BIPOLAR ANALOG INTEGRATED CIRCUIT

μPC1344GT

T-77-05-09

ELECTRONIC TUNING AM RADIO RECEIVER

DESCRIPTION

The μPC1344GT is a silicon monolithic integrated circuit designed for automotive AM radio receivers. The μPC1344GT consists of 1st mixer, 1st oscillator, oscillator buffer amplifier, 2nd mixer, 2nd oscillator, IF amplifier, detector, AGC circuit and IF output circuit for station detection. The IF output (SD OUT) is connected IF counter circuit of digital tuning microprocessor.

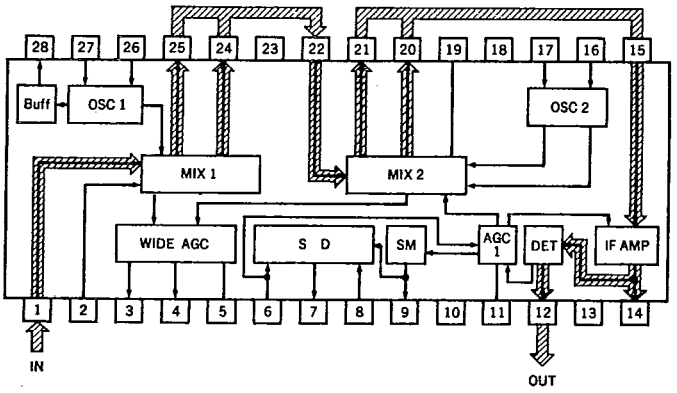
The μPC1344GT's 1st mixer and 1st oscillator convert station signal to 10.7 MHz. And 2nd mixer and 2nd oscillator convert 10.7 MHz signal to 450 kHz. Audio signal is detected from the 450 kHz signal after amplified by IF amplifier.

That is, the μPC1344GT uses up-conversion method, therefore a tracking adjustment free AM radio receiver can be made easily.

FEATURES

- Tracking adjustment free
- MW/LW turnover switch is not necessary
- Excellent tweet characteristic
- Excellent sensitivity
- Good matching with AM stereo demodulator

BLOCK DIAGRAM



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ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

DC Supply Voltage	V_{CC}	10	V
Package Dissipation	P_D	650	mW
Operating Temperature	T_{opt}	−30 to +75	°C
Storage Temperature	T_{stg}	−40 to +125	°C

RECOMMENDED OPERATING CONDITIONS (T_a = 25 °C)

DC Supply Voltage Range	V_{CC}	7.5 to 8.5	V

ELECTRICAL CHARACTERISTICS (T_a = 25 °C, V_{CC} = 8 V, f = 1 MHz, f_{mod} = 400 Hz, mod = 30 %)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Circuit Current	I_{CC}	34	45	58	mA	NO SIGNAL (IC only)
Signal to Noise Ratio	S/N	51	61		dB	v_i = 74 dBμV
Detector Output Volt	v_o	150	190	220	$mV_{r.m.s.}$	v_i = 74 dBμV
Harmonic Distortion	THD_1		0.2	1.0	%	v_i = 74 dBμV
	THD_2		0.5	1.5	%	v_i = 74 dBμV, m = 80 %
	THD_3		0.4	1.5	%	v_i = 130 dBμV, m = 80 %
Signal Meter Output	V_{S1}		0	0.1	V	NO SIGNAL
	V_{S2}	1.2	2.4	3.0	V	v_i = 30 dBμV
	V_{S3}	3.0	4.0	5.3	V	v_i = 74 dBμV
OSC. Buff. Output	$V_{oscBuff}$	106	108	110	dBμV	

