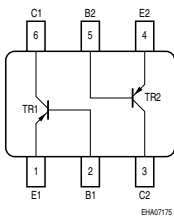
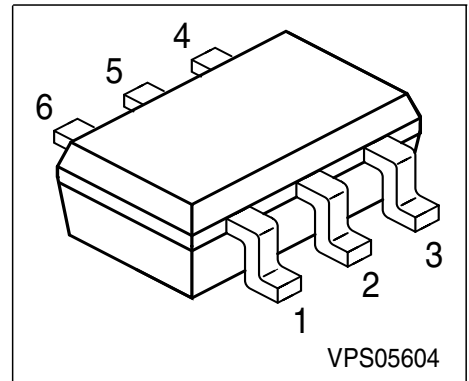


**PNP Silicon AF Transistor Array**

- 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: BCM846S



Type	Marking	Pin Configuration					Package	
BCM856S	3Ms	1=E1	2=B1	3=C2	4=E2	5=B2	6=C1	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	$V_{EBO}$	5	
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	°C
Storage temperature	$T_{stg}$	-65 ... 150	

**Thermal Resistance**

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

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

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>DC Characteristics</b>					
Collector-emitter breakdown voltage $I_C = 10\text{ mA}, I_B = 0\text{ A}$	$V_{(BR)CEO}$	65	-	-	V
Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}, I_E = 0\text{ A}$	$V_{(BR)CBO}$	80	-	-	
Collector-emitter breakdown voltage $I_C = 10\text{ }\mu\text{A}, V_{BE} = 0\text{ A}$	$V_{(BR)CES}$	80	-	-	
Emitter-base breakdown voltage $I_E = 10\text{ }\mu\text{A}, I_C = 0\text{ A}$	$V_{(BR)EBO}$	5	-	-	
Collector-base cutoff current $V_{CB} = 30\text{ V}, I_E = 0\text{ A}$ $V_{CB} = 30\text{ V}, I_E = 0\text{ A}, T_A = 150\text{ }^\circ\text{C}$	$I_{CBO}$	- -	- -	15 5	nA
DC current gain <sup>-1)</sup> $I_C = 10\text{ }\mu\text{A}, V_{CE} = 5\text{ V}$ $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}$	$h_{FE}$	- 200	250 290	- 450	-
Collector-emitter saturation voltage <sup>1)</sup> $I_C = 10\text{ mA}, I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}, I_B = 5\text{ mA}$	$V_{CEsat}$	- -	90 250	300 650	mV
Base emitter saturation voltage <sup>1)</sup> $I_C = 10\text{ mA}, I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}, I_B = 5\text{ mA}$	$V_{BEsat}$	- -	700 850	- -	mV mV
Base-emitter voltage <sup>-1)</sup> $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}$ $I_C = 10\text{ mA}, V_{CE} = 5\text{ V}$	$V_{BE(ON)}$	600 -	650 -	750 820	
Matching $I_B = 1\text{ }\mu\text{A}, V_{CE1} = V_{CE2} = 1.0\text{V}$ $I_B = 100\text{ }\mu\text{A}, V_{CE1} = V_{CE2} = 1.0\text{V}$	$\Delta I_C$	-10 -10	- -	10 10	%

