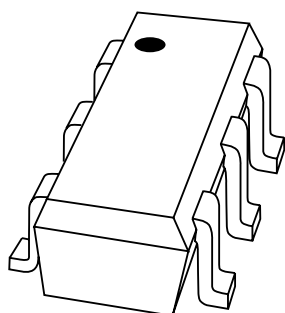


DATA SHEET



PUMH20

NPN/NPN resistor-equipped
transistors; $R1 = 2.2 \text{ k}\Omega$,
 $R2 = 2.2 \text{ k}\Omega$

Product specification

2003 Oct 16

NPN/NPN resistor-equipped transistors; R1 = 2.2 k Ω , R2 = 2.2 k Ω

PUMH20

FEATURES

- Built-in bias resistors
- Simplified circuit design
- Reduction of component count
- Reduced pick and place costs.

APPLICATION

- Low current peripheral driver
- Replacement of general purpose transistors in digital applications
- Control of IC inputs.

DESCRIPTION

NPN/NPN resistor-equipped transistors (see “Simplified outline, symbol and pinning” for package details).

QUICK REFERENCE DATA

SYMBOL	PARAMETER	TYP.	MAX.	UNIT
V _{CEO}	collector-emitter voltage	–	50	V
I _O	output current (DC)	–	100	mA
TR1	NPN	–	–	
TR2	NPN	–	–	
R1	bias resistor	2.2	–	k Ω
R2	bias resistor	2.2	–	k Ω

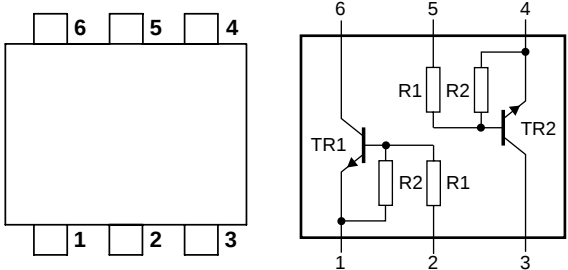
PRODUCT OVERVIEW

TYPE NUMBER	PACKAGE		MARKING CODE ⁽¹⁾	PNP/PNP COMPLEMENT
	PHILIPS	EIAJ		
PUMH20	SOT363	SC-88	H7*	PUMB20

Note

- * = p: made in Hong Kong.
* = t: made in Malaysia.
* = W: made in China.

SIMPLIFIED OUTLINE, SYMBOL AND PINNING

TYPE NUMBER	SIMPLIFIED OUTLINE AND SYMBOL	PINNING	
		PIN	DESCRIPTION
PUMH20	 Top view MHC650	1 2 3 4 5 6	emitter TR1 base TR1 collector TR2 emitter TR2 base TR2 collector TR1

NPN/NPN resistor-equipped transistors;
R1 = 2.2 k Ω , R2 = 2.2 k Ω

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ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PUMH20	–	plastic surface mounted package; 6 leads	SOT363

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITION	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 positive negative		–	+12	V
			–	–10	V
I _O	output current (DC)		–	100	mA
I _{CM}	peak collector current		–	100	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °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} ≤ 25 °C; note 1	–	300	mW

Note

1. Device mounted on an FR4 printed-circuit board, single-sided copper, standard footprint.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
Per transistor				
R _{th j-a}	thermal resistance from junction to ambient	T _{amb} ≤ 25 °C; note 1	625	K/W
Per device				
R _{th j-a}	thermal resistance from junction to ambient	T _{amb} ≤ 25 °C; note 1	416	K/W

Note

1. Device mounted on an FR4 printed-circuit board, single-sided copper, standard footprint.

NPN/NPN resistor-equipped transistors;
 $R1 = 2.2 \text{ k}\Omega$, $R2 = 2.2 \text{ k}\Omega$

PUMH20

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per transistor						
I_{CBO}	collector-base cut-off current	$V_{\text{CB}} = 50 \text{ V}$; $I_{\text{E}} = 0$	–	–	100	nA
I_{CEO}	collector-emitter cut-off current	$V_{\text{CE}} = +30 \text{ V}$; $I_{\text{B}} = 0$	–	–	1	μA
		$V_{\text{CE}} = -30 \text{ V}$; $I_{\text{B}} = 0$; $T_{\text{j}} = 150^{\circ}\text{C}$	–	–	50	μA
I_{EBO}	emitter-base cut-off current	$V_{\text{EB}} = 5 \text{ V}$; $I_{\text{C}} = 0$	–	–	2	mA
h_{FE}	DC current gain	$V_{\text{CE}} = 5 \text{ V}$; $I_{\text{C}} = 20 \text{ mA}$	30	–	–	
V_{CEsat}	collector-emitter saturation voltage	$I_{\text{C}} = 10 \text{ mA}$; $I_{\text{B}} = 0.5 \text{ mA}$	–	–	150	mV
$V_{\text{i(off)}}$	input-off voltage	$I_{\text{C}} = 1 \text{ mA}$; $V_{\text{CE}} = 5 \text{ V}$	–	1.2	0.5	V
$V_{\text{i(on)}}$	input-on voltage	$I_{\text{C}} = 20 \text{ mA}$; $V_{\text{CE}} = 0.3 \text{ V}$	2	1.6	–	V
$R1$	input resistor		1.54	2.2	2.86	$\text{k}\Omega$
$\frac{R2}{R1}$	resistor ratio		0.8	1	1.2	
C_{c}	collector capacitance	$V_{\text{CB}} = 10 \text{ V}$; $I_{\text{E}} = i_{\text{e}} = 0$; $f = 1 \text{ MHz}$	–	–	2.5	pF

