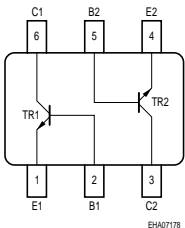
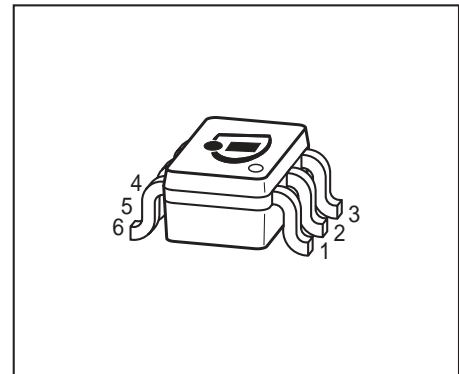


**NPN Silicon AF Transistor Array**

- Precision matched transistor pair:  $\Delta I_C \leq 10\%$
- For current mirror applications
- Low collector-emitter saturation voltage
- Two (galvanic) internal isolated Transistors
- Complementary type: BCM856S
- BCM846S: For orientation in reel see package information below
- Pb-free (RoHS compliant) package<sup>1)</sup>
- Qualified according AEC Q101



Type	Marking	Pin Configuration					Package
		1=E1	2=B1	3=C2	4=E2	5=B2	
BCM846S	1Ms						SOT363

**Maximum Ratings**

Parameter	Symbol	Value	Unit
Collector-emitter voltage	$V_{CEO}$	65	V
Collector-emitter voltage	$V_{CES}$	80	
Collector-base voltage	$V_{CBO}$	80	
Emitter-base voltage	$V_{EBO}$	6	
Collector current	$I_C$	100	mA
Peak collector current	$I_{CM}$	200	
Total power dissipation- $T_S = 115\text{ °C}$	$P_{tot}$	250	mW
Junction temperature	$T_j$	150	
Storage temperature	$T_{stg}$	-65 ... 150	

<sup>1</sup>Pb-containing package may be available upon special request

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>1)</sup>	$R_{thJS}$	140	K/W

**Electrical Characteristics at  $T_A = 25^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

**DC Characteristics**

Collector-emitter breakdown voltage $I_C = 10 \text{ mA}, I_B = 0 \text{ A}$	$V_{(BR)CEO}$	65	-	-	V
Collector-base breakdown voltage $I_C = 10 \mu\text{A}, I_E = 0 \text{ A}$	$V_{(BR)CBO}$	80	-	-	
Collector-emitter breakdown voltage $I_C = 10 \mu\text{A}, V_{BE} = 0 \text{ A}$	$V_{(BR)CES}$	80	-	-	
Emitter-base breakdown voltage $I_E = 10 \mu\text{A}, I_C = 0 \text{ A}$	$V_{(BR)EBO}$	6	-	-	
Collector-base cutoff current $V_{CB} = 30 \text{ V}, I_E = 0 \text{ A}$ $V_{CB} = 30 \text{ V}, I_E = 0 \text{ A}, T_A = 150^\circ\text{C}$	$I_{CBO}$	-	-	0.015 5	$\mu\text{A}$
DC current gain <sup>-2)</sup> $I_C = 10 \mu\text{A}, V_{CE} = 5 \text{ V}$ $I_C = 2 \text{ mA}, V_{CE} = 5 \text{ V}$	$h_{FE}$	- 200	250 290	- 450	-
Collector-emitter saturation voltage <sup>2)</sup> $I_C = 10 \text{ mA}, I_B = 0.5 \text{ mA}$ $I_C = 100 \text{ mA}, I_B = 5 \text{ mA}$	$V_{CEsat}$	-	90 200	300 650	mV
Base emitter saturation voltage <sup>2)</sup> $I_C = 10 \text{ mA}, I_B = 0.5 \text{ mA}$ $I_C = 100 \text{ mA}, I_B = 5 \text{ mA}$	$V_{BEsat}$	-	700 900	- -	
Base-emitter voltage <sup>-2)</sup> $I_C = 2 \text{ mA}, V_{CE} = 5 \text{ V}$ $I_C = 10 \text{ mA}, V_{CE} = 5 \text{ V}$	$V_{BE(ON)}$	580 -	660 -	700 770	
Matching $I_B = 1 \mu\text{A}, V_{CE1} = V_{CE2} = 1.0\text{V}$ $I_B = 100 \mu\text{A}, V_{CE1} = V_{CE2} = 1.0\text{V}$	$\Delta I_C$	-10 -10	- -	10 10	%

