DATA SHEET

BLV897
UHF push-pull power transistor

Preliminary specification
Supersedes data of 1997 Oct 03

1997 Nov 10

Philips
Semiconductors

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UHF push-pull power transistor BLV897

FEATURES

- Internal input matching for an optimum wideband capability and high gain
- Polysilicon emitter ballasting resistors for an optimum temperature profile
- Gold metallization ensures excellent reliability.

APPLICATIONS

- Common emitter class-AB operation in base stations in the 800 to 960 MHz frequency band.

DESCRIPTION

NPN silicon planar transistor with two sections in push-pull configuration. The device is encapsulated in a SOT324B 4-lead rectangular flange package with a ceramic cap. The common emitters are connected to the flange.

PINNING - SOT324B

PIN	SYMBOL	DESCRIPTION
1	c1	collector 1
2	c2	collector 2
3	b1	base 1
4	b2	base 2
5	e	common emitters connected to flange

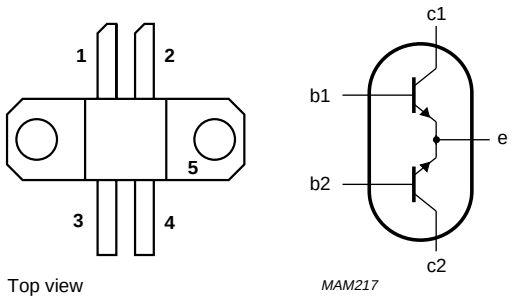


Fig.1 Simplified outline and symbol.

QUICK REFERENCE DATA

RF performance at T_h = 25 °C in a common emitter push-pull test circuit.

MODE OF OPERATION	f (MHz)	V_{CE} (V)	I_{CQ} (mA)	P_L (W)	G_p (dB)	η_C (%)	d_3 (dBc)
CW, class-AB	900	24	2×80	30	≥10	≥45	–
2-tone, class-AB	900	24	2×80	30 (PEP)	≥11	≥35	<–32; typ. –37

WARNING

Product and environmental safety - toxic materials

This product contains beryllium oxide. The product is entirely safe provided that the BeO discs are not damaged. All persons who handle, use or dispose of this product should be aware of its nature and of the necessary safety precautions. After use, dispose of as chemical or special waste according to the regulations applying at the location of the user. It must never be thrown out with the general or domestic waste.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	70	V
V_{CEO}	collector-emitter voltage	open base	–	30	V
V_{EBO}	emitter-base voltage	open collector	–	3	V
I_C	collector current (DC)		–	5	A
$I_{C(AV)}$	average collector current		–	5	A
P_{tot}	total power dissipation	T_{mb} = 25 °C; note 1	–	97	W
T_{stg}	storage temperature		−65	+150	°C
T_j	operating junction temperature		–	200	°C

Note

1. Total device; both sections equally loaded.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}mb}$	thermal resistance from junction to mounting base	P_{tot} = 97 W; note 1	1.79	K/W
$R_{th\ mb\text{-}h}$	thermal resistance from mounting base to heatsink	note 1	0.4	K/W

Note

1. Total device; both sections equally loaded.

CHARACTERISTICS

Values apply to either transistor section; T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	I_C = 15 mA; I_E = 0	70	–	–	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	I_C = 30 mA; I_B = 0	30	–	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	I_E = 0.6 mA; I_C = 0	3	–	–	V
I_{CBO}	collector-base leakage current	V_{CB} = 28 V; V_{BE} = 0	–	–	1.5	mA
h_{FE}	DC current gain	V_{CE} = 10 V; I_C = 1 A	30	–	120	
C_c	collector capacitance	V_{CB} = 24 V; $I_E = i_e$ = 0; f = 1 MHz	–	18	–	pF

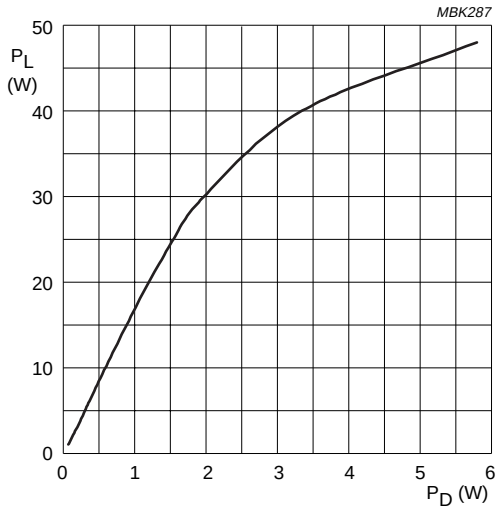
APPLICATION INFORMATION

RF performance at T_h = 25 °C in a common emitter push-pull class-AB test circuit.

