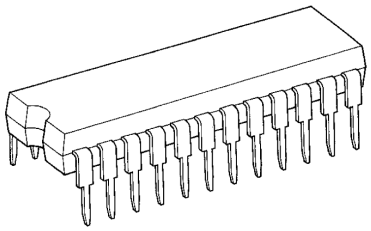
TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

TA8189N

Quad Preamplifier For Double Cassette Tape Recorder

The TA8189N is a quad pre amplifier designed for use in record / play back amplifier. It is suitable for double cassette tape recorder.



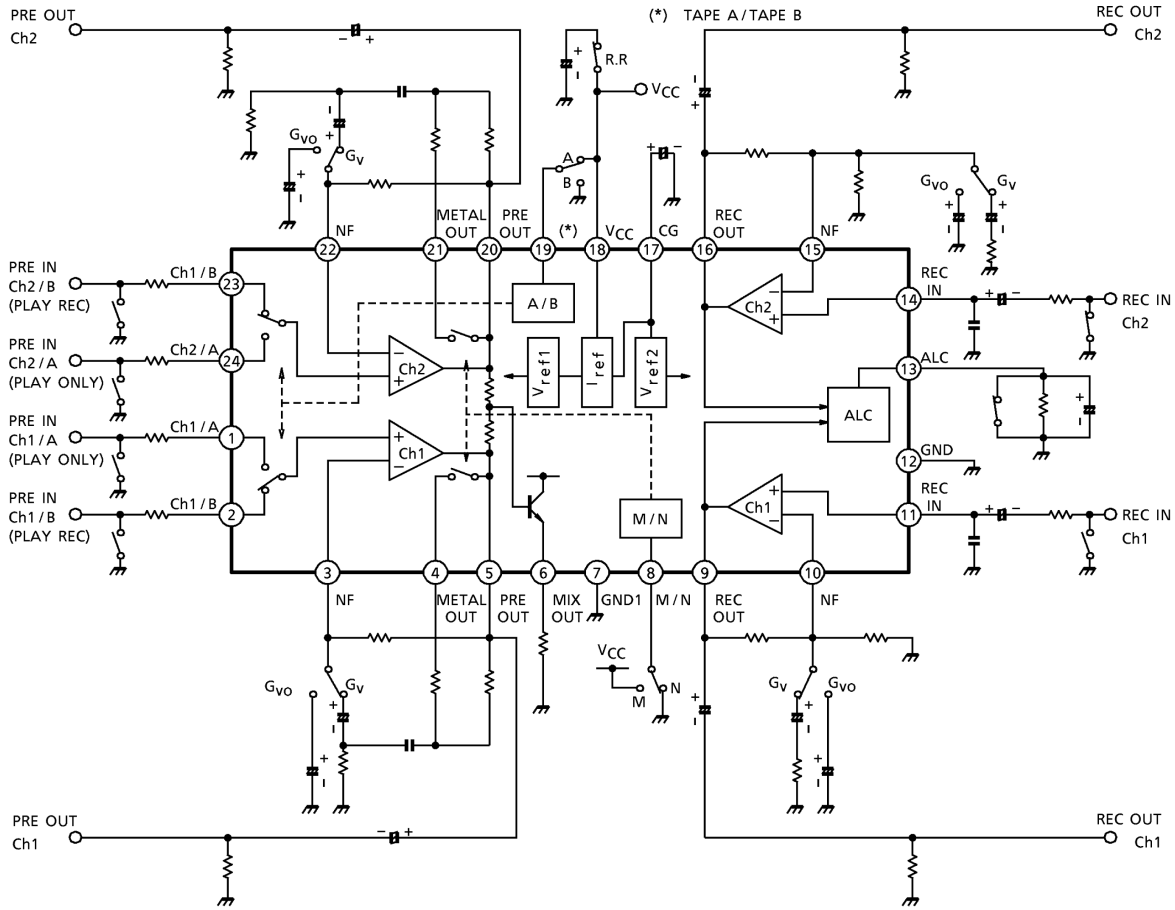
SDIP24-P-300-1.78

Weight: 1.2g (typ.)

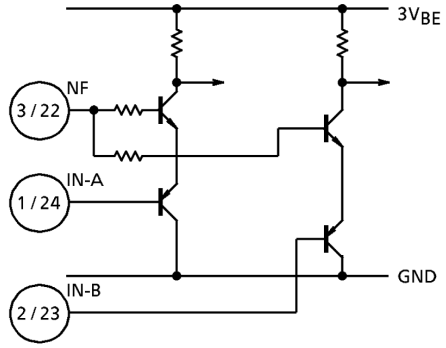
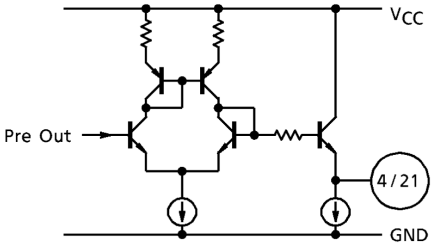
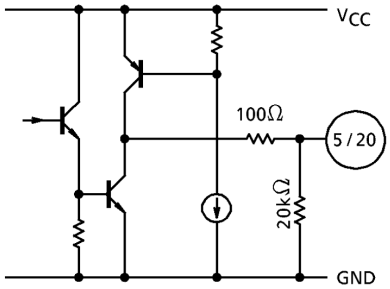
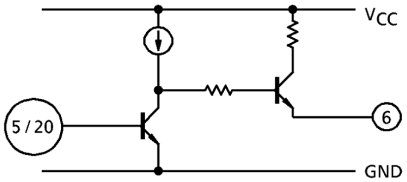
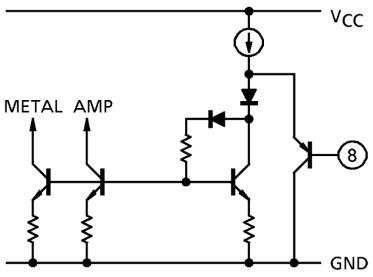
Features

