

## DIO2364L

### Ultra Low Vos, Low Power Amplifier

#### Features

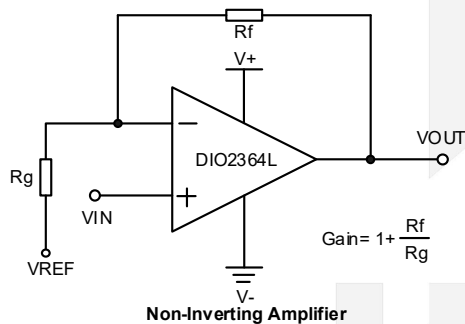
- Ultra low  $V_{OS}$ : DIO2364L:  $65\mu V$ (Max)
- Low Power:  $7.0\mu A$ (typ.)
- Unity Gain Stable
- Gain Bandwidth Product:  $110kHz$ (typ.)
- Wide supply range:  $1.8V$  to  $5.5V$
- Available in DFN3\*2-14, SOP-14 and TSSOP-14 packages
- Temperature Range:
  - Industrial:  $-40^{\circ}C$  to  $85^{\circ}C$
  - Extended:  $-40^{\circ}C$  to  $125^{\circ}C$

#### Descriptions

DIO2364L is an ultra low  $V_{OS}$  operational amplifier, with rail-to-rail CMOS input/output and single/dual channels selectable. DIO2364L has a gain-bandwidth product of  $110kHz$ (typ.), wide operating supply voltage from  $1.8V$  to  $5.5V$  and broad output voltage swing.

DIO2364L consumes ultra low power, with each channel  $7.0\mu A$ (typ.) of bias current, which makes DIO2364L be ideal for battery powered device, temperature-sense device, etc.

#### Typical Applications



#### Applications

- Portable Equipment
- Active Filters
- Data Acquisition
- Test Equipment
- Broadband Communication
- Process Control
- Audio and Video Processing

## Ordering Information

Order Part Number	Top Marking		T <sub>A</sub>	Package	
DIO2364LCD14	D2364L	Green or RoHS	-40 to 125°C	DFN3*2-14	Tape & Reel, 3000
DIO2364LCS14	D2364L	Green or RoHS	-40 to 125°C	SOP-14	Tape & Reel, 2500
DIO2364LTP14	D2364L	Green or RoHS	-40 to 125°C	TSSOP-14	Tape & Reel, 2500

## Pin Assignments

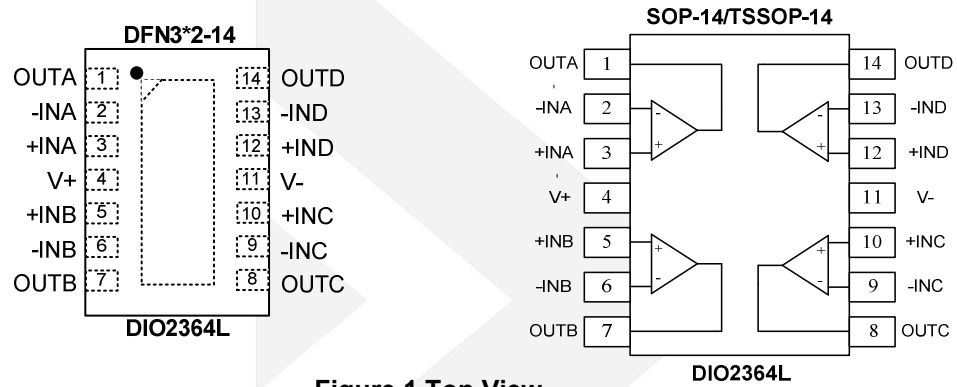


Figure 1 Top View

## Pin Description

Pin name	Description
V+	Positive supply
V-	Negative supply
+INX	Positive Input
-INX	Negative Input
OUTX	Output
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-)-0.3V to (V+)+0.3V	V
Difference Input Voltage		V+ – V-	V
Storage Temperature Range		-65 to 150	°C
Junction Temperature		150	°C
Lead Temperature Range		260	°C
ESD	HBM, JEDEC: JESD22-A114	8	kV

## 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 5	V
Operating Temperature Range		-40 to 125	°C



## Electrical Characteristics

Typical value:  $V_+ = 5V$ ,  $R_L = 1M\Omega$  to  $V_+/2$ ,  $V_{CM} = 1/2V_+$ ,  $T_A = 25^\circ C$ , unless otherwise specified.