MODE OF OPERATION	f (MHz)	V_{CE} (V)	I_{CQ} (mA)	P_L (W)	G_p (dB)	η_C (%)	d_3 (dBc)
CW, class-AB	900	24	2 × 80	30	≥10	≥45	–
2-tone, class-AB	900	24	2 × 80	30 (PEP)	≥11	≥35	<–32; typ. –37

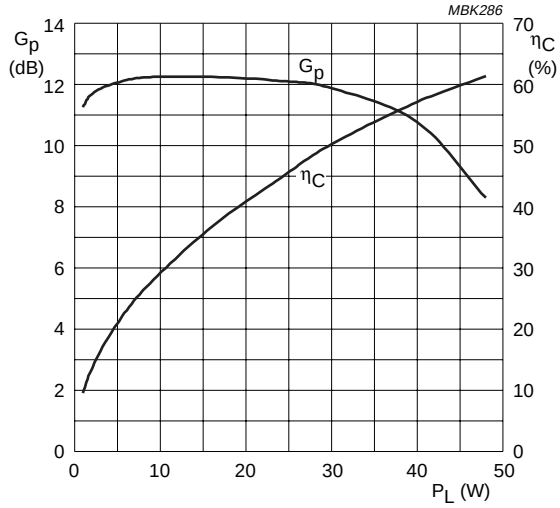
Ruggedness in class-AB operation

The BLV897 is capable of withstanding a load mismatch corresponding to VSWR = 5 : 1 through all phases under the conditions: V_{CE} = 24 V; I_{CQ} = 2 × 80 mA; f = 900 MHz; T_h = 25 °C; P_L = 30 W. The transistor is also capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases at P_L = 30 W (PEP).



V_{CE} = 24 V; I_{CQ} = 2 × 80 mA; f = 900 MHz.

Fig.2 Load power as a function of drive power; typical values.



V_{CE} = 24 V; I_{CQ} = 2 × 80 mA; f = 900 MHz.

Fig.3 Power gain and collector efficiency as functions of load power; typical values.

