

### Dual Voltage Comparator

#### AVAILABLE AS MILITARY SPECIFICATIONS

- M38510/10305B
- MIL-STD-883, 1.2.1

#### FEATURES

- Wide operating supply range:  $\pm 15V$  to a single  $+5V$
- Low input current: 6 nA
- High sensitivity:  $10\mu V$
- Wide differential input range:  $\pm 30V$
- High output drive: 50mA, 50V

#### OPTIONS

- Packages

16 pin Ceramic DIP

16 pin Flatpack

#### MARKINGS

C016

F016

- Temperature Ranges

Extended ( $-55^{\circ}C$  to  $+125^{\circ}C$ )

MIL-STD-883 paragraph 1.2.1

( $-55^{\circ}C$  to  $+125^{\circ}C$ )

XT

/883

#### GENERAL DESCRIPTION

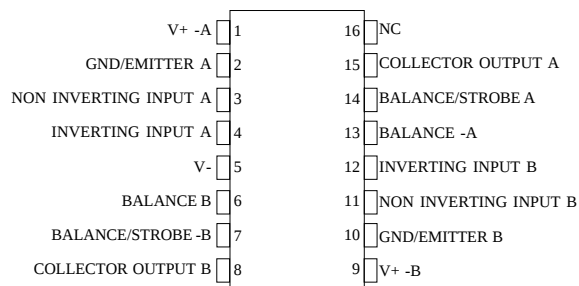
The AS2111 dual voltage comparator is two AS111 type comparators in a single hermetic package. Featuring all the same performance characteristics of the single, these duals offer in addition closer thermal tracking, lower weight, reduced insertion cost and smaller size than two singles. For additional information, see the AS111 data sheet.

The AS2111 is specified for operation over the  $-55^{\circ}C$  to  $+125^{\circ}C$  military temperature range.

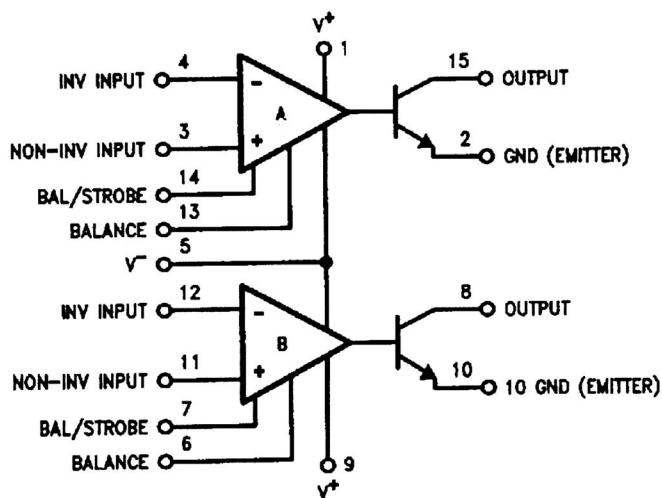
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#### PIN ASSIGNMENT (Top View)

##### 16 Pin Ceramic DIP (C016) 16 Pin Flatpack (F016)



#### CONNECTION DIAGRAM





Austin Semiconductor, Inc.

# Dual Voltage Comparator AS2111

## ABSOLUTE MAXIMUM RATINGS\*

|                                                       |                                 |
|-------------------------------------------------------|---------------------------------|
| Total Supply Voltage ( $V_+ - V_-$ )                  | 36V                             |
| Output to Negative Supply Voltage ( $V_{OUT} - V_-$ ) | 50V                             |
| Ground to Negative Supply Voltage ( $GND - V_-$ )     | 30V                             |
| Differential Input Voltage                            | $\pm 30V$                       |
| Input Voltage <sup>1</sup>                            | $\pm 15V$                       |
| Power Dissipation <sup>2</sup>                        | 500mW                           |
| Output Short Circuit Duration                         | 10sec                           |
| Operating Temperature Range                           | $-55^\circ C$ to $+125^\circ C$ |
| Storage Temperature Range                             | $-65^\circ C$ to $150^\circ C$  |
| Lead Temperature (Soldering, 10sec)                   | $300^\circ C$                   |