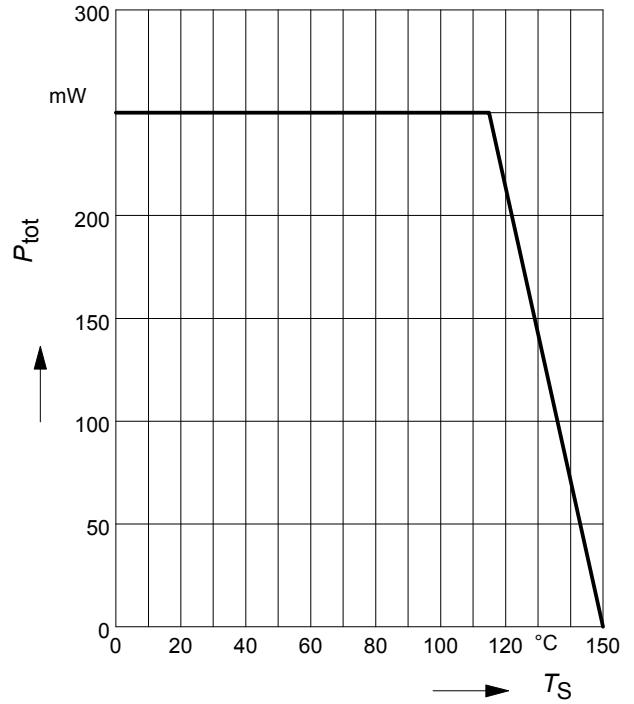
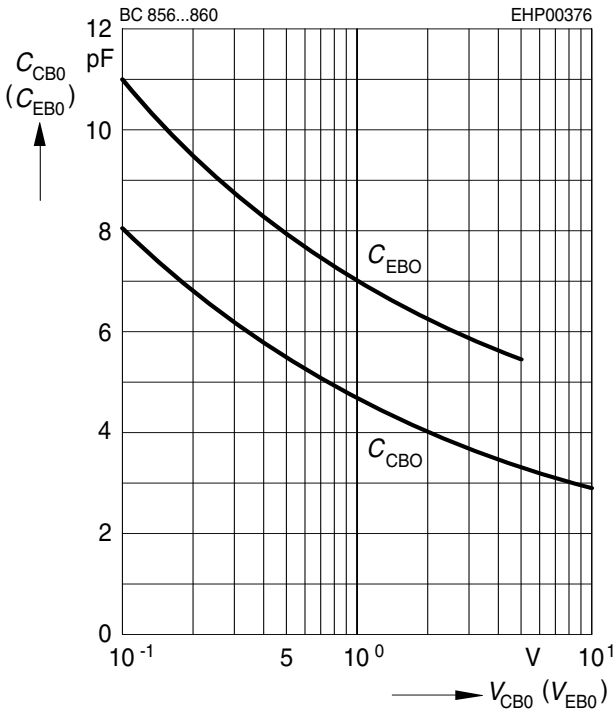
<sup>1</sup>Puls test:  $t < 300\mu\text{s}; D < 2\%$

**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 $V_{CB} = 10\text{ V}, f = 1\text{ MHz}$	$C_{cb}$	-	3	-	pF
Emitter-base capacitance $V_{EB} = 0.5\text{ V}, f = 1\text{ MHz}$	$C_{eb}$	-	8	-	
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 <sup>-4</sup>
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

Collector-base capacitance  $C_{CB} = f(V_{CB0})$   
 Emitter-base capacitance  $C_{EB} = f(V_{EB0})$

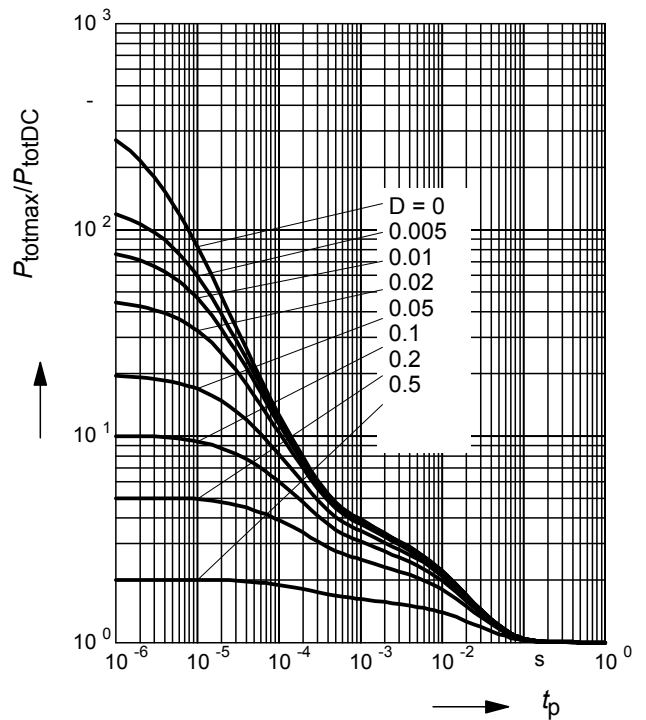
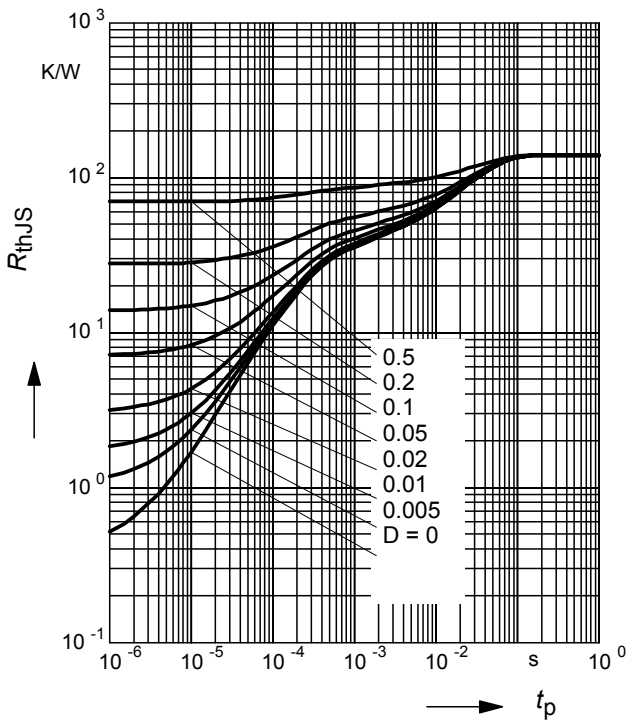
Total power dissipation  $P_{tot} = f(T_S)$



