

BRITISH STANDARDS INSTITUTION 2, Park Street, London W1A 2BS	BS CECC 90105 - 002 Issue 1
Specification available from :- As Shown in PD9002, and CECC 00 200 and NATIONAL SEMICONDUCTOR (UK) Ltd. Larkfield Industrial Estate, Greenock, Scotland	September 1985 E Page 1 of 28
ELECTRONIC COMPONENTS OF ASSESSED QUALITY DETAIL SPECIFICATION IN ACCORDANCE WITH GS: BS CECC 90000 Issue 2 SS: BS CECC 90100 Issue 2	MANUFACTURER'S TYPE NUMBER DM54S287J
Outline NOT TO SCALE Isometric projection For dimensions see IEC 191-2 (A50C)	For Ordering Information see clause 5
	256 X 4 BIT SCHOTTKY TTL PROGRAMMABLE READ-ONLY MEMORY WITH TRI-STATE OUTPUTS
	TYPICAL CONSTRUCTION: MONOLITHIC INTEGRATED CIRCUIT, DUAL-IN-LINE HERMETICALLY SEALED ENCAPSULATION
	ASSESSMENT LEVEL: R
Terminal connections: See figure 1 For Marking Information See clause 1.3.3	

1. Functional Description

The DM54S287 is a 1024 bit programmable read-only memory (PROM) organised as 256, 4 bit words. It features SCHOTTKY clamping for high speed, advanced titanium-tungsten (Ti-W) fuse links, low current PNP inputs to reduce loading, and Three-state outputs. The DM54S287 is TTL compatible.

The address inputs are decoded on-chip. Two Enable inputs are provided to control the output states. When $\overline{E1}$ and $\overline{E2}$ are LOW, the outputs present the contents of the addressed word. When either $\overline{E1}$ or $\overline{E2}$ are HIGH the output will be in the high impedance state.

In the unprogrammed condition a logic LOW level will be produced at the output.

Refer to Qualified Product List PD 9002 and CECC 00200 for details of manufacturers approved to this specification.

