

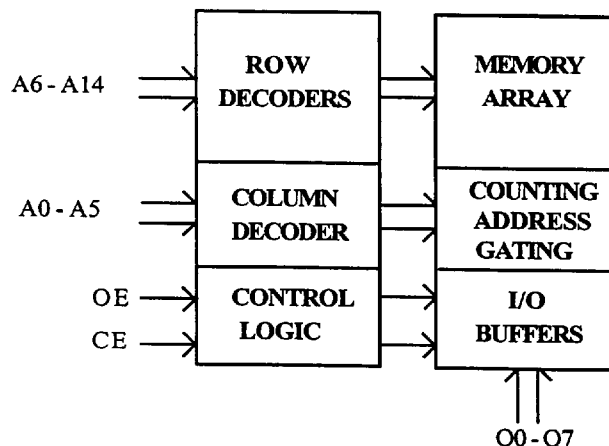
64kbit PROM - Radiation Hardened 27C64RPDS

8k x 8 PROM
Memory Microcircuit

For Space Applications

SEI's 27C64RPDS (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 27C64RPDS is fully

equivalent to the commercial SMJ27C64 from Texas Instruments and uses HVC MOS technology for high speed and simple interface with MOS and bipolar circuits. All inputs, including program data inputs can be driven by Series 54 TTL circuits without the use of external pull-up resistors, and each output can drive one Series 54 TTL circuit without external resistors. The data outputs are three-state for connecting multiple devices to a common bus. One other (12.5 V) supply is needed for programming, but all programming signals are TTL level. For programming outside the system, existing EPROM programmers can be used. Locations may be programmed singly, in blocks, or at random. The patented radiation hardened RAD-PAK[®] technology incorporates radiation shielding in the microcircuit package. Capable of surviving in space environments, the 27C64RPDS is ideal for satellite, spacecraft, and space probe missions. This product is available in Class S packaging and screening.



Block Diagram

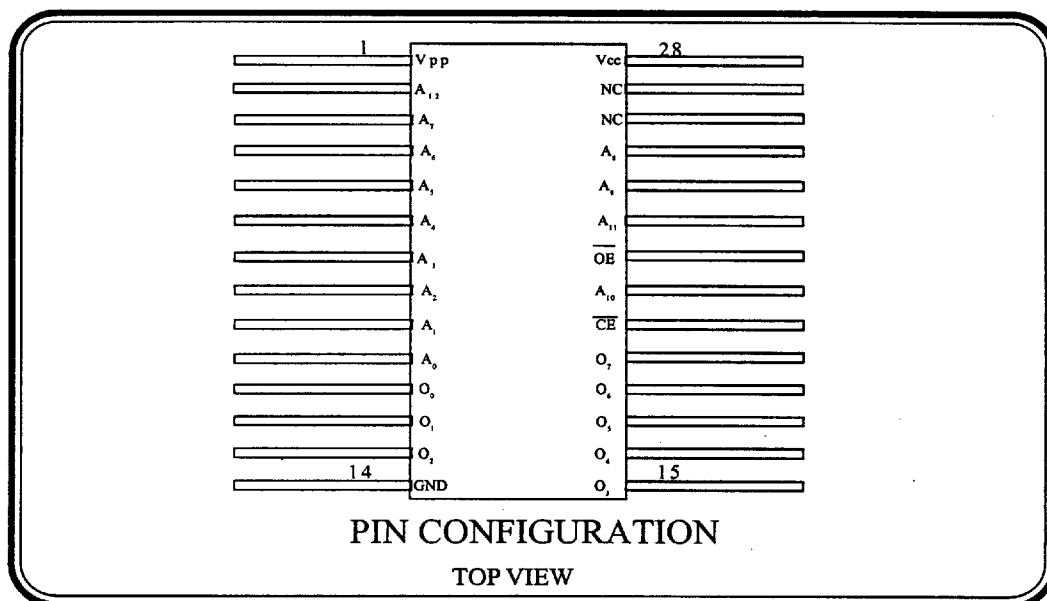


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Radiation Hardened 27C64RPDS

CMOS 8kx8 PROM
Memory Microcircuit



Features:

- 8k x 8 Bit PROM Organization
 - One time programmable
- Pin Compatible with Texas Instruments SMJ27C64
- RAD-PAK® Radiation Hardened Against Natural Space Radiation
- Total Dose Hardness >100 krad (Si)
- Package:
 - 28 Pin RAD-PAK® DIP 600 mils ctr.
 - Weight - 5.0 grams
- Operating Temperature Range: -55°C to 125°C
- JEDEC Approved Byte Wide Pinout
- High Speed:
 - 70 ns Maximum Access Times Available
- Advanced HVC MOS Technology
 - Single 5V Power Supply
 - 36 MeV SEL/ SEU
 - 400mV Guaranteed DC Noise Immunity with Standard TTL Loads
- Low Operating Power
 - 158 mW max Active
 - 1.4 mW max Standby

Specifications and design are subject to change without notice.