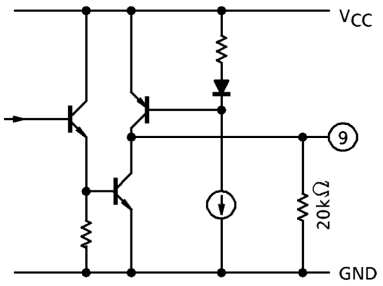
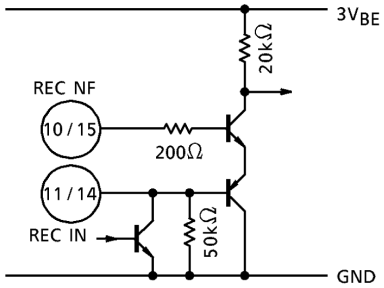
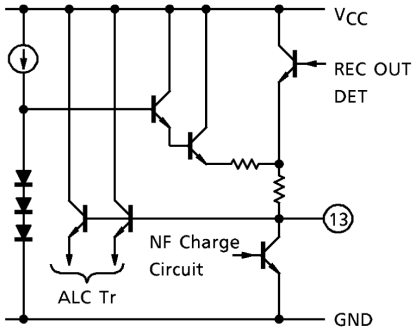
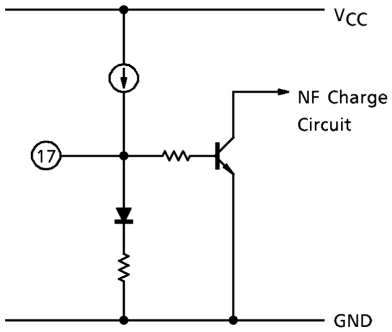
- Play back amp
  - Built in input select switch.
  - Built in equalizer control switch.
  - Mixing output, for music selection.
- Recording amp
  - Built in ALC detector circuit.
- Operating supply voltage range: $V_{CC\ (opr)}$ = 4.0~13.5V (Ta = 25°C)

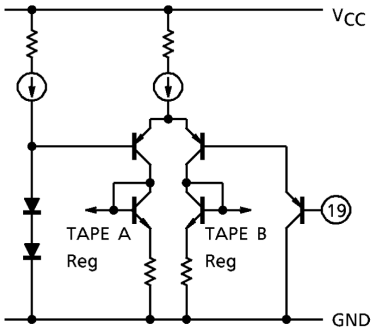
Block Diagram



Terminal Explanation

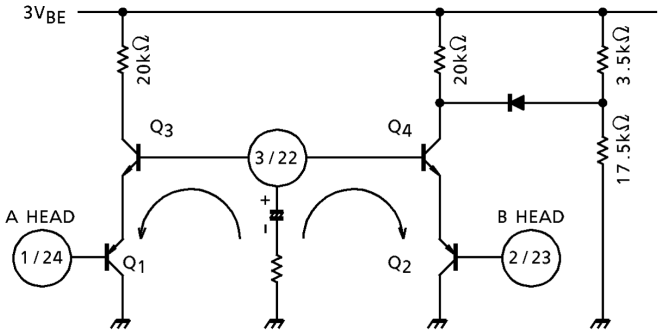
Terminal No.	Symbol	Function	Equivalent Circuit
1	Tape A in (ch1)	Tape play back input (play)	
24	Tape A in (ch1)		
2	Tape B in (ch2)	Tape play back input (play / rec)	
23	Tape B in (ch2)		
3	PB NF (ch1)	Tape play back NF	
22	PB NF (ch2)		
4 / 21	Metal out	Metal EQ switch	
5	Pre out (ch1)	Play back amp output	
20	Pre out (ch2)		
6	Mix out	Mixing output	
7	GND	GND	—
8	Metal / normal SW	Change over switch for metal mode and normal mode.	

Terminal No.	Symbol	Function	Equivalent Circuit
9	Rec out (ch1)	Recording amp output	
16	Rec out (ch2)		
10	Rec NF (ch1)	Recording amp NF	
15	Rec NF (ch2)		
11	Rec in (ch1)	Recording amp input	
14	Rec in (ch2)		
12	GND	GND	—
13	ALC T.C	Automatic level control (ALC) time constant terminal	
17	CG det.	NF charge up circuit switching terminal	

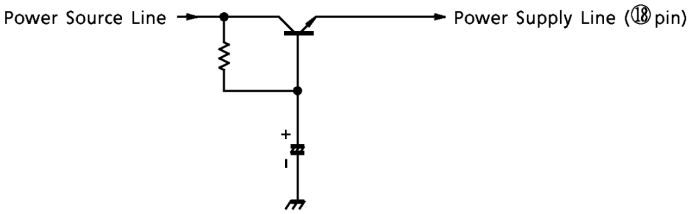
Terminal No.	Symbol	Function	Equivalent Circuit
19	Tape A / tape B SW	Play back AMP input selector	

Application Information And Application Method

1. Input level of play amp.
   In case that input voltage (V_{in} > 0.0245V_{rms} (–30dBm)) is applied to A–head and B–head at same time on a set, use A–head for reproducing only and, B–head for recording or reproducing.
   In case that the over–voltage is applied to A–head and B–head at same time, the transistor Q_3, Q_4 are made a saturation condition and NF condenser is discharged by base–current of Q_3, Q_4 and the output DC voltage of pin 3 / 22 are raised.
   In case of the high input, use B–head, because of building in the diode against saturation on Q_4.



2. Power source line
   In case of including the ripple on the power source line, stabilize by using a transistor as following figure.



Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Supply voltage	V_{CC}	14.5	V
Power dissipation	P_D (Note)	1200	mW
Operating temperature	T_{opr}	−20~75	°C
Storage temperature	T_{stg}	−55~150	°C

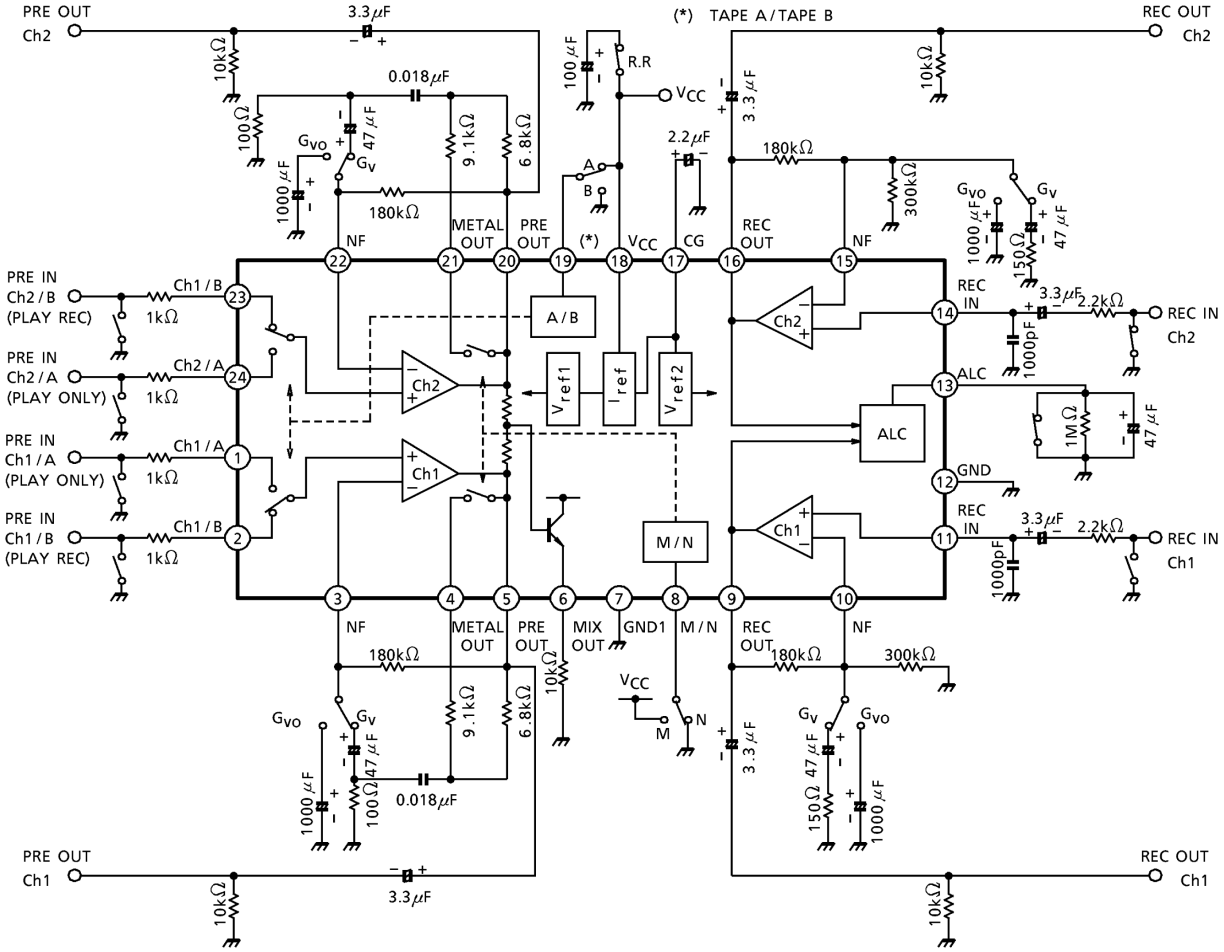
(Note) Derated above Ta = 25°C in the proportion of 9.6mW / °C.

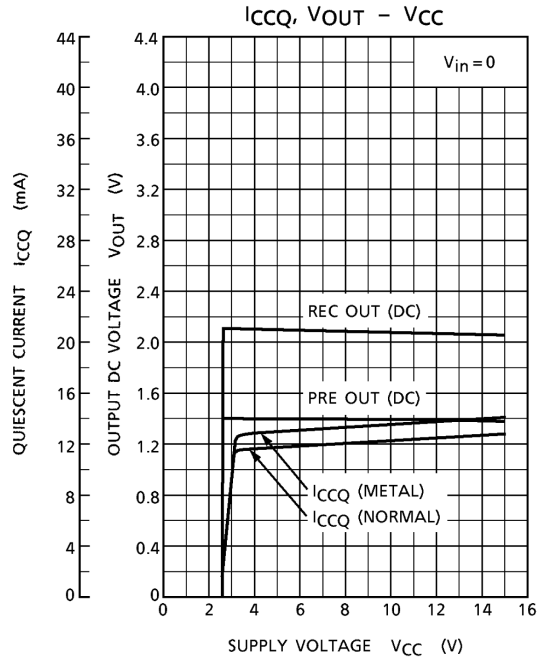
Electrical Characteristics (unless otherwise specified, V_{CC} = 6V, f = 1kHz, Ta = 25°C)