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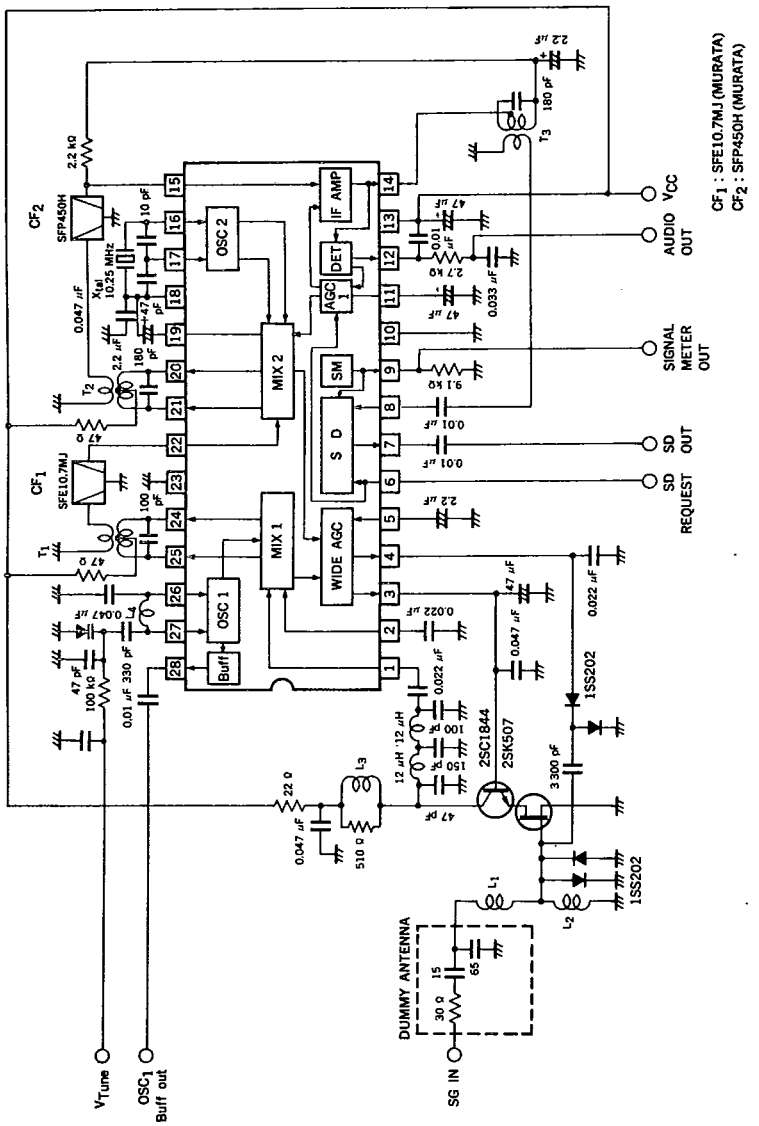
TEST CIRCUIT



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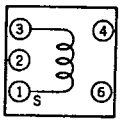
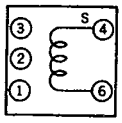
COIL DATA (TOKO INC.)

L_1 X119FNS-16314Z



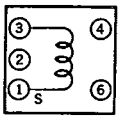
1 – 3 : 15T
L = 4.7 μH
$Q_u > 60$

L_2 7PD-1043



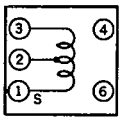
4 – 6 : 1440T
L = 100 mH
Q > 45

L_3 247BR-0147Z



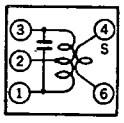
1 – 3 : 274T
L = 2 mH
Q > 50

L_4 260LC-1694Y



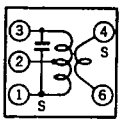
1 – 3 : 8T 1 – 2 : 4T
2 – 3 : 4T
L = 1.8 μH
$Q_u > 70$

T_1 260LC-1635N



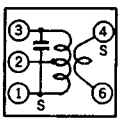
1 – 3 : 14T 1 – 2 : 7T
2 – 3 : 7T 4 – 6 : 2T
C = 47 pF
Q = 68 ± 20 % f_o = 10.7 MHz

T_2 S7YC-1633N



1 – 3 : 150T 1 – 2 : 75T
2 – 3 : 75T 4 – 6 : 20T
C = 180 pF
Q = 42 ± 20 % f_o = 450 kHz

T_3 CX7YCS-8986N



1 – 3 : 148T 1 – 2 : 43T
2 – 3 : 105T 4 – 6 : 30T
C = 180 pF
Q = 40 ± 20 % f_o = 450 kHz

