

## 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

- Temperature Ranges

Extended ( $-55^{\circ}C$  to  $+125^{\circ}C$ )  
MIL-STD-883 paragraph 1.2.1  
( $-55^{\circ}C$  to  $+125^{\circ}C$ )

### MARKINGS

C016  
F016

XT

/883

### GENERAL DESCRIPTION

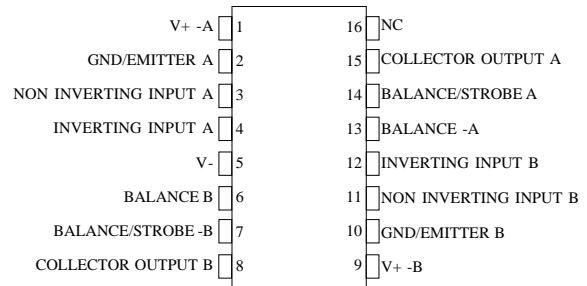
The AS2111 dual voltage comparator is two AS111 type comparators in a single hermetic package. Featuring all the same performance characteristics of the single, these duals offer in addition closer thermal tracking, lower weight, reduced insertion cost and smaller size than two singles. For additional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

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

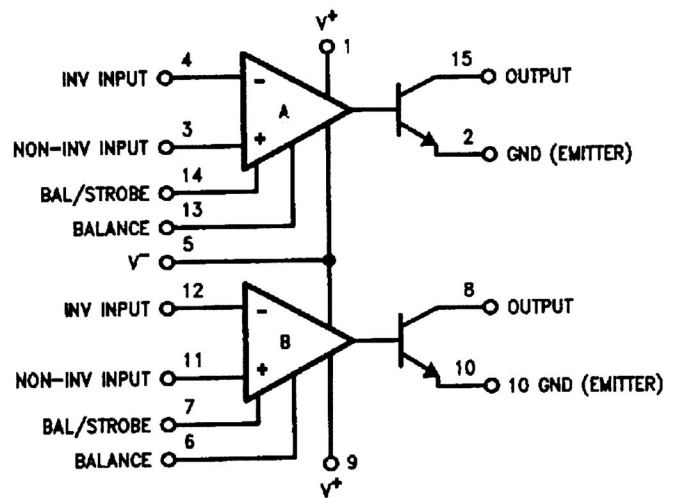
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### PIN ASSIGNMENT (Top View)

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



### CONNECTION DIAGRAM





**ABSOLUTE MAXIMUM RATINGS\***

Total Supply Voltage (V+ -- V-)	36V
Output to Negative Supply Voltage (V <sub>OUT</sub> -- V-)	50V
Ground to Negative Supply Voltage (GND -- V-)	30V
Differential Input Voltage	±30V
Input Voltage <sup>1</sup>	±15V
Power Dissipation <sup>2</sup>	500mW
Output Short Circuit Duration	10sec
Operating Temperature Range	-55°C to +125°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature (Soldering, 10sec)	300°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>**

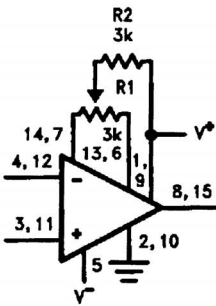
PARAMETER	CONDITIONS	TYP	MAX	UNITS
Input Offset Voltage <sup>4</sup>	T <sub>A</sub> = 25°C, R <sub>S</sub> ≤ 50k		3.0	mV
Input Offset Current <sup>4</sup>	T <sub>A</sub> = 25°C		10	nA
Input Bias Current	T <sub>A</sub> = 25°C		100	nA
Voltage Gain	T <sub>A</sub> = 25°C	200		V/mV
Response Time <sup>5</sup>	T <sub>A</sub> = 25°C	200		ns
Saturation Voltage	V <sub>IN</sub> ≤ -5mV, I <sub>OUT</sub> = 50mA, T <sub>A</sub> = 25°C		1.5	V
Strobe On Current	T <sub>A</sub> = 25°C	3.0		mA
Output Leakage Current	V <sub>IN</sub> ≥ 5mV, I <sub>OUT</sub> = 35V, T <sub>A</sub> = 25°C		10	nA
Input Offset Voltage <sup>4</sup>	R <sub>S</sub> ≤ 50k		4.0	mV
Input Offset Current <sup>4</sup>			20	nA
Input Bias Current			150	nA
Input Voltage Range		±14		V
Saturation Voltage	V <sub>+</sub> ≥ 4.5V, V <sub>-</sub> = 0, V <sub>IN</sub> ≤ -5mV, I <sub>SINK</sub> ≤ 8mA		0.4	V
Positive Supply Current	T <sub>A</sub> = 25°C		6.0	mA
Negative Supply Current	T <sub>A</sub> = 25°C		5.0	mA

