SILICON PLANAR EPITAXIAL TRANSISTORS

P-N-P silicon transistors, in a microminiature plastic envelope, intended for medium power switching and general purpose amplifier applications in thick and thin-film circuits.

QUICK REFERENCE DATA

			BSR15	BSR16	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	60	60	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	40	60	V
Emitter-base voltage (open collector)	$-V_{EBO}$	max.	5		V
Collector current (d.c.)	$-I_C$	max.	600		mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	250		mW
Junction temperature	T_j	max.	150		°C
D.C. current gain $-I_C$ = 500 mA; $-V_{CE}$ = 10 V	h_{FE}	>	30	50	
Turn-off switching time $-I_{Con}$ = 150 mA; $-I_{Bon}$ = I_{Boff} = 15 mA	t_{off}	>	100		ns
Transition frequency at f = 100 MHz $-I_C$ = 50 mA; $-V_{CE}$ = 20 V	f_T	>	200		MHz

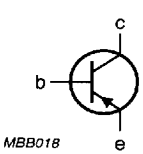
MECHANICAL DATA

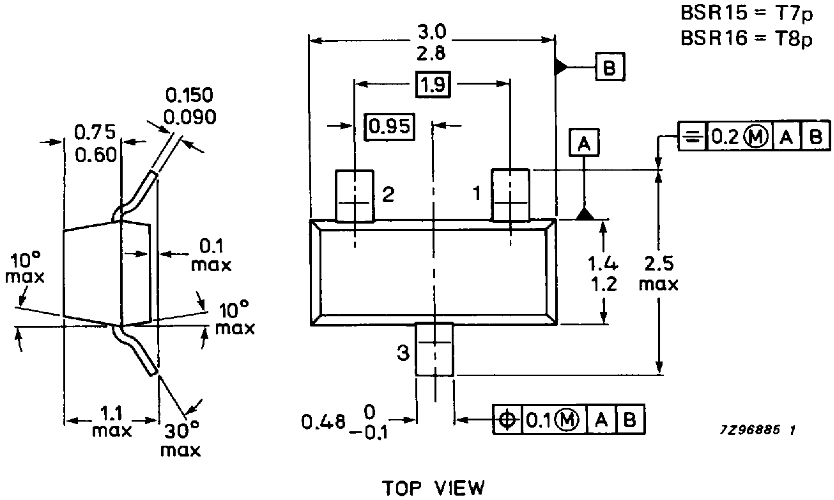
Fig. 1 SOT-23.

Dimensions in mm

Marking code
BSR15 = T7p
BSR16 = T8p

Pinning:
1 = base
2 = emitter
3 = collector





Reverse pinning types are available on request.
See also Soldering recommendations.

RATINGS

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

			BSR15	BSR16	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	60	60	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	40	60	V
Emitter-base voltage (open collector)	$-V_{EBO}$	max.	5	5	V
Collector current (d.c.)	$-I_C$	max.	600		mA
Power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	250		mW
Storage temperature	T_{stg}		−65 to +150		°C
Junction temperature	T_j	max.	150		°C

THERMAL RESISTANCE

From junction to ambient*	$R_{th\ j\text{-}a}$	=	500	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

			BSR15	BSR16	
Collector cut-off current					
$I_E = 0$; $-V_{CB}$ = 50 V	$-I_{CBO}$	<	20	10	nA
$I_E = 0$; $-V_{CB}$ = 50 V; T_j = 150 °C	$-I_{CBO}$	<	20	10	μA
$-V_{EB}$ = 0,5 V; $-V_{CE}$ = 30 V	$-I_{CEX}$	<	50		nA
Base current with reverse biased emitter junction					
$-V_{EB}$ = 3 V; $-V_{CE}$ = 30 V	$-I_{BEX}$	<	50		nA
Saturation voltages					
$-I_C$ = 150 mA; $-I_B$ = 15 mA	$-V_{CEsat}$	<	0,4		V
	$-V_{BEsat}$	<	1,3		V
$-I_C$ = 500 mA; $-I_B$ = 50 mA	$-V_{CEsat}$	<	1,6		V
	$-V_{BEsat}$	<	2,6		V

* Device mounted on a ceramic substrate of 8 mm x 10 mm x 0,7 mm.