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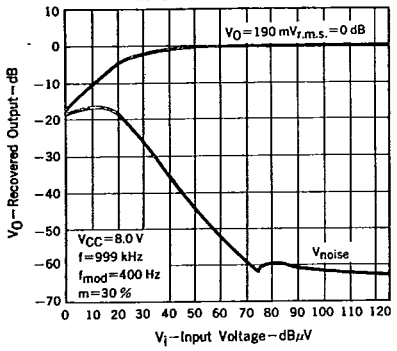
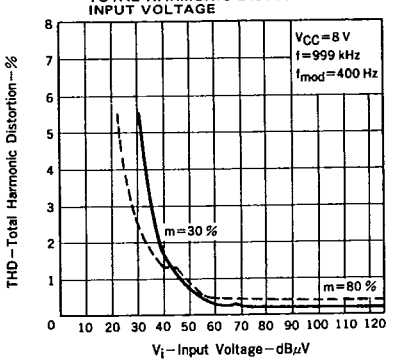
TYPICAL CHARACTERISTICS (T_a = 25 °C)

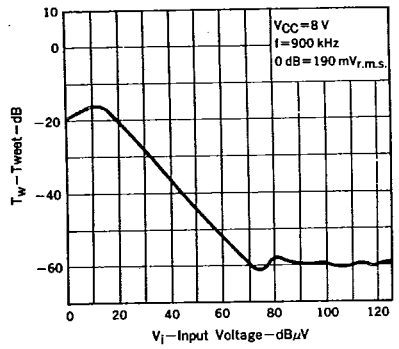
RECOVERED OUTPUT vs. INPUT VOLTAGE



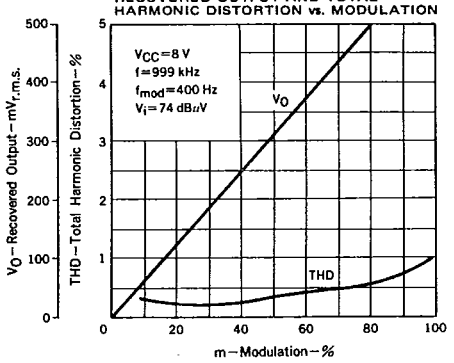
TOTAL HARMONIC DISTORTION vs. INPUT VOLTAGE



