

# DIO20891

## Ultra Low Power Comparator

### Features

- Ultra Low Power Consumption: 0.3 $\mu$ A (TYP) at V+ = 1.4V
- Wide Supply Voltage Range: 1.4V to 5.5V
- Propagation Delay: 8 $\mu$ s (TYP) at V+ = 1.4V
- Push-Pull Output Current Drive: 23mA (TYP) at V+ = 5V
- Rail-to-Rail Input
- -40°C to 85°C Operating Temperature Range
- Available in the Green SC70-5, DFN1\*1-6 and DFN0.8\*0.8-4 Packages

### Descriptions

The DIO20891 is an ultra low-power comparator with a typical power supply current of 0.3 $\mu$ A. It has the best-in-class power supply current versus propagation delay performance. The propagation delay is as low as 8 $\mu$ s with 100mV overdrive at 1.4V supply.

Designed to operate over a wide range of supply voltages, from 1.4V to 5.5V, with guaranteed operation at 1.4V, 1.8V, 2.5V and 5.0V, the DIO20891 is ideal for use in a variety of battery-powered applications. With rail-to-rail common mode voltage range, the DIO20891 is well suited for single-supply operation.

### Applications

- RC Timers
- Window Detectors
- IR Receiver
- Multi-vibrators
- Alarm and Monitoring Circuits

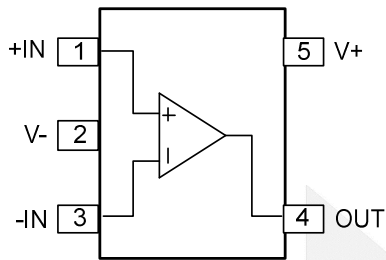
Featuring a push-pull output stage, the DIO20891 allows for operation with absolute minimum power consumption when driving any capacitive or resistive load.

DIO20891 is available in the Green SC70-5, DFN1\*1-6 and DFN0.8\*0.8-4 packages. The DIO20891 is ideal for use in handheld electronics and mobile phone applications. It is rated over the -40°C to 85°C temperature range.

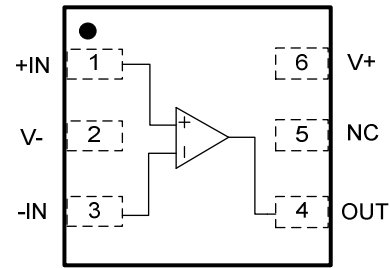
### Ordering Information

Order Part Number	Top Marking		T <sub>A</sub>	Package	
DIO20891SC5	YW91	Green or RoHS	-40 to 85°C	SC70-5	Tape & Reel, 3000
DIO20891TN6	W9	Green or RoHS	-40 to 85°C	DFN1*1-6 T	Tape & Reel, 10000
DIO20891EN6	9	Green or RoHS	-40 to 85°C	DFN1*1-6 E	Tape & Reel, 10000
DIO20891CN4	9	Green or RoHS	-40 to 85°C	DFN0.8*0.8-4	Tape & Reel, 5000

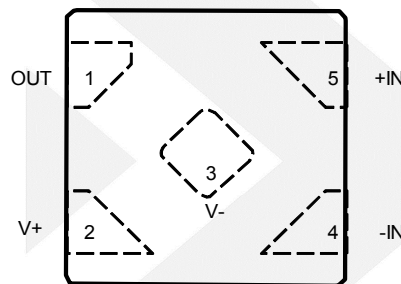
## Pin Assignments



SC70-5



DFN1\*1-6



DFN0.8\*0.8-4

Figure 1 Pin Assignment (Top View)

## Pin Description

Pin name	Description
+IN	Positive Input
V-	Negative supply
-IN	Negative Input
OUT	Output
V+	Positive supply
NC	No Connect

## 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	V
Input Voltage		(V-)-0.3 to (V+)+0.3	V
Signal input terminals current		±10	mA
Output short circuit		Continuous	mA
Operating Temperature Range (T <sub>A</sub> )		-40 to 85	°C
Storage Temperature Range (T <sub>STO</sub> )		-65 to 150	°C
Junction Temperature (T <sub>J</sub> )		160	°C
Lead Temperature Range		260	°C
ESD	HBM, JEDEC: JESD22-A114	8000	V

## 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		1.4 to 5.5	V
Common-mode voltage range (V <sub>CM</sub> )		(V-)-0.1 to (V+)+0.1	V
Quiescent current (per channel)	T <sub>A</sub> = 25°C	500 ( Max )	nA
	T <sub>A</sub> = -40°C to 85°C	1000 ( Max )	nA

## Electrical Characteristics:

At  $T_A = 25^\circ\text{C}$ ,  $V_S = 1.4\text{V}$  to  $5.5\text{V}$ ,  $V_{CM} = V_S/2$  and  $C_L = 15\text{pF}$ , unless otherwise noted.

