Ordering number: EN3848D

Monolithic Linear IC

LA4705

15 W 2-channel BTL AF Power Amplifier for Car Stereos

Overview

The LA4705 is a BTL two-channel power IC for car audio and radio-cassette players developed in pursuit of excellent sound quality. Low-region frequency characteristics have been improved through the use of a new NF capacitorless circuit, and crosstalk which causes ‘‘muddy’’ sound has been reduced by improving both circuit and pattern layout. As a result, the LA4705 provides powerful bass and clear treble. In addition, the LA4705 features on-chip protectors and standby switch.

Features

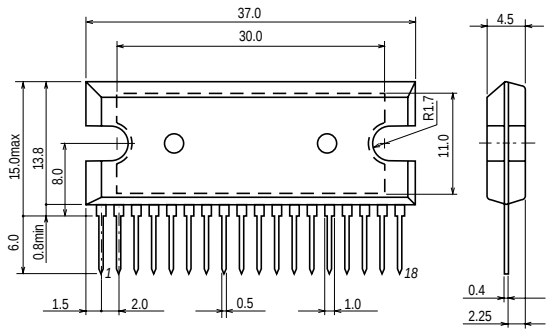
- High power: supports total output of 25 W + 25 W (V_{CC} = 14.4 V, THD = 30%, R_L = 4 Ω)
- Less pop noise
- Designed for excellent sound quality (f_L < 10 Hz, f_H = 130 kHz)
- Any on time settable by external capacitor
- Standby switch circuit on chip (microprocessor supported)
- Various protectors on chip (output-to-ground short/output-to-V_{CC} short/ load short/overvoltage/thermal shutdown circuit)
- NF capacitorless
- Supports R_L = 2 Ω

Package Dimensions

unit: mm

3109-SIP18H

[LA4705]



SANYO : SIP18H

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max 1	No signal, t = 60 s	24	V
	V_{CC} max 2	With signal	18	V
Surge supply voltage	V_{CC} surge	t ≦ 0.2 s, single giant pulse	50	V
Allowable power dissipation	Pd max	Arbitrarily large heat sink	37.5	W
Operating temperature	Topr		–35 to +85	°C
Storage temperature	Tstg		–40 to +150	°C

* Set V_{CC}, R_L in a range that does not exceed Pd max = 37.5 W

SANYO Electric Co.,Ltd. Semiconductor Company

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

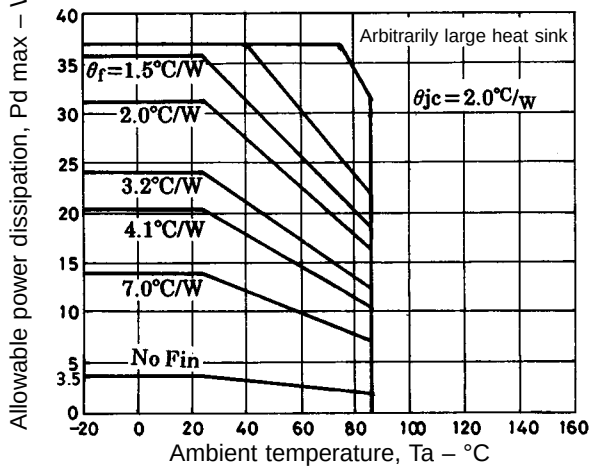
Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		13.2	V
Operating voltage range	V_{CC} op	Range where Pd max is not exceeded	9 to 18	V
Recommended load resistance	R_L		4	Ω

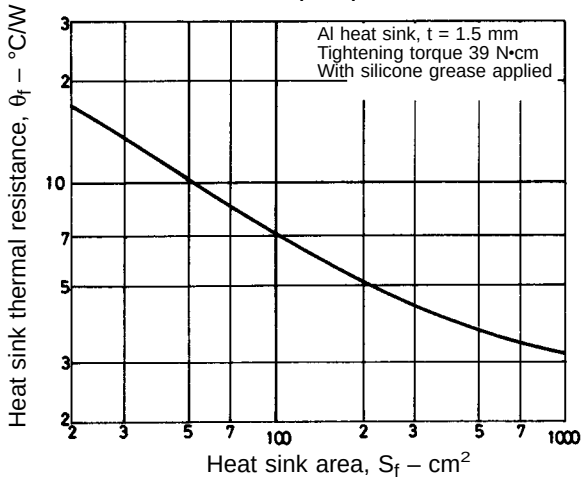
Operating Characteristics at Ta = 25°C, V_{CC} = 13.2 V, R_L = 4 Ω, f = 1 kHz, Rg = 600 Ω

Parameter	Symbol	Conditions	min	typ	max	Unit
Quiescent current	I_{CCO}		80	115	250	mA
Standby current	Ist			10	60	μA
Voltage gain	VG		38	40	42	dB
Total harmonic distortion	THD	P_O = 1 W		0.1	0.4	%
Output power	P_O1	THD = 10%	11	15		W
	P_O2	THD = 10%, V_{CC} = 14.4 V		18		W
	P_O3	THD = 10%, R_L = 2 Ω		16		W
Output offset voltage	V_N offset	Rg = 0	–300		+300	mV
Output noise voltage	V_{NO}	Rg = 0, B.P.F. = 20 Hz to 20 kHz		0.1	0.5	mVrms
Ripple rejection ratio	SVRR	Rg = 0, f_R = 100 Hz, V_R = 0 dBm	40	50		dB
Channel separation	CHsep	Rg = 10 kΩ, V_O = 0 dBm	50	60		dB
Input resistance	r_i		21	30	39	kΩ
Standby pin applied voltage	Vst	Amp on, applied through 10 kΩ	2.5		V_{CC}	V

