



### 32K x 8 SRAM SRAM MEMORY ARRAY

#### FEATURES

- Access Times: 12, 15, & 20ns
- Fast output enable (tDOE) for cache applications
- Low active power: 400 mW (TYP)
- Low power standby
- Fully static operation, no clock or refresh required
- High-performance, low-power CMOS double-metal process
- Single +5V ( $\pm 10\%$ ) Power Supply
- Easy memory expansion with CE\
- All inputs and outputs are TTL compatible

#### OPTIONS

- Timing
  - 12ns access\*
  - 15ns access
  - 20ns access
- Package(s)\*\*
  - Plastic SOJ
- Operating Temperature Ranges
  - Military -55°C to +125°C
  - Industrial -40°C to +85°C

#### MARKING

-12		
-15		
-20		
DJ	No. 906	
XT		
IT		

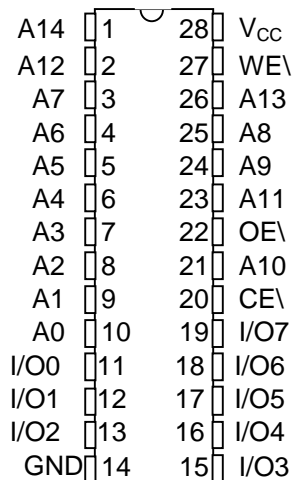
\* -12 available in IT only.

\*\* For ceramic version of this product, see the MT5C2568 data sheet.

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#### PIN ASSIGNMENT (Top View)

28-PIN PSOJ (DJ)



#### GENERAL DESCRIPTION

The Austin Semiconductor SRAM family employs high-speed, low power CMOS designs using a four-transistor memory cell. These SRAMs are fabricated using double-layer metal, double-layer polysilicon technology.

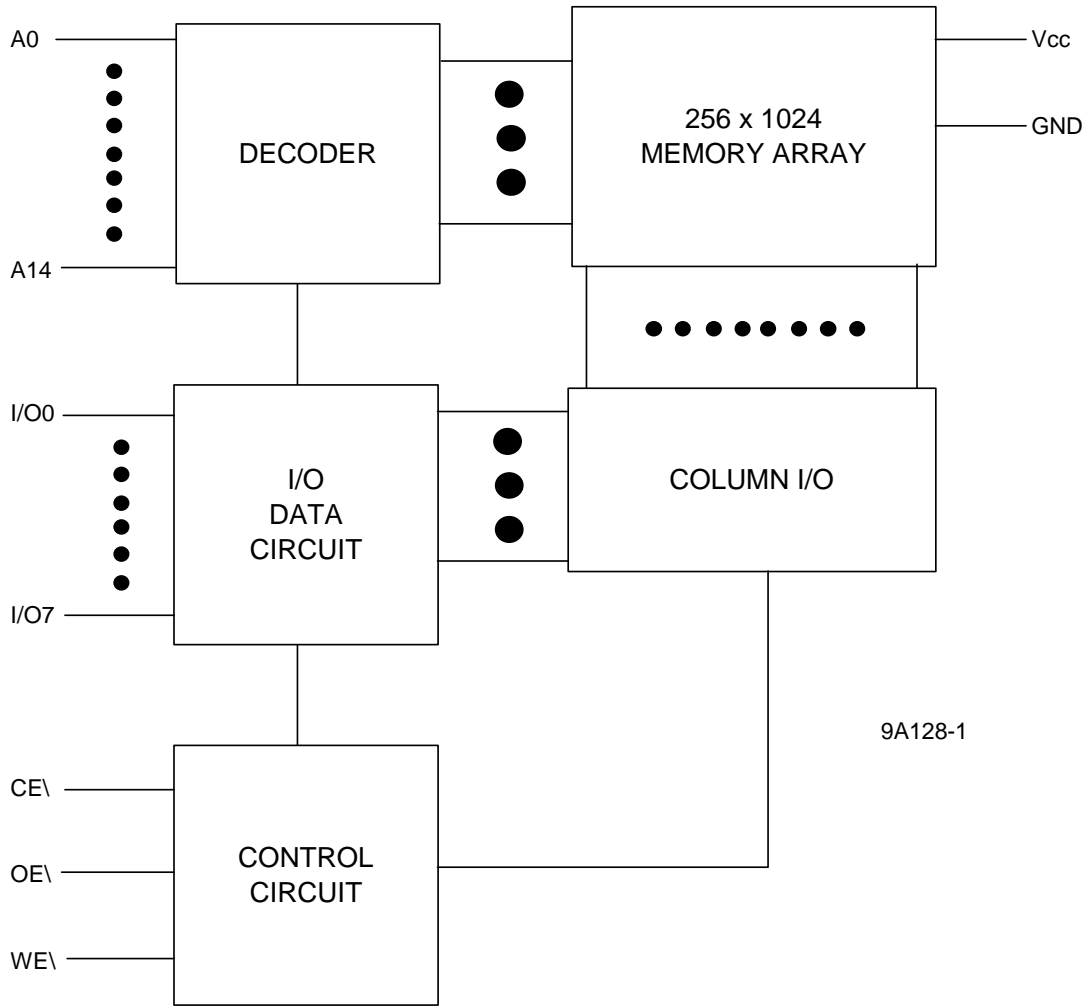
For flexibility in high-speed memory applications, Austin Semiconductor offers chip enable (CE\) and output enable (OE\) capability. These enhancements can place the outputs in High-Z for additional flexibility in system design.

