

DIO32051/32051A/32052/32054

0.5MHz, 24 μ A, Rail-to-Rail I/O CMOS Amplifier

Features

- Rail-to-Rail Input and Output
 - Maxim offset (V_{OS}):
DIO32051/32051A/32052/32054 @ $\pm 3\text{mV}$
 - Unity Gain Stable
 - Gain Bandwidth Product: 0.5MHz
 - Very low input bias currents: 5pA
 - Wide supply range: 1.8V to 5.5V
 - Input Voltage Range: 0V to 5V
 - Ultra low power: 24 μ A per channel
 - Compact Package best for portable applications
- DIO32051: SOT23-5 and SC70-5
DIO32051A: SOT23-5 and SC70-5
DIO32052: SOIC-8 and MSOP-8
DIO32054: SOIC-14 and TSSOP-14

Descriptions

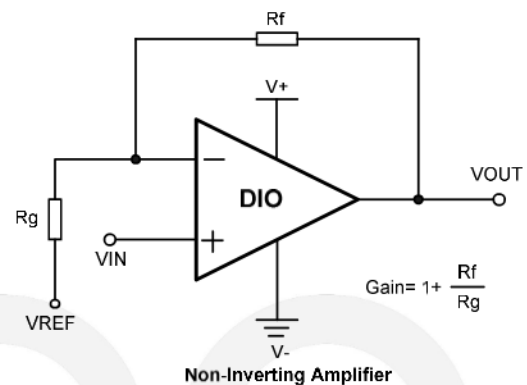
DIO32051/32051A (single), DIO32052 (dual), DIO32054 (quad) are rail-to-rail CMOS operational amplifiers with ultra low offset. Features include wide input common-mode voltage range and broad output voltage swing with operating supply voltage from 1.8V to 5.5V. Products are fully specified over the extended -40 to $+125^{\circ}\text{C}$ temperature range.

DIO32051/32051A/32052/32054 series provides 0.5MHz bandwidth consuming ultra low current of 24 μ A per channel. Very low input bias currents of 5pA enable them ideal for integrators, photodiode amplifiers, and piezoelectric sensors.

Applications

- ASIC Input or Output Amplifier
- Sensor Interface
- Piezo Electric Transducer Amplifier
- Medical Instrumentation
- Audio Output
- Portable Systems
- Smoke Detectors
- Notebook PC
- Battery-Powered equipment

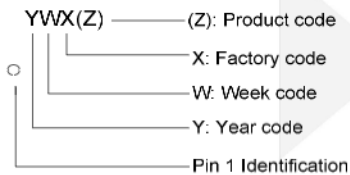
Typical Application



Ordering Information

Order Part Number	Top Marking		T _A	Package	
DIO32051ST5	YWXT	RoHS or Green	-40 to +125°C	SOT23-5	Tape & Reel, 3000
DIO32051SC5	YWXT	RoHS or Green	-40 to +125°C	SC70-5	Tape & Reel, 3000
DIO32051AST5	YWXU	RoHS or Green	-40 to +125°C	SOT23-5	Tape & Reel, 3000
DIO32051ASC5	YWXU	RoHS or Green	-40 to +125°C	SC70-5	Tape & Reel, 3000
DIO32052MP8	DIO2052	RoHS or Green	-40 to +125°C	MSOP-8	Tape & Reel, 3000
DIO32052SO8	DIO2052	RoHS or Green	-40 to +125°C	SOIC-8	Tape & Reel, 2500
DIO32054SO14	DIO2054	RoHS or Green	-40 to +125°C	SOIC-14	Tape & Reel, 2500
DIO32054TP14	DIO2054	RoHS or Green	-40 to +125°C	TSSOP-14	Tape & Reel, 2500