Pd max – Ta



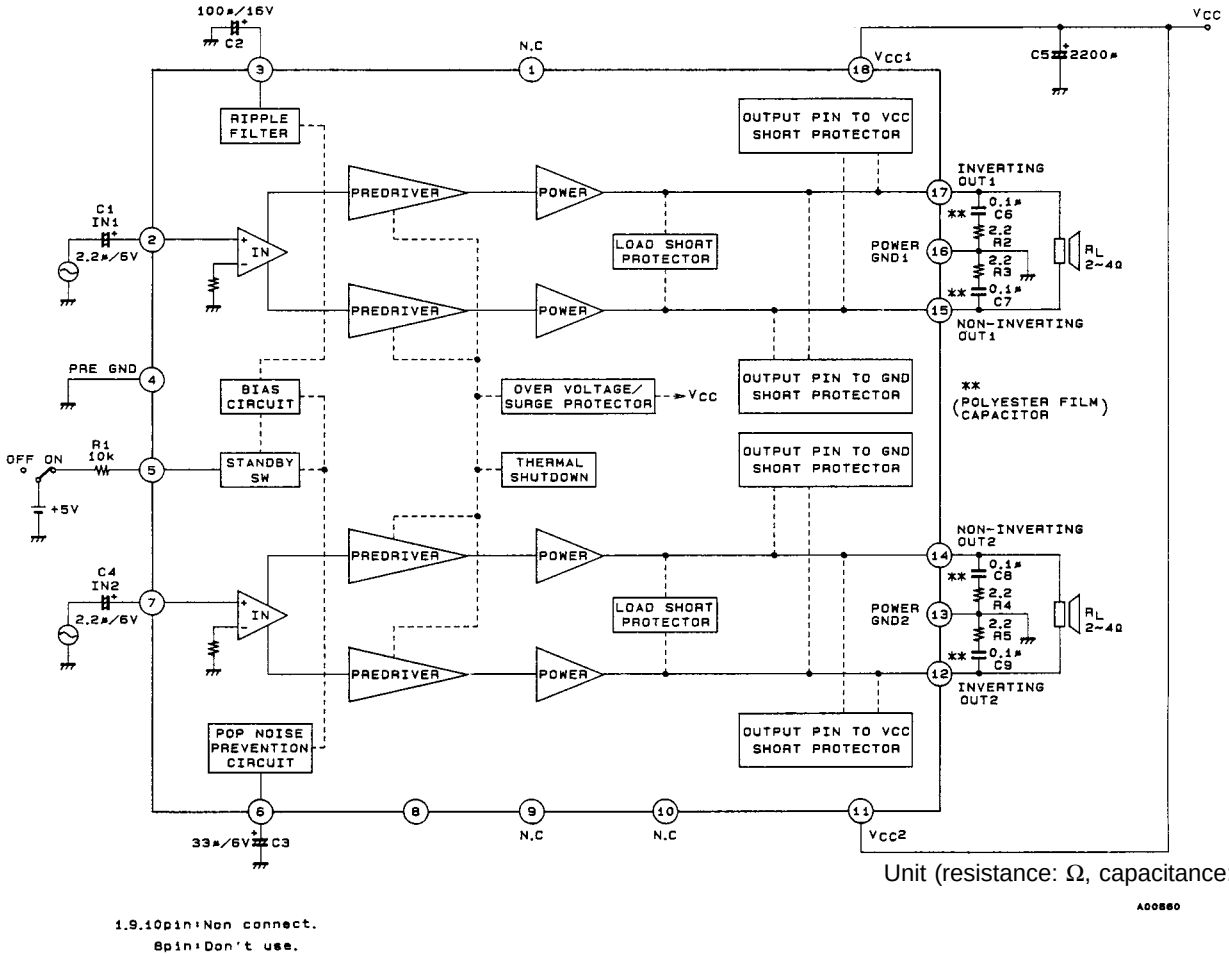
θ_f – S_f



Features and Usage Notes

- Pin 5 is the standby switch pin. The amplifier is turned on by applying approximately 2 V or more to this pin through an external resistor (R1). The current flowing into pin 5 is 500 µA or less.
- Pin 6 is the mute pin. The amplifier on time can be set as desired through C3. By grounding pin 6, the amplifier can implement mute operation. In this case, the recovery time depends on C3.
- In order to prevent damage or degradation which may be caused by abnormally heated IC, the LA4705 has a thermal shutdown protector. Accordingly, in the case of inadequate heat dissipation, the thermal shutdown protector will operate to control the output gradually into attenuation.
- Also be fully careful of handling other protectors built in the LA4705.

