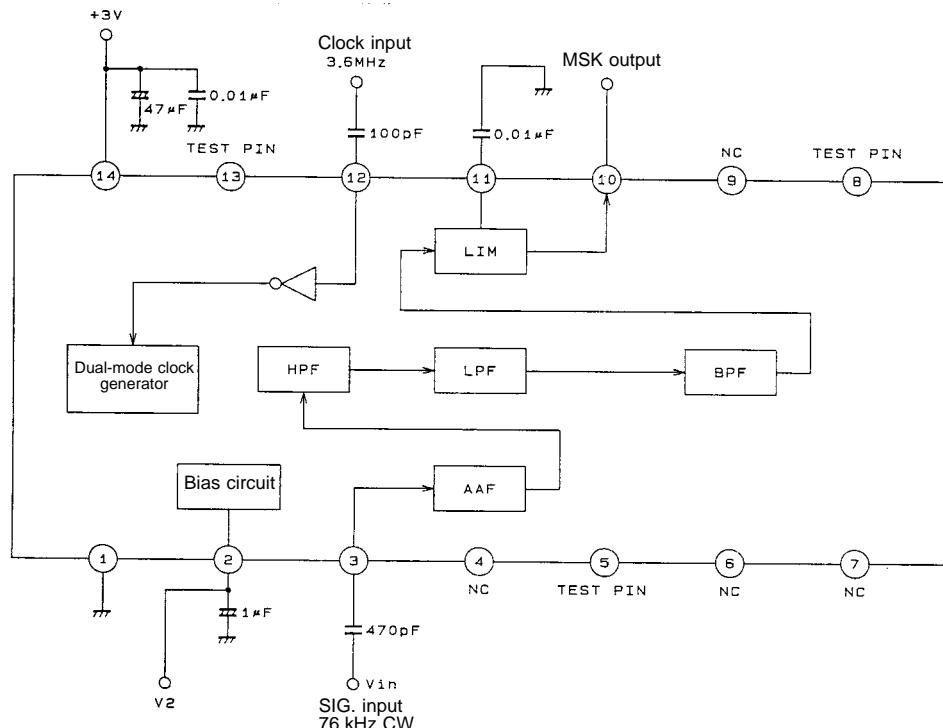
A05917

Pin Descriptions

Pin No.~	Pin name~	Description
1~	GND~	Ground.
2	V _{COM}	Common for SCF section. Connect to decoupling capacitor.
3~	SIG.IN~	Signal input. Input a frequency-modulated signal (composite signal) at 200 to 300 mVrms. When inputting 76 kHz only, the input sensitivity is 4 mVrms or less.
10~	MSK OUT~	MSK output (CMOS output.)
11~	V _{REF}	Limiter reference pin. Form an LPF with the 10 kΩ internal resistor and an external capacitor.
12~	CLK IN	3.6 MHz clock input. Because the DC bias is output by the limiter amplifier input, the clock is input with capacitor coupling.
14~	V _{CC}	Power supply
5, 8, 13~	TEST PIN~	Test pin. Leave open.
4, 6, 7, 9~	NC~	Unused.

Notes on usage:

- (1) When using this IC, leave pins 4 to 9 and pin 13 open.
- (2) The clock is connected to pin 12 from the decoder (LC72700) clock output pin through a 100 pF capacitor. In addition, by inserting a resistor in the clock line, it is possible to dampen the rising and falling edges, reducing spurious radiation.

Equivalent Circuit Block Diagram

A05918

Note : Pins 4 through 9 and pin 13 must be left open.

- No products described or contained herein are intended for use in surgical implants, life-support systems, aerospace equipment, nuclear power control systems, vehicles, disaster/crime-prevention equipment and the like, the failure of which may directly or indirectly cause injury, death or property loss.
- Anyone purchasing any products described or contained herein for an above-mentioned use shall:
 - ① Accept full responsibility and indemnify and defend SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors and all their officers and employees, jointly and severally, against any and all claims and litigation and all damages, cost and expenses associated with such use;
 - ② Not impose any responsibility for any fault or negligence which may be cited in any such claim or litigation on SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors or any of their officers and employees jointly or severally.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of June, 1996. Specifications and information herein are subject to change without notice.