

## NPN Switching Transistors

## BSR13,BSR14

## ■ Features

- High current (max. 800 mA).
- Low voltage (max. 40 V).

■ Absolute Maximum Ratings  $T_a = 25^\circ\text{C}$ 

Parameter	Symbol	BSR13	BSR14	Unit
Collector-base voltage	$V_{CB0}$	60	75	V
Collector-emitter voltage	$V_{CE0}$	30	40	V
Emitter-base voltage	$V_{EB0}$	5	6	V
Collector current	$I_C$	800		mA
Peak collector current	$I_{CM}$	800		mA
Peak base current	$I_{BM}$	200		mA
Total power dissipation	$P_{tot}$	250		mW
Storage temperature	$T_{stg}$	-65 to +150		$^\circ\text{C}$
Junction temperature	$T_j$	150		$^\circ\text{C}$
Operating ambient temperature	$R_{amb}$	-65 to +150		$^\circ\text{C}$
Thermal resistance from junction to ambient *	$R_{th\ j-a}$	500		K/W

\* Transistor mounted on an FR4 printed-circuit board.

## BSR13,BSR14

## ■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit	
Collector cutoff current	BSR13	$I_E = 0; V_{CB} = 50 \text{ V}$			30	nA	
		$I_E = 0; V_{CB} = 50 \text{ V}; T_J = 150 \text{ }^\circ\text{C}$			10	$\mu\text{A}$	
	BSR14	$I_E = 0; V_{CB} = 60 \text{ V}$			10	nA	
		$I_E = 0; V_{CB} = 60 \text{ V}; T_J = 150 \text{ }^\circ\text{C}$			10	$\mu\text{A}$	
Emitter cutoff current	BSR13	$I_C = 0; V_{EB} = 5 \text{ V}$			30	nA	
	BSR14				10	nA	
DC current gain *		hFE	$I_C = 0.1 \text{ mA}; V_{CE} = 10 \text{ V};$ $I_C = 1 \text{ mA}; V_{CE} = 10 \text{ V};$ $I_C = 10 \text{ mA}; V_{CE} = 10 \text{ V};$ $I_C = 150 \text{ mA}; V_{CE} = 10 \text{ V}$ $I_C = 150 \text{ mA}; V_{CE} = 1 \text{ V};$	35			
				50			
				75			
				100		300	
				50			
DC current gain *	BSR13	hFE	$I_C = 500 \text{ mA}; V_{CE} = 10 \text{ V};$	30			
	BSR14			40			
collector-emitter saturation voltage	BSR13	$V_{CEsat}$	$I_C = 150 \text{ mA}; I_B = 15 \text{ mA}$			400	mV
	BSR14					300	mV
collector-emitter saturation voltage	BSR13	$V_{CEsat}$	$I_C = 500 \text{ mA}; I_B = 50 \text{ mA}$			1.6	V
	BSR14					1	V
base-emitter saturation voltage	BSR13	$V_{BEsat}$	$I_C = 150 \text{ mA}; I_B = 15 \text{ mA}$			1.3	V
	BSR14			0.6		1.2	V
base-emitter saturation voltage	BSR13	$V_{BEsat}$	$I_C = 500 \text{ mA}; I_B = 50 \text{ mA}$			2.6	V
	BSR14					2	V
Collector capacitance	$C_c$	$I_E = I_C = 0; V_{CB} = 10 \text{ V}; f = 1 \text{ MHz}$		8		pF	
Transition frequency	BSR13	$f_T$	$I_C = 20 \text{ mA}; V_{CE} = 20 \text{ V}; f = 100 \text{ MHz}$	250			MHz
	BSR14			300			MHz
Turn-on time	$t_{on}$	$I_{Con} = 150 \text{ mA}; I_{Bon} = 15 \text{ mA};$ $I_{Boff} = -15 \text{ mA}$			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	

\* Pulse test:  $t_p \leq 300 \mu\text{s}; d \leq 0.02$ .

## ■ hFE Classification

TYPE	BSR13	BSR14
Marking	U7	U8