SILICON PLANAR EPITAXIAL TRANSISTOR

PNP transistor in a microminiature SMD package (SOT-223). Designed primarily for high-speed, saturated switching applications in industrial service.

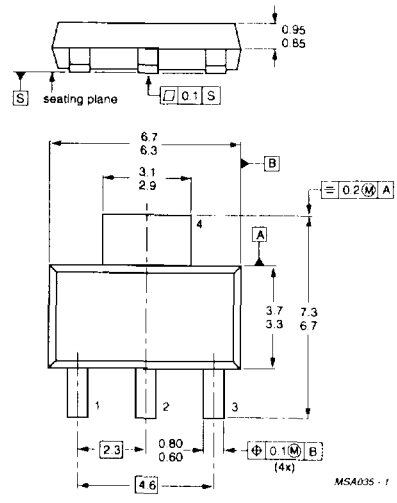
QUICK REFERENCE DATA

Collector-base voltage (open emitter)	$-V_{CBO}$	max.	40 V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	40 V
Collector current (DC)	$-I_C$	max.	200 mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	1,5 W
Junction temperature	T_j	max.	150 °C
DC current gain $-I_C$ = 10 mA; $-V_{CE}$ = 1 V	h_{FE}	> <	100 300
Transition frequency at f = 100 MHz $-I_C$ = 10 mA; $-V_{CE}$ = 20 V	f_T	>	250 MHz
Storage time $-I_{Con}$ = 10 mA; $-I_{Bon} = I_{Boff}$ = 1 mA	t_s	<	225 ns

MECHANICAL DATA

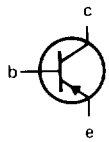
Dimensions in mm

Fig. 1 SOT-223



Pinning

1 = Base
2 = Collector
3 = Emitter
4 = Collector



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Collector-base voltage (open emitter)	$-V_{CBO}$	max.	40	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	40	V
Emitter-base voltage (open collector)	$-V_{EBO}$	max.	5	V
Collector current (DC)	$-I_C$	max.	200	mA
Total power dissipation at T_{amb} = 25 °C*	P_{tot}	max.	1,5	W
Storage temperature range	T_{stg}		−65 to +150	°C
Junction temperature	T_j	max.	150	°C

THERMAL RESISTANCE

From junction to ambient*	$R_{th\ j\text{-}a}$	=	83,3	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Currents at reverse biased emitter junction				
$-V_{CE}$ = 30 V; + V_{BE} = 3 V	$-I_{CEX}$	<	50	nA
	$+I_{BEX}$	<	50	nA
Saturation voltages				
$-I_C$ = 10 mA; $-I_B$ = 1 mA	$-V_{CEsat}$	<	250	mV
	$-V_{BEsat}$		650 to 850	mV
$-I_C$ = 50 mA; $-I_B$ = 5 mA	$-V_{CEsat}$	<	400	mV
	$-V_{BEsat}$	<	950	mV
DC current gain				
$-I_C$ = 0,1 mA; $-V_{CE}$ = 1 V	h_{FE}	>	60	
$-I_C$ = 1 mA; $-V_{CE}$ = 1 V	h_{FE}	>	80	
$-I_C$ = 10 mA; $-V_{CE}$ = 1 V	h_{FE}	>	100	
		<	300	
$-I_C$ = 50 mA; $-V_{CE}$ = 1 V	h_{FE}	>	60	
$-I_C$ = 100 mA; $-V_{CE}$ = 1 V	h_{FE}	>	30	
Collector capacitance at 100 kHz ≤ f ≤ 1 MHz				
$I_E = i_e$ = 0; $-V_{CB}$ = 5 V	C_c	<	4,5	pF
Emitter capacitance at 100 kHz ≤ f ≤ 1 MHz				
$I_C = i_c$ = 0; $-V_{EB}$ = 0,5 V	C_e	<	10	pF
Transition frequency at f = 100 MHz				
$-I_C$ = 10 mA; $-V_{CE}$ = 20 V; T_{amb} = 25 °C	f_T	>	250	MHz
Noise figure at R_S = 1 kΩ				
$-I_C$ = 100 μA; $-V_{CE}$ = 5 V				
f = 10 Hz to 15,7 kHz; T_{amb} = 25 °C	F	<	4,0	dB

* Device mounted on an epoxy printed circuit board 40 mm x 40 mm x 1,5 mm; mounting pad for the collector lead min. 6 cm²

Switching times

Turn-on time (see Figs 2 and 3) when switched from
$+V_{BEoff}$ = 0,5 V to $-I_{Con}$ = 10 mA; $-I_{Bon}$ = 1 mA

Delay time	t_d	<	35 ns
Rise time	t_r	<	35 ns

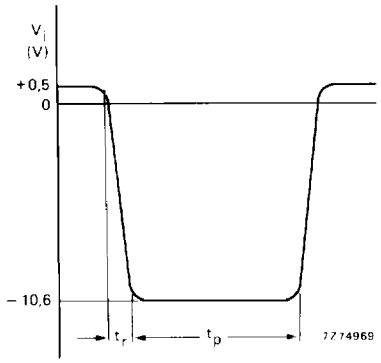


Fig. 2 Input waveform; $t_r < 1$ ns; t_p = 300 ns; δ = 0,02.

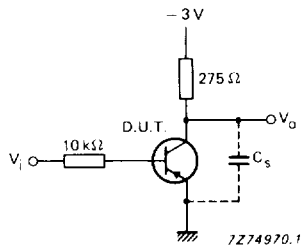


Fig. 3 Delay and rise time test circuit; total shunt capacitance of test jig and connectors $C_s < 4$ pF; scope impedance = 10 MΩ.

Turn-off time (see Figs 4 and 5)
$-I_{Con}$ = 10 mA; $-I_{Bon} = I_{Boff}$ = 1 mA

Storage time	t_s	<	225 ns
Fall time	t_f	<	75 ns

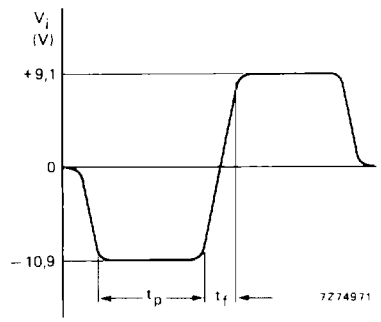


Fig. 4 Input waveform; $t_f < 1$ ns; 10 μs < t_p < 500 μs; δ = 0,02.

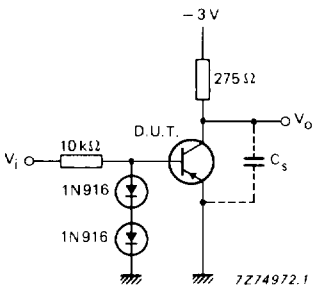


Fig. 5 Storage and fall time test circuit; total shunt capacitance of test jig and connectors $C_s < 4$ pF; scope impedance = 10 MΩ.