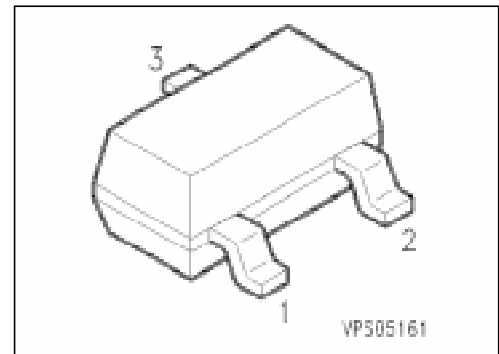


PNP Silicon Switching Transistors

SMBT 2907 SMBT 2907 A

- High DC current gain: 0.1 mA to 500 mA
- Low collector-emitter saturation voltage
- Complementary types: SMBT 2222,
SMBT 2222 A (NPN)



Type	Marking	Ordering Code (tape and reel)	Pin Configuration			Package ¹⁾
			1	2	3	
SMBT 2907 SMBT 2907 A	s2B s2F	Q68000-A6501 Q68000-A6474	B	E	C	SOT-23

Maximum Ratings

Parameter	Symbol	Values		Unit
		SMBT 2907	SMBT 2907 A	
Collector-emitter voltage	V_{CE0}	40	60	V
Collector-base voltage	V_{CB0}	60		
Emitter-base voltage	V_{EB0}	5		
Collector current	I_C	600		mA
Total power dissipation, $T_s = 77\text{ °C}$	P_{tot}	330		mW
Junction temperature	T_j	150		°C
Storage temperature range	T_{stg}	- 65 ... + 150		

Thermal Resistance

Junction - ambient ²⁾	$R_{th\ JA}$	≤ 290	K/W
Junction - soldering point	$R_{th\ JS}$	≤ 220	

¹⁾ For detailed information see chapter Package Outlines.

²⁾ Package mounted on epoxy pcb 40 mm × 40 mm × 1.5 mm/6 cm² Cu.

Electrical Characteristics

at $T_A = 25\text{ °C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC characteristics					
Collector-emitter breakdown voltage $I_C = 10\text{ mA}$	$V_{(BR)CE0}$				V
SMBT 2907		40	–	–	
SMBT 2907 A		60	–	–	
Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$	$V_{(BR)CB0}$				
SMBT 2907		60	–	–	
SMBT 2907 A		60	–	–	
Emitter-base breakdown voltage $I_E = 10\text{ }\mu\text{A}$	$V_{(BR)EB0}$	5	–	–	
Collector cutoff current $V_{CB} = 50\text{ V}$	I_{CB0}				nA
SMBT 2907		–	–	20	
$V_{CB} = 50\text{ V}$	SMBT 2907 A	–	–	10	nA
$V_{CB} = 50\text{ V}, T_A = 150\text{ °C}$	SMBT 2907	–	–	20	μA
$V_{CB} = 50\text{ V}, T_A = 150\text{ °C}$	SMBT 2907 A	–	–	10	μA
Emitter cutoff current $V_{EB} = 3\text{ V}$	I_{EB0}	–	–	10	nA
DC current gain ¹⁾ $I_C = 100\text{ }\mu\text{A}, V_{CE} = 10\text{ V}$	h_{FE}				–
SMBT 2907		35	–	–	
SMBT 2907 A		75	–	–	
$I_C = 1\text{ mA}, V_{CE} = 10\text{ V}$	SMBT 2907	50	–	–	
SMBT 2907 A		100	–	–	
$I_C = 10\text{ mA}, V_{CE} = 10\text{ V}^{1)}$	SMBT 2907	75	–	–	
SMBT 2907 A		100	–	–	
$I_C = 150\text{ mA}, V_{CE} = 10\text{ V}^{1)}$	SMBT 2907	100	–	300	
SMBT 2907 A		100	–	300	
$I_C = 500\text{ mA}, V_{CE} = 10\text{ V}^{1)}$	SMBT 2907	30	–	–	
SMBT 2907 A		50	–	–	
Collector-emitter saturation voltage ¹⁾ $I_C = 150\text{ mA}, I_B = 15\text{ mA}$	V_{CEsat}				V
$I_C = 500\text{ mA}, I_B = 50\text{ mA}$		–	–	0.4	
		–	–	1.6	
Base-emitter saturation voltage ¹⁾ $I_C = 150\text{ mA}, I_B = 15\text{ mA}$	V_{BEsat}				
$I_C = 500\text{ mA}, I_B = 50\text{ mA}$		–	–	1.3	
		–	–	2.6	