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
<b>OFFSET VOLTAGE</b>						
Input Offset Voltage <sup>(1)</sup>	$V_{OS}$	$T_A = 25^\circ\text{C}$		$\pm 3$	$\pm 5$	mV
		$T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$			$\pm 7$	mV
Hysteresis	$V_{HYS}$	$V_{CM}=0.225\text{V}$		20		mV
Input offset voltage drift <sup>(1)</sup>	$dV_{OS}/dT$	$T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$			$\pm 70$	$\mu\text{V}/^\circ\text{C}$
<b>INPUT BIAS CURRENT</b>						
Input bias current	$I_B$	$T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$			20	nA
Input offset current <sup>(1)</sup>				8		pA
Capacitive load drive	$C_{LOAD}$			60		pF
<b>OUTPUT</b>						
Voltage output swing from upper rail	$V_{OH}$	$I_O = 2.5\text{ mA}$ , input overdrive $\geq 50\text{ mV}$ , $V_S = 5.5\text{ V}$		155	165	mV
		$I_O = 2.5\text{ mA}$ , input overdrive $\geq 50\text{ mV}$ , $V_S = 5.5\text{ V}$ , $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$			200	mV
		$I_O \leq 100\ \mu\text{A}$ , input overdrive $\geq 50\text{ mV}$ , $V_S = 5.5\text{ V}$			6	mV
		$I_O \leq 100\ \mu\text{A}$ , input overdrive $\geq 50\text{ mV}$ , $V_S = 5.5\text{ V}$ , $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$			8	mV
		$I_O \leq 100\ \mu\text{A}$ , input overdrive $\geq 50\text{ mV}$ , $V_S = 1.8\text{ V}$		20		mV
		$I_O \leq 100\ \mu\text{A}$ , input overdrive $\geq 50\text{ mV}$ , $V_S = 1.8\text{ V}$ , $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$			26	mV
Voltage output swing from lower rail	$V_{OL}$	$I_O = 2.5\text{ mA}$ , input overdrive $\geq 50\text{ mV}$ , $V_S = 5.5\text{ V}$		150		mV
		$I_O = 2.5\text{ mA}$ , input overdrive $\geq 50\text{ mV}$ , $V_S = 5.5\text{ V}$ , $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$			200	mV
		$I_O \leq 100\ \mu\text{A}$ , input overdrive $\geq 50\text{ mV}$ , $V_S = 5.5\text{ V}$		6		mV
		$I_O \leq 100\ \mu\text{A}$ , input overdrive $\geq 50\text{ mV}$ , $V_S = 5.5\text{ V}$ , $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$			8	mV
		$I_O \leq 100\ \mu\text{A}$ , input overdrive $\geq 50\text{ mV}$ , $V_S = 1.8\text{ V}$		16		mV
		$I_O \leq 100\ \mu\text{A}$ , input overdrive $\geq 50\text{ mV}$ , $V_S = 1.8\text{ V}$ , $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$			23	mV
Short circuit sink current	$I_{SC}$	$V_S = 5\text{ V}$		24		mA
Short circuit source current		$V_S = 5\text{ V}$		23		mA

Note(1) : Guaranteed by Design.

## Switching Characteristics

At  $T_A = 25^\circ\text{C}$ ,  $V_S = 1.4\text{ V to }5.5\text{ V}$ ,  $V_{CM}=0.225\text{V}$ , and  $C_L = 15\text{ pF}$ , unless otherwise noted.

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit	
Propagation delay time	$t_{PHL}$	High-to-low	$V_S = 1.8\text{ V}$ , Input overdrive = 50 mV		10		$\mu\text{s}$
			$V_S = 1.8\text{ V}$ , Input overdrive = 100 mV		7		
	$t_{PLH}$	Low-to-high	$V_S = 1.8\text{ V}$ , Input overdrive = 50 mV		10		
			$V_S = 1.8\text{ V}$ , Input overdrive = 100 mV		8		
Rise time	$t_R$	$V_S = 1.8\text{ V}$ , Input overdrive = 100 mV		40		ns	
Fall time	$t_F$	$V_S = 1.8\text{ V}$ , Input overdrive = 100 mV		35			



## CONTACT US

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For additional product information, or full datasheet, please contact with our Sales Department or Representatives.

A large, light gray watermark of the Dioo logo is centered on the page. It consists of a stylized arrow pointing right, followed by the word "dioo" in a lowercase, sans-serif font.