Marking Definition



Pin Assignments

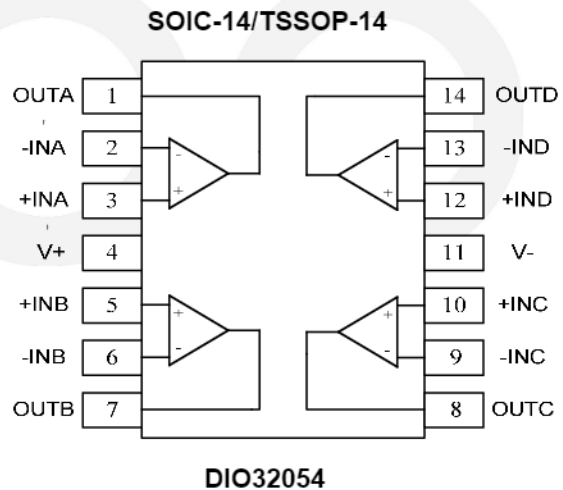
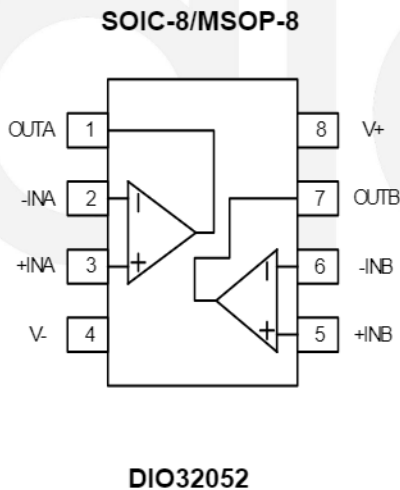
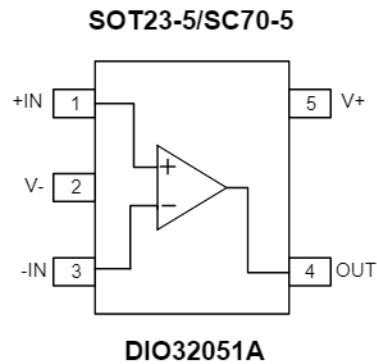
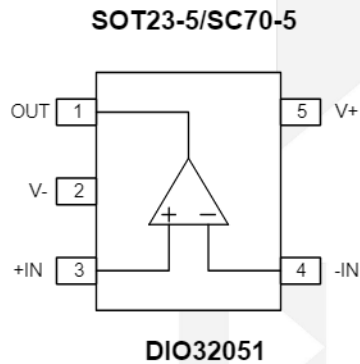


Figure 1 Pin Assignment

Pin Description

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

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	V
Input Voltage	(V ₋)-0.5 to 7	V
Storage Temperature Range	-65 to 150	°C
Junction Temperature	150	°C
Lead Temperature Range	260	°C
ESD	HBM, JEDEC: JESD22-A114	8
	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	1.8 to 5.5	V
Input Voltage	0 to V+	V
Operating Temperature Range	-40 to 125	°C

