

DIO2026

190 μ A, 3MHz, Rail-to-Rail I/O CMOS Operational Amplifiers

Features

- Supply Voltage Range: 2.5V to 5.5V
- Supply Current: Typical 190 μ A per channel
- Rail-to-Rail Input and Output
- ± 1 mV Typical offset (V_{OS})
- V_{OSMAX} Specificity: ± 4.9 mV
- 3MHz High Gain-Bandwidth Product
- Slew Rate: 1.7V/ μ s
- Packages Available in: QFN4*4-20

Descriptions

The DIO2026 (Triple) are amplifiers with very low noise, low voltage, and low power operational. The DIO2026 has a high gain-bandwidth product of 3MHz, a slew rate of 1.7V/ μ s, and a quiescent current of 190 μ A/amplifier at 5V typically.

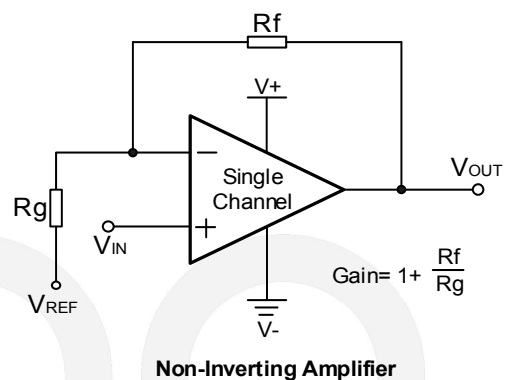
The DIO2026 is designed to provide optimal performance in low voltage and low noise system. All these chips provide rail-to-rail output swing into heavy loads. The input common-mode voltage range includes ground, and the maximum input offset voltage is 4.9mV for DIO2026.

They are specified over the extended industrial temperature range (-40 $^{\circ}$ C to +125 $^{\circ}$ C). The operating range is from 2.5V to 5.5V.

Applications

- Audio Output
- Sensor Interface
- Active Filters
- A/D Converters
- Cellular and Cordless Phones
- Laptops and PDAs
- Photodiode Amplification
- Battery-Powered Instrumentation

Typical Application



Ordering Information

Order Part Number	Top Marking		T_A	Package	
DIO2026QN20	D2026	RoHS/Green	-40 to +125 $^{\circ}$ C	QFN4*4-20	Tape & Reel, 5000

Pin Assignments

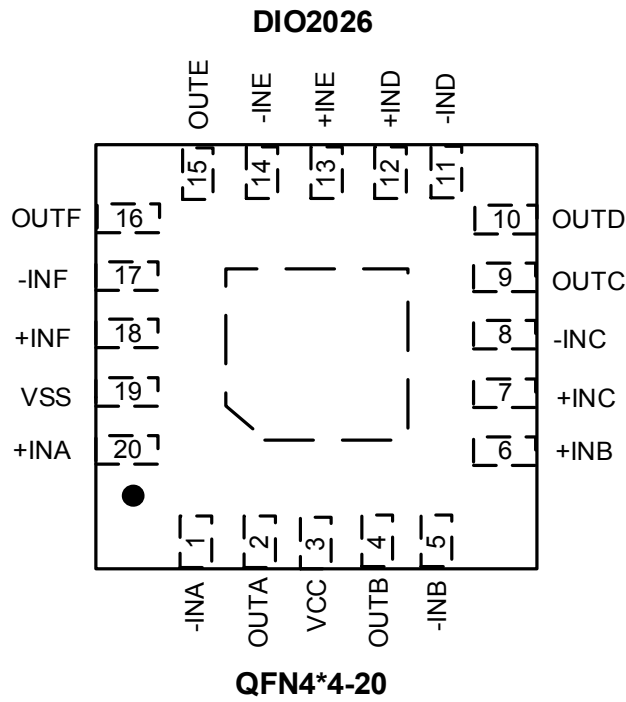


Figure 1 Pin assignment (Top View)

