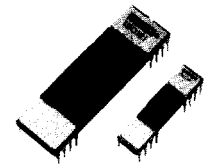
BURR - BROWN®



ISO120
ISO121

www.burr-brown.com/databook/ISO120.html

Precision Low Cost ISOLATION AMPLIFIER

FEATURES

- 100% TESTED FOR PARTIAL DISCHARGE
- ISO120: Rated 1500Vrms
- ISO121: Rated 3500Vrms
- HIGH IMR: 115dB at 60Hz
- USER CONTROL OF CARRIER FREQUENCY
- LOW NONLINEARITY: ±0.01% max
- BIPOLAR OPERATION: V_O = ±10V
- 0.3"-WIDE 24-PIN HERMETIC DIP, ISO120
- SYNCHRONIZATION CAPABILITY
- WIDE TEMP RANGE: –55°C to +125°C (ISO120)

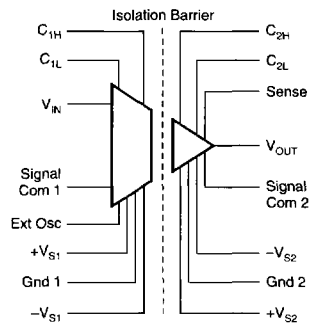
APPLICATIONS

- INDUSTRIAL PROCESS CONTROL: Transducer Isolator for Thermocouples, RTDs, Pressure Bridges, and Flow Meters, 4mA to 20mA Loop Isolation
- GROUND LOOP ELIMINATION
- MOTOR AND SCR CONTROL
- POWER MONITORING
- ANALYTICAL MEASUREMENTS
- BIOMEDICAL MEASUREMENTS
- DATA ACQUISITION
- TEST EQUIPMENT

DESCRIPTION

The ISO120 and ISO121 are precision isolation amplifiers incorporating a novel duty cycle modulation-demodulation technique. The signal is transmitted digitally across a 2pF differential capacitive barrier. With digital modulation the barrier characteristics do not affect signal integrity, which results in excellent reliability and good high frequency transient immunity across the barrier. Both the amplifier and barrier capacitors are housed in a hermetic DIP. The ISO120 and ISO121 differ only in package size and isolation voltage rating.

These amplifiers are easy to use. No external components are required for 60kHz bandwidth. With the addition of two external capacitors, precision specifications of 0.01% max nonlinearity and 150µV/°C max V_{OS} drift are guaranteed with 6kHz bandwidth. A power supply range of ±4.5V to ±18V and low quiescent current make these amplifiers ideal for a wide range of applications.



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Internet: http://www.burr-brown.com/ • FAXLine: (800) 548-6133 (US/Canada Only) • Cable: BBRCORP • Telex: 066-6491 • FAX: (520) 889-1510 • Immediate Product Info: (800) 548-6132

SPECIFICATIONS

ELECTRICAL

At T_A = +25°C: V_{S1} = V_{S2} = ±15V: and R_L = 2kΩ, unless otherwise noted.

