TBA 231

LINEAR INTEGRATED CIRCUIT

DUAL LOW NOISE OPERATIONAL AMPLIFIER

- SINGLE or DUAL SUPPLY OPERATION
- LOW NOISE FIGURE
- HIGH GAIN
- LARGE INPUT VOLTAGE RANGE
- EXCELLENT GAIN STABILITY VERSUS SUPPLY VOLTAGE
- NO LATCH UP
- OUTPUT SHORT CIRCUIT PROTECTED

The TBA 231 is a monolithic integrated dual operational amplifier in a 14-lead dual in-line plastic package.
These low-noise, high-gain amplifiers show extremely stable operating characteristics over a wide range of supply voltage and temperatures.
The device is intended for a variety of applications requiring two high performance operational amplifiers, such as phono and tape stereo preamplifier, TV remote control receiver, etc.

ABSOLUTE MAXIMUM RATINGS

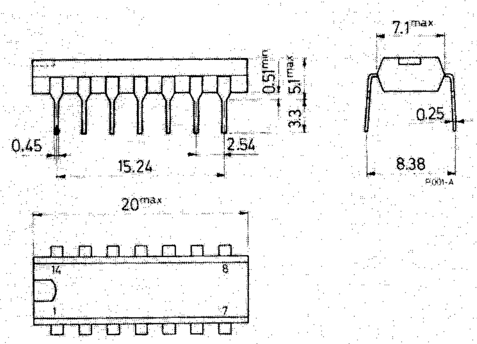
V_s	Supply voltage	± 18	V
	Differential input voltage	± 5	V
	* Common mode input voltage	± 15	V
P_{tot}	Power dissipation at $T_{amb} \leq 60$ °C	500	mW
→ T_{stg}	Storage temperature	-40 to 150	°C
T_{op}	Operating temperature	0 to 70	°C

* For $V_s \leq \pm 15$ V, V_i max = V_s

ORDERING NUMBER: TBA 231

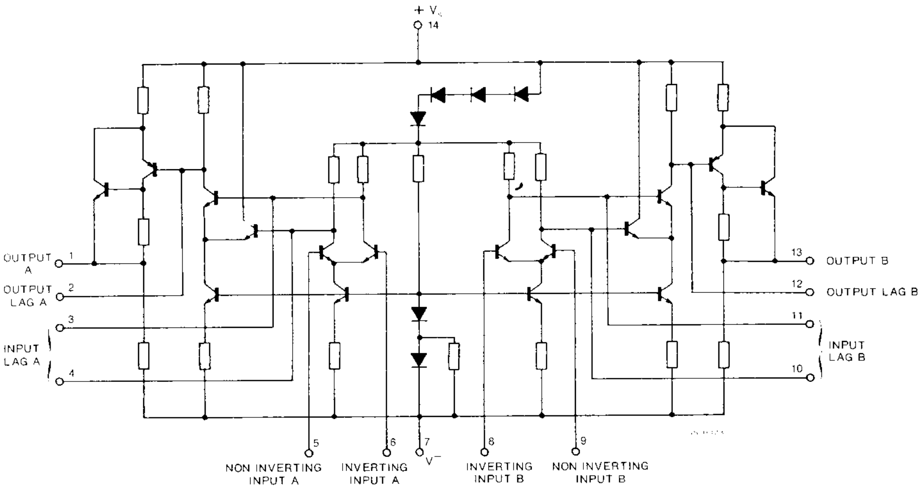
MECHANICAL DATA

Dimensions in mm

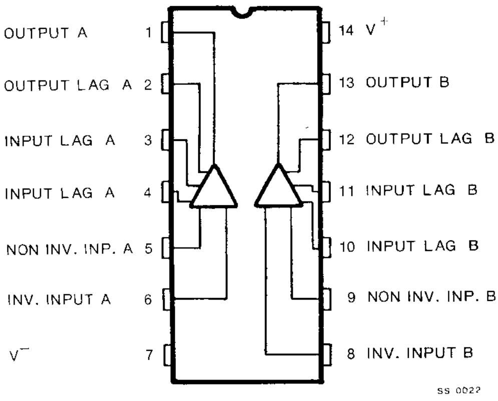


TBA 231

SCHEMATIC DIAGRAM

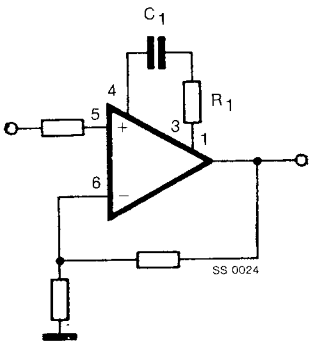


CONNECTION DIAGRAM



TEST CIRCUIT

Frequency response



THERMAL DATA

→ $R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	180	°C/W

ELECTRICAL CHARACTERISTICS

(T_{amb} = 25 °C, R_L = 50 kΩ to pin 7 unless otherwise specified)

