



## 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 Ta = 25 °C

Parameter↵	Symbol↵	Conditions↵	Ratings↵	Unit
Maximum supply voltage↵	V <sub>CC</sub> max↵		6↵	V
Maximum input voltage↵	V <sub>IN</sub> max↵	SIG.IN, CLK IN pin↵	-0.3 to V <sub>CC</sub> +0.3↵	V
Allowable power dissipation↵	Pd max↵		180↵	mW
Operating temperature↵	T <sub>opr</sub> ↵		-20 to +70↵	°C
Storage temperature↵	T <sub>stg</sub> ↵		-55 to +125↵	°C

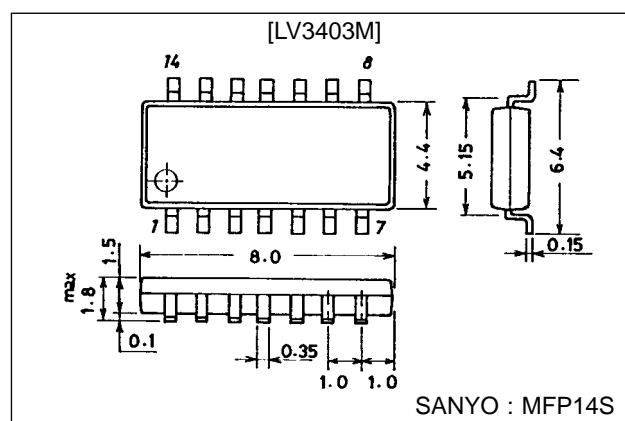
#### Operating Conditions at Ta = 25 °C

Parameter↵	Symbol↵	Conditions↵	Ratings↵	Unit
Recommended supply voltage↵	V <sub>CC</sub>		3	V
Operating supply voltage range↵	V <sub>CC</sub> op↵		2.7 to 4.5↵	V
Input voltage range↵	V <sub>IN</sub>	Base band signal equivalent to FM: 100% modulation	200 to 300↵	mVrms
		f <sub>IN</sub> = 76 kHz, CW↵	8 to 30↵	mVrms
Clock frequency↵	f <sub>ck</sub> ↵	Rectangular wave↵	3.60↵	MHz
Clock input voltage↵	V <sub>ck</sub> ↵	Rectangular wave↵	1.0 to V <sub>CC</sub>	Vp-p

### Package Dimensions

unit : mm

#### 3111-MFP14S



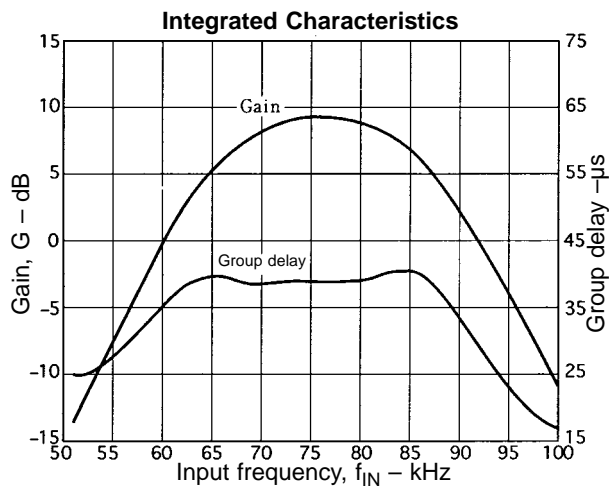
# LV3403M

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

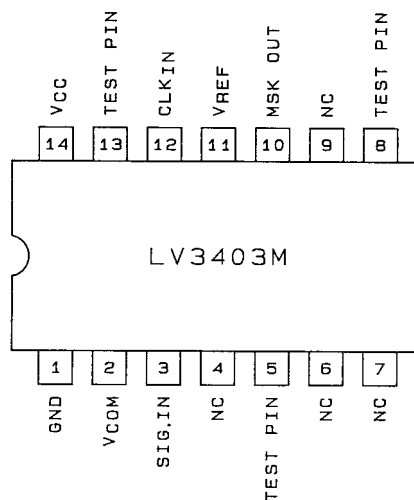
Parameter	Symbol	Conditions	min	typ	max	Unit
Current drain	$I_{CCO}$	Current on pin 14 when $V_{IN}$ = no signal	3.5	5	6.5	mA
SCF block common voltage	$V_2$	Voltage on pin 2 when $V_{IN}$ = no signal	1.2	1.4	1.6	V
Input signal resistance	$R_{IN3}$	Pin 3 input resistance		36		$k\Omega$
Clock input resistance	$R_{IN12}$	Pin 12 input resistance		5		$k\Omega$
[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	$\pm 5$	$\mu\text{s}$



## Pin Assignment



Top view

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# LV3403M

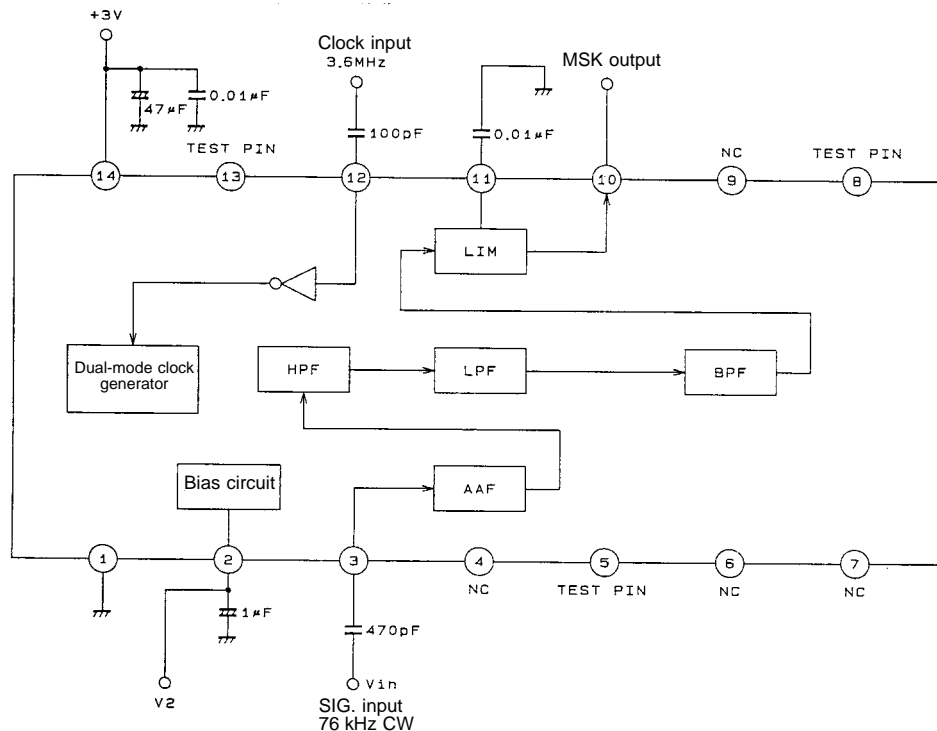
## Pin Descriptions

Pin No.	Pin name	Description
1	GND	Ground.
2	V <sub>COM</sub>	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 <sub>REF</sub>	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 <sub>CC</sub>	Power supply
5, 8, 13	TEST PIN	Test pin. Leave open.
4, 6, 7, 9	NC	Unused.

Notes on usage:

- When using this IC, leave pins 4 to 9 and pin 13 open.
- 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



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

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