

# DATA SHEET

## **PMBTH10**

**NPN 1 GHz general purpose  
switching transistor**

Product specification  
File under Discrete Semiconductors, SC14

September 1995

## NPN 1 GHz general purpose switching transistor

## PMBTH10

## FEATURES

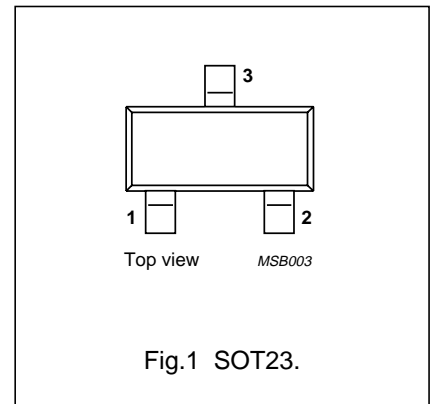
- Low cost
- High power gain.

## DESCRIPTION

The PMBTH10 is a general purpose silicon npn transistor, encapsulated in a SOT23 plastic envelope. Its pnp complement is the PMBTH81.

## PINNING

PIN	DESCRIPTION
Code: V30	
1	base
2	emitter
3	collector



## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	30	V
$V_{CEO}$	collector-emitter voltage	open base	–	25	V
$V_{EBO}$	emitter-base voltage	open collector	–	3	V
$P_{tot}$	total power dissipation	$T_s = 45\text{ °C}$ (note 1)	–	400	mW
$h_{FE}$	DC current gain	$V_{CE} = 10\text{ V}$ ; $I_C = 4\text{ mA}$	60	–	
$C_{re}$	collector-emitter feedback capacitance	$V_{CB} = 10\text{ V}$ ; $I_E = 0$ ; $f = 1\text{ MHz}$	–	0.7	pF
$C_{rb}$	collector-base feedback capacitance	$V_{CB} = 10\text{ V}$ ; $I_E = 0$ ; $f = 1\text{ MHz}$	0.35	0.65	pF
$f_T$	transition frequency	$V_{CE} = 10\text{ V}$ ; $I_C = 4\text{ mA}$ ; $f = 100\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$	650	–	MHz
$r_b C_C$	collector-base time constant	$V_{CE} = 10\text{ V}$ ; $I_C = 4\text{ mA}$ ; $f = 100\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$	–	9	ps

## LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	30	V
$V_{CEO}$	collector-emitter voltage	open base	–	25	V
$V_{EBO}$	emitter-base voltage	open collector	–	3	V
$I_C$	DC collector current		–	40	mA
$P_{tot}$	total power dissipation	$T_s = 45\text{ °C}$ (note 1)	–	400	mW
$T_{stg}$	storage temperature		–65	150	°C
$T_j$	junction temperature		–	150	°C

## Note

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

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## 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.

