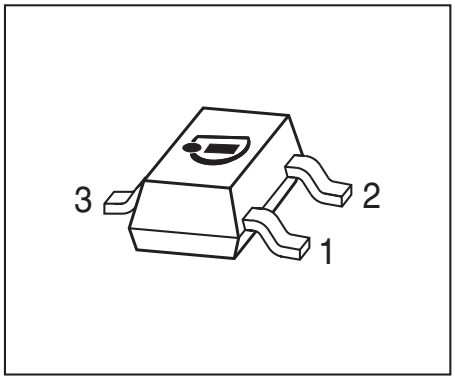
NPN Silicon Darlington Transistor



- High collector current
- Low collector-emitter saturation voltage
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101

AEC Qualified RoHS

Type	Marking	Pin Configuration			Package
SMBTA14/MMBTA14	s1N	1=B	2=E	3=C	SOT23

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CES}	30	V
Collector-base voltage	V_{CBO}	30	
Emitter-base voltage	V_{EBO}	10	
Collector current	I_C	300	mA
Peak collector current, $t_p \leq 10$ ms	I_{CM}	500	
Base current	I_B	100	
Peak base current	I_{BM}	200	
Total power dissipation- $T_S \leq 81$ °C	P_{tot}	330	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[1)]	R_{thJS}	≤ 210	K/W

[1]For calculation of R_{thJA} please refer to Application Note AN077 (Thermal Resistance Calculation)

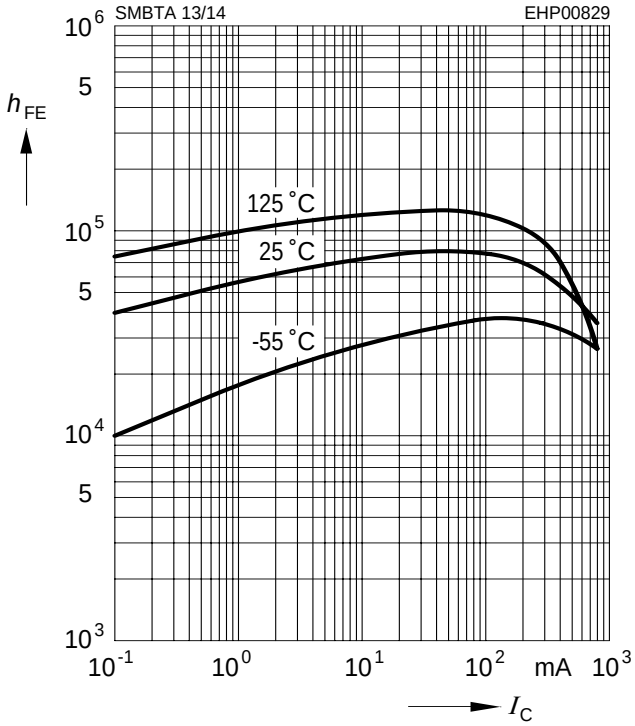
Electrical Characteristics at T_A = 25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-base breakdown voltage I_C = 10 µA, I_E = 0	$V_{(BR)CBO}$	30	-	-	V
Collector-emitter breakdown voltage I_C = 10 µA, V_{BE} = 0	$V_{(BR)CES}$	30	-	-	
Emitter-base breakdown voltage I_E = 10 µA, I_C = 0	$V_{(BR)EBO}$	10	-	-	
Collector-base cutoff current V_{CB} = 30 V, I_E = 0 V_{CB} = 30 V, I_E = 0 , T_A = 150 °C	I_{CBO}	 - -	 - -	 0.1 10	µA
Emitter-base cutoff current V_{EB} = 10 V, I_C = 0	I_{EBO}	-	-	100	nA
DC current gain[1)] I_C = 10 mA, V_{CE} = 5 V I_C = 100 mA, V_{CE} = 5 V	h_{FE}	 10000 20000	 - -	 - -	-
Collector-emitter saturation voltage[1)] I_C = 100 mA, I_B = 0.1 mA	V_{CEsat}	-	-	1.5	V
Base emitter saturation voltage[1)] I_C = 100 mA, I_B = 0.1 mA	V_{BEsat}	-	-	2	
AC Characteristics					
Transition frequency I_C = 50 mA, V_{CE} = 5 V, f = 20 MHz	f_T	125	-	-	MHz
Collector-base capacitance V_{CB} = 10 V, f = 100 MHz	C_{cb}	-	3	-	pF

