

Silicon NPN Transistor

BLT80

UHF Power Transistor

20V / 750mA

DATASHEET

OEM – Philips

Source: Philips Data Handbook SC09

RF Power Modules and Transistors for Mobile Phones 1996

UHF power transistor**BLT80****FEATURES**

- SMD encapsulation
- Gold metallization ensures excellent reliability.

APPLICATIONS

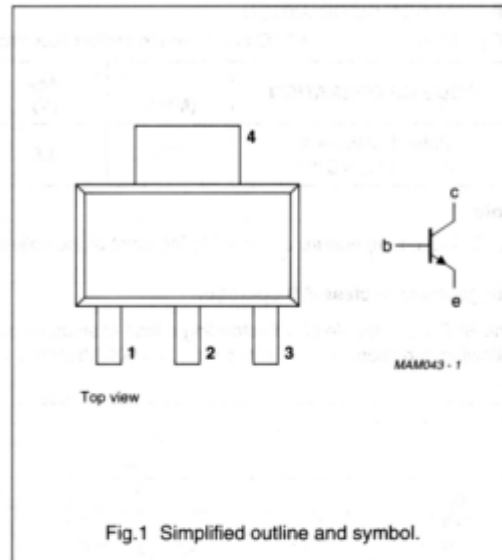
- Hand-held radio equipment in the 900 MHz communication band.

DESCRIPTION

NPN silicon planar epitaxial transistor encapsulated in a plastic SOT223 SMD package.

PINNING - SOT223

PIN	SYMBOL	DESCRIPTION
1	e	emitter
2	b	base
3	e	emitter
4	c	collector

**QUICK REFERENCE DATA**

RF performance at $T_s \leq 60^\circ\text{C}$ in a common emitter test circuit (see Fig.7).

MODE OF OPERATION	f (MHz)	V_{CE} (V)	P_L (W)	G_p (dB)	η_c (%)
CW, class-B narrow band	900	7.5	0.8	≥ 6	≥ 60

UHF power transistor

BLT80

LIMITING VALUES

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

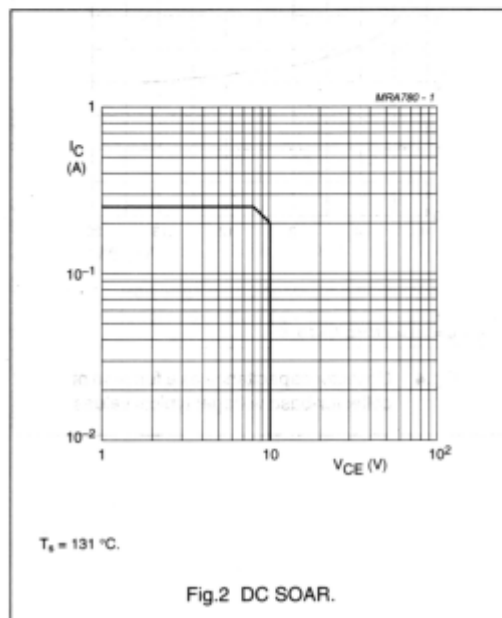
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	20	V
V_{CEO}	collector-emitter voltage	open base	–	10	V
V_{EBO}	emitter-base voltage	open collector	–	3	V
I_C	collector current (DC)		–	250	mA
$I_{C(AV)}$	average collector current		–	250	mA
I_{CM}	peak collector current	$f > 1$ MHz	–	750	mA
P_{tot}	total power dissipation	$T_s = 131$ °C; note 1	–	2	W
T_{stg}	storage temperature		–65	+150	°C
T_j	operating junction temperature		–	175	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-s}$	thermal resistance from junction to soldering point	$P_{tot} = 2$ W; $T_s = 131$ °C; note 1	22	K/W
$R_{th\ j-a}$	thermal resistance from junction to ambient	$P_{tot} = 2$ W; $T_{amb} = 25$ °C; note 2	85	K/W

Note to the "Limiting values" and "Thermal characteristics"

- T_s is the temperature at the soldering point of the collector pin.
- Transistor mounted on a printed-circuit board measuring $40 \times 40 \times 1$ mm, collector pad 35×17 mm.



