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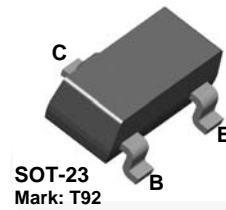


March 2014

BSR18A PNP General-Purpose Amplifier

Description

This device is designed as a general-purpose amplifier for switching applications at collector currents of 10 μ A to 100 mA. Sourced from process 66.



Ordering Information

Part Number	Marking	Package	Packing Method
BSR18A	T92	SOT-23 3L	Tape and Reel

Absolute Maximum Ratings^{(1),(2)}

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Value	Unit
V_{CEO}	Collector-Emitter Voltage	-40	V
V_{CBO}	Collector-Base Voltage	-40	V
V_{EBO}	Emitter-Base Voltage	-5	V
I_C	Collector Current - Continuous	-200	mA
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

Notes:

1. These ratings are based on a maximum junction temperature of 150 $^\circ\text{C}$.
2. These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty-cycle operations.

Thermal Characteristics⁽³⁾

Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Max.	Unit
P_D	Total Device Dissipation	350	mW
	Derate Above $T_A = 25^\circ\text{C}$	2.8	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	$^\circ\text{C}/\text{W}$

Note:

3. Device mounted on FR-4 PCB 40 mm X 40 mm X 1.5 mm.

Electrical Characteristics

Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Max.	Unit	
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	$I_C = -10 \mu\text{A}$, $I_B = 0$	-40		V	
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = -1.0 \text{ mA}$, $I_E = 0$	-40		V	
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = -10 \mu\text{A}$, $I_C = 0$	-5.0		V	
I_{CBO}	Collector Cut-Off Current	$V_{CB} = -30 \text{ V}$, $I_E = 0$		-50	nA	
I_{EBO}	Emitter Cut-Off Current	$V_{EB} = -3.0 \text{ V}$, $I_C = 0$		-50	nA	
h_{FE}	DC Current Gain ⁽⁴⁾	$I_C = -0.1 \text{ mA}$, $V_{CE} = -1.0 \text{ V}$	60			
		$I_C = -1.0 \text{ mA}$, $V_{CE} = -1.0 \text{ V}$	80			
		$I_C = -10 \text{ mA}$, $V_{CE} = -1.0 \text{ V}$	100	300		
		$I_C = -50 \text{ mA}$, $V_{CE} = -1.0 \text{ V}$	60			
		$I_C = -100 \text{ mA}$, $V_{CE} = -1.0 \text{ V}$	30			
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ⁽⁴⁾	$I_C = -10 \text{ mA}$, $I_B = -1.0 \text{ mA}$		-0.25	V	
		$I_C = -50 \text{ mA}$, $I_B = -5.0 \text{ mA}$		-0.40		
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ⁽⁴⁾	$I_C = -10 \text{ mA}$, $I_B = -1.0 \text{ mA}$	-0.65	-0.85	V	
		$I_C = -50 \text{ mA}$, $I_B = -5.0 \text{ mA}$		-0.95		
f_T	Transition Frequency	$I_C = -10 \text{ mA}$, $V_{CE} = -20 \text{ V}$, $f = 100 \text{ MHz}$	250		MHz	
C_{cb}	Collector-Base Capacitance	$V_{CB} = -5.0 \text{ V}$, $I_E = 0$, $f = 100 \text{ kHz}$		4.5	pF	
C_{eb}	Emitter-Base Capacitance	$V_{EB} = -0.5 \text{ V}$, $I_C = 0$, $f = 100 \text{ kHz}$		10	pF	
h_{ie}	Input Impedance	$V_{CE} = -10 \text{ V}$, $I_C = -1.0 \text{ mA}$, $f = 1.0 \text{ kHz}$	2	12	k Ω	
h_{ie}	Small-Signal Current Gain	$V_{CE} = -10 \text{ V}$, $I_C = -1.0 \text{ mA}$, $f = 1.0 \text{ kHz}$	100	400		
h_{ie}	Output Admittance	$V_{CE} = -10 \text{ V}$, $I_C = -1.0 \text{ mA}$, $f = 1.0 \text{ kHz}$	3	60	μS	
t_d	Delay Time	$I_C = -10 \text{ mA}$, $I_{B1} = -1.0 \text{ mA}$, $V_{EB} = -0.5 \text{ V}$		35	ns	
t_r	Rise Time			35	ns	
t_s	Storage Time		$I_C = -10 \text{ mA}$,		275	ns
t_f	Fall Time		$I_{Bon} = I_{Boff} = -1.0 \text{ mA}$		75	ns

Note:

4. Pulse test: pulse width 300 μs , duty cycle 0.01%.

Typical Performance Characteristics

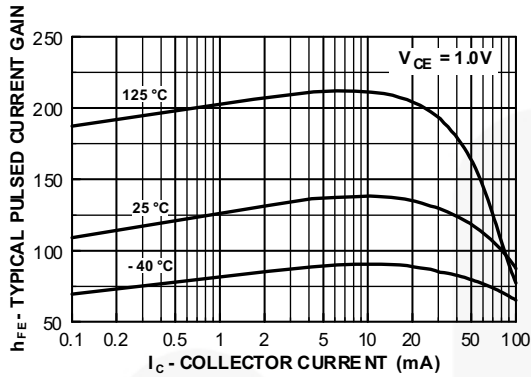


Figure 1. Typical Pulsed Current Gain vs. Collector Current

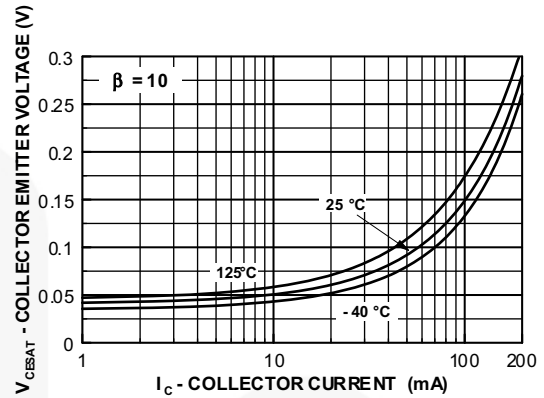


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

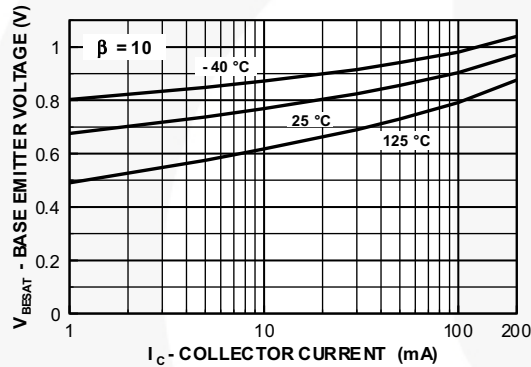


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

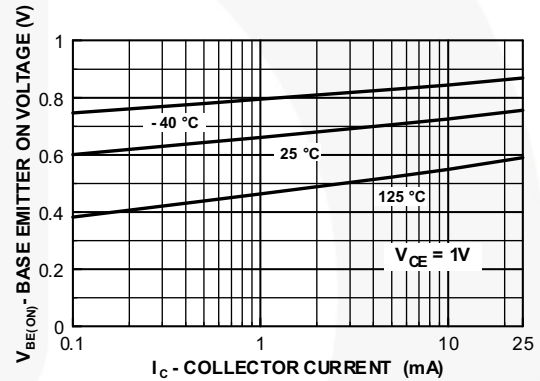


Figure 4. Base-Emitter On Voltage vs. Collector Current

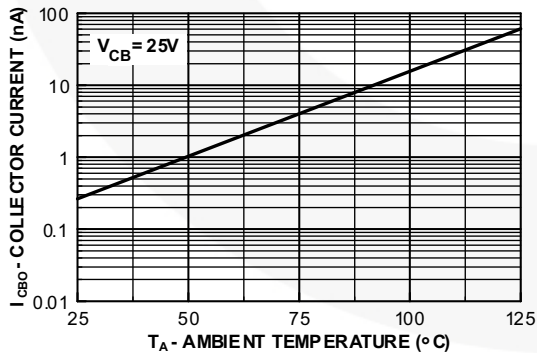


Figure 5. Collector Cut-Off Current vs. Ambient Temperature

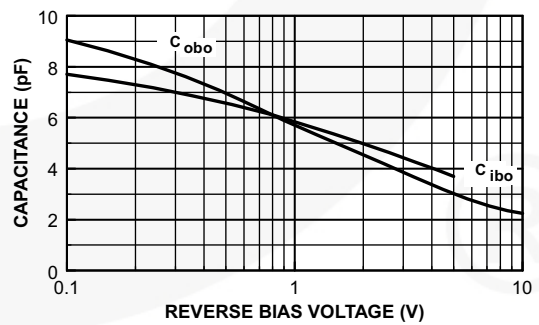


Figure 6. Common-Base Open Circuit Input and Output Capacitance vs. Reverse Bias Voltage

Typical Performance Characteristics (Continued)