Electrical Characteristics

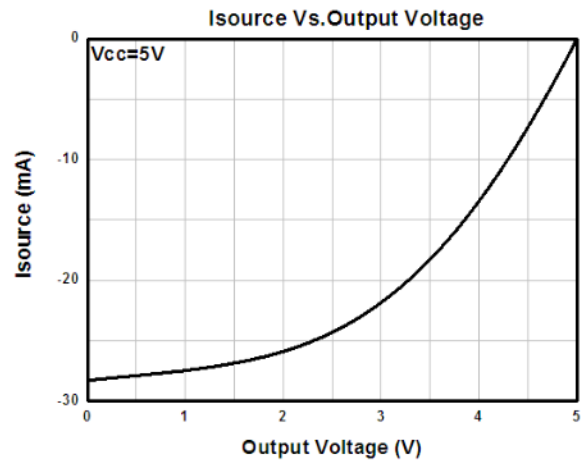
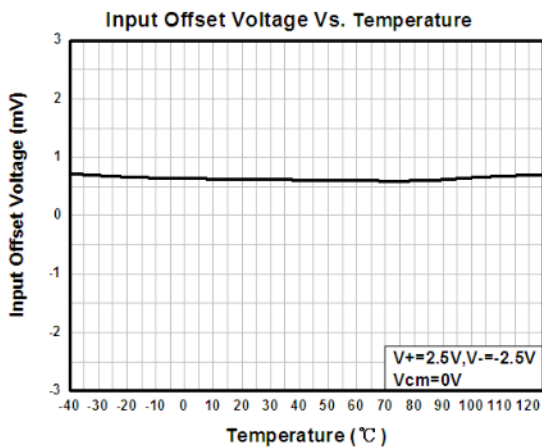
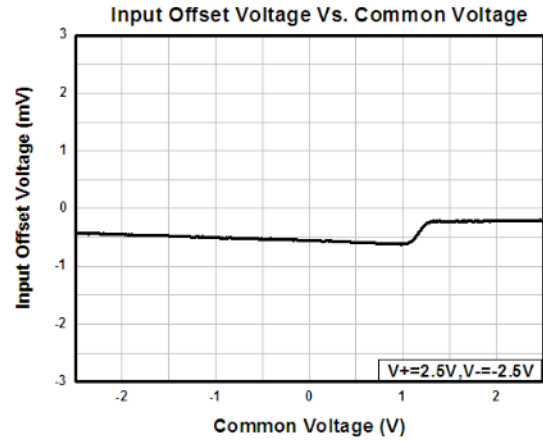
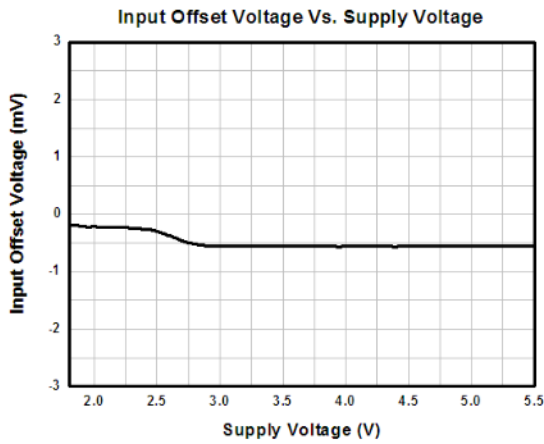
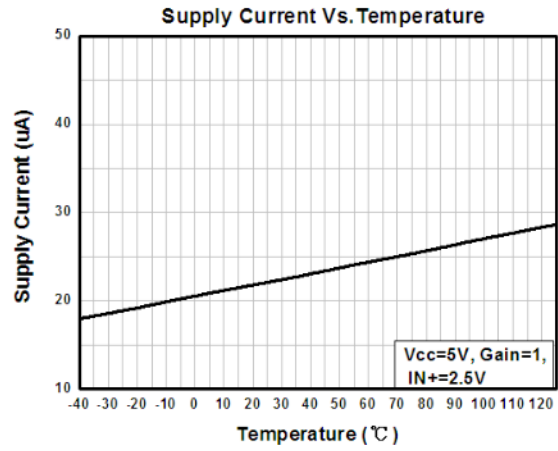
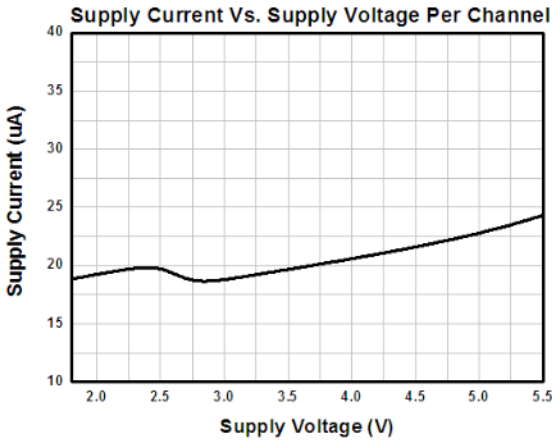
Typical value: $V_{+}=5V$, $R_L=100k\Omega$ to $V_{+}/2$, $T_A = 25^{\circ}C$, unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
INPUT CHARACTERISTICS						
V_{OS}	Input Offset Voltage	$-40^{\circ}C \leq T_A \leq 125^{\circ}C$, $V_{+}=1.8V$ to $5V$	-3	0	3	mV
I_B	Input Bias Current	$-40^{\circ}C \leq T_A \leq 125^{\circ}C$, $V_{+}=1.8V$ to $5V$		5		pA
I_{OS}	Input Offset Current	$-40^{\circ}C \leq T_A \leq 125^{\circ}C$, $V_{+}=1.8V$ to $5V$		5		pA
V_{CM}	Common Mode Voltage Range		0.1		(V_{+}) +0.1	V
CMRR	Common Mode Rejection Ratio	$-40^{\circ}C \leq T_A \leq 125^{\circ}C$, $V_{CM}=-0.1$ to $(V_{+})+0.1$		75		dB
A_{OL}	Open Loop Voltage Gain	$R_L=5k\Omega$, $V_O=0.1$ to $(V_{+})-0.1$	80	102		dB
		$R_L=200k\Omega$, $V_O=0.1$ to $(V_{+})-0.1$	100	128		
5	Input Offset Voltage Drift	$-40^{\circ}C \leq T_A \leq 125^{\circ}C$			2.5	$\mu V/^{\circ}C$
OUTPUT CHARACTERISTICS						
V_{OH}	Output Voltage High	$V_{+}=5V$, $R_L=100k\Omega$, $-40^{\circ}C \leq T_A \leq 125^{\circ}C$		4.995		V
		$V_{+}=1.8V$, $R_L=100k\Omega$, $-40^{\circ}C \leq T_A \leq 125^{\circ}C$		1.79		
V_{OL}	Output Voltage Low	$V_{+}=5V$, $R_L=100k\Omega$, $-40^{\circ}C \leq T_A \leq 125^{\circ}C$		5		mV
		$V_{+}=1.8V$, $R_L=100k\Omega$, $-40^{\circ}C \leq T_A \leq 125^{\circ}C$		5		
I_{SC}	Output Short Circuit Current	Source I_{SC} , $V_{+}=5V$		28		mA
		Sink I_{SC} , $V_{+}=5V$		28		
POWER SUPPLY						
PSRR	Power Supply Rejection Ration		65	85		dB
I_S	Supply Current per Channel/Amp	$-40^{\circ}C \leq T_A \leq 125^{\circ}C$		24		μA
DYNAMIC PERFORMANCE						
GBP	Gain Bandwidth Product	$R_L=100k\Omega$, $C_L=100pF$		0.5		MHz
SR	Slew Rate	$G=1$, 2V Output Step		0.29		$V/\mu s$
t_s	Setting Time	$G=1$, 2V Output Step		4		μs
NOISE PERFORMANCE						
THD	Total Harmonic Distortion	$f=10kHz$, 2V Output Step, $R_L=10k\Omega$		0.02		%
e_n	Voltage Noise Density	$f=1kHz$		66		nV/\sqrt{Hz}
		$f=10kHz$		54		

