RING (DE)MODULATOR FOR TELEPHONY AND INDUSTRIAL EQUIPMENT

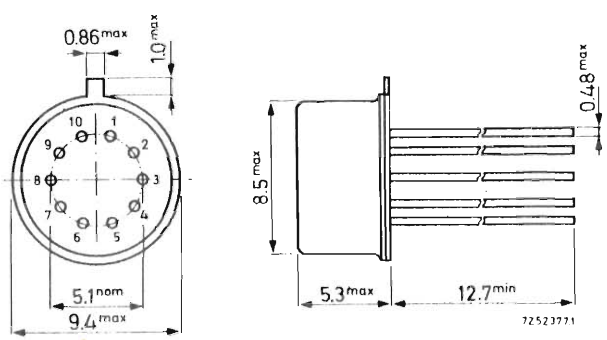
The TAB101 is a monolithic integrated circuit comprising a 4-transistor modulator and demodulator circuit. The circuit being made on a single crystal ensures a great similarity in characteristics of the transistors and optimal tracking of their parameters with temperature variations. Consequently, the TAB101 gives a better balancing and therefore less carrier leakage than a conventional circuit. The use of transistors instead of diodes provides a better isolation between input and output circuits.

QUICK REFERENCE DATA				
Collector cut-off current V_{CB} = 5 V; T_{amb} = 25 °C	I_{CBO}	<	100	nA
Base-emitter voltage differences between transistors 1, 2, 3, 4 V_{CB} = 5 V; $-I_E$ = 150 μA	$\lvert V_{BE1}-V_{BE2} \rvert$	<	5	mV
	$\lvert V_{BE3}-V_{BE4} \rvert$	<	5	mV
Common-base current gain differences between transistors 1, 2, 3, 4 V_{CB} = 5 V; $-I_E$ = 150 μA	$\lvert h_{FB1}-h_{FB2} \rvert$	<	0.008	
	$\lvert h_{FB3}-h_{FB4} \rvert$	<	0.008	

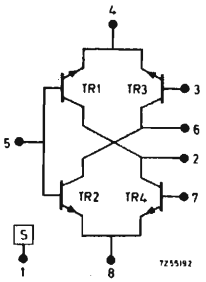
PACKAGE OUTLINE

Dimensions in mm

XA10; TO-74 (reduced height)



CIRCUIT DIAGRAM



RATINGS Limiting values in accordance with the Absolute Maximum System (IEC 134)

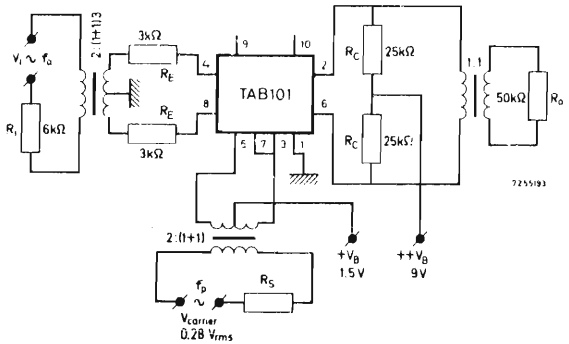
Voltages (each transistor)				
Collector-base voltage (open emitter)	V_{CBO}	max.	10	V
Emitter-base voltage (open collector)	V_{EBO}	max.	5	V
Collector-substrate voltage	V_{CS}	max.	12	V
Currents (each transistor)				
Collector current	I_C	max.	10	mA
Power dissipation (4 transistors)				
Total power dissipation up to T_{amb} = 100 °C	P_{tot}	max.	100	mW
Temperatures				
Storage temperature	T_{stg}	−35 to +125		°C
Operating ambient temperature	T_{amb}	−25 to +100		°C

CHARACTERISTICS (each transistor) T_{amb} = 25 °C

Collector cut-off current				
I_E = 0; V_{CB} = 5 V	I_{CBO}	typ. <	5 100	nA nA
Collector-substrate leakage current				
V_{CS} = 9.5 V	I_{CS}	typ. <	5 100	nA nA
Emitter cut-off current				
I_C = 0; V_{EB} = 1 V	I_{EBO}	typ. <	5 100	nA nA
Break down voltages				
I_E = 0; I_C = 10 μA	$V_{(BR)CBO}$	>	10	V
I_B = 0; I_C = 10 μA	$V_{(BR)CEO}$	>	9	V
$-I_S$ = 10 μA	$V_{(BR)CS}$	>	12	V
I_C = 0; I_E = 200 μA	$V_{(BR)EBO}$	>	5	V
D.C. current gain				
I_C = 150 μA; V_{CE} = 5 V	h_{FE}	< typ.	20 75	
Spot noise figure at f = 1 kHz				
$-I_E$ = 150 μA; V_{CB} = 5 V				
R_S = 1 kΩ; Bandwidth: 200 Hz		typ.	6	dB
Base-emitter voltage difference				
between transistors TR1 and TR2 at				
$-I_{E1} = -I_{E2}$ = 150 μA; $V_{CB1} = V_{CB2}$ = 5 V	$\lvert V_{BE1}-V_{BE2}\rvert$	typ. <	2 5	mV mV
between transistors TR3 and TR4 at				
$-I_{E3} = -I_{E4}$ = 150 μA; $V_{CB3} = V_{CB4}$ = 5 V	$\lvert V_{BE3}-V_{BE4}\rvert$	typ. <	2 5	mV mV
Current amplification factor difference				
between transistors TR1 and TR2 at				
$-I_{E1} = -I_{E2}$ = 150 μA; $V_{CB1} = V_{CB2}$ = 5 V	$\lvert h_{FB1}-h_{FB2}\rvert$	typ. <	0.002 0.008	
between transistors TR3 and TR4 at				
$-I_{E3} = -I_{E4}$ = 150 μA; $V_{CB3} = V_{CB4}$ = 5 V	$\lvert h_{FB3}-h_{FB4}\rvert$	typ. <	0.002 0.008	

APPLICATION INFORMATION

Telephony carriers ring modulator



Performance at T_{amb} = 25 °C

Conversion gain at f_a = 1 kHz,

V_i = 0.4 V; f_p = 34 kHz	G_c	typ.	−0.75	dB
Carrier leakage power in R_o at f_p = 34 kHz	P_{oc}	typ.	. 3	nW