HA118129MP

Preliminary

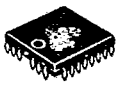
FM Demodulator IC for BS Tuner

T-77-09

Description

The HA118129MP was developed to provide IF demodulation for broadcast satellite (BS) tuners, and it has built-in functions such as PLL-method FM demodulation and AFC and AGC detection.
It comes in a samll package with excellent heat-dissipation characteristics, enabling the creation of a compact BS tuner front end.

HA118129MP



(MP-28)

Features

- Built-in amplifier enables stablized PLL demodulation characteristics
- Both Japanese specifications (IF = 403 MHz) and European specifications (IF = 480 MHz) possible
- AFC sensitivity settable by external constant
- AFC output has voltage limiter circuit; maximum and minimum voltages settable by external constants
- Keyed AFC pulse input pin for MUSE receiving

Ordering Information

Type No.	Package
HA118129MP	MP-28

Block Diagram

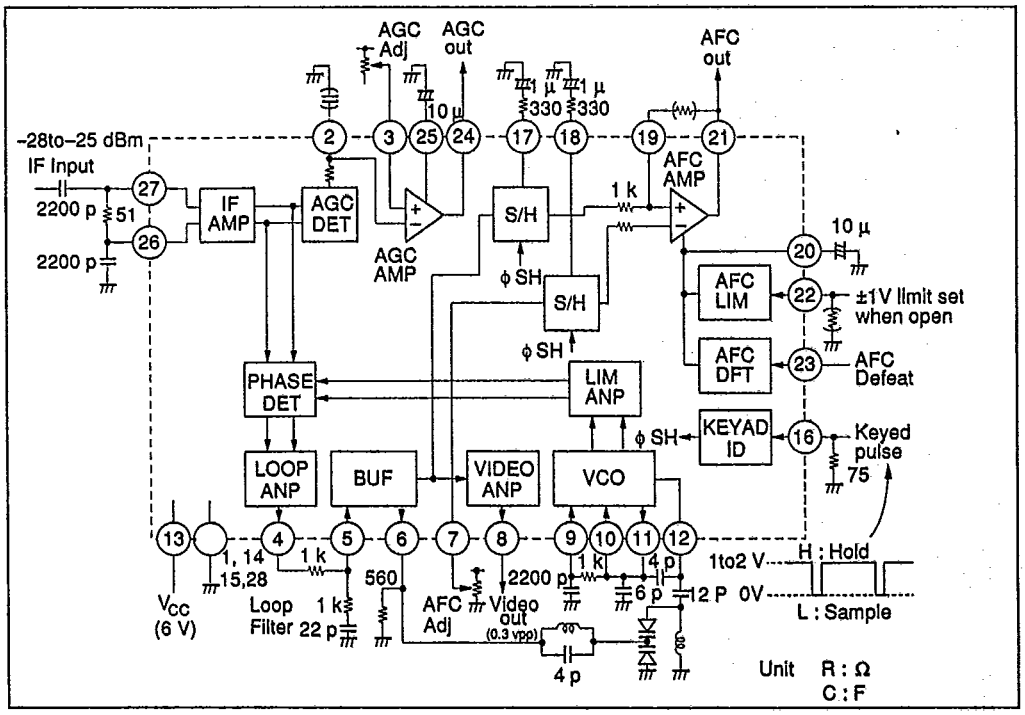


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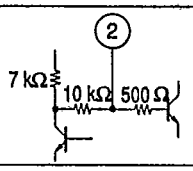
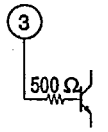
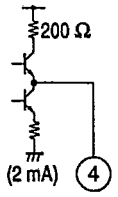
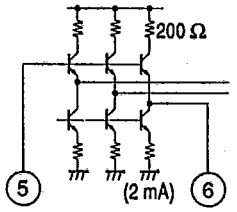
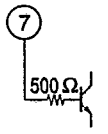
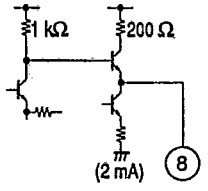
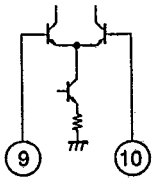
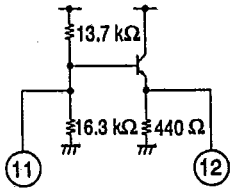
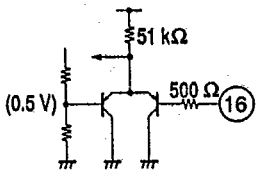
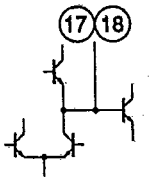
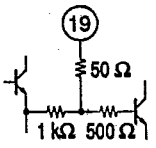
Table 1 Pin Functions

Pin No.	Function	DC bias voltage (V)	Maximum current (mA)	Internal circuit
1	GND	—	—	
2	AGC detection	3.0	—	
3	AGC control	—	—	
4	Loop amp output	4.0	3.0	
5	Buffer amp input	4.0	—	
6	Buffer amp output	3.3	6.0	
7	AFC control	—	—	
8	Video detector output	4.2	6.0	

Pin Functions (cont)

Pin No.	Function	DC bias voltage (V)	Maximum current (mA)	Internal circuit
9	Limiter amp input	2.3	—	