Specifications subject to change without notice.

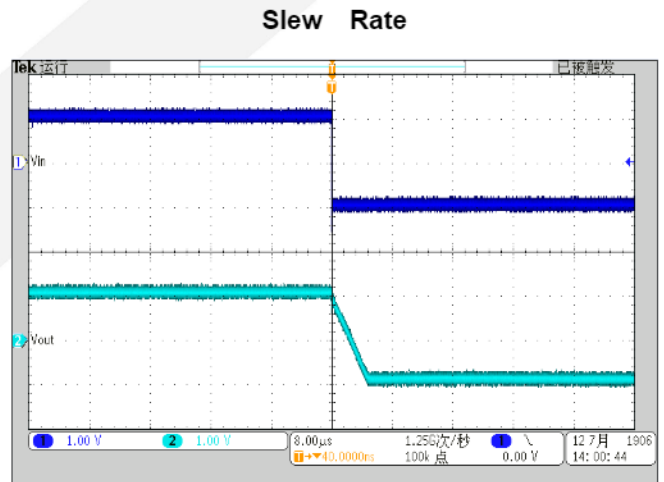
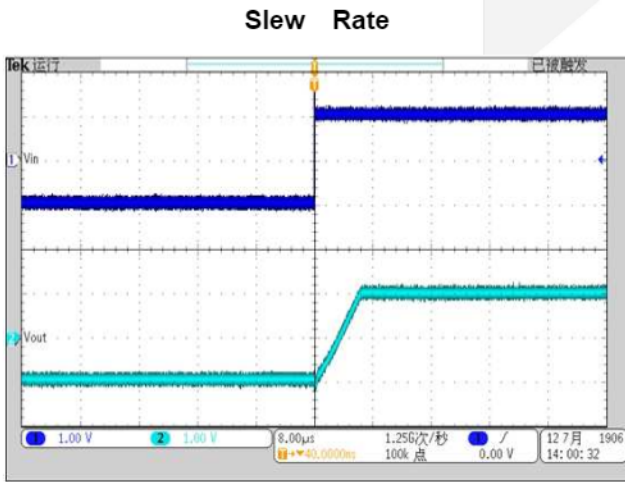
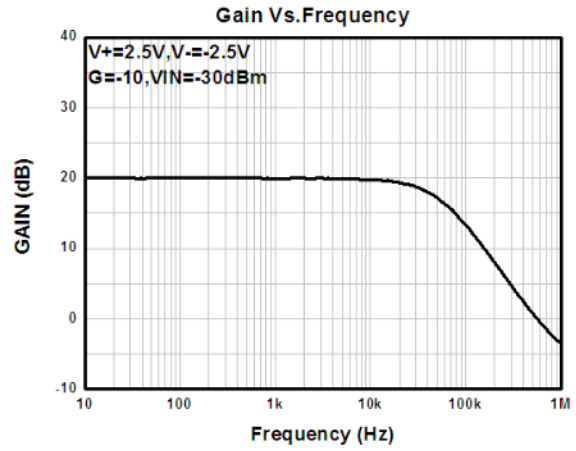
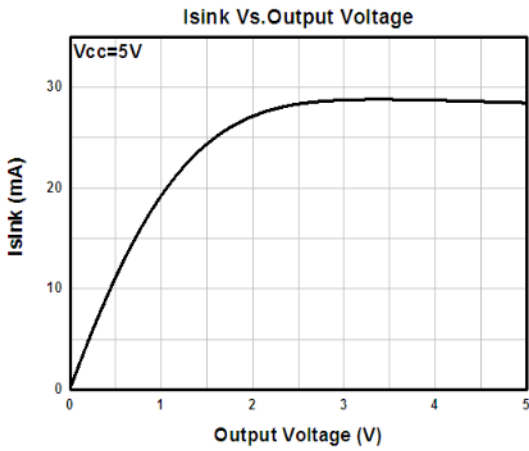
Typical Performance Characteristics

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CONTACT US

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