AS395 - Matched PNP transistor pair

Features

- dual matched PNP transistor
- low offset voltage: 100 µV max
- low noise: 1 nV/√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

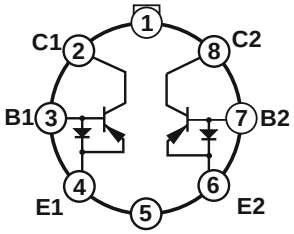
The AS395 dual monolithic PNP transistor offers excellent parametric matching and high frequency performance. Low noise characteristics (1 nV/√Hz typ @ 1 kHz), high bandwidth (190 MHz typical), and low offset voltage (100 µV max), makes the AS395 an excellent choice for demanding preamplifier applications. 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

Top View



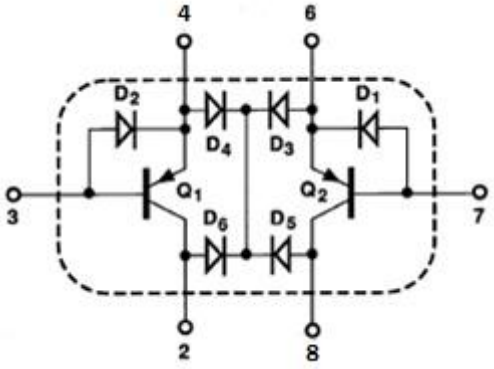
AS395H

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°C, unless otherwise noted.)

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

NOTES

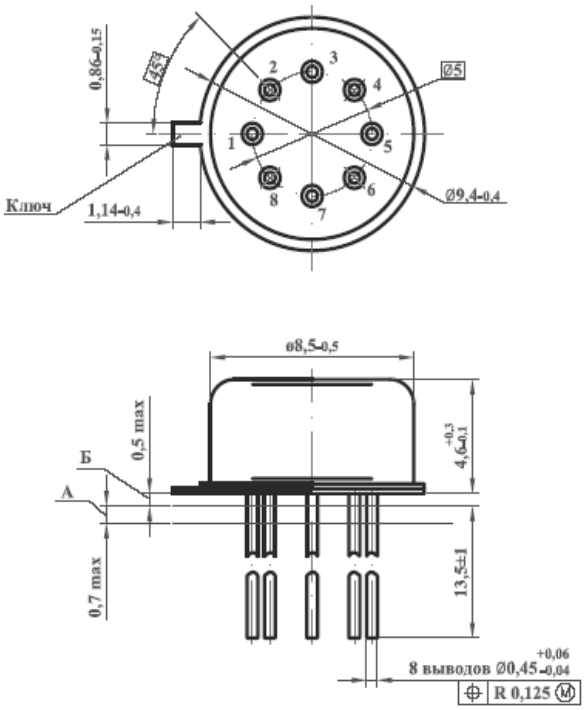
[1] Current gain is measured at collector-base voltages (V_{CB}) swept from 0 to V_{MAX} at indicated collector current. Typicals are measured at V_{CB} = 0 V.

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

[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

Botton view



8-lead T0-5 metal can package

Revision history

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