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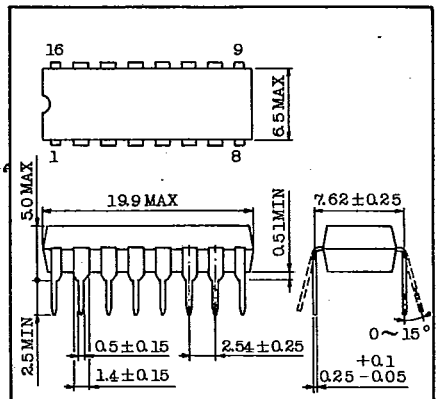
TA7613AP

AM/FM RADIO IC WITH POWER AMPLIFIER

- TA7613AP is Suitable for Use in AM/FM Portable Radios or Main-fed AM/FM Clock Radios.
- It Incorporates : AM RF Amp, AM Local Oscillator, AM Mixer, AM/FM IF Amp, AM/FM Detector, AM AGC Circuit, FM AFC Circuit and B Class-Audio Power Amplifier.
- Using the TA7613AP, Plus the Discrete Input Stage (for FM : RF Amp and Converter), It is Possible to Construct a Complete AM/FM Radios Receivers.
- It Features Wide Operating Voltage Range : from 3 Volts to Approximately 13 Volts, Depending on the Internal Regulator Tolerance.
- As the Internal Shunt Voltage Regulator Circuit is Connected to the Supply Voltage Terminal, it Permits a Constant Current Mode (Approximately 42mA) of Operation which is Desirable for Line-Operated Equipments.
- AM to FM Switching is Accomplished by Switching Only DC Circuitly.

Unit in mm



Lead pitch is 2.54 and tolerance is ±0.25 against theoretical center of each lead that is obtained on the basis of No.1 and No.16 leads.

JEDEC	—
TOSHIBA	3D16A-P

MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	11	V
Supply Current	I_{CC}	44	mA
Power Dissipation (Note) (Ta=≦65°C)	P_D	600	mW
Thermal Resistance	R_{J-A}	100	°C/W
Operating Temperature	T_{opr}	-18~65	°C
Storage Temperature	T_{stg}	-40~125	°C

Note : Derated above Ta=25°C in the proportion of 10mW/°C.

V_{CC} vs R_L

R_L \ V_{CC}	4.5V	6V	7.5V	9V	Line Operated
8 Ω	○	○	○	×	×
16 Ω	○	○	○	○	×
45 Ω	○	○	○	○	○

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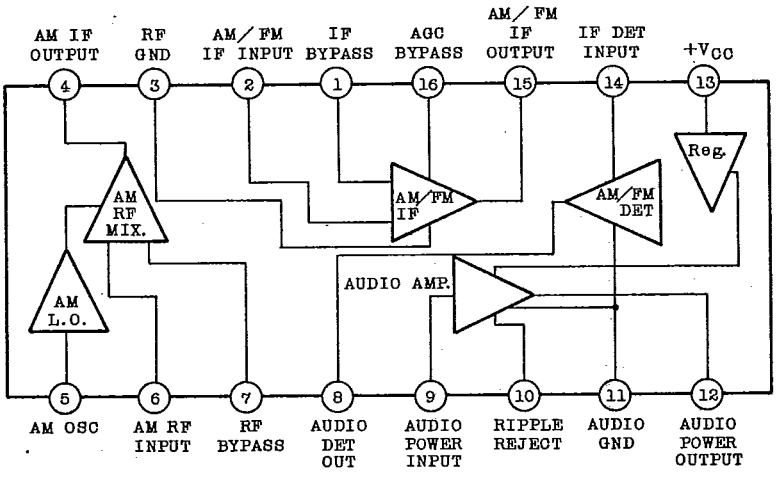
ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, Ta=25°C, $f_{(AM)}$=1MHz, Mod=30%, $f_{(FM)}$=10.7MHz, ΔF=22.5kHz, f_M=1kHz, V_{IN}=SG Open Voltage -6dB)