10	Limiter amp input	2.3	—	
11	Oscillator output	2.3	5.0	
12	Oscillator input	3.0	—	
13	V_{CC}	—	—	—
14	GND	—	—	—
15				
16	Keyed pulse input	—	—	
17	Sampling hold	4.4	3.0	
18				
19	AFC gain control	—	—	

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Pin Functions (cont)

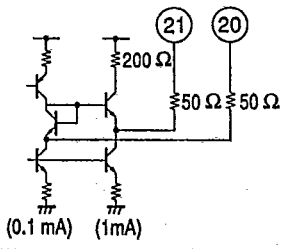
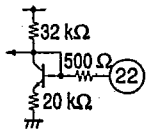
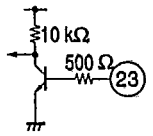
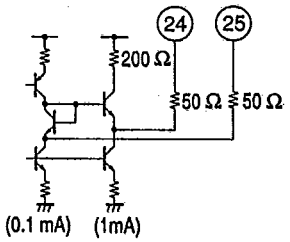
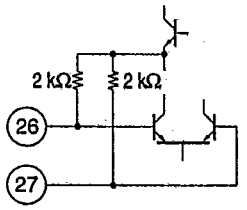
Pin No.	Function	DC bias voltage (V)	Maximum current (mA)	Internal circuit
20	AFC filter	3.0	1.0	
21	AFC output	3.0	3.0	
22	AFC limiter control	—	—	
23	AFC defeater	—	—	
24	AGC output	2.5	3.0	
25	AGC filter	2.5	1.0	
26	IF input	2.5	—	
27	IF input	2.5	—	
28	GND	—	—	—

Table 2 Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Supply voltage	V_{CC}	7	V
Power dissipation	P_T	780	mW
Operating temperature	T_{opr}	–10 to +80	°C
Storage temperature	T_{stg}	–55 to +125	°C

Note: Operating power voltage range: 6.0 V ± 0.3 V, recommended IF input voltage: –28 to –25 dB

Table 3 Electrical Characteristics (Ta = 25°C, V_{CC} = 6 V)

Item	Symbol	Min	Typ	Max	Unit	Applicable pin	Test conditions
Supply current	I_{CC}	64	92	120	mA	13	
Loop amp conversion gain	G_{VL1}	36	39	42	dB	4	f_{in} = 398 MHz, V_{in} = –40dBm, SW2: 1
	G_{VL2}	36	39	42			f_{in} = 480 MHz, V_{in} = –40 dBm, SW2: 1
Video amp gain	G_{VV}	–7	–6	–5	dB	8	f = 500 kHz, SW1: 2
Video amp frequency characteristics	V_{fv1}	–0.25	0	+0.25	dB		f = 500 kHz reference, f = 4.2 MHz, SW1: 2
	V_{fv2}	–0.3	0	+0.3			f = 8.1 MHz, SW1: 2
Capture range	f_{CRH}	10	25	—	MHz		V_{in} = –25 dBm
	f_{CRL}	—	–25	–10			
AGC detector sensitivity	V_{SA}	30	50	—	mV/dB	2	f = 480 MHz
AGC amp DC gain	G_{VAGC}	46	60	—	dB	24	V_{out} = 4.5 to 0.7 V
Maximum AGC amp output voltage	V_{OGH}	4.5	4.8	5.1	V		
Minimum AGC amp output voltage	V_{OGL}	0	0.3	0.7			