Sample Application Circuit

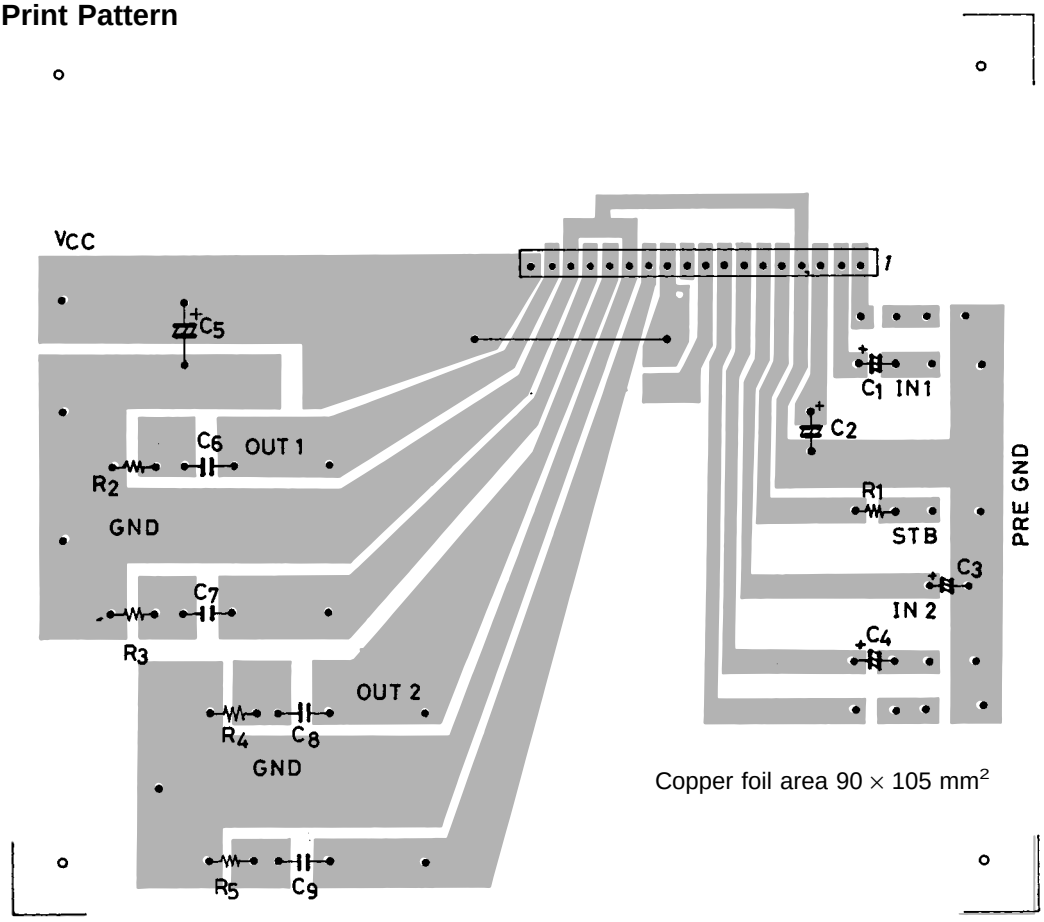


Unit (resistance: Ω, capacitance: F)

A00560

1.9.10pin:Non connect.
8pin:Don't use.

Sample Print Pattern

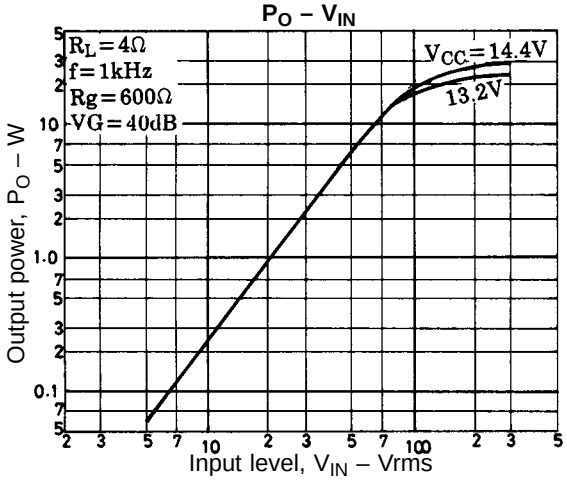


Copper foil area 90 × 105 mm^2

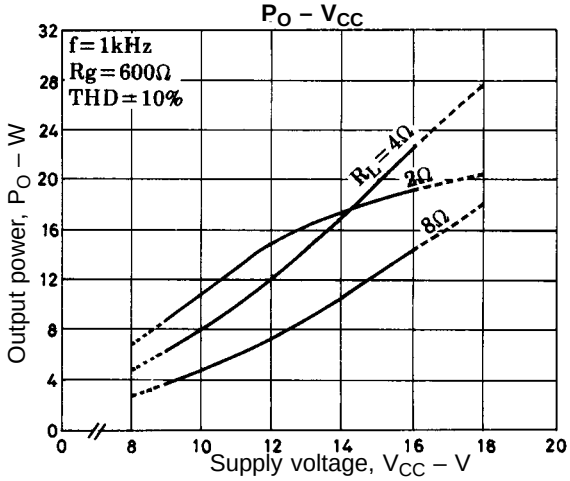
Description of External Components

C1, C4	Input capacitors	2.2 µF is recommended. f_L can be varied by C1, C4 capacitances to adjust the bass range.
C2	Decoupling capacitor (ripple filter)	
C3	Amplifier on time setting capacitor	Approximately 0.6 to 0.7 second for 33 µF. Since the on time is proportional to this capacitance, it can be set as desired by varying this capacitance. The amplifier can implement mute operation by setting C3 to GND potential.
C5	Power supply capacitor	
C6, C7, C8, C9	Oscillation blocking capacitors	Use polyester film capacitors (Mylar capacitors) with good temperature characteristics. (R2, R3, R4, and R5 used jointly.) Since stability may be affected slightly by the pattern layout, etc., 0.1 µF or more is recommended.
R1	Standby switch current limiting resistor	10 kΩ is recommended. This resistor cannot be removed.

