

ICL7106/D, ICL7106/W, ICL7107/D, ICL7107/W 3½-Digit LCD/LED Single-Chip A/D Converter



ICL7106/D, ICL7106/W, ICL7107/D, ICL7107/W

GENERAL DESCRIPTION

The Intersil ICL7106 and 7107 are high performance, low power 3½-digit A/D converters containing all the necessary active devices on a single CMOS I.C. Included are seven-segment decoders, display drivers, a reference, and a clock. The 7106 is designed to interface with a liquid crystal display (LCD) and includes a backplane drive; the 7107 will directly drive an instrument-size light emitting diode (LED) display.

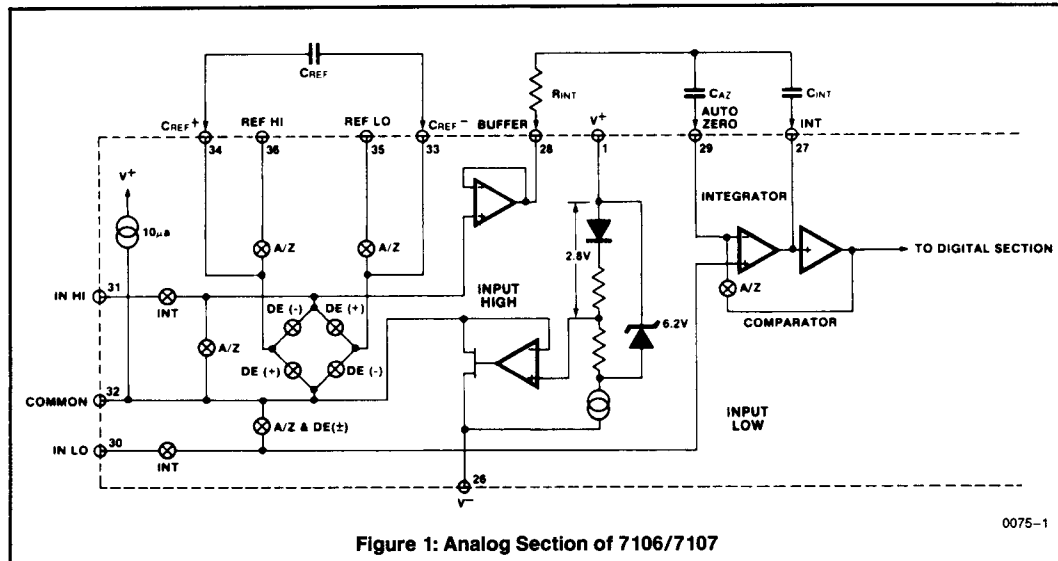
The 7106 and 7107 bring together an unprecedented combination of high accuracy, versatility, and true economy. It features auto-zero to less than 10 μV , zero drift of less than 1 $\mu\text{V}/^\circ\text{C}$, input bias current of 10 pA max., and rollover error of less than one count. True differential inputs and reference are useful in all systems, but give the designer an uncommon advantage when measuring load cells, strain gauges and other bridge-type transducers. Finally, the true economy of single power supply operation (7106), enables a high performance panel meter to be built with the addition of only 10 passive components and a display.

FEATURES

- Guaranteed Zero Reading for 0V Input On All Scales
- True Polarity at Zero for Precise Null Detection
- 1 pA Typical Input Current
- True Differential Input and Reference
- Direct Display Drive—No External Components Required—LCD ICL7106
—LED ICL7107
- Low Noise—Less Than 15 $\mu\text{V}_{\text{p-p}}$
- On-Chip Clock and Reference
- Low Power Dissipation—Typically Less Than 10 mW
- No Additional Active Circuits Required

ORDERING INFORMATION

Part Number	Temperature	Form
ICL7106/D	+ 25°C	Dice
ICL7107/D	+ 25°C	Dice
ICL7106/W	+ 25°C	Wafer
ICL7107/W	+ 25°C	Wafer



INTERSIL'S SOLE AND EXCLUSIVE WARRANTY OBLIGATION WITH RESPECT TO THIS PRODUCT SHALL BE THAT STATED IN THE WARRANTY ARTICLE OF THE CONDITION OF SALE. THE WARRANTY SHALL BE EXCLUSIVE AND SHALL BE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE.

NOTE: All typical values have been characterized but are not tested.

ICL7106/D, ICL7106/W, ICL7107/D, ICL7107/W



ABSOLUTE MAXIMUM RATINGS

Supply Voltage	
ICL7106, V ⁺ to V ⁻	15V
ICL7107, V ⁺ to GND	+6V
ICL7107, V ⁻ to GND	-9V
Analog Input Voltage (Either Input) (Note 1)	
Reference Input Voltage (Either Input)	V ⁺ to V ⁻
Clock Input	
ICL7106	TEST to V ⁺
ICL7107	GND to V ⁺

NOTE: Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions above 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.

NOTE 1: Input voltages may exceed the supply voltages provided the input current is limited to ±100 μA.

