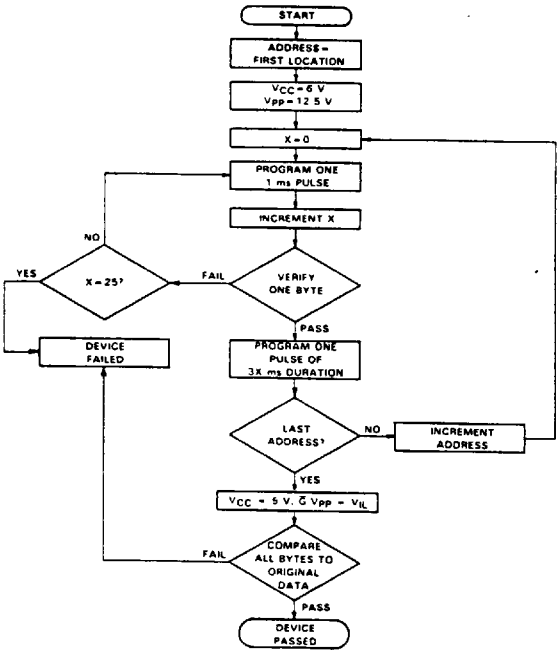
1 Megabit PROM - Radiation Hardened

27C010RP

128k x 8 bit PROM
Memory Microcircuit

For Space Applications



SEI's 27C010RP (RP for RAD-PAK®) memory microcircuit features a minimum 100 kilorad (Si) total dose tolerance. Using SEI's radiation hardened RAD-PAK® packaging technology, the 27C010RP is fully equivalent to the commercial Texas Instruments TMS27C010. It uses CMOS technology for high speed and simple interface with MOS and bipolar circuits. All inputs, including program data inputs, can be driven by Series 74 TTL circuits. Each output can drive one Series 74 TTL circuit without external resistors. The data outputs are three-state for connecting multiple devices to a common bus. All programming signals are TTL level. For programming outside the system, existing EPROM programmers can be used. The patented radiation hardened RAD-PAK® technology incorporates radiation shielding in the microcircuit package. The 27C010RP has a total dose survivability of greater than 100 krad (Si). Capable of surviving in space environments, the 27C010RP is ideal for satellite, spacecraft, and space probe missions. This product is offered as a one time programmable product. It is available in Class S packaging and screening.

SPACE ELECTRONICS INCORPORATED
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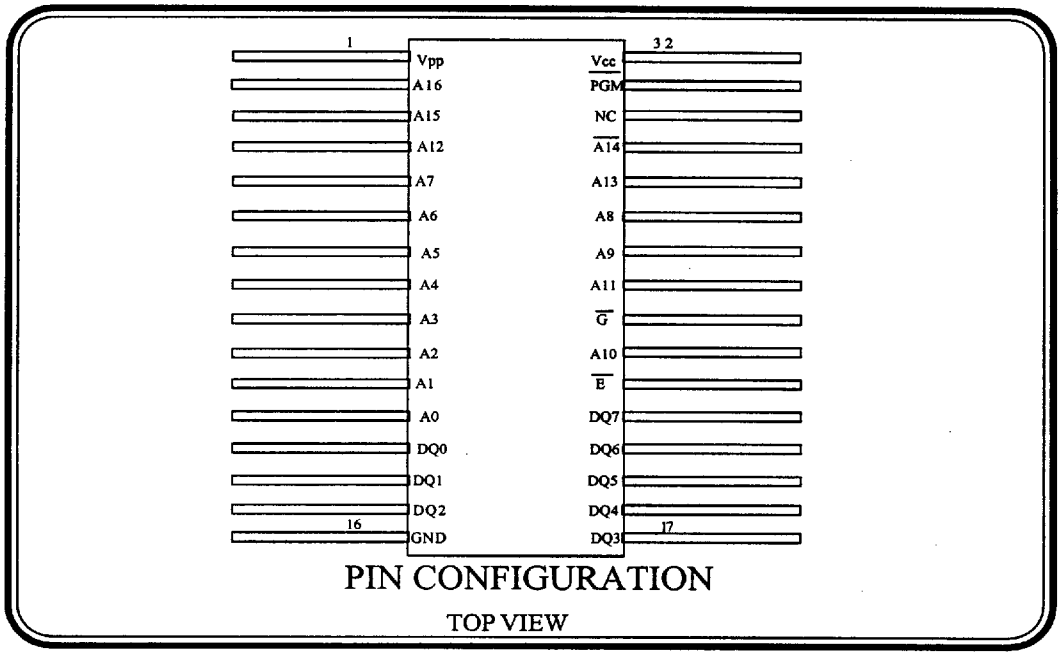
Radiation Hardened
27C010RP