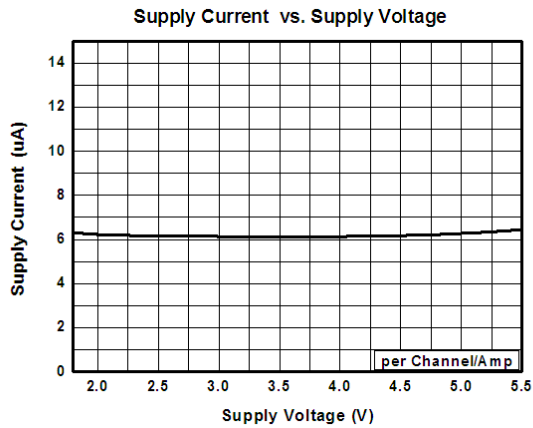
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
<b>INPUT CHARACTERISTICS</b>						
$V_{OS}$	Input Offset Voltage	$V_+ = 1.8V$ to $5.5V$	-65		65	$\mu V$
$I_B$	Input Bias Current	$V_+ = 1.8V$ to $5.5V$		1		pA
$I_{OS}$	Input Offset Current	$V_+ = 1.8V$ to $5.5V$		1		pA
$V_{CM}$	Common Mode Voltage Range		-0.1		( $V_+$ ) +0.1	V
CMRR	Common Mode Rejection Ratio	$-40^\circ C \leq T_A \leq 125^\circ C$		130		dB
$A_{OL}$	Open Loop Voltage Gain	$R_L = 50k\Omega$ , $V_O = 0.1$ to $(V_+) - 0.1$	80	110		dB
$\Delta V_{OS}/\Delta T$	Input Offset Voltage Drift	$-40^\circ C \leq T_A \leq 125^\circ C$		0.02		$\mu V/^\circ C$
<b>OUTPUT CHARACTERISTICS</b>						
$V_{OH}$	Output Voltage High	$R_L = 50k\Omega$ , $-40^\circ C \leq T_A \leq 125^\circ C$		4.992		V
$V_{OL}$	Output Voltage Low	$R_L = 50k\Omega$ , $-40^\circ C \leq T_A \leq 125^\circ C$		8		mV
$I_{SC}$	Output Short Circuit Current	Source $I_{SC}$ , $V_+ = 5V$		34		mA
		Sink $I_{SC}$ , $V_+ = 5V$		34		
<b>POWER SUPPLY</b>						
PSRR	Power Supply Rejection Ration		100			dB
$I_S$	Supply Current per Channel/Amp	$-40^\circ C \leq T_A \leq 125^\circ C$		7	11	$\mu A$
<b>DYNAMIC PERFORMANCE</b>						
GBP	Gain Bandwidth Product	$C_L = 100pF$ , $R_L = 1M\Omega$		110		kHz
SR	Slew Rate	$G = 1$ , 2V Output Step		80		V/ms
$t_s$	Setting Time	$G = 1$ , 2V Output Step		2		ms
$\Theta_m$	Phase Margin			70		Deg
$t_r$	Overload Recovery Time			3.9		ms
<b>NOISE PERFORMANCE</b>						
THD	Total Harmonic Distortion	$f = 1kHz$ , $4V_{PP}$ , $R_L = 5k\Omega$		0.33		%

$e_n$	Voltage Noise Density	$f=1\text{kHz}$		100	$\text{nV}/\sqrt{\text{Hz}}$
-------	-----------------------	-----------------	--	-----	------------------------------

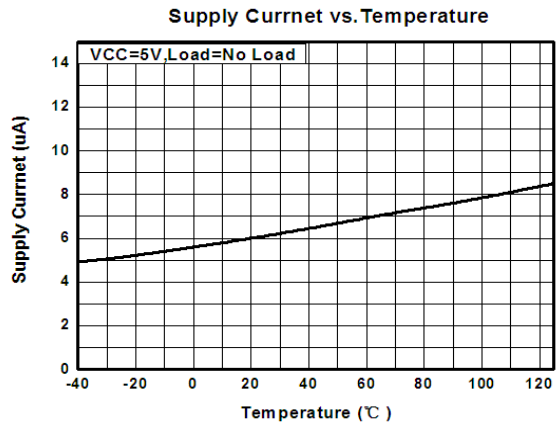
Specifications subject to change without notice.

