

TECHNICAL DATA
DATASHEET 4138, REV. -

Dual, Matched Picoampere, Microvolt Input, Low Noise Op Amp

Replaces obsolete LT[®]1024MD, LT[®]1024AMD

Features:

- Guaranteed Offset Voltage: 50 μ V Max
- Guaranteed Bias Current:
 - 25°C: 120pA Max
 - 55°C to 125°C: 700pA Max
- Guaranteed Drift: 1.5 μ V/°C Max
- Low Noise, 0.1Hz to 10Hz: 0.5 μ VP-P
- Guaranteed Supply Current: 600 μ A Max
- Guaranteed CMRR: 112dB Min
- Guaranteed PSRR: 112dB Min
- Guaranteed Voltage Gain with 5mA Load Current
- Guaranteed Matching Characteristics

Applications:

- Strain Gauge Signal Conditioner
- Dual Limit Precision Threshold Detection
- Charge Integrators
- Wide Dynamic Range Logarithmic Amplifiers
- Light Meters
- Low Frequency Active Filters
- Standard Cell Buffers
- Thermocouple Amplifiers

Description: The SCP-5453 dual, matched internally compensated universal precision operational amplifier can be used in practically all precision applications requiring multiple op amps. The SCP-5453 combines picoampere bias currents (which are maintained over the full -55°C to 125°C temperature range), microvolt offset voltage (and low drift with time and temperature), low voltage and current noise and low power dissipation.

Extremely high common mode and power supply rejection ratios, practically immeasurable warm-up drift, and the ability to deliver 5mA load current with a voltage gain of a million, round out the SCP-5453's superb precision specifications.

Tight matching is guaranteed on offset voltage, noninverting bias currents and common mode and power supply rejections. The all-around excellence of the SCP-5453 eliminates the necessity of the time-consuming error analysis procedure of precision system design in many dual applications.

MAXIMUM RATINGS

All ratings are at T_A = 25°C unless otherwise specified.

Parameter	Limit
Supply Voltage	±20V
Differential Input Current	±10mA
Input Voltage	±20V
Output Short Circuit Duration	Indefinite
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature (Soldering)	300°C

SENSITRON**TECHNICAL DATA
DATA SHEET 4138, REV. -****Electrical Characteristics (25°C)****non-A limits in parentheses**

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	V _{os}			15(20)	50(100)	μV
Long Term Input Offset Voltage Stability				0.3		μV/mo.
Input Offset Current	I _{os}			20(25)	100(180)	pA
Input Bias Current	I _B			±25(30)	±120(200)	pA
Input Noise Voltage	e _n	0.1Hz to 10Hz		0.5		μV _{P-P}
Input Noise Voltage Density	e _n	f _o = 10Hz f _o = 1000Hz		17 14	33 24	nV/Hz _{0.5} nV/Hz _{0.5}
Input Noise Current Density	i _n	f _o = 10Hz		20		fA/Hz _{0.5} ⁰
Large-Signal Voltage Gain	A _{vol}	V _{OUT} = ±12V, R _L = 10k? V _{OUT} = ±10V, R _L = 2k?	250(180) 150(100)	2000 1000		V/mV V/mV
Common Mode Rejection Ratio	CMRR	V _{CM} = ±13.5V	112(108)	132		dB
Power Supply Rejection Ratio	PSRR	V _S = ±2V to ±20V	112(108)	132		dB
Input Voltage Range			±13.5	±14.0		V
Output Voltage Swing	V _{OUT}	R _L = 10k?	±13	±14		V
Slew Rate			0.1	0.2		V/μs
Supply Current per Amplifier	I _S			380	600(700)	μA

Matching Characteristics (25°C)**non-A limits in parentheses**

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage Match				20(25)	75(150)	μV
Average Noninverting Bias Current	I _{B+}			±30(40)	±150(250)	pA
Noninverting Offset Current	I _{os+}			30	150(300)	pA
Common Mode Rejection Ratio Match	ΔCMRR	V _{CM} = ±13.5V	110(106)	132		dB
Power Supply Rejection Ratio Match	ΔPSRR	V _S = ±2V to 20V	110(106)	132		dB
Channel Separation		f = 10Hz (Note 4)	134	150		dB

SENSITRON**TECHNICAL DATA
DATA SHEET 4138, REV. -****Electrical Characteristics (-55°C to 125°C)****non-A limits in parentheses**

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	V _{os}			40(50)	200(300)	μV
Average Temperature Coefficient of Input Offset Voltage				.25(.3)	1.5(2.0)	μV/°C
Input Offset Current	I _{os}			80(100)	350(500)	pA
Average Temperature Coefficient of Input Offset Current				.5(.7)	2.5(3)	pA/°C
Input Bias Current	I _B			±100 (200)	±700 (1300)	pA
Average Temperature Coefficient of Input Bias Current				1(2)	6(12)	pA/°C
Large-Signal Voltage Gain	A _{vol}	V _{OUT} = ±12V, R _L = 10k? V _{OUT} = ±10V, R _L = 2k?	150	1000		V/mV
			100	600		V/mV
Common Mode Rejection Ratio	CMRR	V _{CM} = ±13.5V	108(106)	128		dB
Power Supply Rejection Ratio	PSRR	V _S = ±2.5V to ±18V	108(106)	128		dB
Input Voltage Range			±13.5			V
Output Voltage Swing	V _{OUT}	R _L = 10k?	±13	±14		V
Supply Current per Amplifier	I _S			400	800(900)	μA

