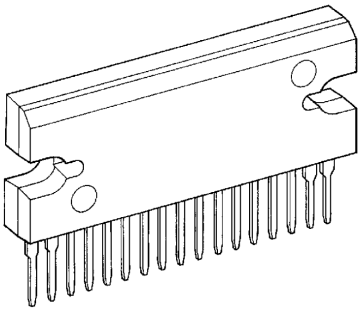
TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

TA8231L

42W BTL × 2CH Audio Power IC

The TA8231L is BTL audio power amplifier for consumer application. It is designed for high power,low distortion and low noise.
It contains various kind of protectors and the function of stand−by.



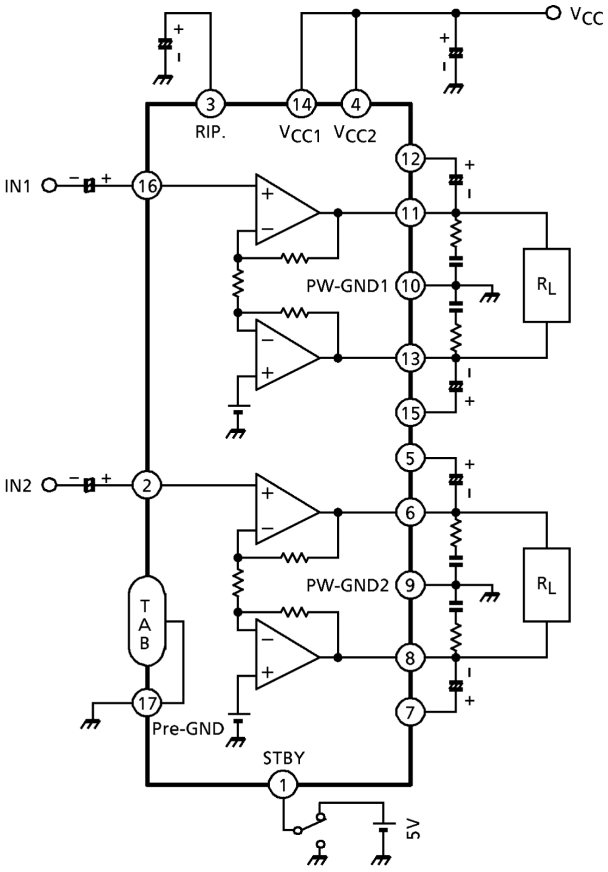
HSIP17-P-2.00

Weight: 9.8g (typ.)

Feature

- High power
  : $P_{OUT\ (1)}$ = 42W (typ.)
  (V_{CC} = 14.4V, f = 1kHz, THD = 10%, R_L = 2Ω)
  : $P_{OUT\ (2)}$ = 37W (typ.)
  (V_{CC} = 13.2V, f = 1kHz, THD = 10%, R_L = 2Ω)
  : $P_{OUT\ (3)}$ = 22W (typ.)
  (V_{CC} = 13.2V, f = 1kHz, THD = 10%, R_L = 4Ω)
- Excellent output power bandwidth
  : $P_{OUT\ (4)}$ = 17W (typ.)
  (V_{CC} = 13.2V, f = 20Hz~20kHz, THD = 1%, R_L = 4Ω)
- Fixed voltage gain
  : G_V = 32dB (typ.)
  V_{CC} = 13.2V, V_{out} = 0.775V_{rms} (0dBm)
- Low thermal resistance
  : θ_{j-c} = 1.5°C / W (typ.)
- Low distortion
  : THD = 0.02% (typ.)
  (V_{CC} = 13.2V, f = 1kHz, P_{out} = 4W, R_L = 4Ω)
- Built−in stand−by switch function
  : I_{STBY} = 100μA (typ.)
  (With pin(1) set at high, power is turned on)
- Built−in various protection circuit
  : Thermal shut down,Over voltage,Out to GND,Out to V_{CC},Out to Out short
- Operating supply voltage
  : V_{CC} (opr) = 9~18V

Block Diagram
(G_V = 32dB)

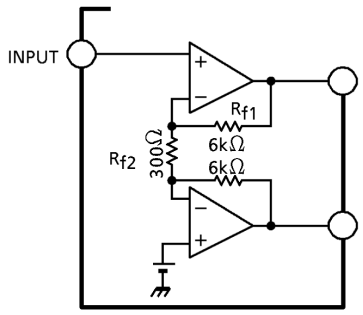


Caution And Application Method

(Description is made only on the single channel.)