Pin Description

Pin name	Description
+Vs	Positive supply
-Vs	Negative supply
+IN(+INA/+INB/+INC/+IND/+INE/+INF)	Positive Input (channel A/B/C/D/E/F)
-IN(-INA/-INB/-INC/-IND/-INE/-INF)	Negative Input (channel A/B/C/D/E/F)
OUT (OUTA/OUTB/OUTC/OUTD/OUTE/OUTF)	Output (channel A/B/C/D/E/F)
NC	Not 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		7.5	V
Input Voltage		(V ⁻)-0.5 to (V ⁺)+0.5	V
Storage Temperature Range		-65 to 150	°C
Junction Temperature		150	°C
Lead Temperature Range		260	°C
ESD	HBM, JEDEC: JESD22-A114	8	kV
	CDM, JEDEC: JESD22-C101	2	

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		2.5 to 5.5	V
Input Voltage		0 to 5	V
Operating Temperature Range		-40 to 125	°C

Electrical Characteristics

Typical value: $V_+ = 5V$, $R_L = 100k\Omega$ to $V_+/2$, $T_A = 25^\circ C$, unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
INPUT CHARACTERISTICS						
V_{OS}	Input Offset Voltage	$T_A = 25^\circ C$		± 1	± 4.9	mV
I_B	Input Bias Current	$-40^\circ C \leq T_A \leq 125^\circ C$, $V_+ = 2.5V$ to $5.5V$		1	10	pA
I_{OS}	Input Offset Current	$-40^\circ C \leq T_A \leq 125^\circ C$, $V_+ = 2.5V$ to $5.5V$		1	10	pA
V_{CM}	Common Mode Voltage Range	$V_+ = 5.5V$	-0.1		5.6	V
CMRR	Common Mode Rejection Ratio	$-40^\circ C \leq T_A \leq 125^\circ C$, $V_S = 5.5V$, $V_{CM} = -0.1V$ to $5.6V$	80	120		dB
A_{OL}	Open Loop Voltage Gain	$R_L = 10k\Omega$, $V_O = 0.05V$ to $4.9V$	80	120		dB
$\Delta V_{OS}/\Delta T$	Input Offset Voltage Drift	$-40^\circ C \leq T_A \leq 125^\circ C$		2.5		$\mu V/^\circ C$
OUTPUT CHARACTERISTICS						
	Output Voltage Swing from Rail	$R_L = 600\Omega$, $-40^\circ C \leq T_A \leq 125^\circ C$			0.1	V
		$R_L = 10k\Omega$, $-40^\circ C \leq T_A \leq 125^\circ C$			0.015	
I_{OUT}	Output Current	$V_+ = 5V$		80		mA
R_O	Closed Loop Output Impedance	$F = 100kHz$, $G = +1$		3.1		Ω
POWER SUPPLY						
PSRR	Power Supply Rejection Ration		70	80		dB
I_S	Supply Current per Channel/Amp	$V_+ = 5V$, $-40^\circ C \leq T_A \leq 125^\circ C$		190	250	μA
		$V_+ = 2.5V$, $-40^\circ C \leq T_A \leq 125^\circ C$		180	250	
DYNAMIC PERFORMANCE						
GBP	Gain Bandwidth Product	$R_L = 10k\Omega$		3		MHz
SR	Slew Rate	$R_L = 600\Omega$, $G = 1$, 2V Output Step		1.7		V/ μs
t_s	Setting Time	$R_L = 600\Omega$, $G = 1$, 2V Output Step			1	μs
NOISE PERFORMANCE						
THD	Total Harmonic Distortion	$f = 10kHz$, 1V Output Step, $R_L = 600\Omega$ and $100pF$		0.015		%
e_n	Voltage Noise Density	$f = 1kHz$, $V_+ = 5V$		27		nV/ \sqrt{Hz}
		$f = 10kHz$, $V_+ = 5V$		18		

Specifications subject to change without notice.