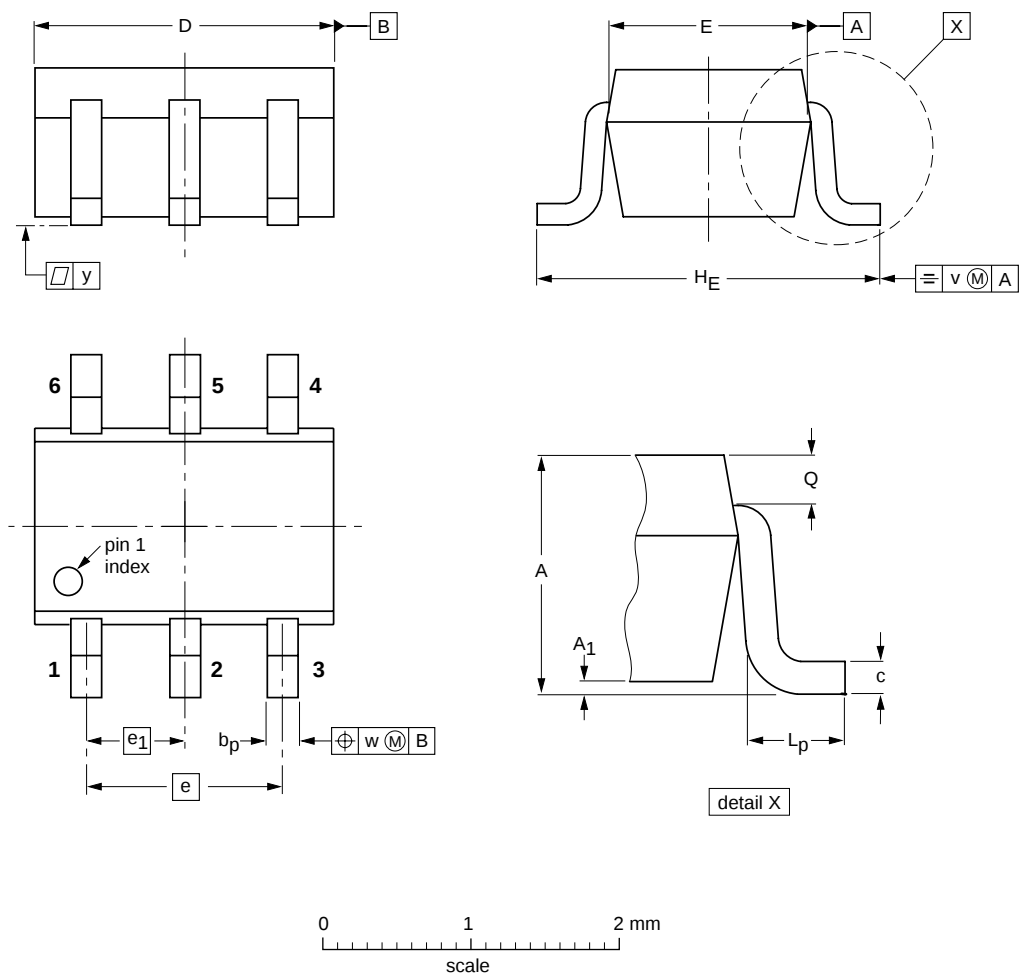
NPN/NPN resistor-equipped transistors;
R1 = 2.2 kΩ, R2 = 2.2 kΩ

PUMH20

PACKAGE OUTLINE

Plastic surface mounted package; 6 leads

SOT363



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁ max	b _p	c	D	E	e	e ₁	H _E	L _p	Q	v	w	y
mm	1.1 0.8	0.1	0.30 0.20	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.25 0.15	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT363			SC-88			97-02-28

NPN/NPN resistor-equipped transistors;
R1 = 2.2 k Ω , R2 = 2.2 k Ω

PUMH20

DATA SHEET STATUS

LEVEL	DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾⁽³⁾	DEFINITION
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

Notes

1. Please consult the most recently issued data sheet before initiating or completing a design.
2. The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.
3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

DEFINITIONS

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). 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.

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