

## DIO331\_393

# Micro-power CMOS input RRIO 1.8V Open Drain Output Comparator

### Features

- Low Power Consumption:  
37 $\mu$ A (TYP) at V+ = 1.8V
- Wide Supply Voltage Range: 1.8V to 5.5V
- Propagation Delay: 84ns (TYP) at V+ = 1.8V
- Open Drain Output Sink Current Drive:  
33.5mA (TYP) at V+ = 5V
- Rail-to-Rail Input
- -40°C to 125°C Operating Temperature Range
- Available in the Green SOT23-5, SC70-5,  
SOIC-8 and MSOP-8 Packages

### Applications

- RC Timers
- Window Detectors
- IR Receiver
- Multivibrators
- Alarm and Monitoring Circuits

### Descriptions

The DIO331\_393 is a low-power comparator with a typical power supply current of 37 $\mu$ A. It has the best-in-class power supply current versus propagation delay performance. The propagation delay is as low as 84ns with 100mV overdrive at 1.8V supply.

Designed to operate over a wide range of supply voltages, from 1.8V to 5.5V, with guaranteed operation at 1.8V, 2.5V and 5.0V, the DIO331\_393 is ideal for use in a variety of battery-powered applications. With rail-to-rail common mode voltage range, the DIO331\_393 is well suited for single-supply operation.

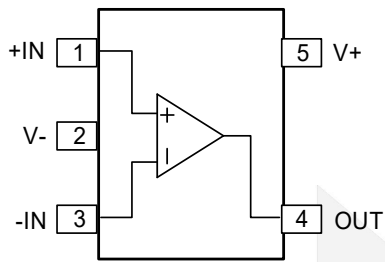
Featuring an open drain output stage, the DIO331\_393 allows for operation with absolute minimum power consumption when driving any capacitive or resistive load.

DIO331\_393 is available in the Green SOT23-5, SC70-5, SOIC-8 and MSOP-8 packages. The DIO331\_393 is ideal for use in handheld electronics and mobile phone applications. It is rated over the -40°C to 125°C temperature range.

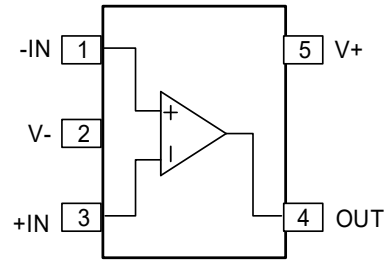
### Ordering Information

Order Part Number	Top Marking		T <sub>A</sub>	Package	
DIO331ST5	YW31	Green	-40 to 125°C	SOT23-5	Tape & Reel, 3000
DIO331SC5	YW31	Green	-40 to 125°C	SC70-5	Tape & Reel, 3000
DIO331AST5	W31A	Green	-40 to 125°C	SOT23-5	Tape & Reel, 3000
DIO331ASC5	W31A	Green	-40 to 125°C	SC70-5	Tape & Reel, 3000
DIO393SO8	DIO393	Green	-40 to 125°C	SOIC-8	Tape & Reel, 2500
DIO393MP8	DIO393	Green	-40 to 125°C	MSOP-8	Tape & Reel, 3000

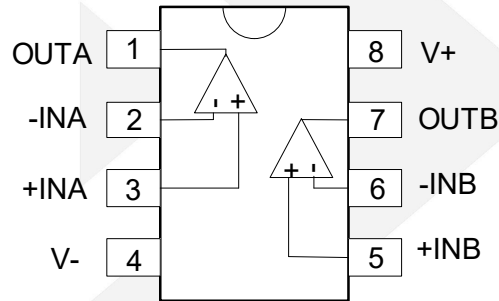
## Pin Assignments



**DIO331**  
SOT23-5/SC70-5



**DIO331A**  
SOT23-5/SC70-5



**DIO393**  
SOIC-8/MSOP-8

Figure 1 Pin Assignment (Top View)

## Pin Description

Pin name	Description
OUTX	Output
V-	Negative supply
+INX	Positive Input
-INX	Negative Input
V+	Positive supply

## Absolute Maximum Ratings

Stresses beyond those listed under “Absolute Maximum Rating” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Parameter		Rating	Unit
Supply Voltage ( V+ – V-)		7.5	V
Input Voltage		(V-)-0.5 to (V+)+0.5	V
Differential Input Voltage		±2.5	V
Operating Temperature Range (T <sub>A</sub> )		-40 to 125	°C
Storage Temperature Range (T <sub>STO</sub> )		-55 to 150	°C
Junction Temperature (T <sub>J</sub> )		160	°C
Lead Temperature Range		260	°C
ESD	HBM, JEDEC: JESD22-A114	4000	V
	CDM, JEDEC: JESD22-C101	400	

## Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation to ensure optimal performance to the datasheet specifications. DIOO does not recommend exceeding them or designing to Absolute Maximum Ratings.