\*Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

## ELECTRICAL CHARACTERISTICS: Each Side<sup>3</sup>

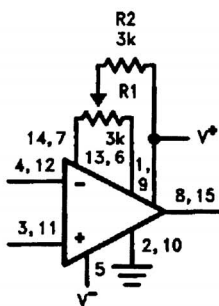
| PARAMETER                         | CONDITIONS                                                             | TYP      | MAX | UNITS |
|-----------------------------------|------------------------------------------------------------------------|----------|-----|-------|
| Input Offset Voltage <sup>4</sup> | $T_A = 25^\circ C$ , $R_S \leq 50k$                                    |          | 3.0 | mV    |
| Input Offset Current <sup>4</sup> | $T_A = 25^\circ C$                                                     |          | 10  | nA    |
| Input Bias Current                | $T_A = 25^\circ C$                                                     |          | 100 | nA    |
| Voltage Gain                      | $T_A = 25^\circ C$                                                     | 200      |     | V/mV  |
| Response Time <sup>5</sup>        | $T_A = 25^\circ C$                                                     | 200      |     | ns    |
| Saturation Voltage                | $V_{IN} \leq -5mV$ , $I_{OUT} = 50mA$ , $T_A = 25^\circ C$             |          | 1.5 | V     |
| Strobe On Current                 | $T_A = 25^\circ C$                                                     | 3.0      |     | mA    |
| Output Leakage Current            | $V_{IN} \geq 5mV$ , $I_{OUT} = 35V$ , $T_A = 25^\circ C$               |          | 10  | nA    |
| Input Offset Voltage <sup>4</sup> | $R_S \leq 50k$                                                         |          | 4.0 | mV    |
| Input Offset Current <sup>4</sup> |                                                                        |          | 20  | nA    |
| Input Bias Current                |                                                                        |          | 150 | nA    |
| Input Voltage Range               |                                                                        | $\pm 14$ |     | V     |
| Saturation Voltage                | $V_+ \geq 4.5V$ , $V_- = 0$ , $V_{IN} \leq -5mV$ , $I_{SINK} \leq 8mA$ |          | 0.4 | V     |
| Positive Supply Current           | $T_A = 25^\circ C$                                                     |          | 6.0 | mA    |
| Negative Supply Current           | $T_A = 25^\circ C$                                                     |          | 5.0 | mA    |

### NOTES:

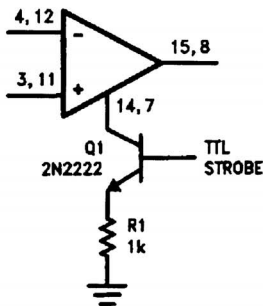
1. This rating applies for  $\pm 15V$  supplies. The positive input voltage limit is 30V above the negative supply. The negative input voltage limit is equal to the negative supply voltage or 30V below the positive supply, whichever is less.
2. The maximum junction temperature is  $150^\circ C$ . For operating at elevated temperatures, devices in the flat package, the derating is based on a thermal resistance of  $185^\circ C/W$  when mounted on a 1/16-inch-thick epoxy glass board with 0.03-inch-wide, 2 ounce copper conductor. The thermal resistance of the dual-in-line package is  $100^\circ C/W$ , junction to ambient.
3. These specifications apply for  $V_S = \pm 15V$  and  $-55^\circ C \leq T_A \leq 125^\circ C$ , unless otherwise stated. The offset voltage, offset current and bias current specifications apply for any supply voltage from a single 5V supply up to  $\pm 15V$  supplies.
4. The offset voltages and offset currents given are the maximum values required to drive the output within a volt of either supply with a 1mA load. Thus, these parameters define an error band and take into account the worst case effects of voltage gain and input impedance.
5. The response time specified is for a 100mV input step with 5mV overdrive.