UHF power transistor

BLT80

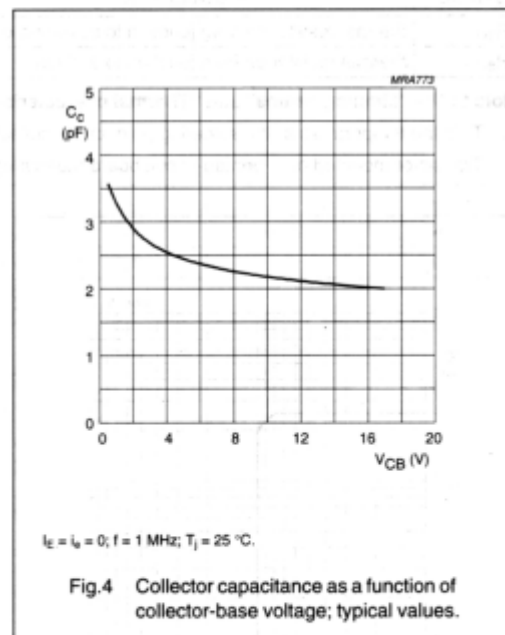
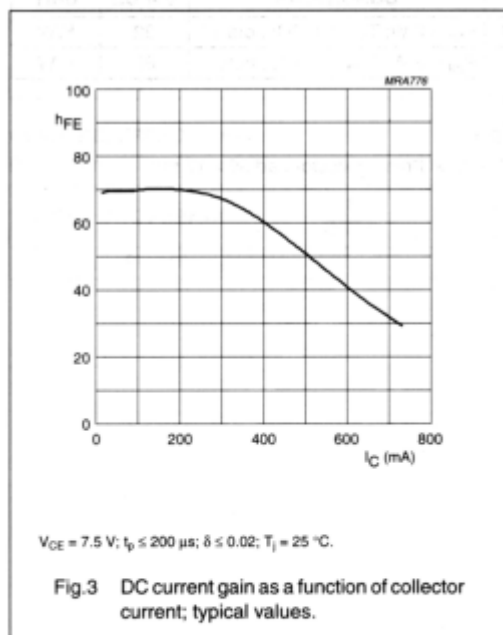
CHARACTERISTICS

 $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	open emitter; $I_C = 2.5\text{ mA}$	20	–	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	open base; $I_C = 5\text{ mA}$	10	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	open collector; $I_E = 0.5\text{ mA}$	3	–	V
I_{CES}	collector leakage current	$V_{CE} = 10\text{ V}$; $V_{BE} = 0$	–	0.1	mA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}$; $I_C = 150\text{ mA}$; note 1; see Fig.3	25	–	
C_c	collector capacitance	$V_{CB} = 7.5\text{ V}$; $I_E = I_B = 0$; $f = 1\text{ MHz}$; see Fig.4	–	3.5	pF
C_{re}	feedback capacitance	$V_{CE} = 7.5\text{ V}$; $I_C = 0$; $f = 1\text{ MHz}$	–	2.5	pF

Note

1. Measured under pulsed conditions: $t_p \leq 200\text{ }\mu\text{s}$; $\delta \leq 0.02$.



UHF power transistor

BLT80

APPLICATION INFORMATION

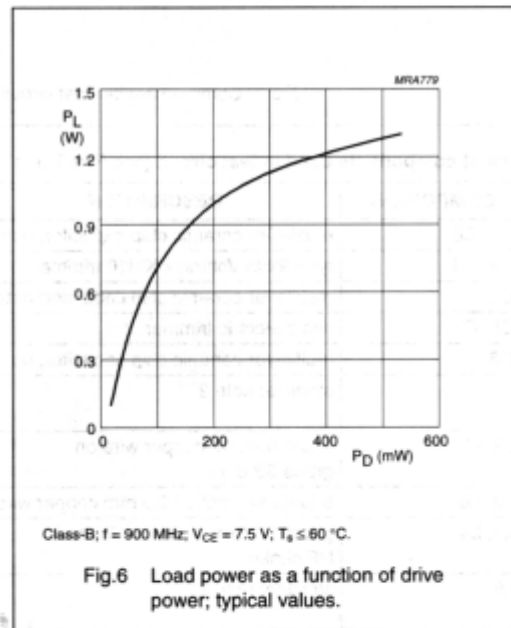
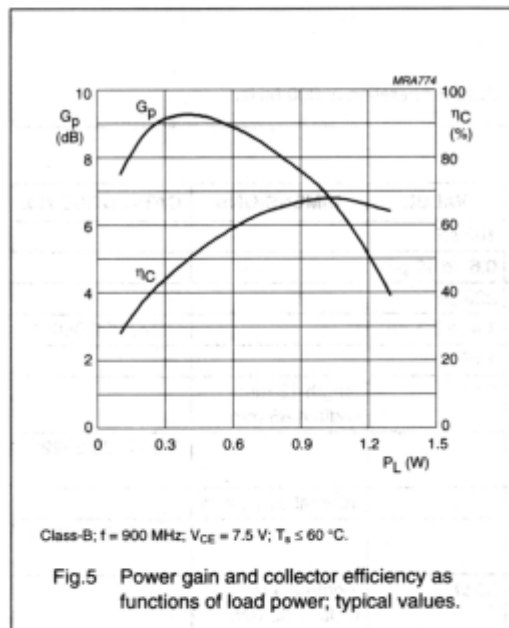
RF performance at $T_s \leq 60^\circ\text{C}$ in a common emitter test circuit (see note 1 and Fig.7).

