T-77-05-05

TA7641BP
TA7641BF

AM 1 CHIP RADIO

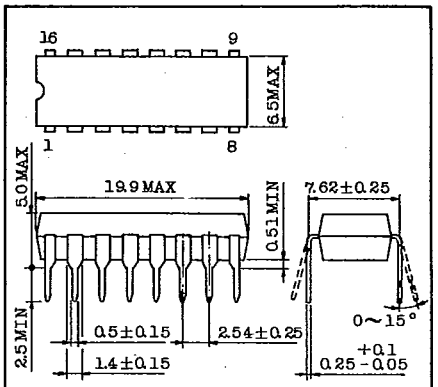
The TA7641BP is designed for the portable AM Radio applications and provides all of the functions from the converter to power amplifier. It is designed to make the quiescent current very small (1.6mA Typ. at V_{CC}=3V) by use of the idle current control circuit. So it is capable to design the portable radio set with merit that the battery life is very long.

- Low Quiescent Current: I_{CCQ}=1.6mA(Typ.) at V_{CC}=3V
- Operating Supply Voltage Range: V_{CC}=2～5V
- High Power Efficiency
- Power Output: P_O=100mW(Typ.) at THD=10%
- The Item is Different Each Outlines.

  TA7641BP; Dual in Line Package..Outline 3D16A-P

  TA7641BF; Flat Package.....Outline F16GA1-P

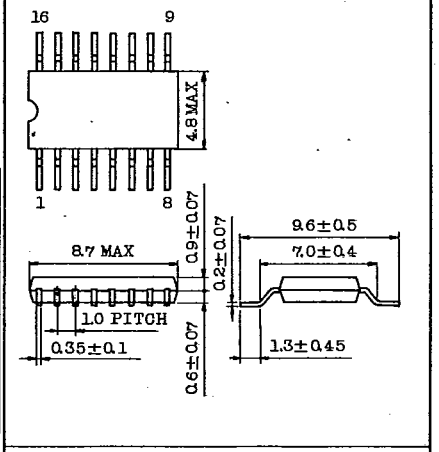
Unit in mm



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

Unit in mm



JEDEC	—
TOSHIBA	F16GA1-P

MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}	6	V
Power Dissipation (Note)	TA7641BP	P_D	750	mW
	TA7641BF		350	
Output Current (Peak)		$I_{O(peak)}$	0.2	A
Operating Temperature		T_{opr}	-10～60	°C
Storage Temperature		T_{stg}	-55～150	°C

Note: TA7641BP: Derated above Ta=25°C in the proportion of 6mW/°C.

TA7641BF: Derated above Ta=25°C in the proportion of 2.8mW/°C.