<sup>1</sup>For calculation of  $R_{thJA}$  please refer to Application Note Thermal Resistance

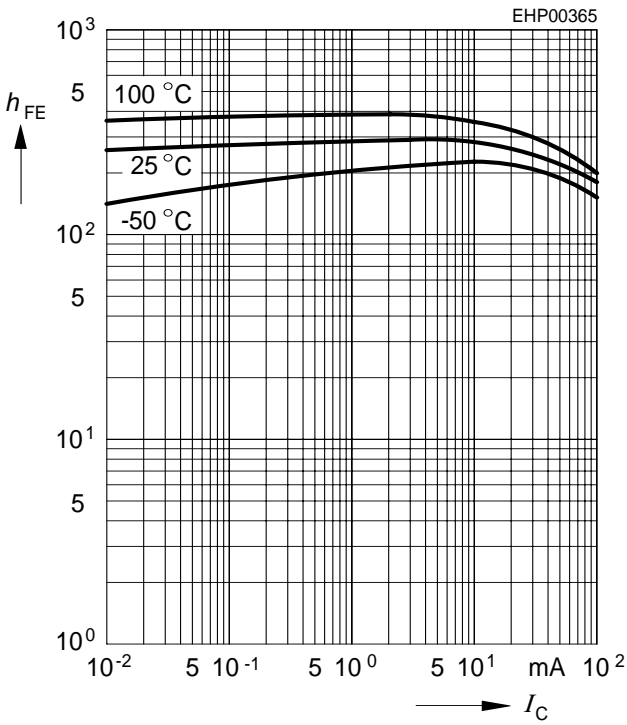
<sup>2</sup>Puls test:  $t < 300\mu\text{s}; D < 2\%$

**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics</b>					
Transition frequency $I_C = 20\text{ mA}, V_{CE} = 5\text{ V}, f = 100\text{ MHz}$	$f_T$	-	250	-	MHz
Collector-base capacitance $V_{CB} = 10\text{ V}, f = 1\text{ MHz}$	$C_{cb}$	-	0.95	-	pF
Emitter-base capacitance $V_{EB} = 0.5\text{ V}, f = 1\text{ MHz}$	$C_{eb}$	-	9	-	
Short-circuit input impedance $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}, f = 1\text{ kHz}$	$h_{11e}$	-	4.5	-	$k\Omega$
Open-circuit reverse voltage transf. ratio $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}, f = 1\text{ kHz}$	$h_{12e}$	-	2	-	$10^{-4}$
Short-circuit forward current transf. ratio $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}, f = 1\text{ kHz}$	$h_{21e}$	-	330	-	-
Open-circuit output admittance $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}, f = 1\text{ kHz}$	$h_{22e}$	-	30	-	$\mu\text{S}$
Noise figure $I_C = 200\text{ }\mu\text{A}, V_{CE} = 5\text{ V}, f = 1\text{ kHz},$ $\Delta f = 200\text{ Hz}, R_S = 2\text{ k}\Omega$	$F$	-	-	10	dB