¹⁾ Pulse test conditions: $t \leq 300\text{ }\mu\text{s}$, $D = 2\%$.

Electrical Characteristics

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

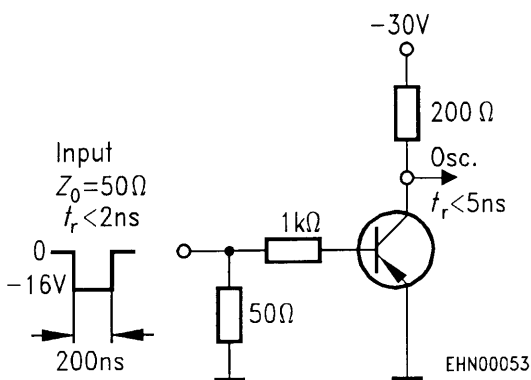
Parameter	Symbol	Values			Unit
		min.	typ.	max.	

AC characteristics

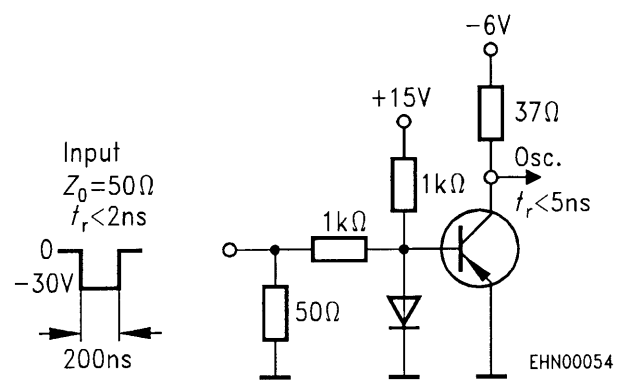
Transition frequency $I_C = 20\text{ mA}$, $V_{CE} = 20\text{ V}$, $f = 100\text{ MHz}$	f_t	200	–	–	MHz
Output capacitance $V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$	C_{obo}	–	–	8	pF
Input capacitance $V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$	C_{ibo}	–	–	30	pF
$V_{CC} = 30\text{ V}$, $I_C = 150\text{ mA}$, $I_{B1} = 15\text{ mA}$					
Delay time	t_d	–	–	10	ns
Rise time	t_r	–	–	40	ns
$V_{CC} = 6\text{ V}$, $I_C = 150\text{ mA}$, $I_{B1} = I_{B2} = 15\text{ mA}$					
Storage time	t_{stg}	–	–	80	ns
Fall time	t_f	–	–	30	ns

