# DIO2352A/B

## Ultra Low Vos, 2.5kHz, RRIO CMOS High-Precision Amplifier

## Features

- Rail-to-Rail Input and Output
- Low offset ($V_{OS}$): ±13μV
- Gain Error: ±1%
- Input offset drift: 0.01μV/°C(Max)
- Gain drift: 10ppm/°C(Max)
- Gain Selection:
  DIO2352A: 50V/V
  DIO2352B: 100V/V
- Wide supply range: 2.5V to 5.5V
- Single Supply Operation
- Quiescent Current: 730μA(Typ)
- Available Packages: SOIC-8,TSSOP-8,DFN-8

## Descriptions

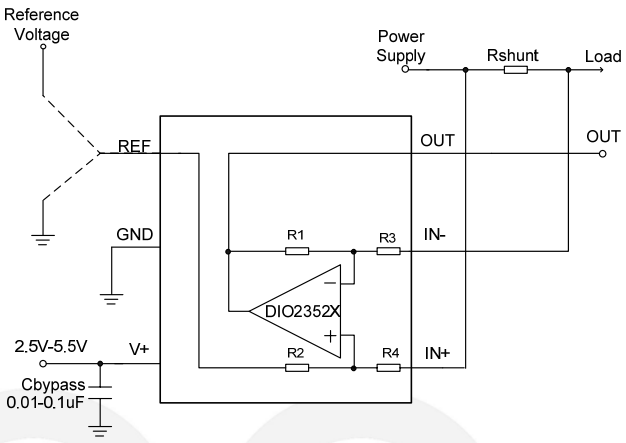
The DIO2352X is an ultra-low offset voltage rail-to-rail input and output voltage feedback amplifier. They have a wide input common-mode voltage range and output voltage swing, and take the operating supply voltage is from 2.5 to 5.5V.

The DIO2352X features an offset voltage of only 13μV and drift of 0.01μV/°C, which makes the product perfect in applications of intolerant errors. Temperature/position/pressure sensors and medical equipment can benefit greatly from nearly zero drift over their operating temperature range.

## Applications

- Notebook Computer
- Mobile Phone
- Power Management IC
- Battery Charger
- Welding Equipment

## Typical Application

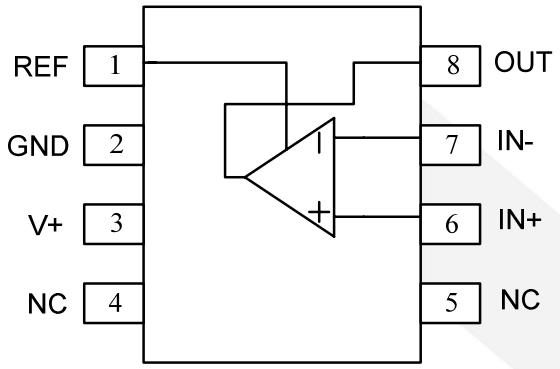



## Ordering Information

| Order Part Number | Top Marking | | $T_A$ | Package | |
|---|---|---|---|---|---|
| DIO2352ASO8 | DIO2352A | Green/RoHS | -40 to +125°C | SOIC-8 | Tape & Reel, 2500 |
| DIO2352BSO8 | DIO2352B | Green/RoHS | -40 to +125°C | SOIC-8 | Tape & Reel, 2500 |
| DIO2352ATP8 | DIO2352A | Green/RoHS | -40 to +125°C | TSSOP-8 | Tape & Reel, 3000 |
| DIO2352BTP8 | DIO2352B | Green/RoHS | -40 to +125°C | TSSOP-8 | Tape & Reel, 3000 |
| DIO2352AED8 | 23A | Green/RoHS | -40 to +125°C | DFN-8 | Tape & Reel, 3000 |
| DIO2352BED8 | 23B | Green/RoHS | -40 to +125°C | DFN-8 | Tape & Reel, 3000 |

