

PCMCIA/JEIDA MASK ROM

1. VARIATION

Part Number	Memory Size	Description
KWB257SD**	256K BYTE	128K × 16 bit MASK ROM CARD
KWB513SD**	512K BYTE	256K × 16 bit MASK ROM CARD
KWB101SD**	1M BYTE	512K × 16 bit MASK ROM CARD
KWB201SD**	2M BYTE	1M × 16 bit MASK ROM CARD
KWB401SD**	4M BYTE	2M × 16 bit MASK ROM CARD
KWB801SD**	8M BYTE	4M × 16 bit MASK ROM CARD
KWB161SD**	16M BYTE	8M × 16 bit MASK ROM CARD (UNDER DEVELOPMENT)

2. OUTLINE OF FUNCTIONS AND FEATURES

- (1) This memory card conforms to PCMCIA/JEIDA.
- (2) Operating temperature range: TOPR = 0 ~ 60°C
Storage temperature range: TSTR = -20 ~ 60°C
- (3) Size of the card: 85.6 × 54.0 × 3.3 mm
- (4) Includes exclusive IC's for the control of I/O.
- (5) Supports 2 types of exclusive attribute memory.
 - (5-1) KWB***SDX*: With 2K Bytes EEPROM which can be read/written
 - (5-2) KWB***SDY*: Without exclusive attribute memory (output "FFh", read only)

3. ELECTRICAL CHARACTERISTICS

3-1. Maximum Rating

Symbol	Description	Value	Unit
V _{CC}	SUPPLY VOLTAGE	-0.3 ~ 7.0	V
V _{IN}	INPUT SIGNAL VOLTAGE (*1)	-0.3 ~ V _{CC} +0.5	V
V _{OUT}	OUTPUT SIGNAL VOLTAGE	-0.3 ~ V _{CC}	V
T _{OPR}	OPERATING TEMPERATURE	0 ~ 60	°C
T _{STR}	STORAGE TEMPERATURE	-20 ~ 65	°C
HUM	HUMIDITY (*2)	10 ~ 95	%
PD	POWER DISSIPATION	1	W

*1: V_{IN}: Under 7.0 V

*2: No dew condition

3-2. Capacitance (T_a = 25°C, V_{IN}/OUT=0 V, f = 1 MHz)

Symbol	Description	Min	Typ	Max	Unit
C1	INPUT CAPACITANCE	—	14	20	pF
C2	I/O CAPACITANCE	—	14	20	pF

3-3. Recommended Operating Conditions (T_a = 0 ~ 60°C)

Symbol	Description	Min	Typ	Max	Unit
V _{CC}	V _{CC} SUPPLY VOLTAGE	4.50	5.0	5.5	V
V _{IH}	HIGH LEVEL INPUT VOLTAGE	V _{CC} ×0.8	—	V _{CC} +0.3	V
V _{IL}	LOW LEVEL INPUT VOLTAGE	-0.1	—	V _{CC} ×0.1	V

3-4. I/O DC Characteristics (Ta = 0 ~ 60°C, VCC = 5 V ±10%)

Symbol	Description	Object	Condition	Min	Typ	Max	Unit
ILI	LOW LEVEL INPUT CURRENT	1, 3	VIN=0 V	-10	—	10	μA
		2		-65	—	-40	μA
IHI	HIGH LEVEL INPUT CURRENT	1, 2	VIN=VCC	-10	—	10	μA
		3		10	—	65	μA
VOH	HIGH LEVEL OUTPUT VOLTAGE	3	IOH=-2.0 mA	VCC-0.4	—	—	V
VOL	LOW LEVEL OUTPUT VOLTAGE	3	IOL=6.0 mA	—	—	VSS+0.4	V

