INTEGRATED RECEIVER CIRCUIT

TAD100

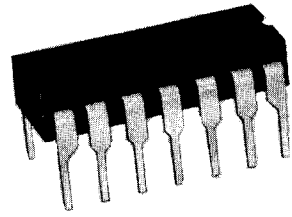
The TAD100 is a silicon integrated circuit primarily intended for a.m. receivers. The circuit incorporates the mixer, oscillator, i.f. amplifier, a.g.c. and audio pre-amplifier stages. The audio output transistors are not included so that different output power stages may be added to suit individual receiver requirements. The circuit incorporates a diode clamp to stabilise the oscillator voltage.

QUICK REFERENCE DATA			
Supply voltage (nom.)	6.0	9.0	V
Receiver audio output power	0.7	1.5	W
Total receiver current drain (quiescent)	15	23	mA
Typical sensitivity (r.f. input voltage at pin 1 for 10mV a.f. at detector load)	6	4	μV
Typical a.g.c. range (change in r.f. input voltage for 10dB change in audio output)	59	62	dB
Typical signal-to-noise ratio (for signal level of 20μV at input)	25	24	dB
Distortion (over most of dynamic range)		<2	%
Operating ambient temperature range		-10 to +55	^{o}C

OUTLINE

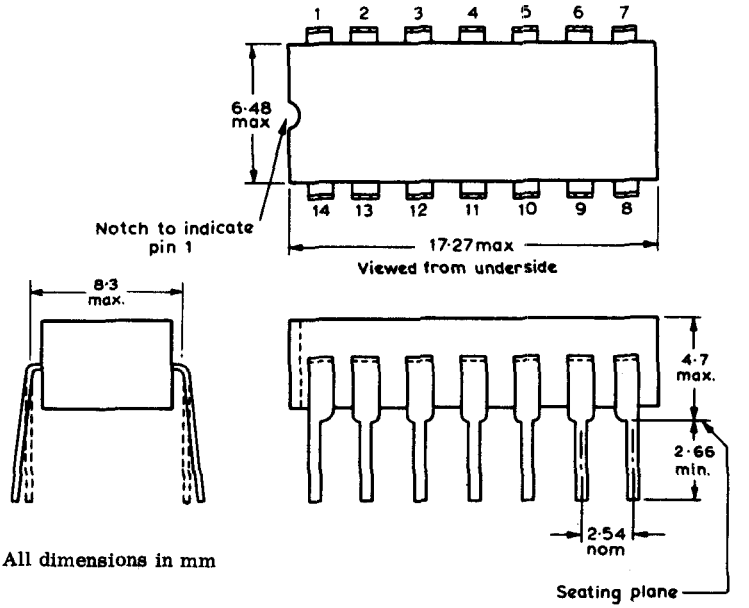
Dual-in-line package conforming to TO-116

For details see page 2 and General Explanatory Notes



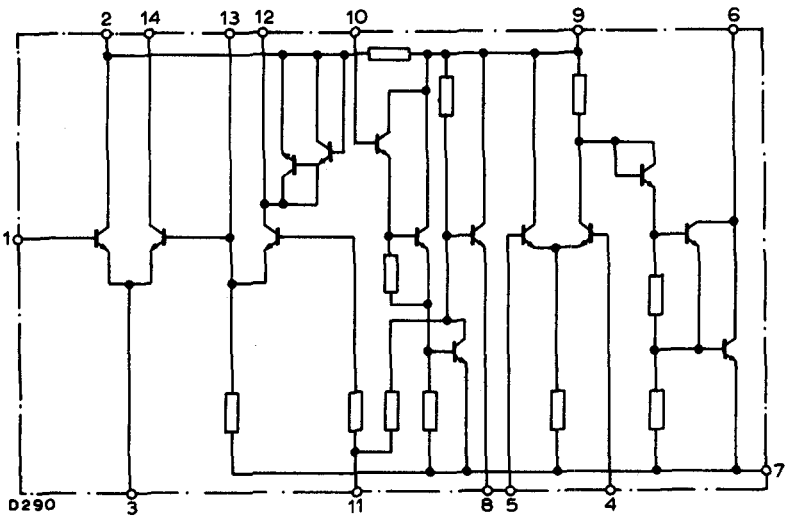
OUTLINE AND DIMENSIONS

Dual-in-line package conforms to J.E.D.E.C. TO-116



All dimensions in mm

EQUIVALENT CIRCUIT



RATINGS

Limiting values of operation according to the absolute maximum system.