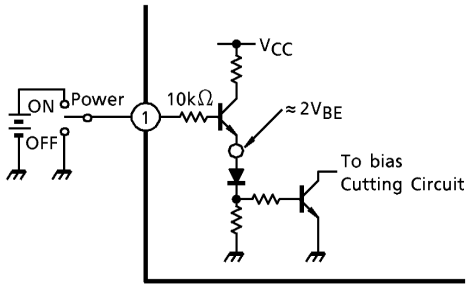
1. Voltage gain adjustment
   This IC has no NF (negative feedback) terminals. Therefore, the voltage gain can't adjusted, but it makes the device a space and total costs saver.
   The voltage gain is decided only internal by expression below.

$$G_V = 20\log\frac{R_{f1}}{R_{f2}} + 6\,(dB) = 32\,(dB)$$



2. Stand–by SW function

By means of controlling pin(1) (stand–by terminal) to high and low,the power supply can be set to on and off.
The threshold voltage of pin(1) is set at about 3V (typ.), and the power supply current is about 100μA (typ.) at the stand–by state.



(Fig. 2) With pin① set to High, Power is turned ON.

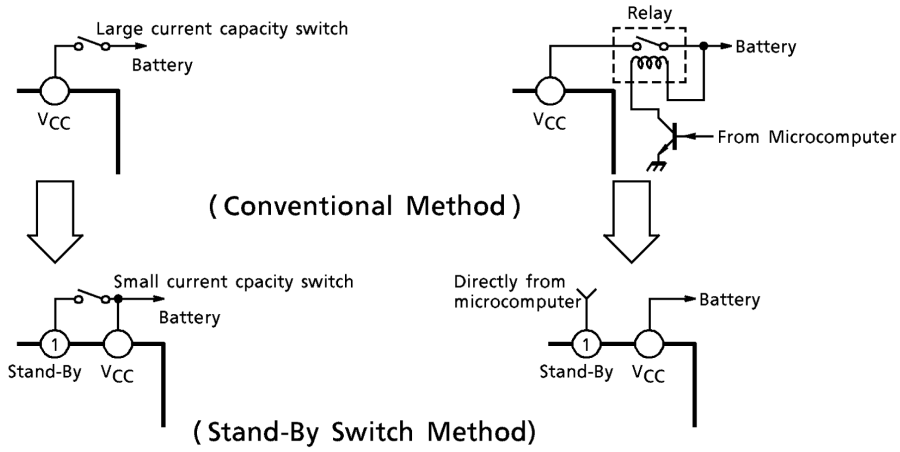
Pin (1) control voltage: $V_{(SB)}$

Stand–by	Power	$V_{(SB)}$ (V)
On	Off	0~2
Off	On	3~V_{CC}

~Advantage of stand–by SW~

(1) Since V_{CC} can directly be controlled to on / off by the microcomputer, the switching relay can be omitted.

(2) Since the control current is microscopic, the switching relay of small current capacity is satisfactory for switching.



3. Preventive measure against oscillation

For preventing the oscillation, it is advisable to use C4, the condenser of polyester film having small characteristic fluctuation of the temperature and the frequency.
The resistance R to be series applied to C4 is effective for phase correction of high frequency, and improves the oscillation allowance.
Since the oscillation allowance is varied according to the causes described below, perform the temperature test to check the oscillation allowance.