Writing to these devices is accomplished when write enable (WE\) and CE\ inputs are both LOW. Reading is accomplished when WE\ remains HIGH and CE\ and OE\ go LOW. The device offers a reduced power standby mode when disabled. This allows system designs to achieve low standby power requirements.

All devices operate from a single +5V power supply and all inputs and outputs are fully TTL compatible.



**FUNCTIONAL BLOCK DIAGRAM**



**TRUTHTABLE**

MODE	OE\	CE\	WE\	DQ	POWER
STANDBY	X	H	X	HIGH-Z	STANDBY
READ	L	L	H	Q	ACTIVE
READ	H	L	H	HIGH-Z	ACTIVE
WRITE	X	L	L	D	ACTIVE



**ABSOLUTE MAXIMUM RATINGS\***

Voltage on Any Input or DQ Relative to V <sub>SS</sub> .....	-0.5V to V <sub>CC</sub> +0.5V
Voltage on V <sub>CC</sub> Supply Relative to V <sub>SS</sub> .....	-1V to +7V
Storage Temperature.....	-65°C to +150°C
Power Dissipation.....	1W
Short Circuit Output Current.....	20mA
Lead Temperature (soldering 10 seconds).....	+260°C
Max. Junction Temperature.....	+175°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 AND RECOMMENDED DC OPERATING CONDITIONS**

(-55°C ≤ T<sub>C</sub> ≤ 125°C or -40°C to +85°C; V<sub>CC</sub> = 5.0V ±10%)

DESCRIPTION	CONDITIONS	SYMBOL	MIN	MAX	UNITS	NOTES
Input High (Logic 1) Voltage		V <sub>IH</sub>	2.2	V <sub>CC</sub> +0.5	V	1
Input Low (Logic 0) Voltage		V <sub>IL</sub>	-0.5	0.8	V	1, 2
Input Leakage Current	0V ≤ V <sub>IN</sub> ≤ V <sub>CC</sub>	I <sub>LI</sub>	-5	5	μA	
Output Leakage Current	Output(s) disabled 0V ≤ V <sub>OUT</sub> ≤ V <sub>CC</sub>	I <sub>LO</sub>	-5	5	μA	
Output High Voltage	I <sub>OH</sub> = -4.0mA	V <sub>OH</sub>	2.4		V	1
Output Low Voltage	I <sub>OL</sub> = 8.0mA	V <sub>OL</sub>		0.4	V	1

DESCRIPTION		CONDITIONS	SYM	MAX			UNITS	NOTES
				-12	-15	-20		
Power Supply Current: Operating		CE ≤ V <sub>IL</sub> ; V <sub>CC</sub> = MAX f = MAX = 1/ t <sub>RC</sub> (MIN) Output Open	I <sub>CC</sub>	190	165	150	mA	3
Power Supply Current: Standby	TTL <sub>1</sub>	CE ≤ V <sub>IH</sub> ; V <sub>CC</sub> = MAX f = MAX = 1/ t <sub>RC</sub> (MIN) Outputs Open	I <sub>SBT1</sub>	60	50	45	mA	
	TTL <sub>2</sub>	CE ≤ V <sub>IH</sub> ; All Other Inputs ≤ V <sub>IL</sub> or ≥ V <sub>IH</sub> , V <sub>CC</sub> = MAX f = 0 Hz	I <sub>SBT2</sub>	25	25	25	mA	
	CMOS	CE ≥ V <sub>CC</sub> -0.2V; V <sub>CC</sub> = MAX V <sub>IN</sub> ≤ V <sub>SS</sub> +0.2V or V <sub>IN</sub> ≥ V <sub>CC</sub> -0.2V; f = 0 Hz	I <sub>SBC1</sub>	5	5	5	mA	