**NOTES:**

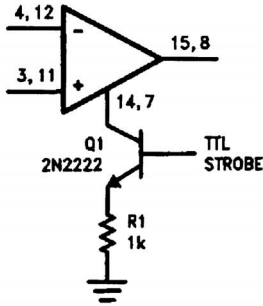
1. This rating applies for ±15V supplies. The positive input voltage limit is 30V above the negative supply. The negative input voltage limit is equal to the negative supply voltage or 30V below the positive supply, whichever is less.
2. The maximum junction temperature is 150°C. For operating at elevated temperatures, devices in the flat package, the derating is based on a thermal resistance of 185°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°C/V, junction to ambient.
3. These specifications apply for V<sub>S</sub> = ±15V and -55°C ≤ T<sub>A</sub> ≤ 125°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 ±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**

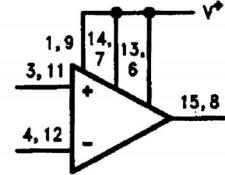
**Offset Balancing**



**Strobing**

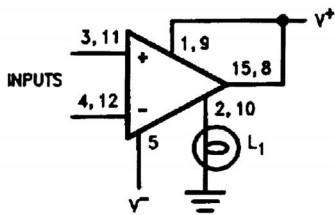


**Increasing Input Stage Current\***

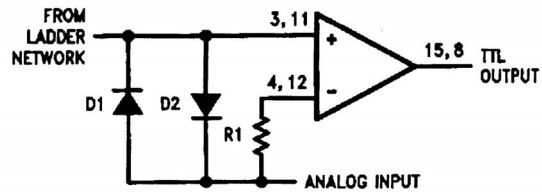


\*Increases typical common mode slew from 7.0 V/μs to 18 V/μs

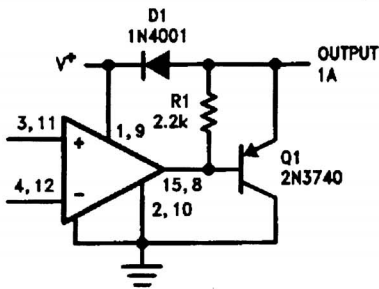
**Driving Ground-Referred Load**



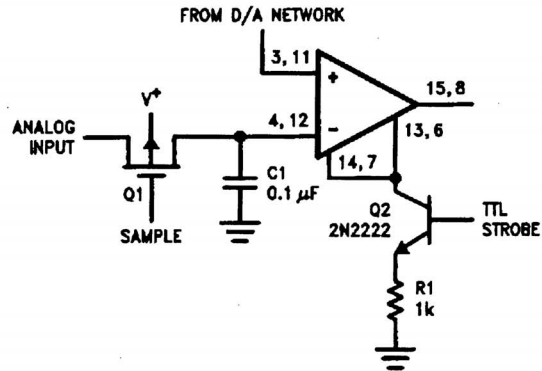
**Using Clamp Diodes to Improve Responses**