[1]Pulse test: t < 300µs; D < 2%

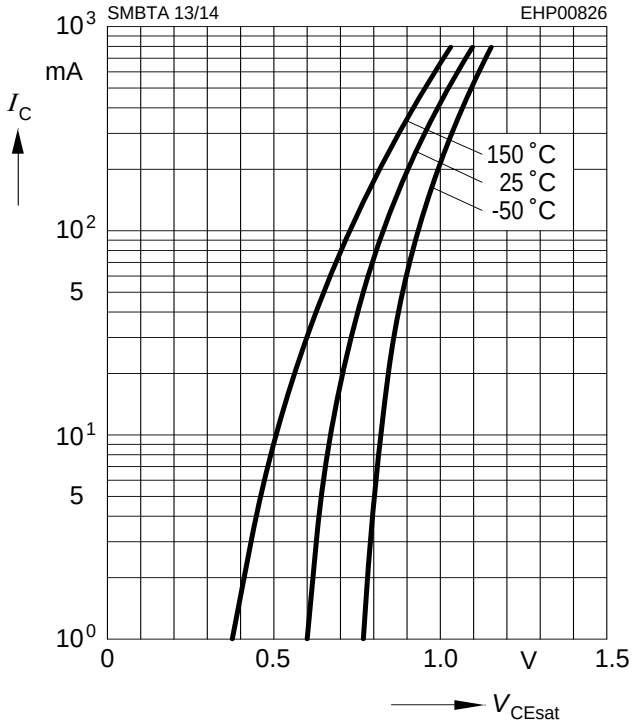
DC current gain $h_{FE} = f(I_C)$

V_{CE} = 5 V



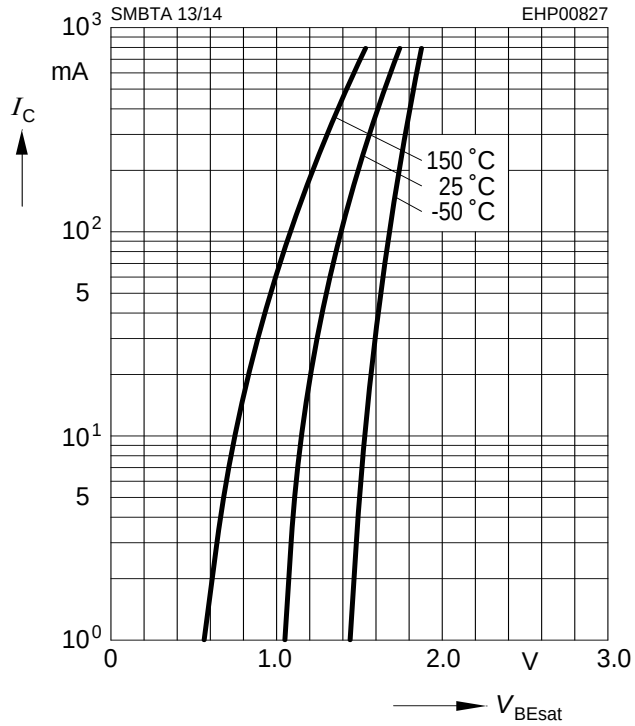
Collector-emitter saturation voltage

$I_C = f(V_{CEsat})$, h_{FE} = 1000