### AUXILIARY CIRCUITS

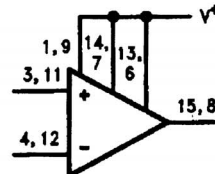
Offset Balancing



Strobing

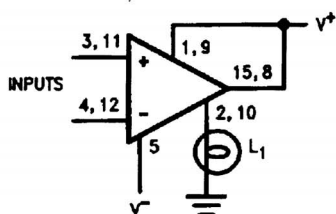


Increasing Input Stage Current\*

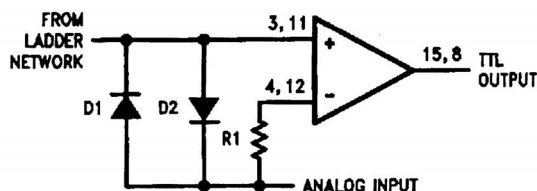


\*Increases typical common mode slew from 7.0 V/μs to 18 V/μs

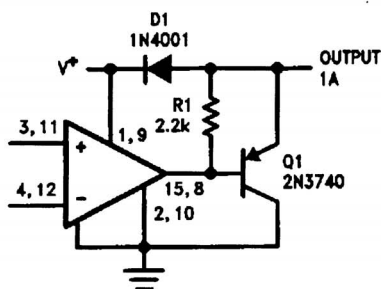
Driving Ground-Referred Load



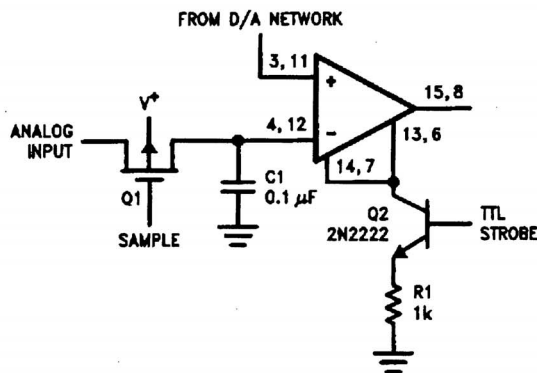
Using Clamp Diodes to Improve Responses



Comparator and Solenoid Driver

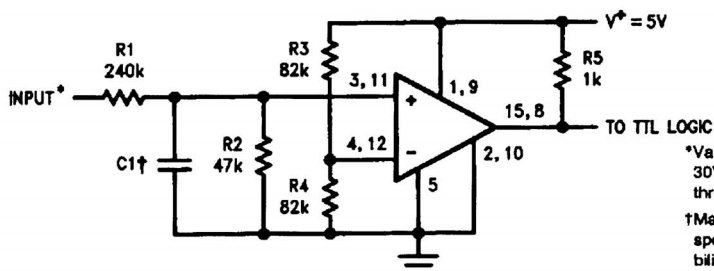


Strobing off Both Input\* and Output Stages



\*Typical input current is 50 pA with inputs strobed off

TTL Interface with High Level Logic

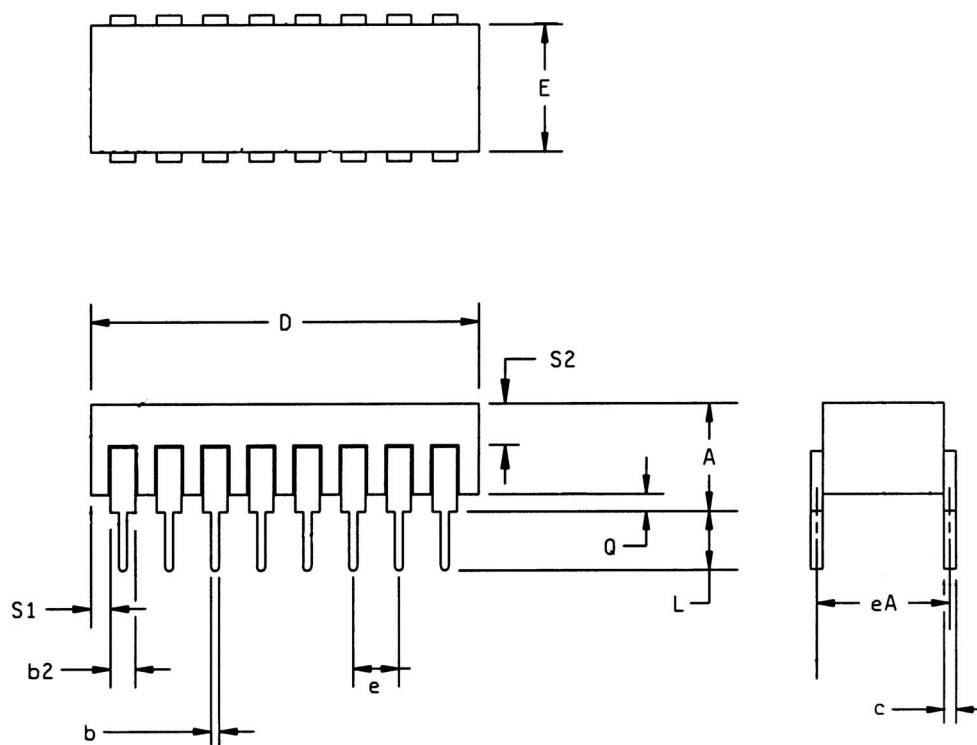


\*Values shown are for a 0V to 30V logic swing and a 15V threshold.

†May be added to control speed and reduce susceptibility to noise spikes.