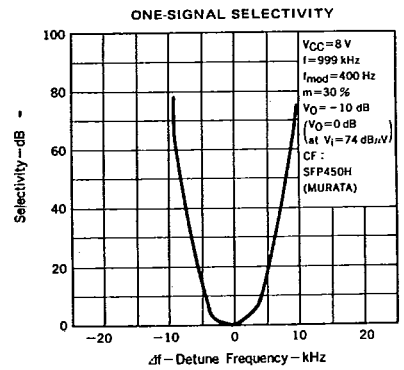
TWEET CHARACTERISTIC



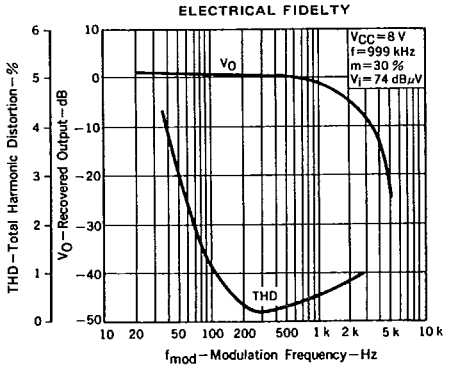
RECOVERED OUTPUT AND TOTAL HARMONIC DISTORTION vs. MODULATION



ONE-SIGNAL SELECTIVITY



ELECTRICAL FIDELTY



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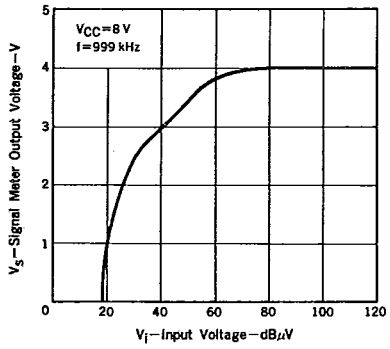
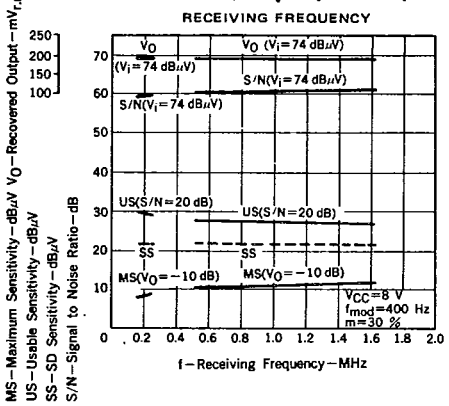
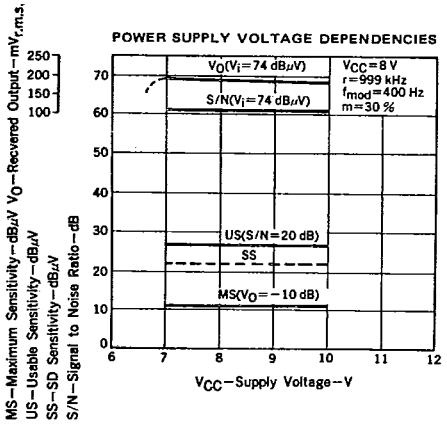
SIGNAL METER OUTPUT VOLTAGE vs. INPUT VOLTAGE



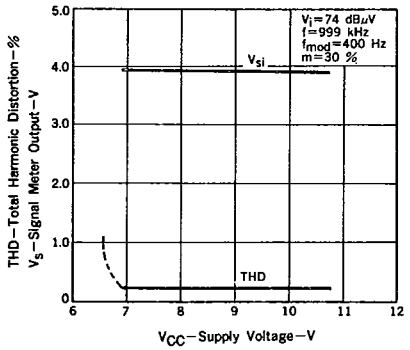
RECEIVING FREQUENCY



POWER SUPPLY VOLTAGE DEPENDENCIES



POWER SUPPLY VOLTAGE DEPENDENCIES



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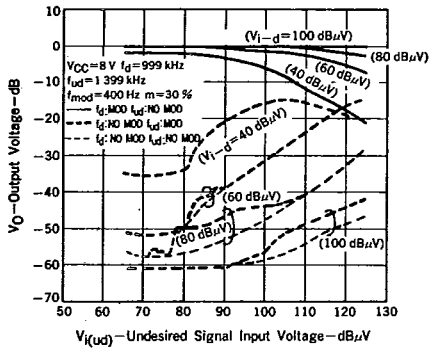
TWO-SIGNAL RECEPTION RESPONSE



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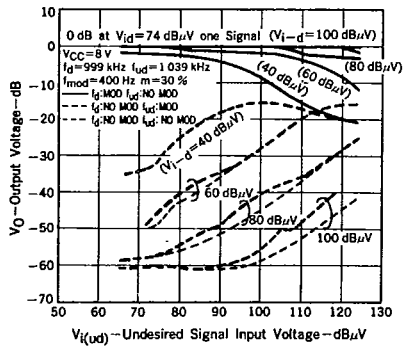

