Monolithic Integrated Circuit

Application: Amplifier for dynamic telephone microphone

Features:

- Operates on telephone lines
- Low current consumption
- Very few external components
- Independent of line polarity
- U 646 B, U 647 B radiation (EMT) protected according to telecommunication (Post) specifications

Type	Case, see page 8			C_3	Gain	
	SO 8	DIP 8	special		50.3 dB	53 dB
U 446 B	X		X		X	
U 646 B			X	X	X	
U 647 B		X		X		X

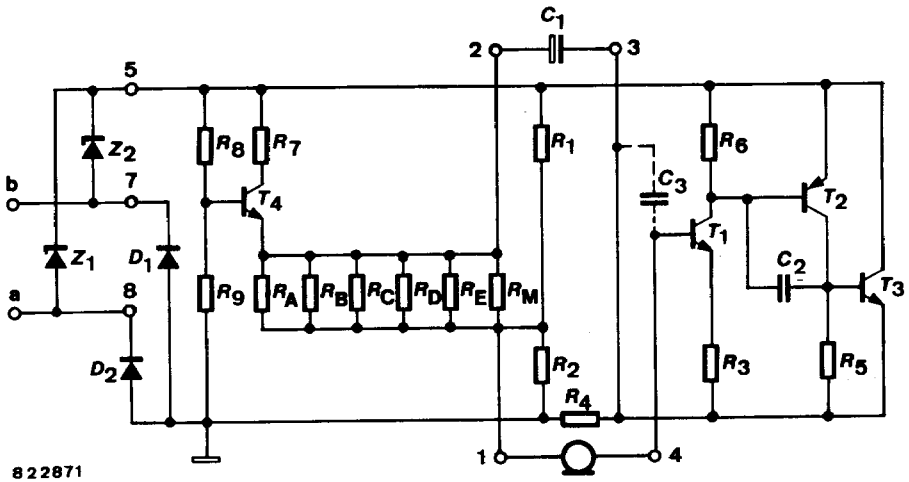


Fig. 1 Diagram and Pin connections

Absolute maximum ratings

Reference point Pin 8, $T_{amb} = 25$ °C, unless otherwise specified

Supply voltage range		V_S	43.2...66	V
Supply current		I_S	60	mA
$T_{amb} = 60$ °C		I_S	50	mA
$t_p = 12$ s		I_S	155	mA
DC output voltage				
$I_S \leqq 60$ mA	Pin 5	V_O	12	V
$\leqq 2 \times \frac{t_p}{T} = 2 \times \frac{12\ s}{60\ s}$	Pin 5	V_O	15	V
$\frac{t_p}{T} = \frac{0.5\ ms}{5\ s}$	Pin 5	V_O	30	V
Inputs voltage				
$f = 800$ Hz, $t = 100$ ms	Pin 1-4	v_i	15.5	V_{RMS}
Power dissipation		P_{tot}	0.72	W
$t = 12$ s		P_{tot}	2.3	W
Junction temperature		T_j	125	°C
Ambient temperature range		T_{amb}	−28...+ 60	°C
Storage temperature range		T_{stg}	−55...+125	°C
Soldering temperature				
$t \leqq 3$ s		T_{sd}	245	°C

Thermal resistance		**Min.**	**Typ.**	**Max.**	
Junction ambient	R_{thJA}			140	K/W

Recommended operating conditions

$R_V = 0...2500\ \Omega$, $R_1 = 1200\ \Omega \pm 7\%$, $R_2 = 50\ \Omega \pm 10\%$
$T_{amb} = -28...+60$ °C, Fig. 2

Private automatic branch exchange					
$V_S = 60\ V \pm 10\%$, $R_{IS} = 1000\ \Omega \pm 10\%$	I_S	9	12...44	54	mA
$V_S = 48\ V \pm 10\%$, $R_{IS} = 800\ \Omega \pm 15\%$	I_S	7	9...42	55	mA
EWSO 1					
$V_S = 60\ V, \pm 10\%$, $R_{IS} = 900\ \Omega \pm 8.5\%$	I_S	10	12...48	59	mA

Electrical characteristics

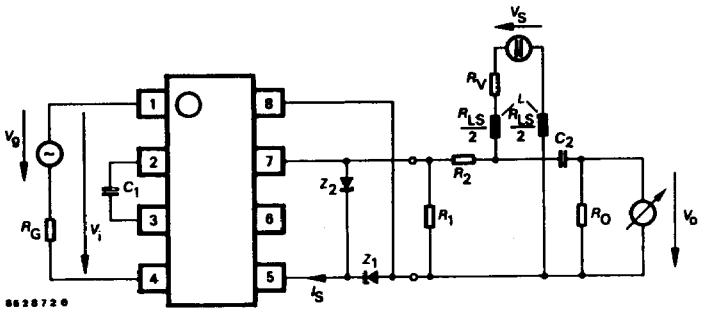
$I_S = 24$ mA, $f = 800$ Hz, $T_{amb} = 25$ °C,
Reference point Pin 8, unless otherwise specified