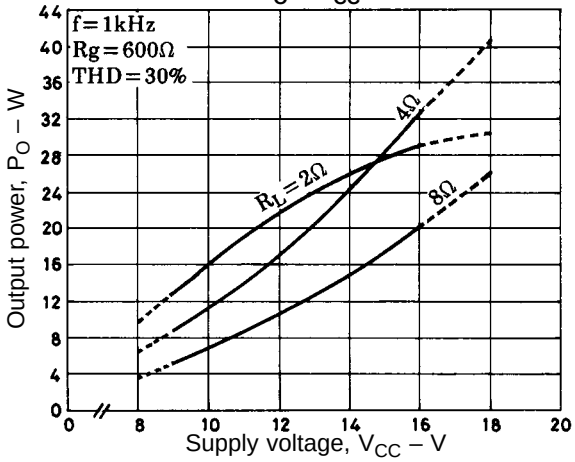
$P_O - V_{IN}$



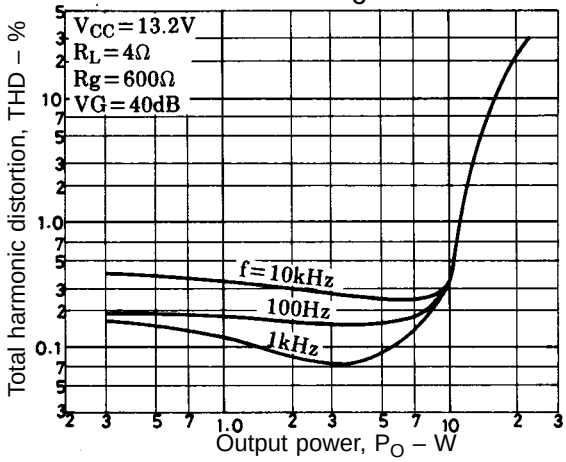
$P_O - V_{CC}$



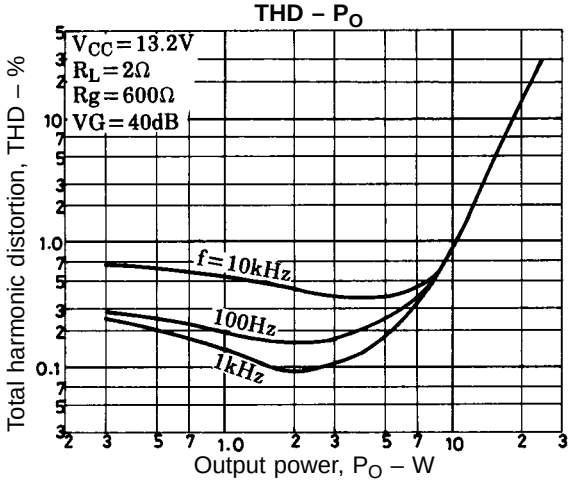
$P_O - V_{CC}$



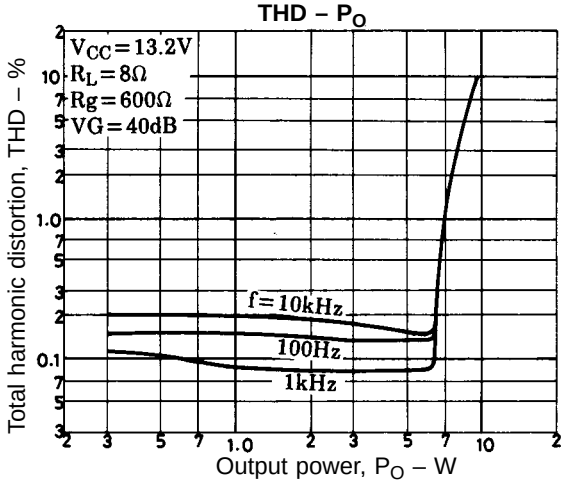
THD – P_O



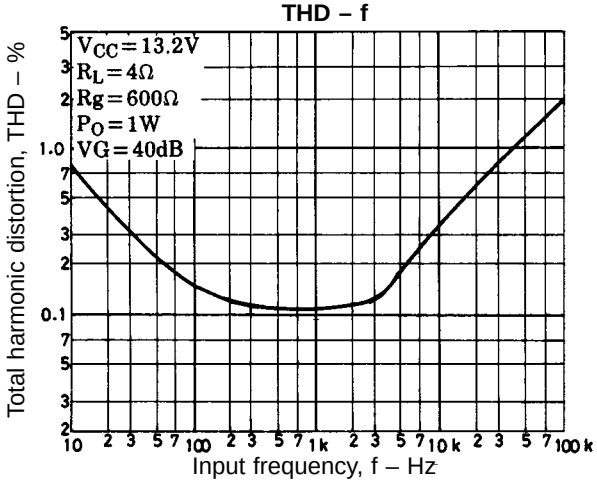
THD – P_O



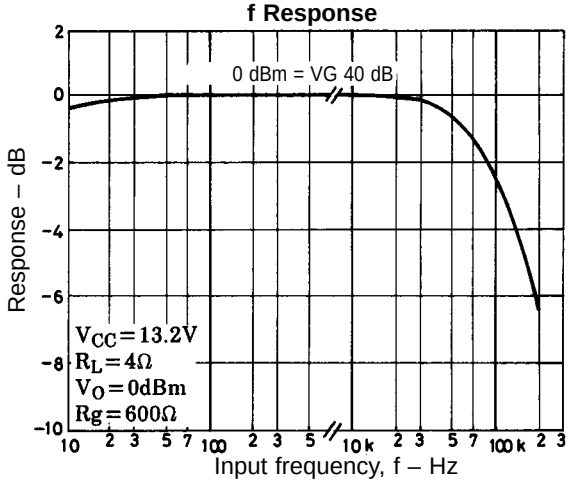