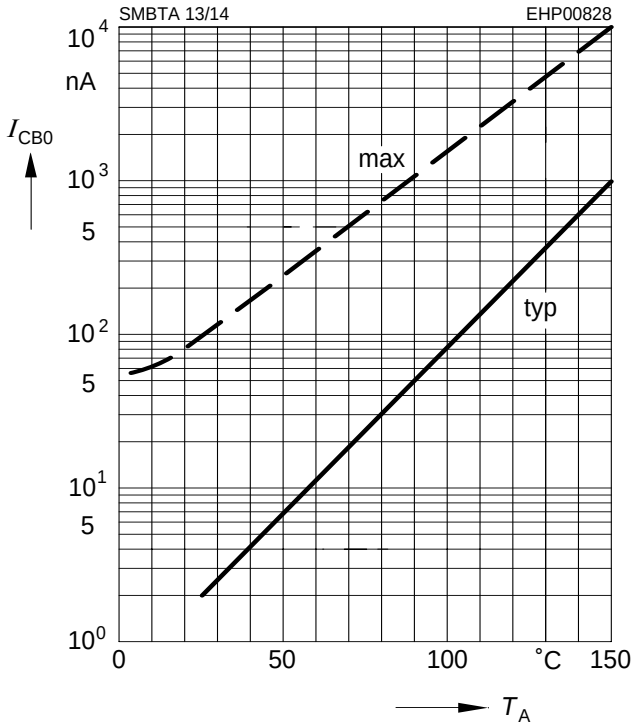
Base-emitter saturation voltage

$I_C = f(V_{BEsat})$, h_{FE} = 1000

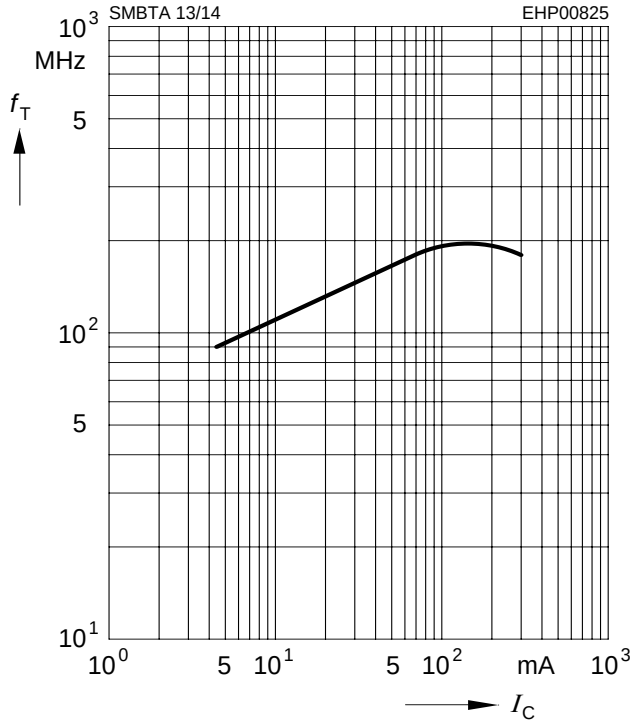


Collector cutoff current $I_{CBO} = f(T_A)$

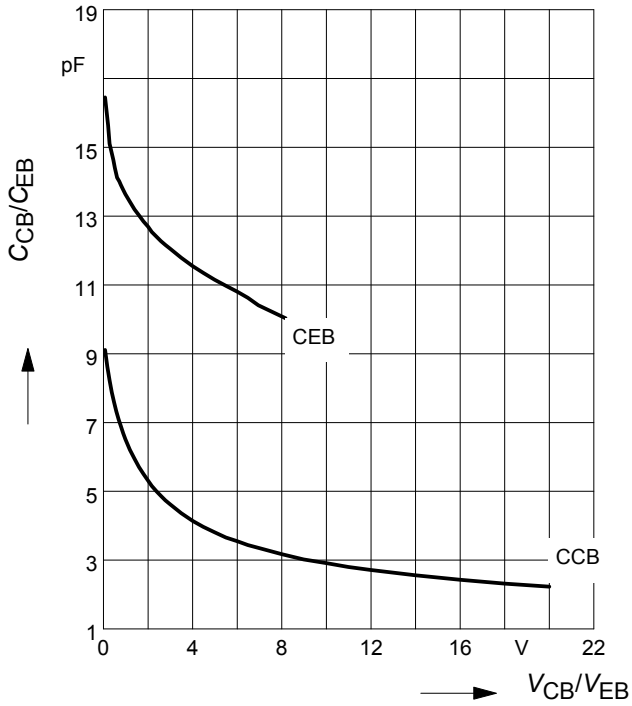
V_{CBO} = 30 V



