

**SOT-23 Formed SMD Package**

**BSR13  
BSR14**

*SILICON PLANAR EPITAXIAL TRANSISTORS*

*N-P-N silicon transistors*

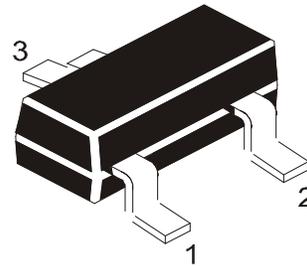
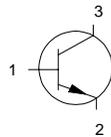
**Marking**

*BSR13 = U7*

*BSR14 = U8*

**Pin configuration**

- 1 = BASE
- 2 = EMITTER
- 3 = COLLECTOR



**ABSOLUTE MAXIMUM RATINGS**

Collector-base voltage (open emitter)  
 Collector-emitter voltage (open base)  
 Emitter-base voltage (open collector)  
 Collector current (d.c.)  
 Total power dissipation up to  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 Junction temperature  
 D.C. current gain  
 $I_C = 150\text{ mA}; V_{CE} = 10\text{ V}$   
 $I_C = 500\text{ mA}; V_{CE} = 10\text{ V}$   
 Transition frequency at  $f = 100\text{ MHz}$   
 $I_C = 20\text{ mA}; V_{CE} = 20\text{ V}$

		<b>BSR13</b>	<b>BSR14</b>
$V_{CB0}$	max.	60	75 V
$V_{CE0}$	max.	30	40 V
$V_{EB0}$	max.	5	6 V
$I_C$	max.	800	mA
$P_{tot}$	max.	250	mW
$T_j$	max.	150	$^{\circ}\text{C}$
$h_{FE}$		100 to 300	
$h_{FE}$	>	30	40
$f_T$	>	250	300 MHz

**BSR13**  
**BSR14**

**RATINGS** (at  $T_A = 25^\circ\text{C}$  unless otherwise specified)

Limiting values

		<b>BSR13</b>	<b>BSR14</b>	
Collector-base voltage (open emitter)	$V_{CB0}$	max. 60	75	V
Collector-emitter voltage (open base)	$V_{CE0}$	max. 30	40	V
Emitter-base voltage (open collector)	$V_{EB0}$	max. 5	6	V
Collector current (d.c.)	$I_C$	max. 800		mA
Total power dissipation up to $T_{amb} = 25^\circ\text{C}$	$P_{tot}$	max. 250		mW
Storage temperature	$T_{stg}$	-55 to +150		$^\circ\text{C}$
Junction temperature	$T_j$	max. 150		$^\circ\text{C}$

**THERMAL RESISTANCE**

From junction to ambient

$R_{th\ j-a} =$	500	K/W
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**CHARACTERISTICS**

$T_j = 25^\circ\text{C}$  unless otherwise specified

Collector cut-off current

$I_E = 0; V_{CB} = 50\text{ V}$

$I_E = 0; V_{CB} = 60\text{ V}$

$I_E = 0; V_{CB} = 50\text{ V}; T_j = 150^\circ\text{C}$

$I_E = 0; V_{CB} = 60\text{ V}; T_j = 150^\circ\text{C}$

$V_{EB} = 3\text{ V}; V_{CE} = 60\text{ V}$

		<b>BSR13</b>	<b>BSR14</b>	
$I_{CB0} <$	30	-	nA	
$I_{CB0} <$	-	10	nA	
$I_{CB0} <$	10	-	$\mu\text{A}$	
$I_{CB0} <$	-	10	$\mu\text{A}$	
$I_{CEX} <$	-	10	nA	

Base current

with reverse biased emitter junction

$V_{EB} = 3\text{ V}; V_{CE} = 60\text{ V}$

$I_{BEX} <$	-	20	nA
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Emitter cut-off current

$I_C = 0; V_{EB} = 3\text{ V}$

$I_{EB0} <$	30	15	nA
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Saturation voltages

$I_C = 150\text{ mA}; I_B = 15\text{ mA}$

$V_{CEsat} <$	400	300	mV
$V_{BEsat} <$	1.3	-	V
$V_{BEsat}$	-	0,6 to 1,2	V

$I_C = 500\text{ mA}; I_B = 50\text{ mA}$

$V_{CEsat} <$	1.6	1.0	V
$V_{BEsat} <$	2.6	2.0	V

D.C. current gain

$I_C = 0,1\text{ mA}; V_{CE} = 10\text{ V}$

$I_C = 1\text{ mA}; V_{CE} = 10\text{ V}$

$I_C = 10\text{ mA}; V_{CE} = 10\text{ V}$

$I_C = 150\text{ mA}; V_{CE} = 10\text{ V}$

$I_C = 150\text{ mA}; V_{CE} = 1\text{ V}$

$I_C = 500\text{ mA}; V_{CE} = 10\text{ V}$  BSR13; R

$I_C = 500\text{ mA}; V_{CE} = 10\text{ V}$  BSR14; R

$h_{FE} >$	35
$h_{FE} >$	50
$h_{FE} >$	75
$h_{FE}$	100 to 300
$h_{FE} >$	50
$h_{FE} >$	30
$h_{FE} >$	40

Transition frequency at  $f = 100\text{ MHz}$

$I_C = 20\text{ mA}; V_{CE} = 20\text{ V}$  BSR13; R

$I_C = 20\text{ mA}; V_{CE} = 20\text{ V}$  BSR14; R

$f_T >$	250	MHz
$f_T >$	300	MHz

Collector capacitance at  $f = 1\text{ MHz}$

$I_E = I_e = 0; V_{CB} = 10\text{ V}$

$C_c <$	8	pF
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Small signal current gain

$I_C = 1\text{ mA}; V_{CE} = 10\text{ V}; f = 1\text{ KHz};$  BSR14

$I_C = 10\text{ mA}; V_{CE} = 10\text{ V}; f = 1\text{ KHz};$  BSR13

$h_{fe}$	50 to 300
$h_{fe}$	75 to 375



## Packing Detail

PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
SOT-23 T&R	3K/reel	136 gm/3K pcs	3" x 7.5" x 7.5"	12.0K	17" x 15" x 13.5"	192.0K	12 kgs
			9" x 9" x 9"	51.0K	19" x 19" x 19"	408.0K	28 kgs
	10K/reel	415 gm/10K pcs	13" x 13" x 0.5"	10.0K	17" x 15" x 13.5"	300.0K	16 kgs

## Customer Notes

### Component Disposal Instructions

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

## Disclaimer

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