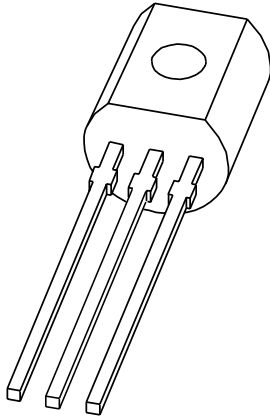


DATA SHEET



MPSH10

**NPN 1 GHz general purpose
switching transistor**

Product specification
Supersedes data of September 1995
File under Discrete Semiconductors, SC14

1998 Aug 27

NPN 1 GHz general purpose switching transistor

MPSH10

FEATURES

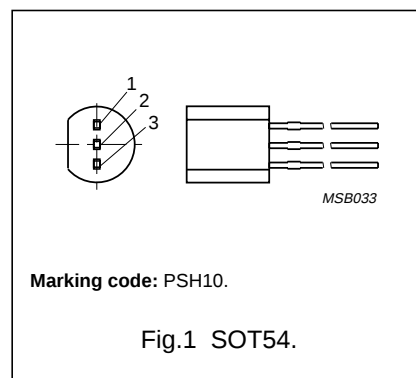
- Low cost
- High power gain.

DESCRIPTION

Silicon NPN general purpose transistor in a SOT54 (TO-92) package. PNP complement is the MPSH81.

PINNING

PIN	DESCRIPTION
1	collector
2	emitter
3	base



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	$T_s = 25\text{ °C}$; note 1	—	1	W
T_j	junction temperature		—	150	°C
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

Note

1. T_s is the temperature at the soldering point of the collector lead, 4 mm from the body.

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	—	30	V
V_{CEO}	collector-emitter voltage	open base	—	25	V
V_{EBO}	emitter-base voltage	open collector	—	3	V
I_C	collector current (DC)		—	40	mA
P_{tot}	total power dissipation	$T_s = 25\text{ °C}$; note 1	—	1	W
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 lead, 4 mm from the body.

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THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-s}$	thermal resistance from junction to soldering point	note 1	125	K/W
$R_{th\ j-a}$	thermal resistance from junction to ambient		250	K/W

Note

1. T_s is the temperature at the soldering point of the collector lead, 4 mm from the body.

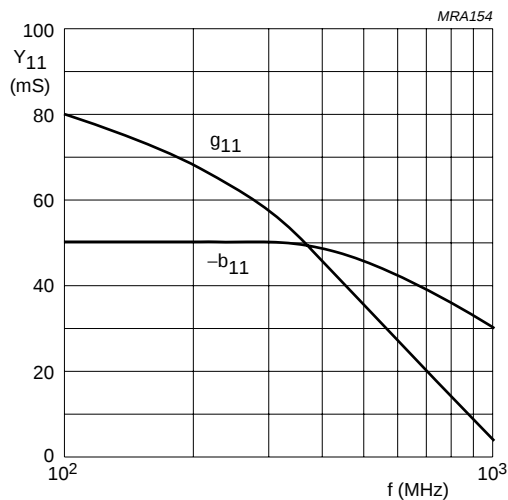
CHARACTERISTICS

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

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_{CEsat}	collector-emitter saturation voltage	$I_C = 4\ \text{mA}$; $I_B = 0.4\ \text{mA}$	–	0.5	V
V_{BEon}	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	$V_{CE} = 10\ \text{V}$; $I_C = 4\ \text{mA}$; $f = 100\ \text{MHz}$; $T_{amb} = 25\ ^\circ\text{C}$	650	–	MHz
$r_b C_c$	collector-base time constant	$V_{CB} = 10\ \text{V}$; $I_C = 4\ \text{mA}$; $f = 100\ \text{MHz}$; $T_{amb} = 25\ ^\circ\text{C}$	–	9	ps

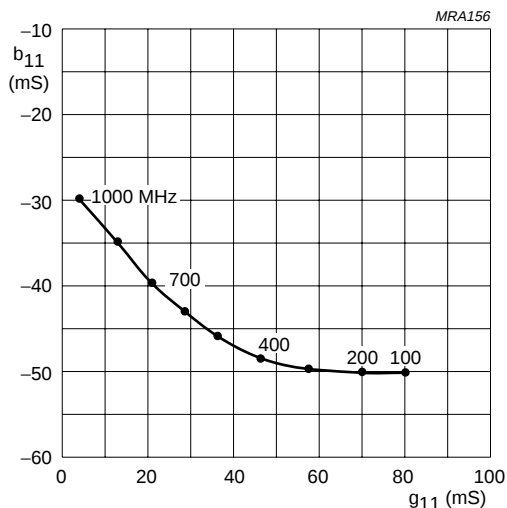
NPN 1 GHz general purpose switching transistor

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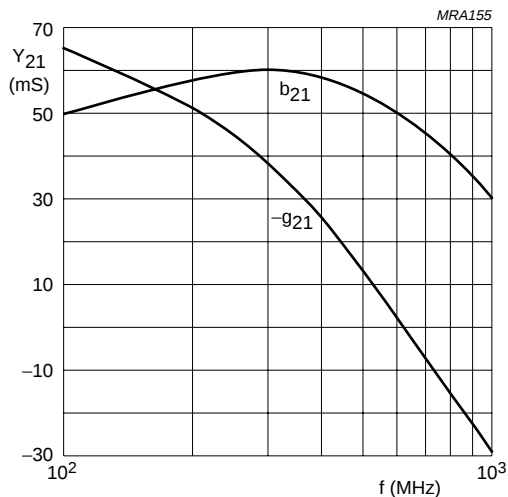
$V_{CB} = 10\text{ V}; I_C = 4\text{ mA}$.