TA7641BP
TA7641BF

T-77-05-05

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified,

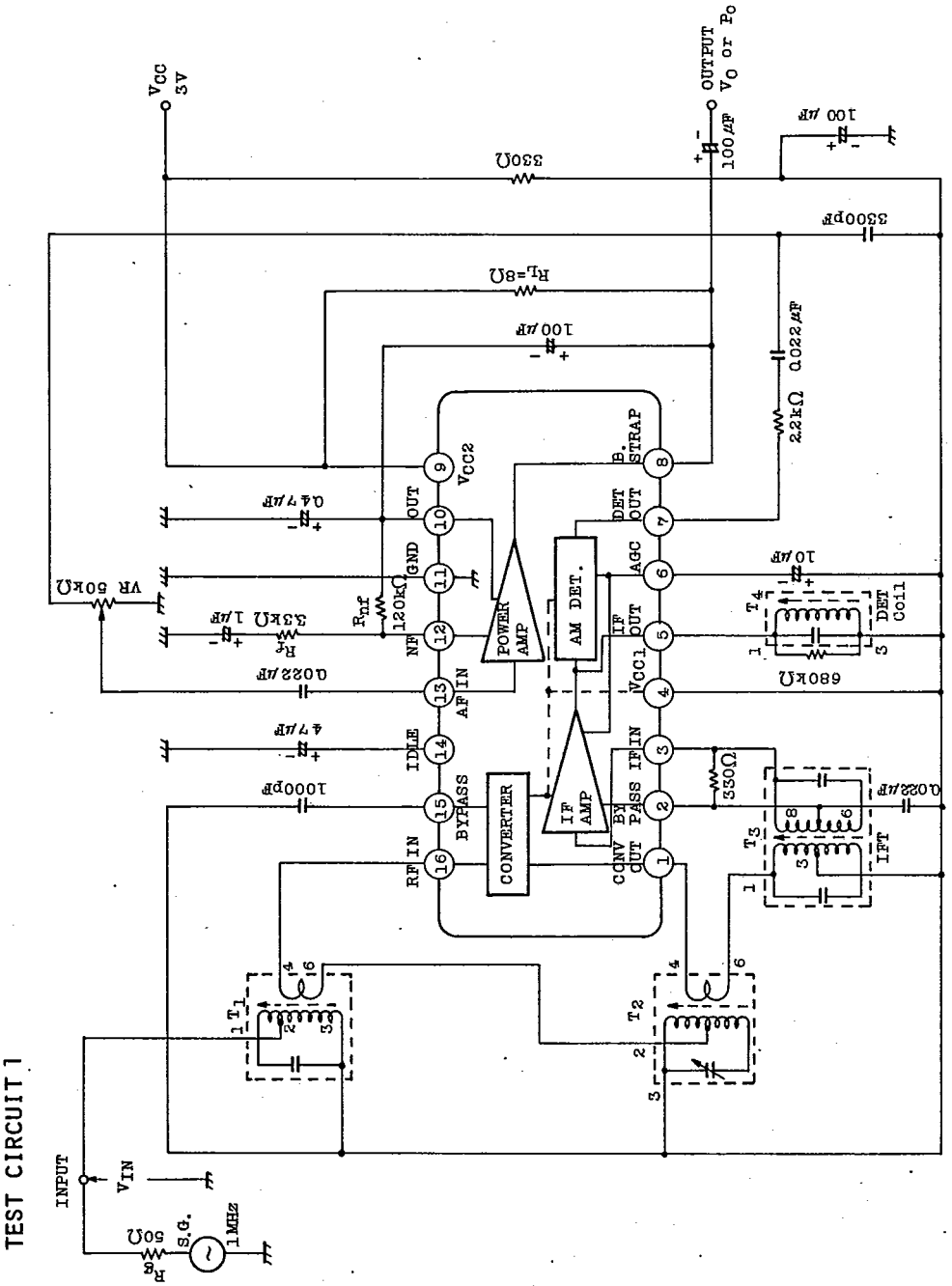
V_{CC}=3V, f=1MHz, f_m=1kHz, Mod=30%, R_g=50Ω, R_L=8Ω, Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I_{CCQ}	1	V_{IN}=0	0.7	1.6	3.0	mA
Maximum Sensitivity	G_{SM}	1	V_{IN}=20dBμV, V_R=Max.	200	-	-	mV_{rms}
Output Power	P_O	1	V_{IN}=42dBμV, V_R=Max. R_L=8Ω	80	100	-	mW
Maximum Output Power	P_{OM}	1	Power Amp. Only	-	150	-	mW
Total Harmonic Distortion	THD	1	V_{IN}=42dBμV V_O=200mV_{rms} (VR=control)	-	2	6	%
Signal to Noise Ratio	S/N	1		-	44	-	dB
Output Noise Voltage	V_{NOISE}	1	V_{IN}=0, VR=Max.	-	3.5	-	mV_{rms}
16 Pin Parallel Input Impedance	r_{ip} 16	2	f=1MHz	-	500	-	kΩ
	C_{ip} 16	2		-	2.5	-	pF
1 Pin Parallel Output Impedance	r_{op} 1	3	f=1MHz	-	500	-	kΩ
	C_{op} 1	3		-	3.9	-	pF
3 Pin Parallel Input Impedance	r_{ip} 3	4	f=500kHz	-	60	-	kΩ
	C_{ip} 3	4		-	2.2	-	pF
5 Pin Parallel Output Impedance	r_{op} 5	5	f=500kHz	-	100	-	kΩ
	C_{op} 5	5		-	3.0	-	pF

