DBL 1019

AM TUNER SYSTEM

The DBL 1019 is a AM electronic tuner IC with high performance. It is greatly improved cross modulation characteristic.

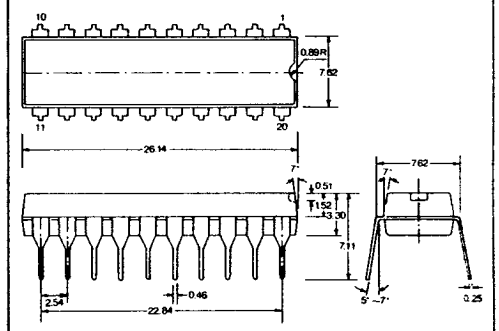
☐ FUNCTIONS

- ○ RF wide-band AGC, Attenuator Driver, Local OSC with ALC, Local OSC Buffer, Mixer, IF Amp, IF AGC, Detector, Signal Meter.

☐ FEATURES

- ○ Low noise
- ○ V_{CC} variation compensation
- ○ the local OSC buffer output facilitates designing of electronic tuner system, frequency display and etc.
- ○ The narrow band signal meter output is usable as auto search stop signal.
- ○ The excellent cross modulation characteristics prevent not only adjacent-channel interference but also interference caused by all channels with in broadcast band.
- ○ The OSC with ALC improves tracking error.
- ○ Double balanced differential MIX

20DIP Unit: mm



- ○ Recommended supply voltage : V_{CC} = 8V
- ○ Operating Supply Voltage range : V_{CC} = 7.5V~12V