**CAPACITANCE**

PARAMETER	CONDITIONS	SYM	MAX	UNITS	NOTES
Input Capacitance	T <sub>A</sub> = 25°C, f = 1MHz V <sub>CC</sub> = 5V	C <sub>IN</sub>	8	pF	4
Input/Output Capacitance		C <sub>IO</sub>	10	pF	4



**ELECTRICAL CHARACTERISTICS AND RECOMMENDED AC OPERATING CONDITIONS**

(Note 5) ( $-55^{\circ}\text{C} \leq T_c \leq 125^{\circ}\text{C}$  or  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ ;  $V_{cc} = 5.0\text{V} \pm 10\%$ )

DESCRIPTION	SYM	-12		-15		-20		UNITS	NOTES
		MIN	MAX	MIN	MAX	MIN	MAX		
<b>READ CYCLE</b>									
READ cycle time	$t_{RC}$	12		15		20		ns	
Address access time	$t_{AA}$		12		15		20	ns	
Chip enable access time	$t_{ACE}$		12		15		20	ns	
Output hold from address change	$t_{OH}$	2		2		2		ns	
Chip enable to output in Low-Z	$t_{LZCE}$	2		2		2		ns	7
Chip disable to output in High-Z	$t_{HZCE}$		7		8		9	ns	6, 7
Chip enable to power-up time	$t_{PU}$	0		0		0		ns	4
Chip disable to power-down time	$t_{PD}$		12		15		20	ns	4
Output enable to access time	$t_{AOE}$		6		7		8	ns	
Output enable to output in Low-Z	$t_{LZOE}$	0		0		0		ns	
Output disable to output in High-Z	$t_{HZOE}$		6		7		8	ns	6
<b>WRITE CYCLE</b>									
WRITE cycle time	$t_{WC}$	12		15		20		ns	
Chip enable to end of write	$t_{CW}$	9		10		12		ns	
Address valid to end of write	$t_{AW}$	9		10		12		ns	
Address setup time	$t_{AS}$	0		0		0		ns	
Address hold from end of write	$t_{AH}$	0		0		0		ns	
WRITE pulse width	$t_{WP}$	10		12		15		ns	
Data setup time	$t_{DS}$	7		8		10		ns	
Data hold time	$t_{DH}$	0		0		0		ns	
Write disable to output in Low-Z	$t_{LZWE}$	2		2		2		ns	7
Write enable to output in High-Z	$t_{HZWE}$	0	7	0	7	0	9	ns	6, 7



**ACTEST CONDITIONS**

Input pulse levels.....	V <sub>SS</sub> to 3V
Input rise and fall times.....	5ns
Input timing reference level.....	1.5V
Output reference level.....	1.5V
Output load.....	See figures 1 & 2

