

# WIDE BAND DIFFERENTIAL LIMITING AMPLIFIER

# TAA350

The TAA350 is a monolithic silicon integrated circuit which is primarily intended for amplification of F.M. i.f. signals. The circuit consists of a high gain amplifier incorporating long tailed pairs with constant current drive to the emitters. This allows excellent A.M. rejection to be obtained with simplified F.M. detectors. The amplifier can be used with either symmetrical or asymmetrical terminations.

## QUICK REFERENCE DATA

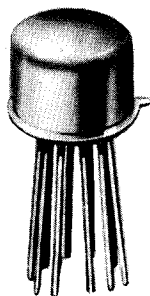
Supply voltage (nominal)	6.0	V
Total current drain (typ.)	20	mA
Matched power gain at 6MHz (typ.)	80	dB
Input limiting voltage at 6MHz (typ.)	100	$\mu$ V
A.M. rejection with slope detector	50	dB
Frequency response (-3dB)	12	MHz
Input conductance (typ.)	400	$\mu$ mho
Output impedance (typ.)	75	$\Omega$

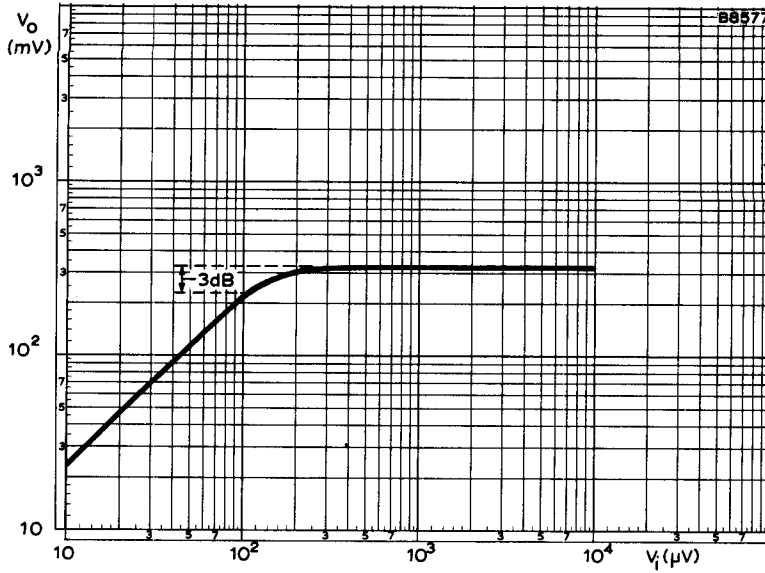
## OUTLINE AND DIMENSIONS

Conforms to B.S. 3934 SO-44B/SB10-1

J.E.D.E.C. TO-74

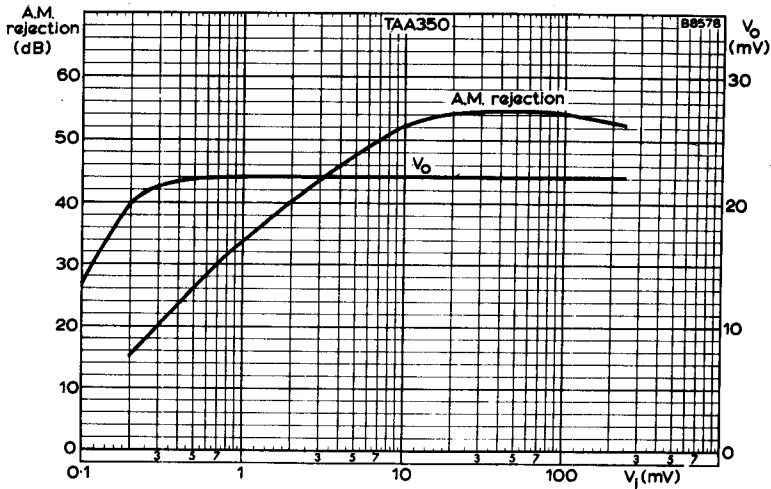
For details see page 5





LIMITING CHARACTERISTIC OF AMPLIFIER  
 ( $V_o$  = output before slope detector)

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AMPLITUDE MODULATION REJECTION AND AUDIO OUTPUT  
 VOLTAGE PLOTTED AGAINST INPUT VOLTAGE  
 ( $V_o$  = audio output from slope detector)



## RATINGS

Limiting values of operation according to the absolute maximum system.

