

# V-F Converter

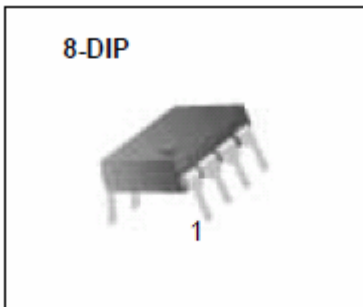
## Features

- 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

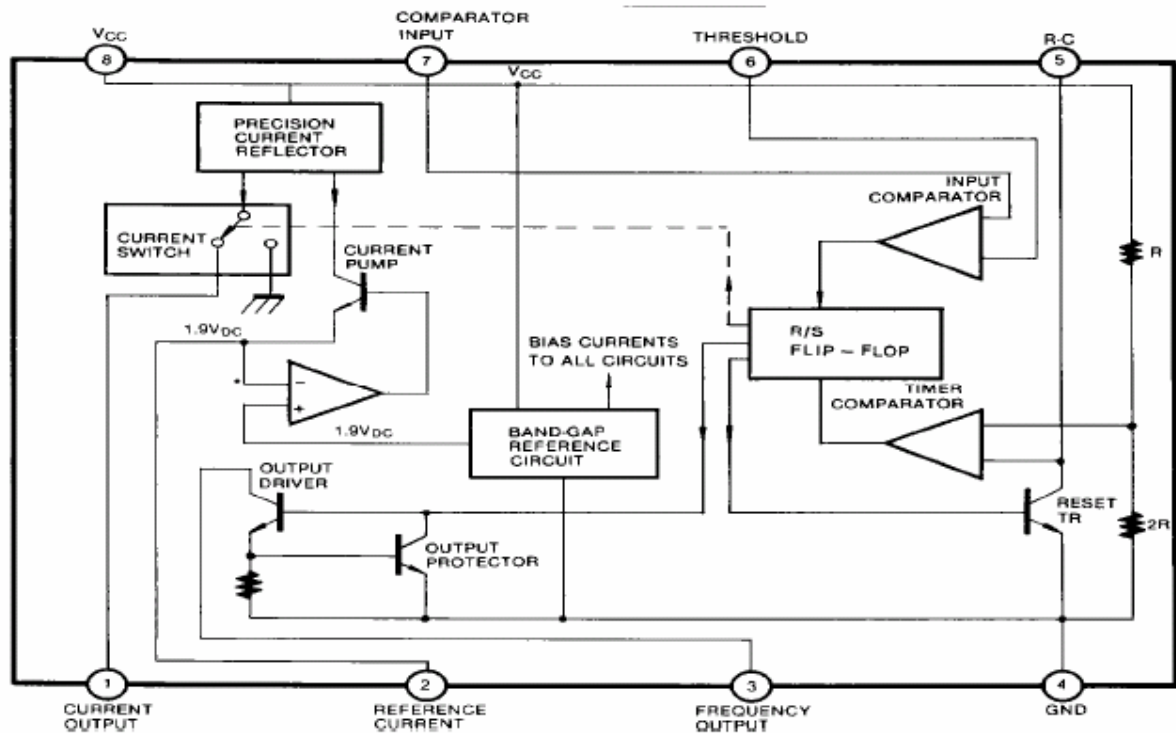
frequency

## Description

This voltage to frequency converter provides the output pulse train at a frequency precisely proportional to the applied input voltage. The MC331 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 (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	$4.5 \leq V_{CC} \leq 20V$	-	$\pm 0.003$	$\pm 0.01$	% Full-Scale
Conversion Accuracy Scale Factor	ACCUR	$V_I = -10V, R_S = 14K\Omega$	0.90	1.00	1.10	KHz/V
Change Of Gain With VCC	VCCΔG/VCC	$4.5V \leq V_{CC} \leq 10V$	-	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
<b>INPUT COMPARATOR</b>						
Offset Voltage	VIO	$0^\circ C \leq T_A \leq +70^\circ C$	-	$\pm 3$	$\pm 10$	mV
Bias Current	IBIAS	-	-	-80	-300	nA
Offset Current	IIO	-	-	$\pm 8$	$\pm 100$	nA
Common-Mode Range	VCM	$0^\circ C \leq T_A \leq +70^\circ C$	-0.2	-	VCC-2.0	V
<b>TIMER (PIN 5)</b>						
Timer Threshold Voltage	VTH	-	0.63	0.667	0.701	$\times V_{CC}$
Input Bias Current	IBIAS	$V_{CC} = 15V, 0V \leq V_5 \leq 9.9V$	-	$\pm 10$	$\pm 100$	nA
		$V_5 = 10V$	-	200	1000	nA
Saturation Voltage	VSAT	$I = 5mA$	-	0.22	0.5	V
<b>CURRENT SOURCE (PIN 1)</b>						
Output Current	IO	$R_S = 14K\Omega, V_I = 0V$	116	136	156	$\mu A$
Change with Voltage	$\Delta IO/\Delta V_1$	$0V \leq V_1 \leq 10V$	-	0.2	1.0	$\mu A$
Current Source Off Leakage	ILKG	-	-	0.02	10.0	nA
<b>REFERENCE VOLTAGE (PIN 2)</b>						
Reference Voltage	VREF	-	1.70	1.89	2.08	VDC
Stability vs Temperature	STT	-	-	$\pm 60$	-	ppm/°C
Stability vs Time, 1000Hours	STT	-	-	$\pm 0.1$	-	%
<b>LOGIC OUTPUT (Pin 3)</b>						
Saturation Voltage	VSAT	$I = 5mA$	-	0.15	0.50	V
		$I = 3.2mA$	-	0.10	0.40	
Off Leakage	ILKG	-	-	$\pm 0.05$	1.0	$\mu A$
<b>SUPPLY CURRENT</b>						
Supply Current	ICC	$V_{CC} = 5V$	1.5	3.0	6.0	mA
		$V_{CC} = 40V$	2.0	4.0	8.0	