CMOS 32 Pin
Memory Microcircuit



PIN CONFIGURATION

TOP VIEW

Features:

- 128k x 8 Bit Organization
  - One Time Programmable
- Pin Compatible with Texas Instruments TMS27C010
- RAD-PAK™ Radiation Hardened Against Natural Space Radiation
- Total Dose Hardness >100 krad (Si)
- Package:
  - 32 Pin RAD-PAK™ flat pack (410 mils x 820 mils)
  - Weight – 6.0 grams
- High Speed:
  200, 250, 300 ns Maximum Access Times Available
- Power-saving CMOS Technology
  - Single 5 Volt power supply
  - High-speed SNAP! pulse programming
  - All inputs/outputs fully TTL compatible
  - Latchup immunity of 250 mA on all input and output pins
  - No pullup resistors required
- Low Power Dissipation (Vcc=5.5V)
  - Active: 165 mW worst case
  - Standby: 550 uW worst case
- 3-state output buffers

TQM
Total Quality Management

June 1994

For Further Information Contact:
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27C010RP Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply voltage range	V_{CC}	-0.6	7	V
Supply voltage range	V_{PP}	-0.6	14	V
Input voltage range All inputs except A9 A9		 -0.6 -0.6	 V_{CC}+1 13.5	 V V
Output voltage range		-0.6	V_{CC}+1	V
Normal operating temperature		-55	125	°C
Storage temperature range		-65	150	°C

27C010RP Recommended Operating Conditions[1]

Parameter	Symbol	Min	Max	Unit
Supply voltage Read mode SNAP! Pulse programming algorithm	V_{CC}	 4.5 6.25	 5.5 6.75	 V V
Supply voltage Read mode SNAP! Pulse programming algorithm	V_{PP}	 V_{CC}-0.6 12.75	 V_{CC}+0.6 13.25	 V V
High-level input voltage TTL CMOS	V_{IH}	 2 V_{CC}-0.2	 V_{CC}+0.5 V_{CC}+0.5	 V V
Low-level input voltage TTL CMOS	V_{IL}	 -0.5 -0.5	 0.8 GND+0.2	 V V
Normal operating temperature range	T_A	-55	125	°C

Notes:

1. T_A = 25°C, V_{CC} = 6.5V, V_{PP} = 13V

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27C010RP DC Electrical Characteristics

Parameter	Symbol	Min	Max	Unit
High-level output voltage I_{OH}=-20 uA I_{OH}=-2.5 mA	V_{OH}	 V_{CC}-0.2 3.5		V
Low-level output voltage I_{OL}=2.1 mA I_{OL}=20 uA	V_{OL}		 0.4 0.1	V
Input current (leakage): V_I=0 V to 5.5 V	I_I		±1	uA
Output current (leakage): V_O=0 V to V_{CC}	I_O		±1	uA
V_{PP} supply current:: V_{PP}=V_{CC}=5.5 V	I_{PP1}		10	uA
V_{PP} supply current (during program pulse): V_{PP}=13 V	I_{PP2}		50	mA
V_{CC} supply current (standby) TTL-input level V_{CC}=5.5 V, E\=V_{IH} CMOS-input level V_{CC}=5.5 V, E\=V_{CC} ± 0.2 V	I_{CC1}		 500 100	 uA uA
V_{CC} supply current (active) V_{CC}=5.5 V, E\=V_{IL} t_{cycle}= minimum cycle time, outputs open	I_{CC2}		30	mA