Table 3 Electrical Characteristics (Ta = 25°C, V_{CC} = 6 V) (cont)

Item		Symbol	Min	Typ	Max	Unit	Applicable pin	Test conditions	
AFC amp DC gain		G_{VAFC}	46	60	—	dB	21	V_{out} = 2 to 4 V	
AFC limiter output voltage	Lower	V_{OFL1}	1.8	2.0	2.2	V		Pin 22 open	
		V_{OFL2}	—	0.4	0.7			Pin 22 grounded	
	Upper	V_{OFH1}	3.8	4.0	4.2			Pin 22 open	
		V_{OFH2}	4.5	4.9	—			Pin 22 grounded	
AFC output voltage during AFC defeat		V_{OFD}	2.8	3.0	3.2	V			
AFC-defeat-on voltage		V_{IFD}	0.6	1.1	2.0	V	23	R = 100 kΩ	
Keyed-AFC-on voltage		V_{IKON}	0.38	—	—	V	16		
Keyed-AFC-off voltage		V_{IKOFF}	—	—	0.09	V			
Signal-to-noise ratio		S/N	—	39	—	dB		C/N = 14 dB	When IC is mounted
Threshold C/N			—	6	—	dB			
Beat rejection ratio			—	45	—	dB			
Differential gain		DG	—	2	—	%			
Differential phase		DP	—	2	—	deg			
AFC temperature drift			—	0	—	MHz		Ta = −10 to +80°C	