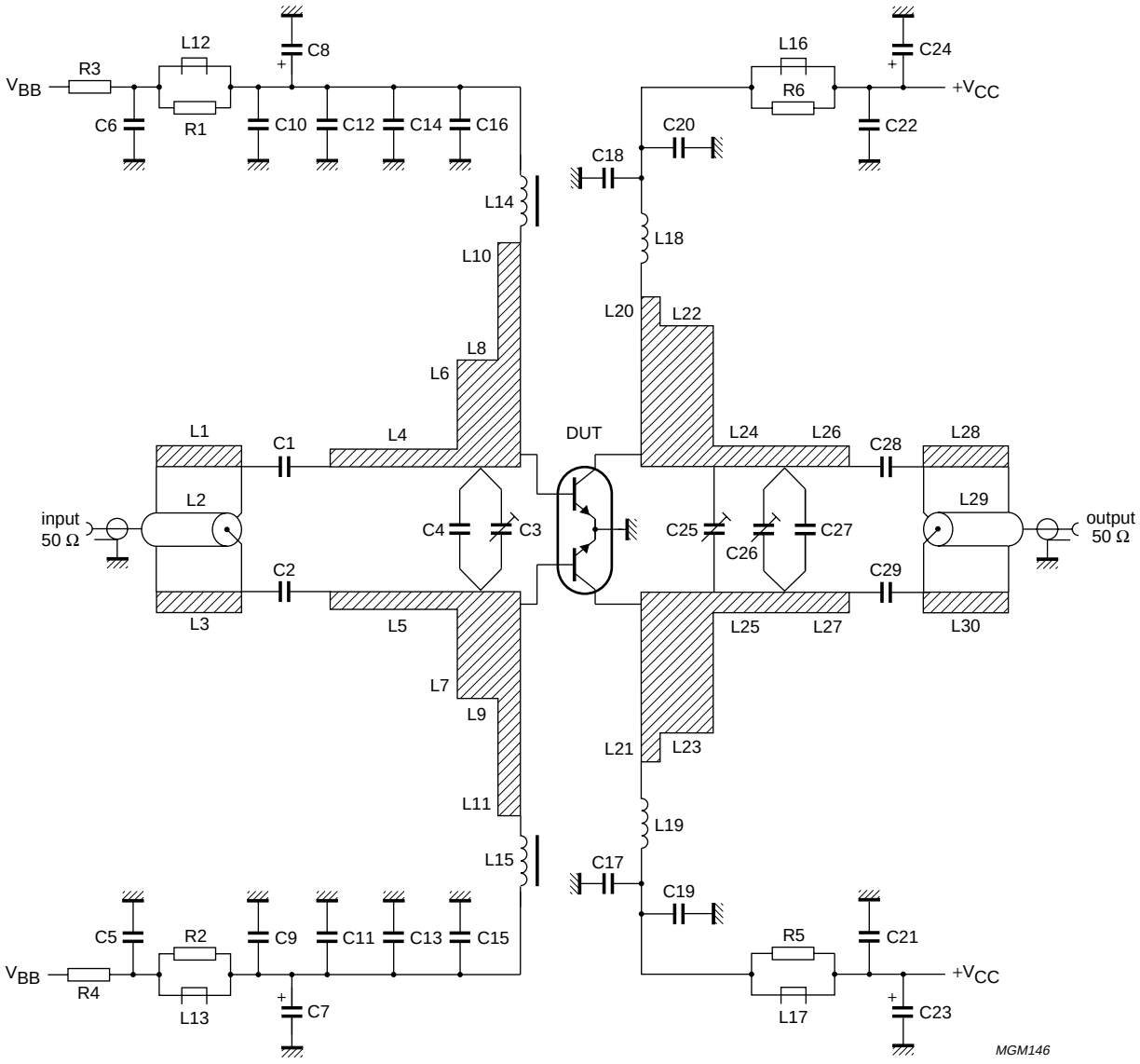


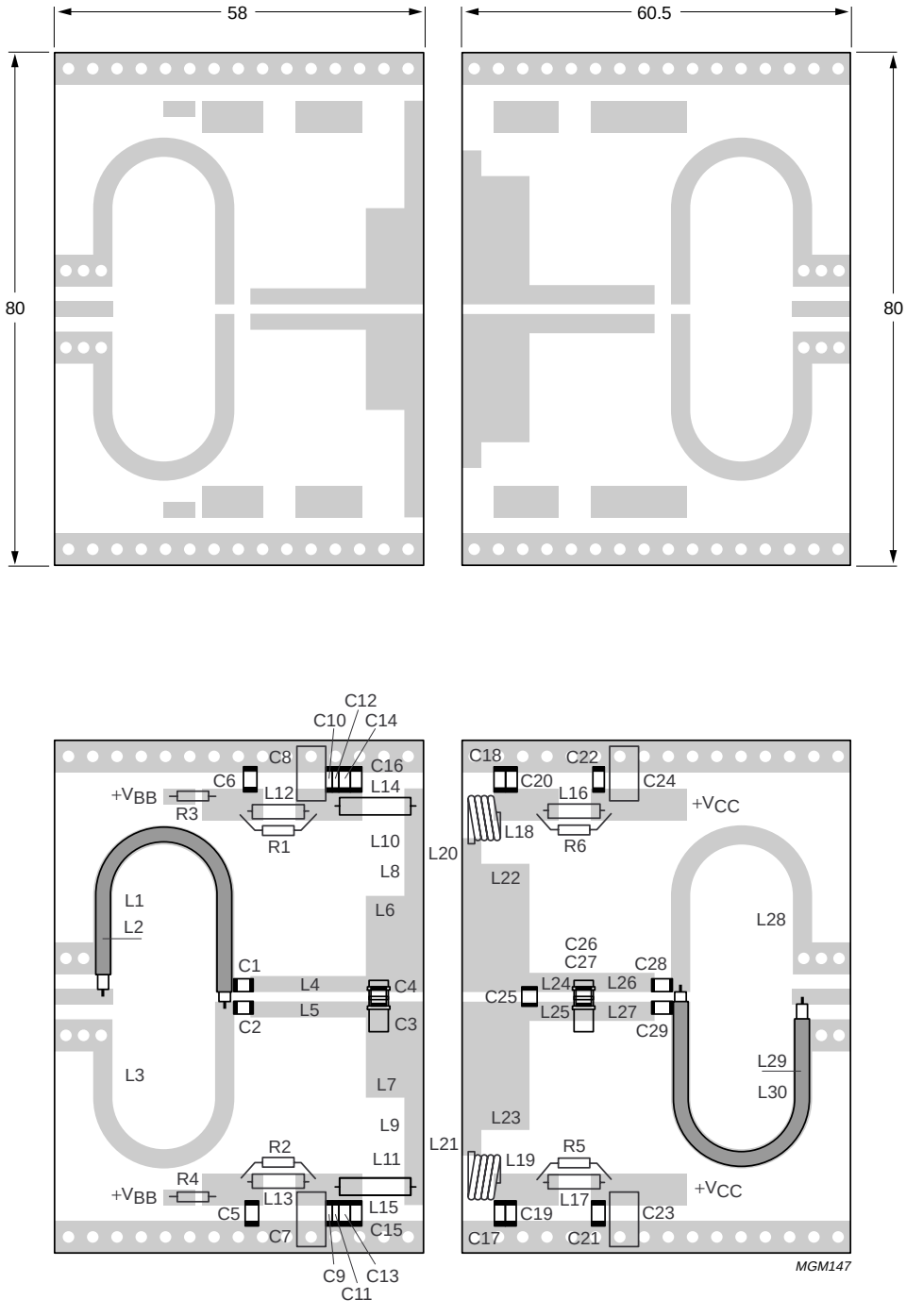
Fig.4 Class-AB test circuit at 900 MHz.

List of components

COMPONENT	DESCRIPTION	VALUE	DIMENSIONS	CATALOGUE No.
C1, C2	multilayer ceramic chip capacitor; note 1	47 pF; 500 V		
C3, C27	Tekelec trimmer (type 37271)	0.6 to 4.5 pF		
C4, C25	multilayer ceramic chip capacitor; note 1	5.6 pF; 500 V		
C5, C6, C13, C14, C19, C20, C21, C22	multilayer ceramic chip capacitor; note 1	300 pF; 200 V		
C7, C8, C23, C24	tantalum SMD capacitor	10 μF; 35 V		
C9, C10	multilayer ceramic chip capacitor	100 nF; 50 V		2222 581 76641
C11, C12	multilayer ceramic chip capacitor	10 nF; 50 V		2222 581 76627
C15, C16, C17, C18	multilayer ceramic chip capacitor; note 1	39 pF; 500 V		
C26	multilayer ceramic chip capacitor; note 1	2.7 pF; 500 V		
