

## HIGH SPEED 2K × 8 CMOS PROM/RPROM

### KEY FEATURES

- **Ultra-Fast Access Time**  
— 35 ns
- **Low Power Consumption**
- **Fast Programming**
- **DESC SMD Nos. 5962-87650/5962-88734**
- **Pin Compatible with AM27S191/291 and N82S191 Bipolar PROMs**
- **Immune to Latch-Up**  
— Up to 200 mA
- **ESD Protection Exceeds 2000V**

### GENERAL DESCRIPTION

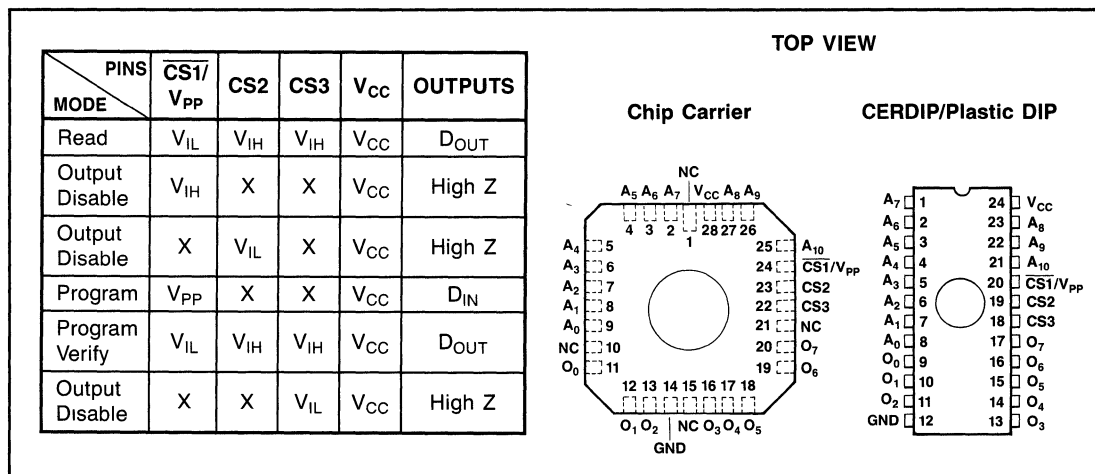
The WS57C191B/291B is an extremely HIGH PERFORMANCE 16K UV Erasable Electrically Re-Programmable Read Only Memory. It is manufactured in an advanced CMOS technology which allows it to operate at Bipolar PROM speeds while consuming only 25% of the power of its Bipolar counterparts.

A further advantage of the WS57C191B/291B over Bipolar PROM devices is the fact that it utilizes a proven EPROM technology. This allows the entire memory array to be tested for switching characteristics and functionality after assembly. Unlike devices which cannot be erased, every WS57C191B/291B is 100% tested with worst case test patterns both before and after assembly.

The WS57C191B/291B is configured in the standard Bipolar PROM pinout which provides an easy upgrade path for systems which are currently using Bipolar PROMs.

### MODE SELECTION

### PIN CONFIGURATION



### PRODUCT SELECTION GUIDE

PARAMETER	WS57C191B/291B-35	WS57C191B/291B-45	WS57C191B/291B-55
Address Access Time (Max)	35 ns	45 ns	55 ns
Output Enable Time (Max)	20 ns	20 ns	20 ns

**ABSOLUTE MAXIMUM RATINGS\***

Storage Temperature . . . . . – 65°C to + 150°C

Voltage on Any Pin with

Respect to Ground . . . . . – 0.6V to + 7V

 $V_{PP}$  with Respect to Ground . . . . . – 0.6V to + 14V

ESD Protection . . . . . &gt; 2000V

**\*Notice:** Stresses above 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 operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect device reliability.

**OPERATING RANGE**

RANGE	TEMPERATURE	$V_{CC}$
Commercial	0°C to +70°C	+5V $\pm$ 5%
Industrial	–40°C to +85°C	+5V $\pm$ 10%
Military	–55°C to +125°C	+5V $\pm$ 10%