### Electrical

Voltages	Condition	
$V_{1-3}$ Pin 1 to 3	Voltage at pins $V_{2-3} = V_{1-3} \leq V_{9-3}$	0 to +10 V
$V_{2-3}$ Pin 2 to 3	Voltage at pins $V_{1-3} = V_{2-3} \leq V_{9-3}$	0 to +10 V
$V_{4-3}$ Pin 4 to 3	Do not apply an external voltage source	0 to +10 V
$V_{5-3}$ Pin 5 to 3	Current at pin 5 < 20mA, $V_{5-3} \leq V_{9-3}$	0 to +10 V
$V_{6-3}$ Pin 6 to 3	Current at pin 6 < 20mA, $V_{6-3} \leq V_{9-3}$	0 to +10 V
$V_{7-3}$ Pin 7 to 3	Do not apply an external voltage source	0 to +10 V
$V_{9-3}$ Pin 9 to 3	With lower d.c. potential at all other terminals	0 to +10 V

Do not connect pins 8 and 10

The maximum signal voltage between pins 1 and 2 is 6V.

### Power

$P_{\text{tot max.}}$  See curve on page 6

### Temperature

$T_{\text{stg min.}}$	-25	$^{\circ}\text{C}$
$T_{\text{stg max.}}$	+125	$^{\circ}\text{C}$
$T_{\text{j min. operating}}$	-25	$^{\circ}\text{C}$
$T_{\text{j max. operating}}$	+125	$^{\circ}\text{C}$

### OPERATING AND ELECTRICAL CHARACTERISTICS (at $T_{\text{amb}} = 25^{\circ}\text{C}$ )

The four-pole parameters of the TAA350 are defined in terms of hybrid-k parameters where:-

