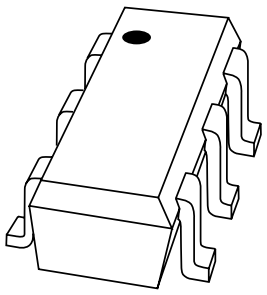
DATA SHEET



PUMF12
PNP general purpose transistor; NPN resistor-equipped transistor

Product specification

2002 Nov 07

Philips Semiconductors

PHILIPS

PNP general purpose transistor; NPN resistor-equipped transistor

PUMF12

FEATURES

- General purpose transistor and resistor equipped transistor in one package
- 100 mA collector current
- 50 V collector-emitter voltage
- 300 mW total power dissipation
- SOT363 package; replaces two SOT323 (SC-70) packaged devices on same PCB area
- Reduced pick and place costs.

APPLICATIONS

- Power management switch for portable equipment, e.g. cellular phone and CD player
- Switch for regulator.

DESCRIPTION

PNP general purpose transistor and an NPN resistor-equipped transistor in a SOT363 (SC-88) plastic package.

MARKING

TYPE NUMBER	MARKING CODE(1)
PUMF12	R2∗

Note

1. ∗ = p: Made in Hong Kong.
   ∗ = t: Made in Malaysia.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
TR1 (PNP)			
V_{CEO}	collector-emitter voltage	–50	V
I_C	collector current (DC)	–100	mA
I_{CM}	peak collector current	–200	mA
TR2 (NPN)			
V_{CEO}	collector-emitter voltage	50	V
I_O	output current (DC)	100	mA
R1	bias resistor	22	kΩ
R2	bias resistor	47	kΩ

PINNING

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

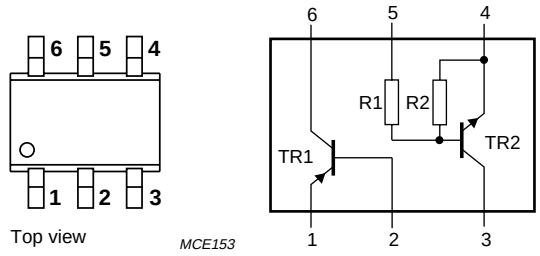


Fig.1 Simplified outline (SOT363) and symbol.

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per transistor					
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C; note 1	–	200	mW
T_{stg}	storage temperature range		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C
TR1 (PNP)					
V_{CBO}	collector-base voltage	open emitter	–	–50	V
V_{CEO}	collector-emitter voltage	open base	–	–40	V
V_{EBO}	emitter-base voltage	open collector	–	–5	V
I_C	collector current (DC)		–	–100	mA
I_{CM}	peak collector current		–	–200	mA
TR2 (NPN)					
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)		–	100	mA
I_{CM}	peak collector current		–	100	mA
Per device					
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C; note 1	–	300	mW

Note

1. Device mounted on an FR4 printed-circuit board.

THERMAL CHARACTERISTICS

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

Note

1. Device mounted on an FR4 printed-circuit board.

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
TR1 (PNP)						
I_{CBO}	collector cut-off current	V_{CB} = –30 V; I_E = 0	–	–	–100	nA
		V_{CB} = –30 V; I_E = 0; T_j = 150 °C	–	–	–10	µA
I_{EBO}	emitter cut-off current	V_{EB} = –4 V; I_C = 0	–	–	–100	nA
V_{CEsat}	saturation voltage	I_C = –50 mA; I_B = –5 mA; note 1	–	–	–200	mV
h_{FE}	DC current gain	V_{CE} = –6 V; I_C = –1 mA	120	–	–	
C_c	collector capacitance	V_{CB} = –12 V; I_E = i_e = 0; f = 1 MHz	–	–	2.2	pF
f_T	transition frequency	V_{CE} = –12 V; I_C = –2 mA; f = 100 MHz	100	–	–	MHz
TR2 (NPN)						
I_{CBO}	collector-base cut-off current	V_{CB} = 50 V; I_E = 0	–	–	100	nA
I_{CEO}	collector-emitter cut-off current	V_{CE} = 30 V; I_B = 0	–	–	1	µA
		V_{CE} = 30 V; I_B = 0; T_j = 150 °C	–	–	50	µA
I_{EBO}	emitter-base cut-off current	V_{EB} = 5 V; I_C = 0	–	–	120	µA
h_{FE}	DC current gain	V_{CE} = 5 V; I_C = 5 mA	80	–	–	
V_{CEsat}	saturation voltage	I_C = 10 mA; I_B = 0.5 mA	–	–	150	mV
$V_{i(off)}$	input off voltage	V_{CE} = 5 V; I_C = 100 µA	–	0.9	0.5	V
$V_{i(on)}$	input on voltage	V_{CE} = 0.3 V; I_C = 2 mA	2	1.1	–	V
R1	input resistor		15.4	22	28.6	kΩ
$\frac{R2}{R1}$	resistor ratio		1.7	2.1	2.6	
C_c	collector capacitance	V_{CB} = 10 V; I_E = i_e = 0; f = 1 MHz	–	–	2.5	pF

