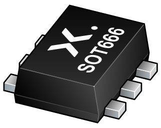


PEMZ7

NPN/PNP general purpose double transistor

29 December 2022 Product data sheet

1. General description

NPN/PNP low V_{CEsat} double transistor in a SOT666 ultra small and flat lead Surface-Mounted Device (SMD)plastic package.

2. Features and benefits

- 300 mW total power dissipation
- Very small 1.6 x 1.2 mm ultra thin package
- Self alignment during soldering due to straight leads
- Low collector capacitance
- Low V_{CEsat}
- High current capabilities
- Improved thermal behaviour due to flat leads
- Reduced required PCB area
- Reduced pick and place costs.

3. Applications

- Heavy duty battery powered equipment (telecom and audio-video) such as lamp drivers
- V_{CEsat} critical applications such as latest low supply voltage IC applications
- All battery driven equipment, to save battery power

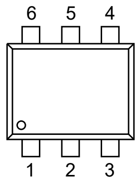
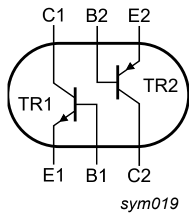
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor; for the PNP transistor with negative polarity							
V_{CEO}	collector-emitter voltage	open base		-	-	12	V
I_C	collector current			-	-	500	mA
h_{FE}	DC current gain	V_{CE} = 2 V; I_C = 10 mA; T_{amb} = 25 °C		200	-	-	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E1	emitter TR1	 **SOT666**	
2	B1	base TR1		
3	C2	collector TR2		
4	E2	emitter TR2		
5	B2	base TR2		
6	C1	collector TR1		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PEMZ7	SOT666	plastic, surface-mounted package; 6 leads; 0.5 mm pitch; 1.6 mm x 1.2 mm x 0.55 mm body	SOT666

7. Marking

Table 4. Marking codes

Type number	Marking code
PEMZ7	Z7

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per transistor; for the PNP transistor with negative polarity						
V_{CBO}	collector-base voltage	open emitter		-	15	V
V_{CEO}	collector-emitter voltage	open base		-	12	V
V_{EBO}	emitter-base voltage	open collector		-	6	V
I_C	collector current			-	500	mA
I_{CM}	peak collector current			-	1	A
I_{BM}	peak base current			-	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	200	mW
Per device						
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	300	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

9. Thermal characteristics

Table 6. Thermal characteristics

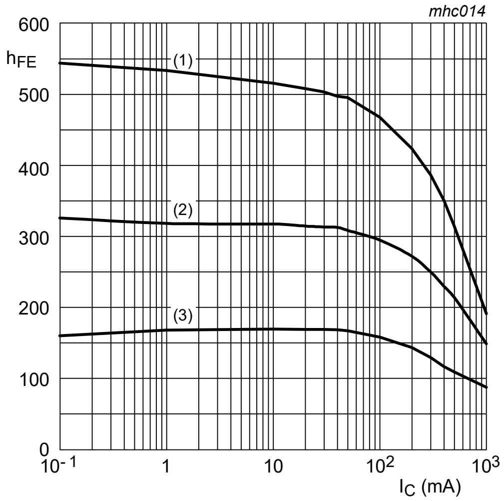
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	416	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Reflow soldering is the only recommended soldering method.

10. Characteristics

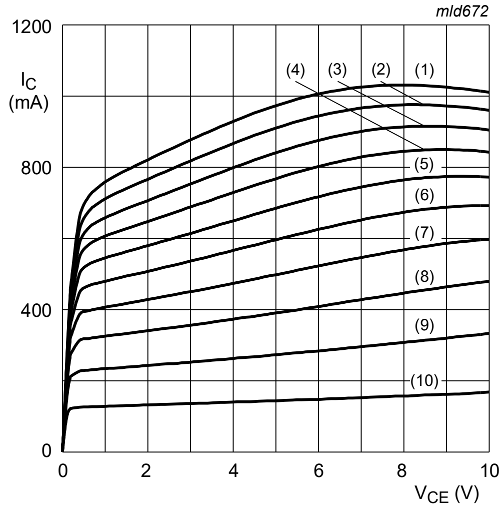
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor; for the PNP transistor with negative polarity							
I_{CBO}	collector-base cut-off current	V_{CB} = 15 V; I_E = 0 A; T_{amb} = 25 °C		-	-	100	nA
		V_{CB} = 15 V; I_E = 0 A; T_j = 150 °C		-	-	50	µA
I_{EBO}	emitter-base cut-off current	V_{EB} = 5 V; I_C = 0 A; T_{amb} = 25 °C		-	-	100	nA
h_{FE}	DC current gain	V_{CE} = 2 V; I_C = 10 mA; T_{amb} = 25 °C		200	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = 200 mA; I_B = 10 mA; pulsed; t_p ≤ 300 µs; δ ≤ 0.02; T_{amb} = 25 °C		-	-	220	mV
Transistor 1 (NPN)							
C_c	collector capacitance	V_{CB} = 10 V; I_E = 0 A; i_e = 0 A; f = 1 MHz; T_{amb} = 25 °C		-	4.4	6	pF
f_T	transition frequency	V_{CE} = 5 V; I_C = 100 mA; f = 100 MHz; T_{amb} = 25 °C		250	420	-	MHz
Transistor 2 (PNP)							
C_c	collector capacitance	V_{CB} = -10 V; I_E = 0 A; i_e = 0 A; f = 1 MHz; T_{amb} = 25 °C		-	-	10	pF
f_T	transition frequency	V_{CE} = -5 V; I_C = -100 mA; f = 100 MHz; T_{amb} = 25 °C		100	280	-	MHz