TA7641BP
TA7641BF

T-77-05-05

TEST CIRCUIT 1

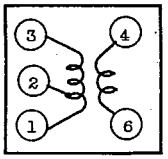


TA7641BP
TA7641BF

T-77-05-05

COIL DATA

T_1 Antenna Coil

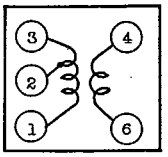


(Bottom View)

f (kHz)	L(μH)	Q_0	Turns		
	1-3	1-3	1-2	2-3	4-6
300	600	115	2	130	8

TOKO
JA-1302 or Equivalent
Wire : 0.07mmφUEW

T_2 OSC Coil

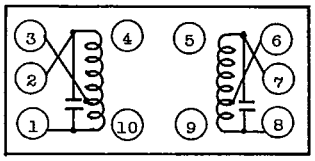


(Bottom View)

f (kHz)	L(μH)	Q_0	Turns		
	1-3	1-3	1-2	2-3	4-6
796	360	125	$92\frac{1}{2}$	8	$10\frac{1}{2}$

SUMIDA
0187-145-092 or Equivalent
Wire : 0.08mmφUEW

T_3 AM IFT

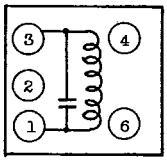


(Bottom View)

C_0(pF)		f	Q_0	Turns			
1-2	7-8	(kHz)	$\frac{1-2}{7-8}$	1-3	2-3	6-7	6-8
150	150	455	65	80	148	196	32

SUMIDA
48-037-921 or Equivalent
Wire : 0.08mmφUEW

T_4 Detector Coil

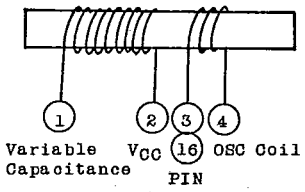


(Bottom View)