MODE OF OPERATION	f (MHz)	V _{CE} (V)	P _L (W)	G _p (dB)	η_c (%)
CW, class-B narrow band	900	7.5	0.8	≥ 6 typ. 8	≥ 60 typ. 67

Note

1. T_s is the temperature at the soldering point of the collector pin.

Ruggedness in class-AB operation

The BLT80 is capable of withstanding a load mismatch corresponding to VSWR = 50 : 1 through all phases under the following conditions: f = 900 MHz; V_{CE} = 9 V; P_L = 0.8 W; $T_s \leq 60^\circ\text{C}$.

UHF power transistor

BLT80

Test circuit information

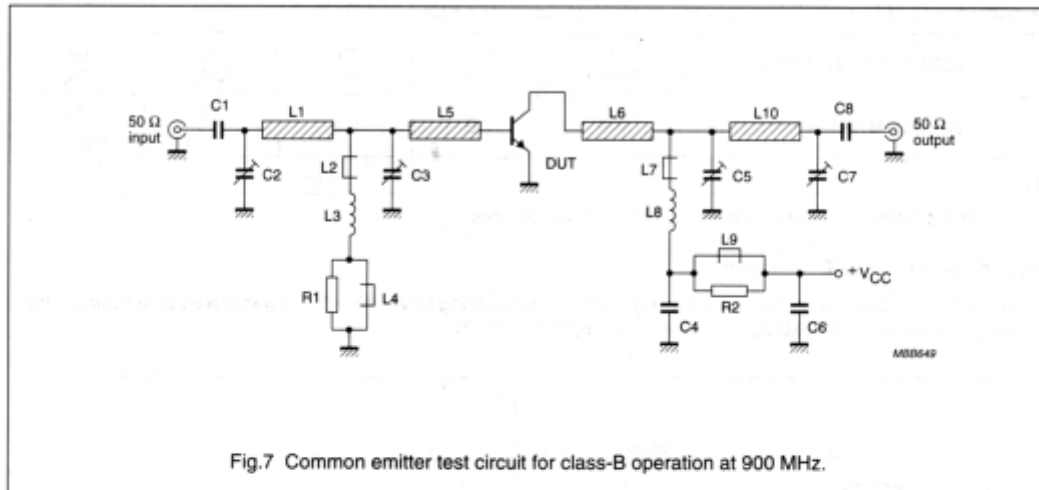


Fig.7 Common emitter test circuit for class-B operation at 900 MHz.

List of components used in test circuit (see Figs 7 and 8)