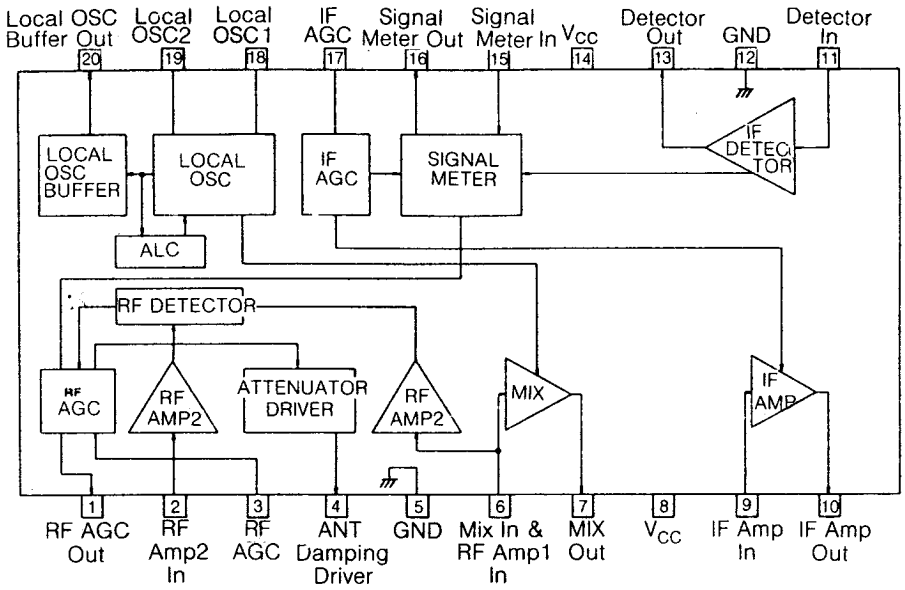
☐ APPLICATIONS

- ○ The AM car radios and the home receivers

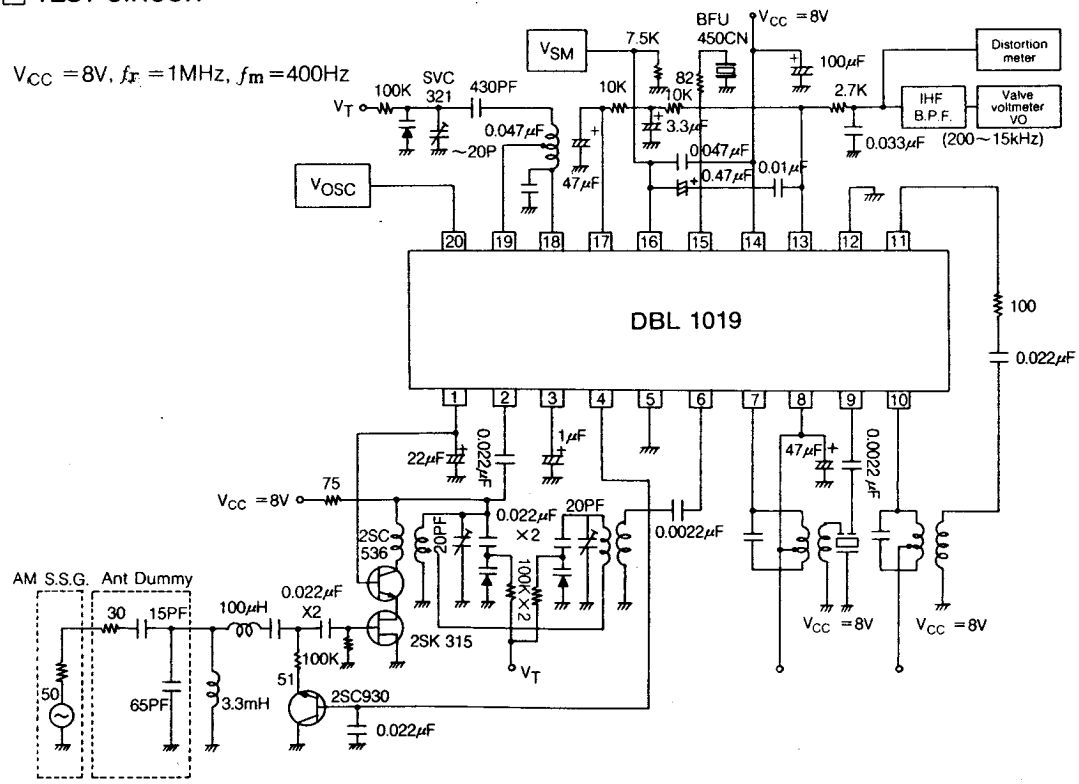
☐ MAXIMUM RATINGS

Characteristics	Symbol	Rating	Unit
Supply Voltage	V_{CC}	16	V
Supply Current	I_{CC}	41	mA
MIX Output and IF Amp Output Voltage	V_{OUT}	24	V
MIX Input and RF Amp 1 input Voltage	V_{IN}	5.6	V
Local OSC Current	I_{OSC}	2	mA
Power Dissipation	P_D	730	mW
Operating Temperature	T_{opr}	−20~+70	°C
Storage Temperature	T_{stg}	−40~+125	°C

☐ BLOCK DIAGRAM



☐ TEST CIRCUIT



☐ ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, Ta = 25°C, V_{CC} = 8V, f_r = 1MHz, f_m = 400Hz)

Characterisic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Quiescent Current	I_{CCQ}	—	13.5	22.5	32.5	mA
Supply Current	I_{CC}	130dBμ Input	20	30	41	mA
Detector Output	V_{OD1}	16dBμ Input 30% mod.	-29	-25	-21	dBm
	V_{OD2}	74dBμ Input 30% mod.	-15	-12	- 9	dBm
Signal to Noise Ratio	S/N	74dBμ Input 30% mod	51	56	—	dB
Total Harmonic Distortion	THD1	74dBμ Input 30% mod.	—	0.3	1	%
	THD2	74dBμ Input 80% mod.	—	0.3	2	%
	THD3	130dBμ Input 80% mod.	—	0.4	2	%
Signal Meter Output	V_{SM1}	Quiescent	—	0	0.3	V
	V_{SM2}	130dBμ Input	3.5	5	7.5	V
Input Voltage at Signal Meter Output 1V	V_{IN}	V_{SM} = 1V	18	24	30	dBμ
Local OSC Buffer Output	V_{OSC} (BUF)	—	320	380	—	mVrms
Quieting sensitivity	QS	S/N = 20dB	—	25	—	dBμ
Detection Output Variation	$\triangle V_{OD}$	Input 74dBμ→130dBμ	—	0.2	—	dB
Wide-Band AGC On State Input	WB_{AGC}	Interference 1.4MHz non mod. Reception 1MHz quiescent Input for ANT Damping ON.	—	82	—	dBμ
Local OSC Variation Within broadcast band	$\triangle V_{OSC}$	$V_{OSCL} - V_{OSCH}$	—	15	—	mVrms
Signal Meter Band	V_{SM-BW1}	74dBμ Input, frequency at which output is reduced to 1/2	—	± 1.5	—	KHz
	V_{SM-BW2}	74dBμ Input, frequency at which output is reduced to 1/10	—	-4.5/+7	—	KHz
Selectivity	SEL	30% mod ± 10KHz, WB_{AGC} : "OFF"	—	43	—	dB
IF Interference	IF. I.	f_r = 600KHz, WB_{AGC} : "OFF"	—	77.5	—	dB
Image Frequency Interference	IM. I.	f_r = 1400KHz, WB_{AGC} : "OFF"	—	52	—	dB

