DIO331_393
Micro-Power CMOS Input RRIO 1.8 V Open-Drain Output Comparator

Features

- Low power consumption:
- 37 μA (TYP) at V+ = 1.8 V
- Wide supply voltage range: 1.8 V to 5.5 V
- Propagation delay: 84 ns (TYP) at V+ = 1.8 V
- Open drain output sink current drive:
- 33.5 mA (TYP) at V+ = 5 V
- 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 μA. It has the best-in-class power supply current versus propagation delay performance. The propagation delay is as low as 84 ns with 100 mV overdrive at 1.8 V supply.

Designed to operate over a wide range of supply voltages, from 1.8 V to 5.5 V, with guaranteed operation at 1.8 V, 2.5 V and 5.0 V, 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.

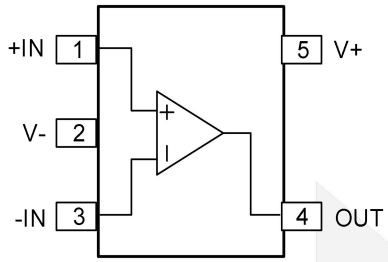
Featuring an open drain output stage, the DIO331_393 allows for operation with absolute minimum power consumption when driving any capacitive or resistive load.

The 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

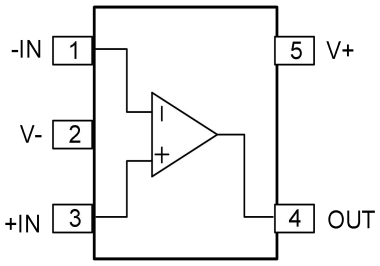
Order Part Number	Top Marking	RoHS	T_A	Package	
DIO331ST5	YW31	Green	-40 to 125°C	SOT23-5	Tape & Reel, 3000
DIO331SC5	YW31	Green	-40 to 125°C	SC70-5	Tape & Reel, 3000
DIO331AST5	W31A	Green	-40 to 125°C	SOT23-5	Tape & Reel, 3000
DIO331ASC5	W31A	Green	-40 to 125°C	SC70-5	Tape & Reel, 3000
DIO393SO8	DIO393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

Pin Assignments



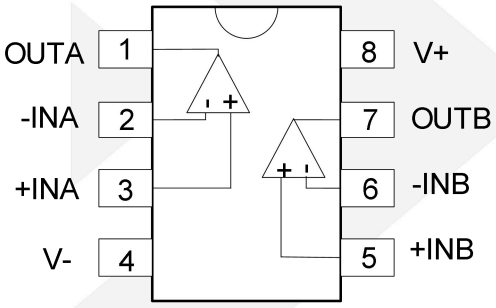
DIO331

Figure 1. SOT23-5/SC70-5



DIO331A

Figure 2. SOT23-5/SC70-5



DIO393

SOIC-8/MSOP-8

Figure 3. 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. DIOO does not recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter	Rating	Unit
V_{CC}	Supply voltage (V+ – V-)	7.5	V
	Input voltage	(V-) - 0.5 to (V+) + 0.5	V
	Differential input voltage	±2.5	V
T_A	Operating temperature range	-40 to 125	°C
T_{STO}	Storage temperature range	-55 to 150	°C
T_J	Junction temperature	160	°C
T_L	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.

Symbol	Parameter	Rating	Unit
V_{CC}	Supply voltage	1.8 to 5.5	V
T_O	Operating temperature range	-40 to 125	°C

Electrical Characteristics: V+ = 1.8 V

(At T_A = 25°C, V_+ = 1.8 V, V- = 0 V, V_{LE} = 1.8 V, V_{CM} = V_+/2 and V_O = V-, unless otherwise noted.)