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current		I_{CCQ}		SW1→FM, V_{CC}=3V	7	12	17	mA
				SW1→FM, V_{CC}=9V	10	17	23	
Pin 16 Terminal Voltage		$V_{16(FM)}$		SW1→FM, I_{CC}=42mA, No Signal	2.0	2.4	3.1	V
Limiting Voltage		$V_{IN(lim)}$		SW1→FM, V_{CC}=5.5V, -3dB V_{16}=2.4V, VR=Min.	-	57	-	dBμV
Internal Regulated Voltage		V_{CC}		SW1→AM, I_{CC}=42mA	12.5	13.2	14.0	V
Pin 16 Terminal Voltage		$V_{16(AM)}$		SW1→AM, V_{CC}=9V, No Signal	1.4	-	1.9	V
Maximum Sensitivity		V_O		SW1→AM, V_{CC}=12V, V_{IN}=37dB SW2→45Ω, V_{16}=1.4V	1.5	3.0	-	V
Quieting Sensitivity		S/N		SW1→AM, V_{CC}=5.5V SW2→8Ω, V_{IN}=37.5dB	15	20	-	dB
Power Stage	Output Power	P_{OUT}		SW2→8Ω, V_{CC}=5.5V, f=1kHz VR=Min. THD=10%	0.28	-	-	W
	Total Harmonic Distortion	THD		SW2→45Ω, I_{CC}=42mA, f=1kHz VR=Min. V_{OUT}=2V	-	0.5	4.0	%
	Voltage Gain	G_V		SW2→8Ω, V_{CC}=5.5V, f=1kHz VR=Min.	-	40	-	dB

BLOCK DIAGRAM



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INPUT-OUTPUT IMPEDANCE (Ta=25°C, V_{CC}=6V)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Pin 2 Input Impedance (AM)	$R_{ip2(AM)}$	f=455kHz	-	200	-	kΩ
	$c_{ip2(AM)}$	f=455kHz	-	3	-	pF
Pin 2 Input Impedance (FM)	$R_{ip2(FM)}$	f=10.7MHz	-	30	-	kΩ
	$c_{ip2(FM)}$	f=10.7MHz	-	3.5	-	pF
Pin 4 Output Impedance	R_{op4}	f=455kHz	-	300	-	kΩ
	c_{op4}	f=455kHz	-	6	-	pF
Pin 6 Input Impedance	R_{ip6}	f=1MHz	-	50	-	kΩ
	c_{ip6}	f=1MHz	-	5	-	pF
Pin 14 Input Impedance (AM)	$R_{ip14(AM)}$	f=455kHz	-	300	-	kΩ
	$c_{ip14(AM)}$	f=455kHz	-	3.5	-	pF
Pin 14 Input Impedance (FM)	$R_{ip14(FM)}$	f=10.7MHz	-	300	-	kΩ
	$c_{ip14(FM)}$	f=10.7MHz	-	4	-	pF
Pin 15 Output Impedance (AM)	$R_{op15(AM)}$	f=455kHz	-	300	-	kΩ
	$c_{op15(AM)}$	f=455kHz	-	5.5	-	pF
Pin 15 Output Impedance (FM)	$R_{op15(FM)}$	f=10.7MHz	-	300	-	kΩ
	$c_{op15(FM)}$	f=10.7MHz	-	6	-	pF