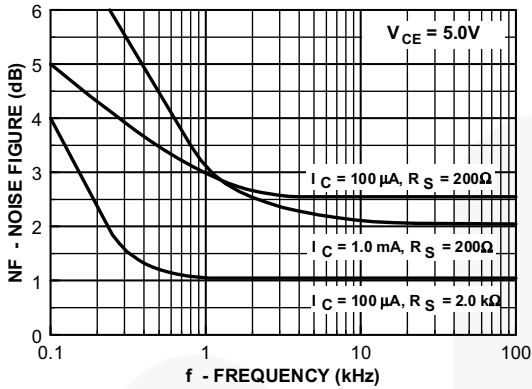


Figure 7. Noise Figure vs. Frequency

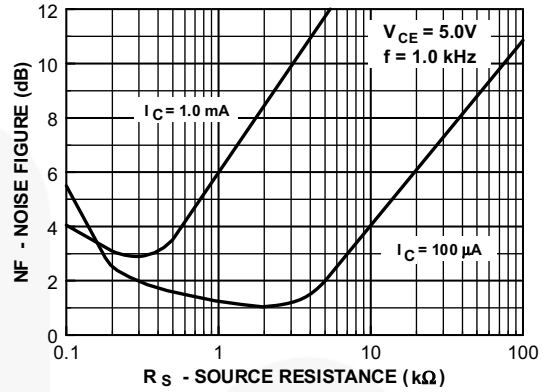


Figure 8. Noise Figure vs. Source Resistance

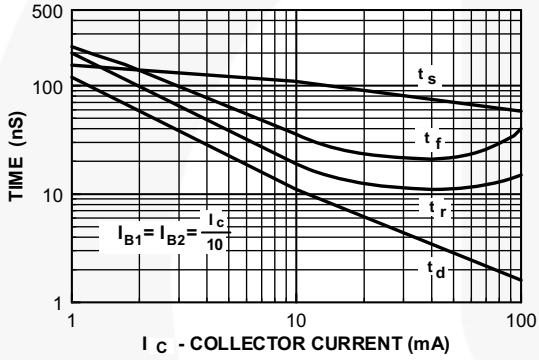


Figure 9. Switching Times vs. Collector Current

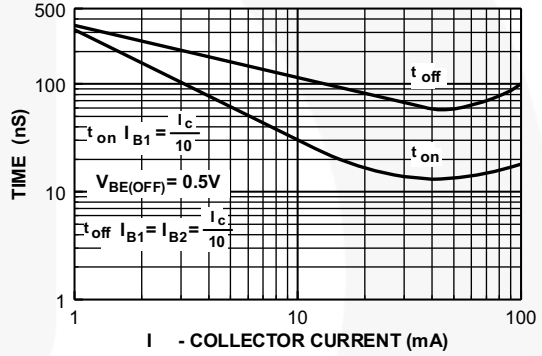


Figure 10. Turn-On and Turn-Off Times vs. Collector Current

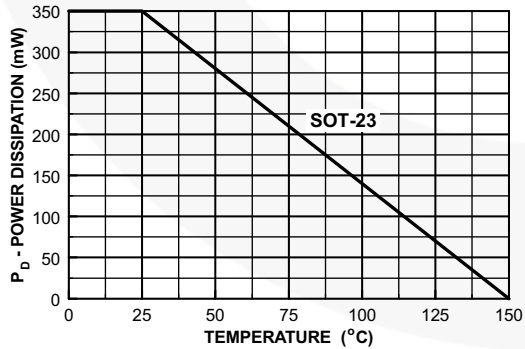


Figure 10. Power Dissipation vs. Ambient Temperature

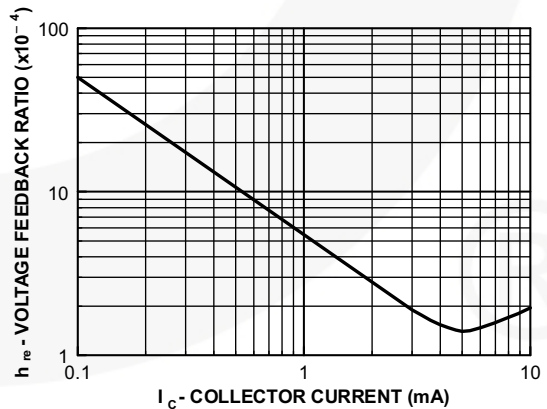


Figure 11. Voltage Feedback Ratio

Typical Performance Characteristics (Continued)