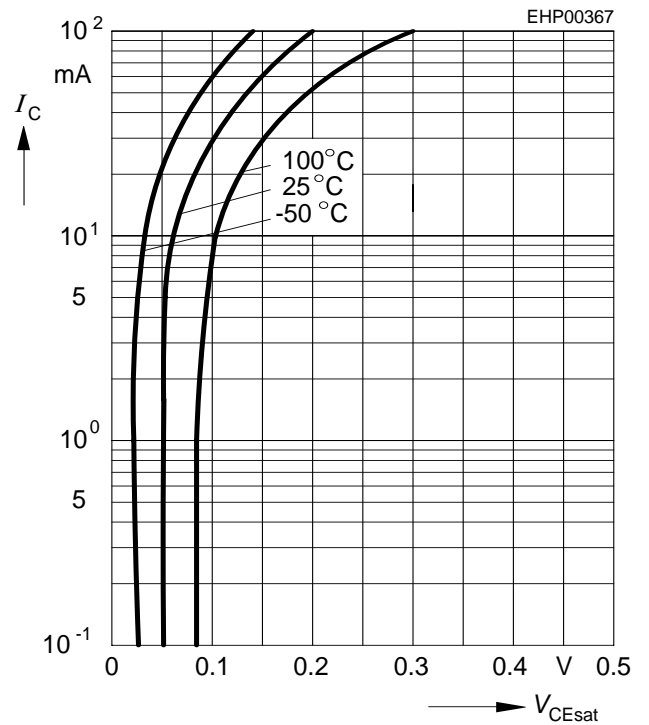
**DC current gain  $h_{FE} = f(I_C)$**

$V_{CE} = 5V$



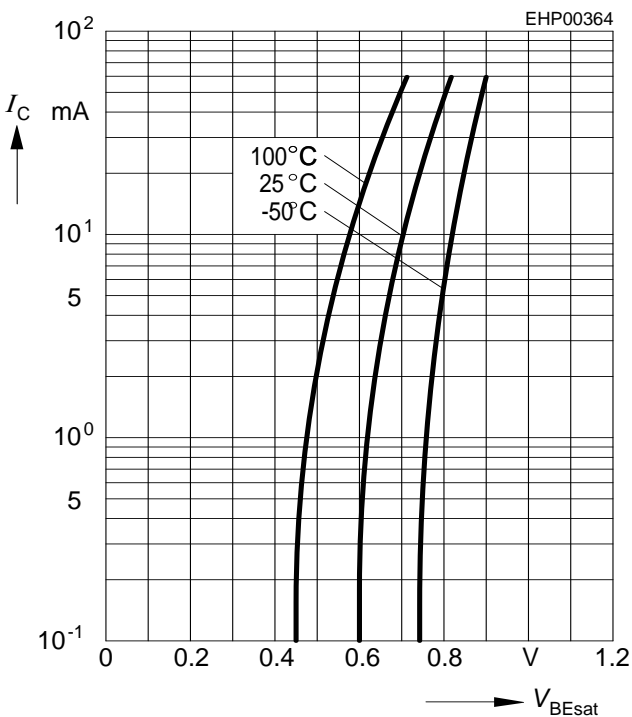
**Collector-emitter saturation voltage**