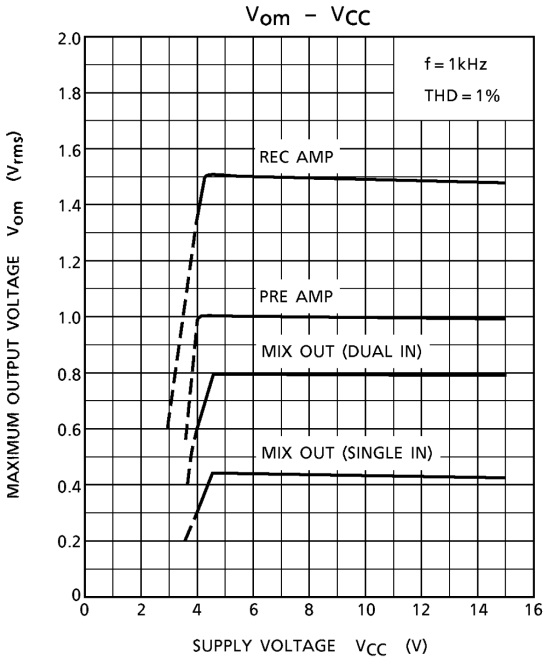
Characteristic		Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit
Quiescent current		I_{CCQ}	—	Metal mode, V_{in} = 0	—	13	20	mA
Play back amp.	Output noise voltage	V_{no}	—	Normal mode, R_g = 2.2kΩ, nab EQ, BW = 20Hz~20kHz, G_V = 40dB	—	200	600	μV_{rms}
	Total harmonic distortion	THD	—	V_{out} = 0.2V_{rms}, f = 1kHz normal mode	—	0.06	0.2	%
	Maximum output voltage	V_{om}	—	THD = 1.0%, R_L = 10kΩ, f = 1kHz, normal mode	0.5	1.0	—	V_{rms}
	Open loop voltage gain	G_{vo}	—	f = 1kHz, R_L = 10kΩ, V_{in} = 13.8μV (−95dBm)	70	95	—	dB
	Cross talk	C.T. (ch)	—	V_{out} = 0.775V_{rms} (0dBm), f = 1kHz, R_g = 2.2kΩ, normal mode	−40	−60	—	dB
	Tape A / tape B cross talk	C.T. (in)	—	V_{out} = 0.775V_{rms} (0dBm), f = 1kHz, R_g = 2.2kΩ, normal mode	—	−66	—	dB
	Ripple rejection ratio	R.R.	—	V_{ripple} = 0.775V_{rms} (0dBm), f_{ripple} = 100Hz, R_g = 2.2kΩ, normal mode	—	−38	—	dB
	Voltage gain	G_{vn}	—	V_{in} = 7.75mV_{rms} (−40dBm), f = 1kHz, R_L = 10kΩ, normal nab	—	40	—	dB
Pre amp →rec amp C.T.		C.T. (P / R)	—	f = 1kHz, V_{out} (pre) = 0.775V_{rms} (0dBm), normal (pre)	—	−53	—	dB
Rec amp →pre amp C.T.		C.T. (R / P)	—	f = 1kHz, V_{out} (rec) = 0.775V_{rms} (0dBm), normal (pre)	—	−76	—	dB

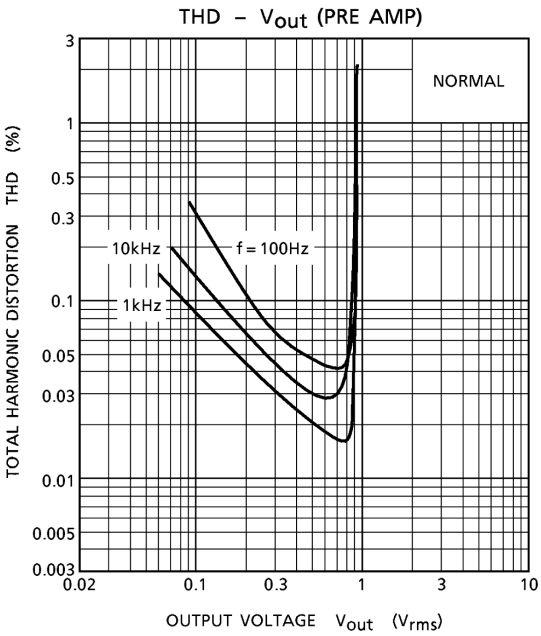
	Characteristic	Symbol	Test Cir–cuit	Test Condition	Min.	Typ.	Max.	Unit
Recording amp.	Output noise voltage	V_{no}	—	R_g = 2.2kΩ, BW = 20Hz~20kHz, ALC off G_V = 60dB	—	1.35	2.7	mV
	Total harmonic distortion	THD	—	V_{out} = 0.5V_{rms}, f = 1kHz, ALC off R_L = 10kΩ	—	0.37	1.0	%
	Maximum output voltage	V_{om}	—	THD = 1%, R_L = 10kΩ, f = 1kHz, ALC off	1.2	1.5	—	V_{rms}
	Open loop voltage gain	G_{vo}	—	f = 1kHz, R_L = 10kΩ, ALC off, V_{in} = 3.16μV_{rms} (–110dBV)	80	108	—	dB
	ALC range	R (ALC)	—	3dB up, f = 1kHz, dual input	—	52	—	dB
	Total harmonic distortion (ALC)	THD (ALC)	—	V_{in} = 0.0775V_{rms} (–20dBm), f = 1kHz dual input, R_L = 10kΩ	—	0.48	1.0	%
	ALC balance	B (ALC)	—	V_{in} = 0.0775V_{rms} (–20dBm), dual input, R_L = 10kΩ, f = 1kHz	—	0	2	dB
	ALC level	V (ALC)	—	V_{in} = 0.0775V_{rms} (–20dBm), f = 1kHz, R_L = 10kΩ	0.75	1.0	1.2	V_{rms}
	Ripple rejection ratio	R.R.	—	V_{ripple} = 0.775V_{rms} (0dBm), f = 100Hz, R_g = 2.2kΩ	—	–30	—	dB
	Voltage gain	G_{vn}	—	f = 1kHz (flat), R_L = 10kΩ, V_{in} = 1mV_{rms} (–60dBV)	—	61	—	dB
	Cross talk (ALC off)	C.T. (ch)	—	V_{out} = 0.775V_{rms} (0dBm), f = 1kHz, R_g = 2.2kΩ, ALC off, V_{in} = 1mV_{rms} (–60dBV)	–40	–54	—	dB
	Cross talk (ALC on)	C.T. (ALC)	—	V_{out} = 0.775V_{rms} (0dBm), f = 1kHz, R_g = 2.2kΩ, ALC on, V_{in} = 0.0775V_{rms} (–20dBm)	–40	–54	—	dB