$$I_1 = k_{11} V_1 + k_{12} I_2$$

$$V_2 = k_{21} V_1 + k_{22} I_2$$

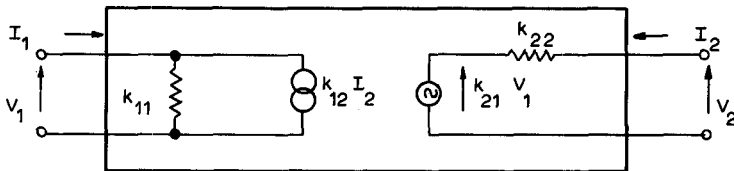


Fig. 2 Hybrid-k parameters equivalent circuit



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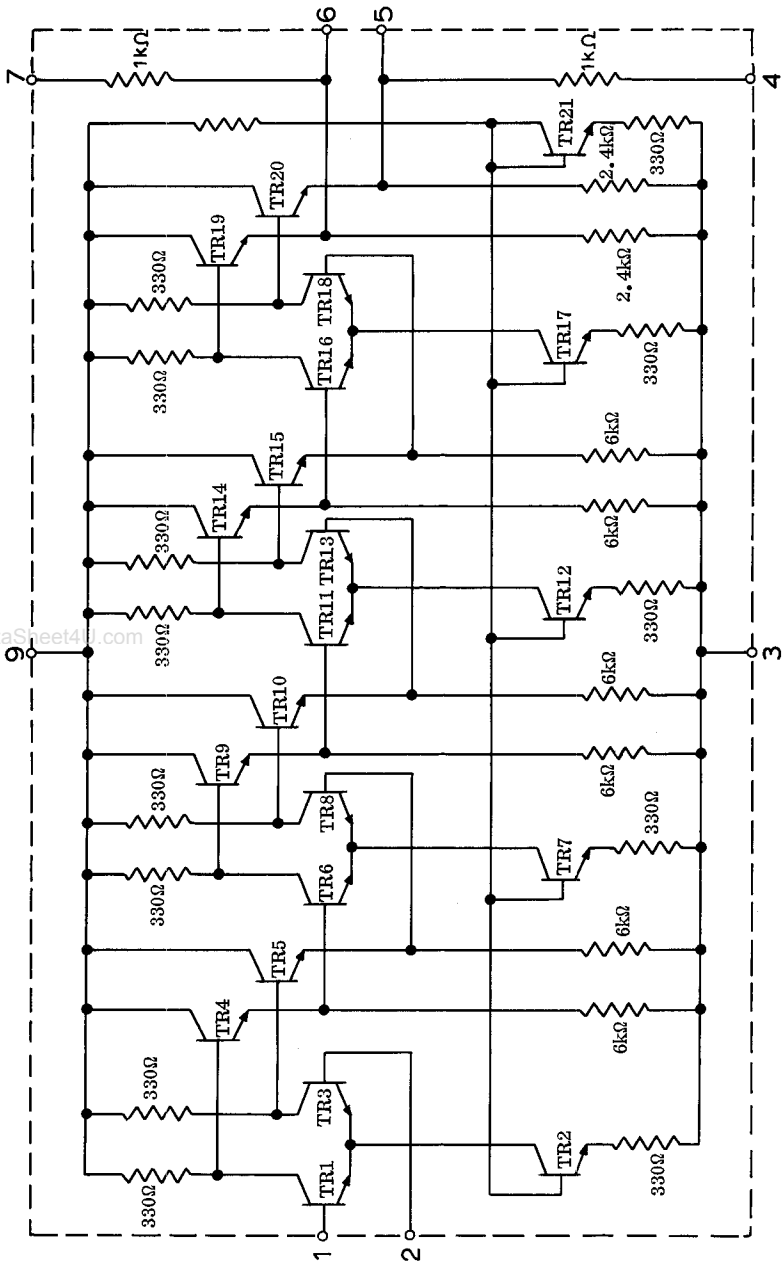
# TAA350

## OPERATING AND ELECTRICAL CHARACTERISTICS (cont'd)

PARAMETER	CONDITIONS	Input pin 2 Output pin 6 Common pin 3	D. C. Supply V <sub>9-3</sub> (V)	Freq. (MHz)	LIMITS		
					Typ.	Max.	
I <sub>tot</sub>	Total d.c. current (see page 6)		6	20	-	mA	
			10	-	47	mA	
k <sub>21</sub>	Voltage gain (see page 7)	output open-circuit	6	6	67	-	dB
			6	10.7	65	-	dB
k <sub>12</sub>	Feedback ratio (see page 8)	input short-circuit	6	6	-89	-	dB
			6	10.7	-80	-	dB
g <sub>11</sub>	Input conductance (see page 9)	output open-circuit	6	6	400	-	μmho
b <sub>11</sub>	Input susceptance (see page 9)	output open-circuit	6	6	600	-	μmho
r <sub>22</sub>	Output resistance (see page 9)	input short-circuit	6	6	80	-	Ω
x <sub>22</sub>	Output reactance (see page 9)	input short-circuit	6	6	18	-	Ω
V <sub>i(lim)</sub>	Input limiting voltage (see page 10)	See Fig. 3	6	6	100	-	μV
	A.M. rejection (see page 10)	See Fig. 3	6	6	50	-	dB
V <sub>o</sub>	Audio output voltage (see page 10)	See Fig. 3	6	6	20	-	mV
D <sub>tot</sub>	Total distortion	See Fig. 3	6	6	-	4	%



EQUIVALENT CIRCUIT



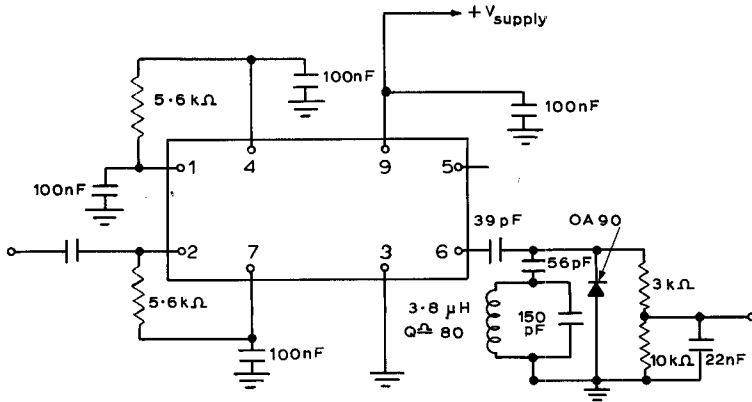
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## TEST CIRCUIT