February 1995

For Further Information Contact:

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27C64RPDS Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN	MAX	UNITS
Supply voltage range	V_{CC}	-2.0	6.5	V
Supply voltage range	V_{PP}	-2.0	14.0	V
All inputs or outputs		-2.0	$V_{CC}+1.0$	V
Normal operating temperature range	T_C	-55	+125	°C
Storage temperature range		-65	150	°C

27C64RPDS Recommended Operating Conditions

PARAMETER	SYMBOL	MIN	MAX	UNITS
Supply voltage ¹	V_{CC}	4.5	5.5	V
Supply voltage	V_{PP}	12.0	13.0	V
Minimum high-level input voltage	V_{IH}	2.0		V
Maximum low-level input voltage	V_{IL}		0.8	V
Operating temperature range	T_A	-55	125	°C



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27C64RPDS DC Electrical Characteristics¹

PARAMETER	SYMBOL	MIN	MAX	UNITS
Input load current $V_{IN} = 0.0\text{ V and } 5.5\text{ V}; V_{CC} = V_{PP} = 5.5\text{ V}$	I_{LI}		± 1	μA
Output leakage current $V_{OUT} = 0.0\text{ V and } 5.5\text{ V}, V_{IN} = 0.0\text{ V and } 5.5\text{ V}$ $V_{CC} = V_{PP} = 5.5\text{ V}$	I_{LO}^2		± 1	μA
Operating current CMOS inputs $V_{CC} = 5.5\text{ V}, V_{PP} = 0.0\text{ V}, A_0-A_{12} = 0.45\text{ V to } 2.4\text{ V}$ $O_0-O_7 = 0\text{ mA}, CE\backslash = 0.45\text{ V}; OE\backslash = 2.4\text{ V}$	I_{CC}		30	mA
Operating current CMOS inputs $V_{CC} = 5.5\text{ V}, V_{PP} = 0.0\text{ V}, A_0-A_{12} = 0.0\text{ V to } 5.3\text{ V}$ $O_0-O_7 = 0\text{ mA}, CE\backslash = 0.0\text{ V}; OE\backslash = 5.3\text{ V}$	I_{CC}		10	mA
Standby current TTL inputs $CE\backslash = OE\backslash = 2.0\text{ V}, F = 0, V_{CC} = 5.5\text{ V}, O_0-O_7 = 0\text{ mA}$	I_{SB}		2	mA
Standby current CMOS inputs $CE\backslash = OE\backslash = 5.3\text{ V}, F = 0, V_{CC} = 5.5\text{ V}, O_0-O_7 = 0\text{ mA}$	I_{SB}		100	μA
V_m read current; $V_{PP} = V_{CC}$	I_{PP}		200	μA
Input low voltage (TTL); $V_{PP} = V_{CC}$	V_{IL}	-0.1	0.8	V
Input low voltage (CMOS); $V_{PP} = V_{CC}$	V_{IL}	-0.2	0.2	V
Input high voltage (TTL); $V_{PP} = V_{CC}$	V_{IH}	2.0	$V_{CC} \pm 1.0$	V
Input high voltage (CMOS); $V_{PP} = V_{CC}$	V_{IH}	$V_{CC} - 0.2$	$V_{CC} + 0.2$	V
Output low voltage $I_{OL} = 2.1\text{ mA}, V_{CC} = V_{PP} = 4.5\text{ V}$ $CE\backslash = OE\backslash = 0.45\text{ V}$	V_{OL}^5		0.45	V



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27C64RPDS DC Electrical Characteristics¹