1.1 Terminal Function

Refer to para. 1.3.1

1.2 Functional Table, Block Diagram and Timing Diagram

1.2.1 Functional Table - Not applicable

1.2.2 Timing Diagram (Read Mode)

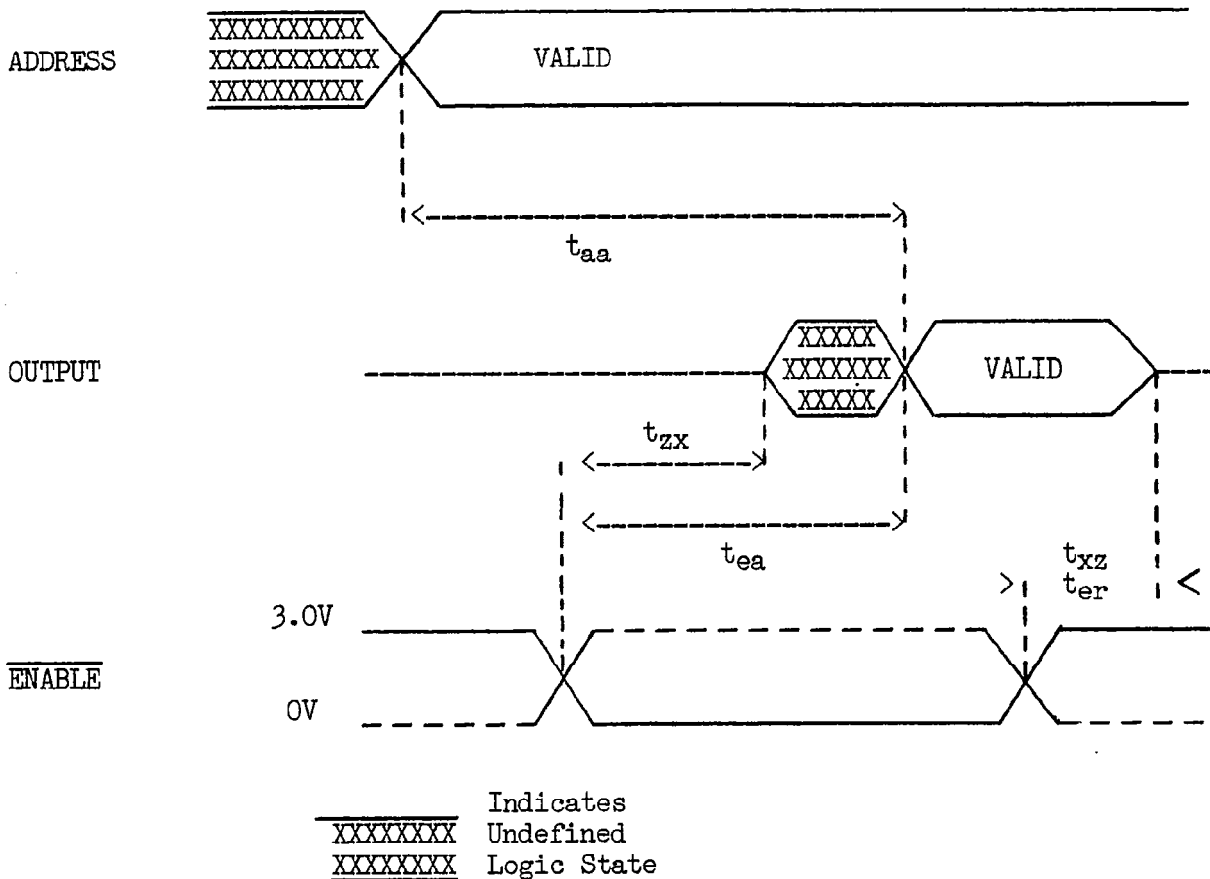


FIG. 1

Device input waveform characteristics are:

1. Repetition Rate = 1MHz
 2. Source Impedance = 50 ohms
 3. Rise & Fall time = 2.5ns max (Mark/Space ratio = 1, amplitude 3V)
- t_{aa} is measured with stable enable inputs.
 - All measurements made at the 1.5V level on the input and output waveforms.
 - t_{ea} and t_{er} are measured from the 1.5V level on inputs and outputs with all address and unused enable inputs stable at applicable levels.