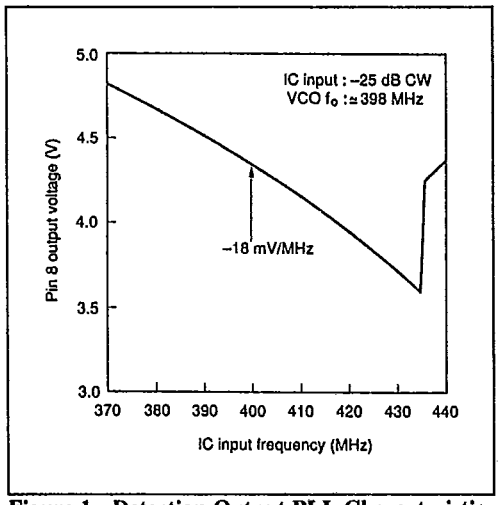


Figure 1 Detection Output PLL Characteristics

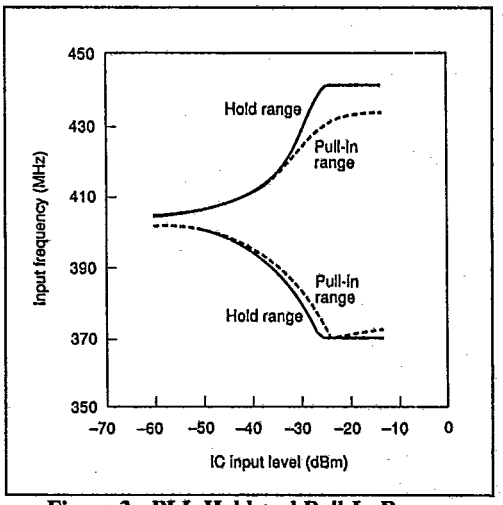


Figure 3 PLL Hold and Pull-In Ranges

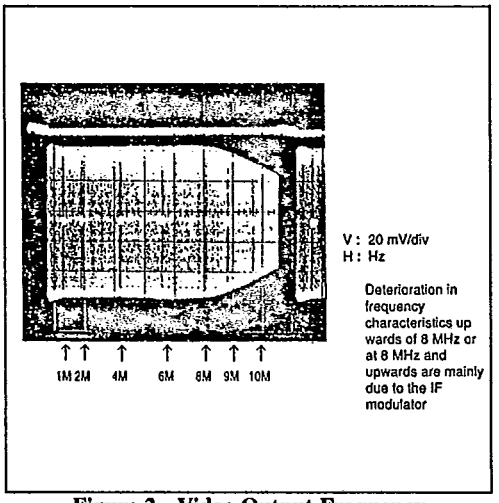


Figure 2 Video Output Frequency Characteristics (Reference data)

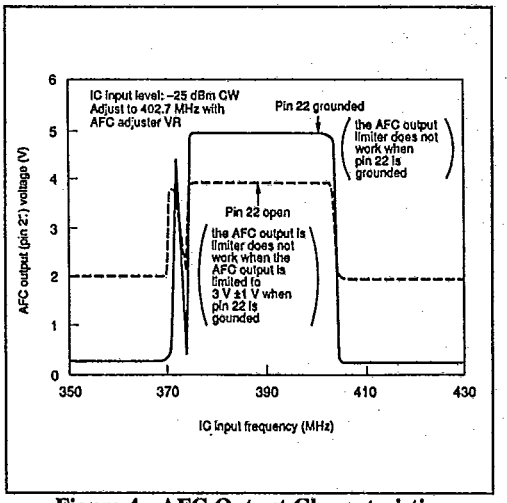


Figure 4 AFC Output Characteristics

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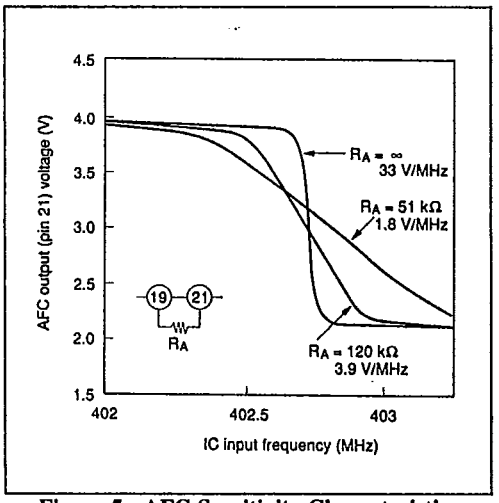