C28, C29	multilayer ceramic chip capacitor; note 1	27 pF; 500 V		
L1, L3, L28, L30	stripline; note 2	50 Ω	57.1 × 3 mm	
L2, L29	semi-rigid cable; note 3	50 Ω	ext. conductor length 57.1 mm, ext. dia. 2.2 mm	
L4, L5	stripline; note 2		18 × 2.6 mm	
L6, L7	stripline; note 2		2 × 15 mm	
L8, L9	stripline; note 2		4.8 × 15 mm	
L10, L11	stripline; note 2		3 × 31.5 mm	
L12, L13, L16, L17	Ferroxcube chip-bead grade 4S2			4330 030 36300
L14, L15	microchoke	470 nH		4322 057 04771
L18, L19	4 turns enamelled 1 mm copper wire		int. dia. 6 mm, close wound	
L20, L21	stripline; note 2		3 × 24 mm	
L22, L23	stripline; note 2		7.5 × 20 mm	
L24, L25	stripline; note 2		8.5 × 3 mm	
L26, L27	stripline; note 2		11 × 3 mm	
R1, R2, R5, R6	metal film resistor	5.11 Ω; 0.4 W		2322 151 75118
R3, R4	metal film resistor	4.7 Ω; 0.4 W		2322 151 77508

