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# **KA331**

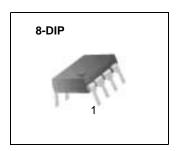
## V-F Converter

### **Features**

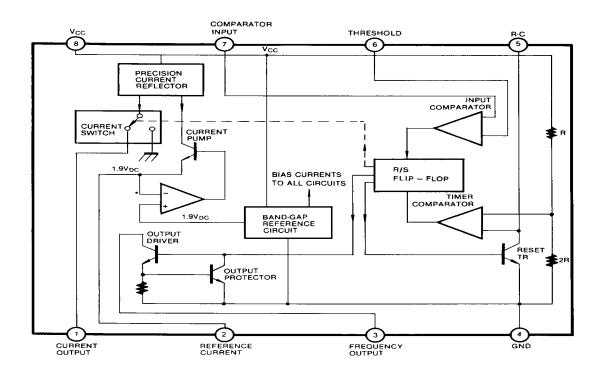
- Guaranteed linearity: 0.01% max.
- Low power dissipation: 15mW at 5V
- Wide range of full scale frequency: 1Hz to 100KHz
- Pulse output compatible with all logic forms
- Wide dynamic range: 100dB min at 10KHz full scale frequency

### **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<sub>A</sub> = 25°C)

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

## **Electrical Characteristics**

Parameter	Symbol	Conditions	Min.	Тур.	Max.	Unit		
VFC Non-Linearity	VFCNL	4.5 ≤ V <sub>CC</sub> ≤ 20V	-	±0.003	±0.01	% Full-Scale		
Conversion Accuracy Scale Factor	ACCUR	$V_I = -10V$ , $R_S = 14K\Omega$	0.90	1.00	1.10	KHz/V		
Chang Of Gain With VCC	Vcc∆G/Vcc	4.5V ≤ V <sub>CC</sub> ≤ 10V	-	0.01	0.1	%/V		
		10V ≤ VCC ≤ 40V	-	0.006	0.06			
Rated Full - Scale Frequency	f	V <sub>I</sub> = -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 (PIN 5)							
Timer Threshold Voltage	VTH	-	0.63	0.667	0.701	×Vcc		
Input Bias Current	IBIAS	VCC = 15V, $0V \le V_5 \le 9.9V$	-	±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	μΑ		
Change with Voltage	ΔΙΟ/ΔV1	0V ≤ V1≤ 10V	-	0.2	1.0	μΑ		
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		
		I = 3.2mA	-	0.10	0.40	V		
Off Leakage	ILKG	-	-	±0.05	1.0	μΑ		
SUPPLY CURRENT								
Supply Current	Icc	VCC = 5V	1.5	3.0	6.0	mA		
оирріу Сипепі. 	100	Vcc = 40V	2.0	4.0	8.0	IIIA		

## **Typical Applications**

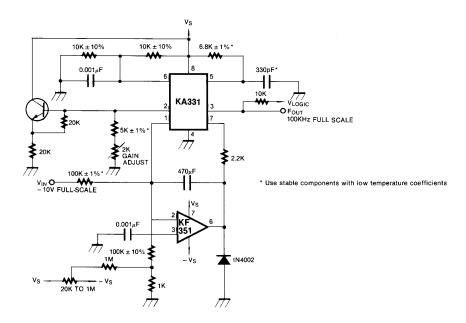


Figure 1. Precision Voltage-to-Frequency Converter, 100KHz Full-Scale

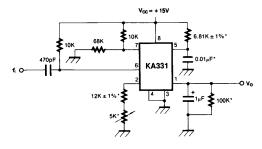


Figure 2. Simple Frequency-to-Voltage Converter, 10KHz Full-Scale

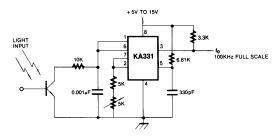
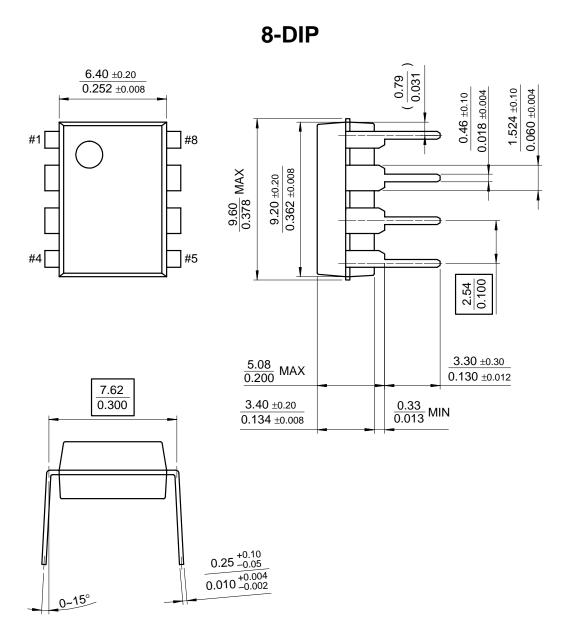


Figure 3. Light Intensity to Frequency Converter

### **Mechanical Dimensions**

### **Package**

### **Dimensions in millimeters**



# **Ordering Information**

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

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