			BSR15	BSR16	
D.C. current gain *					
$-I_C$ = 0,1 mA; $-V_{CE}$ = 10 V	h_{FE}	>	35	75	
$-I_C$ = 1 mA; $-V_{CE}$ = 10 V	h_{FE}	>	50	100	
$-I_C$ = 10 mA; $-V_{CE}$ = 10 V	h_{FE}	>	75	100	
$-I_C$ = 150 mA; $-V_{CE}$ = 10 V	h_{FE}		100 to 300		
$-I_C$ = 500 mA; $-V_{CE}$ = 10 V	h_{FE}	>	30	50	
Transition frequency at f = 100 MHz					
$-I_C$ = 50 mA; $-V_{CE}$ = 20 V; T_{amb} = 25 °C	f_T	>	200		MHz
Collector capacitance at f = 1 MHz					
$I_E = I_e = 0$; $-V_{CB}$ = 10 V	C_c	<	8		pF
Emitter capacitance at f = 1 MHz					
$I_C = I_c = 0$; $-V_{EB}$ = 2 V	C_e	<	30		pF
Switching times (between 10% and 90% levels)					
Turn-on time when switched to					
$-I_C$ = 150 mA; $-I_B$ = 15 mA; (see Fig. 3)					
delay time	t_d	<	10		ns
rise time	t_r	<	40		ns
turn-on time ($t_d + t_r$)	t_{on}	<	45		ns
Turn-off time when switched from					
$-I_C$ = 150 mA; $-I_B$ = 15 mA					
to cut-off with + I_{BM} = 15 mA (see Fig. 4)					
storage time	t_s	<	80		ns
fall time	t_f	<	30		ns
turn-off time ($t_s + t_f$)	t_{off}	<	100		ns

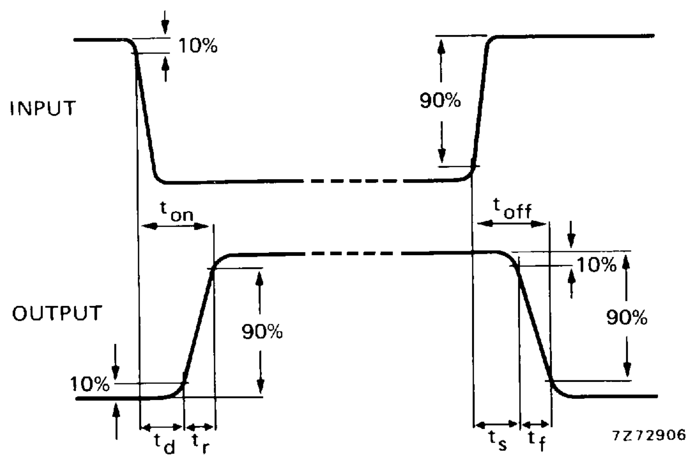


Fig. 2 Switching time waveforms.

* Measured under pulsed conditions to avoid excessive dissipation; pulse duration $t_p \leq 300\ \mu s$; duty factor $\delta \leq 0,02$.

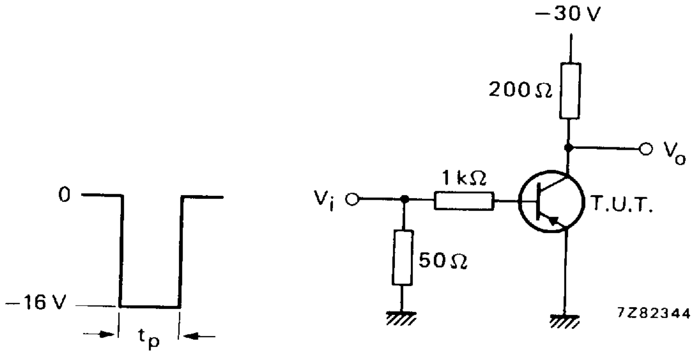


Fig. 3 Turn-on switching time test circuit.

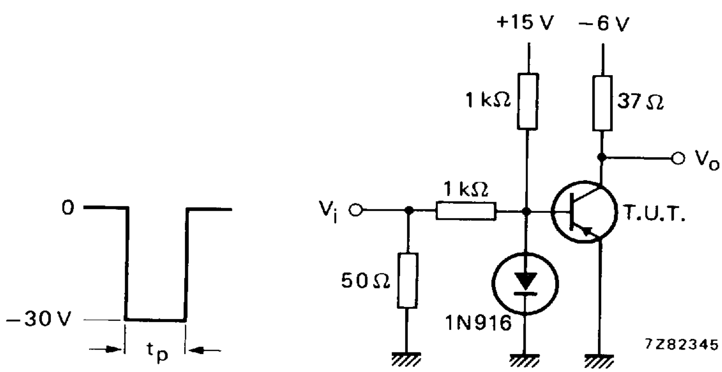


Fig. 4 Turn-off switching time test circuit.

Input pulse generator: Fig. 3 and Fig. 4	frequency	f	=	150	Hz
	pulse duration	t_p	=	200	ns
	rise time	t_r	⩽	2	ns
	output impedance	Z_o	=	50	Ω
Output oscilloscope: Fig. 3 and Fig. 4	rise time	t_r	⩽	5	ns
	input impedance	Z_i	=	10	MΩ