Test circuits

Delay and rise time

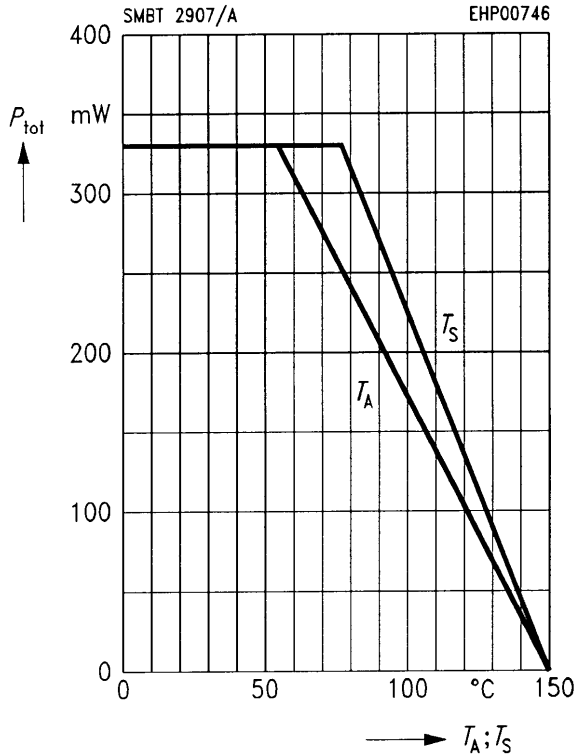


Storage and fall time



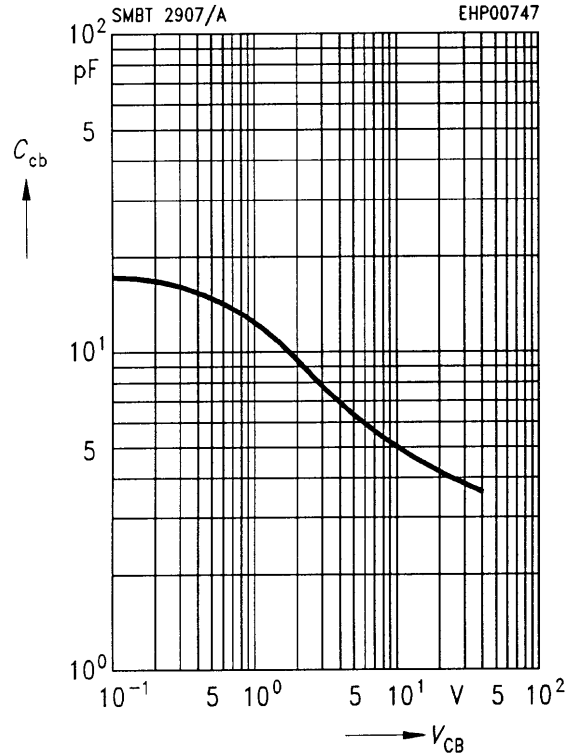
Total power dissipation $P_{tot} = f(T_A^*; T_S)$

* Package mounted on epoxy



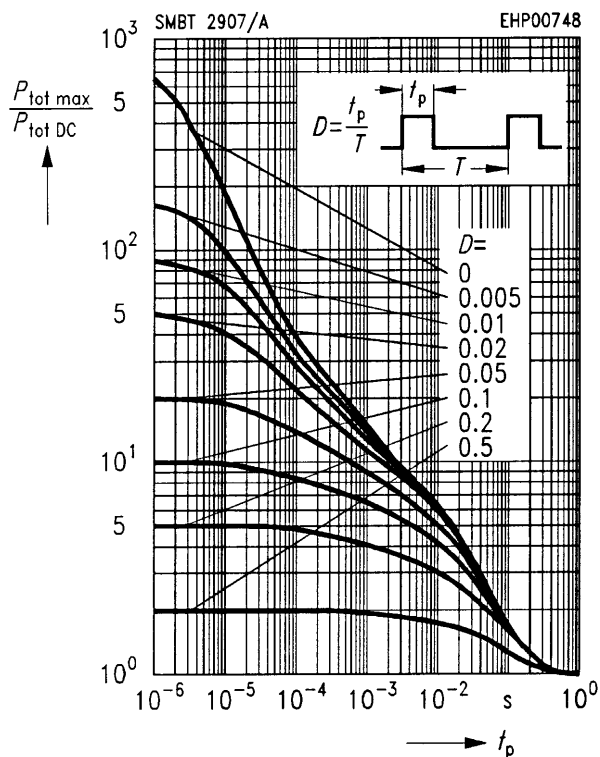
Collector-base capacitance $C_{CB} = f(V_{CB})$