Fig.2 Common base input admittance (Y_{11}) as a function of frequency.



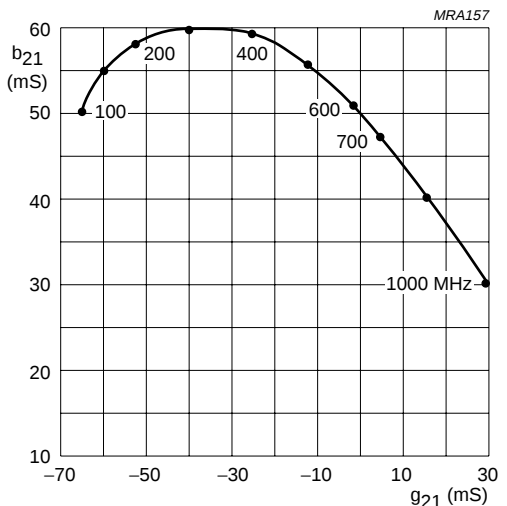
$V_{CB} = 10\text{ V}; I_C = 4\text{ mA}$.

Fig.3 Common base input admittance (Y_{11}).



$V_{CB} = 10\text{ V}; I_C = 4\text{ mA}$.

Fig.4 Common base forward transfer admittance (Y_{21}) as a function of frequency.

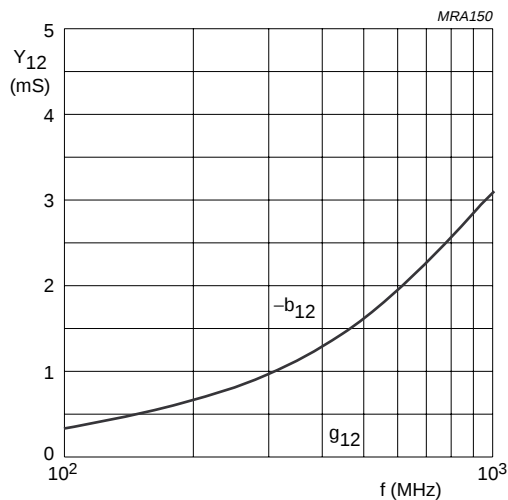


$V_{CB} = 10\text{ V}; I_C = 4\text{ mA}$.

Fig.5 Common base forward transfer admittance (Y_{21}).

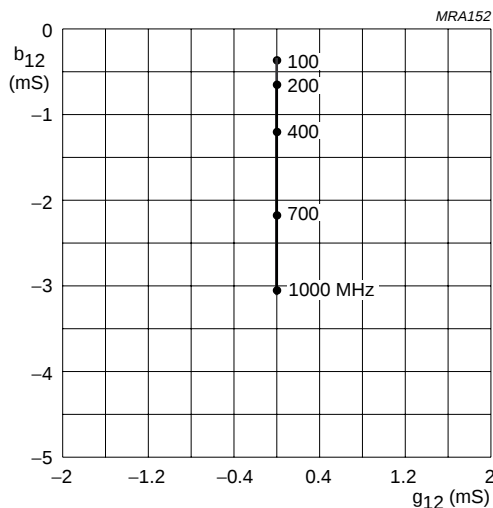
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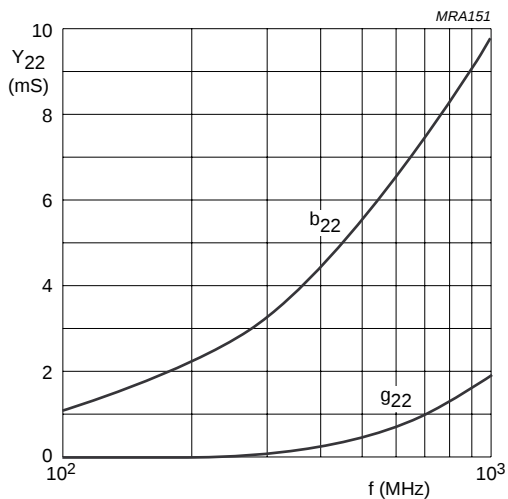
$V_{CB} = 10\text{ V}$; $I_C = 4\text{ mA}$.

Fig.6 Common base reverse transfer admittance (Y_{12}) as a function of frequency.