Electrical

Maximum voltage pin 6		12	V
Maximum voltage pin 2 or pin 9		9	V
Maximum current pin 6	peak	30	mA
	average	20	mA
P_{tot} - Max total dissipation at $T_{amb} = 55^{o}C$		150	mW

Temperature

T_{stg} min.	-25	^{o}C
T_{stg} max.	+85	^{o}C
T_{amb} min. (operating)	-10	^{o}C
T_{amb} max. (operating)	+55	^{o}C

ELECTRICAL CHARACTERISTICS of radio receiver ($T_{amb} = 25^{o}C$)

	Min.	Typ.	Max.	
A.F. driver saturation voltage				
at $I_C = 30mA$	-	0.82	1.0	V
at $I_C = 1.0mA$	0.72	-	-	V
Supply voltage (V_{supply}) = 9.0V - 1.5W circuit, see pages 6 and 7				
R.F./I.F. sensitivity (R.F. input voltage at 1MHz 30% modulation 400Hz measured at pin 1 for 10mV a.f. at detector load)	2.0	4.0	6.0	μV
Voltage at detector load for 100μV r.f. at mixer base (pin 1)	35	50	80	mV
A.G.C. range (change in r.f. input voltage for 10dB change in audio range)	56	62	70	dB
Signal-to-noise ratio for r.f. input voltage = 20μV at 1MHz	22	24	-	dB
Signal-to-noise ratio for r.f. input voltage = 1mV at 1MHz	38	40	-	dB
Loss of overall receiver sensitivity at $V_{supply} = 5.4V$ and 50mW output power	5.0	7.0	10	dB

ELECTRICAL CHARACTERISTICS (contd.)

	Min.	Typ.	Max.	
Oscillator - minimum battery voltage for oscillation (1.5MHz)	4.5	-	-	V
Oscillator - frequency shift over a.g.c. range (1.5MHz)	-	-	350	Hz
Oscillator - frequency shift over range of supply voltage (9 to 5.4V)	-	300	500	Hz
A.F. sensitivity (input voltage pin 4 for 50mW output power)	3.0	4.5	5.0	mV
Percentage distortion ($V_{in\ (R.F.)}$ = 30mV modulated 80% at 400Hz)	-	9	10	%
Percentage distortion ($V_{A.F.}$ = 10mV, $V_{in\ (R.F.)}$ modulated 30% at 400Hz)	-	4	5	%
Total receiver current drain (excepting the output pair TR1-TR2)	17	20	26	mA
Supply voltage (V_{supply}) = 6.0V - 0.7W circuit, see pages 6 and 7				
R.F./I.F. sensitivity (R.F. input voltage at 1MHz 30% modulation 400Hz measured at pin 1 for 10mV a.f. at detector load)	3.0	6.0	10	μV
Voltage at detector load for 100μV r.f. at mixer base (pin 1)	30	45	75	mV
A.G.C. range (change in r.f. input voltage for 10dB change in audio range)	54	59	66	dB
Signal-to-noise ratio for r.f. input voltage = 20μV at 1MHz	22	25	-	dB
Signal-to-noise ratio for r.f. input voltage = 1mV at 1MHz	38	41	-	dB
Oscillator - minimum battery voltage for oscillation (1.5MHz)	3.0	-	-	V
A.F. sensitivity (input voltage pin 4 for 50mW output power)	3.0	3.9	5.0	mV
Total receiver current drain (excepting the output pair TR1-TR2)	11	13	15	mA

HANDLING NOTES

1. Devices may be soldered directly into circuits with soldering irons. At iron temperatures below 245°C the maximum soldering time should be less than 10 seconds and at iron temperatures between 245°C and 400°C the soldering time should be less than 5 seconds. In both cases the soldering iron should be applied below the seating plane (see outline drawing).