$I_C = f(V_{CEsat}), h_{FE} = 20$



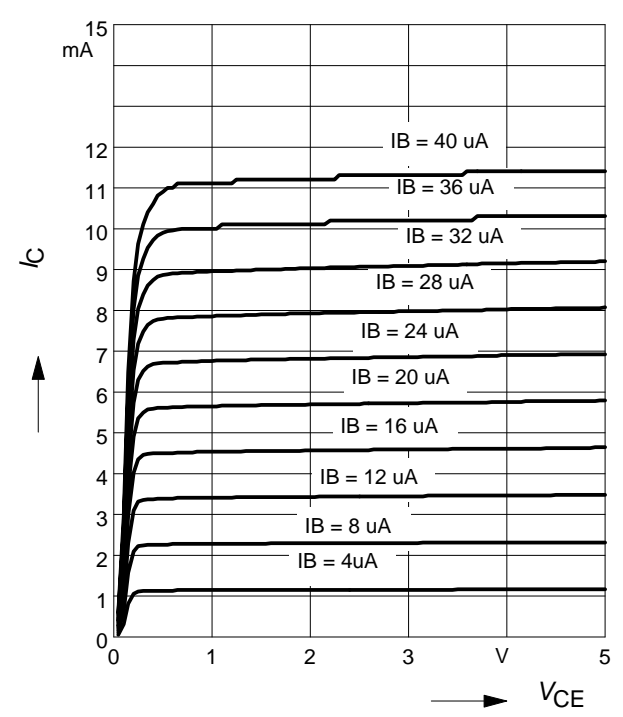
**Base-emitter saturation voltage**

$I_C = f(V_{BEsat}), h_{FE} = 20$

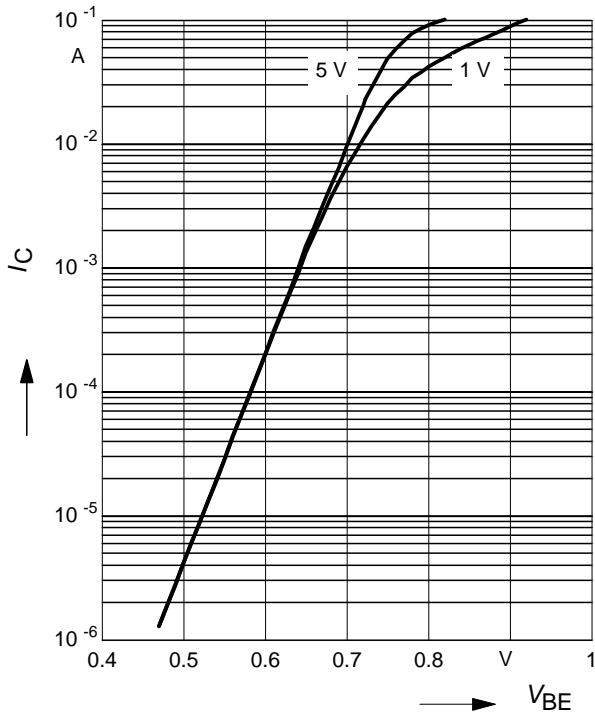


**Output characteristics  $I_C = f(V_{CE})$ ,**

$I_B = \text{parameter}$