V_s = ± 15 V

Parameter		Test conditions	Min.	Typ.	Max.	Unit
I_d	Quiescent drain current	V_o = 0		9	14	mA
$\|V_{BE1}-V_{BE2}\|$	Input offset voltage	R_s = 200 Ω		1	6	mV
$\|I_{B1}-I_{B2}\|$	Input offset current			50	1000	nA
I_b	Input bias current			250	2000	nA
	Common mode input voltage range		±10	±11		V
R_i	Input resistance	f = 1 kHz	37	150		kΩ
G_V	Voltage gain	V_o = ±5 V	6500	20.000		—
V_o	Positive output voltage swing		+12	+13		V
V_o	Negative output voltage swing		-14	-15		V
R_o	Output resistance	f = 1 kHz		5		kΩ
CMRR	Common mode rejection ratio	R_s = 200 Ω	70	90		dB
SVR	Supply voltage rejection	R_s = 200 Ω		50		μV/V
SR	Slew rate	Unity gain C_1 = 0.1 μF R_1 = 4.7 Ω see frequency response test circuit		1		V/μs
	Channel separation	R_s = 10 kΩ f = 10 kHz		140		dB
NF	Noise figure	R_s = 10 kΩ B = 10 Hz to 10 kHz		1.5		dB

ELECTRICAL CHARACTERISTICS (continued)

$V_s = \pm 4$ V

Parameter		Test conditions	Min.	Typ.	Max.	Unit
I_d	Quiescent drain current	$V_o = 0$		2.5		mA
$V_{BE1}-V_{BE2}$	Input offset voltage	$R_s = 200\ \Omega$		1	6	mV
$\lvert I_{B1}-I_{B2}\rvert$	Input offset current			50	1000	nA
I_b	Input bias current			250		nA
G_V	Voltage gain	$V_o = \pm 1$ V	2500	15.000		—
V_o	Positive output voltage swing		+2.5	+2.8		V
V_o	Negative output voltage swing		-3.6	-4		V