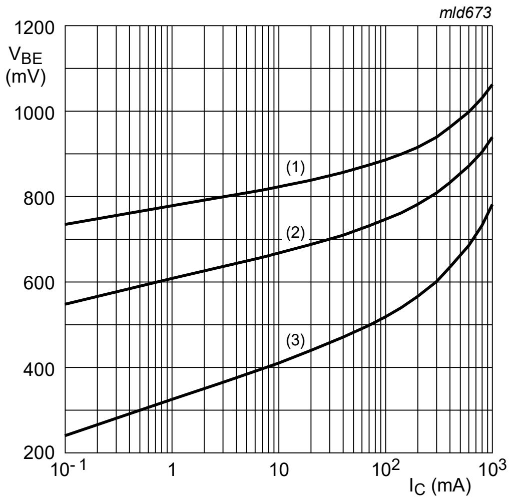
V_{CE} = 2 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −55 °C

Fig. 1. TR1 (NPN): DC current gain as a function of collector current; typical values



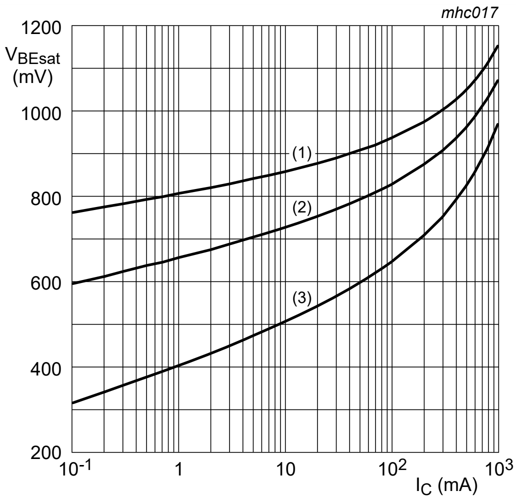
T_{amb} = 25 °C
(1) I_B = 4.60 mA
(2) I_B = 4.14 mA
(3) I_B = 3.68 mA
(4) I_B = 3.22 mA
(5) I_B = 2.76 mA
(6) I_B = 2.30 mA
(7) I_B = 1.84 mA
(8) I_B = 1.38 mA
(9) I_B = 0.92 mA
(10) I_B = 0.46 mA

Fig. 2. TR1 (NPN): Collector current as a function of collector-emitter voltage; typical values



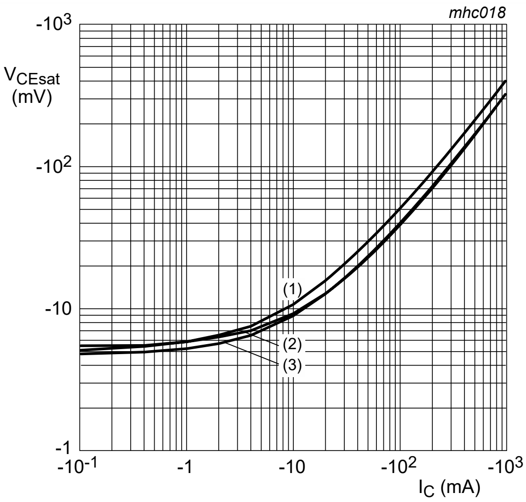
V_{CE} = 2 V
(1) T_{amb} = −55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

Fig. 3. TR1 (NPN): Base-emitter voltage as a function of collector current; typical values