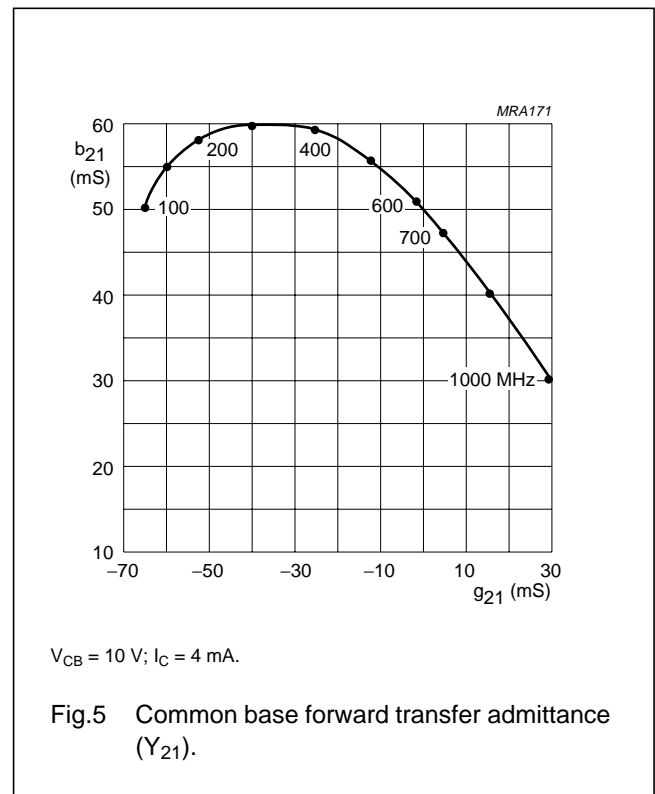
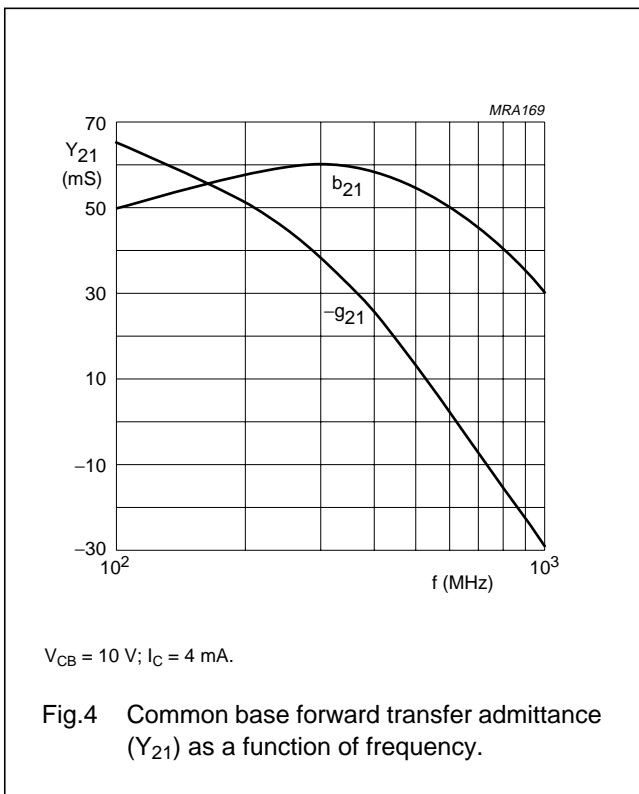
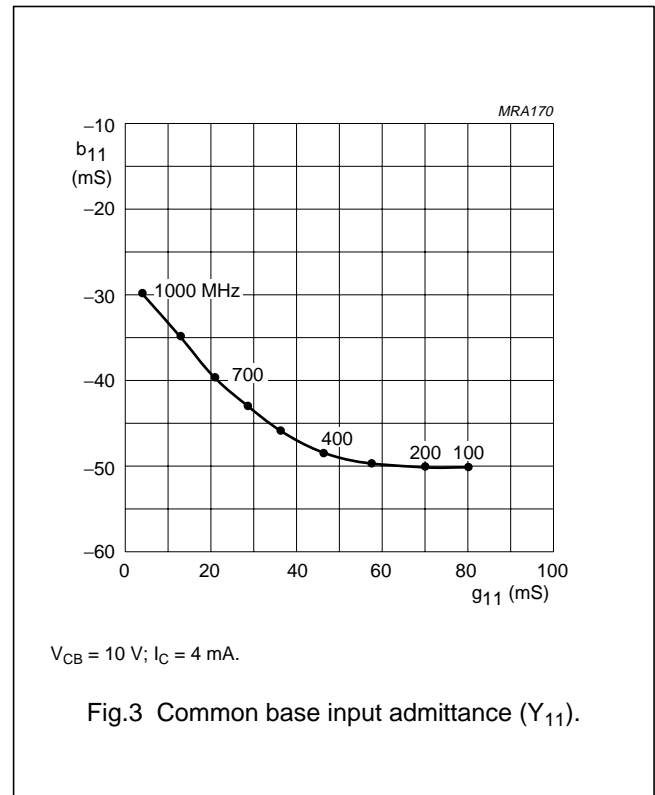
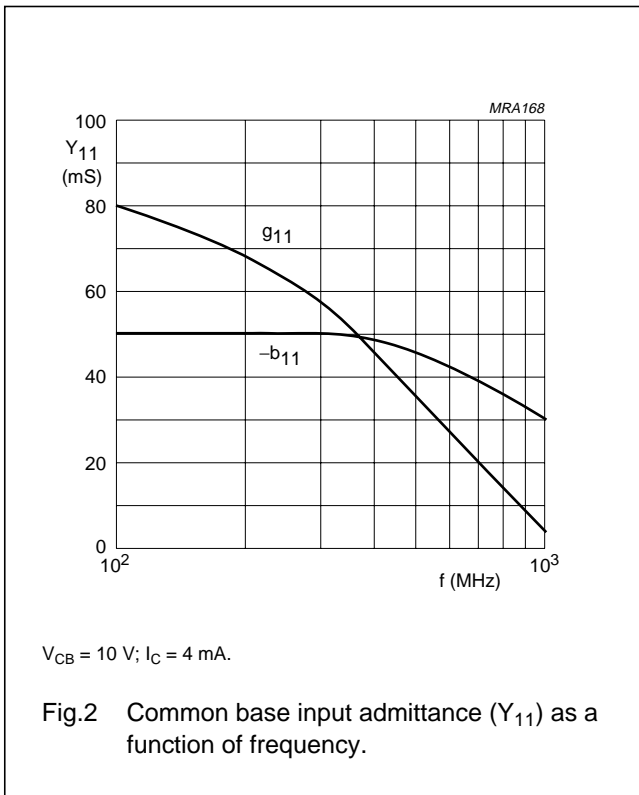
## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	open emitter; $I_C = 100\ \mu\text{A}$ ; $I_E = 0$	30	–	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	open base; $I_C = 1\ \text{mA}$ ; $I_B = 0$	25	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	open collector; $I_E = 10\ \mu\text{A}$ ; $I_C = 0$	3	–	V
$V_{CE\ sat}$	collector-emitter saturation voltage	$I_C = 4\ \text{mA}$ ; $I_B = 0.4\ \text{mA}$	–	0.5	V
$V_{BE\ on}$	base-emitter ON voltage	$V_{CE} = 10\ \text{V}$ ; $I_C = 4\ \text{mA}$	–	0.95	V
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 25\ \text{V}$ ; $I_E = 0$	–	100	nA
$I_{EBO}$	emitter-base cut-off current	$V_{CB} = 25\ \text{V}$ ; $I_C = 0$	–	100	nA
$h_{FE}$	DC current gain	$V_{CE} = 10\ \text{V}$ ; $I_C = 4\ \text{mA}$	60	–	
$C_{re}$	collector-emitter feedback capacitance	$V_{CB} = 10\ \text{V}$ ; $I_E = i_e = 0$ ; $f = 1\ \text{MHz}$	–	0.7	pF
$C_{rb}$	collector-base feedback capacitance	$V_{CB} = 10\ \text{V}$ ; $I_C = i_c = 0$ ; $f = 1\ \text{MHz}$	0.35	0.65	pF
$f_T$	transition frequency	$V_{CE} = 10\ \text{V}$ ; $I_C = 4\ \text{mA}$ ; $f = 100\ \text{MHz}$ ; $T_{amb} = 25\text{ }^\circ\text{C}$	650	–	MHz
$r_b C_C$	collector-base time constant	$V_{CB} = 10\ \text{V}$ ; $I_C = 4\ \text{mA}$ ; $f = 100\ \text{MHz}$ ; $T_{amb} = 25\text{ }^\circ\text{C}$	–	9	ps