### Typical Applications

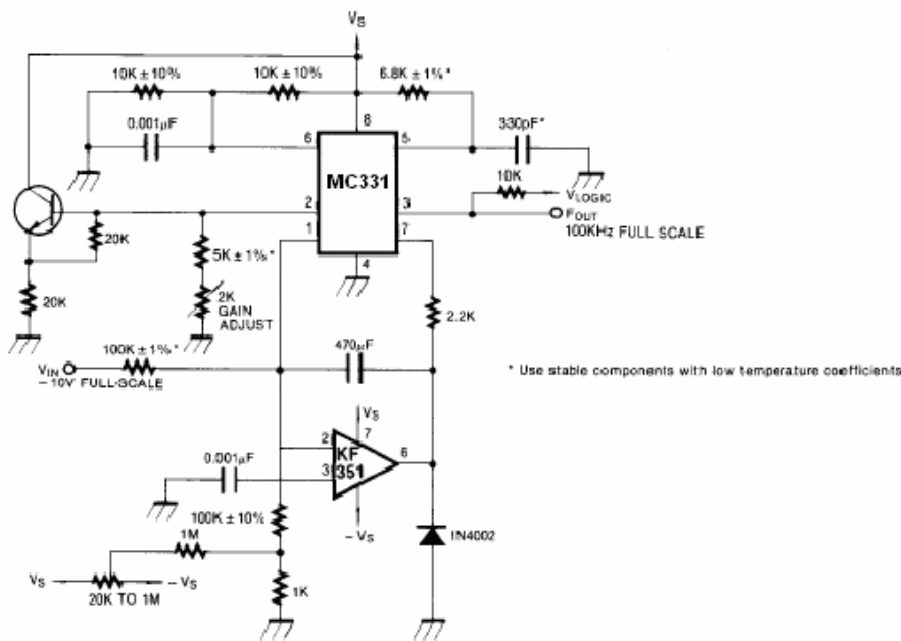


Figure 1. Precision Voltage-to-Frequency Converter, 100KHz Full-Scale

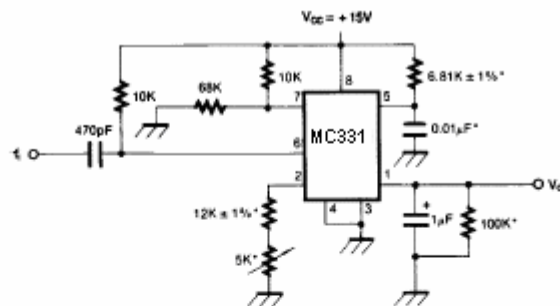


Figure 2. Simple Frequency-to-Voltage Converter, 10KHz Full-Scale

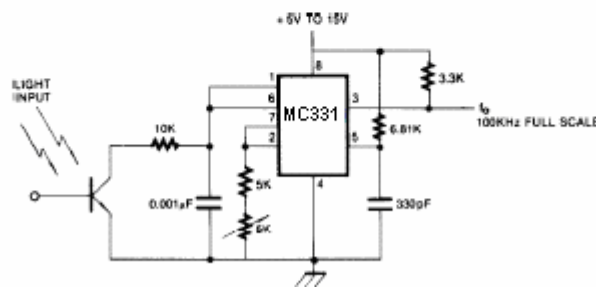