**DC READ CHARACTERISTICS** Over Operating Range. (See Above)

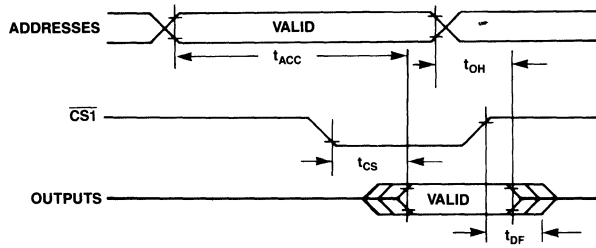
SYMBOL	PARAMETER	TEST CONDITIONS	MIN.	MAX	UNITS
$V_{OL}$	Output Low Voltage	$I_{OL} = 16 \text{ mA}$		0.4	V
$V_{OH}$	Output High Voltage	$I_{OH} = -4 \text{ mA}$	2.4		
$I_{CC1}$	$V_{CC}$ Active Current (CMOS)	Notes 1 and 3	Comm'l	30	mA
			Military	35	
$I_{CC2}$	$V_{CC}$ Active Current (TTL)	Notes 2 and 3	Comm'l	40	
			Military	40	
$I_{LI}$	Input Load Current	$V_{IN} = 5.5V \text{ or Gnd}$	–10	10	$\mu A$
$I_{LO}$	Output Leakage Current	$V_{OUT} = 5.5V \text{ or Gnd}$	–10	10	

**NOTES:** 1. CMOS inputs:  $GND \pm 0.3V$  or  $V_{CC} \pm 0.3V$ .2. TTL inputs:  $V_{IL} \leq 0.8V$ ,  $V_{IH} \geq 2.0V$ .

3. Add 3 mA/MHz for A.C. power component.

**AC READ CHARACTERISTICS** Over Operating Range. (See Above)

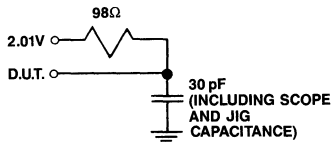
PARAMETER	SYMBOL	57C191B/291B-35		57C191B/291B-45		57C191B/291B-55		UNITS
		MIN	MAX	MIN	MAX	MIN	MAX	
Address to Output Delay	$t_{ACC}$		35		45		55	ns
$\overline{CS}$ to Output Delay	$t_{CE}$		20		20		20	
Output Disable to Output Float	$t_{DF}$		20		20		20	
Address to Output Hold	$t_{OH}$	0		0		0		

**AC READ TIMING DIAGRAM****2****CAPACITANCE<sup>(4)</sup>**  $T_A = 25^\circ\text{C}$ ,  $f = 1\text{ MHz}$ 

SYMBOL	PARAMETER	CONDITIONS	TYP <sup>(5)</sup>	MAX	UNITS
$C_{IN}$	Input Capacitance	$V_{IN} = 0\text{V}$	4	6	pF
$C_{OUT}$	Output Capacitance	$V_{OUT} = 0\text{V}$	8	12	pF
$C_{VPP}$	$V_{PP}$ Capacitance	$V_{PP} = 0\text{V}$	18	25	pF

**NOTES:**

4. This parameter is only sampled and is not 100% tested.

5. Typical values are for  $T_A = 25^\circ\text{C}$  and nominal supply voltages.**TEST LOAD<sup>Q</sup>** (High Impedance Test Systems)**TIMING LEVELS**

Input Levels: 0 and 3V

Reference Levels: 1.5V

**PROGRAMMING INFORMATION****DC CHARACTERISTICS** ( $T_A = 25 \pm 5^\circ\text{C}$ ,  $V_{CC} = 5.50\text{V} \pm 5\%$ ,  $V_{PP} = 13.5 \pm 0.5\text{V}$ )

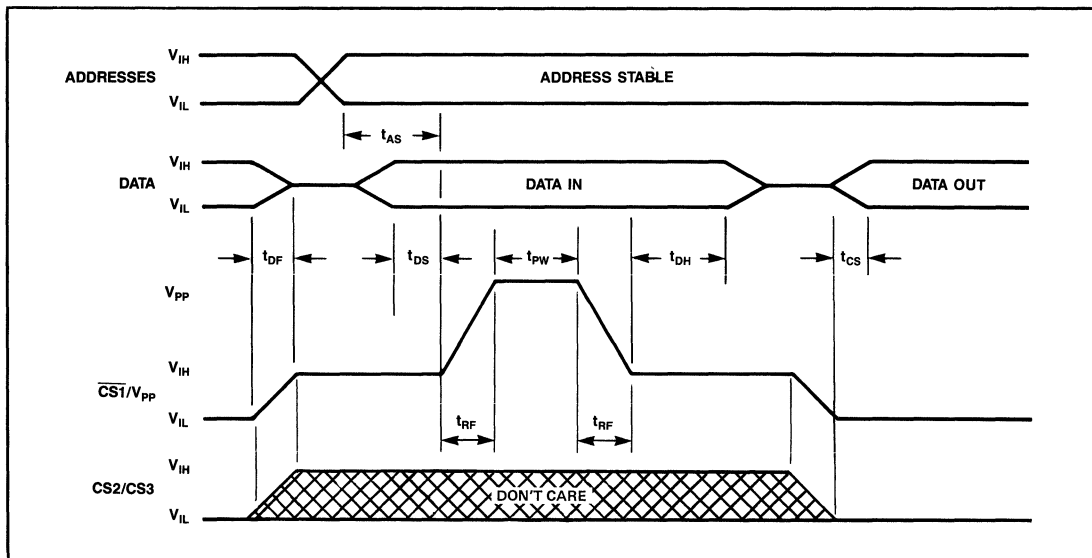
PARAMETER	SYMBOLS	MIN	MAX	UNIT
Input Leakage Current ( $V_{IN} = V_{CC}$ or Gnd)	$I_{LI}$	-10	10	$\mu\text{A}$
$V_{PP}$ Supply Current During Programming Pulse	$I_{PP}$		60	mA
$V_{CC}$ Supply Current	$I_{CC}$		25	mA
Input Low Level	$V_{IL}$	-0.1	0.8	V
Input High Level	$V_{IH}$	2.0	$V_{CC} + 0.3$	V
Output Low Voltage During Verify ( $I_{OL} = 16\text{ mA}$ )	$V_{OL}$		0.45	V
Output High Voltage During Verify ( $I_{OH} = -4\text{ mA}$ )	$V_{OH}$	2.4		V