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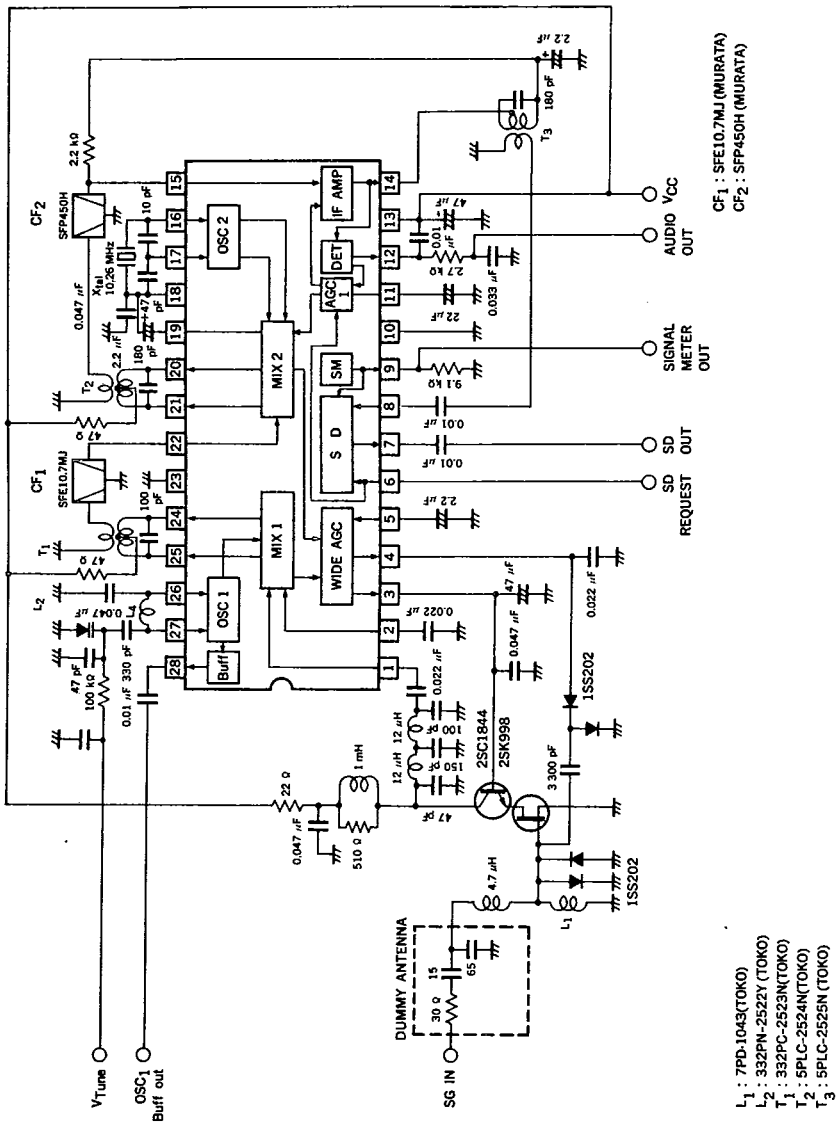
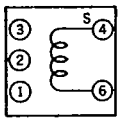
APPLICATION CIRCUIT



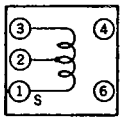
COIL DATA (TOKO INC.)

L_1 7PD-1043



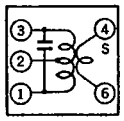
4 – 6 : 1440T
L = 100 mH
$Q_u > 45$

L_2 332PN-2522Y



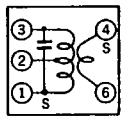
1 – 3 : 10T
1 – 2 : 5T
2 – 3 : 5T
L = 1.8 μH
$Q_u > 70$

T_1 332PC-2523N



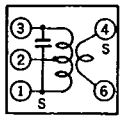
1 – 3 : 16T 1 – 2 : 8T
2 – 3 : 8T 4 – 6 : 2T
C = 47 pF
$Q > 60$ f_o = 10.7 MHz

T_2 5PLC-2524N



1 – 3 : 180T 1 – 2 : 90T
2 – 3 : 90T 4 – 6 : 24T
C = 180 pF
$Q > 40$ f_o = 450 kHz

T_3 5PLC-2525N



1 – 3 : 180T 1 – 2 : 52T
2 – 3 : 128T 4 – 6 : 36T
C = 180 pF
$Q > 40$ f_o = 450 kHz

