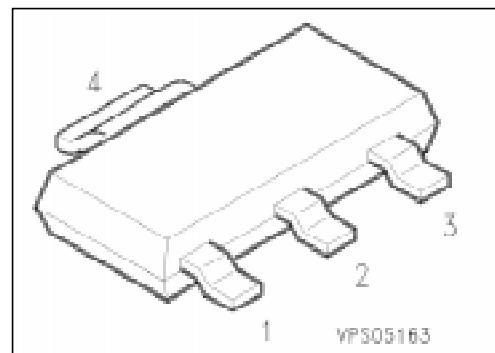


PNP Silicon Switching Transistor

PZT 3906

- High DC current gain 0.1 mA to 100 mA
- Low collector-emitter saturation voltage
- Complementary type: PZT 3904 (NPN)



Type	Marking	Ordering Code (tape and reel)	Pin Configuration				Package ¹⁾
			1	2	3	4	
PZT 3906	ZT 3906	Q62702-Z2030	B	C	E	C	SOT-223

Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage	V_{CE0}	40	V
Collector-base voltage	V_{CB0}	40	
Emitter-base voltage	V_{EB0}	5	
Collector current	I_C	200	mA
Total power dissipation, $T_S = 80^\circ\text{C}$	P_{tot}	1.5	W
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	- 65 ... + 150	

Thermal Resistance

Junction - ambient ²⁾	$R_{th JA}$	≤ 117	K/W
Junction - soldering point	$R_{th JS}$	≤ 47	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

DC characteristics

Collector-emitter breakdown voltage $I_C = 1 \text{ mA}, I_B = 0$	$V_{(\text{BR})\text{CE}0}$	40	—	—	V
Collector-base breakdown voltage $I_C = 10 \mu\text{A}, I_B = 0$	$V_{(\text{BR})\text{CB}0}$	40	—	—	
Emitter-base breakdown voltage $I_E = 10 \mu\text{A}, I_C = 0$	$V_{(\text{BR})\text{EB}0}$	5	—	—	
Collector-base cutoff current $V_{\text{CB}} = 30 \text{ V}, I_E = 0$	$I_{\text{CB}0}$	—	—	50	nA
Collector-emitter cutoff current $V_{\text{CE}} = 30 \text{ V}, + V_{\text{BE}} = 0.5 \text{ V}$	I_{CEV}	—	—	50	
Collector-base cutoff current $V_{\text{CE}} = 30 \text{ V}, + V_{\text{BE}} = 0.5 \text{ V}$	I_{BEV}	—	—	50	
DC current gain ¹⁾ $I_C = 0.1 \text{ mA}, V_{\text{CE}} = 1 \text{ V}$ $I_C = 1 \text{ mA}, V_{\text{CE}} = 1 \text{ V}$ $I_C = 10 \text{ mA}, V_{\text{CE}} = 1 \text{ V}$ $I_C = 50 \text{ mA}, V_{\text{CE}} = 1 \text{ V}$ $I_C = 100 \text{ mA}, V_{\text{CE}} = 1 \text{ V}$	h_{FE}	60 80 100 60 30	— — — — —	— — 300 — —	—
Collector-emitter saturation voltage ¹⁾ $I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$ $I_C = 50 \text{ mA}, I_B = 5 \text{ mA}$	V_{CEsat}	— —	— —	0.25 0.4	V
Base-emitter saturation voltage ¹⁾ $I_C = 10 \text{ mA}, I_C = 1 \text{ mA}$ $I_C = 50 \text{ mA}, I_C = 5 \text{ mA}$	V_{BEsat}	— —	— —	0.85 0.95	

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

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

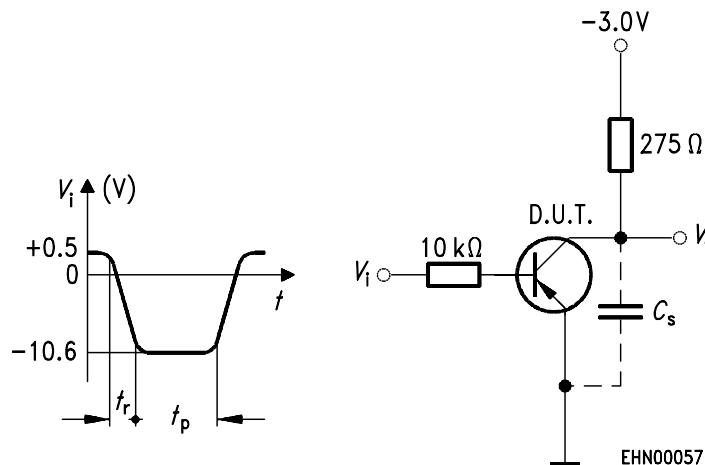
Parameter	Symbol	Values			Unit
		min.	typ.	max.	