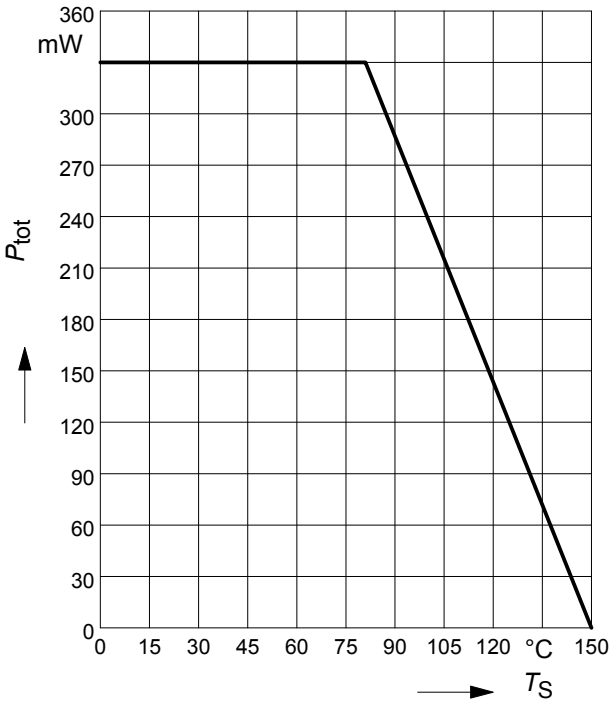
Transition frequency $f_T = f(I_C)$
V_{CE} = 5 V, f = 200 MHz



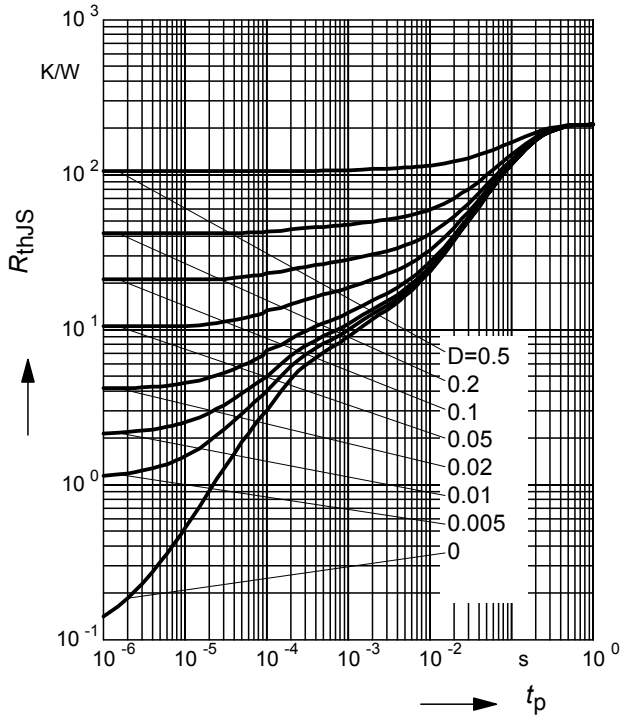
Collector-base capacitance $C_{cb} = f(V_{CB})$
Emitter-base capacitance $C_{eb} = f(V_{EB})$



