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KA331 V-F Converter

Features

- Guaranteed linearity: 0.01% max.
- Low power dissipation: 15mW at 5V
- Wide range of full scale frequency: 1Hz to 100KHz
- Pulse output compatible with all logic forms
- Wide dynamic range: 100dB min at 10KHz full scale frequency

Description

This voltage to frequency converter provides the output pulse train at a frequency precisely proportional to the applied input voltage. The KA331 can operate at power supplies as low as 4.0V and be changed output frequency from 1Hz to 100KHz. It is ideally suited for use in simple low-cost circuit for analog-to digital conversion, long term integration, linear frequency modulation or demodulation, frequency-to-voltage conversion, and many other functions.



Internal Block Diagram



Absolute Maximum Ratings (T_A = 25°C)

Parameter	Symbol	Value	Unit
Supply Voltage	Vcc	40	V
Input Voltage	VI	-0.2 ~ + VCC	V
Operating Temperature Range	TOPR	0 ~ +70	۵°C
Power Dissipation	PD	500	mW

Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Тур.	Max.	Unit	
VFC Non-Linearity	VFCNL	$4.5 \le V_{CC} \le 20V$	-	±0.003	±0.01	% Full-Scale	
Conversion Accuracy Scale Factor	ACCUR	VI = -10V, Rs = 14KΩ	0.90	1.00	1.10	KHz/V	
Chang Of Gain With VCC	Vcc∆G/Vcc	$4.5V \le V_{CC} \le 10V$	-	0.01	0.1	%/V	
		$10V \le VCC \le 40V$	-	0.006	0.06		
Rated Full - Scale Frequency	f	VI = -10V	10.0	-	-	KHz	
INPUT COMPARATOR							
Offset Voltage	Vio	$0^{\circ}C \le T_A \le +70^{\circ}C$	-	±3	±10	mV	
Bias Current	IBIAS	-	-	-80	-300	nA	
Offset Current	lio	-	-	±8	±100	nA	
Common-Mode Range	Vсм	$0^{\circ}C \le T_A \le +70^{\circ}C$	-0.2	-	Vcc-2.0	V	
TIMER (PIN 5)							
Timer Threshold Voltage	Vth	-	0.63	0.667	0.701	×Vcc	
Input Bias Current	IBIAS	$\begin{array}{l} VCC=15V,\\ 0V\leqV_5\leq9.9V \end{array}$	-	±10	±100	nA	
		V5 = 10V	-	200	1000	nA	
Saturation Voltage	VSAT	I = 5mA	-	0.22	0.5	V	
CURRENT SOURCE (PIN 1)							
Output Current	lo	$R_S = 14K\Omega, V_1 = 0V$	116	136	156	μA	
Change with Voltage	$\Delta IO/\Delta V_1$	$0V \le V_1 \le 10V$	-	0.2	1.0	μA	
Current Source Off Leakage	ILKG	-	-	0.02	10.0	nA	
REFERENCE VOLTAGE (PIN 2)							
Reference Voltage	Vref	-	1.70	1.89	2.08	VDC	
Stability vs Temperature	STT	-	-	±60	-	ppm/°C	
Stability vs Time, 1000Hours	STT	-	-	±0.1	-	%	
LOGIC OUTPUT (Pin 3)							
Saturation Voltage	VSAT	I = 5mA	-	0.15	0.50	- V	
		l = 3.2mA	-	0.10	0.40		
Off Leakage	ILKG	-	-	±0.05	1.0	μΑ	
SUPPLY CURRENT							
Supply Current		VCC = 5V	1.5	3.0	6.0	mA	
		$V_{CC} = 40V$	2.0	4.0	8.0		

Typical Applications



Figure 1. Precision Voltage-to-Frequency Converter, 100KHz Full-Scale



Figure 2. Simple Frequency-to-Voltage Converter, 10KHz Full-Scale



Figure 3. Light Intensity to Frequency Converter

Mechanical Dimensions

Package

Dimensions in millimeters



8-DIP

Ordering Information

Product Number	Package	Operating Temperature
KA331	8-DIP	0 ~ + 70°C

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