HA12411/HA12418

FM IF System

HITACHI HA12411* and HA12418* have been developed for the use of FM car radio. HA12411 is encapsulated in a DIP-16pin, and HA12418 in a SIP-16pin (Vertical Plastic Package). These IC's employ the same chips, and their functions and features are as follows.

HA12411

(DP-16)

HA12418

(SP-16)

■ FUNCTIONS

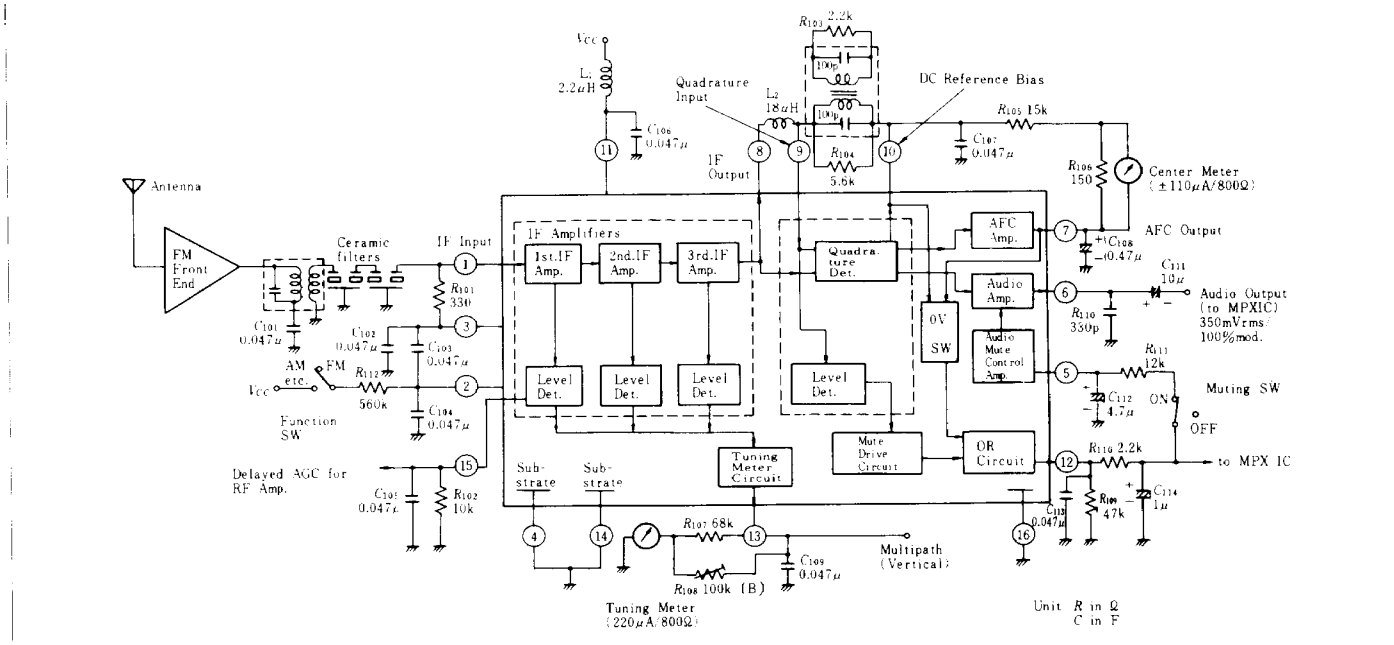
- FM IF Amplifier
- Quandrature Detector
- Audio Post-Amplifier
- Muting Circuit
- AFC, Center Meter Driver
- Muting Control Driver
- Analog Control Driver

■ FEATURES

- Wide range of the operating supply Voltage
- Low distortion: T.H.D. = 0.06% typ.
- High Signal-to-Noise Ratio: S/N = 75dB typ.
- High Input Sensitivity: Vin (lim) = 31dBμ typ.
- Capable of driving the signal meter under low input signal
- High stability against abnormal oscillation

*Note) HA12411 and HA12418 have the pin-to-pin compatibility with HA1137W.