Fig. 1 - Power rating chart

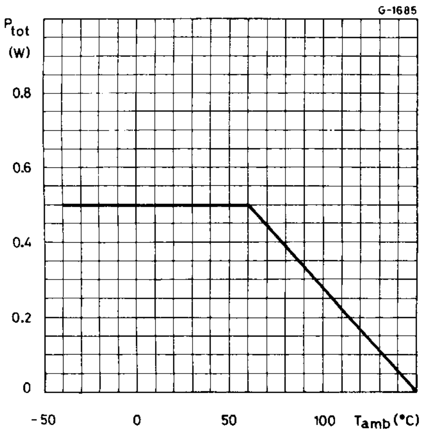


Fig. 2 - Typical output capability vs supply voltage

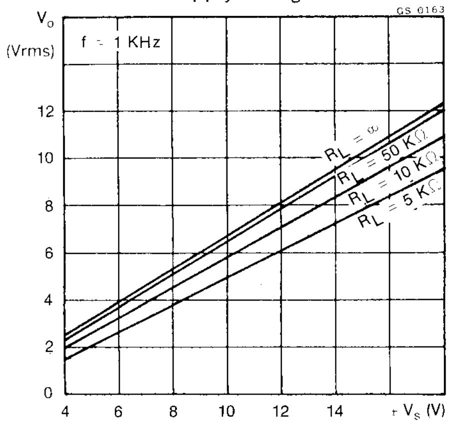


Fig. 3 - Typical quiescent drain current vs supply voltage

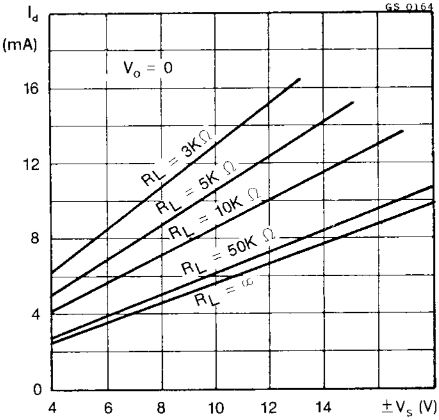


Fig. 4 - Typical open loop voltage gain vs supply voltage

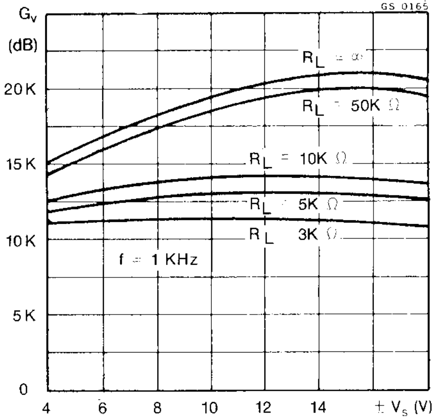


Fig. 5 - Typical open loop frequency response using recommended compensation networks

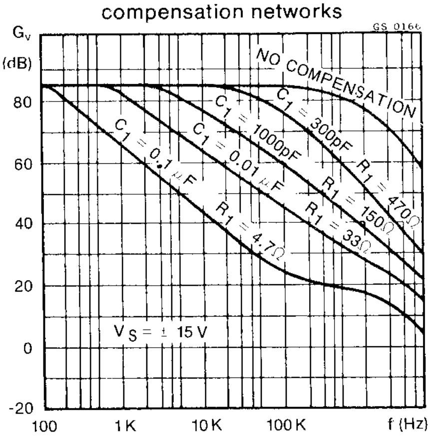


Fig. 6 - Output voltage swing vs frequency for various compensation networks

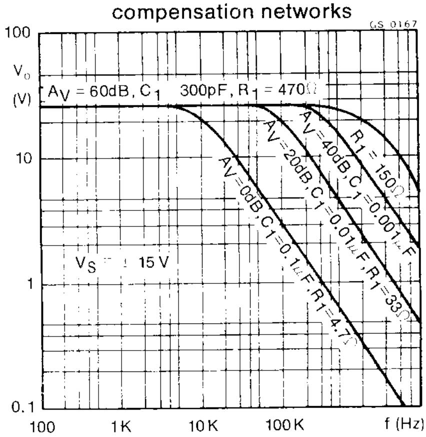


Fig. 7 - Typical input noise voltage vs frequency

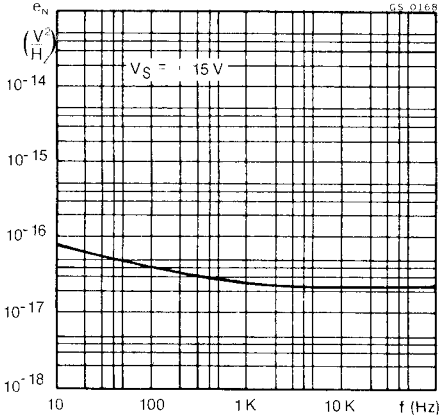


Fig. 8 - Typical input noise current vs frequency

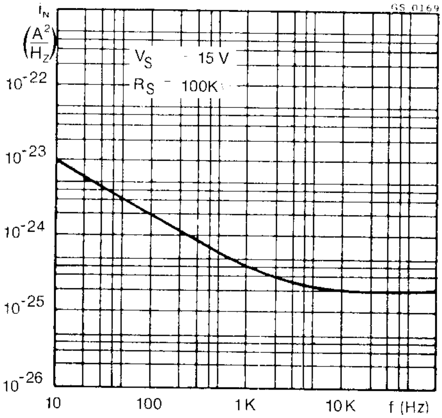


Fig. 9 - Typical closed loop gain vs frequency

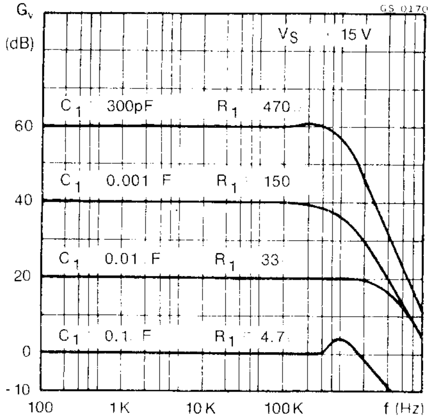


Fig. 10 - Typical open loop voltage gain vs temperature