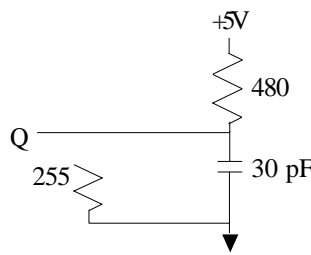


Fig. 1  
OUTPUT LOAD  
EQUIVALENT

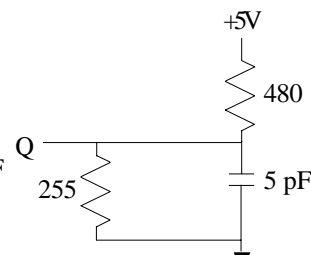


Fig. 2  
OUTPUT LOAD  
EQUIVALENT

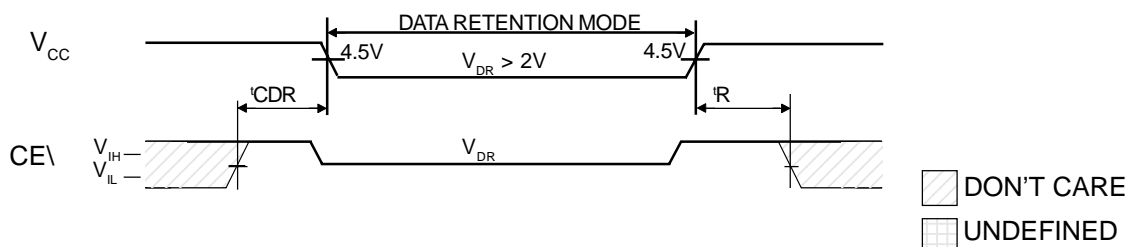
**NOTES**

- All voltages referenced to V<sub>SS</sub> (GND).
- 3V for pulse width < 20ns
- I<sub>CC</sub> is dependent on output loading and cycle rates. The specified value applies with the outputs unloaded, and  $f = \frac{1}{t_{RC} (MIN)}$  Hz.
- This parameter is guaranteed but not tested.
- Test conditions as specified with the output loading as shown in Fig. 1 unless otherwise noted.
- t<sub>HZCE</sub>, t<sub>HZOE</sub> and t<sub>HZWE</sub> are specified with CL = 5pF as in Fig. 2. Transition is measured ±500mV typical from steady state voltage, allowing for actual tester RC time constant.
- At any given temperature and voltage condition, t<sub>HZCE</sub> is less than t<sub>LZCE</sub>, and t<sub>HZWE</sub> is less than t<sub>LZWE</sub>.
- WE\ is HIGH for READ cycle.
- Device is continuously selected. Chip enables and output enables are held in their active state.
- Address valid prior to, or coincident with, latest occurring chip enable.
- t<sub>RC</sub> = Read Cycle Time.
- Chip enable (CE\ ) and write enable (WE\ ) can initiate and terminate a WRITE cycle.

**DATA RETENTION ELECTRICAL CHARACTERISTICS (L Version Only)**

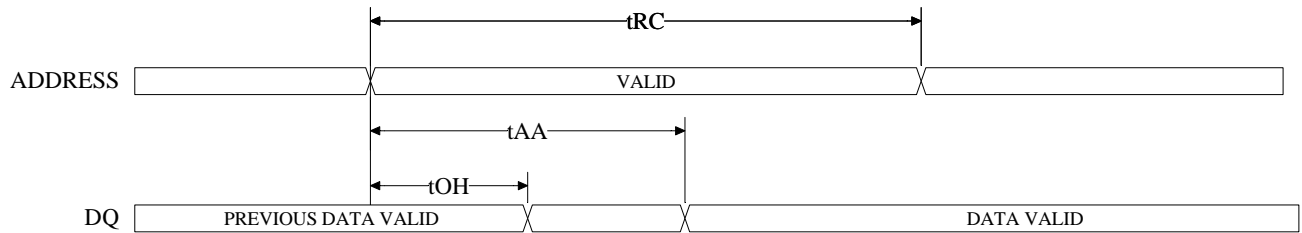
DESCRIPTION	CONDITIONS	SYMBOL	MIN	MAX	UNITS	NOTES
V <sub>CC</sub> for Retention Data		V <sub>DR</sub>	2	--	V	
Data Retention Current	CE\ ≥ (V <sub>CC</sub> - 0.2V) V <sub>IN</sub> ≥ (V <sub>CC</sub> - 0.2V) or ≤ 0.2V	V <sub>CC</sub> = 2V		1.0	mA	
		V <sub>CC</sub> = 3V		2.0	mA	
Chip Deselect to Data Retention Time		t <sub>CDR</sub>	0	--	ns	4
Operation Recovery Time		t <sub>R</sub>	t <sub>RC</sub>		ns	4, 11