1.2.3 Block Diagram

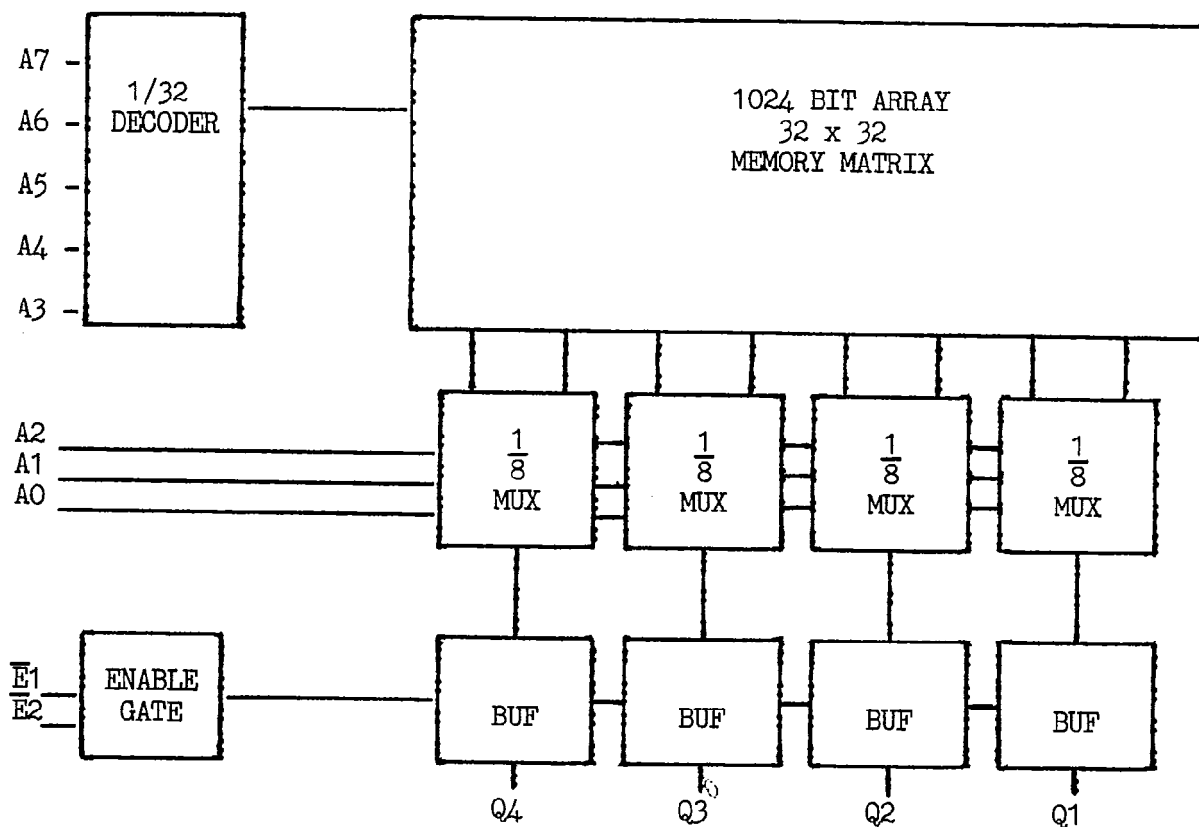
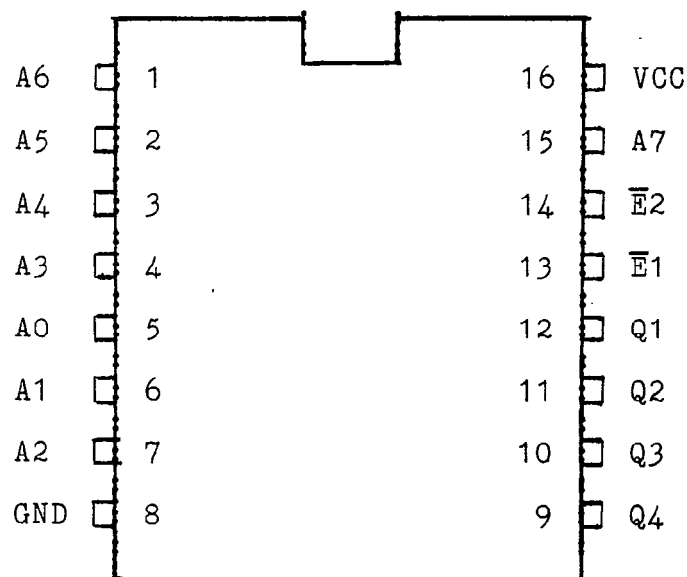


FIG. 2

1.3 Terminal Identification, Type Designation and Marking.

1.3.1 Terminal Identification (top view) and pin definitions.



<u>Pin</u>	<u>Name</u>	<u>Function</u>
A0	to A7	Address Inputs
Q1	to Q4	Data Outputs
E1	E2	Enable Inputs

FIG. 3

1.3.2 Type Designation

DM54S287J

1K-Bit (256 X 4) Schottky TTL Fusible Link PROM with three-state outputs.