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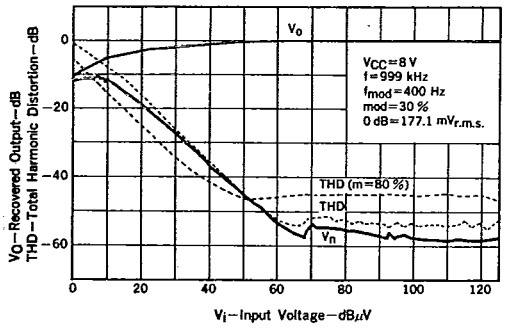
ELECTRICAL CHARACTERISTICS (APPLICATION CIRCUIT)
(T_a = 25 °C, V_{CC} = 8 V, f = 1 MHz, f_{mod} = 400 Hz, mod = 30 %)

CHARACTERISTIC	TEST CONDITION	VALUE	UNIT
Maximum Sensitivity	V_O = −10 dB (V_O = 0 dB at V_{in} = 74 dBμV)	1	dBμV
Usable Sensitivity	S/N = 20 dB	24.5	dBμV
Signal to Noise Ratio	V_{in} = 74 dBμV	55	dB
Detector Output Voltage	V_{in} = 74 dBμV	180	mV
Total Harmonic Distortion	V_{in} = 74 dBμV	0.27	%
	V_{in} = 126 dBμV, mod = 80 %	0.5	%
Selectivity	Δf = ±9 kHz	63	dB
Tweet	V_{in} = 40 dBμV, 2 IF	−29	dB
SD Sensitivity	8 pin Voltage L to H	15	dBμV
Signal Meter Output	V_{in} = 30 dBμV	2.9	V
	V_{in} = 74 dBμV	4.0	V

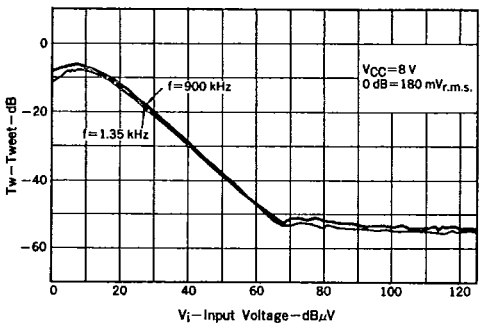
Note: Please change capacitance values for 2nd osc. if X'tal type or maker was changed.

TYPICAL CHARACTERISTICS (T_a = 25 °C)

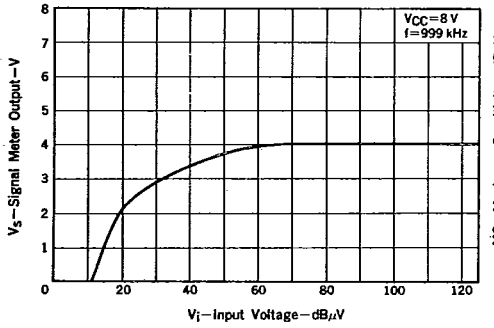
RECOVERED OUTPUT, TOTAL HARMONIC DISTORTION vs. INPUT VOLTAGE



TWEET CHARACTERISTIC



SIGNAL METER OUTPUT VOLTAGE vs. INPUT VOLTAGE



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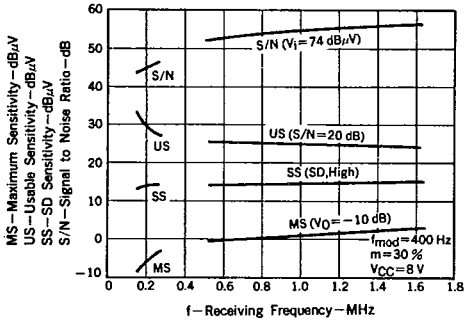

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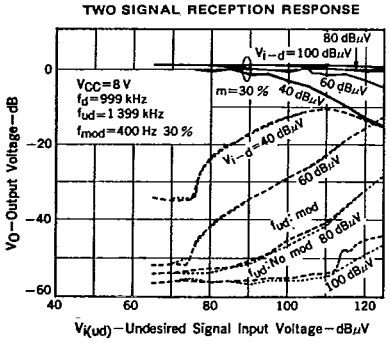
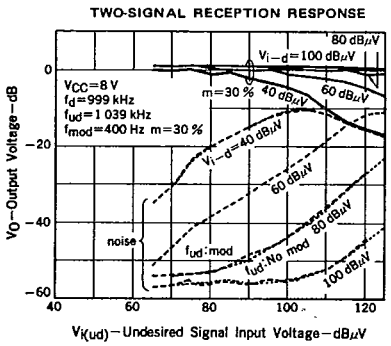
TWO SIGNAL RECEPTION RESPONSE