Parameter		Rating	Unit
Supply Voltage		1.8 to 5.5	V
Operating Temperature Range		-40 to 125	°C

## ELECTRICAL CHARACTERISTICS: V+ = 1.8V

(At T<sub>A</sub>=25°C, V<sub>+</sub>=1.8V, V<sub>-</sub>= 0V, V<sub>EE</sub>=1.8V, V<sub>CM</sub> = V<sub>+</sub>/2 and V<sub>O</sub>= V<sub>-</sub>, unless otherwise noted.)

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
Input Offset Voltage	V <sub>OS</sub>		-5		5	mV
Supply Current	I <sub>S</sub>	-40°C ≤ T <sub>A</sub> ≤ 85°C, V <sub>CM</sub> = 0.3V		37		μA
		-40°C ≤ T <sub>A</sub> ≤ 85°C, V <sub>CM</sub> = 1.1V		47		
Output Swing High	V <sub>OH</sub>	R <sub>L</sub> = 10KΩ		1.8		V
		R <sub>L</sub> = 1KΩ		1.8		
Output Swing Low	V <sub>OL</sub>	I <sub>O</sub> = -500μA		45		mV
		I <sub>O</sub> = -1mA		92		
Output Current	I <sub>OUT</sub>	Sink		5.6		mA
Propagation Delay (High to Low)		Overdrive = 10mV		500		ns
		Overdrive = 100mV		180		
Propagation Delay (Low to High)		Overdrive = 10mV		240		ns
		Overdrive = 100mV		84		
Rise Time	t <sub>Rise</sub>	Overdrive = 10mV, C <sub>L</sub> = 1pF, R <sub>L</sub> = 5KΩ		155		ns
		Overdrive = 100mV, C <sub>L</sub> = 1pF, R <sub>L</sub> = 5KΩ		155		
Fall Time	t <sub>Fall</sub>	Overdrive = 10mV, C <sub>L</sub> = 1pF, R <sub>L</sub> = 5KΩ		16		ns
		Overdrive = 100mV, C <sub>L</sub> = 1pF, R <sub>L</sub> = 5KΩ		16		

## ELECTRICAL CHARACTERISTICS: V+ = 5.0V

(At T<sub>A</sub> = 25°C, V<sub>+</sub> = 5.0V, V<sub>-</sub> = 0V, V<sub>LE</sub> = 5.0V, V<sub>CM</sub> = V<sub>+</sub>/2 and V<sub>O</sub> = V<sub>-</sub>, unless otherwise noted.)

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
Input Offset Voltage	V <sub>OS</sub>		-5		5	mV
Supply Current	I <sub>S</sub>	-40°C ≤ T <sub>A</sub> ≤ 85°C, V <sub>CM</sub> = 0.3V		38		μA
		-40°C ≤ T <sub>A</sub> ≤ 85°C, V <sub>CM</sub> = 4.7V		55		
Output Swing High	V <sub>OH</sub>	R <sub>L</sub> = 10KΩ		5		V
		R <sub>L</sub> = 1KΩ		5		
Output Swing Low	V <sub>OL</sub>	I <sub>O</sub> = -500μA		20		mV
		I <sub>O</sub> = -1mA		41		
Output Current	I <sub>OUT</sub>	Sink		33.5		mA
Propagation Delay (High to Low)		Overdrive = 10mV		550		ns
		Overdrive = 100mV		120		
Propagation Delay (Low to High)		Overdrive = 10mV		700		ns
		Overdrive = 100mV		170		
Rise Time	t <sub>Rise</sub>	Overdrive = 10mV, C <sub>L</sub> = 1pF, R <sub>L</sub> = 5KΩ		155		ns
		Overdrive = 100mV, C <sub>L</sub> = 1pF, R <sub>L</sub> = 5KΩ		155		
Fall Time	t <sub>Fall</sub>	Overdrive = 10mV, C <sub>L</sub> = 1pF, R <sub>L</sub> = 5KΩ		16		ns
		Overdrive = 100mV, C <sub>L</sub> = 1pF, R <sub>L</sub> = 5KΩ		16		

## CONTACT US

Dioo is a professional design and sales corporation for high-quality and performance analog semiconductors. The company focuses on industry markets, such as, cell phone, handheld products, laptop, and medical equipment and so on. Dioo's product families include analog signal processing and amplifying, LED drivers and charger IC. Go to <http://www.dioo.com> for a complete list of Dioo product families.

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