**Comparator and Solenoid Driver**

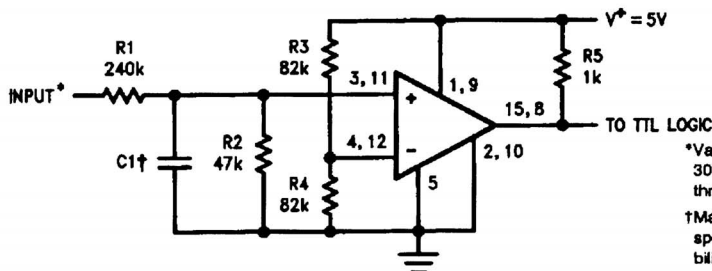


**Strobing off Both Input\* and Output Stages**



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

**TTL Interface with High Level Logic**

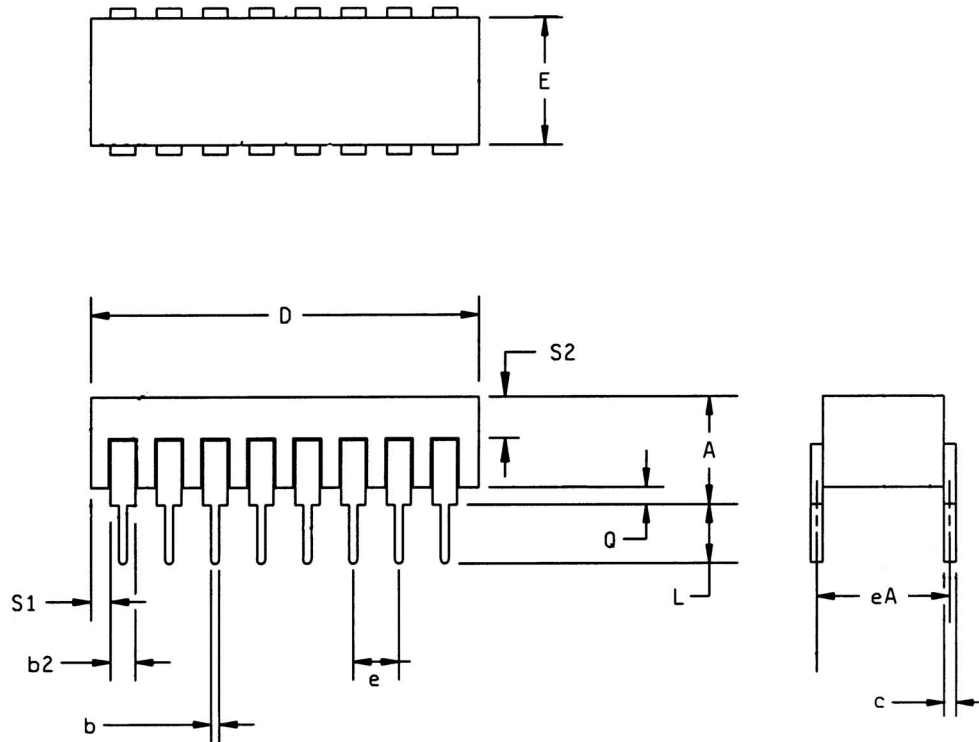


\*Values shown are for a 0V to 30V logic swing and a 15V threshold.

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

**MECHANICAL DEFINITIONS\***

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

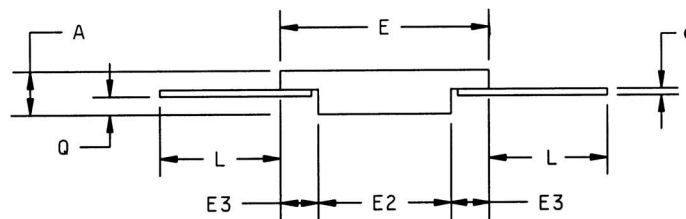
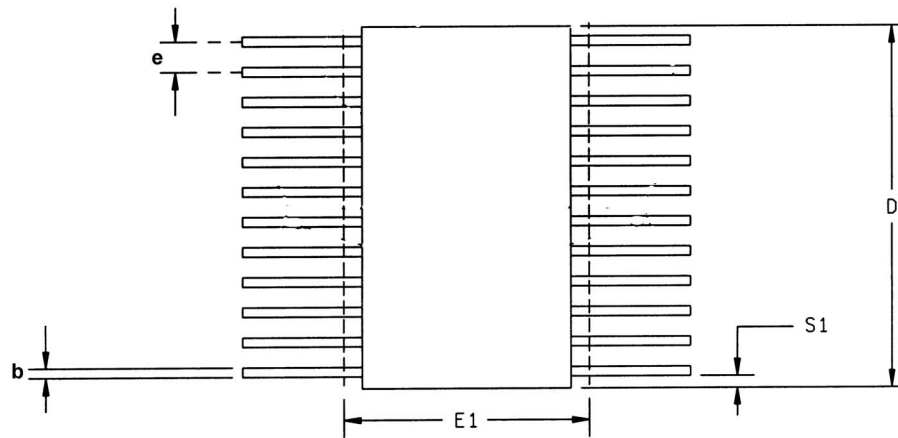


SYMBOL	ASI SPECIFICATIONS	
	MIN	MAX
A	---	0.200
b	0.014	0.026
b2	0.045	0.065
c	0.008	0.018
D	---	0.840
E	0.220	0.310
e	0.100 BCS	
eA	0.300 BSC	
L	0.125	0.200
Q	0.015	0.060
S1	0.005	---
S2	0.005	---

\*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.



## 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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