PARAMETER	SYMBOL	MIN	MAX	UNITS
Output high voltage $I_{OH} = -400 \mu A$ $V_{CC} = V_{PP} = 4.5 V$ $CE\backslash = OE\backslash = 0.45 V$	V_{OH}^5	2.4		V
Output short circuit $V_{PP} = 5.5 V, V_{OUT} = 0.0 V$ $V_{CC} = 4.5 V$ $CE\backslash = OE\backslash = 0.45 V$	I_{OS}^5		-100	mA
V_{PP} read voltage	V_{PP}	$V_{CC}-0.7$	V_{CC}	V
Address to output delay $CE\backslash = OE\backslash = V_{IL}^6$ $V_{PP} = 4.5 V$ and $5.5 V$ $V_{CC} = 4.5 V$ and $5.5 V$	t_{AVQV}^7		70	ns
$CE\backslash$ to output delay $OE\backslash = V_{IL}^6$ $V_{PP} = 4.5 V$ and $5.5 V$ $V_{CC} = 4.5 V$ and $5.5 V$	t_{ELQV}^7		70	ns
$OE\backslash$ to output delay $CE\backslash = V_{IL}^6$ $V_{PP} = 4.5 V$ and $5.5 V$ $V_{CC} = 4.5 V$ and $5.5 V$	t_{OLQV}^7		35	ns
$OE\backslash$ high to output float $CE\backslash = V_{IL}^6$	t_{OHQZ}^3		35	ns
Output hold from addresses $CE\backslash = OE\backslash = V_{IL}^6$	t_{AXQX}^3	0		ns
Input capacitance $V_{IN} = 0.0 V^{8,9}$ $f = 1 MHz$	C_{IN}		10	pF
Output capacitance $V_{OUT} = 0.0 V^{8,9}$ $f = 1 MHz$	C_{OUT}		14	pF



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Notes:

1. $-55^{\circ}\text{C} < T_C < +125^{\circ}\text{C}$, $V_{SS} = 0\text{ V}$, $4.5\text{ V}_{DC} < V_{CC} < 5.5\text{ V}_{DC}$ unless otherwise specified.
2. Connect all address inputs and OE\ to V_{IH} and measure I_{LO} with the output under test connected to V_{OUT} .
3. Guaranteed by design.
4. Tests for all input and control pins.
5. For programmed devices, an appropriate address is selected to acquire the desired output.
6. Equivalent ac test conditions (actual load conditions vary by tester). Output load: 1 TTL gate and $C_L = 100\text{ pF}$. Temperature range: $-55^{\circ}\text{C} < T_C < +100^{\circ}\text{C}$; Supply voltage = $5.0\text{V} \pm 5\%$.
7. t_{AVQV} , t_{ELQV} , t_{BLQV} , address scan (programmed PROM). This program will test all bits in the array with a checkerboard pattern in the device. Terminal conditions are as follows:
 Inputs: $V_{IH} = 2.4\text{ V}$, $V_{IL} = 0.45\text{ V}$.
 Outputs: $V_{OH} \geq 2.0\text{ V}$, $V_{OL} \leq 1.0\text{ V}$.
8. All pins not being tested are to be grounded.
9. C_{IN} and C_{OUT} shall be tested for initial qualification and after any process or design change which may affect capacitance.

27C64RPDS Package Ordering Guide

Package Style	Case Outline	1/	Description
D	D-28		28 Pin Dual In Line Package

Note:

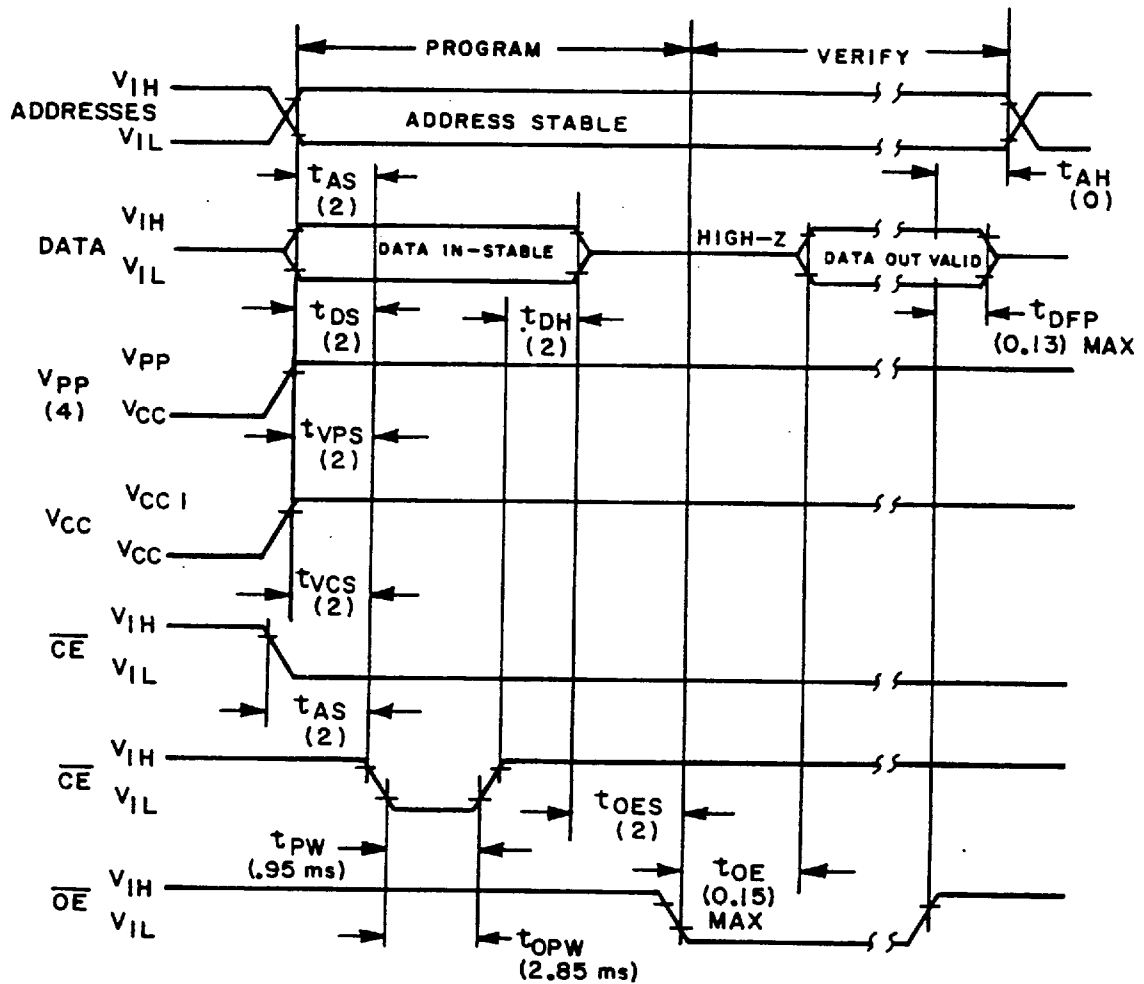
- 1/ For outline information, see Appendix A (Package Information - Outline Dimension)



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PROGRAMMING WAVEFORMS

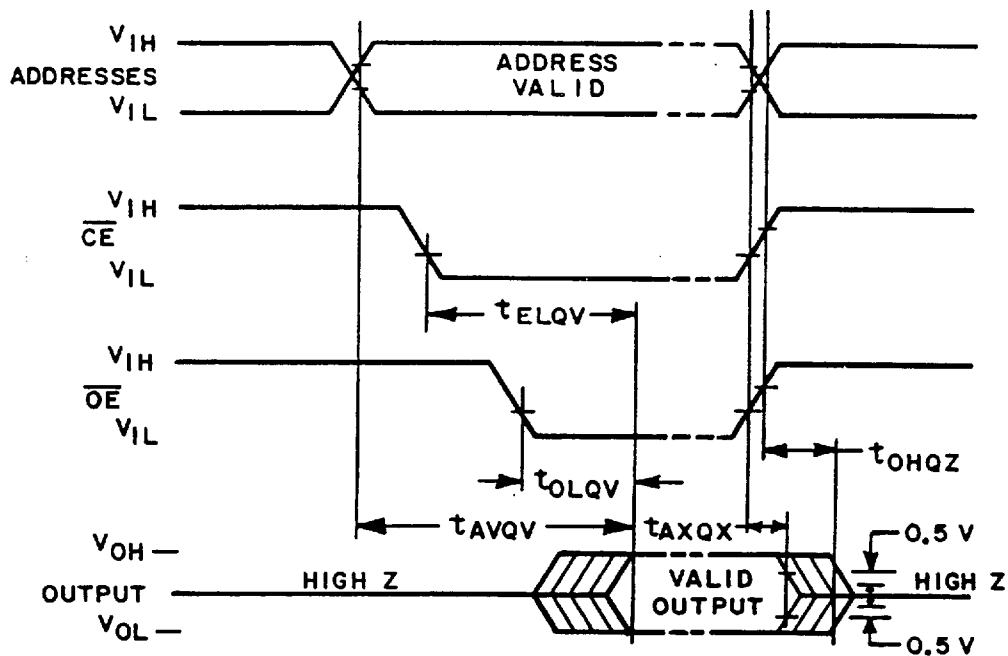
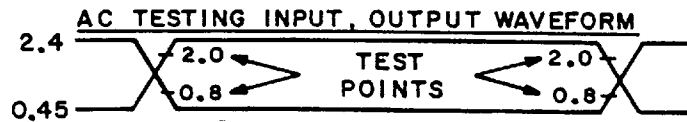


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SWITCHING WAVEFORM



SPACE ELECTRONICS INC.

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