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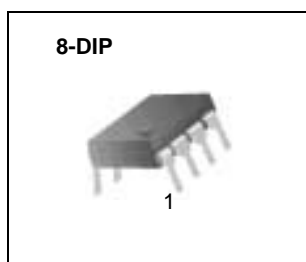
V-F Converter

Features

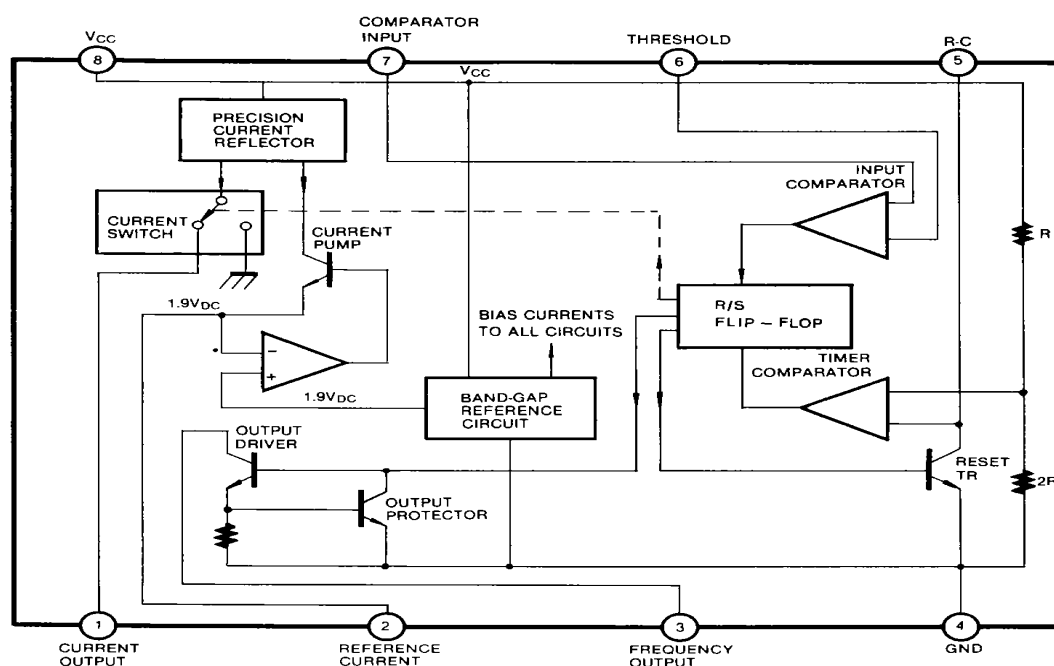
- Guaranteed linearity: 0.01% max.
- Low power dissipation: 15mW at 5V
- Wide range of full scale frequency: 1Hz to 100KHz
- Pulse output compatible with all logic forms
- Wide dynamic range: 100dB min at 10KHz full scale frequency

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



Rev. 1.0.0

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Absolute Maximum Ratings (TA = 25°C)

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

Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
VFC Non-Linearity	VFCNL	$4.5 \leq V_{CC} \leq 20V$	-	± 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	$V_{CC}\Delta G/V_{CC}$	$4.5V \leq V_{CC} \leq 10V$	-	0.01	0.1	%V
		$10V \leq V_{CC} \leq 40V$	-	0.006	0.06	
Rated Full - Scale Frequency	f	$V_I = -10V$	10.0	-	-	KHz
INPUT COMPARATOR						
Offset Voltage	VIO	$0^\circ C \leq T_A \leq +70^\circ C$	-	± 3	± 10	mV
Bias Current	IBIAS	-	-	-80	-300	nA
Offset Current	IIO	-	-	± 8	± 100	nA
Common-Mode Range	VCM	$0^\circ C \leq T_A \leq +70^\circ C$	-0.2	-	$V_{CC}-2.0$	V
TIMER (PIN 5)						
Timer Threshold Voltage	VTH	-	0.63	0.667	0.701	$\times V_{CC}$
Input Bias Current	IBIAS	$V_{CC} = 15V, 0V \leq V_5 \leq 9.9V$	-	± 10	± 100	nA
		$V_5 = 10V$	-	200	1000	nA
Saturation Voltage	VSAT	$I = 5mA$	-	0.22	0.5	V
CURRENT SOURCE (PIN 1)						
Output Current	IO	$R_S = 14K\Omega, V_1 = 0V$	116	136	156	μA
Change with Voltage	$\Delta I_O / \Delta V_1$	$0V \leq V_1 \leq 10V$	-	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
		$I = 3.2mA$	-	0.10	0.40	
Off Leakage	ILKG	-	-	± 0.05	1.0	μA
SUPPLY CURRENT						
Supply Current	ICC	$V_{CC} = 5V$	1.5	3.0	6.0	mA
		$V_{CC} = 40V$	2.0	4.0	8.0	