(1) Capacity value of condenser
(2) Kind of condenser
(3) Layout of printed board

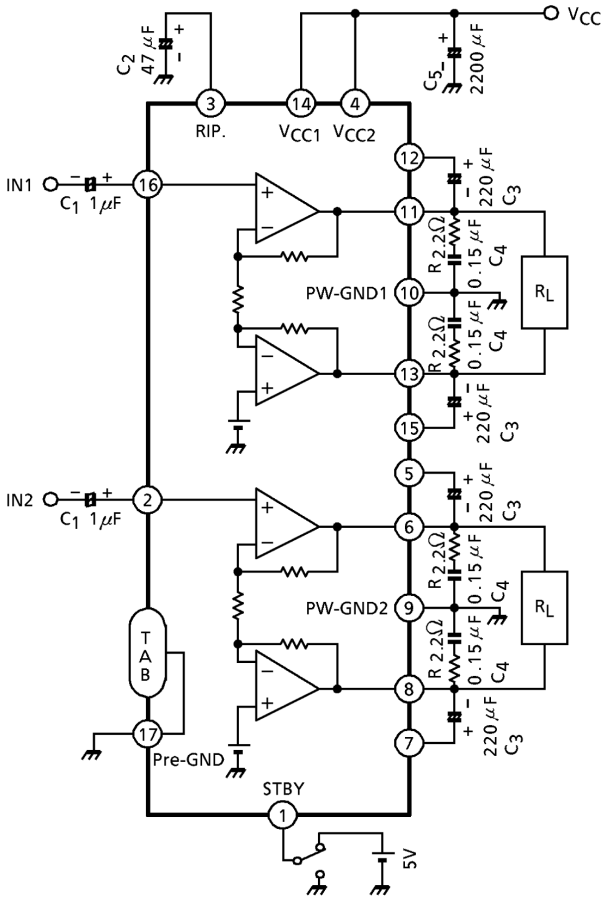
Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Peak supply voltage (0.2s)	$V_{CC\ (surge)}$	50	V
DC supply voltage	$V_{CC\ (DC)}$	25	V
Operating supply voltage	$V_{CC\ (opr)}$	18	V
Output current (peak)	$I_{O\ (peak)}$	9	A
Power dissipation	P_D	50	W
Operating temperature	T_{opr}	−30~85	°C
Storage temperature	T_{stg}	−55~150	°C

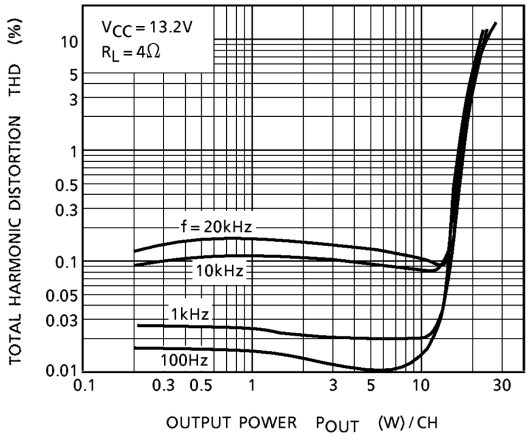
Electrical Characteristics
(unless otherwise specified V_{CC} = 13.2V, f = 1kHz, R_g = 600Ω, Ta = 25°C)