2. Devices mounted up to the seating plane on a printed circuit board may be dip or flow soldered providing the solder temperature is below 245°C and the time of immersion is less than 5 seconds. The body temperature should not be allowed to exceed the maximum storage temperature during soldering. If excessive pre-heat cycles are used, it may be necessary to cool the printed board immediately after leaving the solder bath/wave in order that this requirement is met.

3. Care should be taken not to bend the lead-out tags above the seating plane.

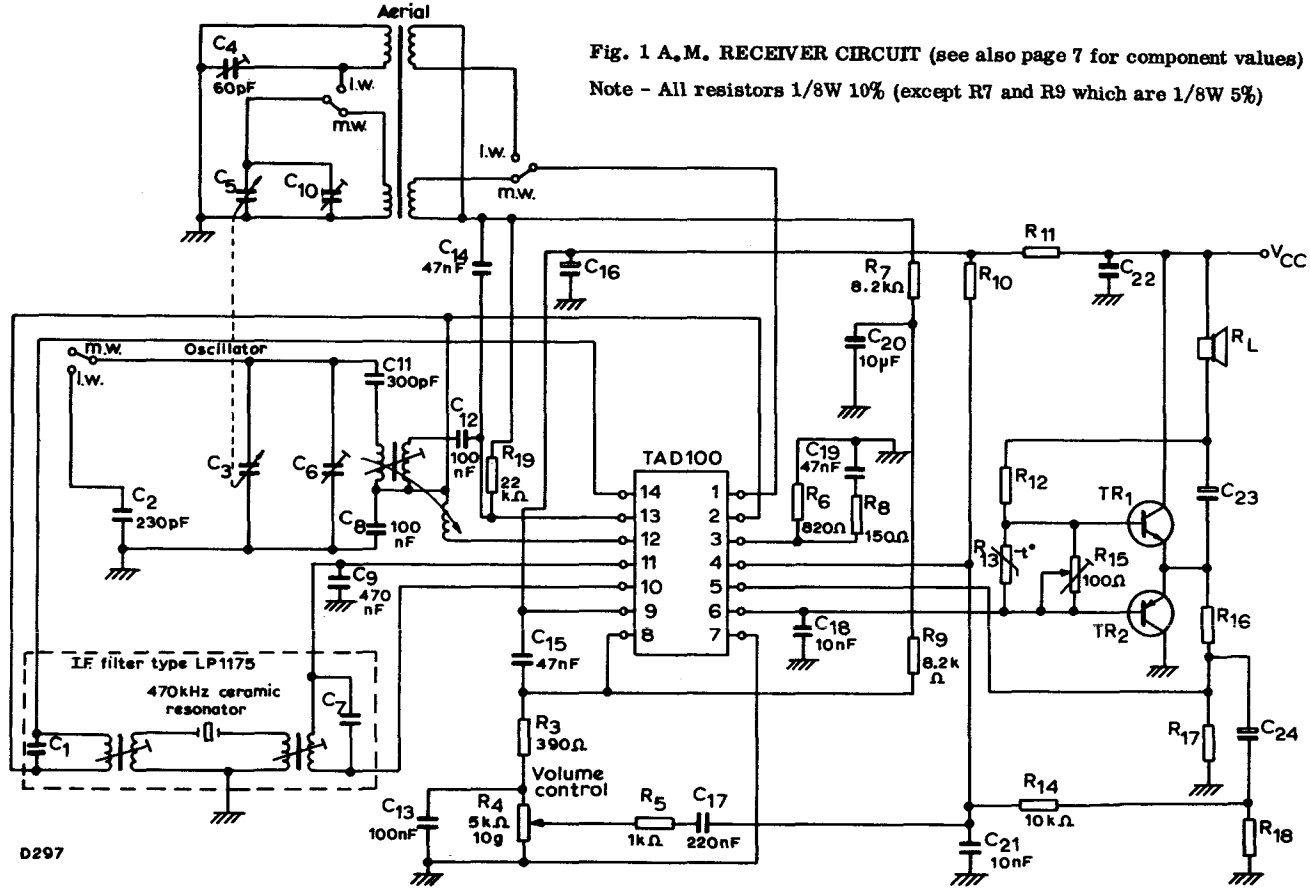


Fig. 1 A.M. RECEIVER CIRCUIT (see also page 7 for component values)