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

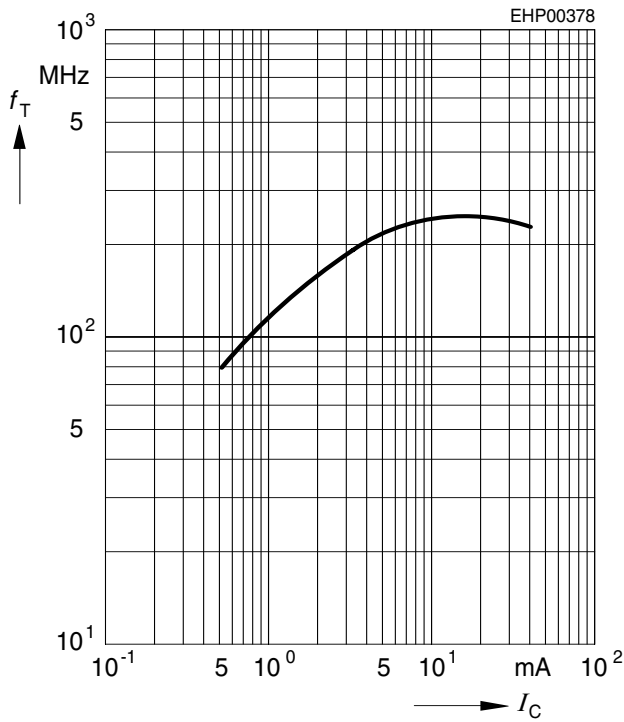
Permissible Pulse Load

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



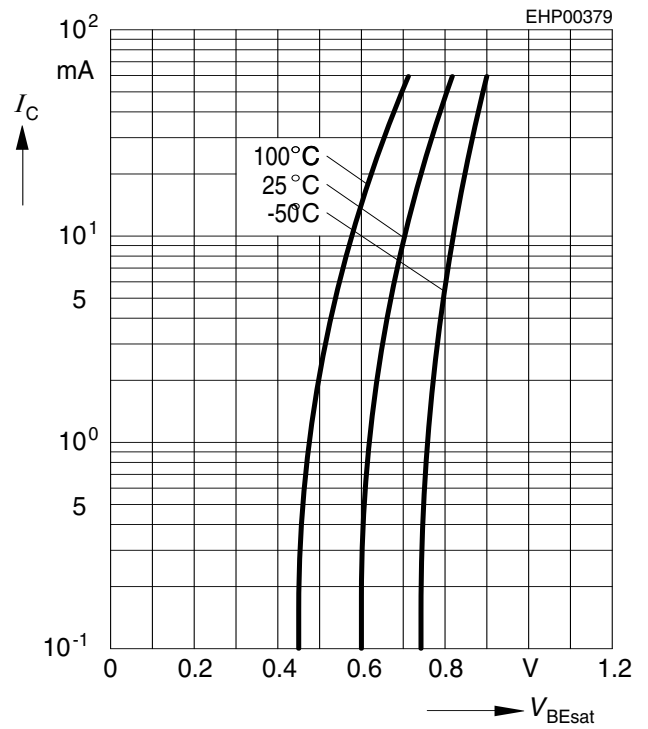
**Transition frequency  $f_T = f(I_C)$**