$f = 1 \text{ MHz}$



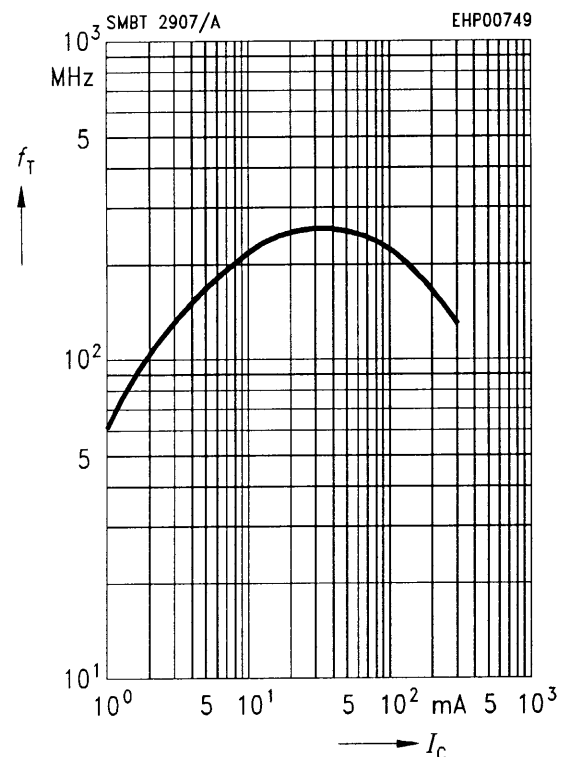
Permissible pulse load $P_{tot \text{ max}}/P_{tot \text{ DC}} = f(t_p)$