## Pin Assignments

SOIC-8/TSSOP-8




DFN-8

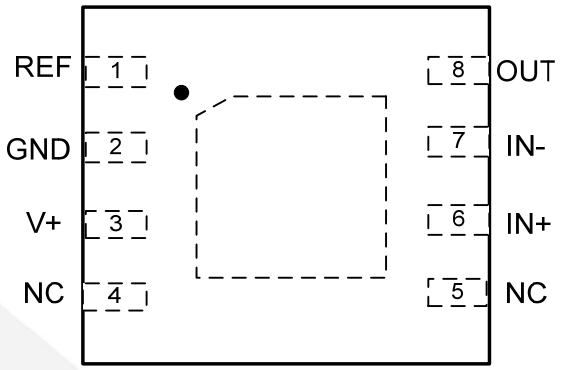



**Figure 1 Pin Assignment**

## Pin Description

| Pin name | Description |
|---|---|
| V+ | Positive supply |
| GND | Negative supply |
| IN+ | Positive Input |
| IN- | Negative Input |
| OUT | Output |
| REF | Reference Input |
| 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 maxim rating conditions for extended periods may affect device reliability.

| Parameter | | Rating | Unit |
|---|---|---|---|
| Supply Voltage | | 7.5 | V |
| Input Voltage | | (-Vs)-0.5 to (+Vs) +0.5V | 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

V+=+5V，$V_{REF}=V_S/2$, $T_A$ = 25°C, unless otherwise specified.

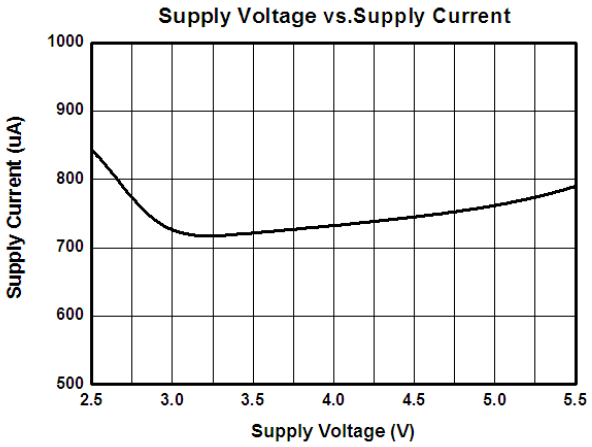
| Symbol | Parameter | | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| **INPUT CHARACTERISTICS** | | | | | | | |
| $V_{CM}$ | Common Mode Input Current | | | -0.1 | | (V+)+ 0.1 | V |
| CMRR | Common Mode Rejection Ratio | | $V_{CM}$=-0.1 to (V+)+0.1 | | 100 | | dB |
| $V_{OS}$ | Input Offset Voltage | | Common voltage=$V_S$ | -80 | 30 | +80 | μV |
| | | | Common voltage=$V_S$/2 | -20 | 13 | 20 | |
| PSRR | Power Supply Rejection Ration | | Vs=2.7V to 5.5V | | 100 | | dB |
| $I_B$ | Input Bias Current | | | | 5 | | μA |
| $I_{OS}$ | Input Offset Current | | | | 20 | | pA |
| $\Delta V_{OS}/\Delta_T$ | Input Offset Voltage Drift | | -40°C≤$T_A$≤125°C | | 0.01 | | μV/°C |
| | Gain Drift | | | | 3 | 10 | ppm/°C |
| Gain | | | DIO2352A | | 50 | | V/V |
| | | | DIO2352B | | 100 | | V/V |
| **OUTPUT CHARACTERISTICS** | | | | | | | |
| $V_{OH}$ | Output Voltage High | | $R_L$=100kΩ, -40°C≤$T_A$≤125°C | | 4.998 | | V |
| | | | $R_L$=10kΩ, -40°C≤$T_A$≤125°C | | 4.99 | | |
| $V_{OL}$ | Output Voltage Low | | $R_L$=100kΩ, -40°C≤$T_A$≤125°C | | 1.2 | | mV |
| | | | $R_L$=10kΩ, -40°C≤$T_A$≤125°C | | 7.3 | | |
| $I_O$ | Output Current | Source Current | | | 50 | | mA |
| | | Sink Current | | | 50 | | |
| $I_S$ | Supply Current | | -40°C≤$T_A$≤125°C | | 730 | | μA |
| GBP | Gain Bandwidth Product | | | | 2.5 | | kHz |
| **NOISE PERFORMANCE** | | | | | | | |
| THD | Total Harmonic Distortion | | f=1kHz, 2V Output Step, $R_L$=10kΩ, | | 0.0014 | | % |
| $e_n$ | Voltage Noise Density | | f=1kHz | | 40 | | nV/kHz |

Specifications subject to change without notice.

