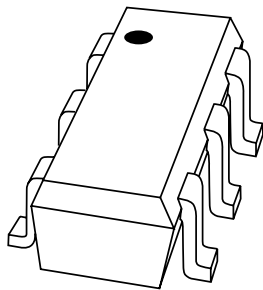


# DATA SHEET



## **PUMF12**

**PNP general purpose transistor;  
NPN resistor-equipped transistor**

Product specification

2002 Nov 07

# 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 <sup>(1)</sup>
PUMF12	R2*

### Note

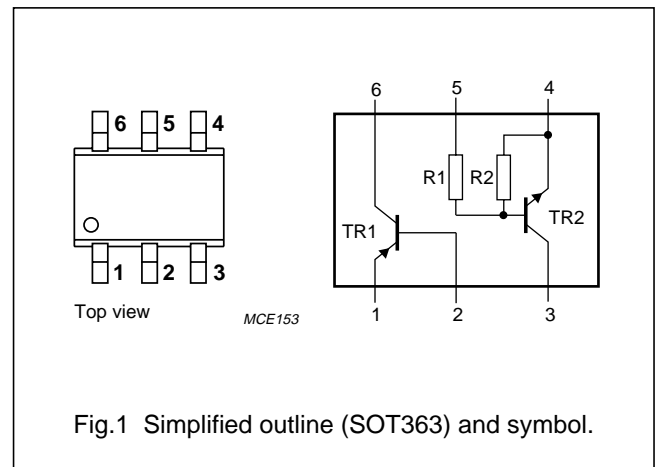
1. \* = p: Made in Hong Kong.  
\* = t: Made in Malaysia.

### QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
<b>TR1 (PNP)</b>			
$V_{CEO}$	collector-emitter voltage	-50	V
$I_C$	collector current (DC)	-100	mA
$I_{CM}$	peak collector current	-200	mA
<b>TR2 (NPN)</b>			
$V_{CEO}$	collector-emitter voltage	50	V
$I_O$	output current (DC)	100	mA
R1	bias resistor	22	k $\Omega$
R2	bias resistor	47	k $\Omega$

### PINNING

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



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**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
<b>Per transistor</b>					
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$ ; 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
<b>TR1 (PNP)</b>					
$V_{CBO}$	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
<b>TR2 (NPN)</b>					
$V_{CBO}$	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		–	+40	V
	negative		–	–10	V
$I_o$	output current (DC)		–	100	mA
$I_{CM}$	peak collector current		–	100	mA
<b>Per device</b>					
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$ ; note 1	–	300	mW

**Note**

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

**THERMAL CHARACTERISTICS**

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

**Note**

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

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**CHARACTERISTICS**

T<sub>amb</sub> = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>TR1 (PNP)</b>						
I <sub>CBO</sub>	collector cut-off current	V <sub>CB</sub> = -30 V; I <sub>E</sub> = 0	-	-	-100	nA
		V <sub>CB</sub> = -30 V; I <sub>E</sub> = 0; T <sub>j</sub> = 150 °C	-	-	-10	μA
I <sub>EBO</sub>	emitter cut-off current	V <sub>EB</sub> = -4 V; I <sub>C</sub> = 0	-	-	-100	nA
V <sub>CEsat</sub>	saturation voltage	I <sub>C</sub> = -50 mA; I <sub>B</sub> = -5 mA; note 1	-	-	-200	mV
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = -6 V; I <sub>C</sub> = -1 mA	120	-	-	
C <sub>c</sub>	collector capacitance	V <sub>CB</sub> = -12 V; I <sub>E</sub> = i <sub>e</sub> = 0; f = 1 MHz	-	-	2.2	pF
f <sub>T</sub>	transition frequency	V <sub>CE</sub> = -12 V; I <sub>C</sub> = -2 mA; f = 100 MHz	100	-	-	MHz
<b>TR2 (NPN)</b>						
I <sub>CBO</sub>	collector-base cut-off current	V <sub>CB</sub> = 50 V; I <sub>E</sub> = 0	-	-	100	nA
I <sub>CEO</sub>	collector-emitter cut-off current	V <sub>CE</sub> = 30 V; I <sub>B</sub> = 0	-	-	1	μA
		V <sub>CE</sub> = 30 V; I <sub>B</sub> = 0; T <sub>j</sub> = 150 °C	-	-	50	μA
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = 5 V; I <sub>C</sub> = 0	-	-	120	μA
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 5 mA	80	-	-	
V <sub>CEsat</sub>	saturation voltage	I <sub>C</sub> = 10 mA; I <sub>B</sub> = 0.5 mA	-	-	150	mV
V <sub>i(off)</sub>	input off voltage	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 100 μA	-	0.9	0.5	V
V <sub>i(on)</sub>	input on voltage	V <sub>CE</sub> = 0.3 V; I <sub>C</sub> = 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 <sub>c</sub>	collector capacitance	V <sub>CB</sub> = 10 V; I <sub>E</sub> = i <sub>e</sub> = 0; f = 1 MHz	-	-	2.5	pF