Characteristic	Symbol	Test Cir− cuit	Condition	Min	Typ.	Max	Unit
Quiescent current	I_{ccq}	—	V_{in} = 0	—	150	250	mA
Output power	$P_{out\ (1)}$	—	V_{CC} = 14.4V, THD = 10%, R_L = 2Ω	—	42	—	W
	$P_{out\ (2)}$	—	THD = 10%, R_L = 2Ω	28	37	—	W
	$P_{out\ (3)}$	—	THD = 10%, R_L = 4Ω	19	22	—	W
	$P_{out\ (4)}$	—	THD = 1%, f = 20Hz~20kHz, R_L = 4Ω	—	17	—	W
Total harmonic distortion	THD	—	P_{out} = 4W	—	0.02	0.2	%
Voltage gain	G_V	—	V_{out} = 0.775V_{rms} (0dBm)	30.5	32	33.5	dB
Voltage gain ratio	ΔG_V	—	V_{out} = 0.775V_{rms} (0dBm)	−1	0	1	dB
Output noise voltage	$V_{NO\ (1)}$	—	R_g = 0Ω, DIN45405 Noise Filter	—	0.07	—	mV_{rms}
	$V_{NO\ (2)}$	—	R_g = 0Ω, BW = 20Hz~20kHz	—	0.06	0.1	mV_{rms}
Ripple rejection ratio	R.R.	—	f_{ripple} = 100Hz, V_{out} = 0.775V_{rms} (0dBm), R_g = 600Ω	40	60	—	dB
Cross talk	C.T.	—	R_g = 600Ω, V_{out} = 0.775V_{rms} (0dBm)	—	60	—	dB
Input resistance	R_{IN}	—	—	—	30	—	kΩ
Output offset voltage	V_{offset}	—	V_{in} = 0	−200	0	200	mV
Stand−by current	I_{STBY}	—	Pin(1): GND	—	100	150	μA

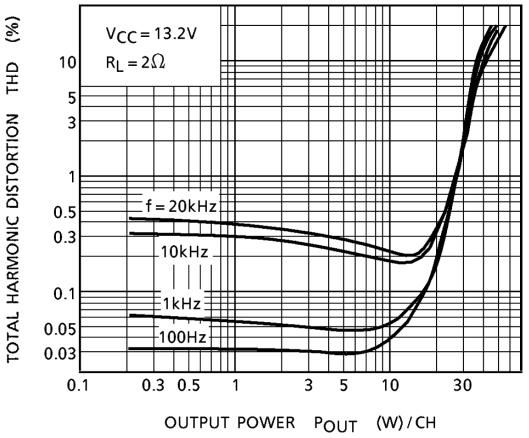
Test Circuit
(G_V = 32dB)