☐ ELECTRICAL CHARACTERISTICS

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Signal Meter Band	V_{SM-BW1}	74dBμ Input, frequency at which output is reduced to 1/2	—	± 1.5	—	KHz
	V_{SM-BW2}	74dBμ Input, frequency at which output is reduced to 1/10	—	-4.5/+7	—	KHz
Selectivity	SEL	30% mod ± 10KHz, WB_{AGC} : "OFF"	—	43	—	dB
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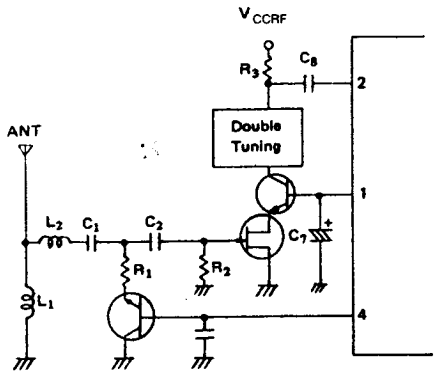
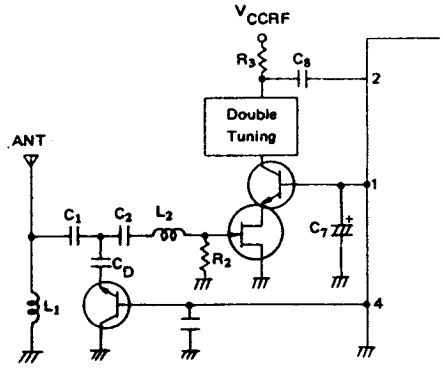
☐ INFORMATION IN USING IC (continued)

6. To make the ANT damping constant within the receiving band, change the application circuit as shown below.

○ Reference Circuit



○ Changing Circuit

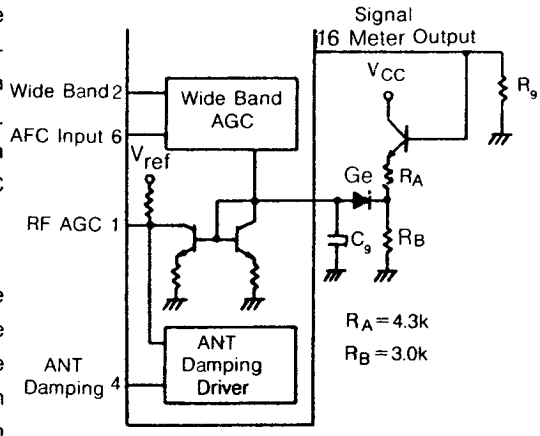


C_D is 2000PF to 3000pF or there abouts

L_2 Damping(600KHz~1400KHz) { Reference Circuit: -15dB / Changing Circuit: -4dB

7. The L_2 is used to remove the SW band.
If the RF stage is double-tuned, the difference in sensitivity within the RF band almost disappears, thereby leading to worse spurious characteristic.

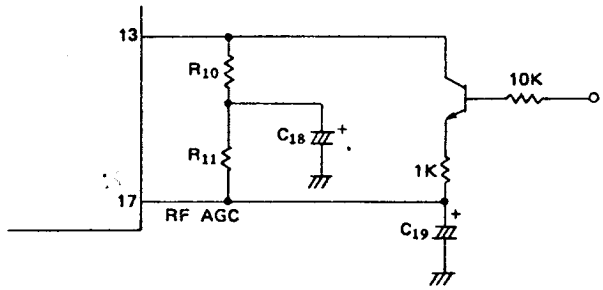
8. The DBL1019 contains 2-channel wide-band AGC. The pin 6 detects and undesired signal within the RF band and wide-band AGC is applied. This detection sensitivity is determined inside the IC. The pin 2 detects and undesired signal outside the RF band. This detection sensitivity is determined by R_3. When 1mVrms(f=1MHz) signal is applied to pin 2, AGC operates.