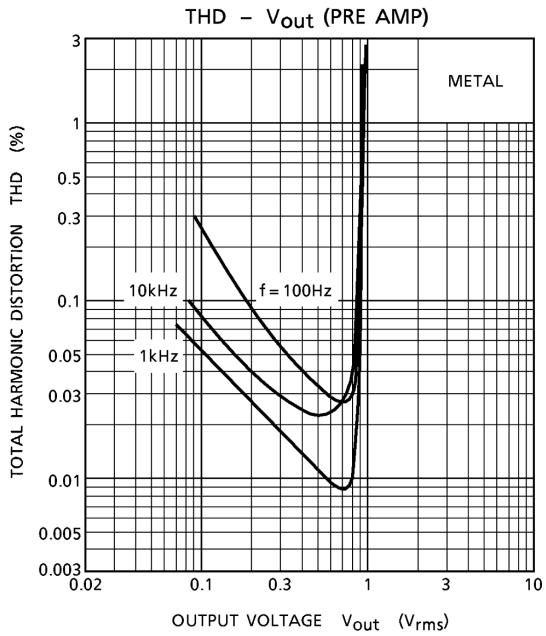
Test Circuit



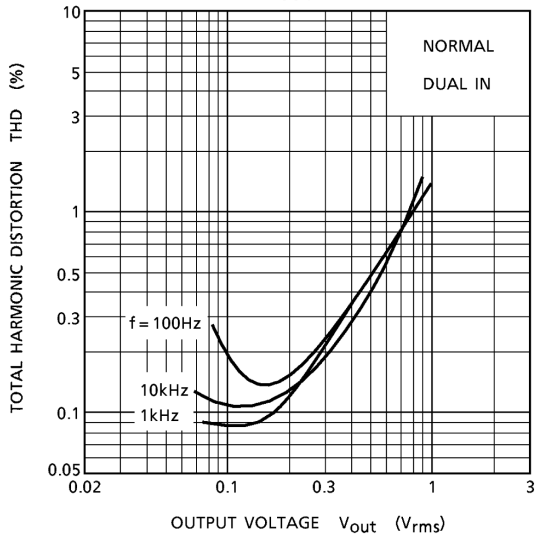

ICCQ, VOUT – VCC
Vin = 0
REC OUT (DC)
PRE OUT (DC)
ICCQ (METAL)
ICCQ (NORMAL)
QUIESCENT CURRENT ICCQ (mA)
OUTPUT DC VOLTAGE VOUT (V)
SUPPLY VOLTAGE VCC (V)


Vom – VCC
f = 1kHz
THD = 1%
REC AMP
PRE AMP
MIX OUT (DUAL IN)
MIX OUT (SINGLE IN)
MAXIMUM OUTPUT VOLTAGE Vom (Vrms)
SUPPLY VOLTAGE VCC (V)

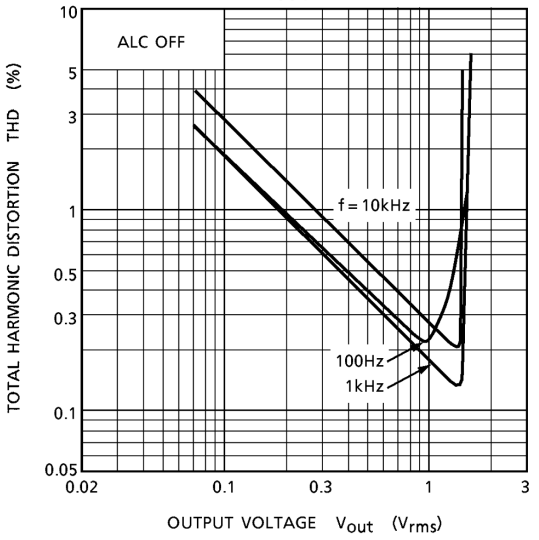

THD – Vout (PRE AMP)
NORMAL
10kHz
f = 100Hz
1kHz
TOTAL HARMONIC DISTORTION THD (%)
OUTPUT VOLTAGE Vout (Vrms)


THD – Vout (PRE AMP)
METAL
10kHz
f = 100Hz
1kHz
TOTAL HARMONIC DISTORTION THD (%)
OUTPUT VOLTAGE Vout (Vrms)

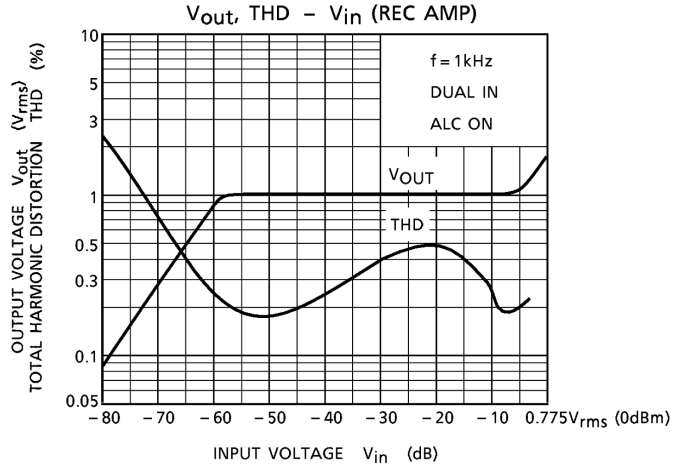
THD – V_{out} (MIX OUT)