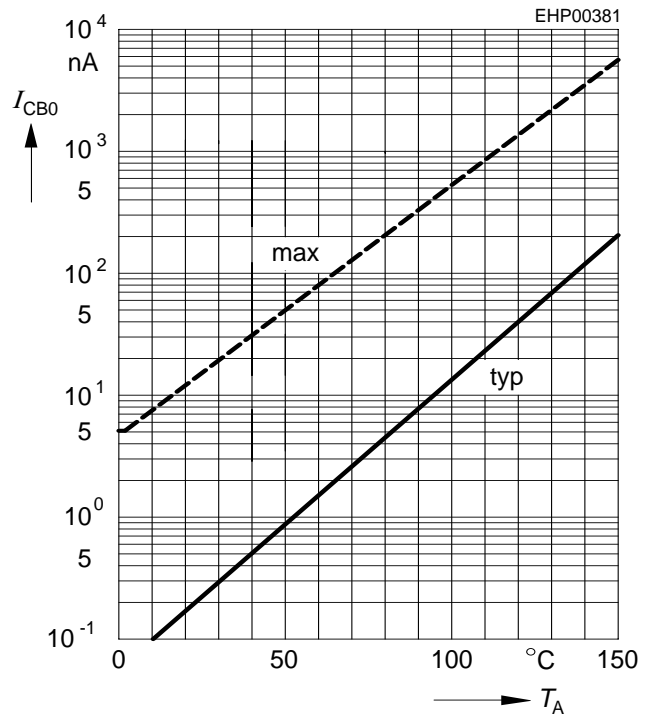


**Collector current  $I_C = f(V_{BE})$**



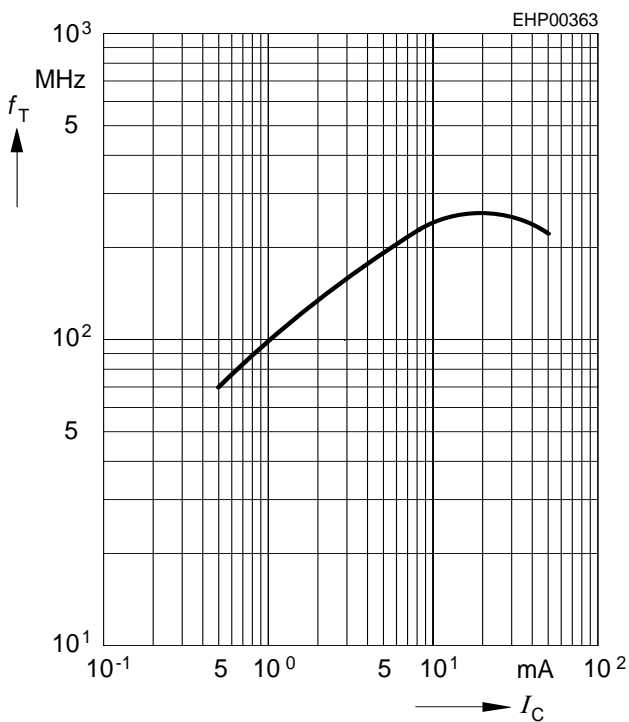
**Collector cutoff current  $I_{CBO} = f(T_A)$**

$V_{CBO} = 30 V$



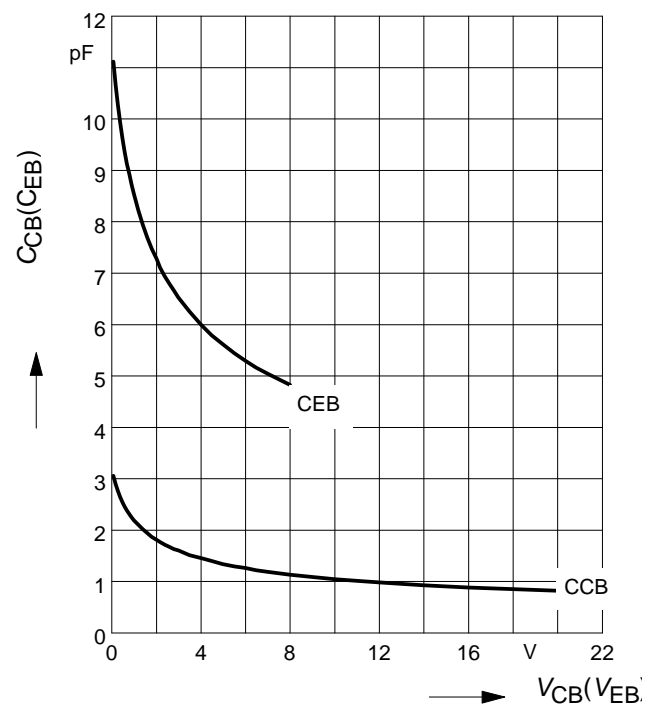
**Transition frequency  $f_T = f(I_C)$**