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27C010RP AC Electrical Performance

Parameter	Symbol	Min	Max	Unit
Access time from address 27C010-20 27C010-25 27C010-30	$t_{a(A)}$		 200 250 300	ns
Access time from chip enable 27C010-20 27C010-25 27C010-30	$t_{a(E)}$		 200 250 300	ns
Output enable time from G\ 27C010-20 27C010-25 27C010-30	$t_{en(G)}$		 75 85 90	ns
Output disable time from G\ or E\, whichever occurs first 27C010-20 27C010-25 27C010-30	t_{dis}	 0 0 0	 50 60 70	ns
Output data valid time after change of address, E\, or G\, whichever occurs first 27C010-20 27C010-25 27C010-30	$t_{v(A)}$	 0 0 0		ns
Input capacitance $V_I = 0$ V, f = 1 MHz	C_i		10	pF
Output capacitance $V_O = 0$ V, f = 1 MHz	C_o		12	pF

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27C010RP Timing Requirements

Parameter	Symbol	Min	Max	Unit
Program pulse duration	$t_{W(PGM)}$	95	105	us
Address setup time	$t_{su(A)}$	2		us
E\ setup time	$t_{su(E)}$	2		us
G\ setup time	$t_{su(G)}$	2		us
Data setup time	$t_{su(D)}$	2		us
V_{PP} setup time	$t_{su(VPP)}$	2		us
V_{CC} setup time	$t_{su(VCC)}$	2		us
Address hold time	$t_{h(A)}$	0		us
Data hold time	$t_{h(D)}$	2		us

NOTES:

1. $T_A = 25°C$, $V_{CC} = 6.5V$, $V_{PP} = 13V$

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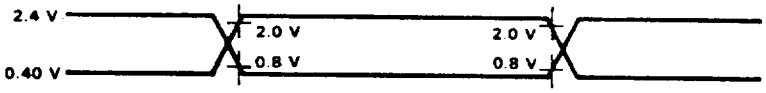
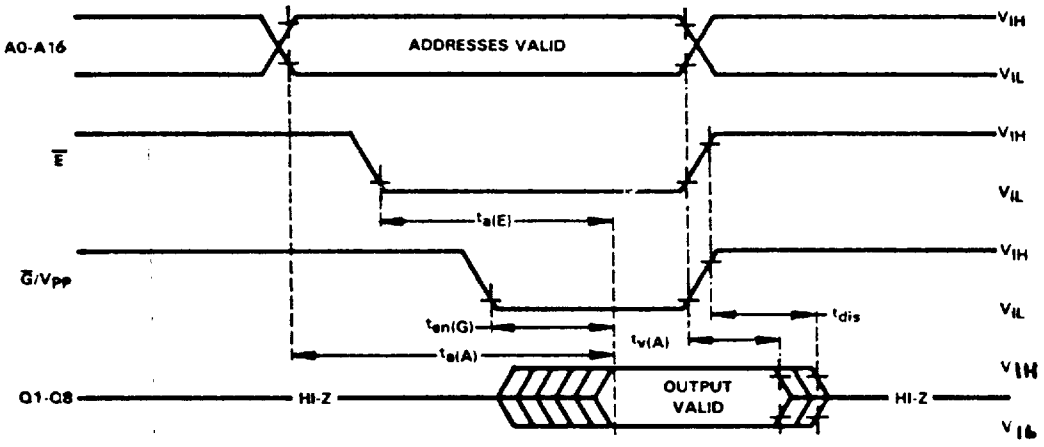
AC Testing Input/Output Wave Forms



Read Cycle Timing



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