■ BLOCK DIAGRAM



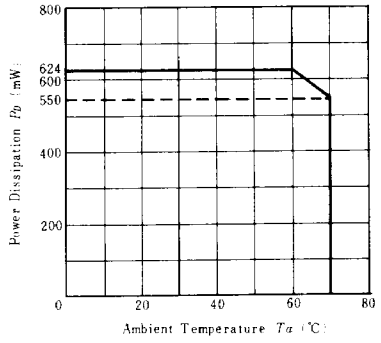
HITACHI

■ ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Supply Voltage	V_{CC}	16	V
Power Dissipation	P_T	624*	W
Operating Temperature	T_{opr}	−20 to +70	℃
Strage Temperature	T_{stg}	−55 to +125	℃

* at Ta=60℃

DELATING CURVE



■ ELECTRICAL CHARACTERISTICS

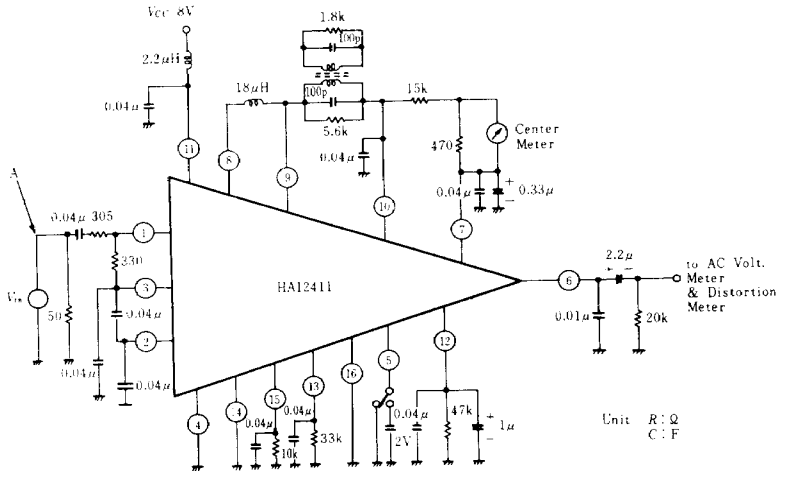
● DC CHARACTERISTICS (Ta=25℃, V_{CC}=8V, V_{in}=0dBμ)

Item	Symbol	min.	typ.	max.	Unit
DC Voltage at Pin 1	$V1$	—	1.95	—	V
DC Voltage at Pin 2	$V2$	—	1.95	—	V
DC Voltage at Pin 3	$V3$	—	1.95	—	V
DC Voltage at Pin 6	$V6$	—	5.60	—	V
DC Voltage at Pin 7	$V7$	—	5.60	—	V
DC Voltage at Pin 10	$V10$	—	5.60	—	V

● AC CHARACTERISTICS (Ta=25℃, V_{CC}=8V, f_C=10.7MHz, f_m=1kHz, $\triangle f$=75kHz dev.)

Item	Symbol	Test Conditions	min.	typ.	max.	Unit
Operating Current	I_{CC}	V_{in}=100dBμ, Mute ON	—	32	39	mA
Limiting Sensitivity	V_{in}(lim)	at −3dB	—	31	37	dBμ
Recovered Output	V_O(AF)	V_{in}=100dBμ	230	300	390	mVrms
Total Harmonic Distortion	$T.H.D$	V_{in}=100dBμ	—	0.06	0.3	%
Signal-to-Noise Ratio	S/N	V_{in}=100dBμ	67	75	—	dB
AM Rejection	AMR	V_{in}=100dBμ, f_m(AM)=1kHz, 30% mod.	45	55	—	dB
Muting Attenuation	Mute(ATT)	V_{in}=100dBμ, V_5=2V	68	75	—	dB
Muting Band Width	BW(Mute)	Detuned frepuency under 1.4V of Pin=12 voltage, V_{in}=100dBμ	—	100	—	kHz
Muting Sensitivity	V_{in}(Mute)	V_{in} under 1.4V of Pin-12 voltage	—	35	—	dBμ
Analogue Control Voltage	V_{13-0}	Pin-13 voltage under V_{in}=0dBμ	—	0.2	—	V
	V_{13-60}	Pin-13 voltage under V_{in}=60dBμ	—	1.65	—	V
	V_{13-100}	Pin-13 voltage under V_{in}=100dBμ	—	4.7	—	V
AGC Control Voltage	V_{15}	Pin-15 voltage under V_{in}=86dBμ	—	3.7	—	V