$V_{CE} = \text{parameter in V, } f = 2 \text{ GHz}$

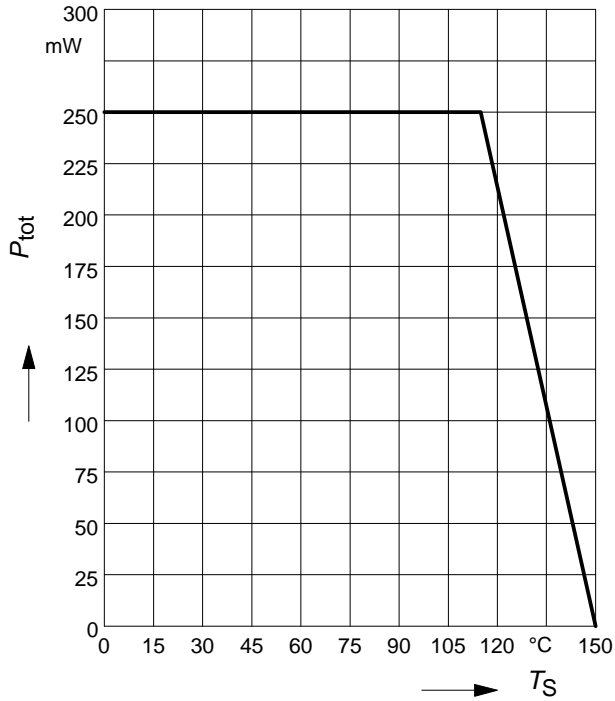


**Collector-base capacitance  $C_{cb} = f(V_{CB})$**

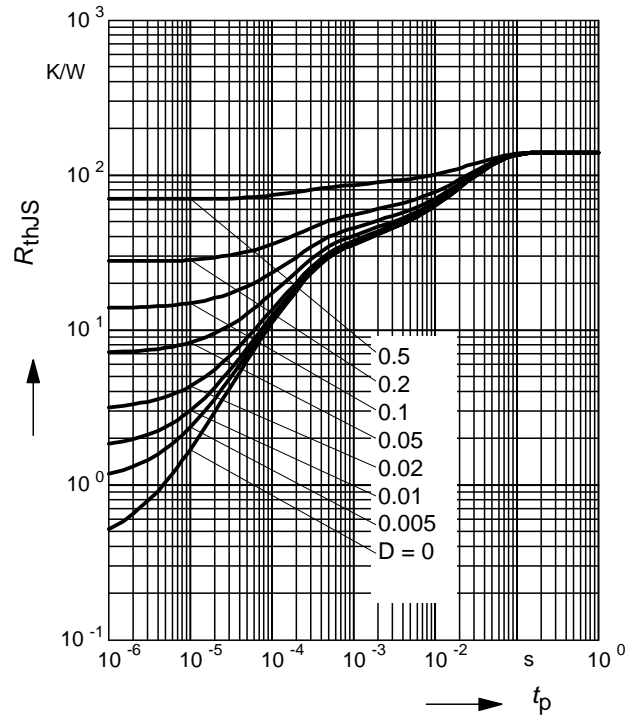
**Emitter-base capacitance  $C_{eb} = f(V_{EB})$**