AC characteristics

Transition frequency $I_C = 10 \text{ mA}, V_{CE} = 20 \text{ V}, f = 100 \text{ MHz}$	f_T	250	—	—	MHz
Collector-base capacitance $V_{CB} = 5 \text{ V}, f = 1 \text{ MHz}$	C_{obo}	—	—	4.5	pF
Input capacitance $V_{EB} = 0.5 \text{ V}, f = 1 \text{ MHz}$	C_{ibo}	—	—	10	
Noise figure $I_C = 100 \mu\text{A}, V_{CE} = 5 \text{ V}, R_S = 1 \text{ k}\Omega, f = 10 \text{ Hz to } 15.7 \text{ kHz}$	F	—	—	4	dB
Input impedance $I_C = 1 \text{ mA}, V_{CE} = 10 \text{ V}, f = 1 \text{ kHz}$	h_{11e}	2	—	12	k Ω
Open-circuit reverse voltage transfer ratio $I_C = 1 \text{ mA}, V_{CE} = 10 \text{ V}, f = 1 \text{ kHz}$	h_{12e}	0.1	—	10	10^{-4}
Short-circuit forward current transfer ratio $I_C = 1 \text{ mA}, V_{CE} = 10 \text{ V}, f = 1 \text{ kHz}$	h_{21e}	100	—	400	—
Open-circuit output admittance $I_C = 1 \text{ mA}, V_{CE} = 10 \text{ V}, f = 1 \text{ kHz}$	h_{22e}	3	—	60	μS
$V_{CC} = 3 \text{ V}, I_C = 10 \text{ mA}, I_{B1} = 1 \text{ mA}$ $V_{BE(off)} = 0.5 \text{ V}$					
Delay time	t_d	—	—	35	ns
Rise time	t_r	—	—	35	ns
$V_{CC} = 3 \text{ V}, I_C = 10 \text{ mA}, I_{B1} = I_{B2} = 1 \text{ mA}$					
Storage time	t_{stg}	—	—	225	ns
Fall time (see diagrams)	t_f	—	—	75	ns

Switching Times

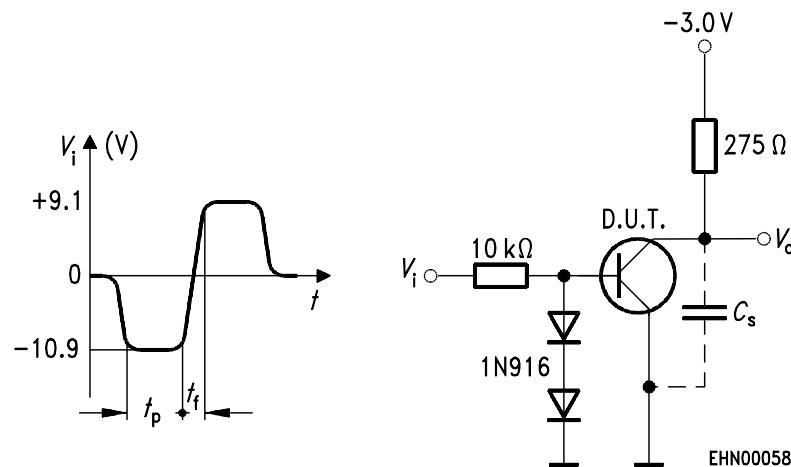
Turn-on time when switched from $+V_{BEoff} = 0.5$ V to $-V_{BEon} = 10.6$ V, $-I_{Con} = 10$ mA; $-I_{Bon} = 1$ mA



Input waveform; $t_r < 1$ ns; $t_p = 300$ ns;
 $\delta = 0.02$.

Delay and rise time test circuit; total shunt capacitance of test jig and connectors
 $C_s < 4$ pF; scope impedance = 10 MΩ.