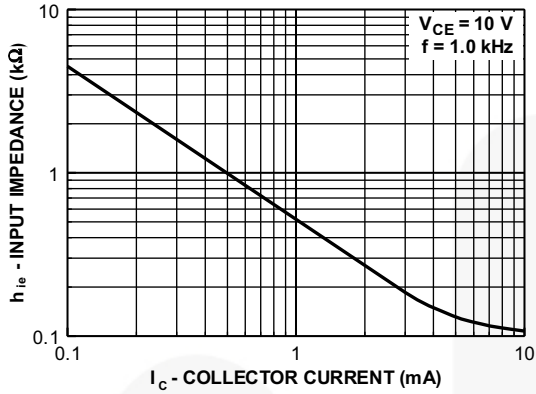


Figure 13. Input Impedance

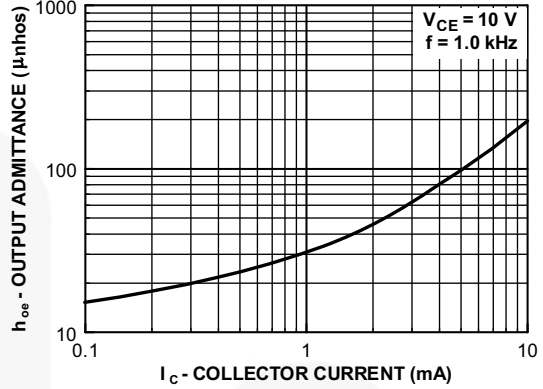


Figure 14. Output Admittance

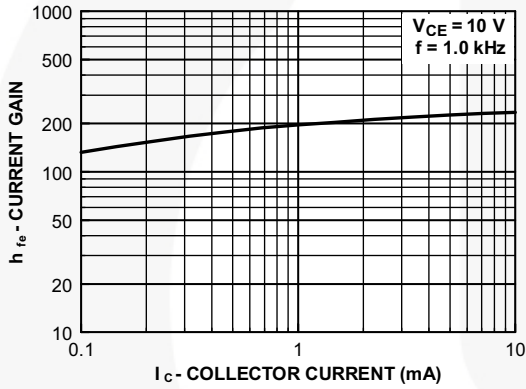


Figure 15. Current Gain

Physical Dimensions

SOT-23

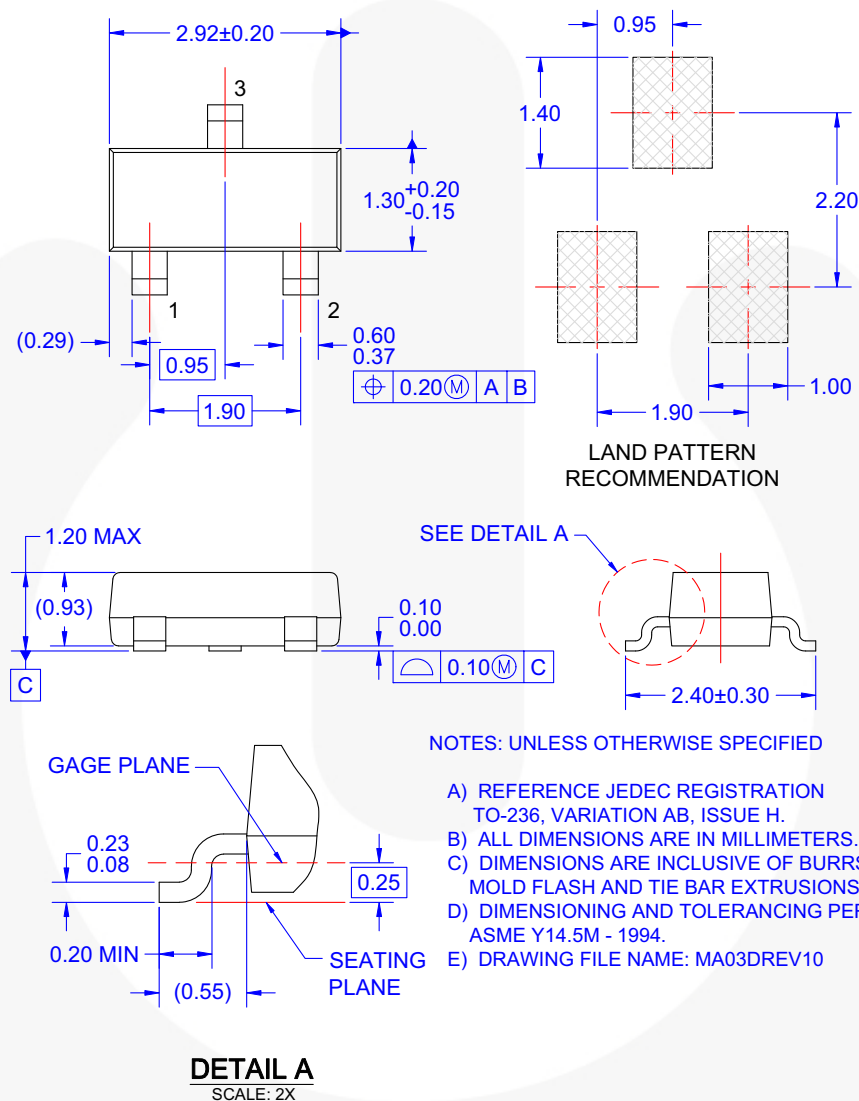


Figure 16. 3-LEAD, SOT23, JEDEC TO-236, LOW PROFILE (ACTIVE)

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