## MECHANICAL DEFINITIONS\*

**ASI Case (Package Designator C)  
M38510/10305B, Case Outline E**

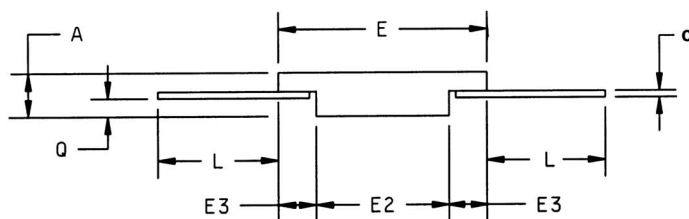
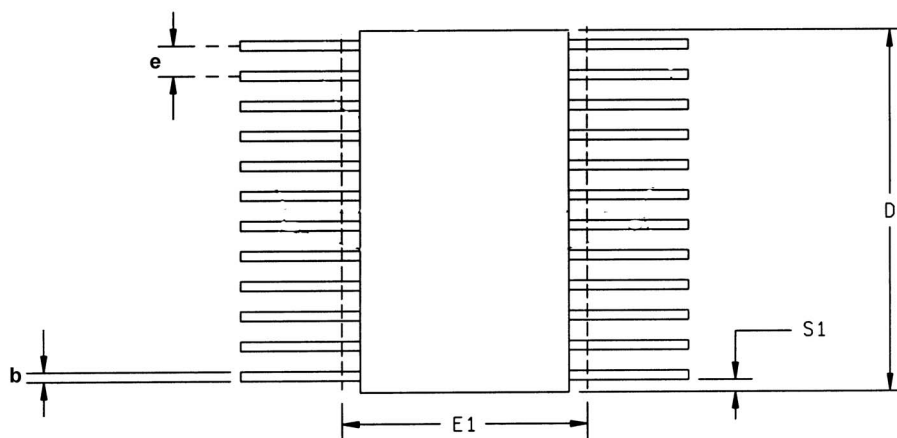


| SYMBOL | ASI SPECIFICATIONS |       |
|--------|--------------------|-------|
|        | MIN                | MAX   |
| A      | ---                | 0.200 |
| b      | 0.014              | 0.026 |
| b2     | 0.045              | 0.065 |
| c      | 0.008              | 0.018 |
| D      | ---                | 0.840 |
| E      | 0.220              | 0.310 |
| e      | 0.100 BCS          |       |
| eA     | 0.300 BCS          |       |
| L      | 0.125              | 0.200 |
| Q      | 0.015              | 0.060 |
| S1     | 0.005              | ---   |
| S2     | 0.005              | ---   |

\*All measurements are in inches.

## MECHANICAL DEFINITIONS\*

**ASI Case (Package Designator F)  
M38510/10305B, Case Outline X**



| SYMBOL | ASI SPECIFICATIONS |       |
|--------|--------------------|-------|
|        | MIN                | MAX   |
| A      | 0.045              | 0.115 |
| b      | 0.015              | 0.022 |
| c      | 0.004              | 0.009 |
| D      | ---                | 0.440 |
| E      | 0.245              | 0.285 |
| E1     | ---                | 0.315 |
| E2     | 0.130              | ---   |
| E3     | 0.030              | ---   |
| e      | 0.050 BCS          |       |
| L      | 0.250              | 0.370 |
| Q      | 0.026              | 0.045 |
| S1     | 0.005              | ---   |

\*All measurements are in inches.



Austin Semiconductor, Inc.

# Dual Voltage Comparator AS2111

## ORDERING INFORMATION

EXAMPLE: AS2111C/883C

| Device Number | Package Type | Process* |
|---------------|--------------|----------|
| AS2111        | C016         | /XT      |
| AS2111        | C016         | /883C    |

EXAMPLE: AS2111F/XT

| Device Number | Package Type | Process* |
|---------------|--------------|----------|
| AS2111        | F016         | /XT      |
| AS2111        | F016         | /883C    |

### \*AVAILABLE PROCESSES:

XT = Extended Temperature Range

-55°C to +125°C

/883C = MIL-STD-883 paragraph 1.2.1

-55°C to +125°C



Austin Semiconductor, Inc.

Dual Voltage  
Comparator  
**AS2111**

## ASI TO DSCC PART NUMBER CROSS REFERENCE

### ASI PART NUMBER

AS2111C016/883C  
AS2111F016/883C

### DSCC PART NUMBER

M38510/10305BEA  
M38510/10305BXA

*\* ASI part number is for reference only. Orders received referencing the SMD part number will be processed per the SMD.*

AS2111  
Rev. 1.6 6/05

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