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

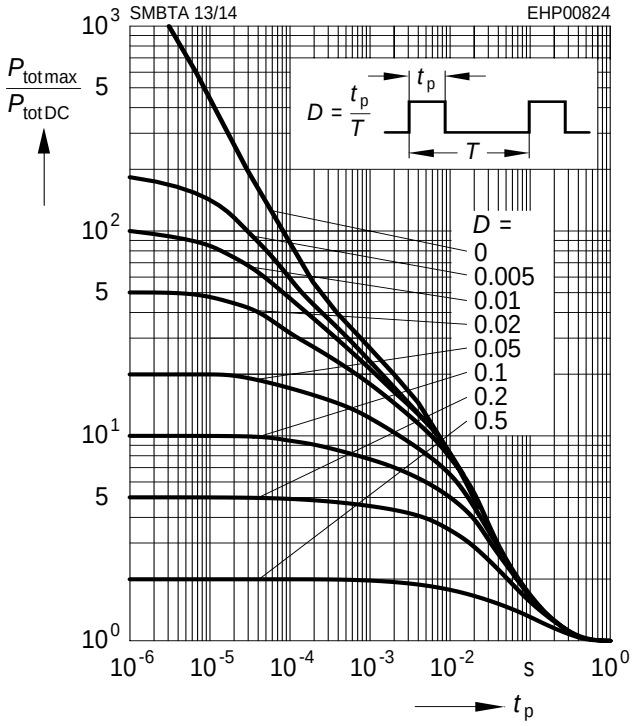


Permissible Pulse Load $R_{thJS} = f(t_p)$

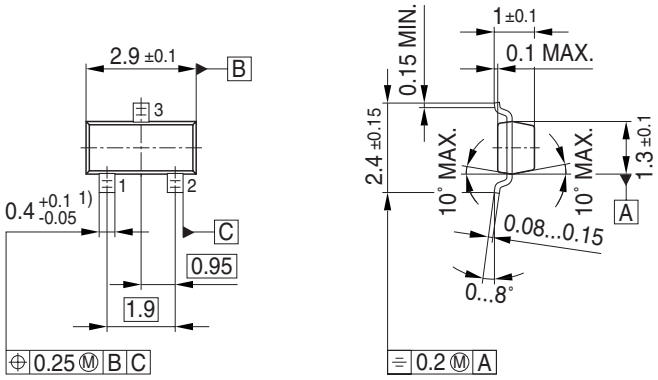


Permissible Pulse Load

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

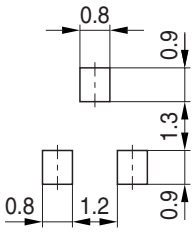


Package Outline

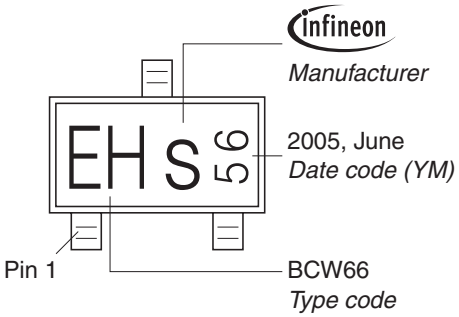


1) Lead width can be 0.6 max. in dambar area

Foot Print

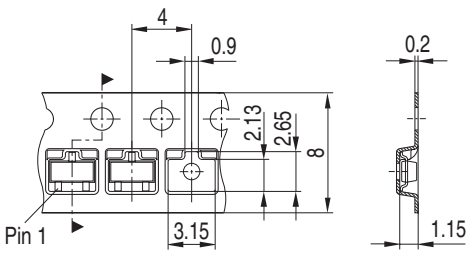


Marking Layout (Example)



Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel



Edition 2009-11-16

Published by
Infineon Technologies AG
81726 Munich, Germany

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