C_0(pF)	f	Q_0	Turns
1-3	(kHz)	1-3	1-3
180	455	65	142

SUMIDA
0130-108-016 or Equivalent
Wire : 0.08mmφUEW

L_1 Bar Antenna



f (kHz)	L(μH)	Q_0	Turns	
	1-2	1-2	1-2	3-4
796	625	200MIN	105	20

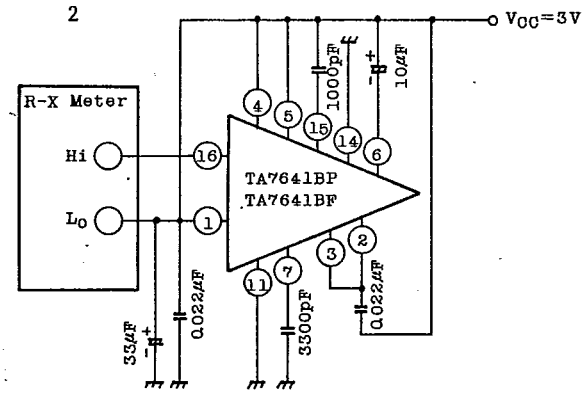
Core ; 12mmφ × 53mmφ
Wire ; USTC-0.1mmφ

TA7641BP
TA7641BF

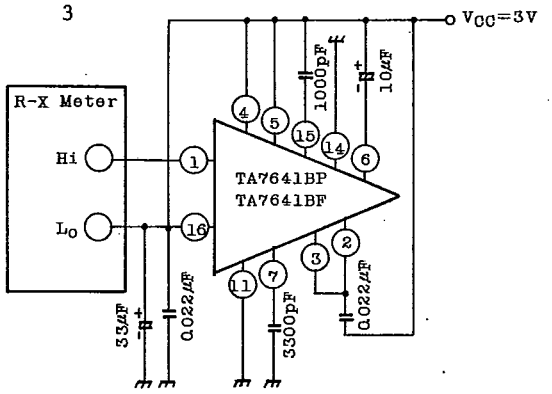
T-77-05-05

TEST CIRCUIT

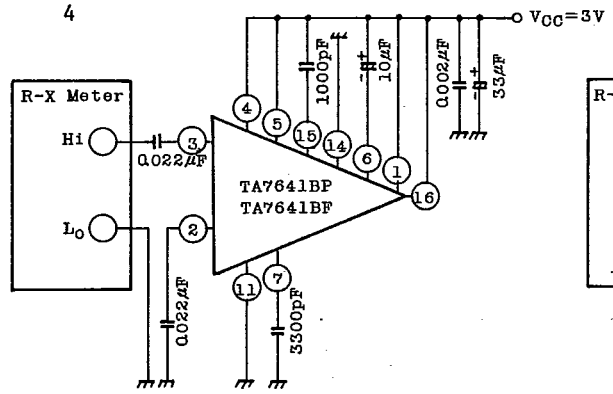
2



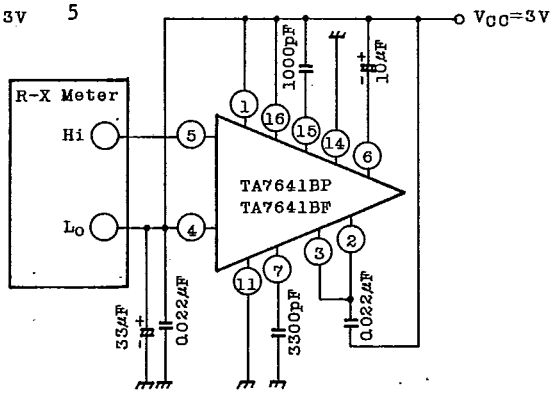
3



4



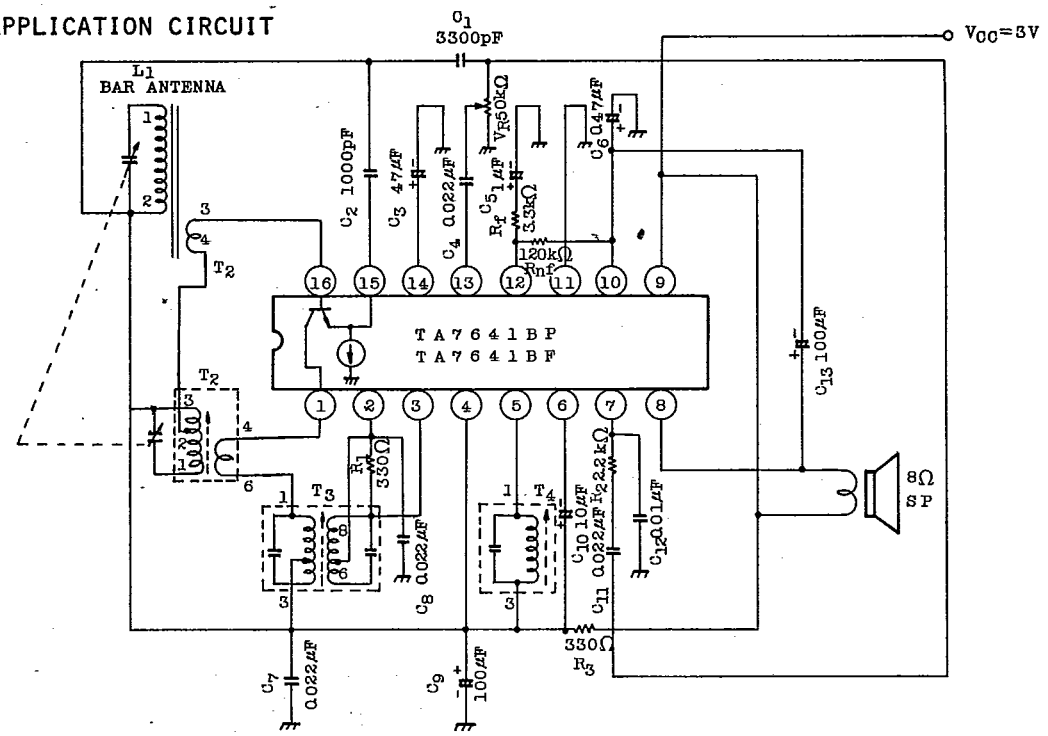
5



TA7641BP
TA7641BF

T-77-05-05

APPLICATION CIRCUIT



ELECTRICAL CHARACTERISTICS

(Unless otherwise specified Ta=25°C, V_{CC}=3V, f=1MHz, f_m=1kHz, Mod.=30%, R_L=8Ω)