THD – P_O



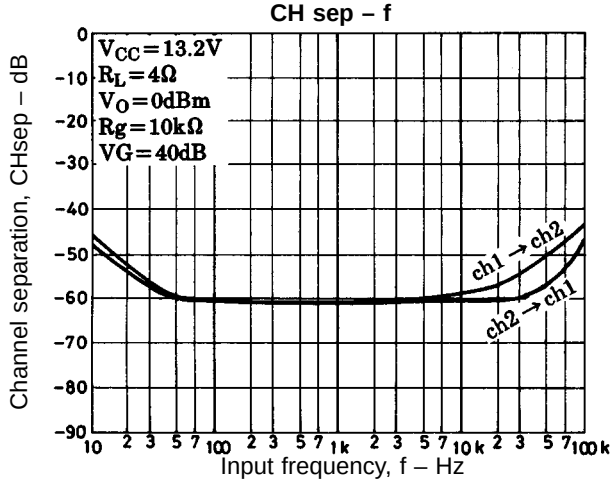
THD – f



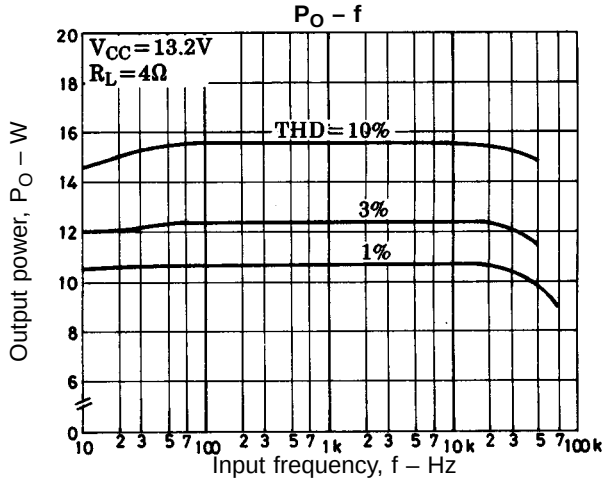
f Response



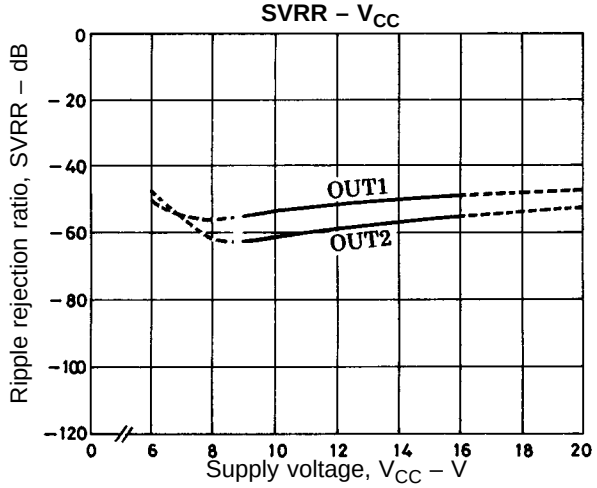
CH sep – f



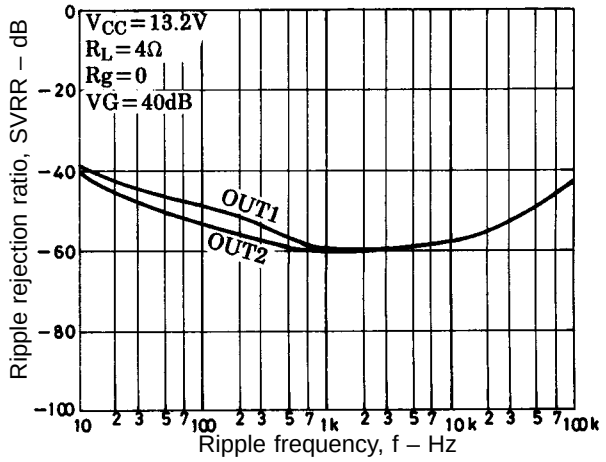
P_O – f



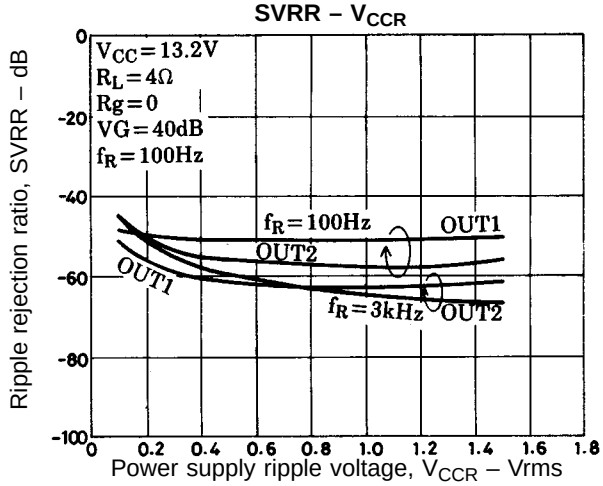
SVRR – V_{CC}



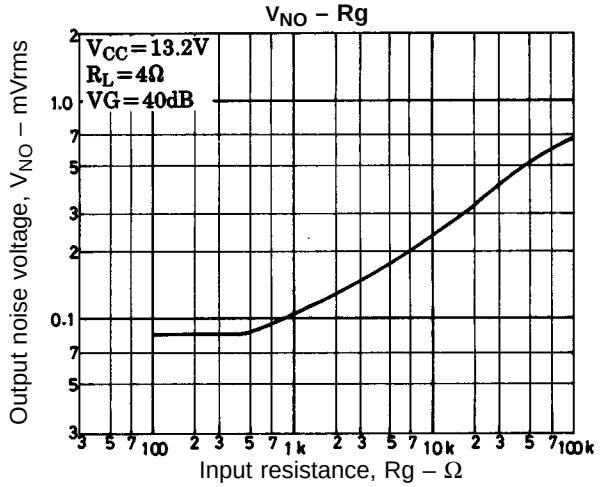