PARAMETER	CONDITIONS	ISO120BG, ISO121BG			ISO120G, ISO120SG[4], ISO121G			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
ISOLATION								
Voltage Rated Continuous ISO120: AC 60Hz	T_{MIN} to T_{MAX}	1500			*			Vrms
DC	T_{MIN} to T_{MAX}	2121			*			VDC
ISO121: AC 60Hz	T_{MIN} to T_{MAX}	3500			*			Vrms
DC	T_{MIN} to T_{MAX}	4950			*			VDC
100% Test (AC 60Hz): ISO120	1s; Partial Discharge ≤ 5pC	2500			*			Vrms
ISO121	1s; Partial Discharge ≤ 5pC	5600			*			Vrms
Isolation Mode Rejection ISO 120: AC 60Hz	1500Vrms		115			*		dB
DC			160			*		dB
ISO121: AC60Hz	3500Vrms		115			*		dB
DC			160			*		dB
Barrier Impedance			10^{14} ll 2			*		Ω ll pF
Leakage Current	V_{ISO} = 240Vrms, 60Hz		0.18	0.5		*	*	μArms
GAIN[4]	V_O = ±10V							
Nominal Gain	C_1 = C_2 = 1000pF		1			1		V/V
Gain Error			±0.04	±0.1		±0.05	±0.25	%FSR
Gain vs Temperature			±5	±20		±10	±40	ppm/°C
Nonlinearity			±0.005	±0.01		±0.01	±0.05	%FSR
Nominal Gain	C_1 = C_2 = 0		1			1		V/V
Gain Error			±0.04	±0.25		±0.05	±0.25	%FSR
Gain vs Temperature			±40			±40		ppm/°C
Nonlinearity			±0.02	±0.1		±0.04	±0.1	%FSR
INPUT OFFSET VOLTAGE[4]								
Initial Offset	C_1 = C_2 = 1000pF		±5	±25		±10	±50	mV
vs Temperature			±100	±150		±150	±400	μV/°C
Initial Offset	C_1 = C_2 = 0		±25	±100		±40	±100	mV
vs Temperature			±250			±500		μV/°C
Initial Offset								
vs Supply	$±V_{S1}$ or $±V_{S2}$ = ±4.5V to ±18V		±2			±2		mV/V
Noise			4			4		μV/√Hz
INPUT								
Voltage Range[1]		±10	±15		*	*		V
Resistance			200			*		kΩ
OUTPUT								
Voltage Range		±10	±12.5		*	*		V
Current Drive		±5	±15		*	*		mA
Capacitive Load Drive			0.1			*		μF
Ripple Voltage[2]			10			*		mVp-p
FREQUENCY RESPONSE								
Small Signal Bandwith	C_1 = C_2 = 0		60			*		kHz
	C_1 = C_2 = 1000pF		6			*		kHz
Slew Rate			2			*		V/μs
Settling Time	V_O = ±10V							
0.1%	C_2 = 100pF		50			*		μs
0.01%	C_1 = C_2 = 1000pF		350			*		μs
Overload Recovery Time[3]	50% Output Overload, C_1 = C_2 = 0		150			*		μs
POWER SUPPLIES								
Rated Voltage			15			*		V
Voltage Range		±4.5		±18	*		*	V
Quiescent Current: V_{S1}			±4.0	±5.5		*	*	mA
V_{S2}			±5.0	±6.5		*	*	mA
TEMPERATURE RANGE								
Specification: BG and G		–25		85	–25		85	°C
SG[4]		–25		85	–55		125	°C
Operating		–55		125	–55		125	°C
Storage		–65		150	–55		150	°C
θ_{JA}: ISO120			40			40		°C/W
ISO121			25			25		°C/W

* Specification same as ISO120BG, ISO121BG.

NOTE: (1) Input voltage range = ±10V for V_{S1}, V_{S2} = ±4.5VDC to ±18VDC. (2) Ripple frequency is at carrier frequency. (3) Overload recovery is approximately three times the settling time for other values of C_2. (4) The SG-grade is specified –55°C to +125°C; performance of the SG in the –25°C to +85°C temperature range is the same as the BG-grade.

ABSOLUTE MAXIMUM RATINGS

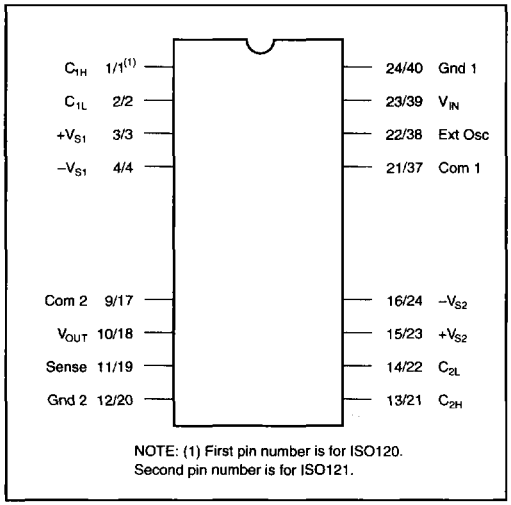
Supply Voltage (any supply)	18V
V_{IN}, Sense Voltage	±100V
External Oscillator Input	±25V
Signal Common 1 to Ground 1	±1V
Signal Common 2 to Ground 2	±1V
Continuous Isolation Voltage: ISO120	1500Vrms
ISO121	3500Vrms
V_{ISO}, dv/dt	20kV/µs
Junction Temperature	150°C
Storage Temperature	–65°C to +150°C
Lead Temperature (soldering, 10s)	+300°C
Output Short Duration	Continuous to Common

PACKAGE/ORDERING INFORMATION

PRODUCT	PACKAGE	PACKAGE DRAWING NUMBER[1]	TEMPERATURE RANGE
ISO120G	24-Pin DIP	225	–25°C to 85°C
ISO120BG	24-Pin DIP	225	–25°C to 85°C
ISO120SG	24-Pin DIP	225	–55C to 125°C
ISO121G	40-Pin DIP	206	–25°C to 85°C
ISO121BG	40-Pin DIP	206	–25°C to 85°C

NOTE: (1) For detailed drawing and dimension table, please see end of data sheet, or Appendix C of Burr-Brown IC Data Book.

CONNECTION DIAGRAM



NOTE: (1) First pin number is for ISO120. Second pin number is for ISO121.

ELECTROSTATIC DISCHARGE SENSITIVITY

This integrated circuit can be damaged by ESD. Burr-Brown recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.