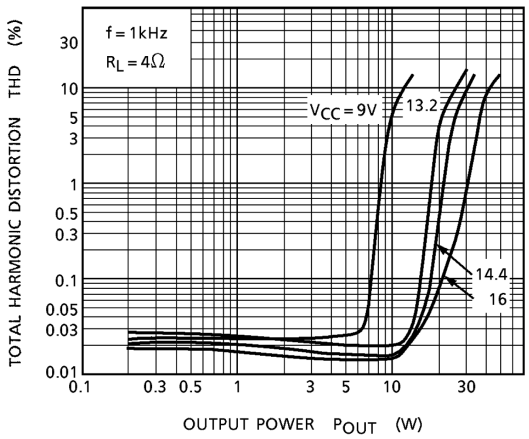
THD – P_{OUT}



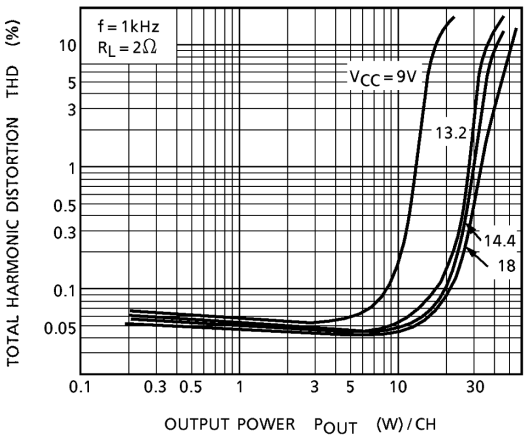
THD – P_{OUT}



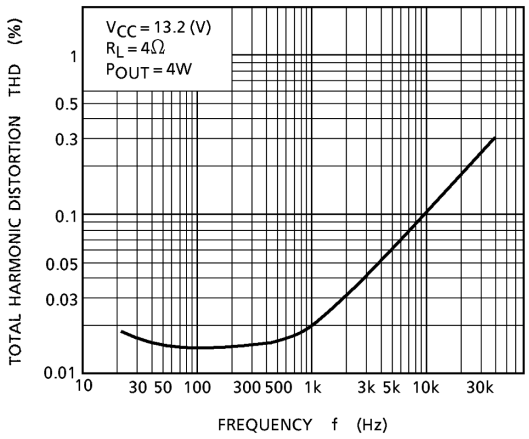
THD – P_{OUT}



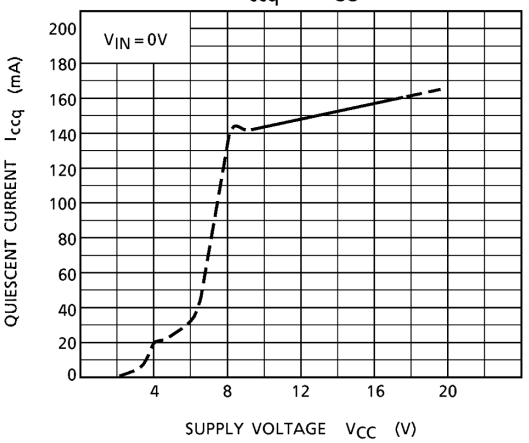
THD – P_{OUT}



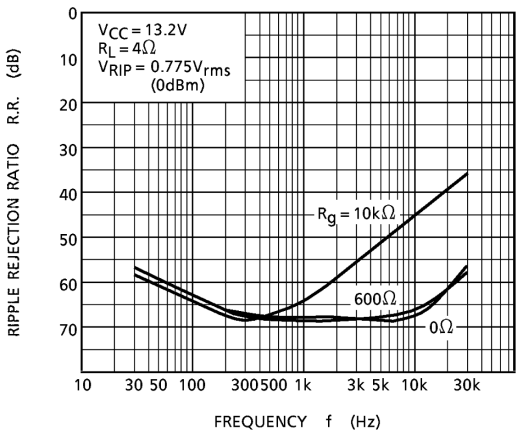
THD – f



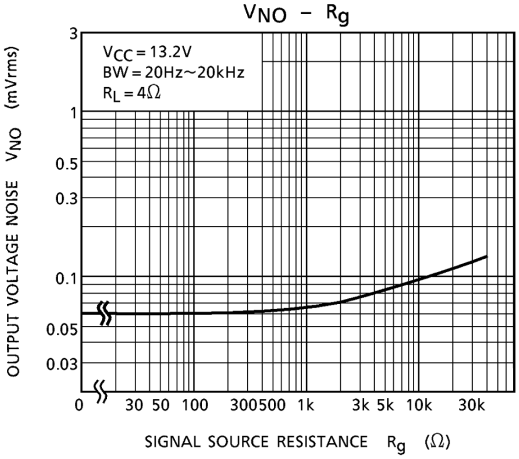
I_{ccq} – V_{CC}



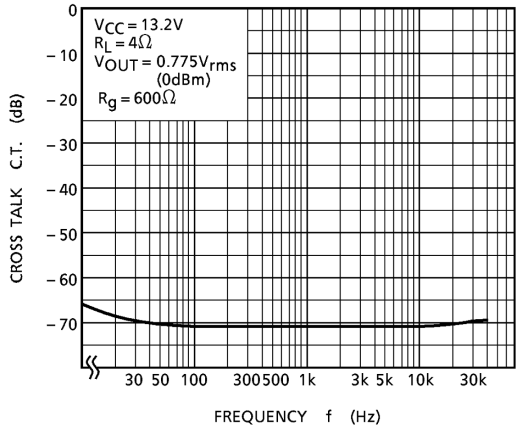
