

**DISCRETE SEMICONDUCTORS**

# DATA SHEET

## **PMBT3640**

### **PNP 1 GHz switching transistor**

Product specification

September 1995

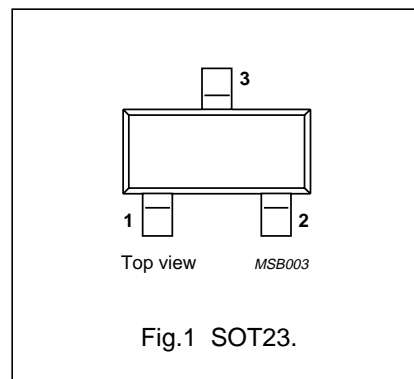
File under Discrete Semiconductors, SC14

**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.

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## PMBT3640

**CHARACTERISTICS**T<sub>j</sub> = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
<b>Off characteristics</b>					
-V <sub>(BR)CBO</sub>	collector-base breakdown voltage	-I <sub>C</sub> = 100 μA; I <sub>E</sub> = 0	12	-	V
-V <sub>(BR)CES</sub>	collector-emitter breakdown voltage	-I <sub>C</sub> = 100 μA; V <sub>BE</sub> = 0	12	-	V
-V <sub>(BR)EBO</sub>	emitter-base breakdown voltage	-I <sub>E</sub> = 100 μA; I <sub>C</sub> = 0	4	-	V
-I <sub>CES</sub>	collector cut-off current	-V <sub>CE</sub> = 6 V; V <sub>BE</sub> = 0	-	0.01	μA
		-V <sub>CE</sub> = 6 V; V <sub>BE</sub> = 0; T <sub>amb</sub> = 65 °C	-	1	μA
-I <sub>B</sub>	base current	-V <sub>CE</sub> = 6 V; V <sub>BE</sub> = 0	-	10	nA
<b>On characteristics; pulse test: pulse width ≤ 300 μs, duty cycle ≤ 2%.</b>					
h <sub>FE</sub>	DC current gain	-I <sub>C</sub> = 10 mA; -V <sub>CE</sub> = 0.3 V	30	120	
		-I <sub>C</sub> = 50 mA; -V <sub>CE</sub> = 1 V	20	-	
-V <sub>CEsat</sub>	collector-emitter saturation voltage	-I <sub>C</sub> = 10 mA; -I <sub>B</sub> = 1 mA	-	0.2	V
		-I <sub>C</sub> = 50 mA; -I <sub>B</sub> = 5 mA	-	0.6	V
		-I <sub>C</sub> = 10 mA; -I <sub>B</sub> = 1 mA; T <sub>amb</sub> = 65 °C	-	0.25	V
-V <sub>BEsat</sub>	base-emitter saturation voltage	-I <sub>C</sub> = 10 mA; -I <sub>B</sub> = 0.5 mA	0.75	0.95	V
		-I <sub>C</sub> = 10 mA; -I <sub>B</sub> = 1 mA	0.8	1	V
		-I <sub>C</sub> = 50 mA; -I <sub>B</sub> = 5 mA	-	1.5	V
<b>Small-signal characteristics</b>					
f <sub>T</sub>	transition frequency	-I <sub>C</sub> = 10 mA; -V <sub>CE</sub> = 5 V; f = 100 MHz	500	-	MHz
C <sub>c</sub>	output capacitance	I <sub>E</sub> = 0; -V <sub>CB</sub> = 5 V; f = 1 MHz	-	3.5	pF
C <sub>e</sub>	input capacitance	I <sub>C</sub> = 0; -V <sub>EB</sub> = 0.5 V; f = 1 MHz	-	3.5	pF
<b>Switching times</b>					
t <sub>d</sub>	delay time	-V <sub>CC</sub> = 6 V; -I <sub>C</sub> = 50 mA; -V <sub>BE(off)</sub> = 1.9 V; -I <sub>B1</sub> = 5 mA	-	10	ns
t <sub>s</sub>	storage time	-V <sub>CC</sub> = 6 V; -I <sub>C</sub> = 50 mA; -I <sub>B1</sub> = -I <sub>B2</sub> = 5 mA	-	20	ns
t <sub>r</sub>	rise time	-V <sub>CC</sub> = 6 V; -I <sub>C</sub> = 50 mA; -V <sub>BE(off)</sub> = 1.9 V; -I <sub>B1</sub> = 5 mA	-	30	ns
t <sub>f</sub>	fall time	-V <sub>CC</sub> = 6 V; -I <sub>C</sub> = 50 mA; -I <sub>B1</sub> = -I <sub>B2</sub> = 5 mA	-	12	ns
t <sub>on</sub>	turn-on time	-V <sub>CC</sub> = 6 V; -I <sub>C</sub> = 50 mA; -V <sub>BE(off)</sub> = 1.9 V; -I <sub>B1</sub> = 5 mA	-	25	ns
		-V <sub>CC</sub> = 1.5 V; -I <sub>C</sub> = 10 mA; -I <sub>B1</sub> = 0.5 mA	-	60	ns
t <sub>off</sub>	turn-off time	-V <sub>CC</sub> = 6 V; -I <sub>C</sub> = 50 mA; -V <sub>BE(off)</sub> = 1.9 V; -I <sub>B1</sub> = I <sub>B2</sub> = 5 mA	-	35	ns
		-V <sub>CC</sub> = 1.5 V; -I <sub>C</sub> = 10 mA; -I <sub>B1</sub> = I <sub>B2</sub> = 0.5 mA	-	75	ns