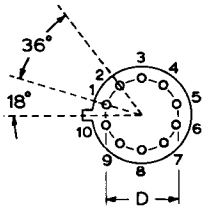
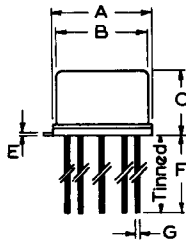


## OPERATING NOTES

Due to the high gain of the circuit, low internal feedback capacitance and low values of common inductance have been incorporated in the design. Similar precautions should be taken with the external circuit design, and earth return currents from the output should not result in feedback to the input.

## OUTLINE AND DIMENSIONS

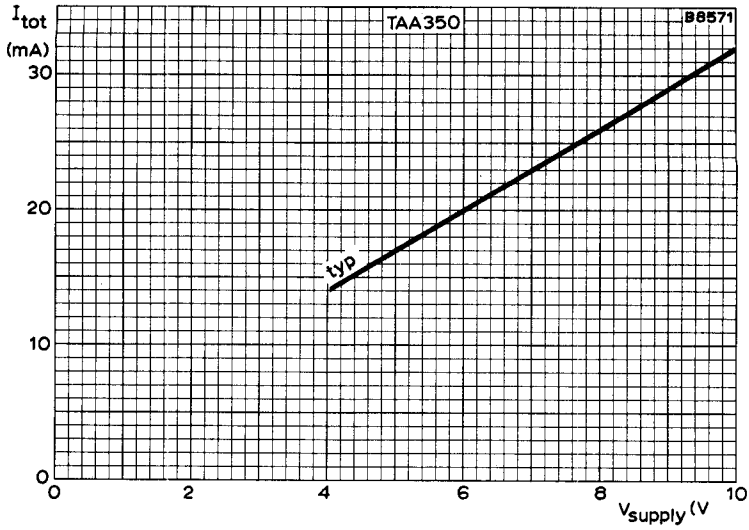
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	Millimetres		
	Min.	Nom.	Max.
A	8.64	8.90	9.40
B	7.75	8.15	8.51
C	-	-	5.33
D	-	5.08	-
E	-	0.40	-
F	12.7	-	- ←
G	-	0.43	-

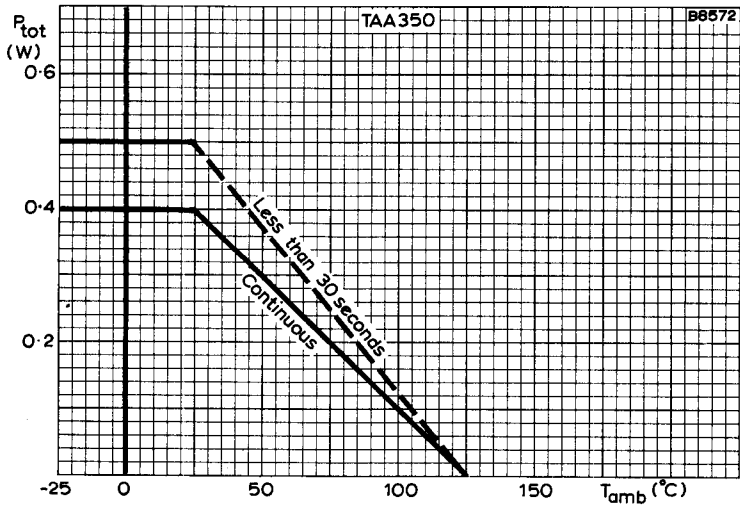
Pin 3 connected to envelope and substrate ←  
10 pins on 360° spaced equally