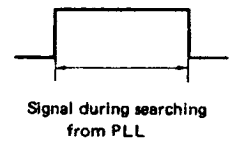


9. In the AGC circuit of the test circuit the presence of an undesired signal of high strength within the receiving band may cause the desired signal to be suppressed when the desired signal is low or medium in strength. Shown below is the circuit configuration where the necessary measures are taken against this suppression.

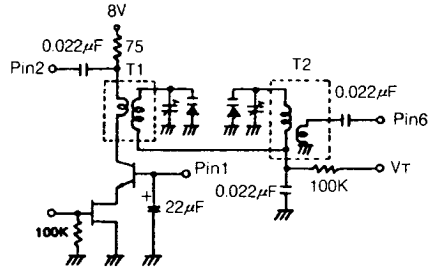
☐ INFORMATION IN USING IC (continued)

10. The circuit shown below is available to stabilize the transient response of the signal meter output at the search stop mode.

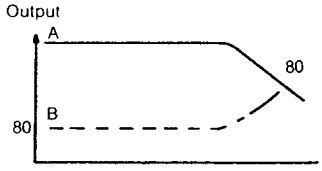




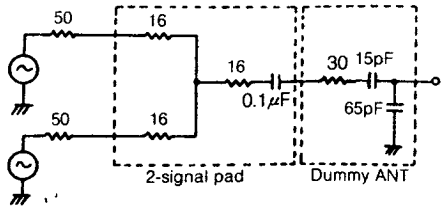
11. When using MW, no additional resistor is required.
    But when using LW(approximately 50°C or greater), additionally connect a resistor of 27kΩ across pins 18 and 19 against increase in local OSC level.
12. For improvement in image frequency interference change the RF double tunning coil as follows, and the image frequency interference becomes 63dB at $f_r = 1400$KHz. (Q point of the tuning circuit must not be decreased with tunning resistor 100kΩ)



13. Shown below is cross modulation characteristic.



Testing Method



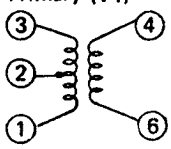
A : Desired signal 83dBμ 400Hz 30% mod.
The stength of an undesired signal (non mod) causes the desired signal to be suppressed.

B : Desired signal 80dBμ non-mod.
The strength of an undesired signal (40Hz 80% mod) causes interference to occur.

☐ COIL DATA (for test circuit)

1. RF double Tunning Coil

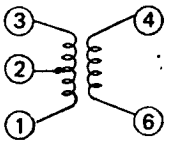
Primary (T1)



Bottom View

Item	L (μH)	Turns		
Pin No.	1-3	1-2	2-3	4-6
Value	224	2	82	37

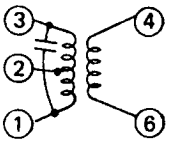
Secondary (T2)



Bottom View

Item	L (μH)	Turns		
Pin No.	1-3	1-2	2-3	4-6
Value	224	2	82	15

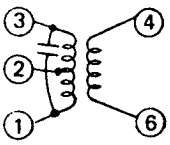
2. IFT(1) Coil(T3)



Bottom View

Item	C_O (pF)	f(KHz)	Q_O	Turns		
Pin No.	1-3	—	1-3	1-2	2-3	4-6
Value	180	450	115	69	77	14

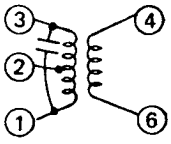
High Selectivity Type



Bottom View

Item	C_O (pF)	f(KHz)	Q_O	Turns		
Pin No.	1-3	—	1-3	1-2	2-3	4-6
Value	180	450	45	49	103	27

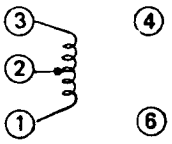
3. IFT(2) Coil(T4)



Bottom View

Item	C_O (pF)	f(KHz)	Q_O	Turns		
Pin No.	1-3	—	1-3	1-2	2-3	4-6
Value	180	455	110	115	37	6