**NOTE:** 6.  $V_{PP}$  must not be greater than 14 volts including overshoot.

**AC CHARACTERISTICS** ( $T_A = 25 \pm 5^\circ\text{C}$ ,  $V_{CC} = 5.50\text{V} \pm 5\%$ ,  $V_{PP} = 13.5 \pm 0.5\text{V}$ )

PARAMETER	SYMBOLS	MIN	TYP	MAX	UNIT
Address Setup Time	$t_{AS}$	2			$\mu\text{s}$
Chip Disable Setup Time	$t_{DF}$	2		30	ns
Data Setup Time	$t_{DS}$				$\mu\text{s}$
Program Pulse Width (Note 7)	$t_{PW}$	1	3	10	ms
Data Hold Time	$t_{DH}$	2			$\mu\text{s}$
Chip Select Delay	$t_{CS}$			30	ns
$V_{PP}$ Rise and Fall Time	$t_{RF}$	1			$\mu\text{s}$

**NOTE:** 7. For programmers utilizing a one shot programming pulse, a 10 ms pulse width should be used.

**PROGRAMMING WAVEFORM**

**PROGRAMMING/ERASURE/PROGRAMMERS**

Refer to Section 5.

**ORDERING INFORMATION**

PART NUMBER	SPEED (ns)	PACKAGE TYPE	PACKAGE DRAWING	OPERATING TEMPERATURE RANGE	WSI MANUFACTURING PROCEDURE
WS57C191B-35D	35	24 Pin Cerdip, 0.6"	D1	Comm'l	Standard
WS57C191B-35J	35	28 Pin PLDCC	J3	Comm'l	Standard
WS57C191B-35P	35	24 Pin Plastic DIP, 0.6"	P2	Comm'l	Standard
WS57C191B-45CMB	45	28 Pin CLLCC	C1	Military	MIL-STD-883C
WS57C191B-45D	45	24 Pin Cerdip, 0.6"	D1	Comm'l	Standard
WS57C191B-45DI	45	24 Pin Cerdip, 0.6"	D1	Industrial	Standard
WS57C191B-45DMB	45	24 Pin Cerdip, 0.6"	D1	Military	MIL-STD-883C
WS57C191B-45J	45	28 Pin PLDCC	J3	Comm'l	Standard
WS57C191B-45P	45	24 Pin Plastic DIP, 0.6"	P2	Comm'l	Standard
WS57C191B-55CMB	55	28 Pin CLLCC	C1	Military	MIL-STD-883C
WS57C191B-55DMB	55	24 Pin Cerdip, 0.6"	D1	Military	MIL-STD-883C
WS57C291B-35S	35	24 Pin Plastic DIP, 0.3"	S1	Comm'l	Standard
WS57C291B-35T	35	24 Pin Cerdip, 0.3"	T1	Comm'l	Standard
WS57C291B-45S	45	24 Pin Plastic DIP, 0.3"	S1	Comm'l	Standard
WS57C291B-45T	45	24 Pin Cerdip, 0.3"	T1	Comm'l	Standard
WS57C291B-45TI	45	24 Pin Cerdip, 0.3"	T1	Industrial	Standard
WS57C291B-45TMB	45	24 Pin Cerdip, 0.3"	T1	Military	MIL-STD-883C
WS57C291B-55T	55	24 Pin Cerdip, 0.3"	T1	Comm'l	Standard
WS57C291B-55TMB	55	24 Pin Cerdip, 0.3"	T1	Military	MIL-STD-883C

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