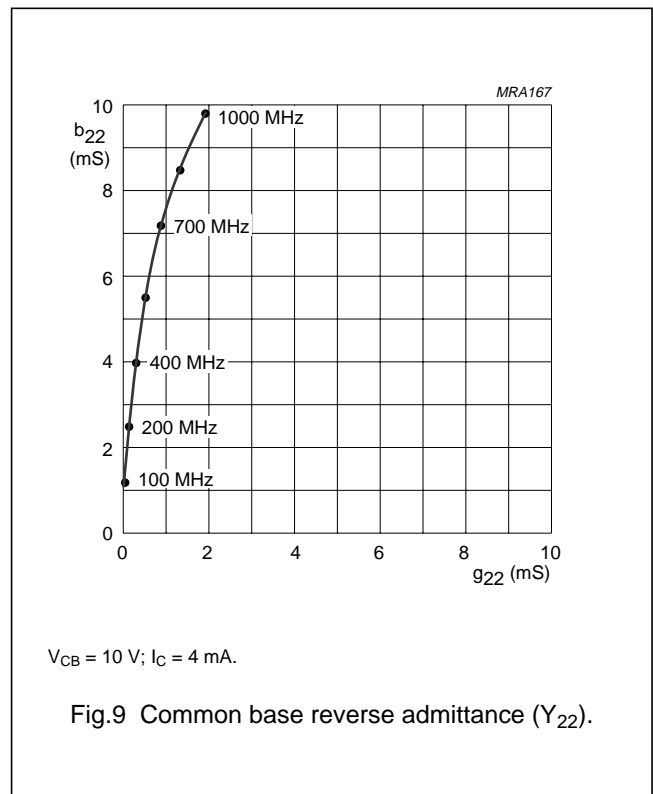
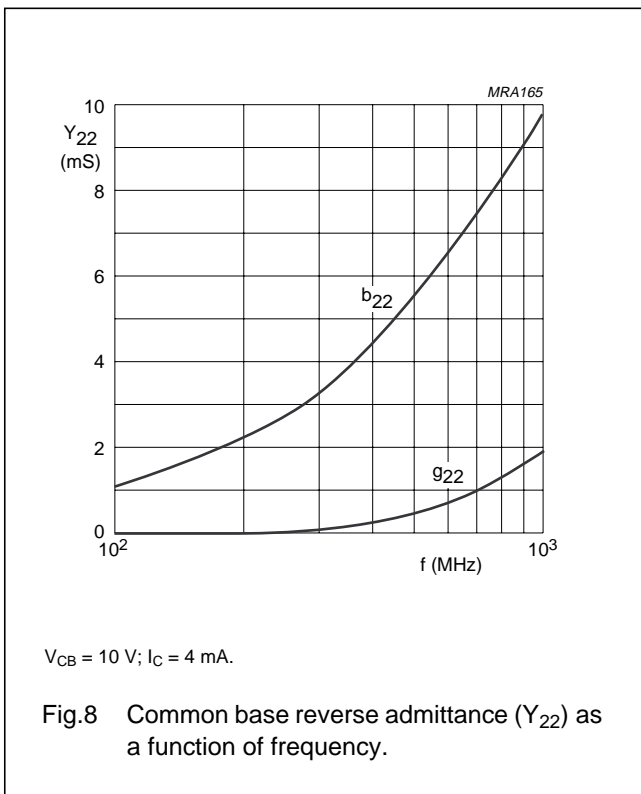
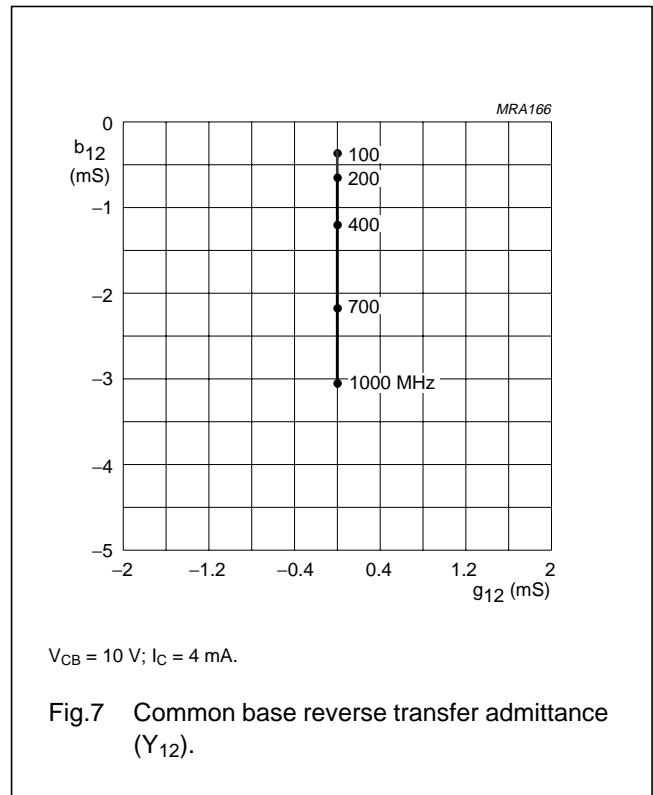
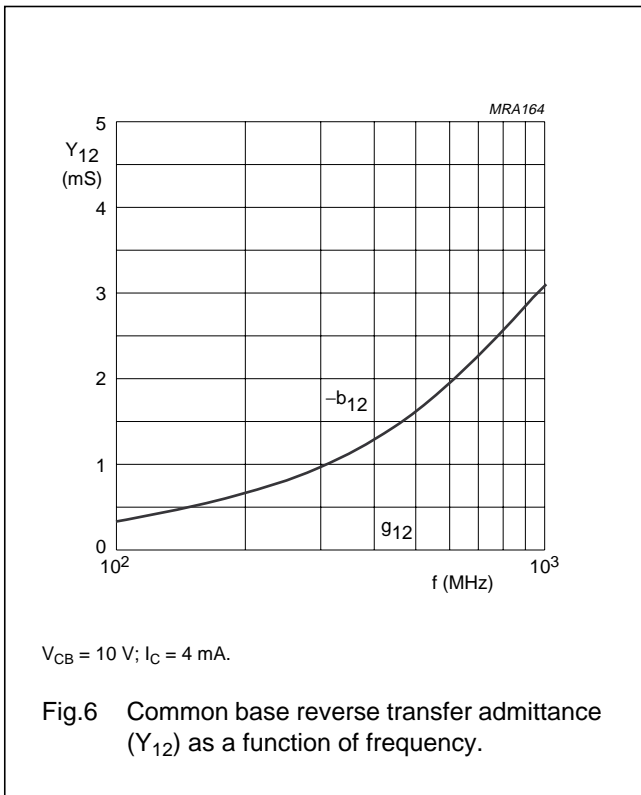
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