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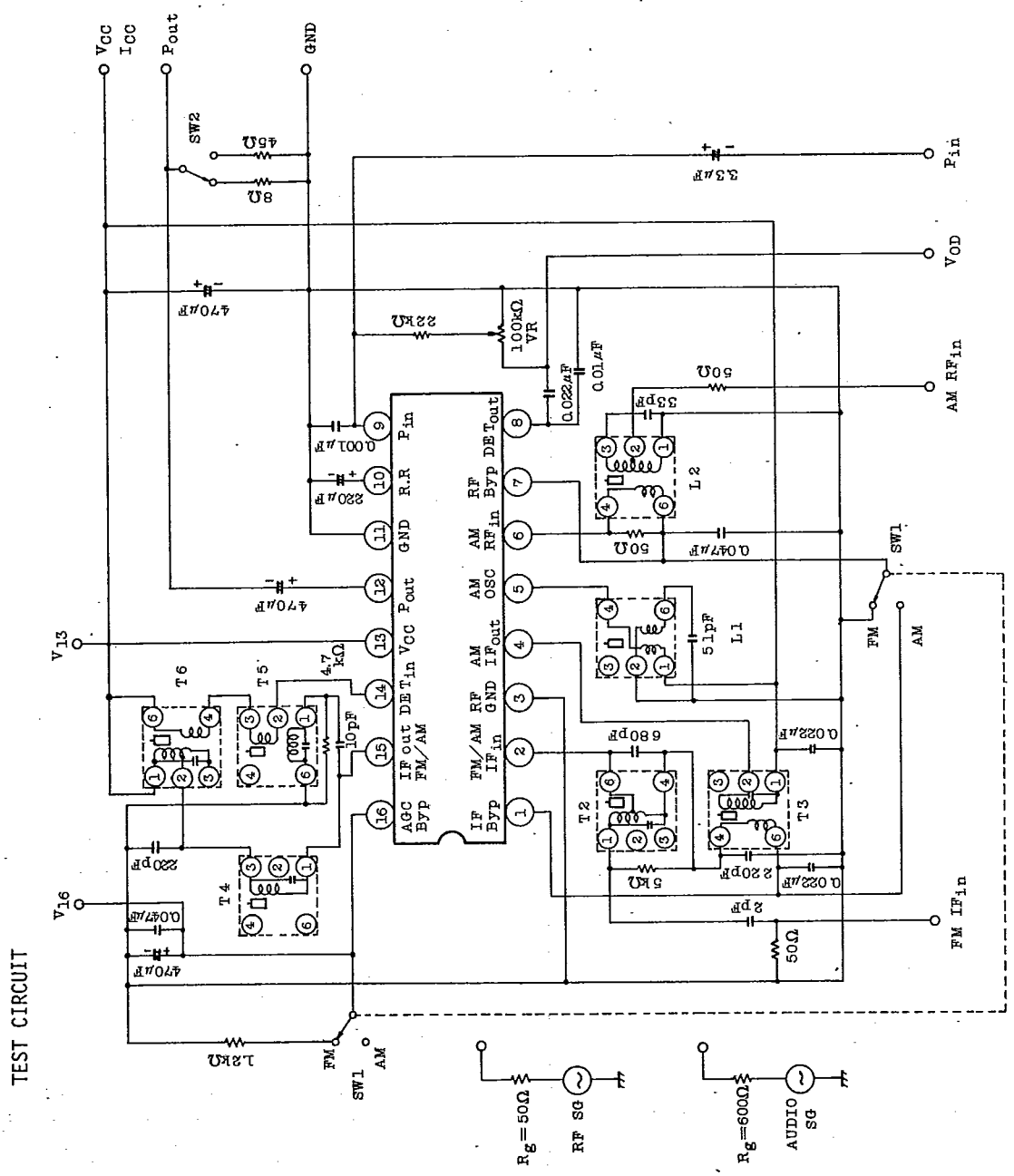
TEST CIRCUIT



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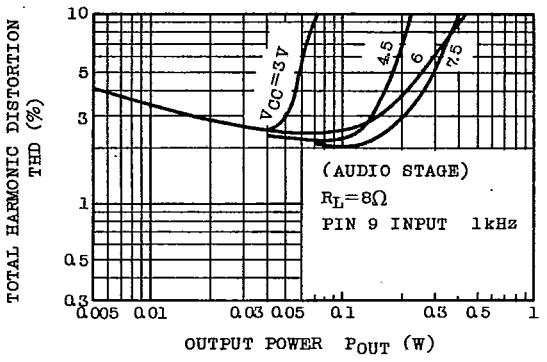
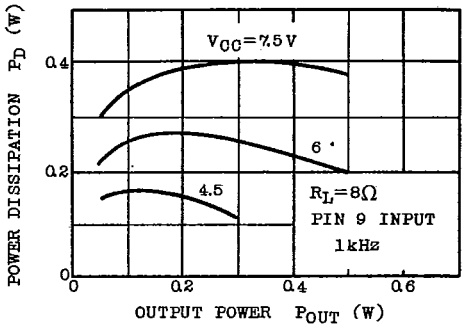
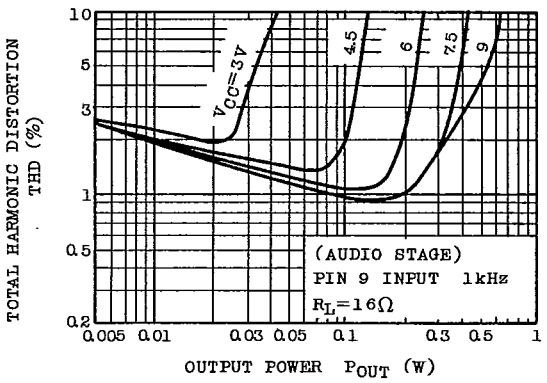
P_{OUT} – THD



