

AS395 - Matched PNP transistor pair

Features

- dual matched PNP transistor
- low offset voltage: 100 μ V max
- low noise: 1 nV/ $\sqrt{\text{Hz}}$ @ 1 kHz typ
- high gain: 100 min
- high gain bandwidth: 190 MHz typ
- tight gain matching: 3% max
- excellent logarithmic conformance

AS395H



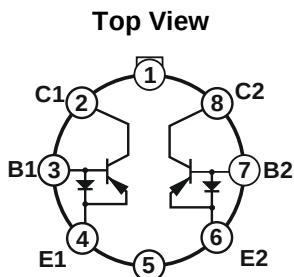
General Description

The AS395 dual monolithic PNP transistor offers excellent parametric matching and high frequency performance. Low noise characteristics (1 nV/ $\sqrt{\text{Hz}}$ typ @ 1 kHz), high bandwidth (190 MHz typical), and low offset voltage (100 μ V max), makes the AS395 an excellent choice for demanding preamplifier applications. Tight current gain matching (3% max mismatch) and high current gain (100 min), over a wide range of collector current, makes the AS395 an excellent choice for current mirrors. A low value of bulk resistance makes the AS395 an ideal component for applications requiring accurate logarithmic conformance.

To insure the long-term stability of the matching parameters, internal protection diodes across the base-emitter junction clamp any reverse base-emitter junction potential. This prevents a base-emitter breakdown condition which can result in degradation of gain and matching performance due to excessive breakdown current.

The AS395H are available in the 8-pin metal can TO5-8.

Connection Diagram



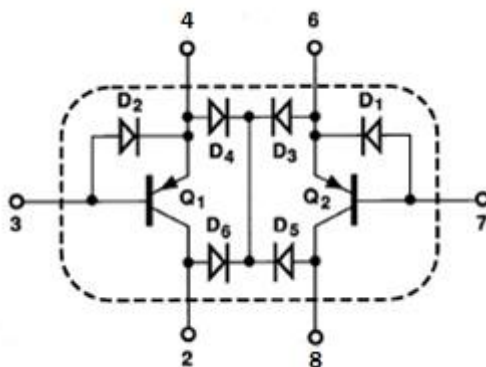
AS395H

Metal Can Package (TO5-8)

Pin Information

Pins number Package type	Symbol	Description
TO5-8		
1	NC	Not connected
2	C1	Collector1
3	B1	Base1
4	E1	Emitter1
5	NC	Not connected
6	E2	Emitter2
7	B2	Base2
8	C2	Collector2

Simplified schematics of AS395





ABSOLUTE MAXIMUM RATINGS

Collector-Base Voltage (BV_{CBO}) 36 V
Collector-Emitter Voltage (BV_{CEO}) 36 V
Collector-Collector Voltage (BV_{CC}) 36 V
Emitter-Emitter Voltage (BV_{EE}) 36 V
Collector Current (I_C) 20 mA
Emitter Current (I_E) 20 mA

Electrical performance characteristics ($T_A=+25^\circ\text{C}$, unless otherwise noted.)

Parameter	Symbol	Conditions	AS395			Unit
			Min	Typ	Max	
Current Gain ¹	h_{FE}	$V_{CB} = 0\text{ V}, -36\text{ V}$				
		$I_C = 1\text{ mA}$	100	165		
		$I_C = 100\text{ }\mu\text{A}$	90	150		
		$I_C = 10\text{ }\mu\text{A}$	80	120		
Current Gain Matching ²	Dh_{FE}	$I_C = 100\text{ }\mu\text{A}, V_{CB} = 0\text{ V}$		0,5	3	%
Offset Voltage ³	V_{OS}	$V_{CB} = 0\text{ V}, I_C = 100\text{ }\mu\text{A}$		40	100	μV
Offset Voltage Change vs. Collector Voltage	DV_{OS}/DV_{CB}	$I_C = 100\text{ }\mu\text{A}$				
		$V_{CB1} = 0\text{ V}$		11	150	μV
		$V_{CB2} = -36\text{ V}$		11	150	
Offset Voltage Change vs. Collector Current	DV_{OS}/DI_C	$V_{CB} = 0\text{ V}$		12	50	μV
		$I_{C1} = 10\text{ }\mu\text{A}, I_{C2} = 1\text{ mA}$		12	50	
Offset Current Collector-Base	I_{OS}	$I_C = 100\text{ }\mu\text{A}, V_{CB} = 0\text{ V}$		6	35	nA
Leakage Current	I_{CBO}	$V_{CB} = -36\text{ V} = V_{MAX}$		50	200	pA
Collector Saturation Voltage	$V_{CE(SAT)}$	$I_C = 1\text{ mA}, I_B = 100\text{ }\mu\text{A}$		0,025	0,1	V

NOTES

¹ Current gain is measured at collector-base voltages (V_{CB}) swept from 0 to V_{MAX} at indicated collector current. Typical values are measured at $V_{CB} = 0\text{ V}$.

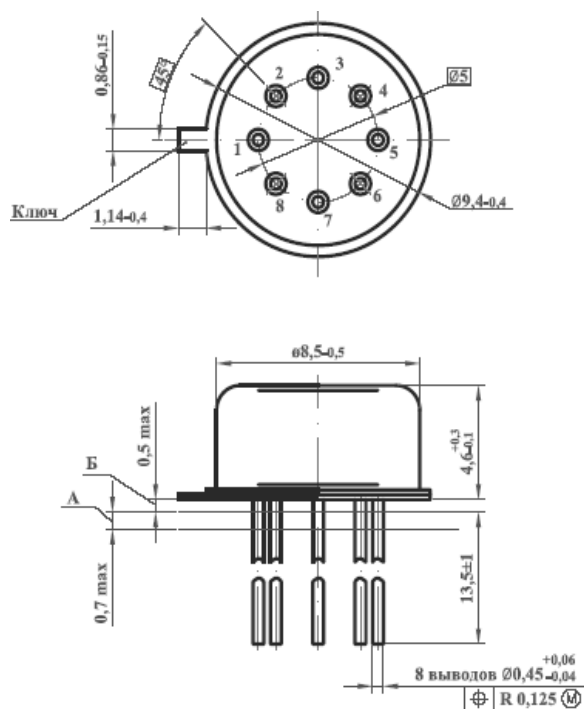
² Current gain matching (Δh_{FE}) is defined as: $\Delta h_{FE} = 100 (\Delta I_B) * h_{FE}(\text{min}) / I_C$

³ Offset voltage is defined as: $V_{OS} = V_{BE1} - V_{BE2}$, where V_{OS} is the differential voltage for $I_{C1} = I_{C2}$:

$$V_{OS} = V_{BE1} - V_{BE2} = KT/q * \ln(I_{C1}/I_{C2})$$

Package Dimensions in millimeters

Bottom view



8-lead TO-5 metal can package

Revision history

Date	Revision	Changes
31-Jan-2020	1	Initial version
19-Oct-2020	2	Minor changes