4. OSC Coil(T5)

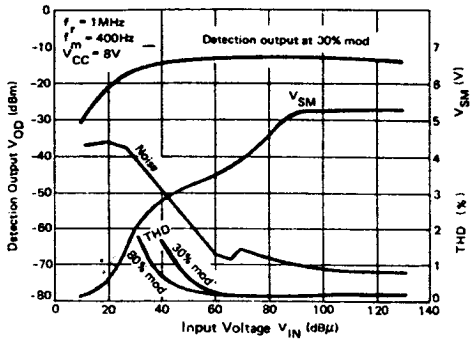


Bottom View

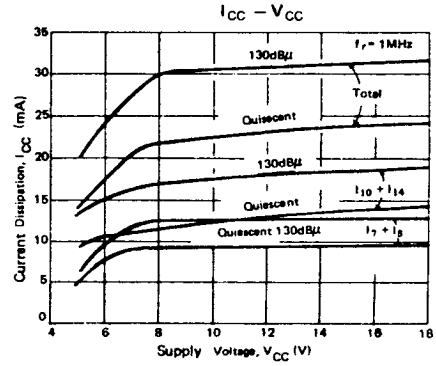
Item	L (μH)	Turns	
Pin No.	1-3	1-2	2-3
Value	118	29	29

☐ TYPICAL PERFORMANCE CHARACTERISTICS

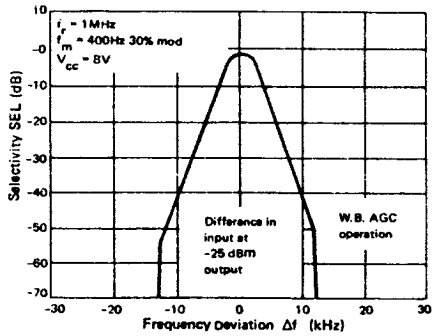
Overall Characteristic



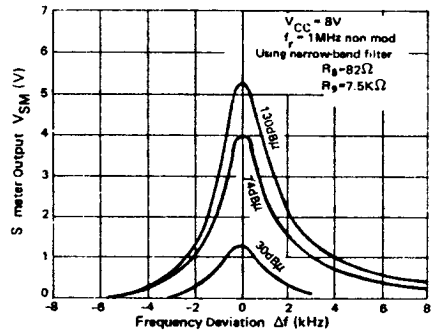
$I_{CC} - V_{CC}$



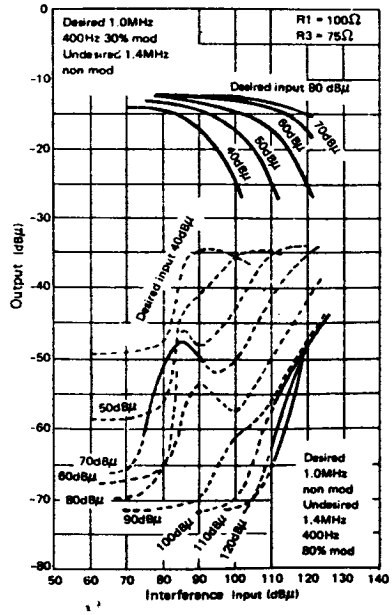
SEL – Δf



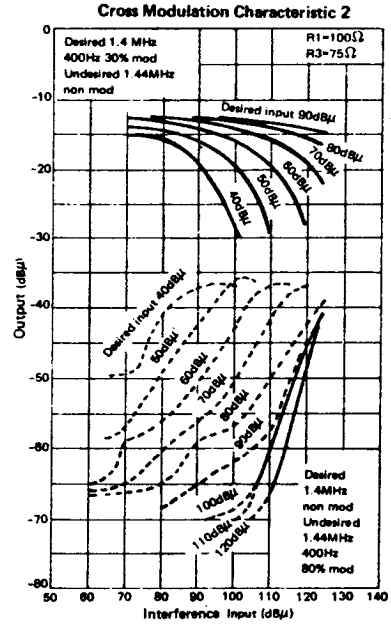
$V_{SM} - \Delta f$



Cross Modulation Characteristic 1



Cross Modulation Characteristic 2



☐ APPLICATION CIRCUIT