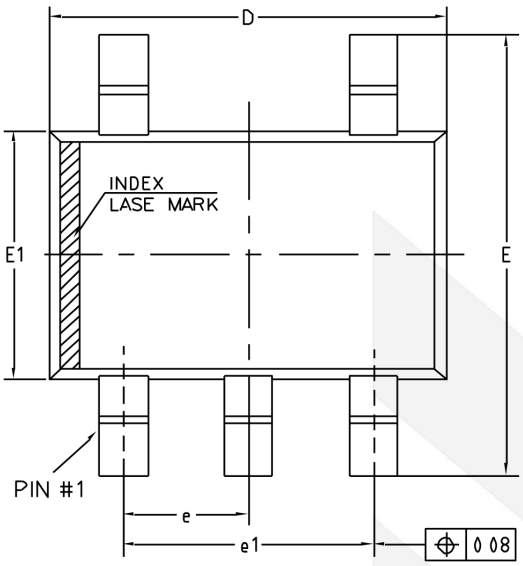
Symbol	Parameter	Condition	MIN	TYP	MAX	Unit
V_{OS}	Input offset voltage		-5		5	mV
I_S	Supply current	-40°C ≤ T_A ≤ 85°C, V_{CM} = 0.3 V		37		μA
		-40°C ≤ T_A ≤ 85°C , V_{CM} = 1.1 V		47		
V_{OH}	Output swing high	R_L = 10 kΩ		1.8		V
		R_L = 1 kΩ		1.8		
V_{OL}	Output swing low	I_O = -500 μA		45		mV
		I_O = -1 mA		92		
I_{OUT}	Output current	Sink		5.6		mA
	Propagation delay (High to low)	Overdrive = 10 mV		500		ns
		Overdrive = 100 mV		180		
	Propagation delay (Low to high)	Overdrive = 10 mV		240		ns
		Overdrive = 100 mV		84		
t_{Rise}	Rise time	Overdrive = 10 mV, C_L = 1 pF, R_L = 5 kΩ		155		ns
		Overdrive = 100 mV, C_L = 1 pF, R_L = 5 kΩ		155		
t_{Fall}	Fall time	Overdrive = 10 mV, C_L= 1 pF, R_L = 5 kΩ		16		ns
		Overdrive = 100 mV, C_L = 1 pF, R_L = 5 kΩ		16		

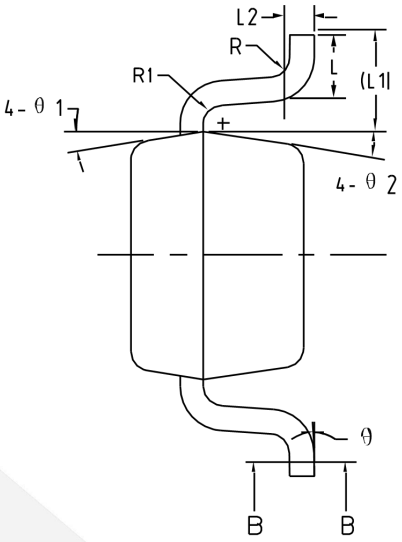
Electrical Characteristics: V+ = 5.0 V

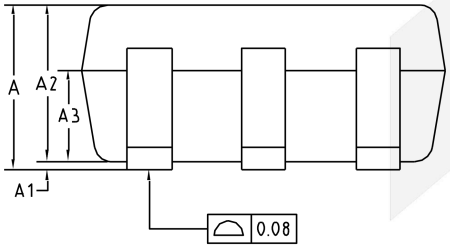
(At T_A = 25°C, V_+ = 5.0 V, V- = 0 V, V_{LE} = 5.0 V, V_{CM} = V_+/2 and V_O = V-, unless otherwise noted.)