1.3.3 Marking

Each Integrated Circuit shall bear the following marking:

- a. Terminal Identification
- b. Type Number
- c. Factory Identification Code
- d. Date Code
- e. Screening Class
- f. Assessment Level

1.4 Ordering Information

1. Manufacturer's Part Number
2. Required Quality Assessment Level
3. Required Screening Class (see addendum 1 to BS CECC 90000)
4. Relevant DS Number, Issue and Date

2. LIMITING CONDITIONS OF USE (not for inspection purposes)

2.1 READ MODE

CHARACTERISTIC	SYMBOL	MIN	MAX	UNIT
Supply Voltage	V _{CC}	-0.5	+7.0	V
Input Voltage	V _I	-1.2	+5.5	V
Output Voltage appl.	V _O	-0.5	+5.5	V
Max. Power Dissipation	P _{tot}		1.0	W
Operating Temperature	T _{amb}	-55.0	+125.0	°C
Storage Temperature	T _{stg}	-65.0	+150.0	°C

2.2 PROGRAMMING MODE

CHARACTERISTIC	SYMBOL	MIN	MAX	UNIT
Supply Voltage	V _{CCP}	10.0	11.0	V
Input Voltage (Address & Enable Inputs)	V _I	0	+5.5	V
Output Voltage appl.	V _O	10.0	11.0	V
Max. Power Dissipation	P _{tot}		1.0	W
Operating Temperature	T _{amb}	+15.0	+30.0	°C

3. RECOMMENDED OPERATING CONDITIONS, PROGRAMMING CHARACTERISTICS AND ASSOCIATED CHARACTERISTICS. (not for inspection purposes)

3.1 Recommended Operating Conditions

The following conditions and characteristics apply over the operating temperature range and supply voltage range specified.

For programming conditions see clause 3.2. For read conditions see clause 3.3.