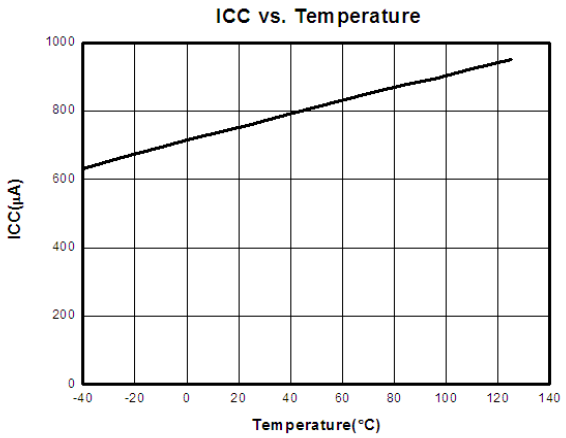
# Typical Performance Characteristics

V+=+5V， $V_{REF}=V_S/2$, $T_A$ = 25°C, unless otherwise specified.

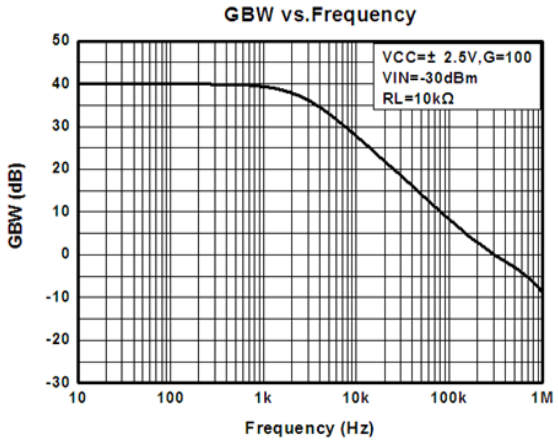
### Supply Voltage & Current



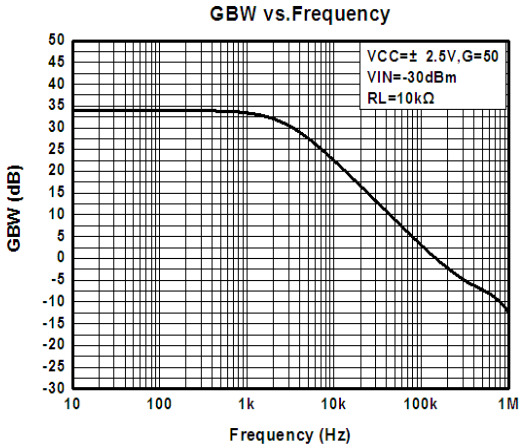

### ICC & Temperature



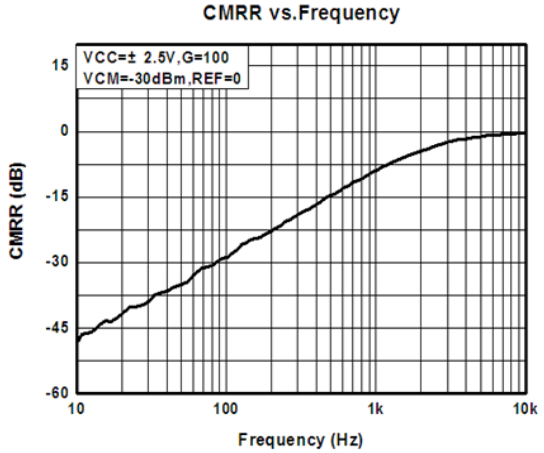

### GBW & Frequency (G=100)



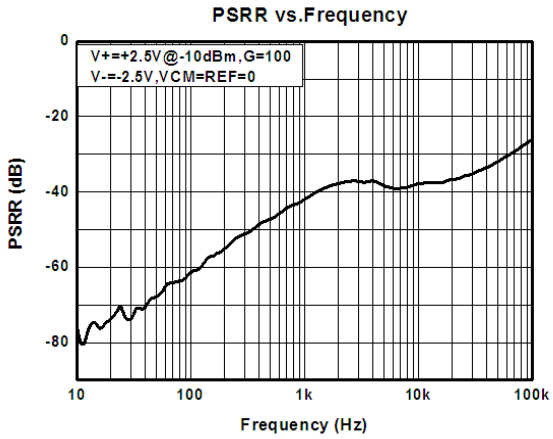