SVRR – f



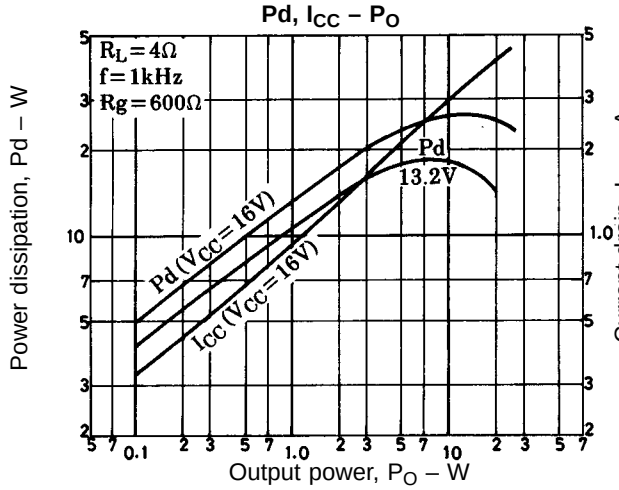
SVRR – V_{CCR}



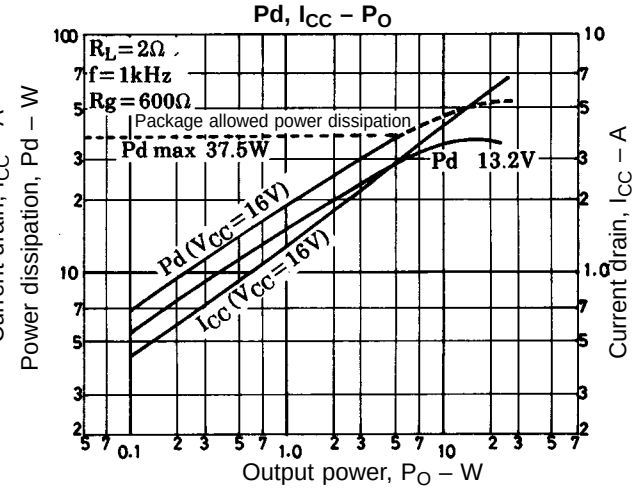
V_{NO} – Rg



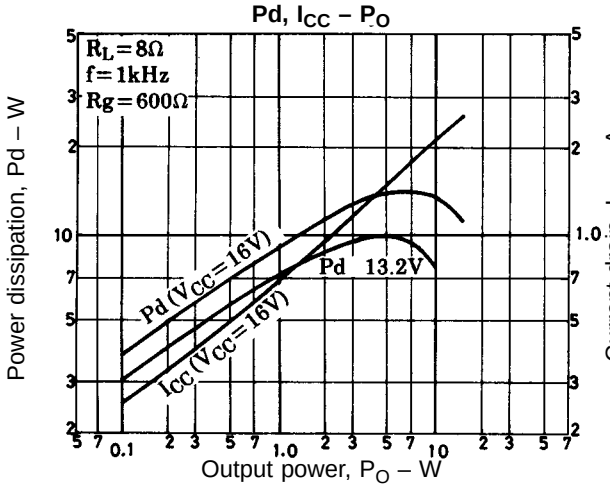
Pd, I_{CC} – P_O



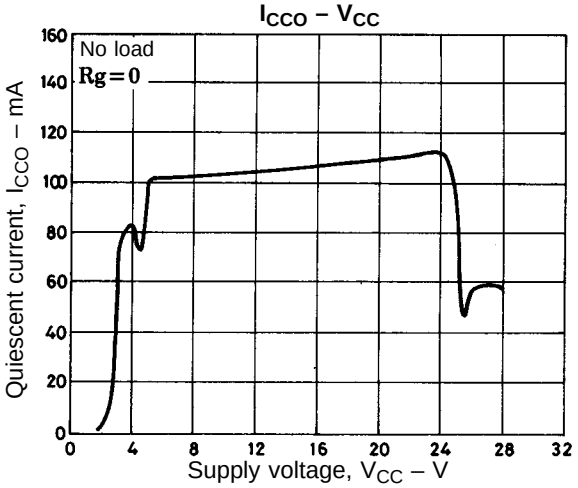
Pd, I_{CC} – P_O



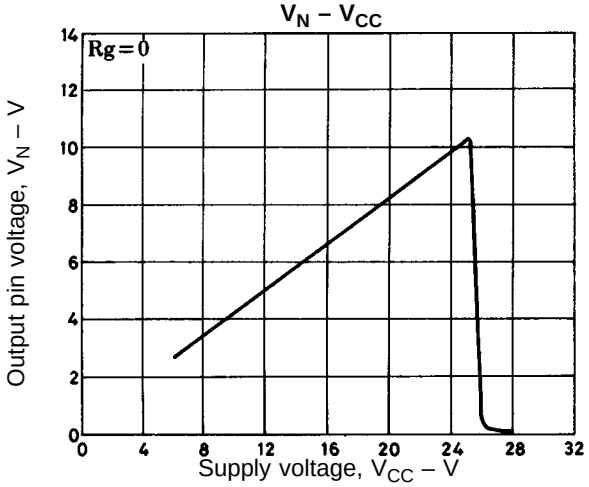
Pd, I_{CC} – P_O



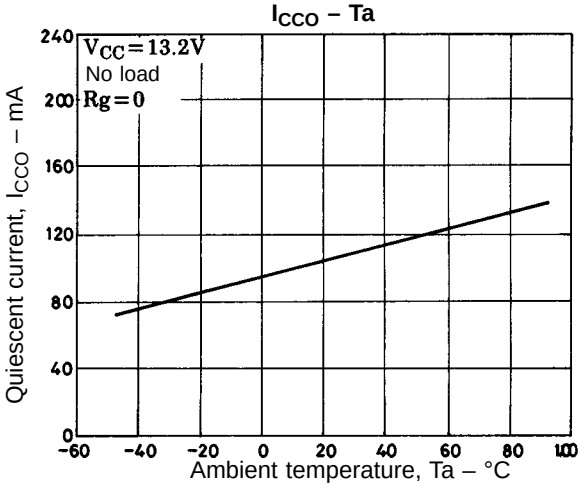