$V_{CE} = 5\text{ V}$



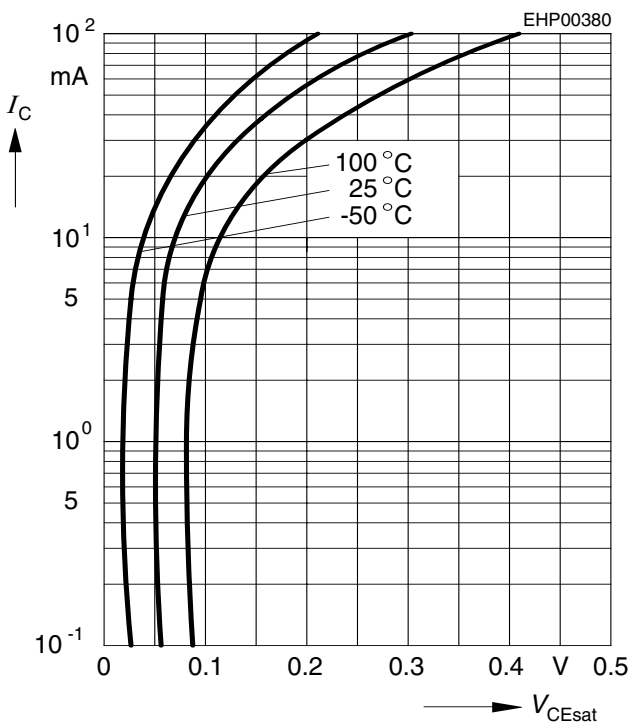
**Base-emitter saturation voltage**

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



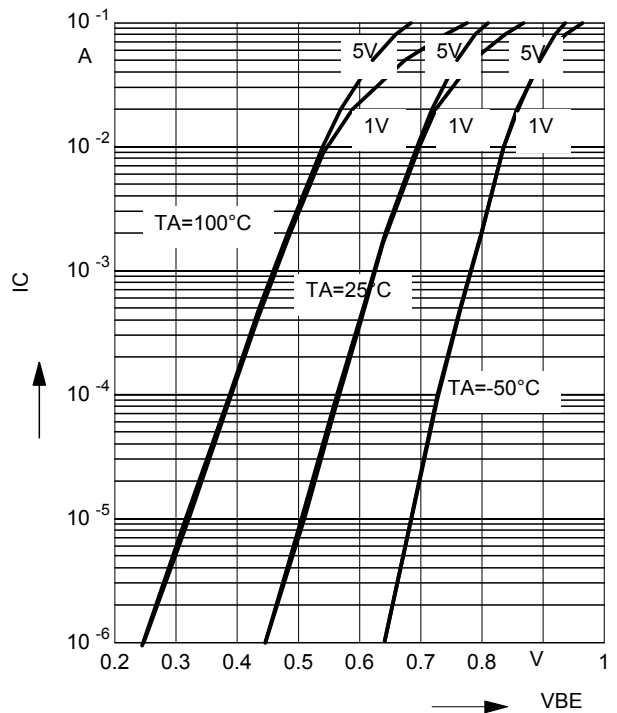
**Collector-emitter saturation voltage**

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



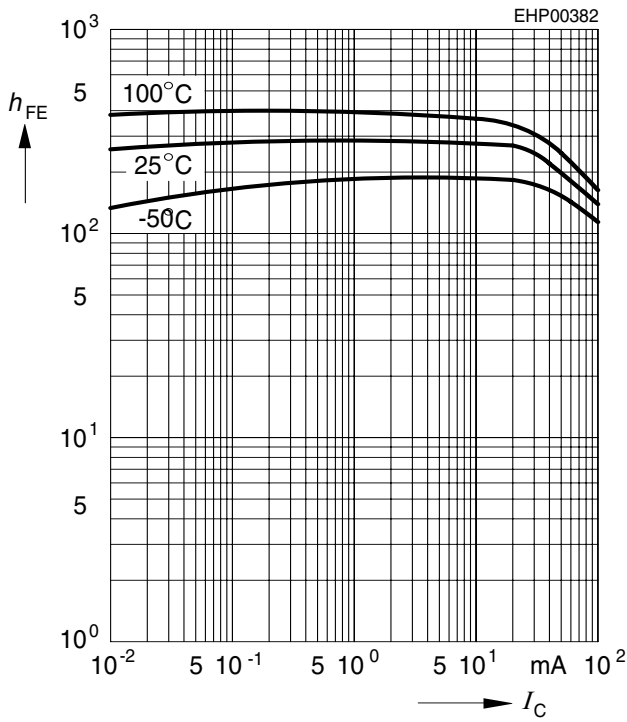
**Collector current  $I_C = f(V_{BE})$**