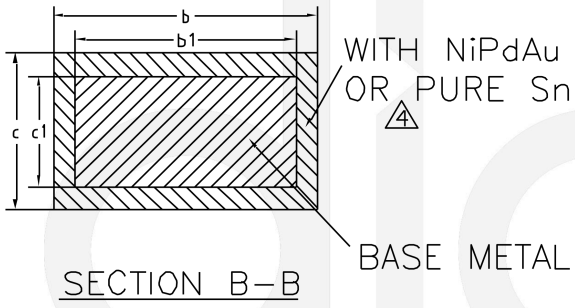
Symbol	Parameter	Condition	MIN	TYP	MAX	Unit
V_{OS}	Input offset voltage		-5		5	mV
I_S	Supply current	-40°C ≤ T_A ≤ 85°C, V_{CM} = 0.3 V		38		µA
		-40°C ≤ T_A ≤85°C, V_{CM} = 4.7 V		55		
V_{OH}	Output swing high	R_L = 10 kΩ		5		V
		R_L = 1 kΩ		5		
V_{OL}	Output swing low	I_O = -500 µA		20		mV
		I_O = -1 mA		41		
I_{OUT}	Output current	Sink		33.5		mA
	Propagation delay (High to low)	Overdrive = 10 mV		550		ns
		Overdrive = 100 mV		120		
	Propagation delay (Low to high)	Overdrive = 10 mV		700		ns
		Overdrive = 100 mV		170		
t_{Rise}	Rise time	Overdrive = 10 mV, CL= 1 pF, RL = 5 kΩ		155		ns
		Overdrive = 100 mV,CL= 1 pF, R_L = 5 kΩ		155		
t_{Fall}	Fall time	Overdrive = 10 mV, CL= 1 pF, R_L = 5 kΩ		16		ns
		Overdrive = 100 mV, CL = 1 pF, R_L = 5 kΩ		16		

Physical Dimensions: SC70-5



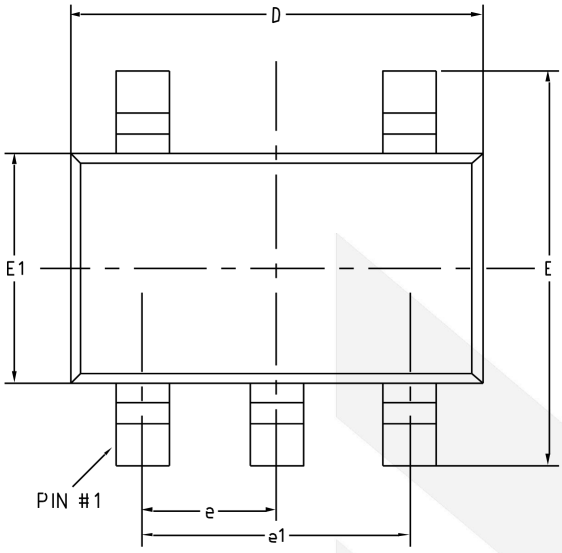


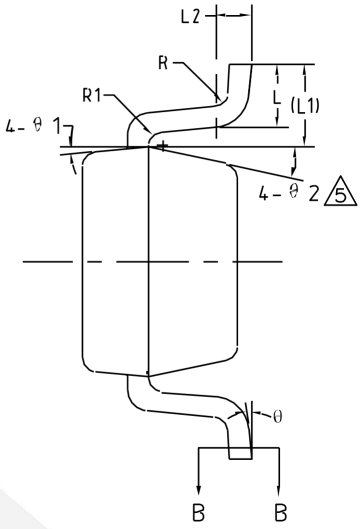




Common Dimension (Units of Measure = Millimeter)			
Symbol	**Min**	**Nom**	**Max**
A	0.85	-	1.05
A1	0	-	0.10
A2	0.80	0.90	1.00
A3	0.47	0.52	0.57
b	0.22	-	0.29
b1	0.22	0.25	0.28
c	0.115	-	0.15
c1	0.115	0.13	0.14
D	2.02	2.07	2.12
E	2.20	2.30	2.40
E1	1.25	1.30	1.35
e	0.65BSC		
e1	1.30BSC		
L	0.28	0.33	0.38
L1	0.50REF		
L2	0.15BSC		
R	0.10	-	-
R1	0.10	-	0.25
Θ	0°	-	8°
Θ1	6°	9°	12°
Θ2	6°	9°	12°