R.R. – f



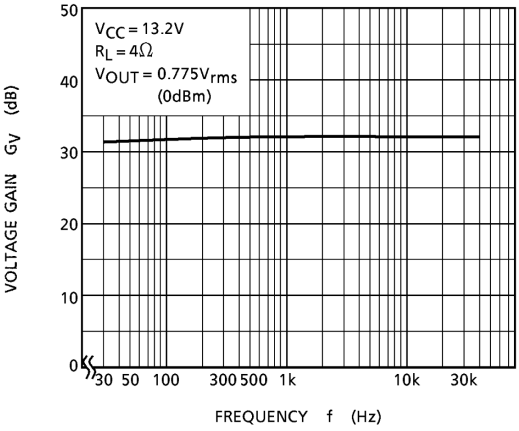
V_{NO} – R_g



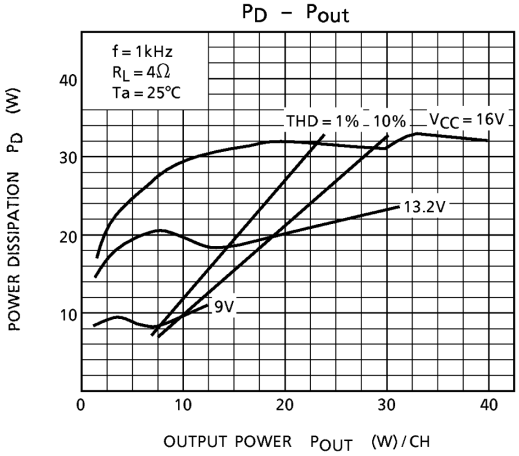
C.T. – f



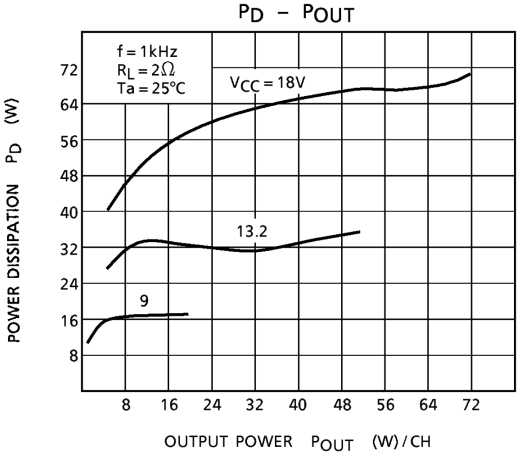
G_V – f

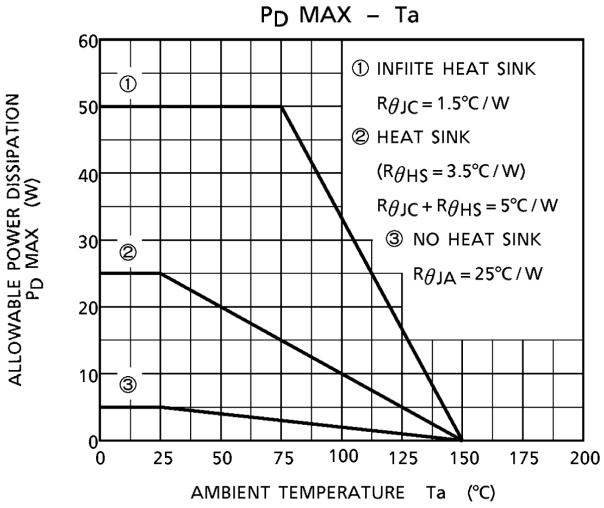


P_D – P_{out}



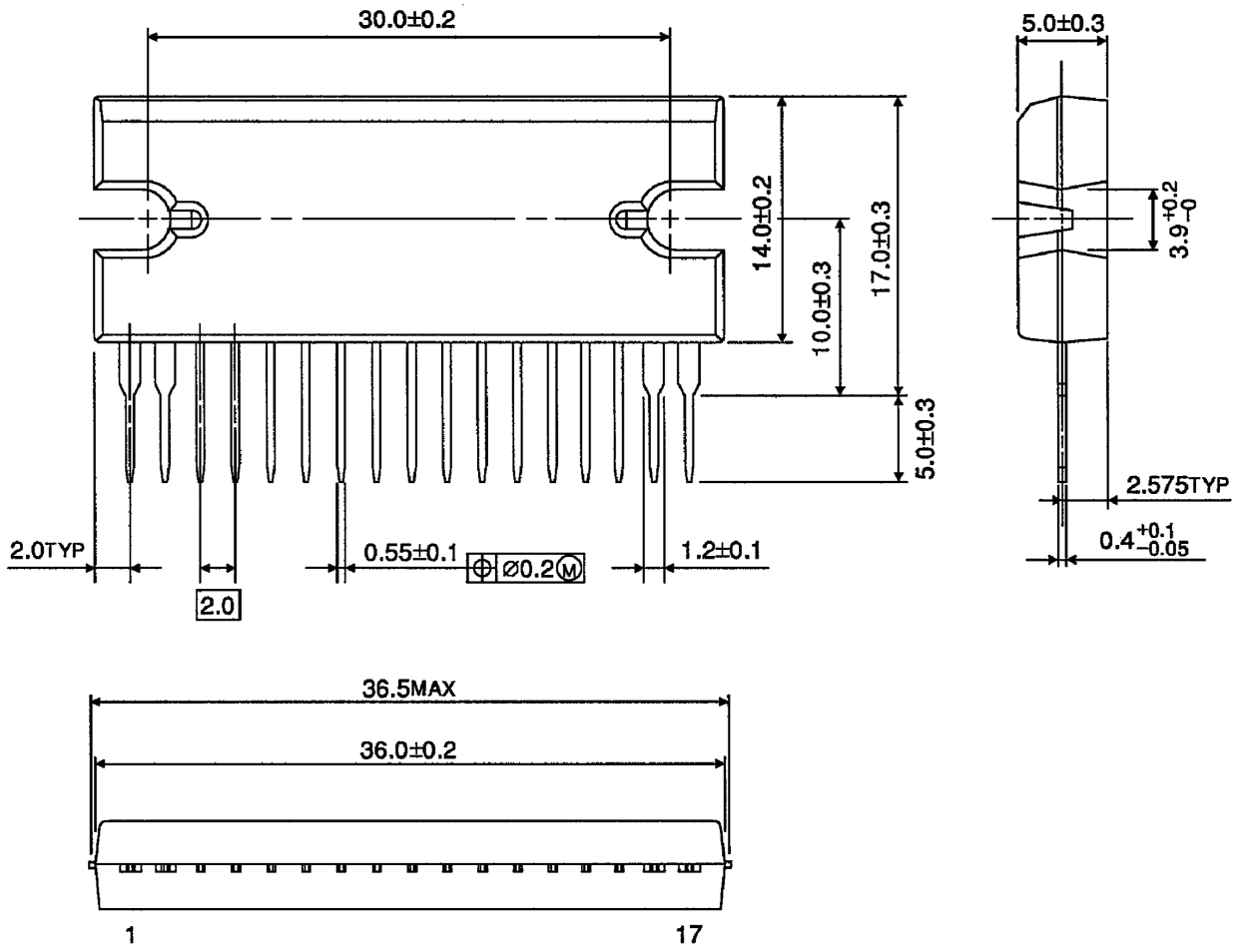
P_D – P_{OUT}




P_D MAX – Ta
ALLOWABLE POWER DISSIPATION P_D MAX (W)
AMBIENT TEMPERATURE Ta (°C)
① INFIITE HEAT SINK
$R_{\theta JC}$ = 1.5°C / W
② HEAT SINK
($R_{\theta HS}$ = 3.5°C / W)
$R_{\theta JC}$ + $R_{\theta HS}$ = 5°C / W
③ NO HEAT SINK
$R_{\theta JA}$ = 25°C / W
0
10
20
30
40
50
60
0
25
50
75
100
125
150
175
200

Package Dimensions

HSIP17-P-2.00 Unit : mm



Weight: 9.8g (typ.)

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000707EBA

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