Note - All resistors 1/8W 10% (except R7 and R9 which are 1/8W 5%)

COMPONENT VALUES FOR Fig. 1 A.M. RECEIVER CIRCUIT

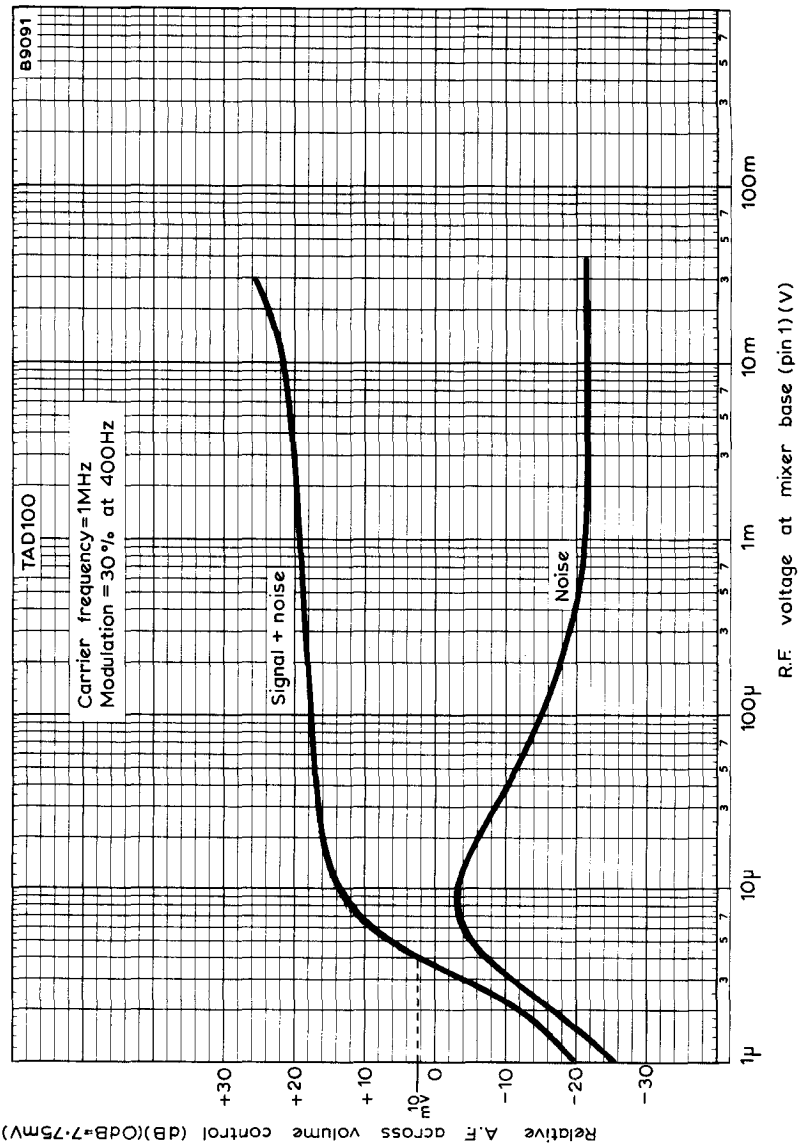
V_{CC}	6.0	9.0	9.0	V
P_{out}	0.7	1.0	1.5	W
R_L	4.0	8.0	5.0	Ω
R_{10}	18	27	27	kΩ
R_{11}	68	150	150	Ω
R_{12}	390	680	390	Ω
R_{13}	VA1040	VA1040	VA1034	
R_{16}	3.9	15	15	kΩ
R_{17}	4.7	10	10	kΩ
R_{18}	27	100	120	Ω
C_{16}	320	200	200	μF
	6.4	10	10	V
C_{22}	640	200	400	μF
	6.4	10	10	V
C_{23}	800	320	640	μF
	4.0	6.4	6.4	V
C_{24}	125	32	32	μF
	4.0	4.0	4.0	V

TR1-AC187, TR2-AC188. Tuning Gang Mullard type AC0049 (C_3, C_5) with 300pF padding capacitor (C_{11}) on oscillator section. C_1, C_7 are part of the i.f. filter. C_6, C_{10} are trimmers on the tuning gang.