CHIP TOPOGRAPHY

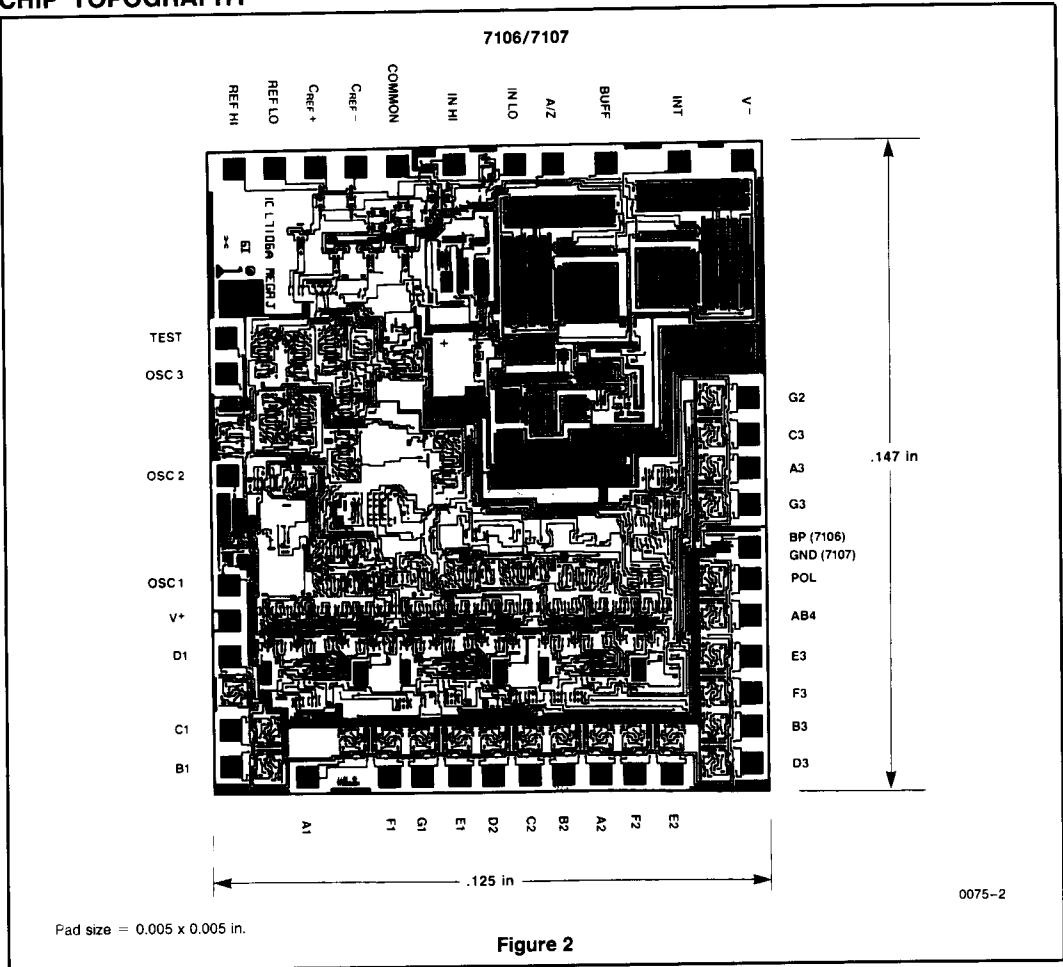


Figure 2

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ELECTRICAL CHARACTERISTICS (Note 3)

Parameter	Test Conditions	Min	Typ	Max	Units
Zero Input Reading	$V_{IN} = 0.0V$ Full Scale = 200.0 mV	-000.0	±000.0	+000.0	Digital Reading
Ratiometric Reading	$V_{IN} = V_{REF}$ $V_{REF} = 100\text{ mV}$	998	999/1000	1000	Digital Reading
Rollover Error (Difference in reading for equal positive and negative inputs near Full Scale)	$-V_{IN} = +V_{IN} \cong 200.0\text{ mV}$	-3	±2	3	Counts
Common Mode Rejection Ratio	$V_{CM} = \pm 1V, V_{IN} = 0V$ Full Scale = 200.0 mV		50		$\mu V/V$
Noise (Pk-Pk value not exceeded 95% of time)	$V_{IN} = 0V$ Full Scale = 200.0 mV		15		μV
Leakage Current Input	$V_{IN} = 0V$ (Note 5)		1		pA
V+ Supply Current (Does not include LED current for 7107)	$V_{IN} = 0V$		0.8	1.8	mA
V- Supply Current (7107 only)			0.6	1.8	mA
Analog Common Voltage (With respect to positive supply)	25 k Ω between Common & Positive Supply	2.4	2.8	3.2	V
Temperature Coefficient of Analog Common (with respect to positive supply)	25 k Ω between Common & Positive Supply		80		ppm/°C
7106 Only Pk-Pk Segment Drive Voltage Pk-Pk Backplane Drive Voltage (Note 4)	$V^+ \text{ to } V^- = 9V$	4	5	6	V
7107 Only Segment Sinking Current (Except Pin 19 & 20) (Pin 19 only) (Pin 20 only)	$V^+ = 5.0V$ Segment Voltage = 3V	5 10 4	8.0 16 7		mA mA

NOTE 3: Unless otherwise noted, specifications apply to both the 7106 and 7107 at $T_A = 25^\circ C$, $f_{clock} = 48\text{ kHz}$.

4: Backplane drive is in phase with segment drive for "off" segment, 180° out of phase for "on" segment. Frequency is 20 times conversion rate. Average DC component is less than 50 mV.

5: Not Tested.

NOTE: Typical values are not tested; for design purposes only.

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NOTE: All typical values have been characterized but are not tested.