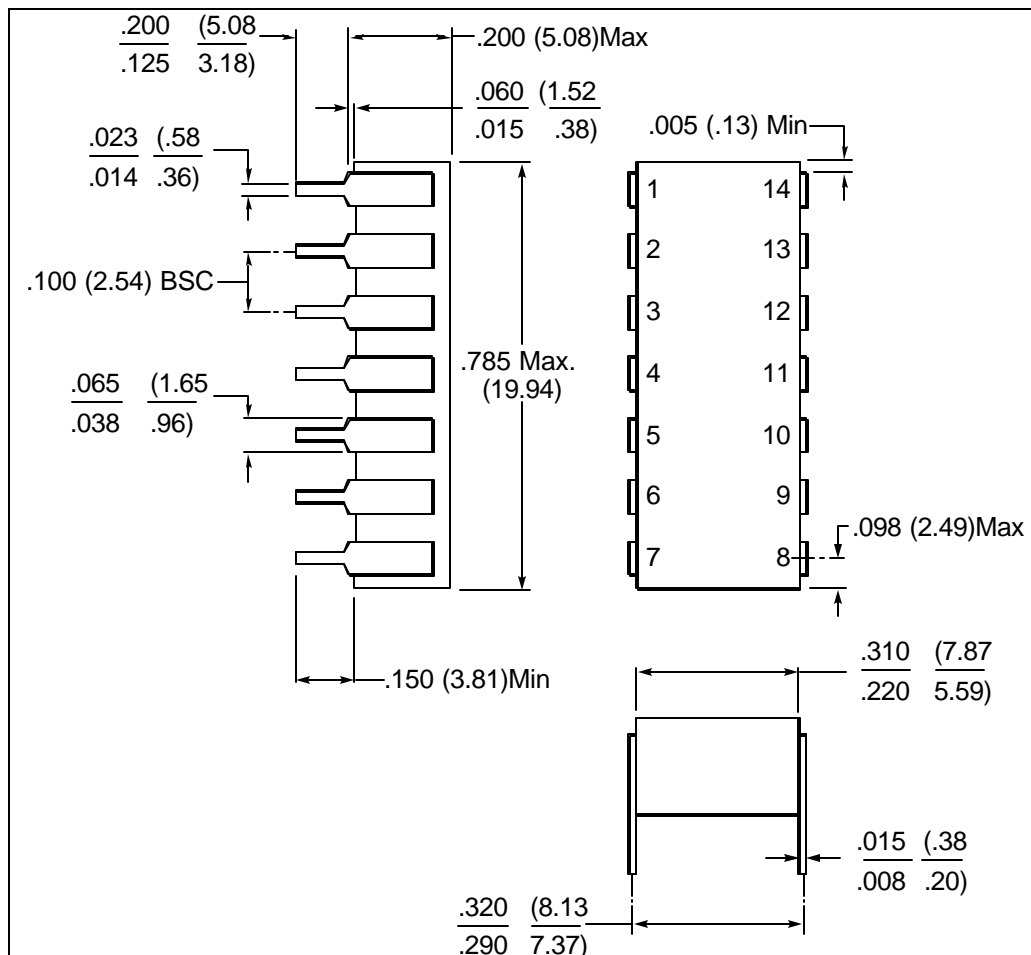
Matching Characteristics (-55°C to 125°C)**non-A limits in parentheses**

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage Match				50(70)	280(500)	μV
Input Offset Voltage Tracking				.3(.4)	2(3.5)	
Average Noninverting Bias Current	I _{B+}			±100 (200)	±800 (1400)	pA
Noninverting Offset Current	I _{OS+}			80(150)	800(1500)	pA
Common Mode Rejection Ratio Match	ΔCMRR	V _{CM} = ±13.5V	106(104)	128		dB
Power Supply Rejection Ratio Match	ΔPSRR	V _S = ±2.5V to 18V	106(104)	128		dB

SENSITRON

TECHNICAL DATA

DATA SHEET 4138, REV. -



PINOUT TABLE

CERDIP-14

PIN	FUNCTION	PIN	FUNCTION
1	Null (A)	8	Null (B)
2	Null (A)	9	Null (B)
3	-IN (A)	10	-IN (B)
4	+IN (A)	11	+IN (B)
5	V- (B)	12	V- (A)
6	Out (B)	13	Out (A)
7	V+ (B)	14	V+ (A)

TECHNICAL DATA

DISCLAIMER:

- 1- The information given herein, including the specifications and dimensions, is subject to change without prior notice to improve product characteristics. Before ordering, purchasers are advised to contact the Sensitron Semiconductor sales department for the latest version of the datasheet(s).
- 2- In cases where extremely high reliability is required (such as use in nuclear power control, aerospace and aviation, traffic equipment, medical equipment, and safety equipment), safety should be ensured by using semiconductor devices that feature assured safety or by means of users' fail-safe precautions or other arrangement.
- 3- In no event shall Sensitron Semiconductor be liable for any damages that may result from an accident or any other cause during operation of the user's units according to the datasheet(s). Sensitron Semiconductor assumes no responsibility for any intellectual property claims or any other problems that may result from applications of information, products or circuits described in the datasheets.
- 4- In no event shall Sensitron Semiconductor be liable for any failure in a semiconductor device or any secondary damage resulting from use at a value exceeding the absolute maximum rating.
- 5- No license is granted by the datasheet(s) under any patents or other rights of any third party or Sensitron Semiconductor.
- 6- The datasheet(s) may not be reproduced or duplicated, in any form, in whole or part, without the expressed written permission of Sensitron Semiconductor.
- 7- The products (technologies) described in the datasheet(s) are not to be provided to any party whose purpose in their application will hinder maintenance of international peace and safety nor are they to be applied to that purpose by their direct purchasers or any third party. When exporting these products (technologies), the necessary procedures are to be taken in accordance with related laws and regulations.