CHARACTERISTIC	SYMBOL	TEST CONDITION	TYP. VALUE	UNIT
Quiescent Current	I_{CCQ}	E_{IN}=0dB/m	1.6	mA
Maximum Sensitivity	MS	P_O=5mW	41	dB/m
Quieting Sensitivity	QS	S/N=20dB	49	dB/m
Signal to Noise Ratio	S/N	E_{IN}=74dB/m	44	dB
AGC Ratio (Note 1)	AGC(FOM)	-10dB Output Reduction (from 100dB/m)	50	dB
Recovered Output Voltage	V_{OD}	E_{IN}=74dB/m, Measure Pin 7	131	mV_{rms}
Power Amplifier Voltage Gain (Note 2)	G_V	R_{nf}=120kΩ, R_f=3.3kΩ	26	dB
Output Power	P_O	THD=10%	100	mW
Total Harmonic Distortion	THD	E_{IN}=74dB/m	2	%

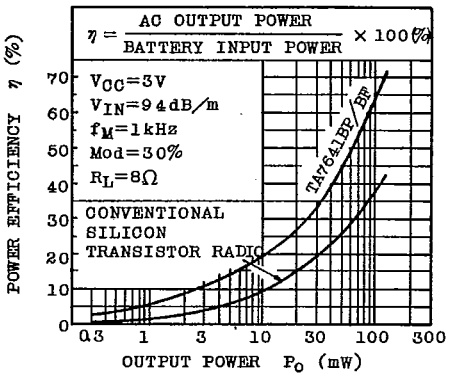
Note 1. The AGC Ratio is defined as the input electric field intensity ratio between the output voltage at 100dB/m and -10dB output voltage.