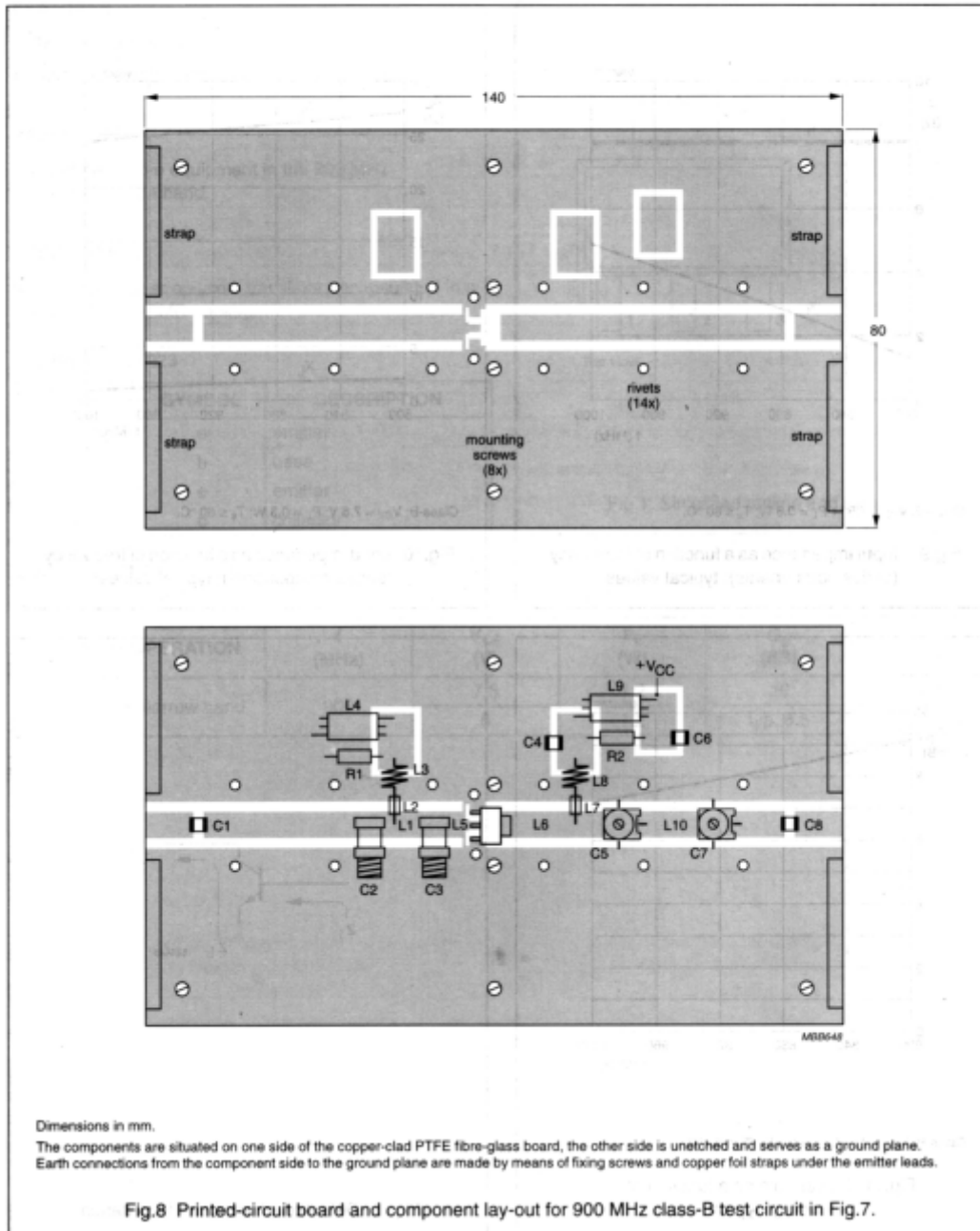
COMPONENT	DESCRIPTION	VALUE	DIMENSIONS	CATALOGUE No.
C1, C8	multilayer ceramic chip capacitor; note 1	100 pF		
C2, C3	type 9105 Voltronix KM10 trimmer	0.6 to 10 pF		
C4	multilayer ceramic chip capacitor; note 1	220 pF		
C5, C7	film dielectric trimmer	1.4 to 5.5 pF		2222 809 09001
C6	multilayer ceramic chip capacitor; note 1	1 nF		
L1	stripline; note 2	50 Ω	length 13 mm width 4.85 mm	
L2, L7	1 turn 0.4 mm copper wire on grade 3B core			4330 030 32221
L3, L8	6 turns enamelled 0.8 mm copper wire		internal dia. 3 mm	
L4, L9	grade 3B Ferroxcube wideband HF choke			4312 020 36640
L5	stripline; note 2	50 Ω	length 8.4 mm width 4.85 mm	
L6	stripline; note 2	50 Ω	length 20 mm width 4.85 mm	
L10	stripline; note 2	50 Ω	length 21 mm width 4.85 mm	
R1, R2	metal film resistor	10 Ω, 0.25 W		

Notes

- American Technical Ceramics type 100A or capacitor of same quality.
- The striplines are on a double copper-clad printed-circuit board, with PTFE fibre-glass dielectric ($\epsilon_r = 2.2$); thickness $\frac{1}{16}$ "; thickness of the copper sheet 35 μm .

UHF power transistor

BLT80



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BLT80