	Recommended types
C_{15} - small dimensions to fit close to pins 8 and 9	C330BA/R47K
C_9 and C_{12} low series resistance types	C280AE/ Series

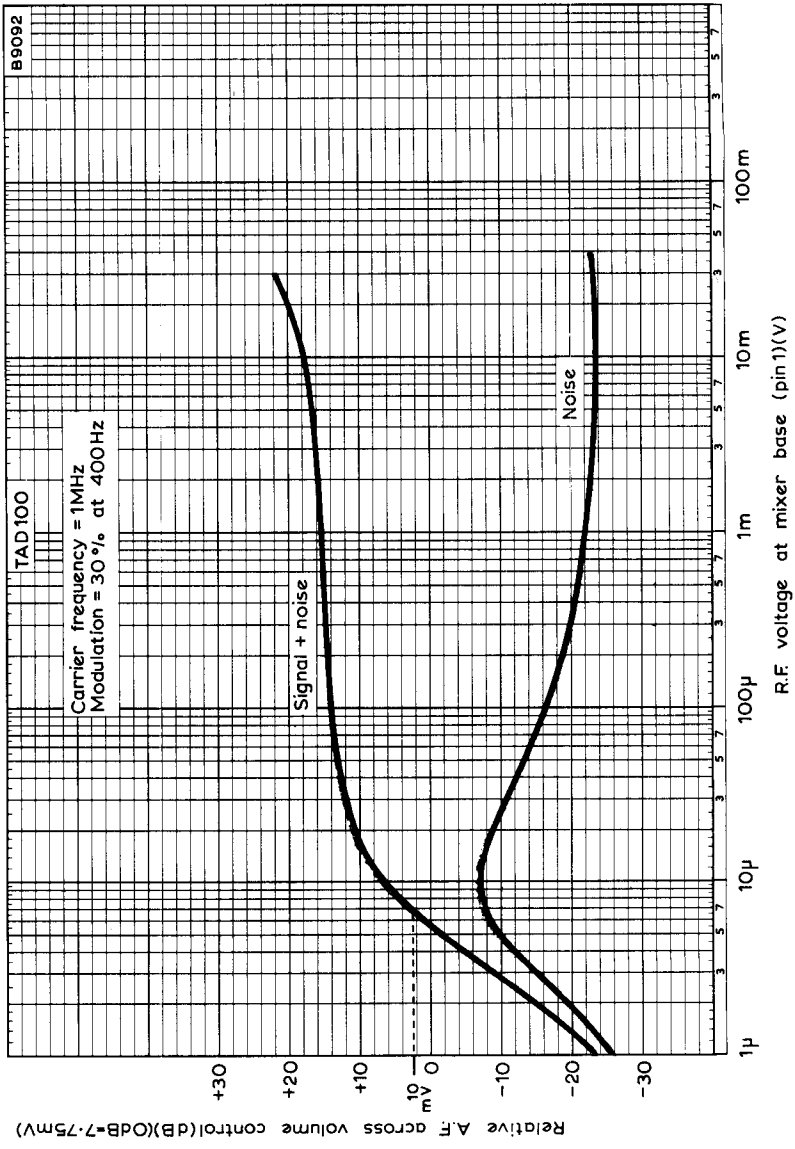
Oscillator coil specification

Tuned winding 100 turns	3 × 46s.w.g. wavewound with bunched
Coupling winding 10 turns	conductor wire on 0.2in former with
Feedback winding 2 turns	ferrite core and frame. $Q_o = 150$



TYPICAL A.G.C. CHARACTERISTIC AND SIGNAL-TO-NOISE RATIO

$V_{supply} = 9V$



TYPICAL A.G.C. CHARACTERISTIC AND SIGNAL-TO-NOISE RATIO

$V_{supply} = 6V$