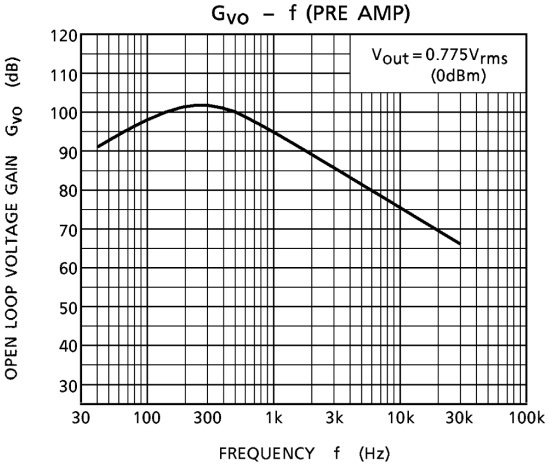
THD – V_{out} (REC AMP)



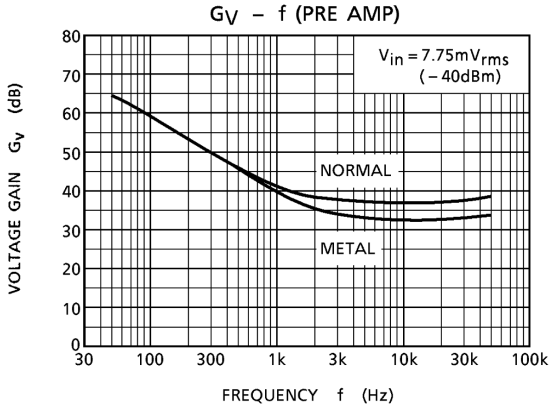
V_{out}, THD – V_{in} (REC AMP)



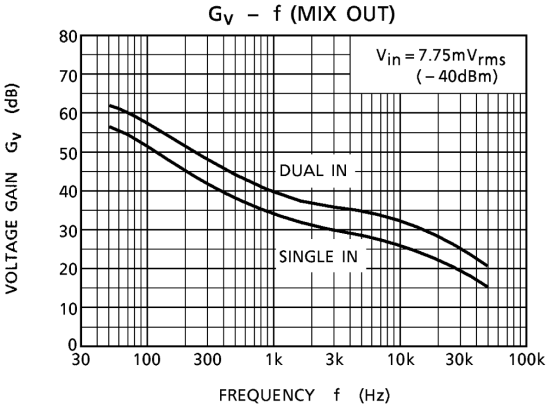
G_{vo} – f (PRE AMP)



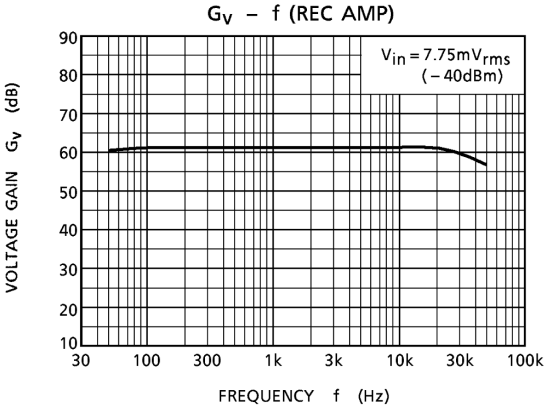
G_V – f (PRE AMP)



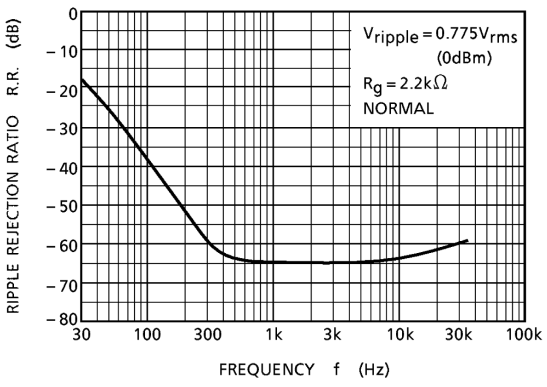
G_v – f (MIX OUT)



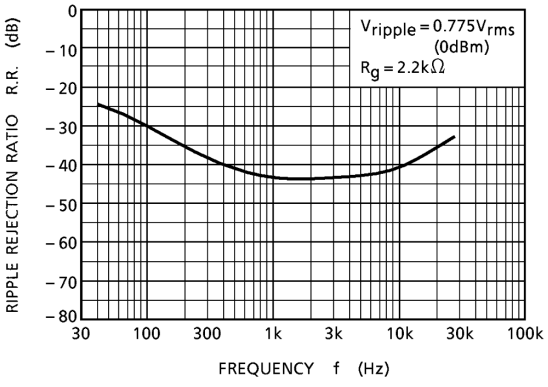
G_V – f (REC AMP)



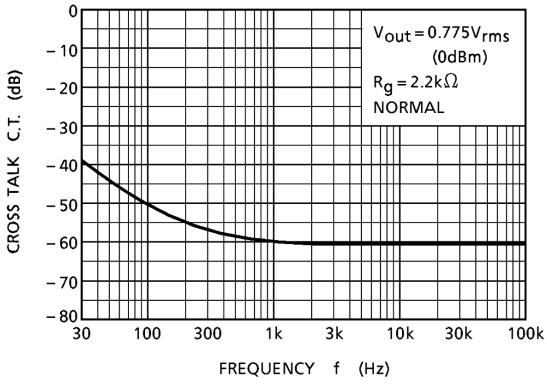
R.R. – f (PRE AMP)



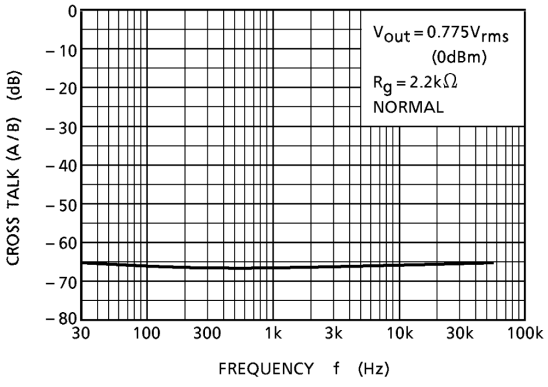
R.R. – f (REC AMP)



