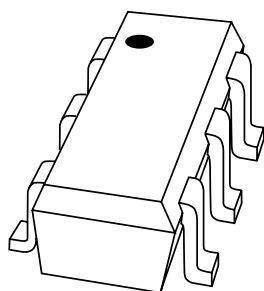


DATA SHEET



PUMH9

NPN resistor-equipped double transistor

Product specification
Supersedes data of 1999 May 06

2001 Jun 05

NPN resistor-equipped double transistor

PUMH9

FEATURES

- Transistors with built-in bias resistors (R1 typ. 10 kΩ and R2 typ. 47 kΩ)
- No mutual interference between the transistors
- Simplification of circuit design
- Reduces number of components and board space.

APPLICATIONS

- Especially suitable for space reduction in interface and driver circuits
- Inverter circuit configurations without use of external resistors.

DESCRIPTION

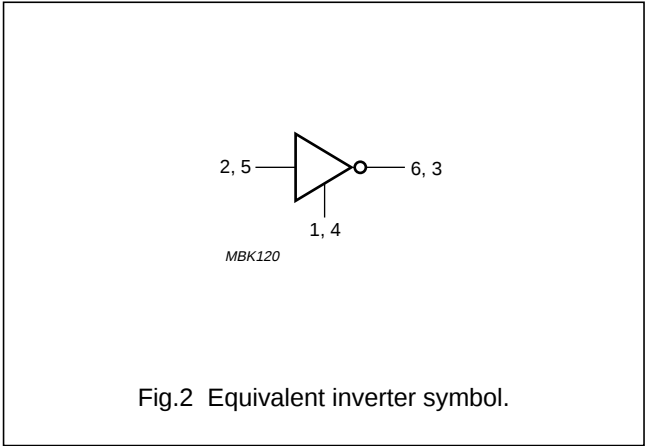
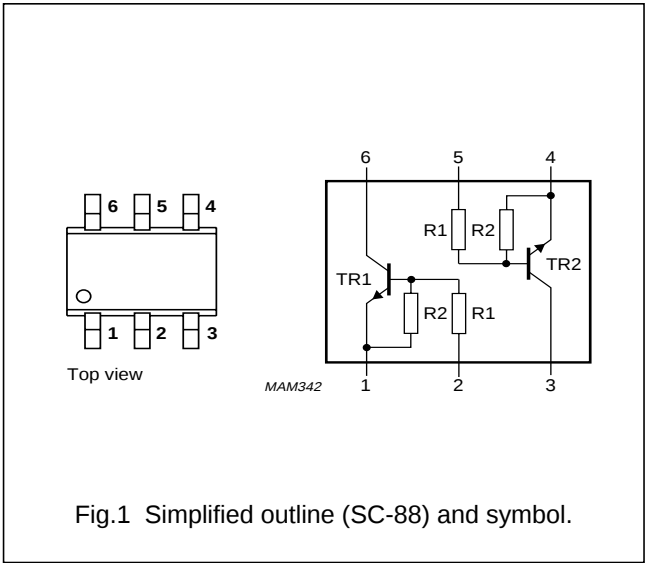
NPN resistor-equipped double transistor in an SC-88 (SOT363) plastic package.

MARKING

TYPE NUMBER	MARKING CODE
PUMH9	Ht9

PINNING

PIN	DESCRIPTION
1, 4	emitter TR1; TR2
2, 5	base TR1; TR2
6, 3	collector TR1; TR2



NPN resistor-equipped double transistor

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LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per transistor					
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		–	+40	V
	positive			–10	V
I_o	output current (DC)		–	100	mA
	peak collector current			100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$; note 1	–	200	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C
Per device					
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$; note 1	–	300	mW

Note

1. Refer to SC-88 standard mounting conditions.

NPN resistor-equipped double transistor

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THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	416	K/W