Typical Applications

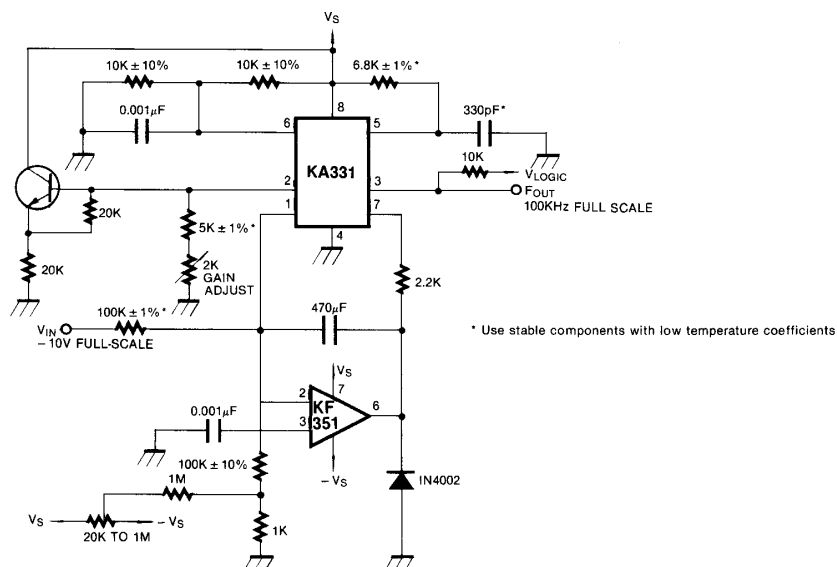


Figure 1. Precision Voltage-to-Frequency Converter, 100KHz Full-Scale

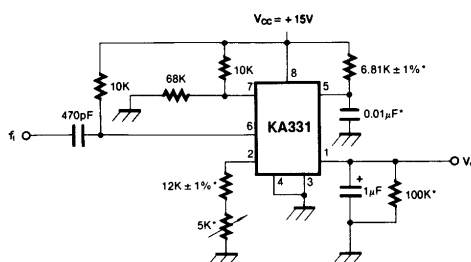


Figure 2. Simple Frequency-to-Voltage Converter, 10KHz Full-Scale

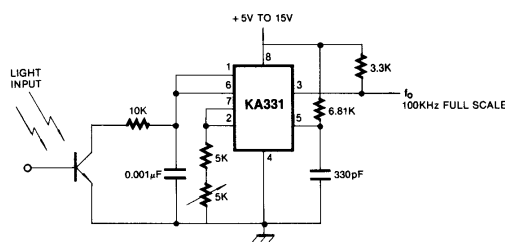


Figure 3. Light Intensity to Frequency Converter

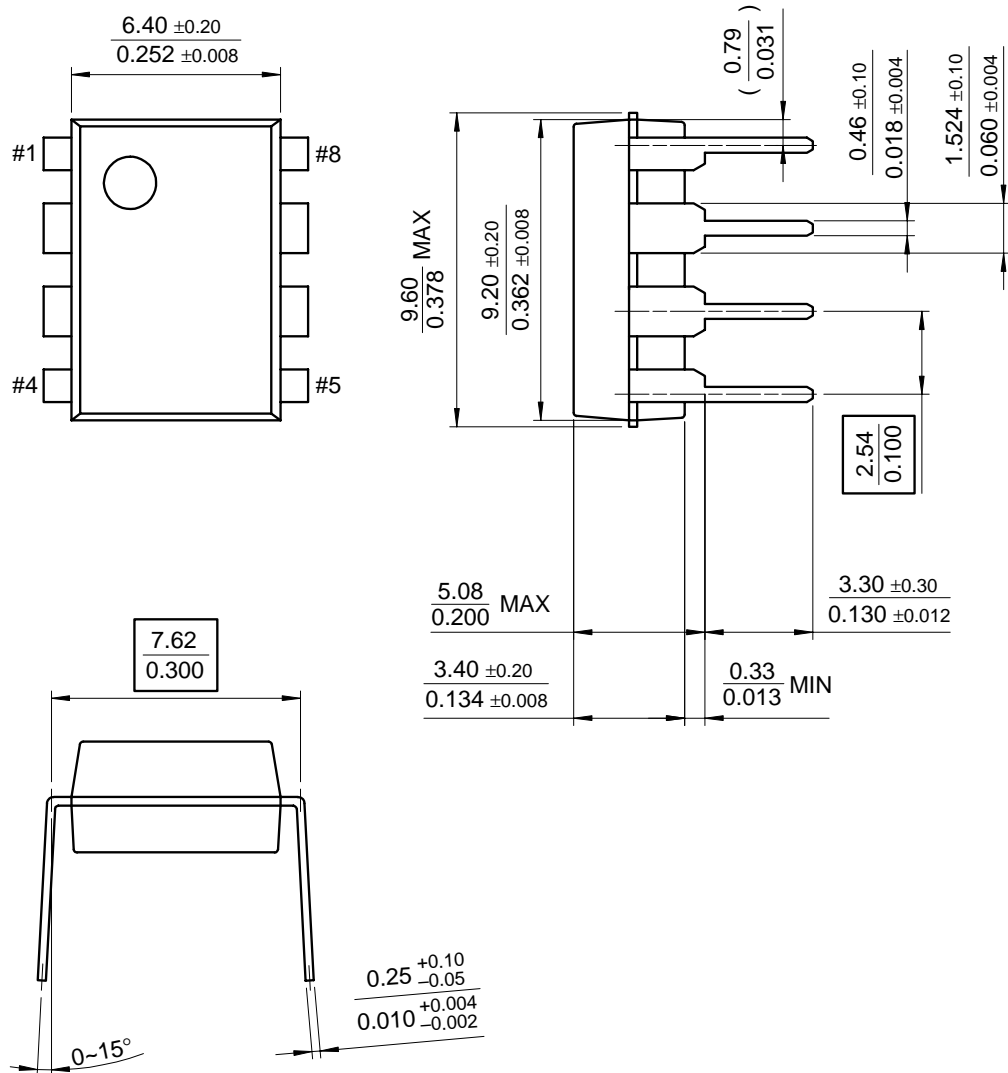
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Mechanical Dimensions

Package

Dimensions in millimeters

8-DIP



Ordering Information

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

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