I_{CCO} – V_{CC}



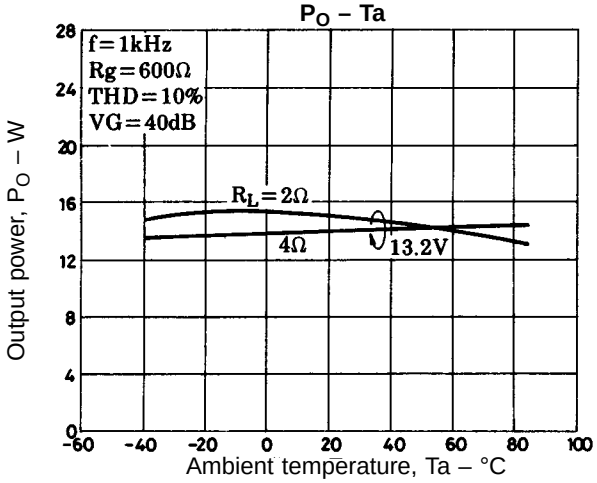
V_N – V_{CC}



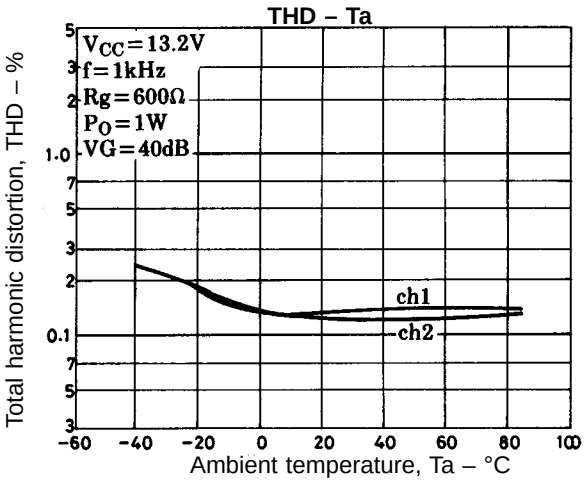
I_{CCO} – Ta



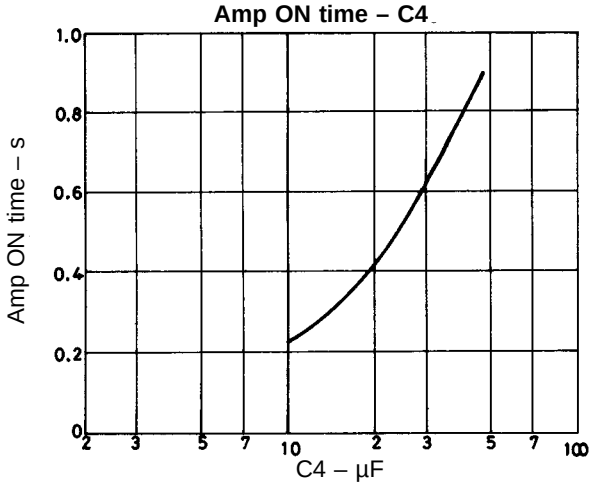
P_O – Ta



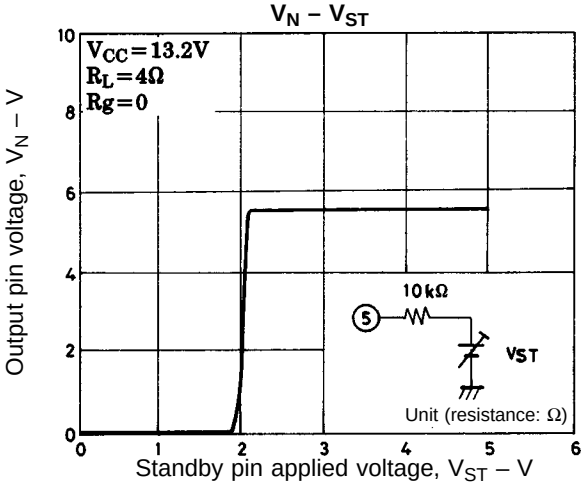
THD – Ta



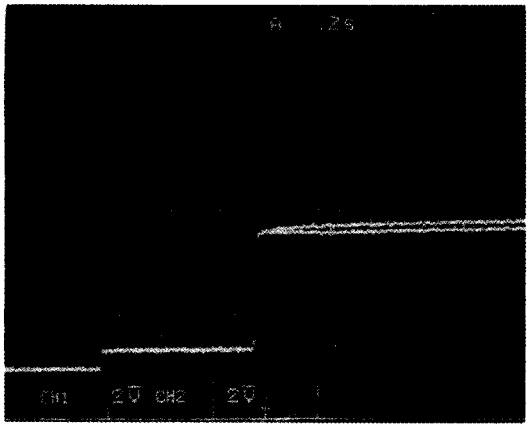
Amp ON time – C4



V_N – V_{ST}