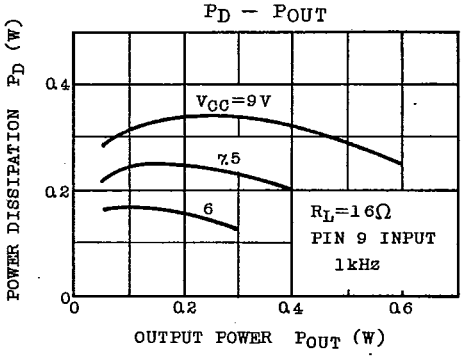
P_D – P_{OUT}



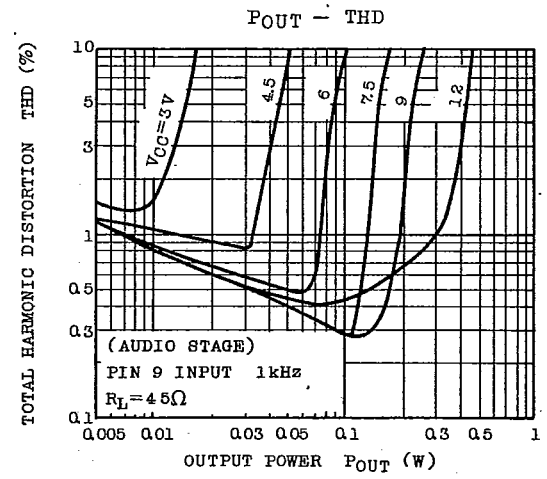
P_{OUT} – THD



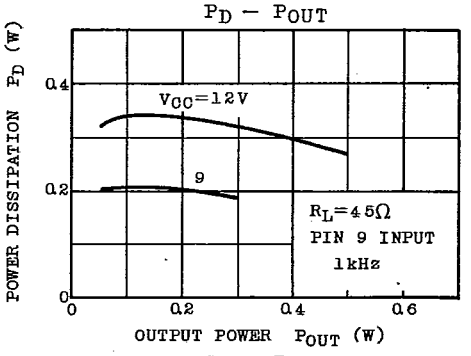
P_D – P_{OUT}



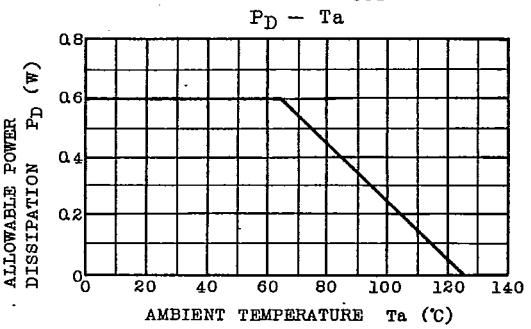
P_{OUT} – THD



P_D – P_{OUT}



P_D – Ta



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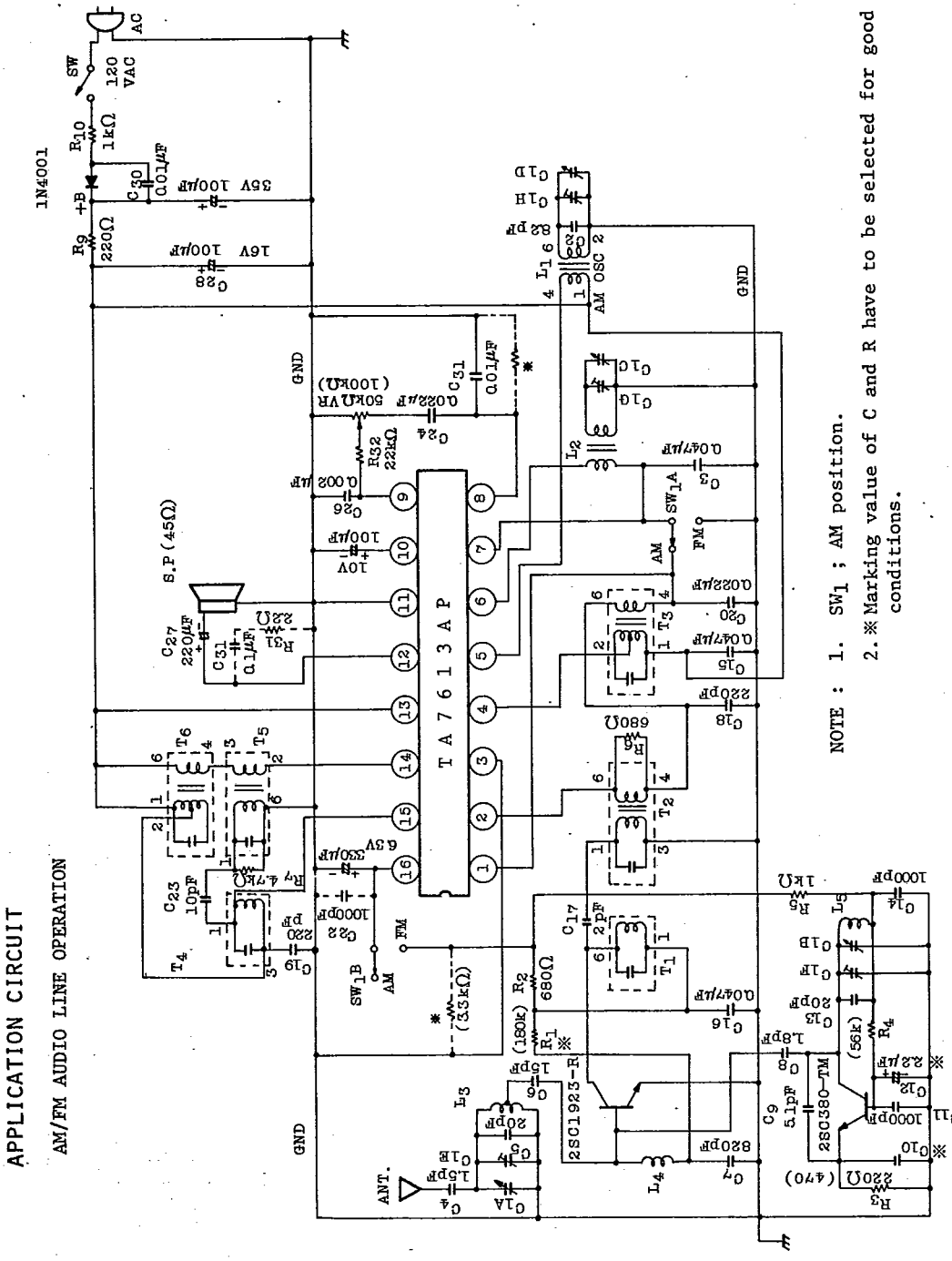
APPLICATION CIRCUIT

AM/FM AUDIO LINE OPERATION



NOTE : 1. SW_1 ; AM position.

2. ※ Marking value of C and R have to be selected for good conditions.

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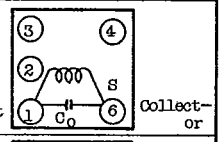
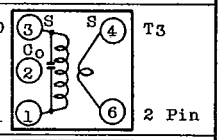
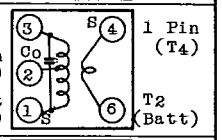