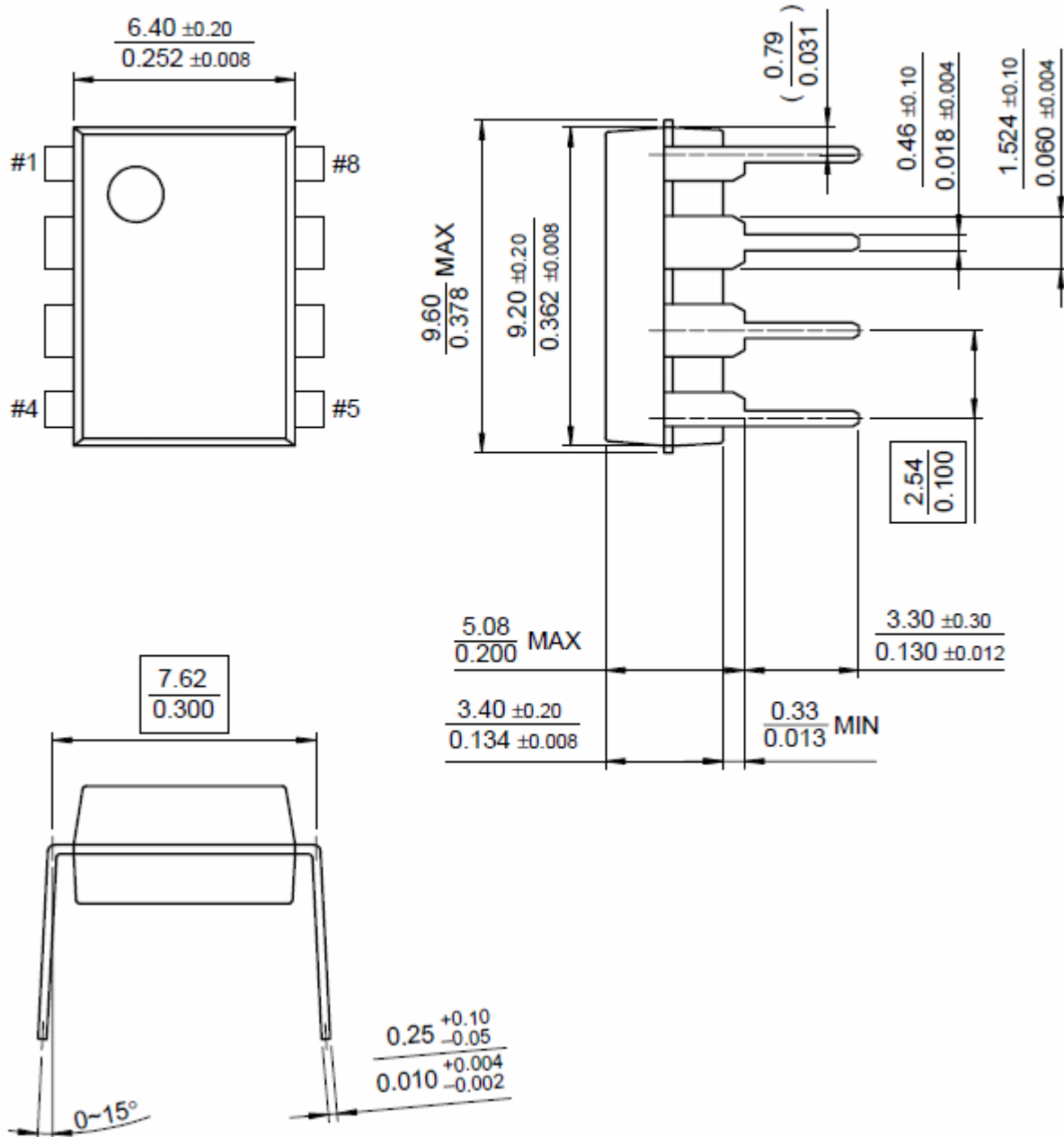
Figure 3. Light Intensity to Frequency Converter

### Mechanical Dimensions

Package

Dimensions in millimeters

### 8-DIP



### Ordering Information

Product Number	Package	Operating Temperature
MC331	8-DIP	0 ~ + 70°C

MICROCELL-IC