2. The open loop voltage gain of the power amplifier is typical 33dB.

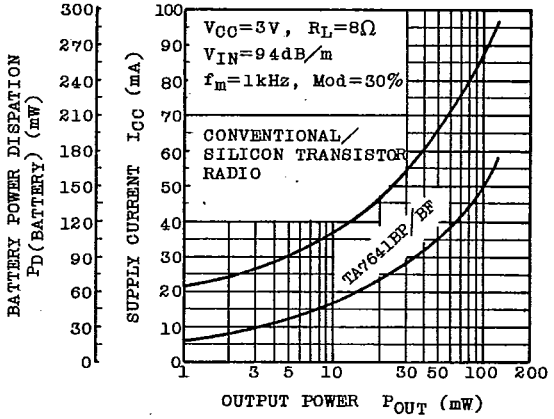
TA7641BP
TA7641BF

T-77-05-05

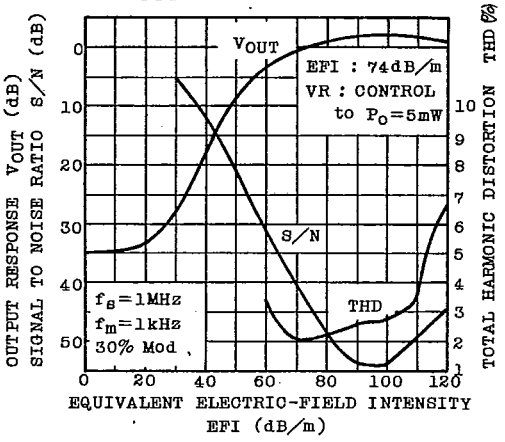
$\eta - P_O$
CHARACTERISTIC COMPARISON



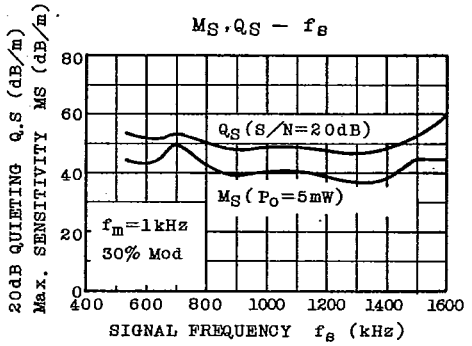
$P_{D(BATTERY)}$, $I_{CC} - P_{OUT}$
CHARACTERISTIC COMPARISON