			Min.	Typ.	Max.	
Z-diode voltage						
$I_{Z1} = I_{Z2} = 50$ mA		$V_{Z1} = V_{Z2}$	11.4		12.7	V
$I_{Z1} = I_{Z2} = 50$ mA, $T_{amb} = -28 \ldots +60$ °C		$V_{Z1} = V_{Z2}$	10.8		13.1	V
Input resistance	Fig. 3	R_i		10		kΩ
Gain	Fig. 3					
$V_g = 0.6$ mV_{RMS}	green	G_v	50.3	50.8	51.3	dB
	red	G_v	52.8	53.3	53.8	dB
Gain change		ΔG_v			3	dB
$I_s = 19 \ldots 29$ mA		ΔG_{vI}			0.5	dB
$f = 300 \ldots 3400$ Hz		ΔG_{vf}			0.5	dB
Line a+b interchanged		ΔG_{vL}			0.5	dB
AC output voltage	Fig. 3					
$v_i = 0.5 \ldots 3.0$ V_{RMS}, $I_S = 9$ mA	green	v_o	0.95			V_{RMS}
	red	v_o	1.05			V_{RMS}
$I_S = 24$ mA, $T_{amb} = -28 \ldots +60$ °C		v_o	1.4			V_{RMS}
$V_{Z1} = V_{Z2} = 11.4$ V, $I_S = 49$ mA	green	v_o	0.77			V_{RMS}
	red	v_o	1.05			V_{RMS}
Output resistance	Fig. 5					
$v_o = 775$ mV		r_o	70		400	Ω
Noise power according to CCITT	Fig. 4	P_n		−72	−67	dBmp
Differential resistance	Fig. 3+6					
$I_{S1} = 20$ mA, $I_{S2} = 45$ mA	green	r_d	78		125	Ω
	red	r_d	80		100	Ω

Explanation of the symbols used in the test circuits

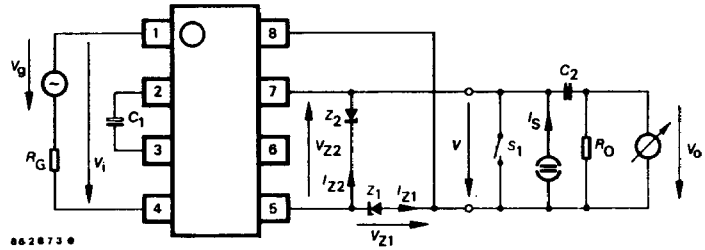
Level transmitter $R_G \approx 0$ Ω symm.
DC current source $R_i \geqq 100$ kΩ
Selective level meter $B = 3$ dB, $\Delta f \leqq 20$ Hz, $R_i \geqq 20$ kΩ, symm.

Test circuits



L = 6 H ±10%
R_O = 600 Ω
C_2 = 20 µF ±10%
C_1 ≧ 50 µF/3 V
R_G = 108 Ω ±10%

Fig. 2 Test circuit for the operational conditions

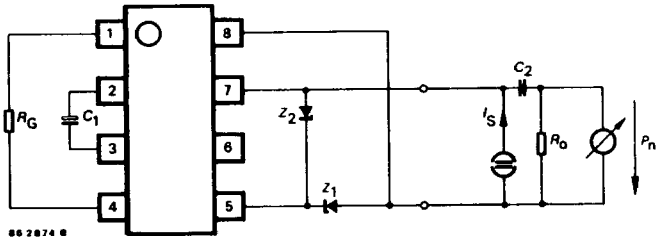


R_G = 108 Ω ±10%
R_O = 422 Ω ±1%
C_2 = 20 µF ±10%
C_1 ≧ 50 µF/3 V

$$R_i = R_G \cdot \frac{V_i}{V_g - V_i};\ G_v = 20 \log \frac{V_o}{V_g};\ V_o = V - I_S \cdot r_d;$$