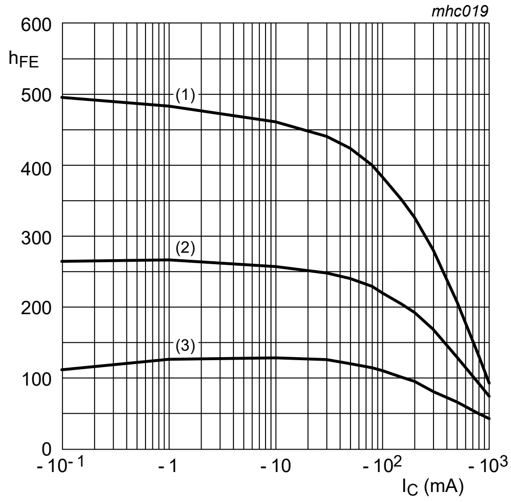
I_C/I_B = 20
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

Fig. 4. TR1 (NPN): Base-emitter saturation voltage as a function of collector current; typical values



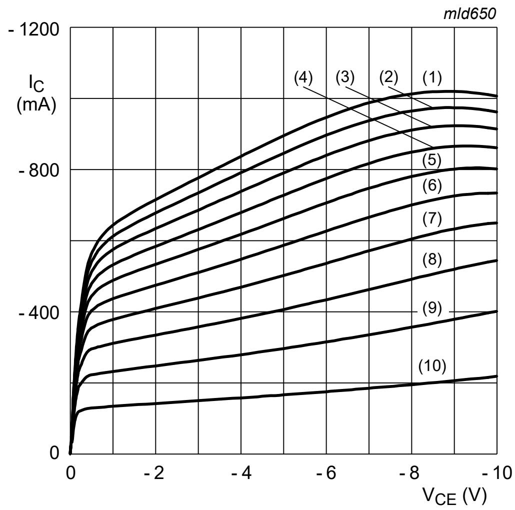
$I_C/I_B = 20$
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −55 °C

Fig. 5. TR1 (NPN): Collector-emitter saturation voltage as a function of collector current; typical values



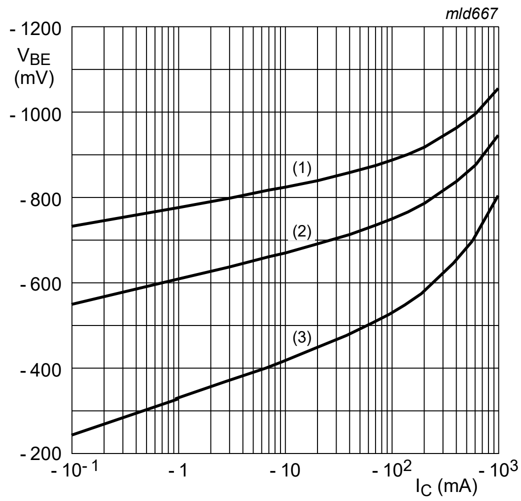
V_{CE} = -2 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

Fig. 6. TR2 (PNP): DC current gain as a function of collector current; typical values



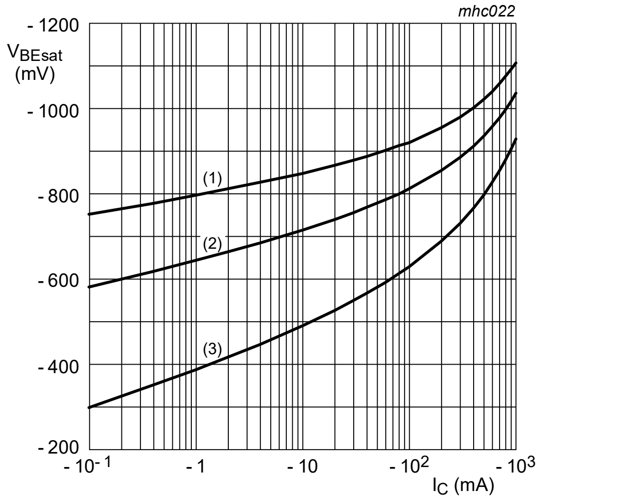
T_{amb} = 25 °C
(1) I_B = -7.0 mA
(2) I_B = -6.3 mA
(3) I_B = -5.6 mA
(4) I_B = -4.9 mA
(5) I_B = -4.2 mA
(6) I_B = -3.5 mA
(7) I_B = -2.8 mA
(8) I_B = -2.1 mA
(9) I_B = -1.4 mA
(10) I_B = -0.7 mA

Fig. 7. TR2 (PNP): Collector current as a function of collector-emitter voltage; typical values