TOTAL CURRENT PLOTTED AGAINST SUPPLY VOLTAGE

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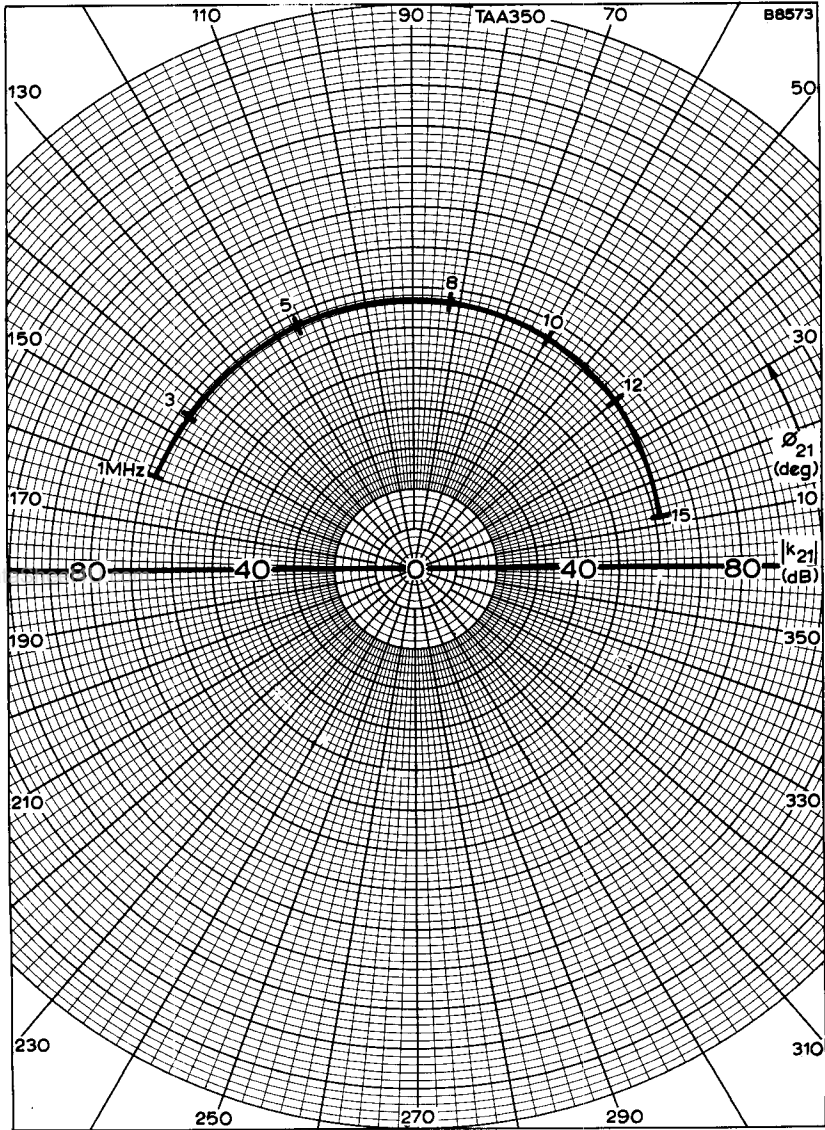