Figure 5 AFC Sensitivity Characteristics

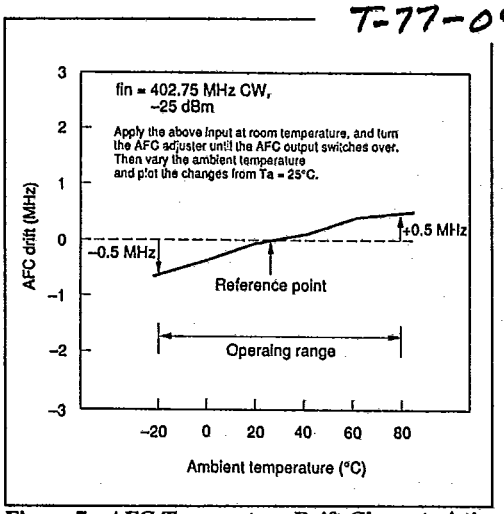


Figure 7 AFC Temperature Drift Characteristics

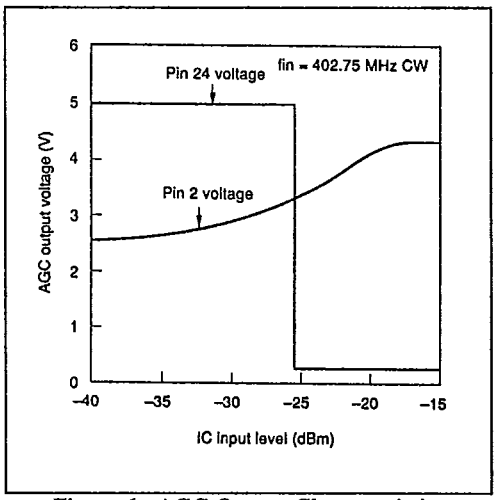


Figure 6 AGC Output Characteristics

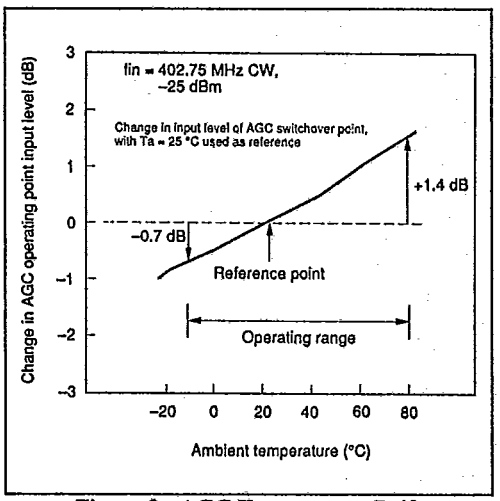


Figure 8 AGC Temperature Drift Characteristics

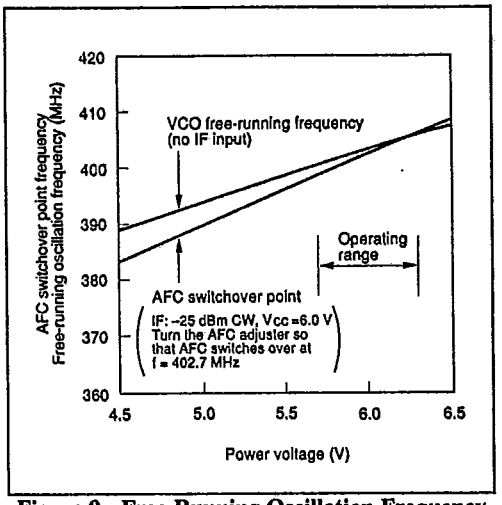
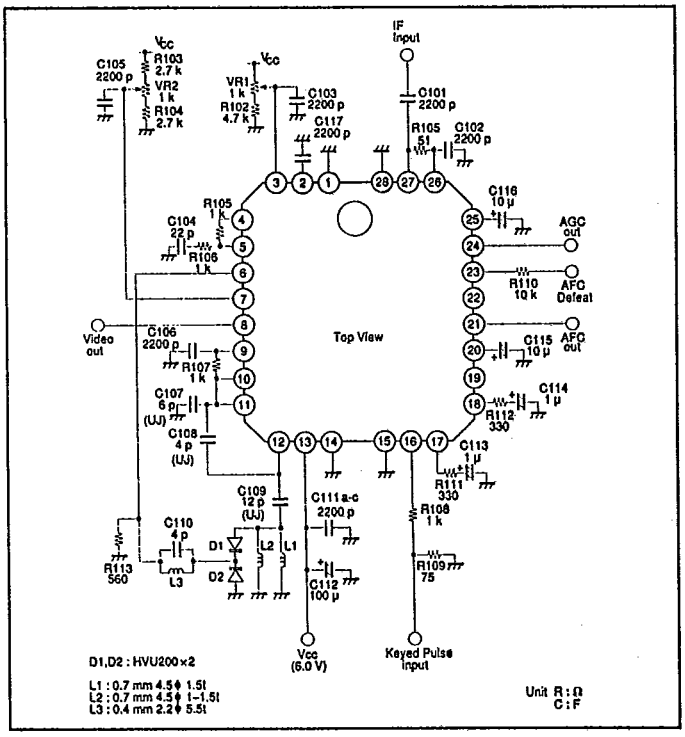