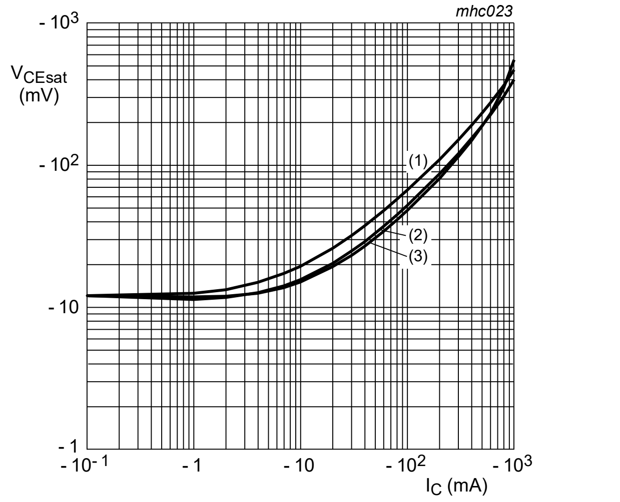
V_{CE} = -2 V
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

Fig. 8. TR2 (PNP): Base-emitter voltage as a function of collector current; typical values



I_C/I_B = 20
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

Fig. 9. TR2 (PNP): Base-emitter saturation voltage as a function of collector current; typical values



I_C/I_B = 20
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

Fig. 10. TR2 (PNP): Collector-emitter saturation voltage as a function of collector current; typical values

11. Package outline

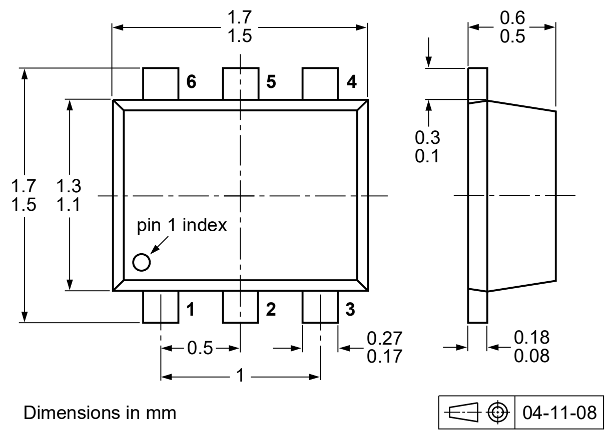


Fig. 11. Package outline SOT666

12. Soldering

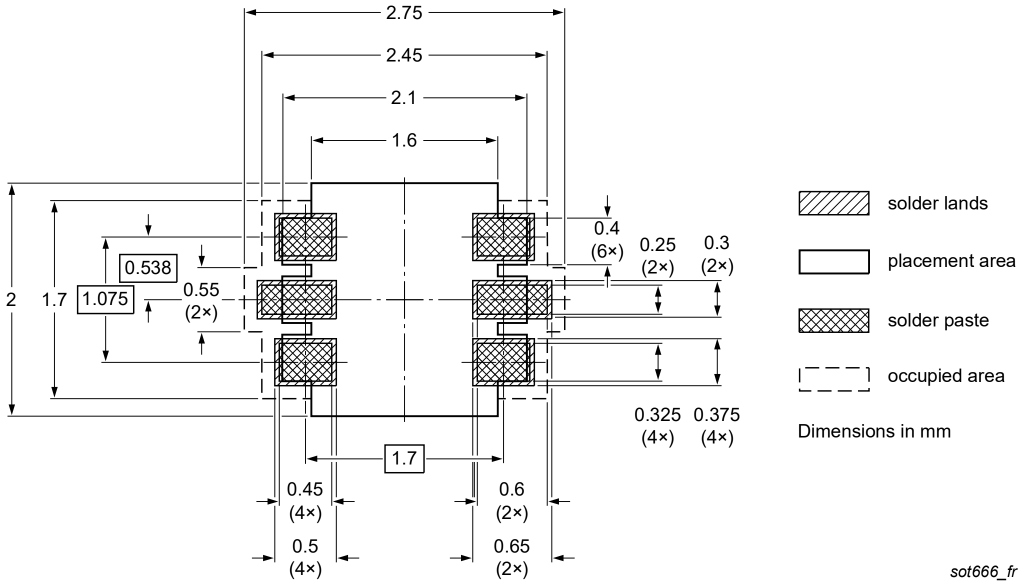


Fig. 12. Reflow soldering footprint for SOT666

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PEMZ7 v.3	20221229	Product data sheet	-	PEMZ7 v.2
Modifications:	• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. • Legal texts have been adapted to the new company name where appropriate. • Product(s) changed to non-automotive qualification.			
PEMZ7 v.2	20011107	Product data sheet	-	PEMZ7 v.1
PEMZ7 v.1	20010925	Product data sheet	-	-

14. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
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Date of release: 29 December 2022