Typical Application

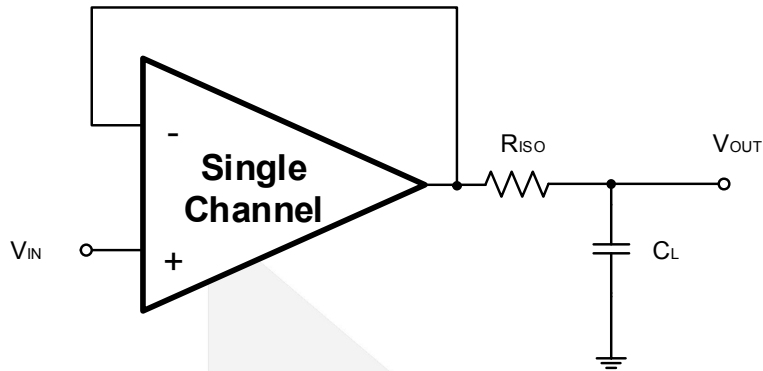


Figure 2 Indirectly Driving Heavy Capacitive Load

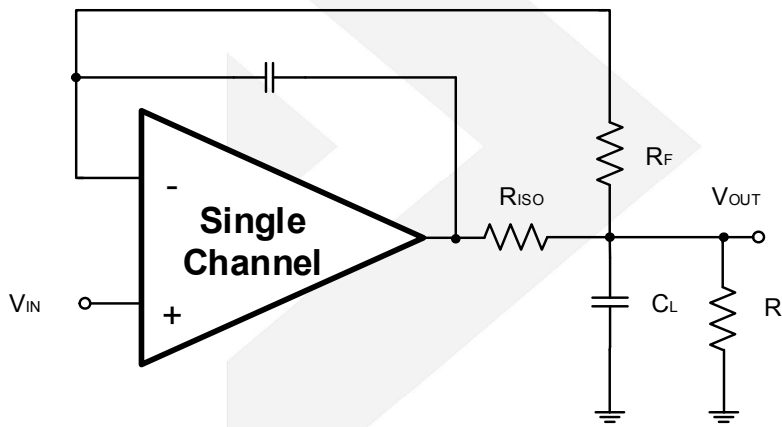


Figure 3 Indirectly Driving Heavy Capacitive Load with DC Accuracy

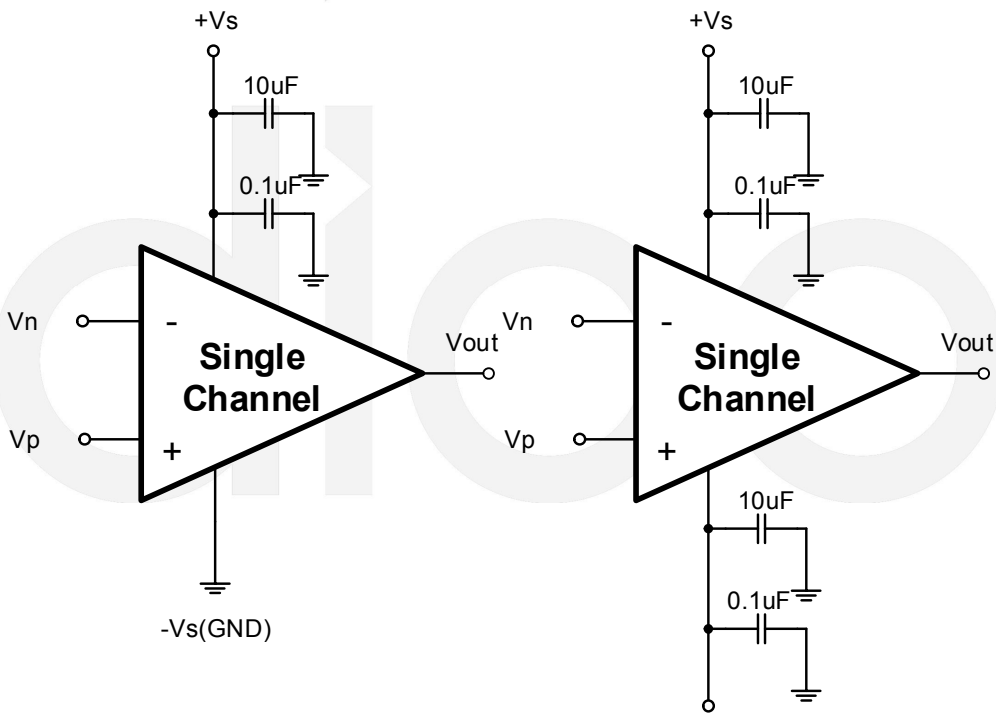
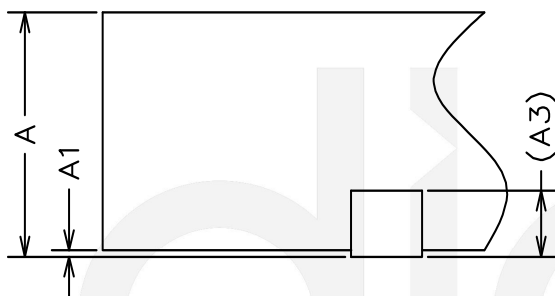
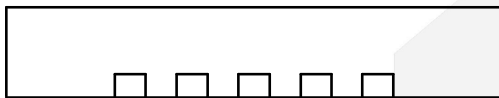
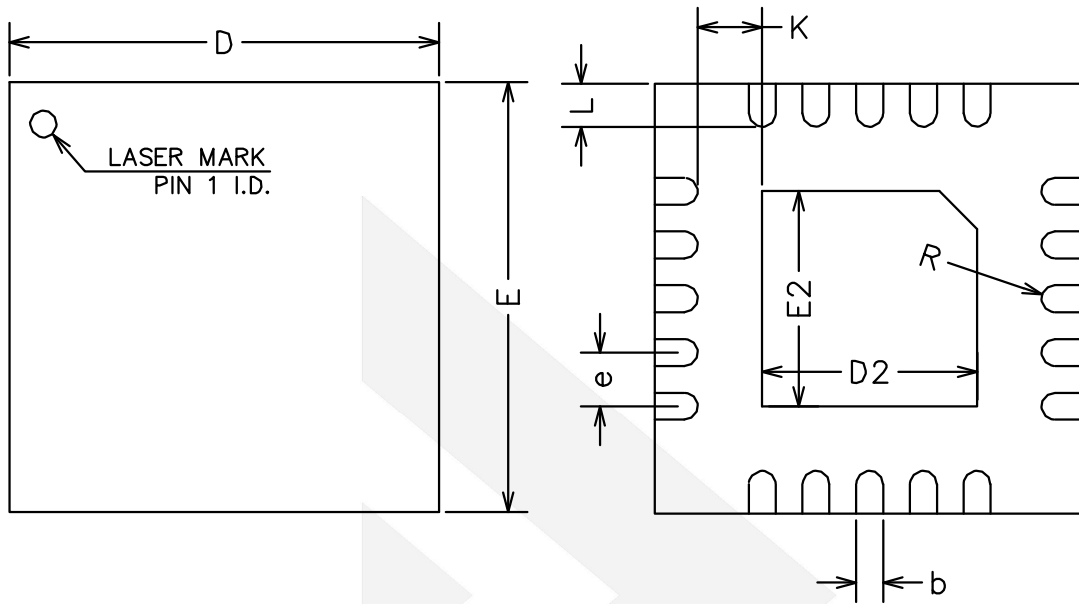


Figure 4 Amplifier with Bypass Capacitors

Physical Dimensions: QFN-20



COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)			
Symbol	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0	0.02	0.05
A3	0.20REF		
b	0.18	0.25	0.30
D	3.90	4.00	4.10
E	3.90	4.00	4.10
D2	1.90	2.00	2.10
E2	1.90	2.00	2.10
e	0.40	0.50	0.60
K	0.20	-	-
L	0.35	0.40	0.45
R	0.09	-	-

CONTACT US

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