Note

1. Refer to SC-88 standard mounting conditions.

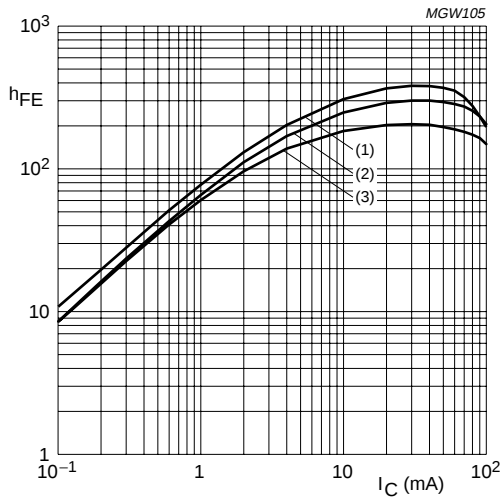
CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per transistor						
I_{CBO}	collector cut-off current	$I_E = 0; V_{CB} = 50\text{ V}$	–	–	100	nA
I_{CEO}	collector cut-off current	$I_B = 0; V_{CE} = 30\text{ V}$	–	–	1	μA
		$I_B = 0; V_{CE} = 30\text{ V}; T_j = 150\text{ °C}$	–	–	50	μA
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = 5\text{ V}$	–	–	150	μA
h_{FE}	DC current gain	$I_C = 5\text{ mA}; V_{CE} = 5\text{ V}$	100	–	–	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 5\text{ mA}; I_B = 0.25\text{ mA}$	–	–	100	mV
$V_{i(off)}$	input-off voltage	$I_C = 100\text{ }\mu\text{A}; V_{CE} = 5\text{ V}$	–	0.7	0.5	V
$V_{i(on)}$	input-on voltage	$I_C = 1\text{ mA}; V_{CE} = 0.3\text{ V}$	1.4	0.8	–	V
R1	input resistor		7	10	13	k Ω
$\frac{R2}{R1}$	resistor ratio		3.7	4.7	5.7	
C_c	collector capacitance	$I_E = I_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	–	2.5	pF

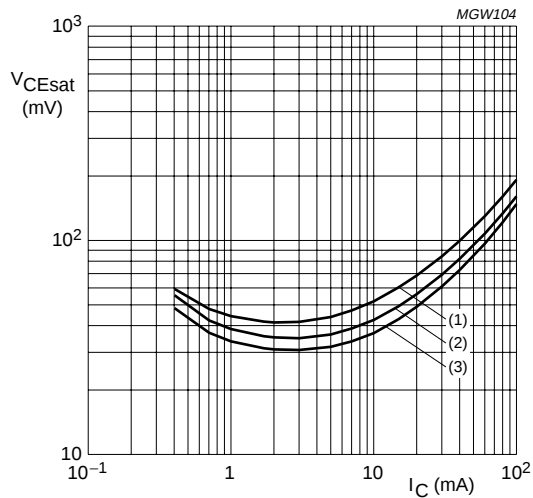
NPN resistor-equipped double transistor

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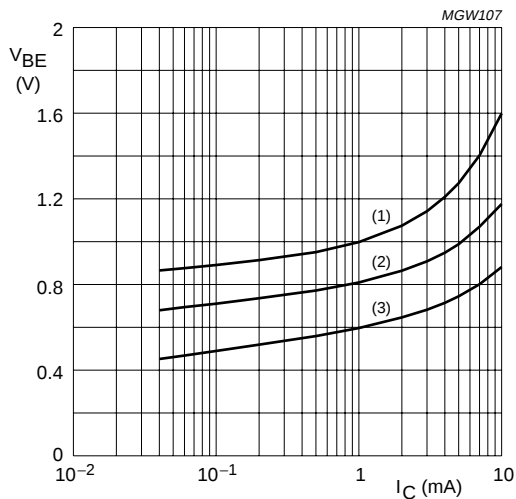
$V_{CE} = 5\text{ V}$.
(1) $T_{amb} = 100^\circ\text{C}$.
(2) $T_{amb} = 25^\circ\text{C}$.
(3) $T_{amb} = -40^\circ\text{C}$.

Fig.3 DC current gain as a function of collector current; typical values.



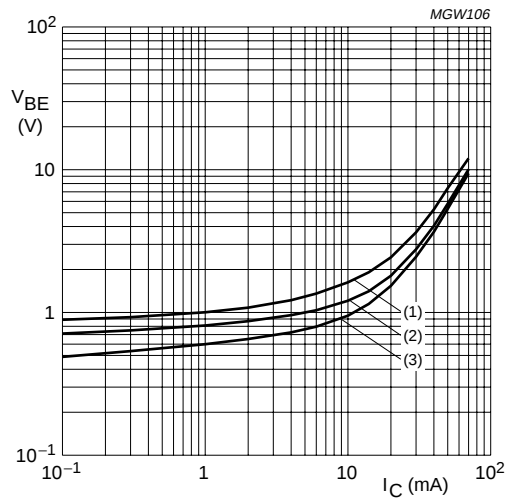
$I_C/I_B = 20$.
(1) $T_{amb} = 100^\circ\text{C}$.
(2) $T_{amb} = 25^\circ\text{C}$.
(3) $T_{amb} = -40^\circ\text{C}$.

Fig.4 Collector-emitter saturation voltage as a function of collector current; typical values.