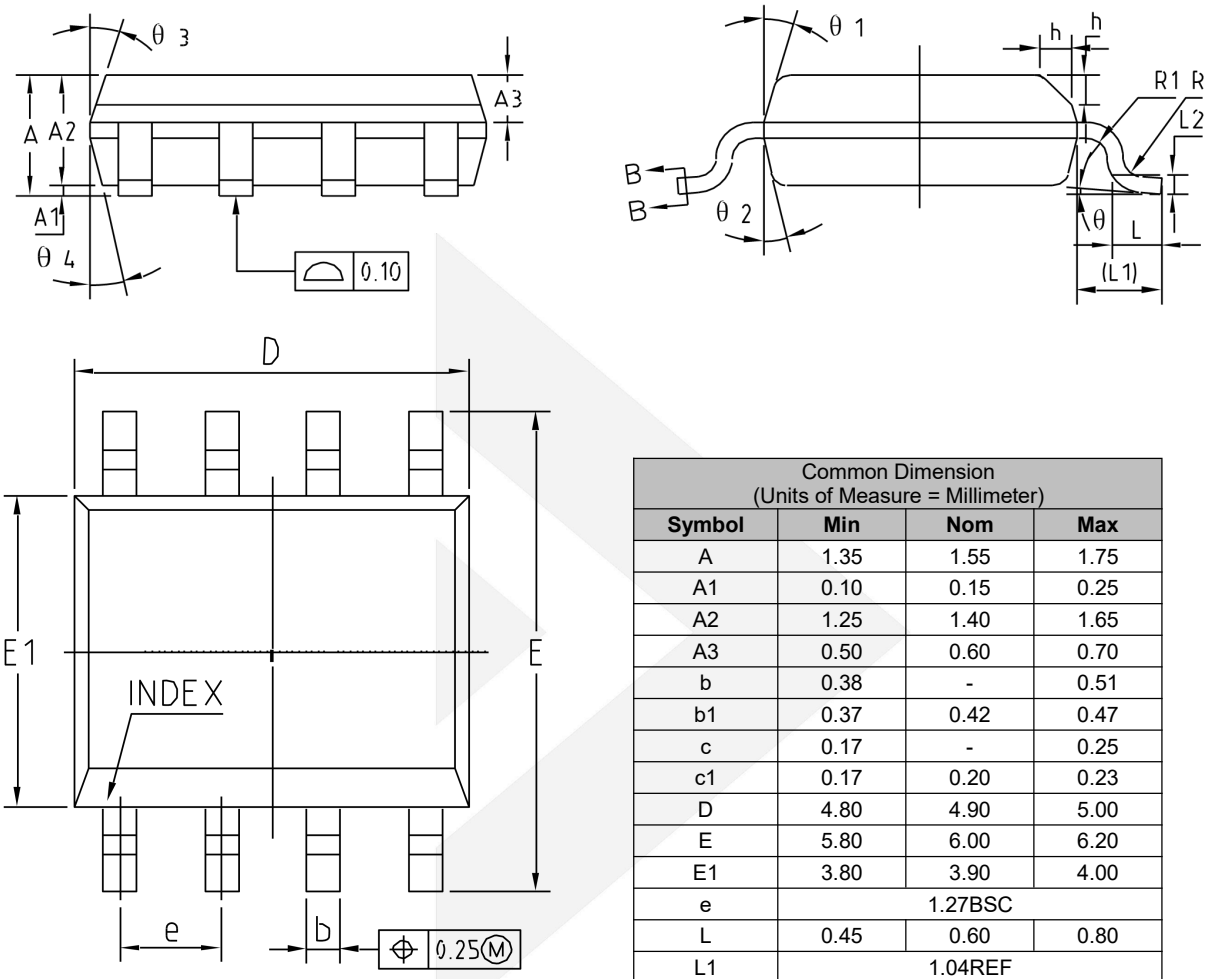
Physical Dimensions: SOT23-5





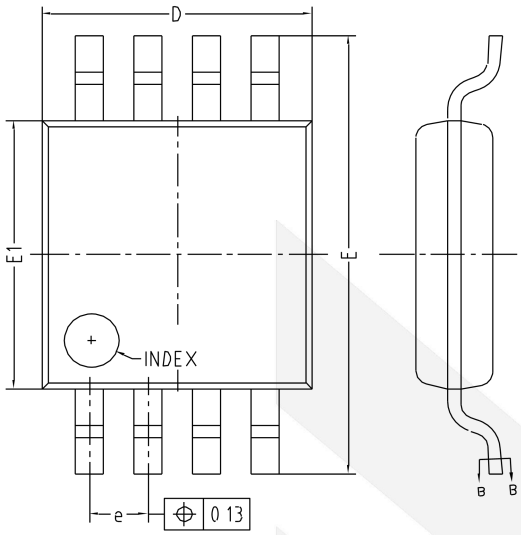
Common Dimension (Units of Measure = Millimeter)			
Symbol	**Min**	**Nom**	**Max**
A	-	-	1.25
A1	0	-	0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.36	-	0.50
b1	0.36	0.38	0.45
c	0.14	-	0.20
c1	0.14	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.59REF		
L2	0.25BSC		
R	0.10	-	-
R1	0.10	-	0.25
Θ	0°	-	8°
Θ1	3°	5°	7°
Θ2	6°	-	14°

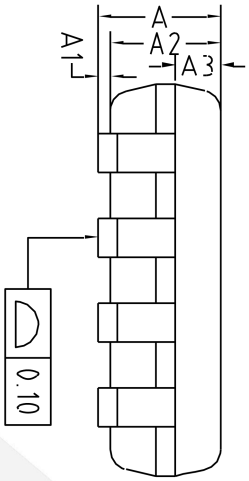
Physical Dimensions: SOIC-8

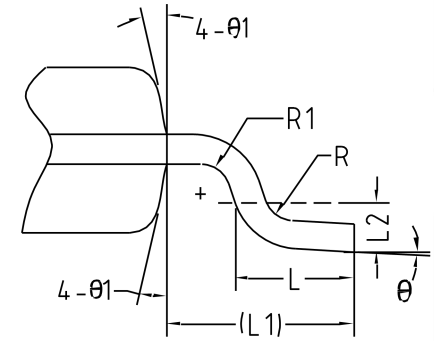


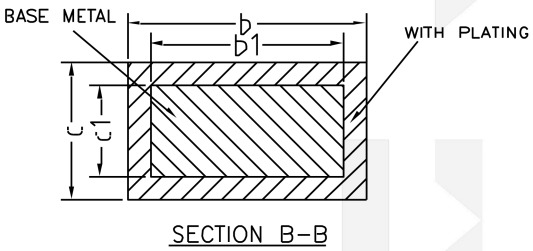
Common Dimension (Units of Measure = Millimeter)			
Symbol	**Min**	**Nom**	**Max**
A	1.35	1.55	1.75
A1	0.10	0.15	0.25
A2	1.25	1.40	1.65
A3	0.50	0.60	0.70
b	0.38	-	0.51
b1	0.37	0.42	0.47
c	0.17	-	0.25
c1	0.17	0.20	0.23
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e		1.27BSC	
L	0.45	0.60	0.80
L1		1.04REF	
L2		0.25BSC	
R	0.07	-	-
R1	0.07	-	-
h	0.30	0.40	0.50
Θ	0°	-	8°
Θ1	15°	17°	19°
Θ2	11°	13°	15°
Θ3	15°	17°	19°
Θ4	11°	13°	15°

Physical Dimensions: MSOP-8









Common Dimension (Units of Measure = Millimeter)			
Symbol	**Min**	**Nom**	**Max**
A	-	-	1.10
A1	0	-	0.15
A2	0.75	0.85	0.95
A3	0.25	0.35	0.39
b	0.28	-	0.37
b1	0.27	0.30	0.33
c	0.15	-	0.20
c1	0.14	0.15	0.16
D	2.90	3.00	3.10
E	4.70	4.90	5.10
E1	2.90	3.00	3.10
e	0.55	0.65	0.75
L	0.40	0.60	0.80
L1	0.95REF		
L2	0.25BSC		
R	0.07	-	-
R1	0.07	-	-
Θ	0°	-	8°
Θ1	9°	12°	15°

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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