$V_{CE} = \text{Parameter}$



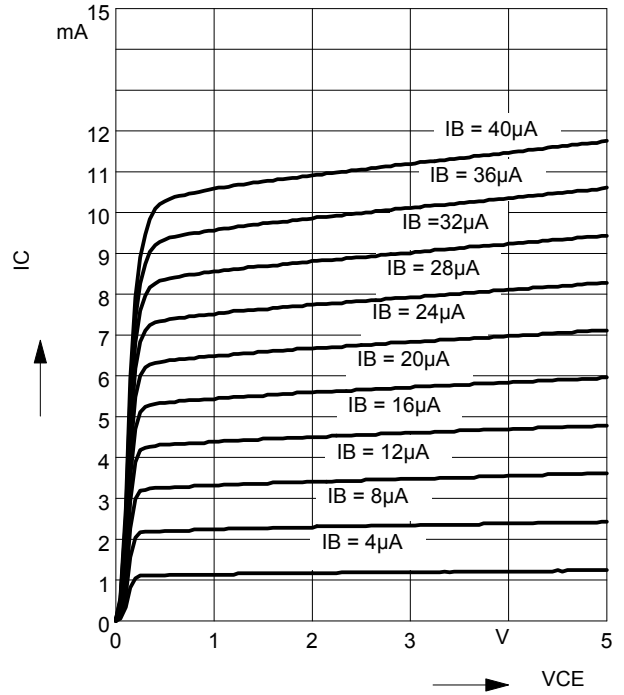
**DC current gain  $h_{FE} = f(I_C)$**

$V_{CE} = 5V$



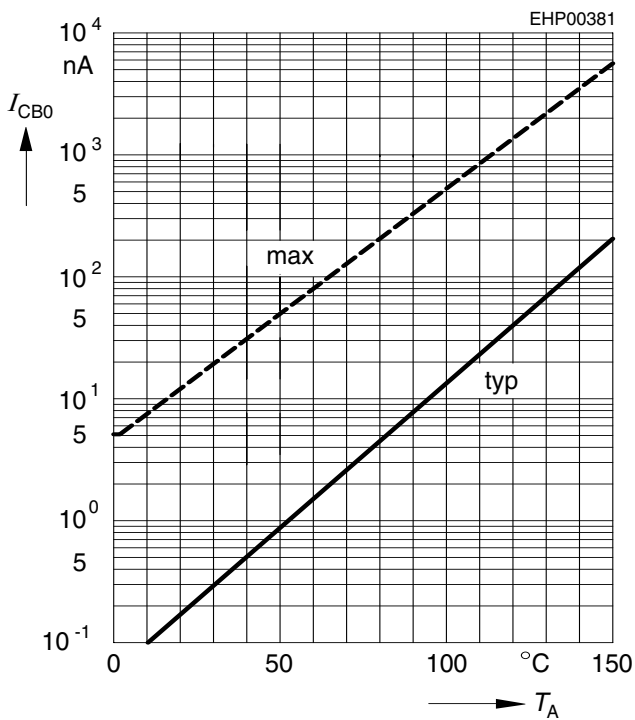
**Output characteristics  $I_C = f(V_{CE})$ ,**

$I_B = \text{parameter}$



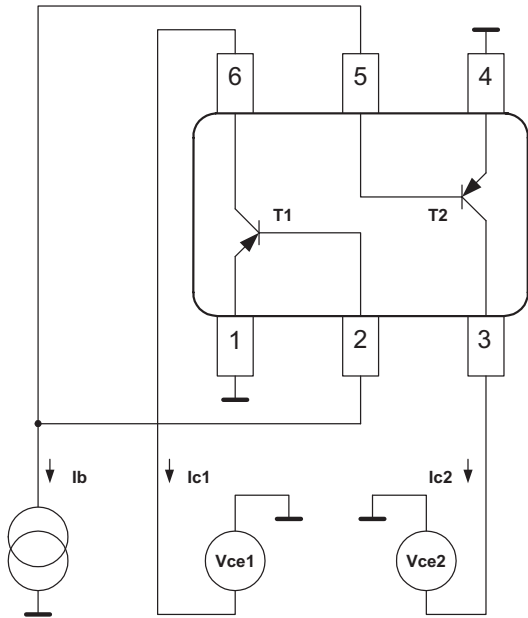
**Collector cutoff current  $I_{CBO} = f(T_A)$**

$V_{CBO} = 30V$



**Definition of matching**

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



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