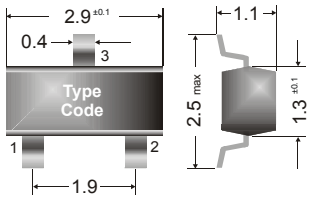
NPN

Surface mount Si-Epitaxial PlanarTransistors
Si-Epitaxial PlanarTransistoren für die Oberflächenmontage

NPN



Dimensions / Maße in mm
1 = B 2 = E 3 = C

Power dissipation – Verlustleistung 250 mW

Plastic case SOT-23
Kunststoffgehäuse (TO-236)

Weight approx. – Gewicht ca. 0.01 g

Plastic material has UL classification 94V-0
Gehäusematerial UL94V-0 klassifiziert

Standard packaging taped and reeled
Standard Lieferform gegurtet auf Rolle

Maximum ratings (T_A = 25˚C) **Grenzwerte (T_A = 25˚C)**

			BSR 13	BSR 14
Collector-Emitter-voltage	B open	V_{CE0}	30 V	40 V
Collector-Base-voltage	E open	V_{CB0}	60 V	75 V
Emitter-Base-voltage	C open	V_{EB0}	5 V	6 V
Power dissipation – Verlustleistung		P_{tot}	250 mW [1])	
Collector current – Kollektorstrom (dc)		I_C	800 mA	
Peak Collector current – Kollektor-Spitzenstrom		I_{CM}	800 mA	
Peak Base current – Basis-Spitzenstrom		I_{BM}	200 mA	
Junction temp. – Sperrschichttemperatur		T_j	150˚C	
Storage temperature – Lagerungstemperatur		T_S	- 65…+ 150˚C	

Characteristics (T_j = 25˚C) **Kennwerte (T_j = 25˚C)**

			Min.	Typ.	Max.
Collector-Base cutoff current – Kollektorreststrom					
I_E = 0, V_{CB} = 50 V	BSR 13	I_{CB0}	–	–	30 nA
I_E = 0, V_{CB} = 50 V, T_j = 150˚C	BSR 13	I_{CB0}	–	–	10 µA
I_E = 0, V_{CB} = 60 V	BSR 14	I_{CB0}	–	–	10 nA
I_E = 0, V_{CB} = 60 V, T_j = 150˚C	BSR 14	I_{CB0}	–	–	10 µA
Emitter-Base cutoff current – Emitterreststrom					
I_C = 0, V_{EB} = 5 V	BSR 13	I_{EB0}	–	–	30 nA
	BSR 14	I_{EB0}	–	–	10 nA

[1]) Mounted on P.C. board with 3 mm² copper pad at each terminal
Montage auf Leiterplatte mit 3 mm² Kupferbelag (Lötpad) an jedem Anschluß

Characteristics (T_j = 25˚C) **Kennwerte (T_j = 25˚C)**

			Min.	Typ.	Max.
DC current gain – Kollektor-Basis-Stromverhältnis [1]					
V_{CE} = 10 V, I_C = 0.1 mA		h_{FE}	35	–	–
V_{CE} = 10 V, I_C = 1 mA		h_{FE}	50	–	–
V_{CE} = 10 V, I_C = 10 mA	BSR 13 BSR 14	h_{FE}	75	–	–
V_{CE} = 10 V, I_C = 150 mA		h_{FE}	100	–	300
V_{CE} = 1 V, I_C = 150 mA		h_{FE}	50	–	–
V_{CE} = 10 V, I_C = 500 mA	BSR 13	h_{FE}	30	–	–
	BSR 14	h_{FE}	40	–	–
Collector saturation volt. – Kollektor-Sättigungsspg. [1]					
I_C = 150 mA, I_B = 15 mA	BSR 13	V_{CEsat}	–	–	400 mV
	BSR 14	V_{CEsat}	–	–	300 mV
I_C = 500 mA, I_B = 50 mA	BSR 13	V_{CEsat}	–	–	1.6 V
	BSR 14	V_{CEsat}	–	–	1 V
Base saturation voltage – Basis-Sättigungsspannung [1]					
I_C = 150 mA, I_B = 15 mA	BSR 13	V_{BEsat}	–	–	1.3 V
	BSR 14	V_{BEsat}	0.6 V	–	1.2 V
I_C = 500 mA, I_B = 50 mA	BSR 13	V_{BEsat}	–	–	2.6 V
	BSR 14	V_{BEsat}	–	–	2 V
Gain-Bandwidth Product – Transitfrequenz					
V_{CE} = 20 V, I_C = 20 mA, f = 100 MHz	BSR 13	f_T	250 MHz	–	–
	BSR 14	f_T	300 MHz	–	–
Collector-Base Capacitance – Kollektor-Basis-Kapazität					
V_{CB} = 10 V, I_E = i_e = 0, f = 1 MHz		C_{CB0}	–	8 pF	–
Switching times – Schaltzeiten					
turn-on time	I_{Con} = 150 mA I_{Bon} = 15 mA - I_{Boff} = 15 mA	t_{on}	–	–	35 ns
delay time		t_d	–	–	15 ns
rise time		t_r	–	–	20 ns
turn-off time		t_{off}	–	–	250 ns
storage time		t_s	–	–	200 ns
fall time		t_f	–	–	60 ns
Thermal resistance junction to ambient air Wärmewiderstand Sperrschicht – umgebende Luft		R_{thA}			420 K/W [2]
Recommended complementary PNP transistors Empfohlene komplementäre PNP-Transistoren				BSR 15, BSR 16	

Marking - Stempelung	BSR 13 = U7	BSR 14 = U8

[1] Tested with pulses t_p = 300 µs, duty cycle ≤ 2% – Gemessen mit Impulsen t_p = 300 µs, Schaltverhältnis ≤ 2%
[2] Mounted on P.C. board with 3 mm² copper pad at each terminal
Montage auf Leiterplatte mit 3 mm² Kupferbelag (Lötpad) an jedem Anschluß