**Note**

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

**APPLICATION INFORMATION**

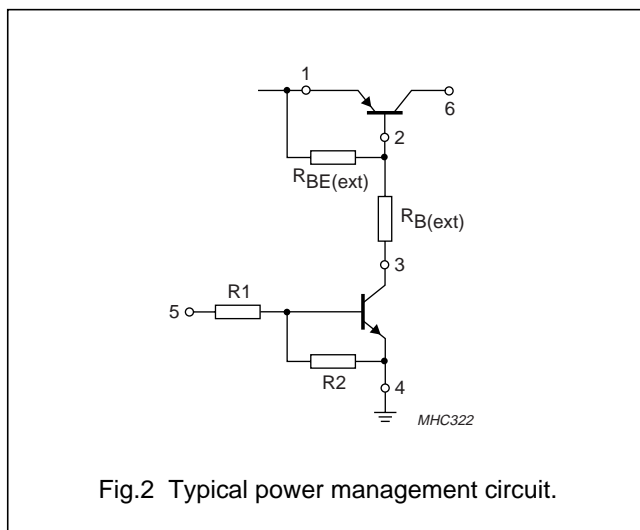


Fig.2 Typical power management circuit.

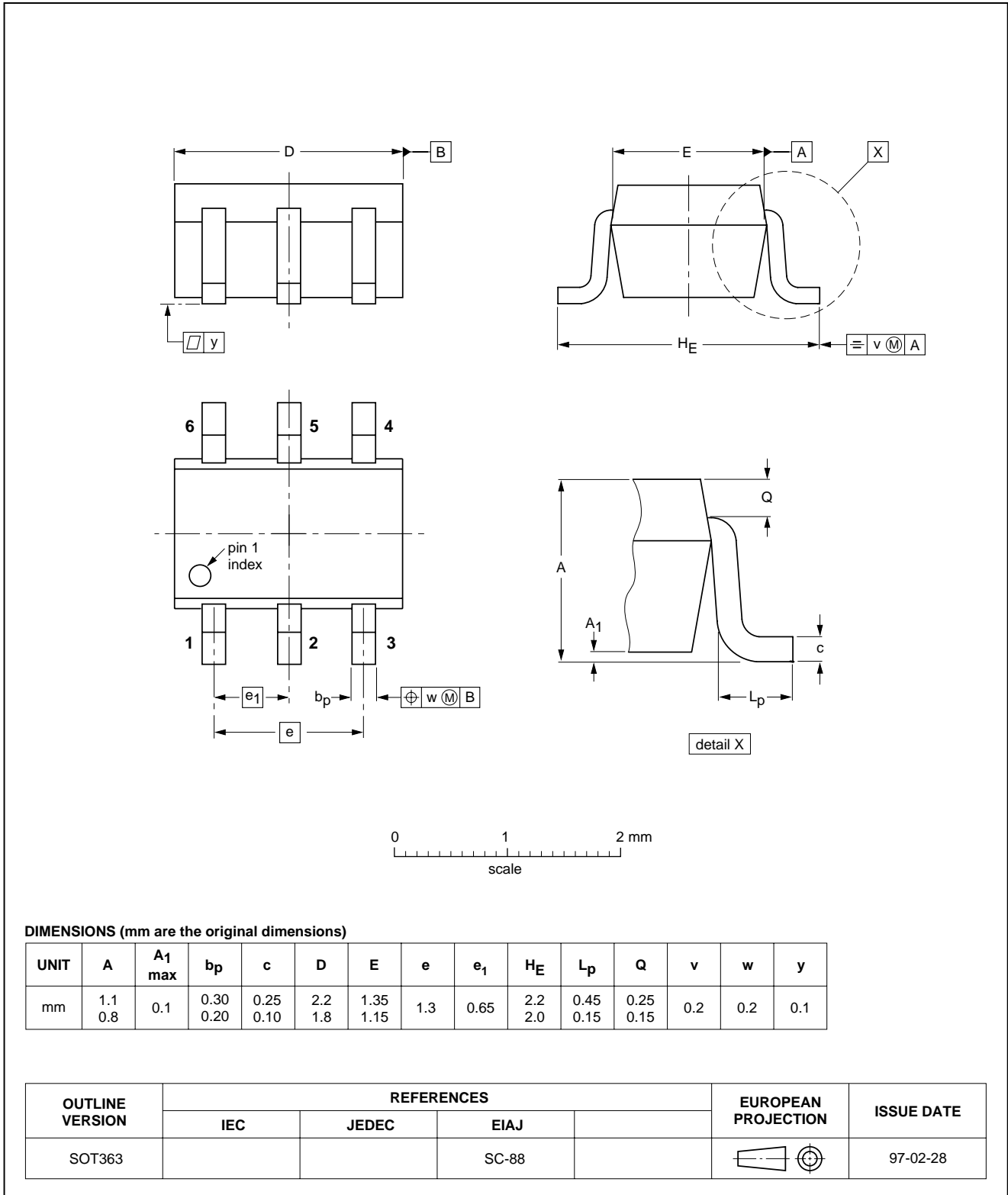
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PACKAGE OUTLINE

Plastic surface mounted package; 6 leads

SOT363



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## DATA SHEET STATUS

LEVEL	DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)(3)</sup>	DEFINITION
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**NOTES**

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