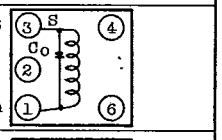
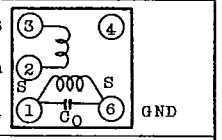
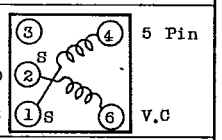
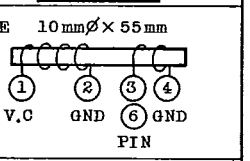
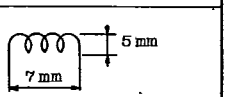
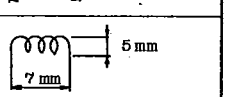
COIL DATA

COIL No.	f	Q0	TURNS	C_o	
T1	10.7MHz	120	6-1 8T	150pF	
T2	10.7MHz	95	3-1 5T 4-6 2T	400pF	
T3 (T6)	455kHz	130	1-2 45T 2-3 110T 4-6 55T	150pF	
T4	10.7MHz	80	3-1 6T	300pF	
T5	10.7MHz	70	6-1 $7\frac{1}{2}$T 2-3 7T	180pF	
L1	AM LOCAL OSCILLATOR	90	2-6 $82\frac{1}{2}$T 1-4 $8\frac{1}{2}$T		
L2	AM ANTENNA	200	① - ② 138T (L=560μH) ③ - ④ 9T	-	
L3	FM ANTENNA	-	0.8mmØ UEW 4T TAP 0.5T	-	
L4	Trap	-	0.32mmØ UEW 10T	-	
L5	FM OSCILLATOR	-	0.8mmØ UEW 4T	-