Note

1. Device mounted on an FR4 printed-circuit board.

APPLICATION INFORMATION

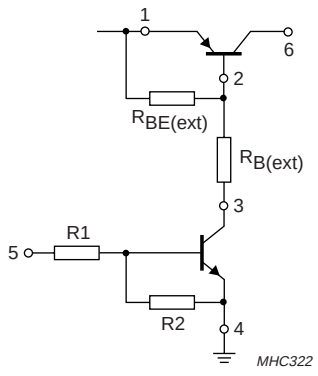
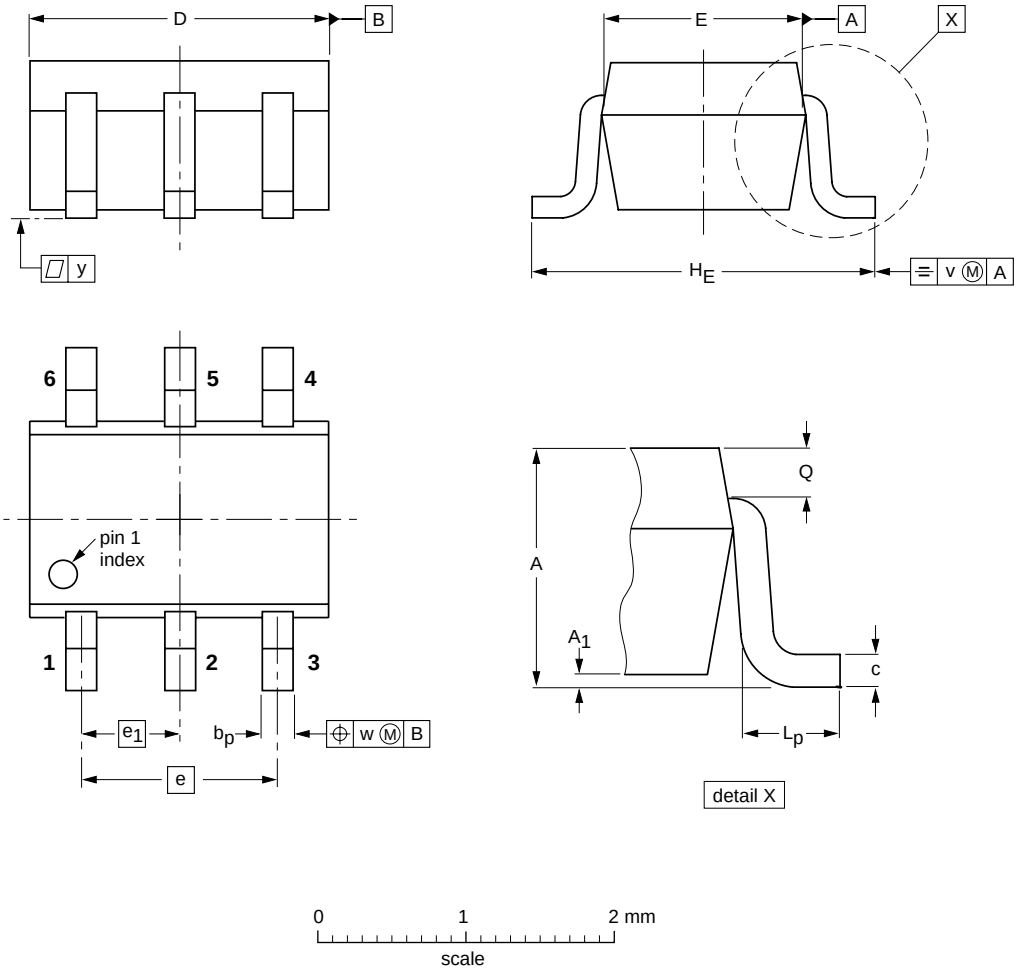


Fig.2 Typical power management circuit.

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

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.

Application information — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

DISCLAIMERS

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 Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

Right to make changes — Philips Semiconductors reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status ‘Production’), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no licence or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

NOTES

Philips Semiconductors – a worldwide company

Contact information

For additional information please visit **http://www.semiconductors.philips.com**. Fax: **+31 40 27 24825**
For sales offices addresses send e-mail to: **sales.addresses@www.semiconductors.philips.com**.

© Koninklijke Philips Electronics N.V. 2002 SCA74

All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner.

The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Printed in The Netherlands 613514/01/pp8 Date of release: 2002 Nov 07 Document order number: 9397 750 10311

Let's make things better.

Philips
Semiconductors

PHILIPS