$V_{CE} = 5\text{ V}$.
(1) $T_{amb} = -40^\circ\text{C}$.
(2) $T_{amb} = 25^\circ\text{C}$.
(3) $T_{amb} = 100^\circ\text{C}$.

Fig.5 Input-off voltage as a function of collector current; typical values.



$V_{CE} = 0.3\text{ V}$.
(1) $T_{amb} = -40^\circ\text{C}$.
(2) $T_{amb} = 25^\circ\text{C}$.
(3) $T_{amb} = 100^\circ\text{C}$.

Fig.6 Input-on voltage as a function of collector current; typical values.

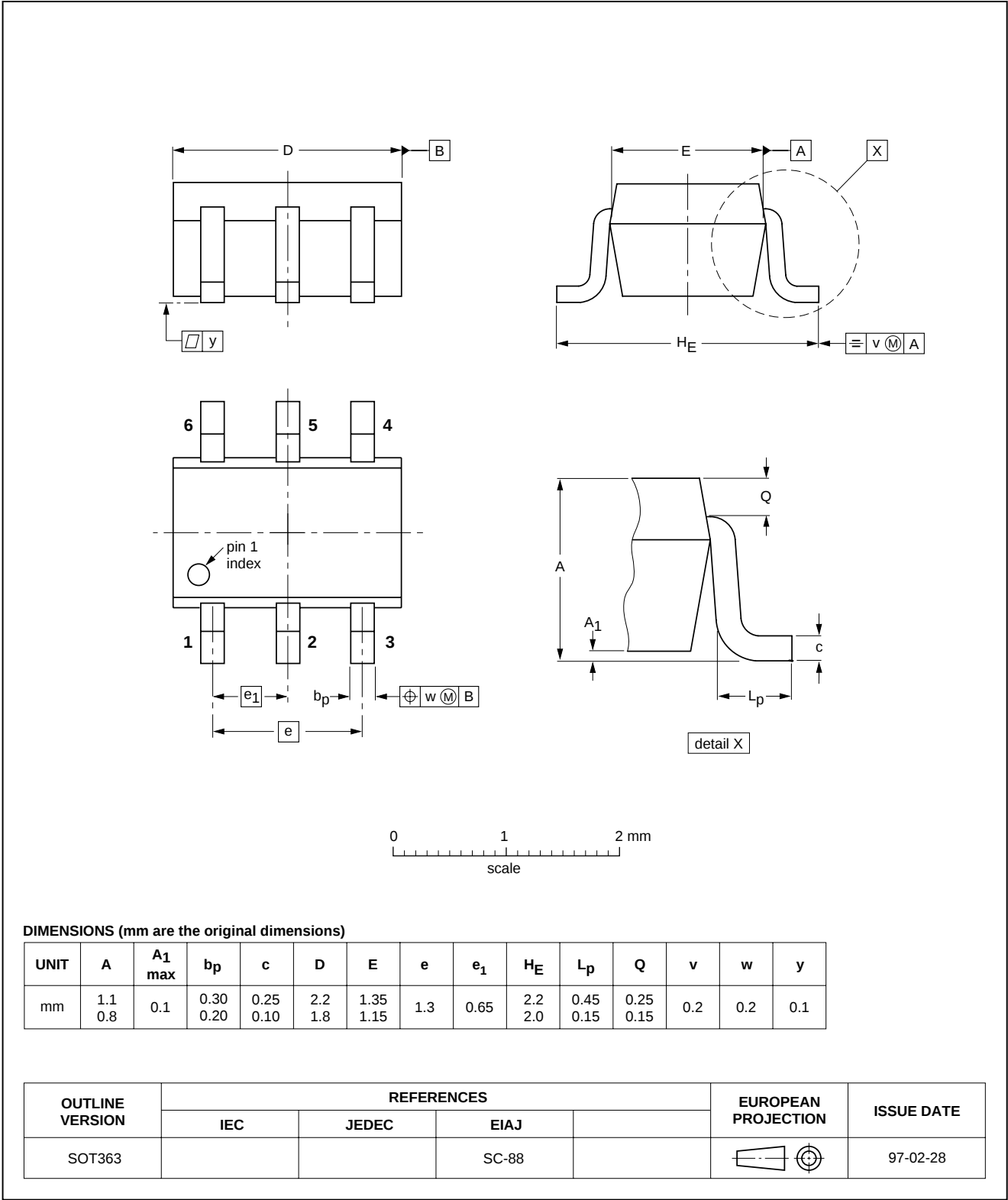
NPN resistor-equipped double transistor

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PACKAGE OUTLINE

Plastic surface mounted package; 6 leads

SOT363



NPN resistor-equipped double transistor

PUMH9

DATA SHEET STATUS

DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITIONS
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