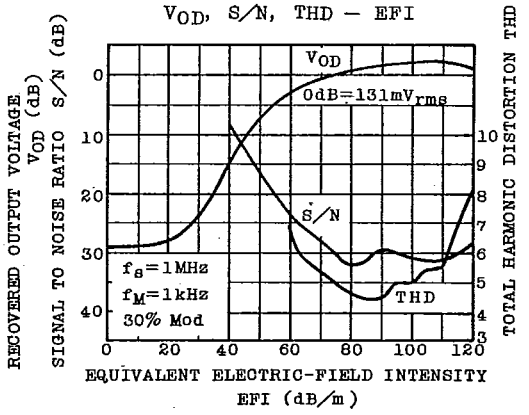
V_{OUT}, S/N, THD — EFI



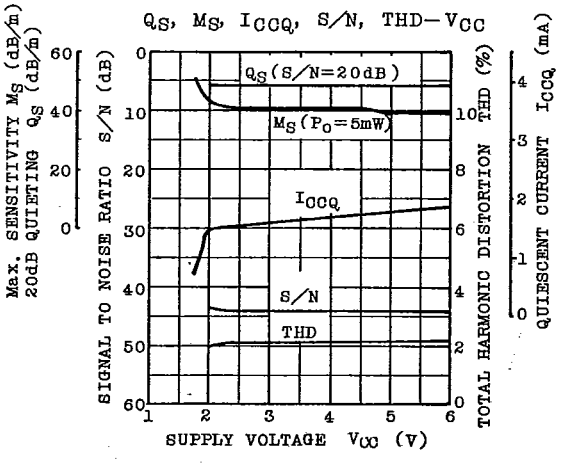
M_S, $Q_S - f_S$



V_{OD}, S/N, THD — EFI



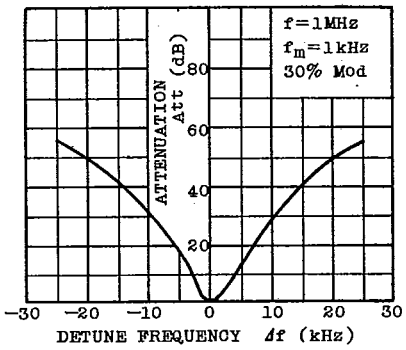
Q_S, M_S, I_{CCQ}, S/N, THD — V_{CC}



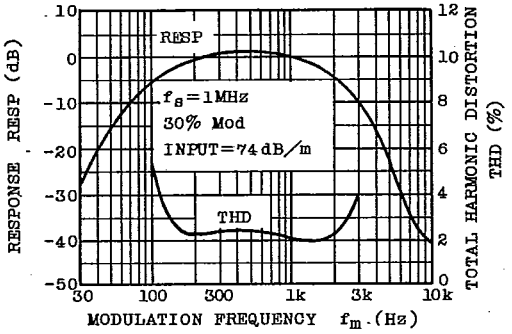
TA7641BP
TA7641BF

T-77-05-05

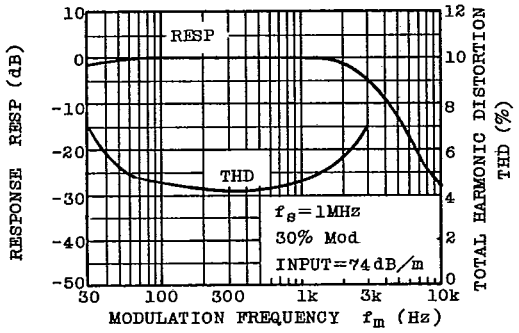
Att — Δf (SELECTIVITY)



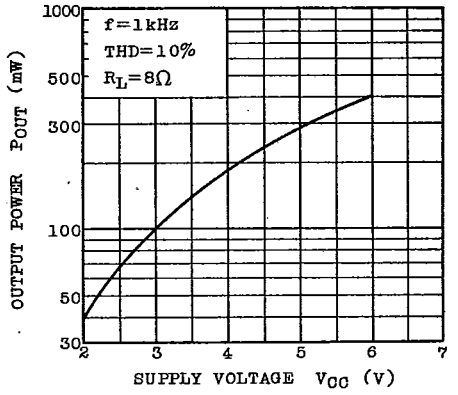
RESP, THD-f_m (8 PIN TERMINAL)



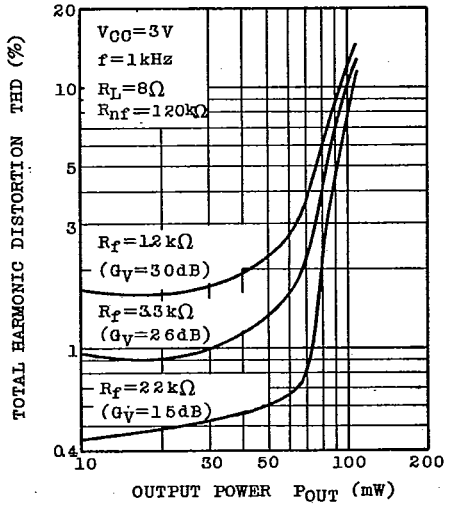
RESP, THD-f_m (7 PIN TERMINAL)



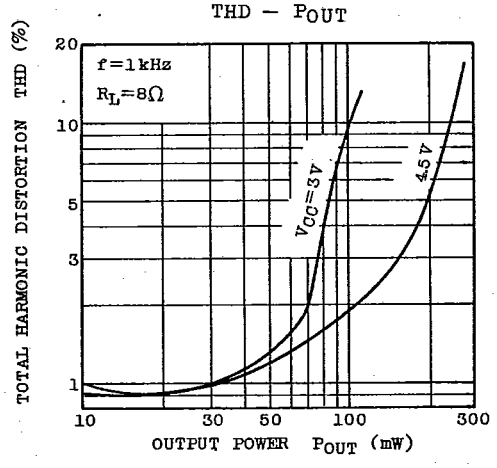
P_{OUT} — V_{CC}



THD — P_{OUT}



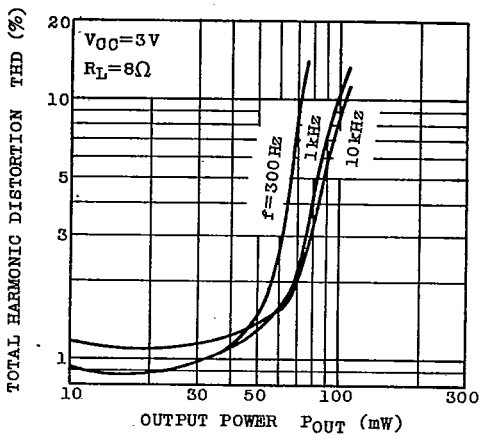
THD — P_{OUT}



TA7641BP
TA7641BF

T-77-05-05

THD – P_{OUT}



V_{OUT}, I_{CC} – V_{IN}