## Typical Performance Characteristics

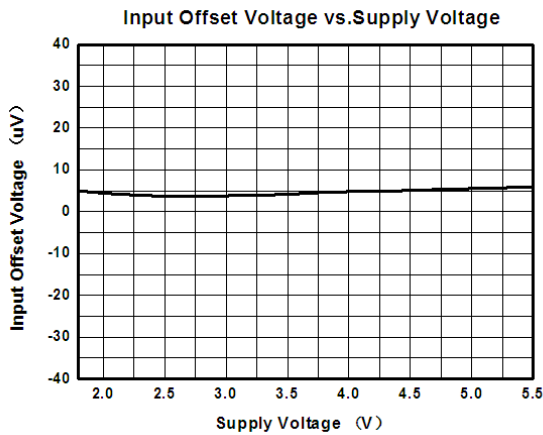
$I_S$  vs.  $V_{CC}$



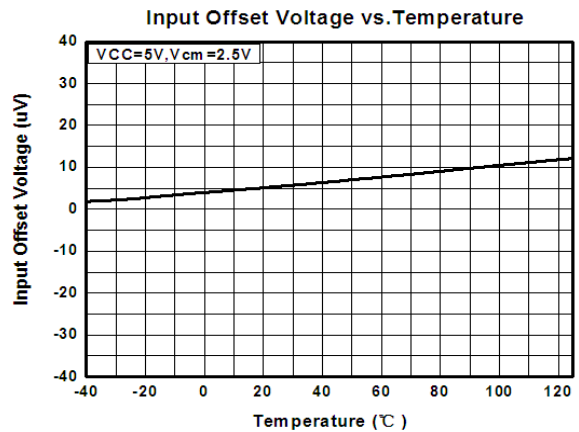
$I_S$  vs. Temperature



$V_{OS}$  vs.  $V_{CC}$

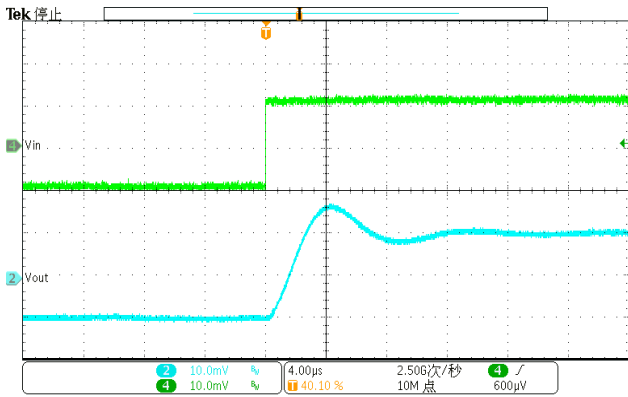


$V_{OS}$  vs. Temperature

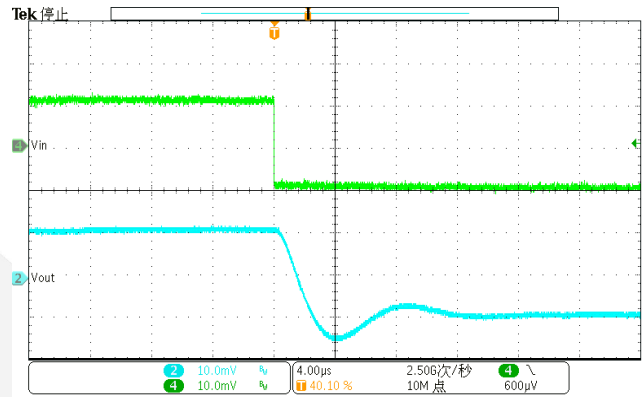


## Typical Performance Characteristics (Continue)

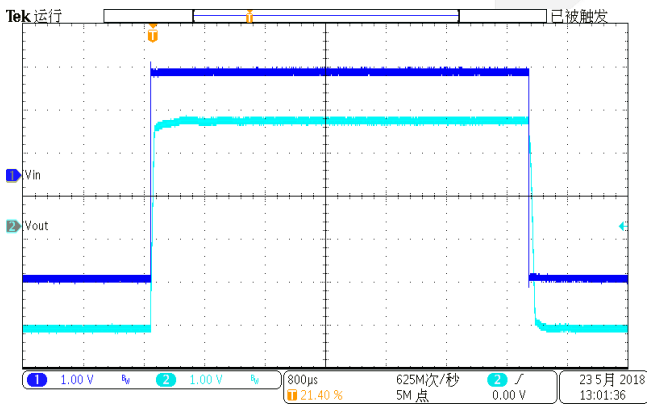
Small-signal Response  
( $V_{CC}=5V, C_L=200pF$ )



Small-signal Response  
( $V_{CC}=5V, C_L=200pF$ )



Large-signal Response  
( $V_{CC}=5V, R_L=5.1k\Omega$ )



## 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.

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