**LOW V<sub>CC</sub> DATA RETENTION WAVEFORM**

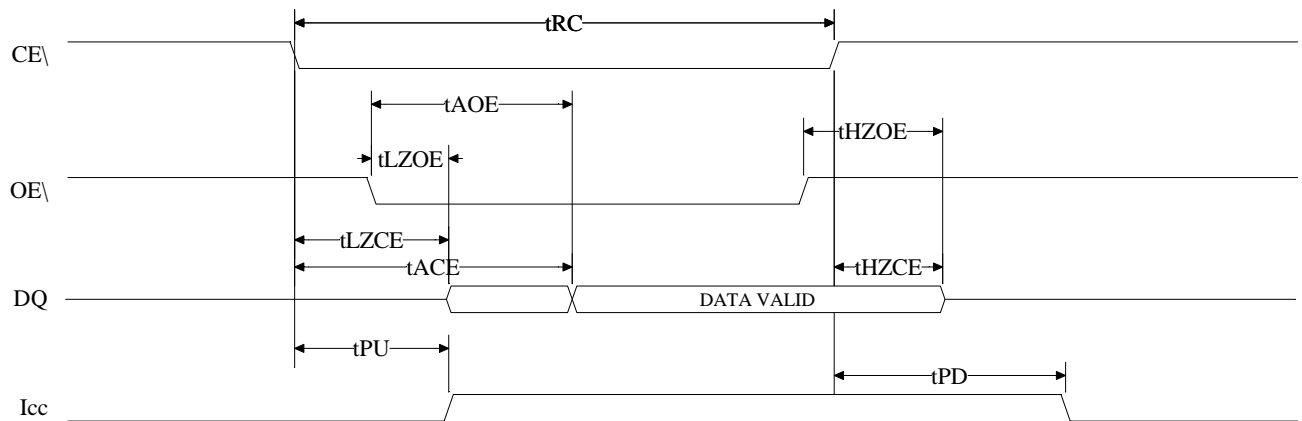




**READ CYCLE NO. 1** 8, 9



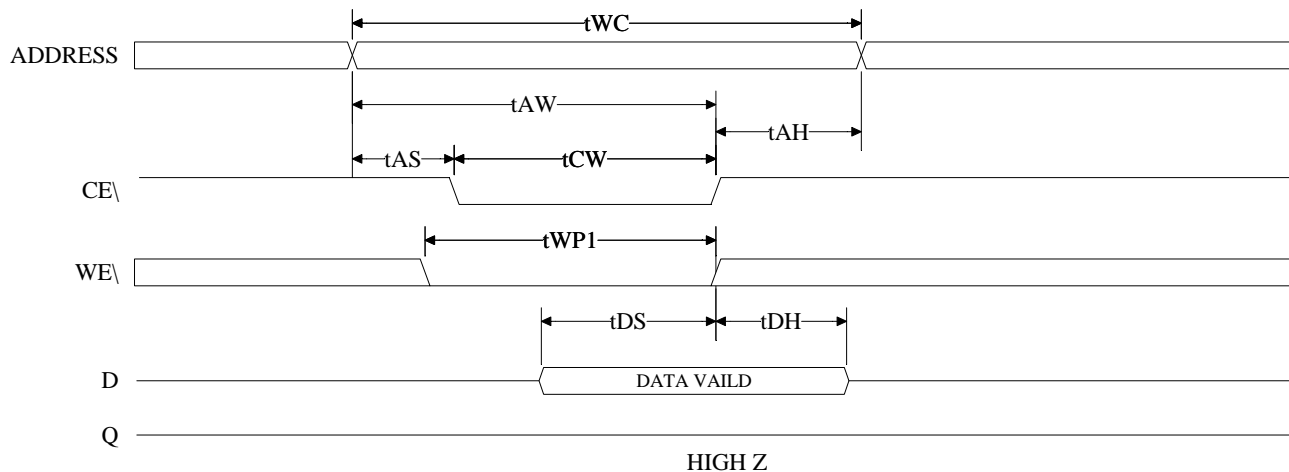
**READ CYCLE NO. 2** 7, 8, 10, 12



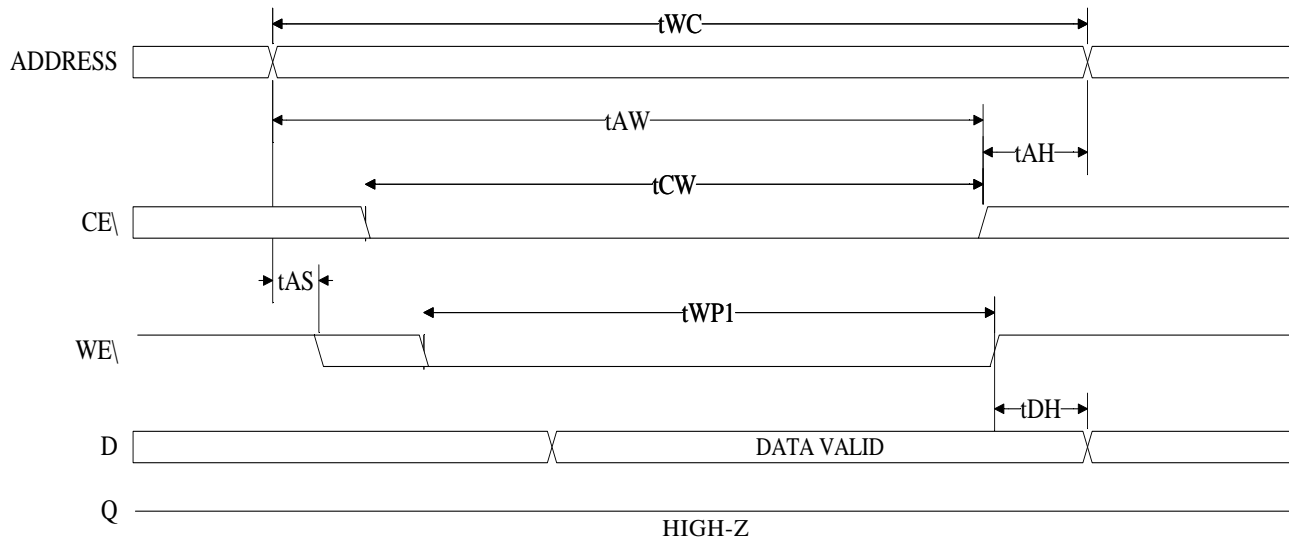
DON'T CARE  
 UNDEFINED





**WRITE CYCLE NO. 1** <sup>12</sup>  
(Chip Enabled Controlled)



**WRITE CYCLE NO. 2** <sup>7, 12</sup>  
(Write Enabled Controlled)



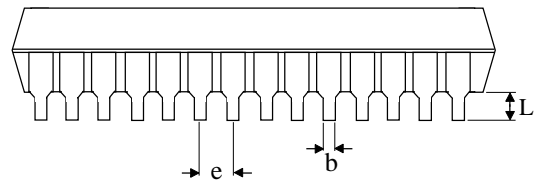
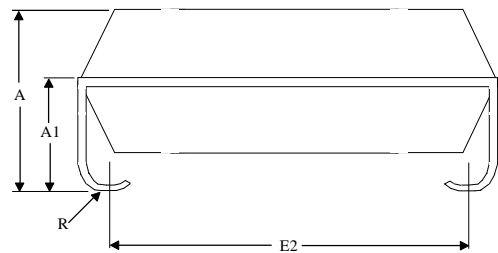
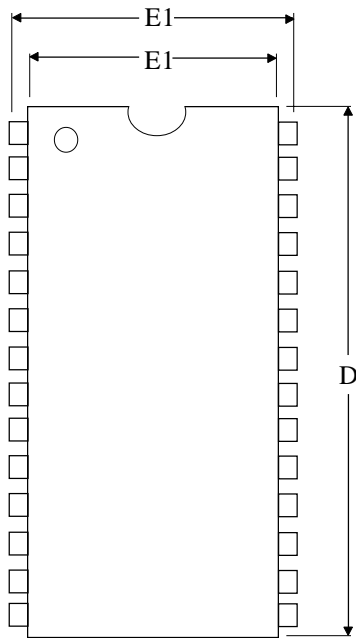
 DON'T CARE  
 UNDEFINED

**NOTE:** Output enable (OE\) is inactive (HIGH).



**MECHANICAL DEFINITIONS\***

ASI Case #906 (Package Designator DJ)



SYMBOL	ASI SPECIFICATIONS	
	MIN	MAX
A	---	0.140
b	0.018 TYP	
D	---	0.73
E	0.327	0.347
E1	0.295	0.305
E2	0.245	0.285
e	0.050 BSC	
L	0.025	---

\* All measurements are in inches.





## ORDERING INFORMATION

EXAMPLE: AS5C2568DJ-15/IT

Device Number	Package Type	Speed ns	Process
AS5C2568	DJ	-12	/*
AS5C2568	DJ	-15	/*
AS5C2568	DJ	-20	/*

### \*AVAILABLE PROCESSES

IT = Industrial Temperature Range

-40°C to +85°C

XT = Extended Temperature Range

-55°C to +125°C

883C = Full Military Processing

-55°C to +125°C

*12ns offered in IT only*