

# DATA SHEET

**PMBT3640**

**PNP 1 GHz switching transistor**

Product specification  
File under Discrete Semiconductors, SC14

September 1995

# PNP 1 GHz switching transistor

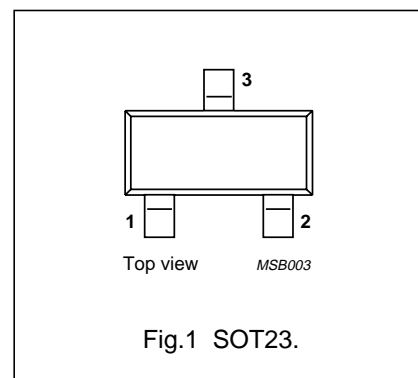
# PMBT3640

### DESCRIPTION

PNP general purpose switching transistor in a SOT23 package.

### PINNING

PIN	DESCRIPTION
Code: V25	
1	base
2	emitter
3	collector



### LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$-V_{CBO}$	collector-base voltage	open emitter	-	12	V
$-V_{CEO}$	collector-emitter voltage	open base	-	12	V
$-V_{EBO}$	emitter-base voltage	open collector	-	4	V
$-I_C$	DC collector current		-	80	mA
$P_{tot}$	total power dissipation	up to $T_s = 85\text{ °C}$ (note 1)	-	350	mW
$T_{stg}$	storage temperature		-55	150	°C
$T_j$	junction temperature		-	175	°C

### THERMAL RESISTANCE

SYMBOL	PARAMETER	THERMAL RESISTANCE
$R_{th\ j-s}$	from junction to soldering point (note 1)	260 K/W

### Note

- $T_s$  is the temperature at the soldering point of the collector tab.

## PNP 1 GHz switching transistor

## PMBT3640

## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
<b>Off characteristics</b>					
$-V_{(BR)CBO}$	collector-base breakdown voltage	$-I_C = 100\text{ }\mu\text{A}; I_E = 0$	12	–	V
$-V_{(BR)CES}$	collector-emitter breakdown voltage	$-I_C = 100\text{ }\mu\text{A}; V_{BE} = 0$	12	–	V
$-V_{(BR)EBO}$	emitter-base breakdown voltage	$-I_E = 100\text{ }\mu\text{A}; I_C = 0$	4	–	V
$-I_{CES}$	collector cut-off current	$-V_{CE} = 6\text{ V}; V_{BE} = 0$	–	0.01	$\mu\text{A}$
		$-V_{CE} = 6\text{ V}; V_{BE} = 0; T_{amb} = 65\text{ }^\circ\text{C}$	–	1	$\mu\text{A}$
$-I_B$	base current	$-V_{CE} = 6\text{ V}; V_{BE} = 0$	–	10	nA
<b>On characteristics; pulse test: pulse width <math>\leq 300\text{ }\mu\text{s}</math>, duty cycle <math>\leq 2\%</math>.</b>					
$h_{FE}$	DC current gain	$-I_C = 10\text{ mA}; -V_{CE} = 0.3\text{ V}$	30	120	
		$-I_C = 50\text{ mA}; -V_{CE} = 1\text{ V}$	20	–	
$-V_{CEsat}$	collector-emitter saturation voltage	$-I_C = 10\text{ mA}; -I_B = 1\text{ mA}$	–	0.2	V
		$-I_C = 50\text{ mA}; -I_B = 5\text{ mA}$	–	0.6	V
		$-I_C = 10\text{ mA}; -I_B = 1\text{ mA}; T_{amb} = 65\text{ }^\circ\text{C}$	–	0.25	V
$-V_{BEsat}$	base-emitter saturation voltage	$-I_C = 10\text{ mA}; -I_B = 0.5\text{ mA}$	0.75	0.95	V
		$-I_C = 10\text{ mA}; -I_B = 1\text{ mA}$	0.8	1	V
		$-I_C = 50\text{ mA}; -I_B = 5\text{ mA}$	–	1.5	V
<b>Small-signal characteristics</b>					
$f_T$	transition frequency	$-I_C = 10\text{ mA}; -V_{CE} = 5\text{ V};$ $f = 100\text{ MHz}$	500	–	MHz
$C_c$	output capacitance	$I_E = 0; -V_{CB} = 5\text{ V}; f = 1\text{ MHz}$	–	3.5	pF
$C_e$	input capacitance	$I_C = 0; -V_{EB} = 0.5\text{ V}; f = 1\text{ MHz}$	–	3.5	pF
<b>Switching times</b>					
$t_d$	delay time	$-V_{CC} = 6\text{ V}; -I_C = 50\text{ mA};$ $-V_{BE(off)} = 1.9\text{ V}; -I_{B1} = 5\text{ mA}$	–	10	ns
$t_s$	storage time	$-V_{CC} = 6\text{ V}; -I_C = 50\text{ mA};$ $-I_{B1} = -I_{B2} = 5\text{ mA}$	–	20	ns
$t_r$	rise time	$-V_{CC} = 6\text{ V}; -I_C = 50\text{ mA};$ $-V_{BE(off)} = 1.9\text{ V}; -I_{B1} = 5\text{ mA}$	–	30	ns
$t_f$	fall time	$-V_{CC} = 6\text{ V}; -I_C = 50\text{ mA};$ $-I_{B1} = -I_{B2} = 5\text{ mA}$	–	12	ns
$t_{on}$	turn-on time	$-V_{CC} = 6\text{ V}; -I_C = 50\text{ mA};$ $-V_{BE(off)} = 1.9\text{ V}; -I_{B1} = 5\text{ mA}$	–	25	ns
		$-V_{CC} = 1.5\text{ V}; -I_C = 10\text{ mA};$ $-I_{B1} = 0.5\text{ mA}$	–	60	ns
$t_{off}$	turn-off time	$-V_{CC} = 6\text{ V}; -I_C = 50\text{ mA};$ $-V_{BE(off)} = 1.9\text{ V}; -I_{B1} = I_{B2} = 5\text{ mA}$	–	35	ns
		$-V_{CC} = 1.5\text{ V}; -I_C = 10\text{ mA};$ $-I_{B1} = I_{B2} = 0.5\text{ mA}$	–	75	ns