TOTAL POWER DISSIPATION PLOTTED AGAINST AMBIENT TEMPERATURE



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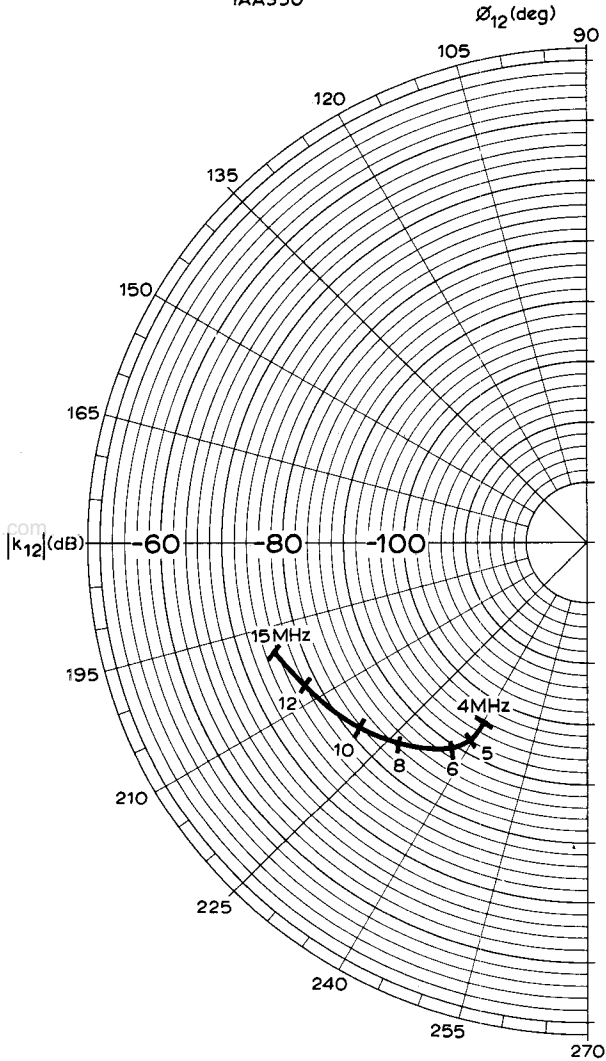
MODULUS AND ANGLE OF VOLTAGE GAIN  
PLOTTED AGAINST FREQUENCY





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TAA350

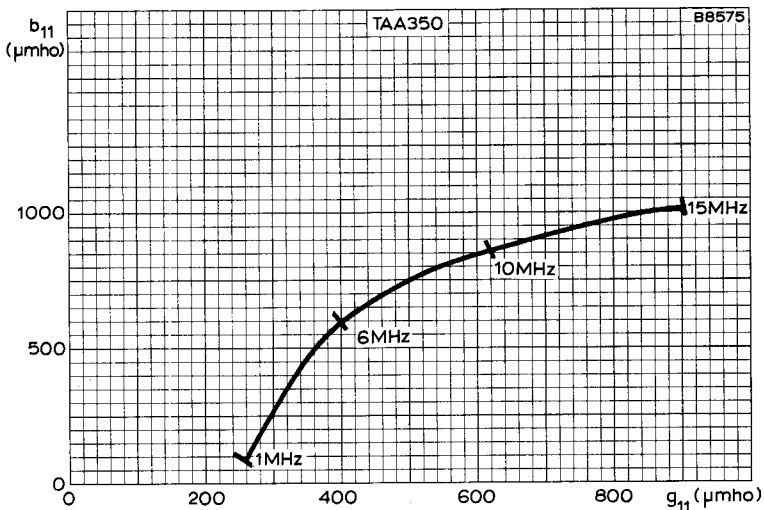


MODULUS AND ANGLE OF FEEDBACK RATIO  
PLOTTED AGAINST FREQUENCY



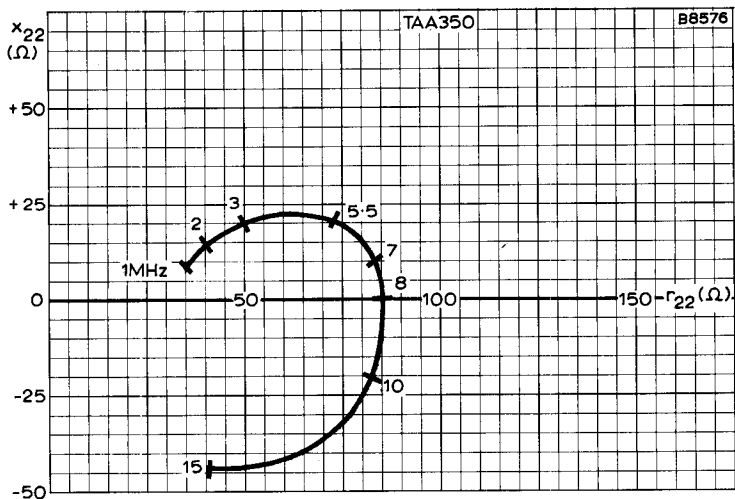
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COMPONENTS OF INPUT ADMITTANCE ( $k_{11}$ )  
PLOTTED AGAINST FREQUENCY



COMPONENTS OF OUTPUT IMPEDANCE ( $k_{22}$ )  
PLOTTED AGAINST FREQUENCY