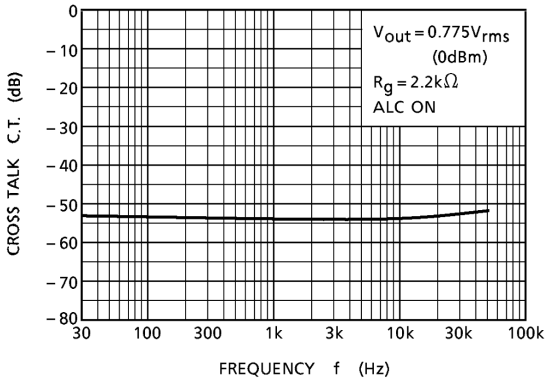
C.T. – f (PRE AMP)



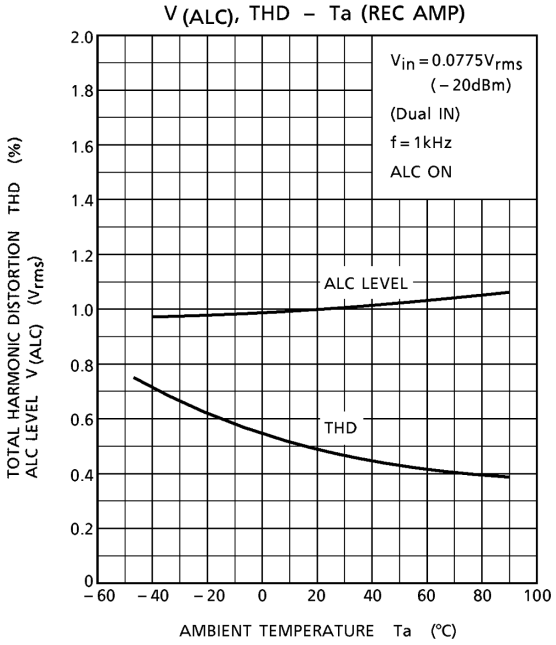
C.T. (A / B) – f (PRE AMP)



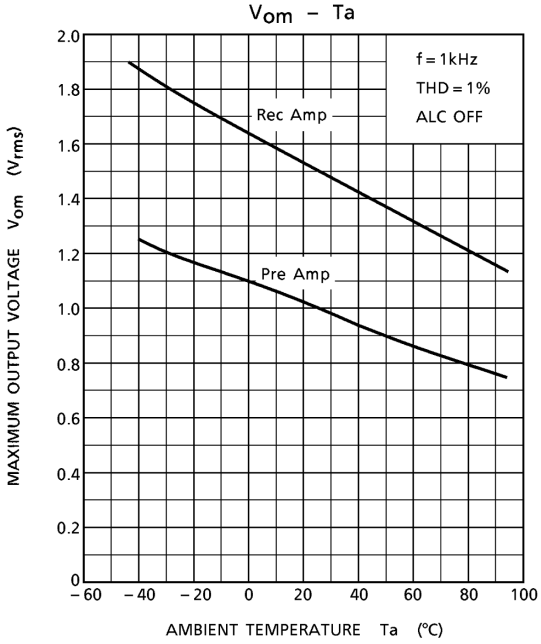
C.T. – f (REC AMP)



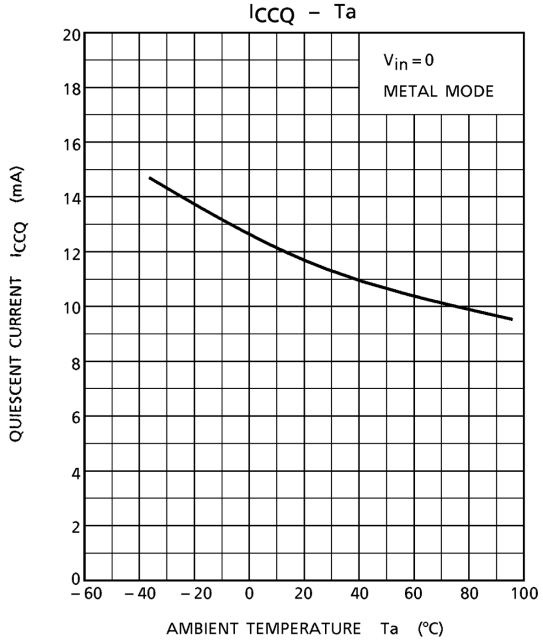
$V_{(ALC)}$, THD – Ta (REC AMP)



