

Current/Frequency Converter (HIF 10)

1. Features (for outside view, see Fig. 1)

- The clock frequency can reach 256kHz
- Externally connected adjustable sampling resistance for constant current source
- The range of power supply: $\pm 12 \sim \pm 18V$
- Adjustable zero position



Size: 39.12×25×5.5mm³; weight: 16.7g

Fig. 1 Outside view of HIF10

2. Scope of application

A/D conversion circuit in inertial navigation system

3. Description

HIF10 current/frequency converter is one of the kernel circuits of the inertial navigation system, which realizes A/D conversion function. Critical indexes such as nonlinear temperature drift and zero stability of this product can reach a higher level.

This product is made by the thick-film hybrid integrated process and is totally sealed in a metal case. Both the design and manufacture of the product satisfy the requirements of GJB2438A-2002 “General specification for hybrid integrated circuits” and specific specification of the product.

4. Electrical performance (Table 1 and 2)

Table 1 Rated conditions and recommended conditions

Absolute max. rated value	Power voltage: $\pm 18V$ Voltage of constant current source: 18V Digital power voltage: 6V Storage temperature: $-55 \sim 125$
Recommended operating conditions	Power voltage: $\pm 15 \pm 0.05V$ Voltage of constant current source: $\pm 15 \pm 0.05V$ Digital supply power voltage: $5 \pm 0.05V$

Table 2 Electric characteristics

parameter	Conditions (unless otherwise specified) $V_{S+} = 15 \pm 0.5V, V_{S-} = -15 \pm 0.5V$ $V_{HL} = 15 \pm 0.5V, V_D = 5 \pm 0.25V$ $0^\circ C \leq T_A \leq 65^\circ C$	HIF10	
		Enterprise military standard: Q/HW30548-2004	
		min.	max.
zero offset frequency/Hz	$T_A = 25^\circ C, I_1 = 0mA$	—	3
zero drift frequency/Hz	$I_1 = 0mA$	—	0.5
small signal error/Hz	$ \pm 0.5\mu A \leq I_1 < \pm 0.5mA $	—	1
nonlinearity	$ \pm 0.5mA \leq I_1 \leq \pm 5mA $	—	3×10^{-4}
	$ \pm 6mA \leq I_1 \leq \pm 9mA $	—	3×10^{-3}
scale factor temperature drift ($m \cdot C^{-1}$)	$ \pm 0.2mA \leq I_1 \leq \pm 9mA $	—	15
symmetry	$ \pm 0.5mA \leq I_1 \leq \pm 9mA $	—	2×10^{-3}
scale factor stability	$T_A = 25^\circ C$ $ \pm 0.2mA \leq I_1 \leq \pm 5mA $	—	1×10^{-4}
	$ \pm 6mA \leq I_1 \leq \pm 9mA $	—	

5 Circuit block chart (Fig. 2)

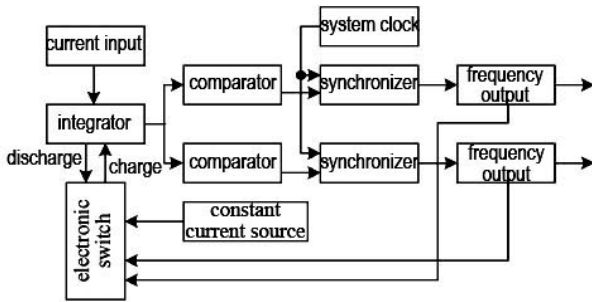


Fig. 2 Circuit block chart

6 MTBF curve (Fig. 3)

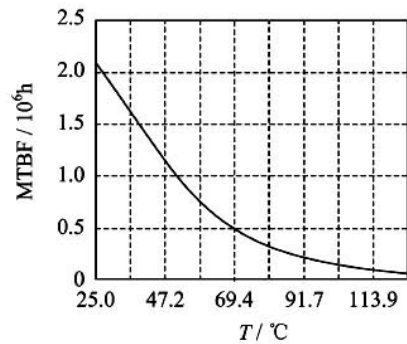


Fig. 3 MTBF-temperature curve

(as per GJB/Z 299B-98, envisaged good ground condition)