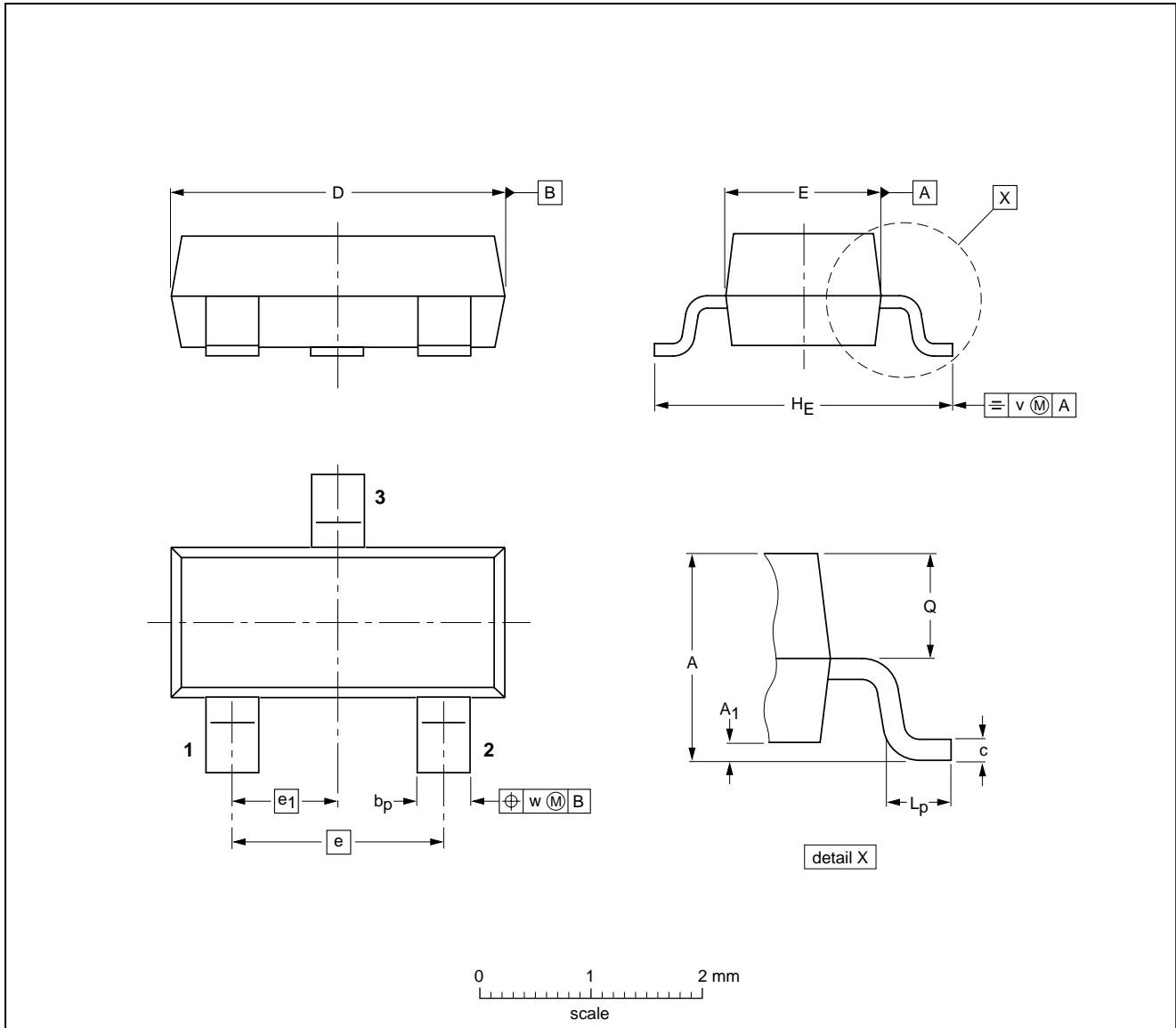
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PACKAGE OUTLINE

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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