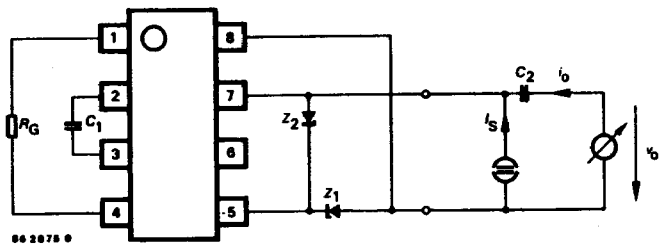
$$r_d = \frac{V\,(I_{S2} = 45\ \text{mA})/V - V(I_{S1} = 20\ \text{mA})/V}{0.025}$$ – see Fig. 6

Fig. 3 Test circuit for: R_i, G_v, V_{Z1}, V_{Z2}, V_o and r_d



GM according to CCIII
R_G = 108 Ω ±10%
R_O = 422 Ω ±1%
C_2 = 20 µF ±20%
C_1 ≧ 50 µF/3 V

Fig. 4 Test circuit for P_n



$R_o = \frac{v_o}{i_o}$

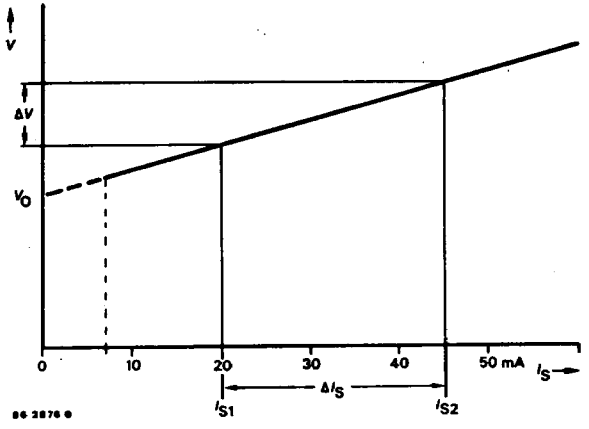
$R_G = 108\,\Omega \pm 10\%$

$v_o = 0.775\ V_{eff}$

$C_2 = 20\,\mu F \pm 20\%$

$C_1 \geq 50\,\mu F/3\ V$

Fig. 5 Test circuit for R_o

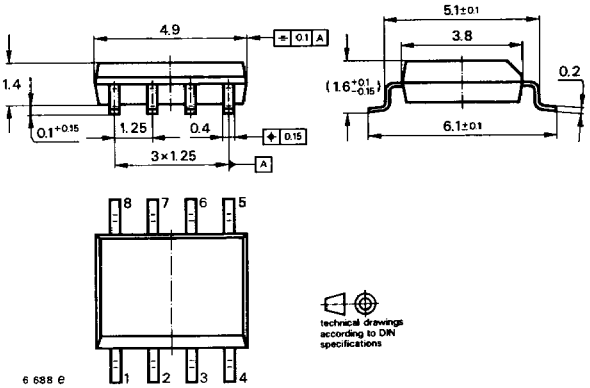


$v_O = V - r_d \cdot I_S$

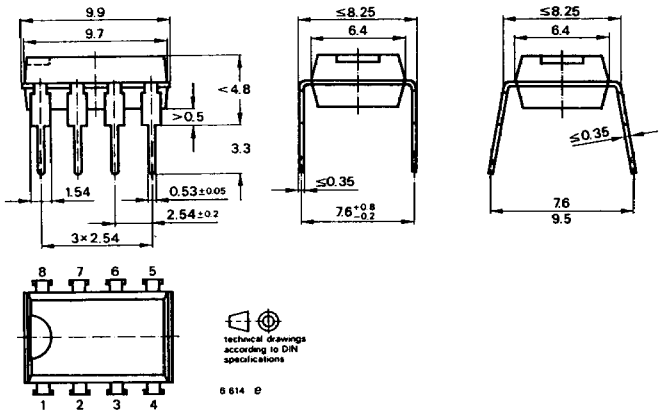
$r_d = \frac{\Delta V}{\Delta I_S}$

Fig. 6

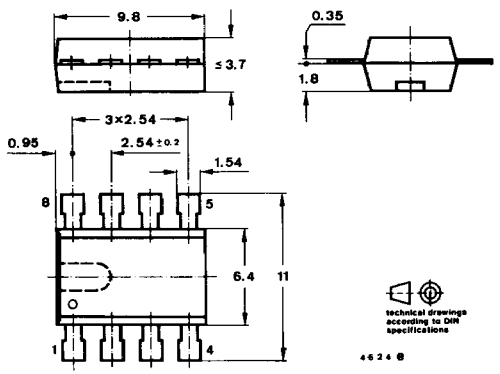
Dimensions in mm



SO 8
(SOT 96 A)
Weight max. 0.8 g



20 A 8 DIN 41866
DIP 8 leads
Weight max. 0.8 g



Special case
Weight max. 0.8 g