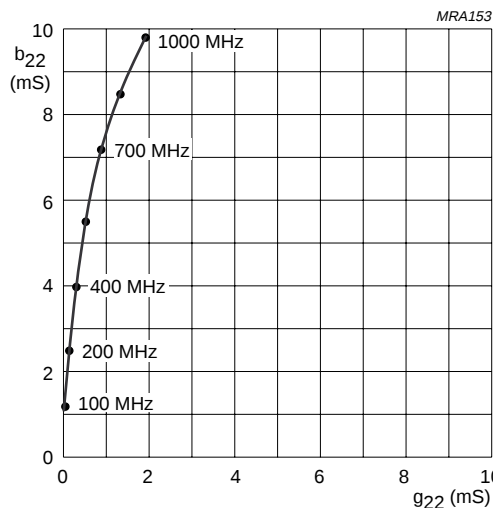
$V_{CB} = 10\text{ V}$; $I_C = 4\text{ mA}$.

Fig.7 Common base reverse transfer admittance (Y_{12}).



$V_{CB} = 10\text{ V}$; $I_C = 4\text{ mA}$.

Fig.8 Common base reverse admittance (Y_{22}) as a function of frequency.



$V_{CB} = 10\text{ V}$; $I_C = 4\text{ mA}$.

Fig.9 Common base reverse admittance (Y_{22}).

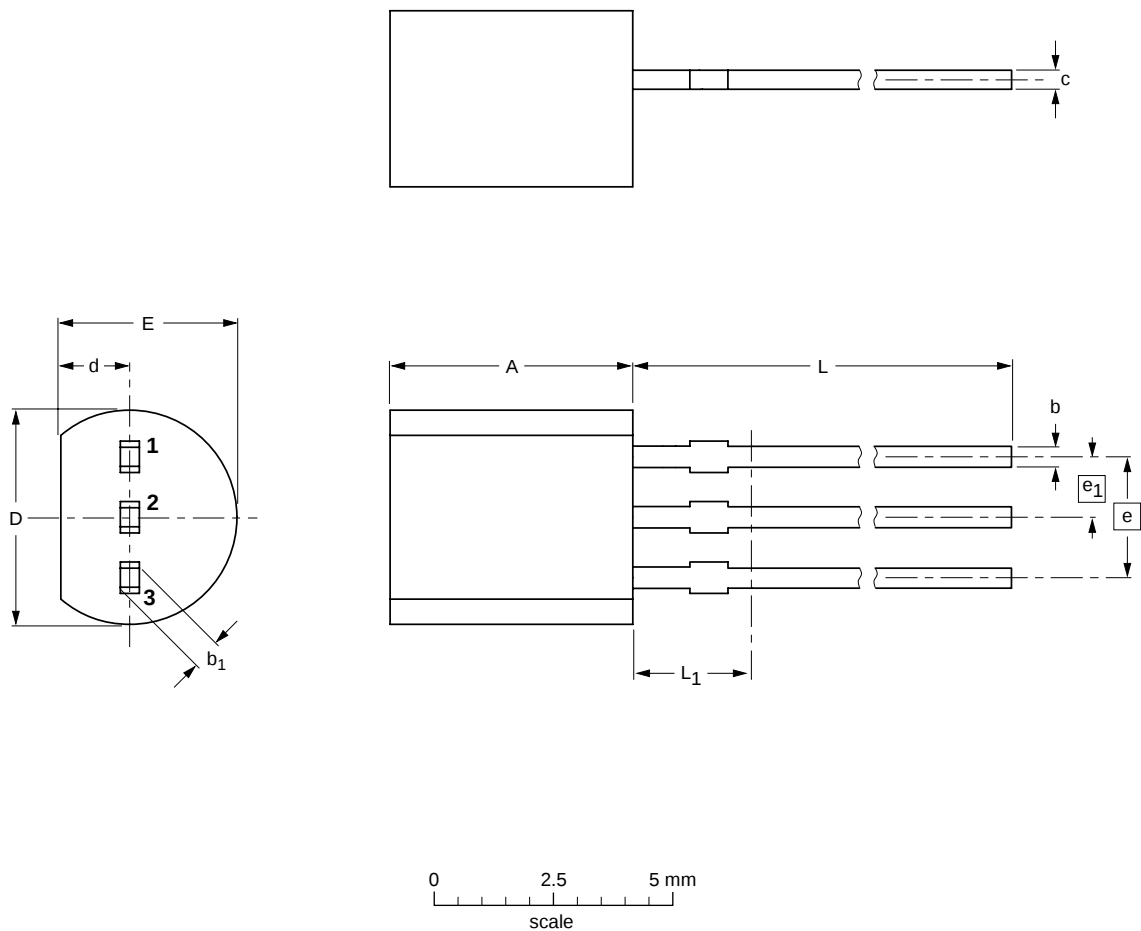
NPN 1 GHz general purpose switching transistor

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PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; 3 leads

SOT54



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b ₁	c	D	d	E	e	e ₁	L	L ₁ ⁽¹⁾
mm	5.2 5.0	0.48 0.40	0.66 0.56	0.45 0.40	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT54		TO-92	SC-43			97-02-28

NPN 1 GHz general purpose switching transistor**MPSH10**

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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