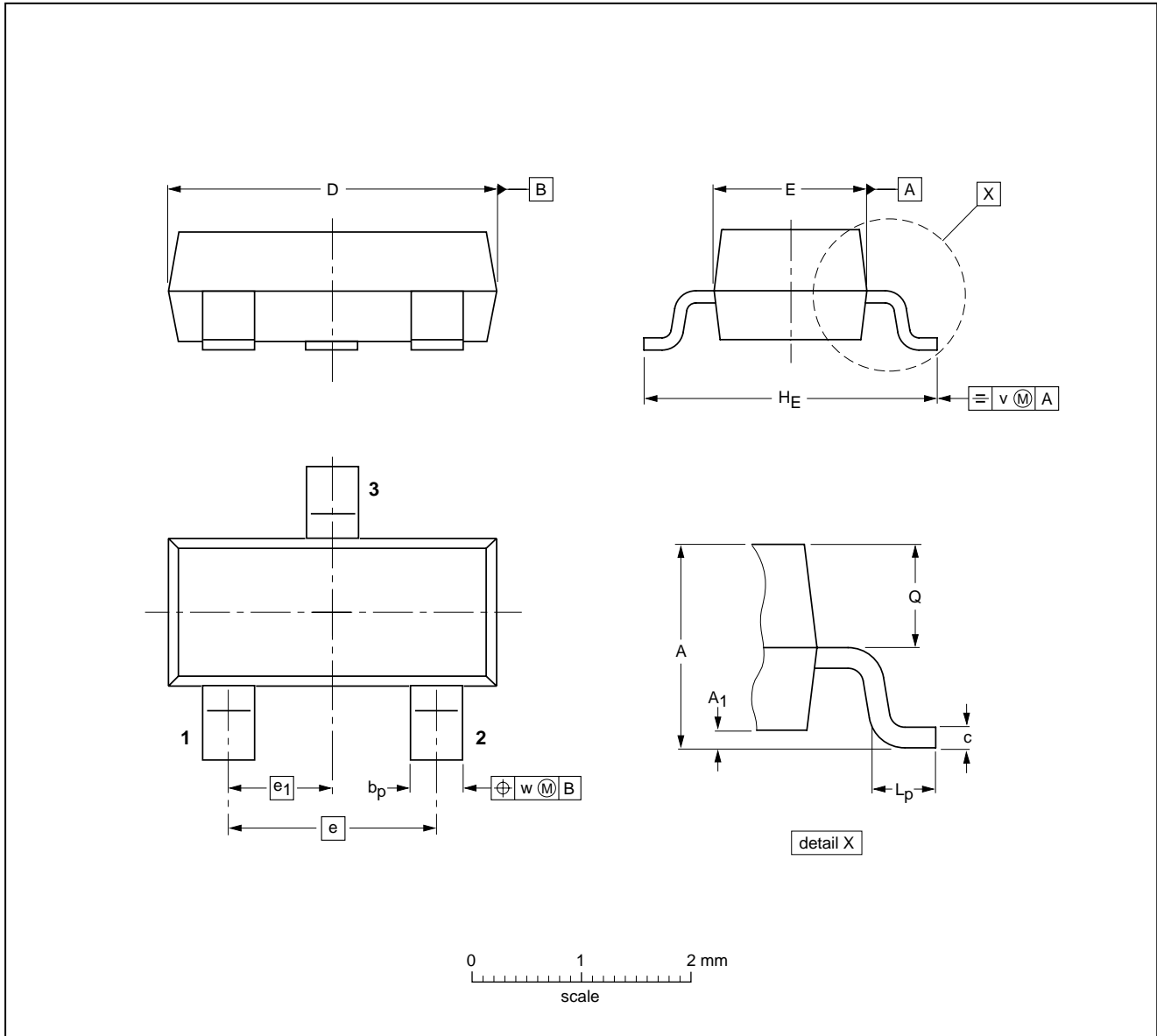
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PMBT3640

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub> max.	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT23						97-02-28

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**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.	

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