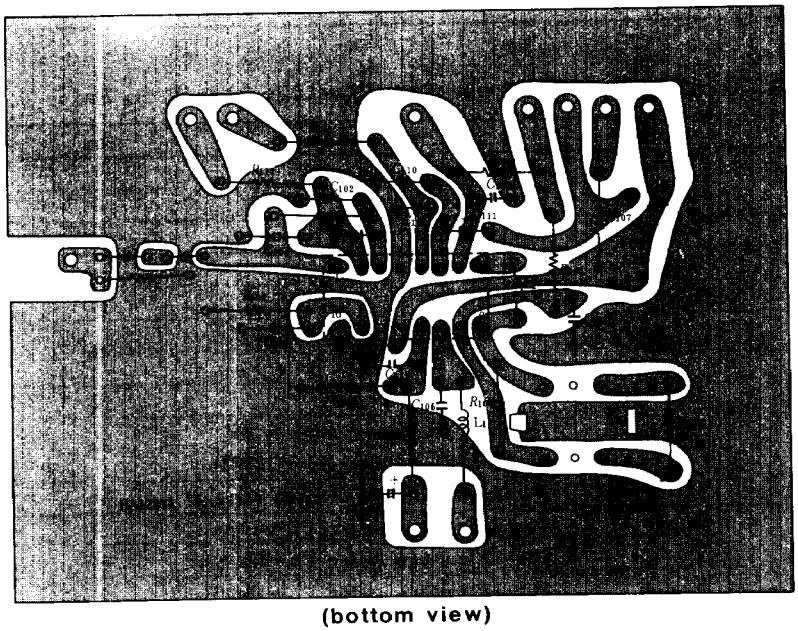
■ TEST CIRCUIT



Note)
HA12411 and HA12418 have the pin-to-pin compatibility with HA1137W, and the external parts of the test circuit are the same.

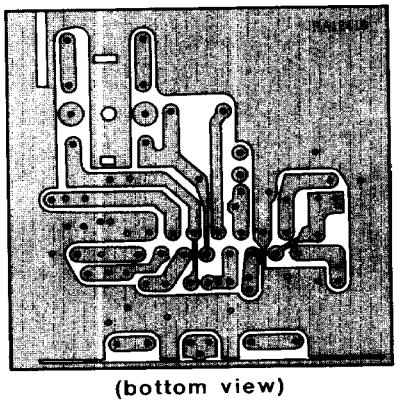
■ PRINTED CIRCUIT BOARD LAYOUT PATTERN

HA12411

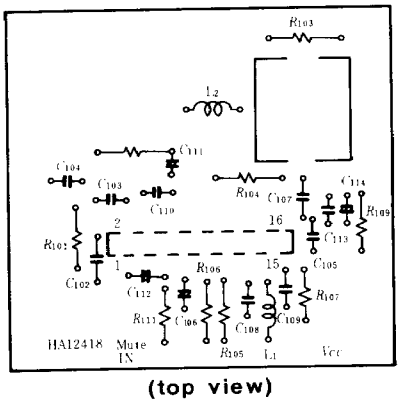


(bottom view)

HA12418

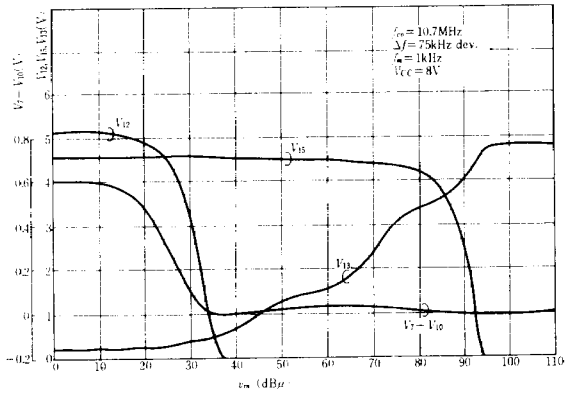


(bottom view)

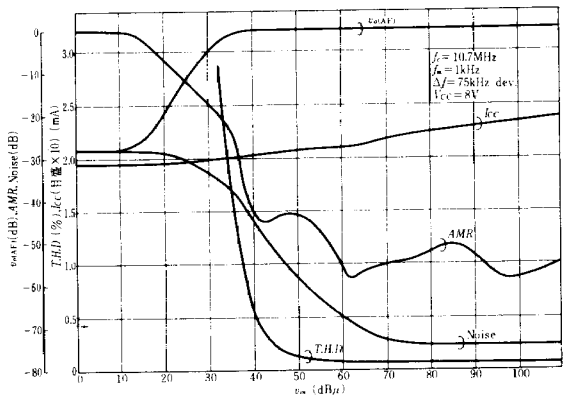


(top view)

