

NPN digital transistor

PDTC124ET

FEATURES

- Built-in bias resistors
- Simplification of circuit design
- Reduces number of components and boardspace.

DESCRIPTION

NPN digital transistor in a plastic SOT23 package. Built-in bias resistors ($R1 = R2 = 22 \text{ k}\Omega$) allow inverter circuit configuration without external resistors. Especially suitable for space reduction in, for example, interface and driver circuit applications.

PINNING - SOT23

PIN	DESCRIPTION
1	base/input
2	emitter/GND
3	collector/output

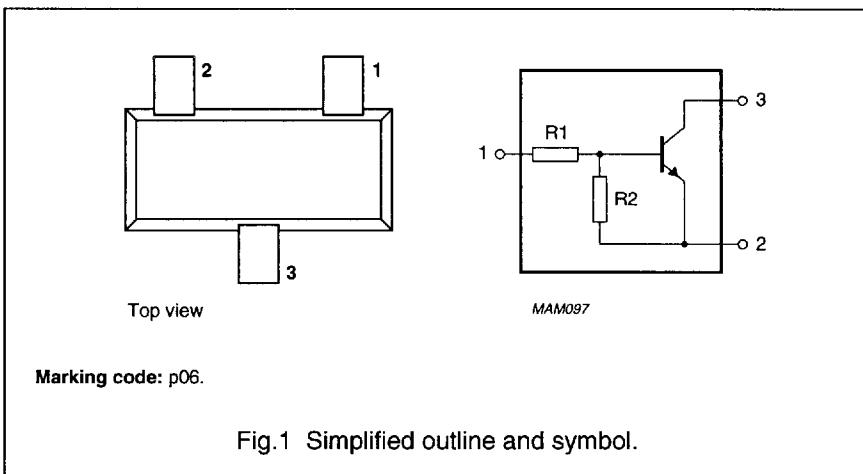


Fig.1 Simplified outline and symbol.

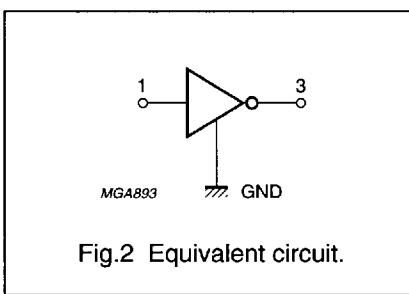


Fig.2 Equivalent circuit.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CEO}	collector-emitter voltage	open base	—	—	50	V
I_O	output current (DC)		—	—	30	mA
P_{tot}	total power dissipation	up to $T_{amb} = 25 \text{ }^\circ\text{C}$	—	—	250	mW
$R1$	input resistor		15.4	22	28.6	$\text{k}\Omega$
$R2/R1$	resistor ratio		0.8	1	1.2	
h_{FE}	DC current gain	$I_C = 5 \text{ mA}; V_{CE} = 5 \text{ V}$	56	—	—	

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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	—	50	V
V_{CEO}	collector-emitter voltage	open base	—	50	V
V_{EBO}	emitter-base voltage	open collector	—	10	V
V_i	input voltage positive negative		— —	+40 -10	V V
I_o	output current (DC)		—	30	mA
I_{CM}	peak collector current		—	100	mA
P_{tot}	total power dissipation	up to $T_{amb} = 25^\circ\text{C}$; note 1	—	250	mW
T_{stg}	storage temperature		-65	+150	°C
T_j	junction temperature		—	+150	°C
T_{amb}	operating ambient temperature		-65	+150	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	in free air; note 1	500	K/W

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

1. Refer to SOT23 standard mounting conditions.

CHARACTERISTICS

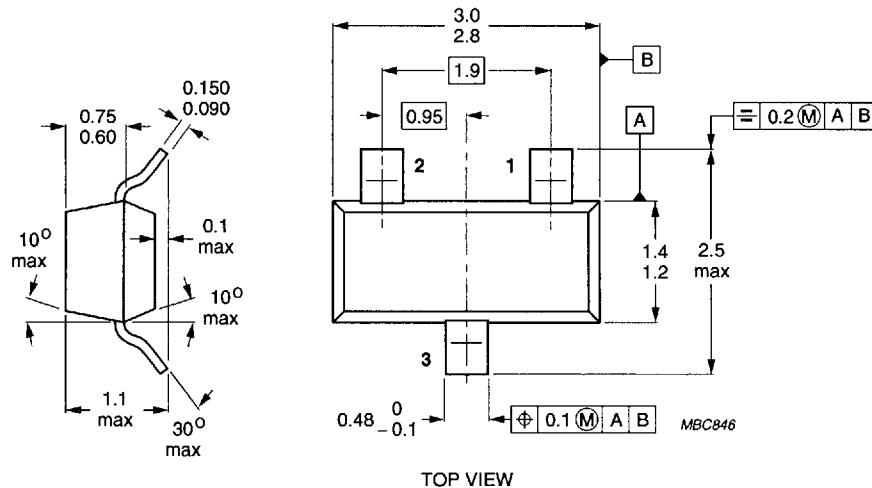
 $T_{amb} = 25^\circ\text{C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	open emitter; $I_C = 10 \mu\text{A}$; $I_E = 0$	50	—	—	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	open base; $I_C = 100 \mu\text{A}$; $I_B = 0$	50	—	—	V
I_{CEO}	collector-emitter cut-off current	$V_{CE} = 30 \text{ V}$; $I_B = 0$	—	—	1	μA
		$V_{CE} = 30 \text{ V}$; $I_B = 0$; $T_j = 150^\circ\text{C}$	—	—	50	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5 \text{ V}$; $I_C = 0$	—	—	500	μA
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10 \text{ mA}$; $I_B = 0.5 \text{ mA}$	—	—	300	mV
$V_{i(off)}$	input off voltage	$V_{CE} = 5 \text{ V}$; $I_C = 100 \mu\text{A}$	—	—	0.5	V
$V_{i(on)}$	input on voltage	$V_{CE} = 0.3 \text{ V}$; $I_C = 5 \text{ mA}$	3	—	—	V
R_1	input resistor		15.4	22	28.6	$\text{k}\Omega$
R_2/R_1	resistor ratio		0.8	1	1.2	
h_{FE}	DC current gain	$V_{CE} = 5 \text{ V}$; $I_C = 5 \text{ mA}$	56	—	—	
C_c	collector capacitance	$V_{CB} = 10 \text{ V}$; $I_E = I_e = 0$; $f = 1 \text{ MHz}$	—	—	3.5	pF

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PACKAGE OUTLINE



Dimensions in mm.

Fig.3 SOT23.

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.	

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.