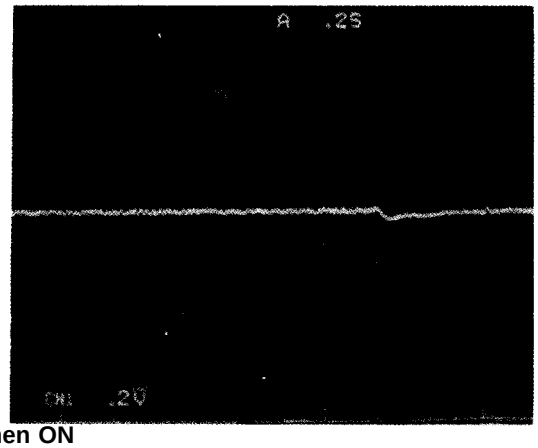


BTL output DC locus



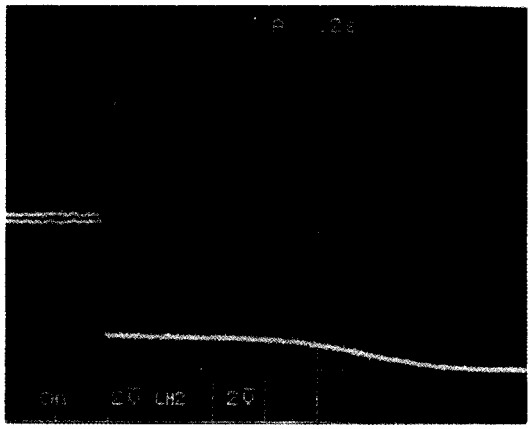
Power ON

AC Level



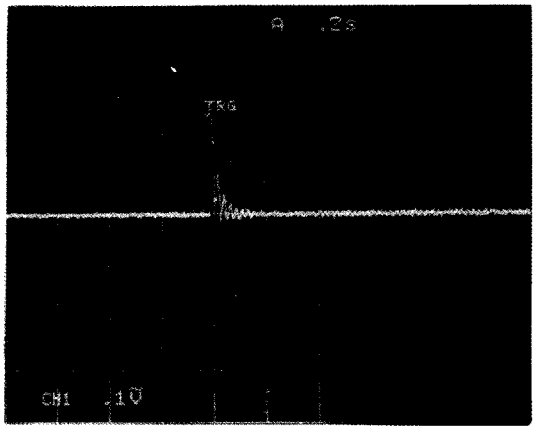
Locus when ON
Power ON
V_{CC}=13.2V
R_L=4Ω
Rg=0

BTL output DC locus



Standby OFF

AC Level



Locus when OFF
Standby SW OFF
V_{CC}=13.2V
R_L=4Ω
Rg=0