### GBW & Frequency (G=50)



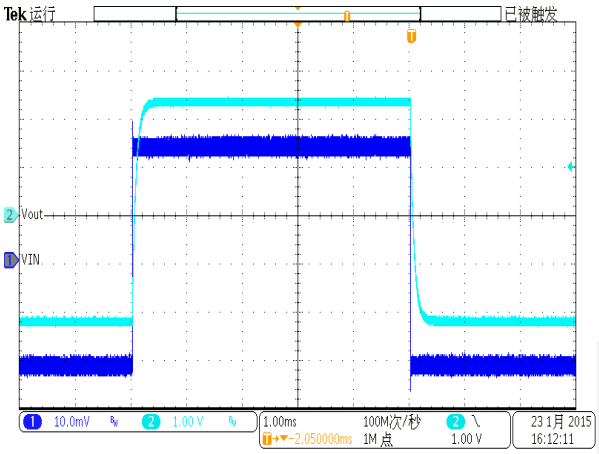

### CMRR & Frequency



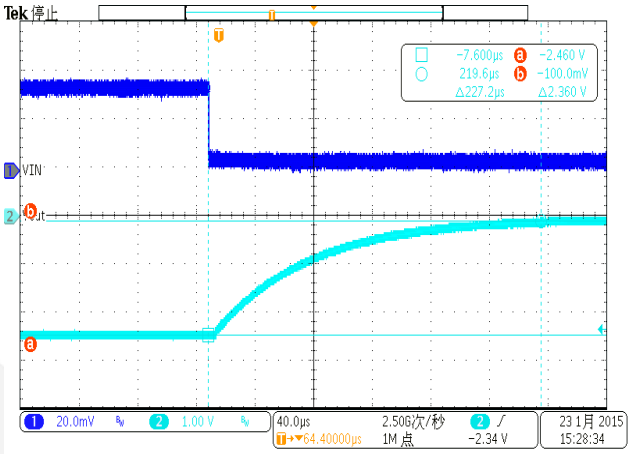

### PSRR & Frequency



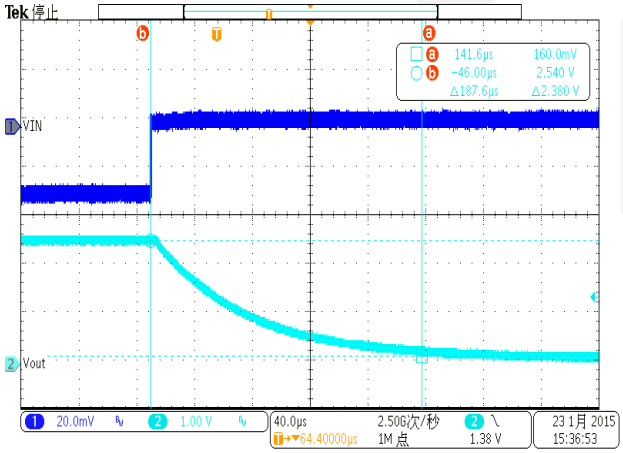
## Large Signal Response




## Over Load Recovery Time




## Over Load Recovery Time



## CONTACT US

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