**Total power dissipation  $P_{tot} = f(T_S)$**

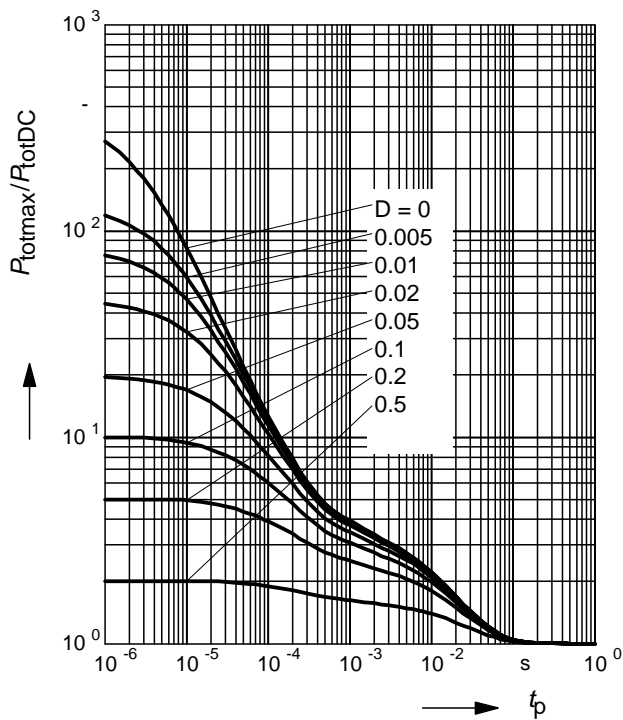


**Permissible Pulse Load  $R_{thJS} = f(t_p)$**



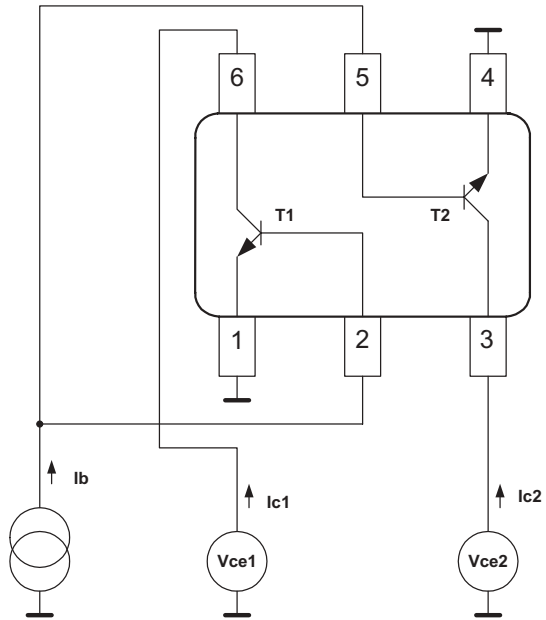
**Permissible Pulse Load**

$P_{totmax}/P_{totDC} = f(t_p)$

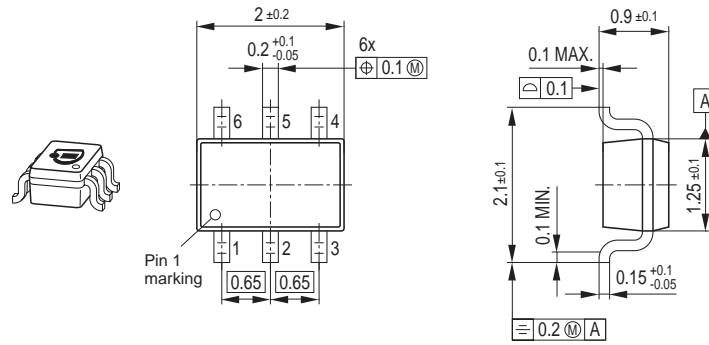


**Definition of matching**

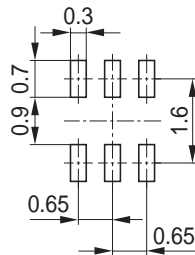
$$\Delta I_C = (I_{C2} - I_{C1}) / I_{C1}$$



### Package Outline

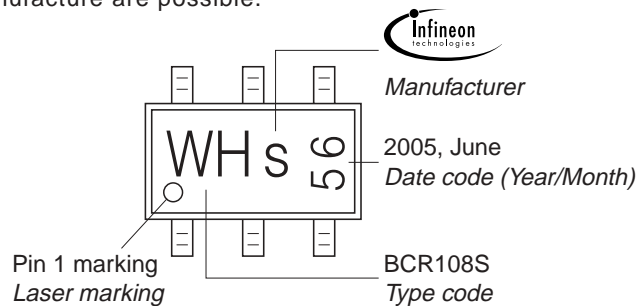


### Foot Print



### Marking Layout (Example)

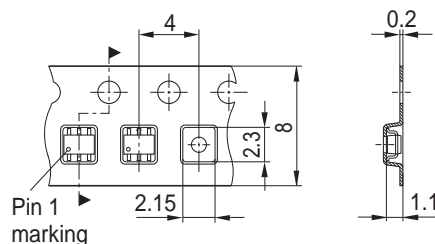
Small variations in positioning of Date code, Type code and Manufacture are possible.



### Standard Packing

Reel  $\varnothing$ 180 mm = 3.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 10.000 Pieces/Reel

For symmetric types no defined Pin 1 orientation in reel.





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