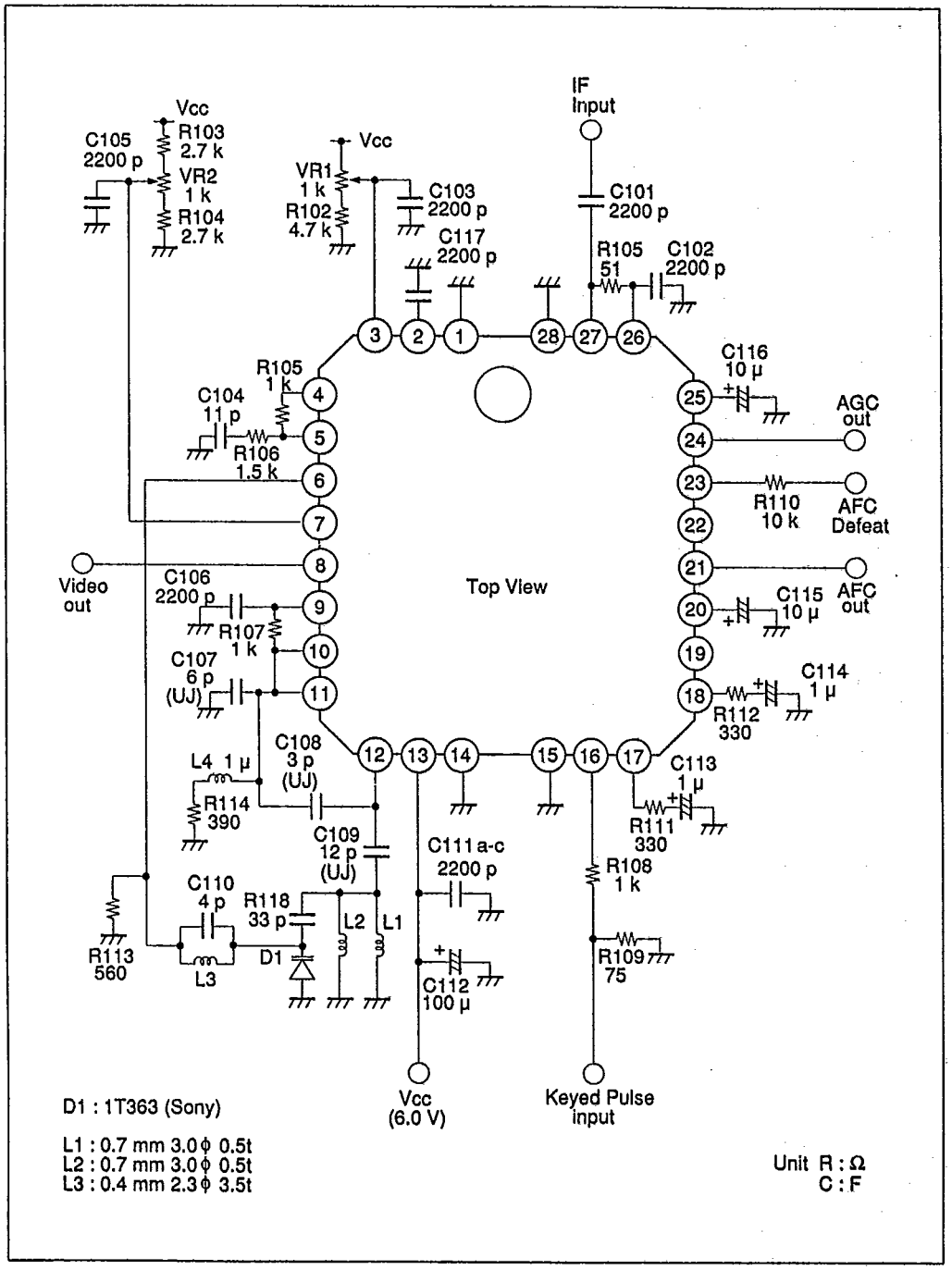
Figure 9 Free-Running Oscillation Frequency and AFC Switchover Point Frequency vs. Power Voltage

Application Circuit Examples

Japanese Specifications (f = 402.7 MHz)



European Specifications (f = 480 MHz)



Printed Pattern

Japanese Specifications