Notes

1. American Technical Ceramics type 100B or capacitor of same quality.
2. The striplines are on a double copper-clad printed-circuit board: PTFE microfibre-glass dielectric (ε_r = 2.2); thickness 1/32 inch; thickness of the copper sheet 2 x 35 μm.
3. Semi-rigid cables L2 and L29 are soldered on the striplines L1 and L30.



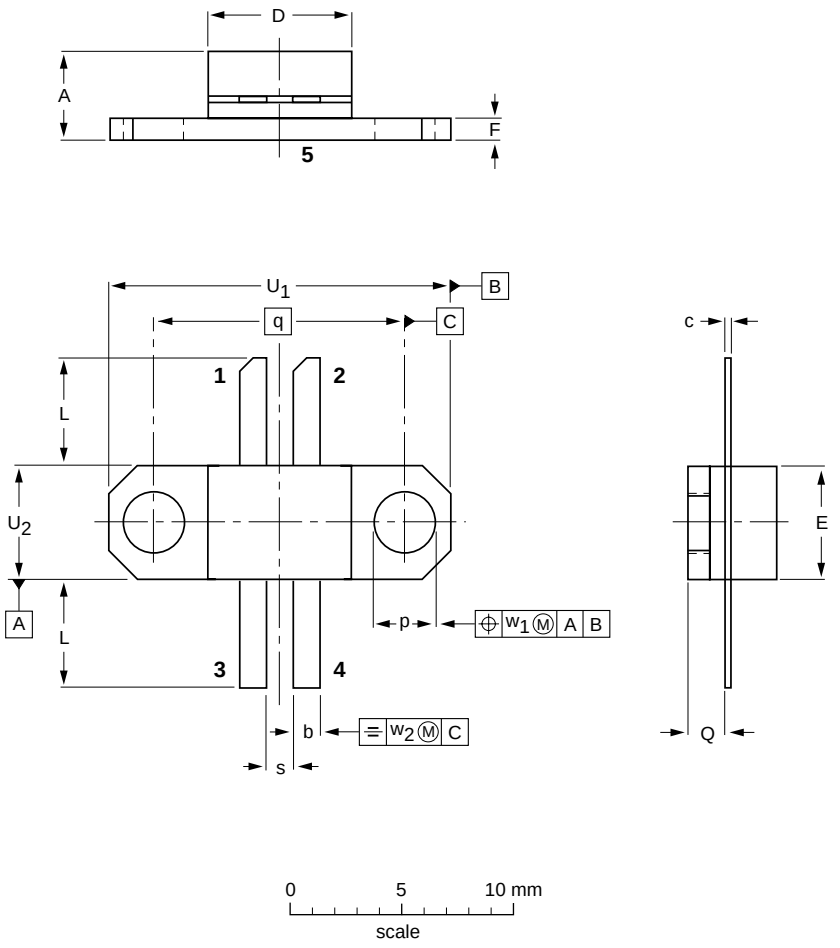
Dimensions in mm.

The components are located on one side of the copper-clad PTFE microfibre-glass board, the other side is unetched and serves as a ground plane. Earth connections from the component side to the ground plane are made by through metallization.

Fig.5 Printed-circuit board for the 900 MHz class-AB test circuit.

PACKAGE OUTLINE

Flanged ceramic package; 2 mounting holes; 4 leads **SOT324B**



DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

UNIT	A	b	c	D	E	F	L	p	Q	q	s	U_1	U_2	w_1	w_2
mm	4.37 3.55	1.66 1.39	0.13 0.07	8.69 8.07	6.91 6.29	1.66 1.39	5.59 4.57	3.43 3.17	2.32 2.00	14.22	1.66 1.39	19.03 18.77	6.43 6.17	0.51	1.02

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT324B						97-06-05

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

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