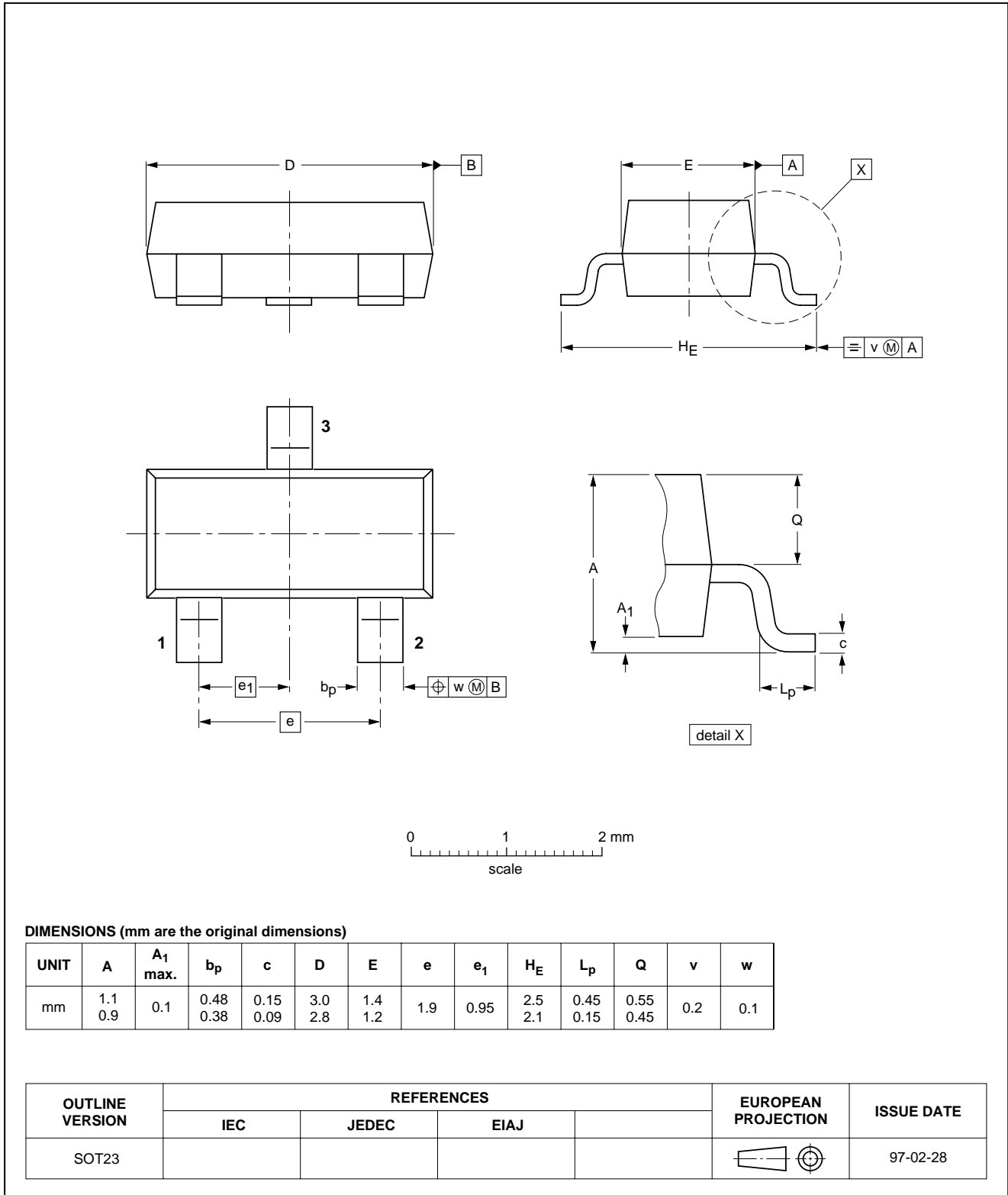
PNP 1 GHz switching transistor

PMBT3640

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



## PNP 1 GHz switching transistor

PMBT3640

**DEFINITIONS**

<b>Data Sheet Status</b>	
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.
<b>Limiting values</b>	
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.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

**LIFE SUPPORT APPLICATIONS**

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.