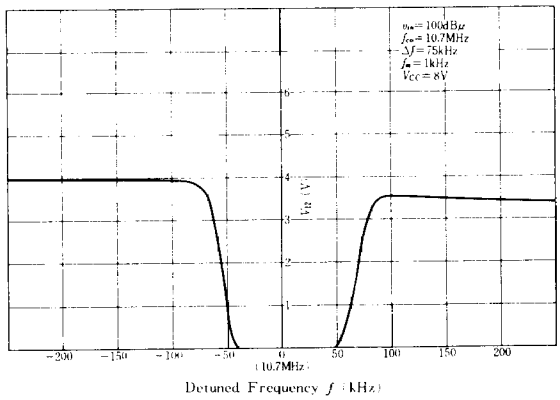
V_{12}, V_{13}, V_{15}, VS. V_{in}



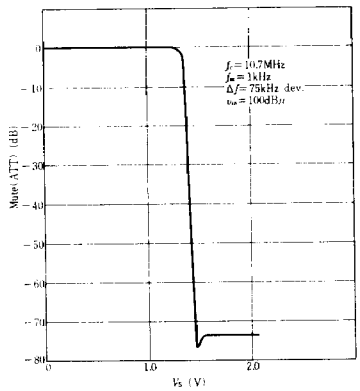
T.H.D, NOISE, V_{out}, I_{CC}, AMR VS. V_{in}



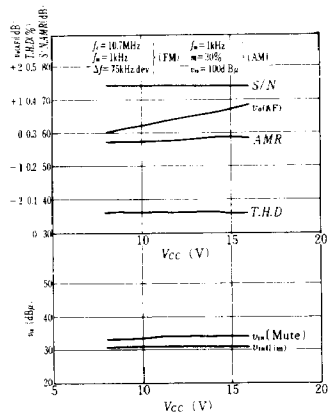
V_{12} VS. DETUNED FREQUENCY



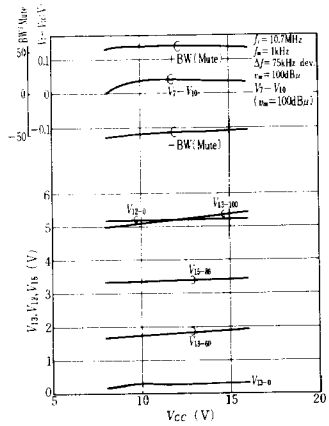
Mute(ATT), T.H.D VS. V_5 VOLTAGE



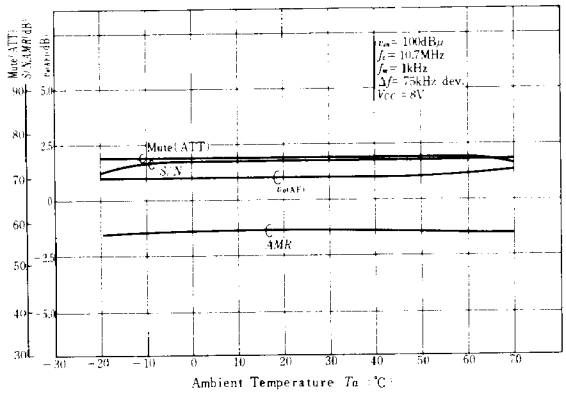
S/N, V_o(AF), AMR, T.H.D, V_{in}(lim), V_{in}(Mute) VS. V_{CC}



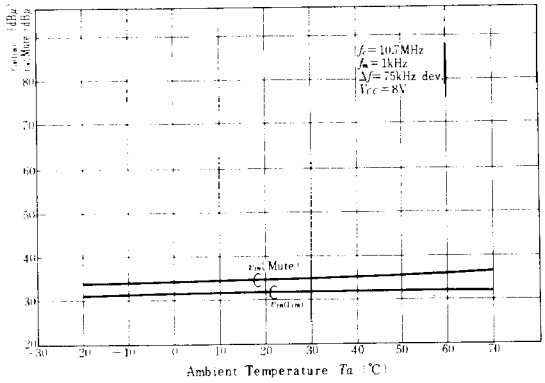
(V_7-V_{10}), V_{12-100}, V_{12-0}, V_{15-80}, V_{13-70}, V_{13-54}, V_{13-0} VS. V_{CC}



Mute(ATT), S/N, V_o(AF), AMR VS. AMBIENT TEMPERATURE



V_{in}(Mute), V_{in}(lim) VS. AMBIENT TEMPERATURE



T.H.D, BW(Mute) VS. AMBIENT TEMPERATURE