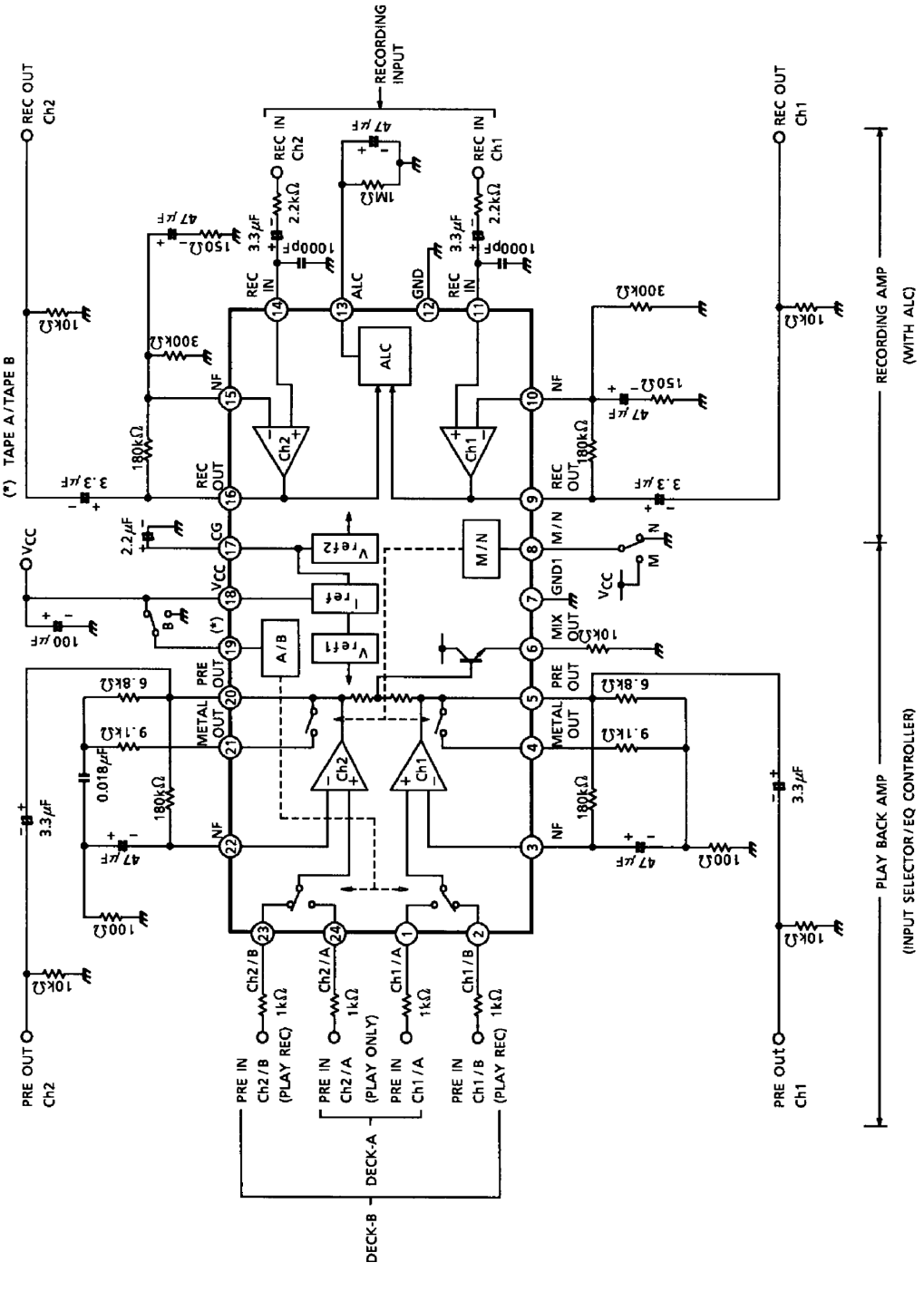
V_{om} – Ta



I_{CCQ} – Ta



APPLICATION CIRCUIT



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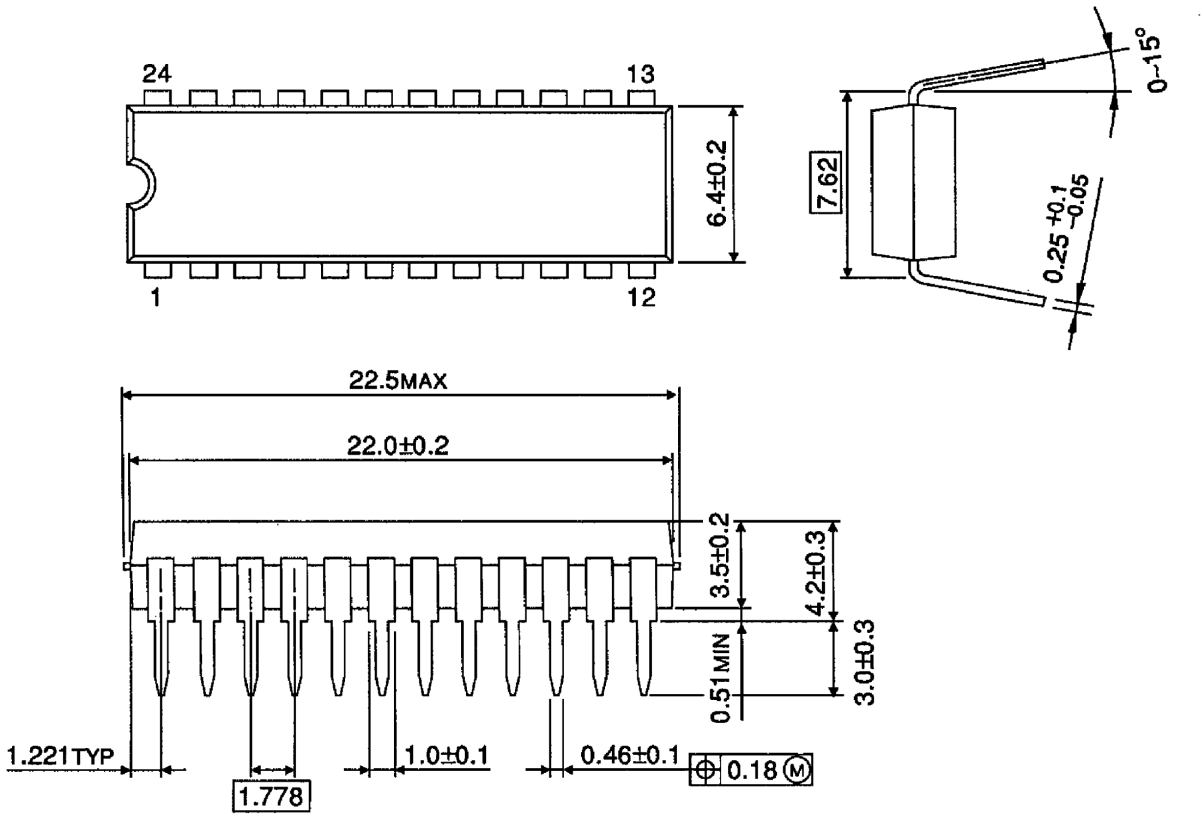
Package Dimensions

SDIP24-P-300-1.78 Unit : mm



Weight: 1.2g (typ.)

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000707EBA

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