3.2 Programming Mode.

3.2.1 Programming Conditions and Characteristics.

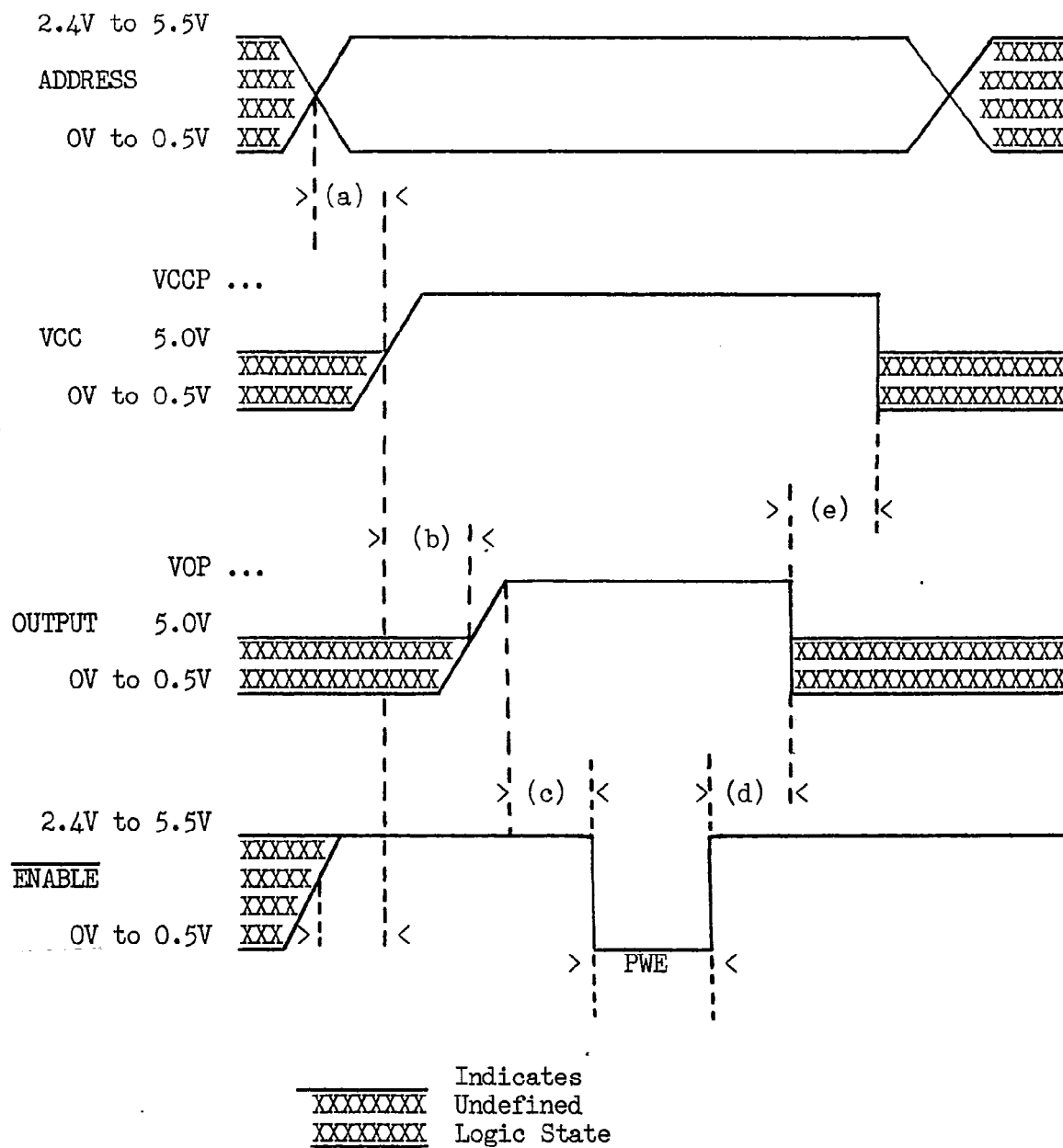
CHARACTERISTIC	CONDITIONS	SYMBOL	MIN	MAX	UNIT
Operating Temperature		T_{amb}	15.0	30.0	$^{\circ}C$
Power Supply Voltage to Program		V_{CCP}	10.0	11.0	V
Power Supply Voltage to Verify		V_{CCV}	3.8	4.2	V
Programming Supply Current	$V_{CCP} = 10.0V$ to 11.0V	I_{CCP}		750	mA
Input High Voltage		V_{IH}	2.0	5.5	V
Input Low Voltage		V_{IL}	0	0.8	V
Input High Current	$V_{IH} = 2.7V$	I_{IH}		25.0	μA
Input Low Current	$V_{IL} = 0.45$	I_{IL}		-250.0	μA
Forced Output Voltage		V_{CCP}	10.0	11.0	V
Programming Output Current		I_{OPF}		20.0	mA
CE Input High Voltage		V_{IHCE}		5.5	V
CE Input Low Voltage		V_{ILCE}	0.0		V
Applied Output Voltage: Pulse Slew Rate		t_{sr}	1.0	10.0	V/ μs
CE Programming Pulse Width		t_p	9.0	11.0	μs

3.2.1. cont.

CHARACTERISTIC	CONDITIONS	SYMBOL	MIN	MAX	UNIT
Pulse Sequence Delay		t_d	33.0		us
Duty Cycle for V_{cc} at V_{ccp}				25.0	%
Max. fusing attempts per link to achieve the min. yield		F_L		10	
Minimum Programming Yield		P_Y	90		%
Set-Up time of Address		t_{sadd}	100		ns
Set-Up time of Program V_{cc}		t_{sVccp}	5 *		us
Set-Up time of Output voltage		t_{sVop}	100		ns
Hold time of Output voltage		t_{hVop}	100		ns
Hold time of Program V_{cc}		t_{hVccp}	100		ns
Total Programming time for each location: (Excluding Verify time)			65		us

* May be >0 if V_{ccp} rises at the same rate or faster than V_{op}

3.2.2 Programming Waveforms



- (a) t_{sadd} Set-up time of address before program V_{CC} set.
 (b) t_{sVccp} Set-up time of program V_{CC} before output program voltage set.
 (c) t_{sVop} Set-up time of output voltage before program pulse.
 (d) t_{hVop} Hold time of output after program pulse.
 (e) t_{hVccp} Hold time of program V_{CC} after output program voltage removed.

FIG. 4