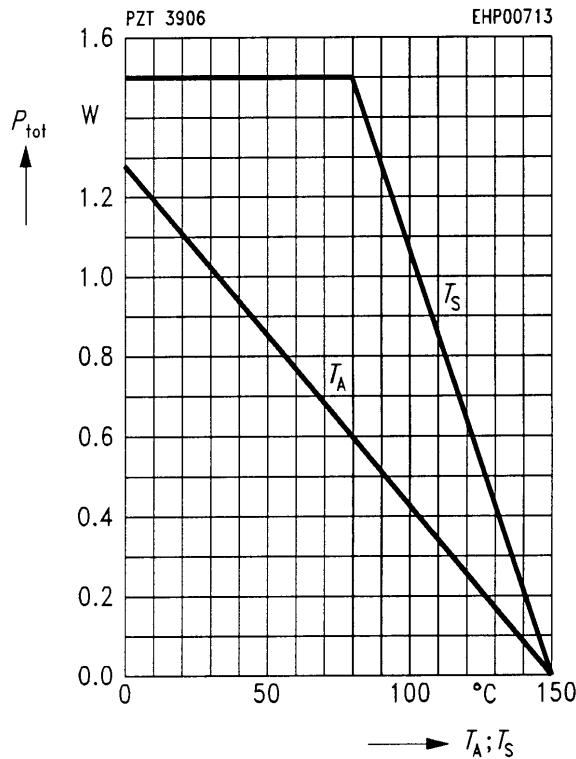
Turn-off time $I_{Con} = 10$ mA; $I_{Bon} = -I_{Boff} = 1$ mA



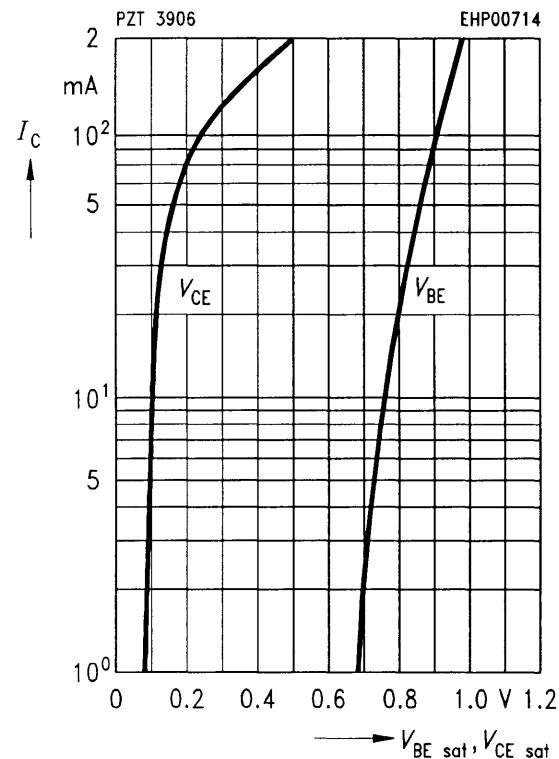
Input waveform; $t_f < 1$ ns; $10 \mu s < t_p \leq 500 \mu s$;
 $\delta = 0.02$.

Storage and fall time test circuit; total shunt capacitance of test jig and connectors
 $C_s < 4$ pF; scope impedance = 10 MΩ.

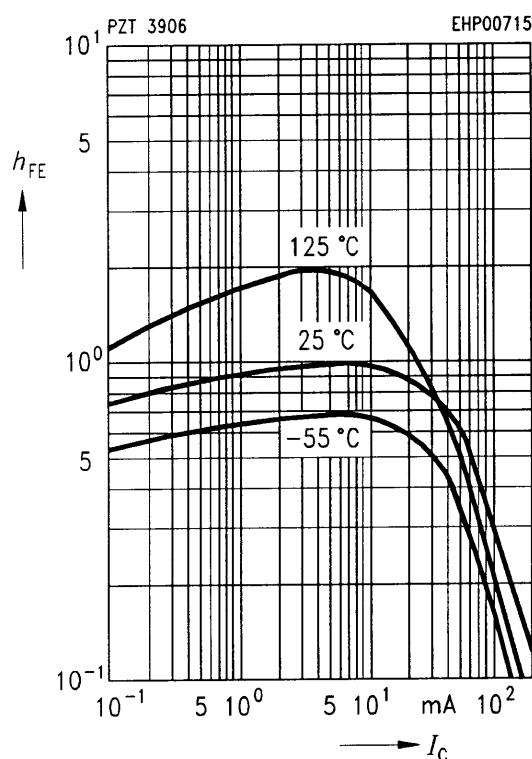
Total power dissipation $P_{\text{tot}} = f(T_A^*; T_S)$
 * Package mounted on epoxy



Saturation voltage $I_C = f(V_{BE\text{sat}}, V_{CE\text{sat}})$
 $h_{FE} = 10$



DC current gain $h_{FE} = f(I_C)$
 $V_{CE} = 1$ V, normalized



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