TWO-SIGNAL RECEPTION RESPONSE



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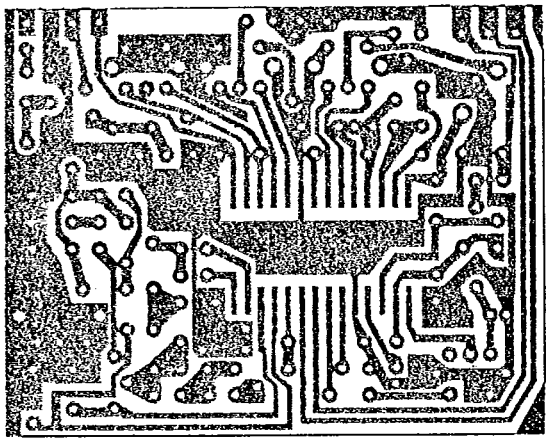
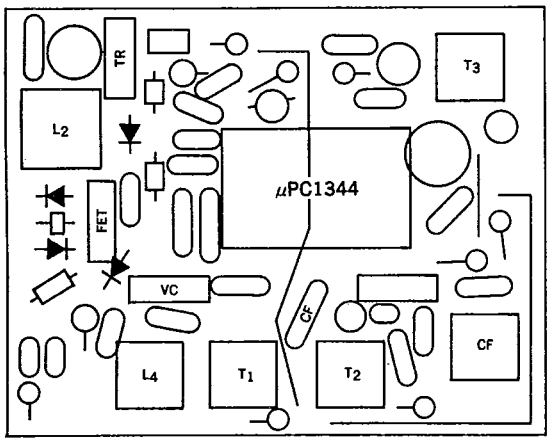
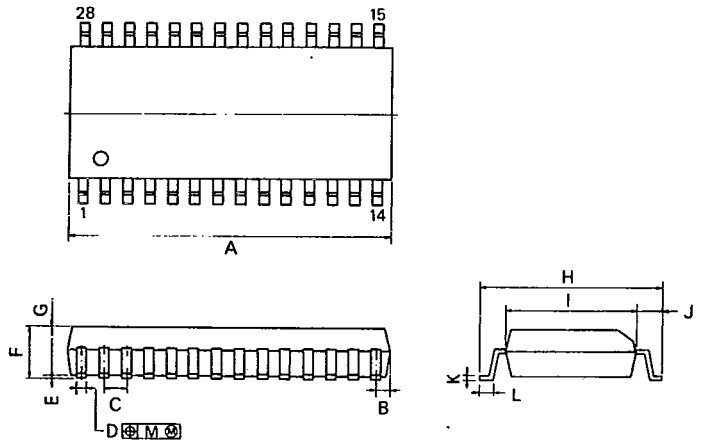
TYPICAL PCB

(COPPER SIDE)





38PIN PLASTIC SOP (375 mil)



P28GM-50-375B

NOTE

Each lead centerline is located within 0.12 mm (0.005 inch) of its true position (T.P.) at maximum material condition.

ITEM	MILLIMETERS	INCHES
A	18.07 MAX.	0.712 MAX.
B	0.78 MAX.	0.031 MAX.
C	1.27 (T.P.)	0.050 (T.P.)
D	$0.40^{+0.10}_{-0.08}$	$0.016^{+0.004}_{-0.003}$
E	0.1 ± 0.1	0.004 ± 0.004
F	2.9 MAX.	0.115 MAX.
G	2.50	0.098
H	10.3 ± 0.3	$0.406^{+0.012}_{-0.013}$
I	7.2	0.283
J	1.6	0.063
K	$0.15^{+0.10}_{-0.05}$	$0.006^{+0.004}_{-0.002}$
L	0.8 ± 0.2	$0.031^{+0.009}_{-0.008}$
M	0.12	0.005

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