7 Pin designation (Fig. 4, Table 3)

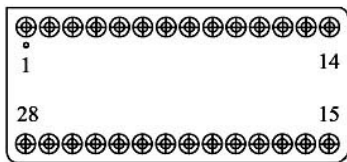


Fig. 4 Bottom view

8 Connection diagram for typical application (Fig. 5)

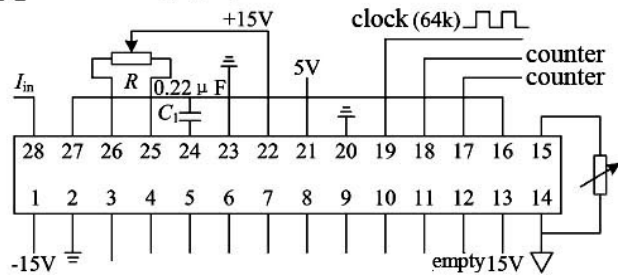


Fig. 5 Connection diagram for typical application

Table 3 Pin designation

Pin	Meaning	Pin	Meaning	Pin	Meaning
1	-15V power supply	16	input 2 (connected to C ₁)	23	precision ground
2	analogue ground	17	frequency negative output	24	external integration capacitor (connected to C ₁)
3~11	vacant	18	frequency positive output	25	zeroing
12	output reference voltage	19	clock frequency input	26	zeroing
13	15V constant current source voltage	20	digital ground	27	input 1 (connected to C ₁)
14	constant current source ground	21	5V power supply	28	input
15	constant current source sampling	22	+15V power supply		

9 Package specifications (Unit: mm)(Fig. 6, Table 4)

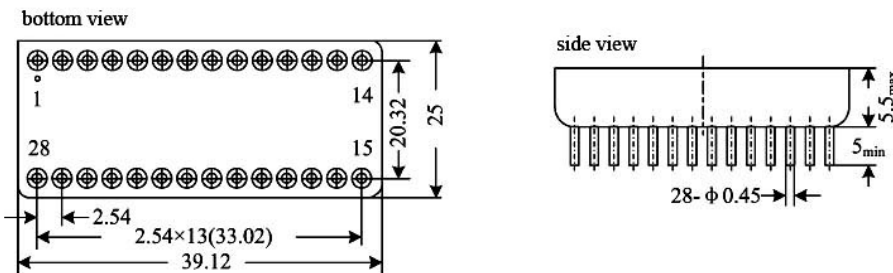


Fig. 6 External dimension diagram

Table 4 Case materials

Case model	Header	Header plating	Cover	Covering plating	Pin material	Pin plating	Sealing style	Notes
UP3925-28	Kovar (4J29)	Ni/Au	Iron/nickel alloy	Ni/Au	Kovar (4J29)	Ni/Au	Compression seal	

Note: temperature of the solder pins within 10s shall not exceed 300 .

10 Part numbering key (Fig. 7)

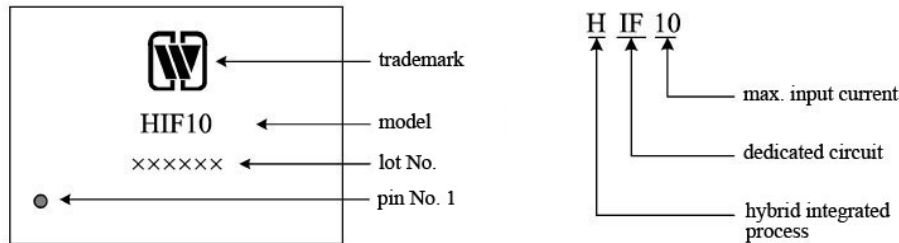


Fig. 7 Part numbering key

Application notes

Upon power-on, be sure to correctly connect the positive and negative pole of the power supply to ensure correct power supply for fear of burning.

Upon assembly, the bottom of the product shall fit to the circuit board closely so as to avoid damage of pins, and shockproof provision shall be added, if necessary.

Do not bend the pinouts to prevent the insulator from breaking, which affects the sealing property.

The dynamic parameters of meter head produced by different users are different, the user is required to provide meter head by himself to achieve the optimum commissioning state.

When the user places an order for the product, detailed electric performance indexes shall refer to the relevant enterprise standard.