$D = \frac{t_p}{T}$

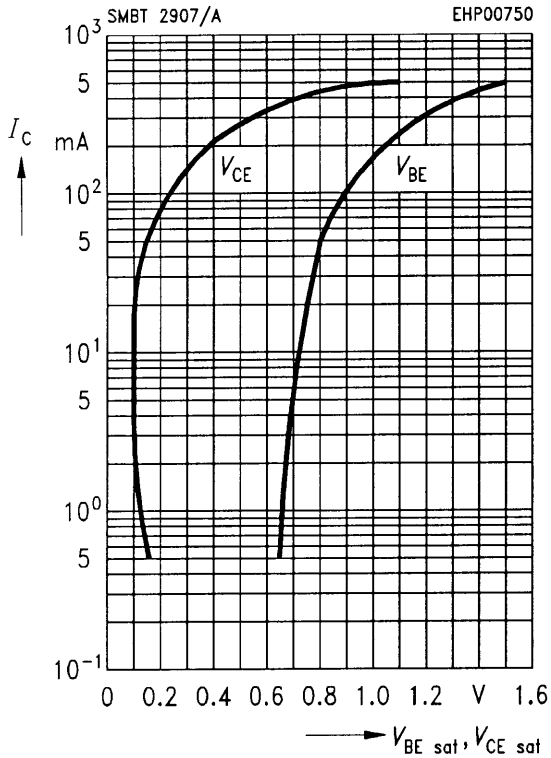


Transition frequency $f_T = f(I_C)$

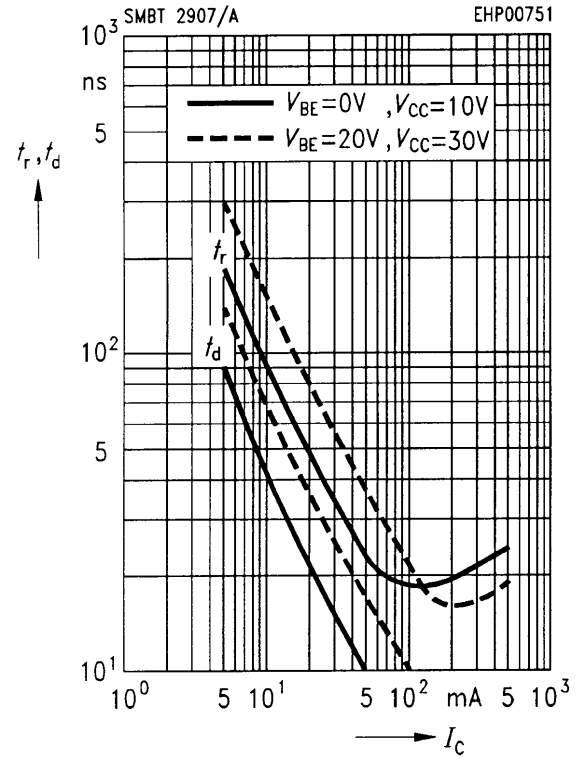
$V_{CE} = 20 \text{ V}$



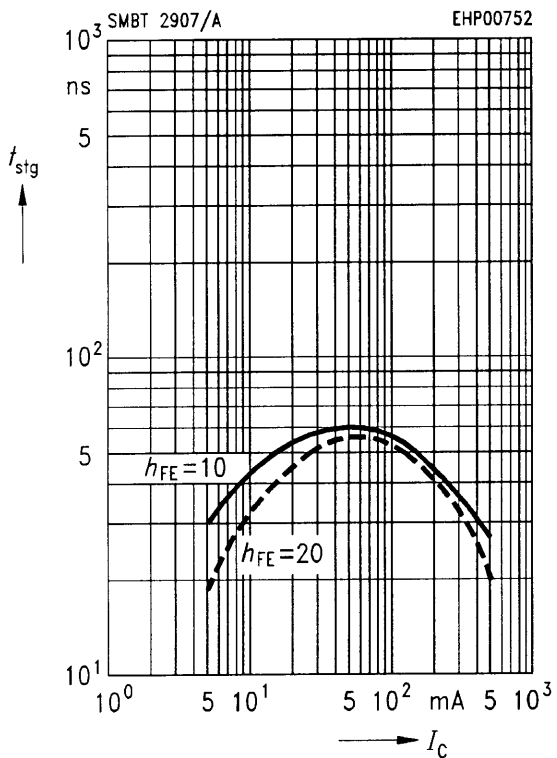
Saturation voltage $I_C = f(V_{BEsat}, V_{CEsat})$
 $h_{FE} = 10$



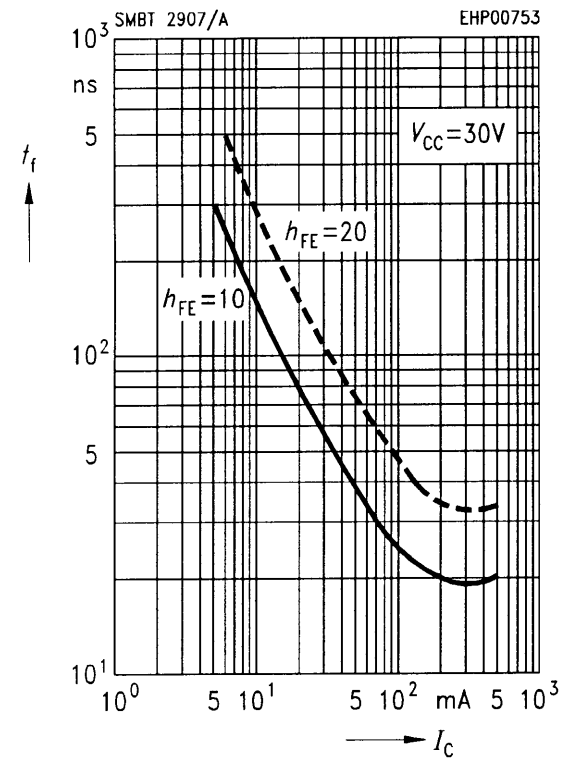
Delay time $t_d = f(I_C)$
Rise time $t_r = f(I_C)$
 $h_{FE} = 10$



Storage time $t_{stg} = f(I_C)$



Fall time $t_f = f(I_C)$



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