1: A0 ~ A23

2: /CE1, /CE2, /OE, /WE, /REG

3: D0 ~ D15

/CE1, /CE2, /OE, /WE, /REG

: Pull-up to VCC through 100 KΩ in the card

D0 ~ D15 : Pull-down to GND through 100 KΩ in the card

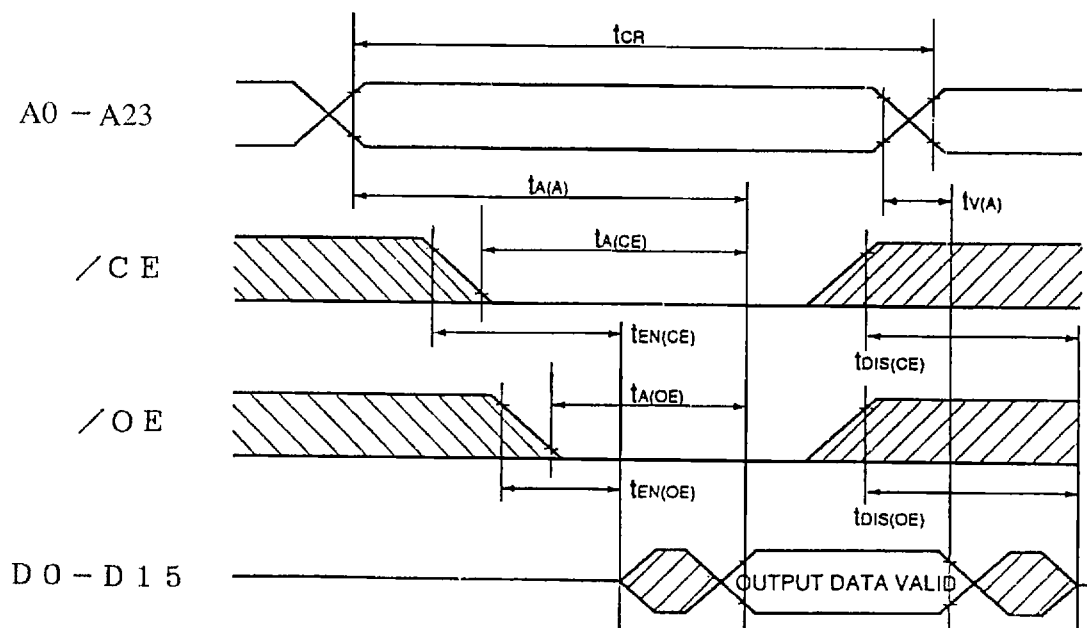
3-5. Current Consumption (Ta = 0 ~ 60°C, VCC = 5 V ±10%)

Symbol	Description	Condition		Min	Typ	Max	Unit
ISTBY1	VCC STANDBY CURRENT 1	/CE1=/CE2=/OE=/WE=/REG=VCC-0.4 V OTHERS=0.4V/VCC-0.4V		—	—	1.0	mA
IACT1	VCC ACTIVE CURRENT (READ)	/CE1=/CE2=0.4V IOUT=0 mA OTHERS=0.4/VCC-0.4V INPUT PULSE LEVEL (0.4V/VCC-0.4V)	f=1uS	—	—	50	mA
			f=200nS	—	—	100	mA

3-6. AC Electrical Characteristics at Read of Common Memory ($T_a = 0 \sim 60^\circ\text{C}$, $V_{CC} = 5\text{ V} \pm 10\%$)

Symbol	Description	Min	Max	Unit
TCR	READ CYCLE TIME	250	—	nS
TA (A)	ADDRESS ACCESS TIME	—	250	nS
TA (CE)	/CE ACCESS TIME	—	250	nS
TA (OE)	/OE ACCESS TIME	—	125	nS
TDIS (CE)	OUTPUT DISABLE TIME FROM /CE	—	100	nS
TDIS (OE)	OUTPUT DISABLE TIME FROM /OE	—	100	nS
TEN (CE)	OUTPUT ENABLE TIME FROM /CE	5	—	nS
TEN (OE)	OUTPUT ENABLE TIME FROM /OE	5	—	nS
TV (A)	VALID DATA HOLD TIME FROM ADDRESS INVALID	0	—	nS

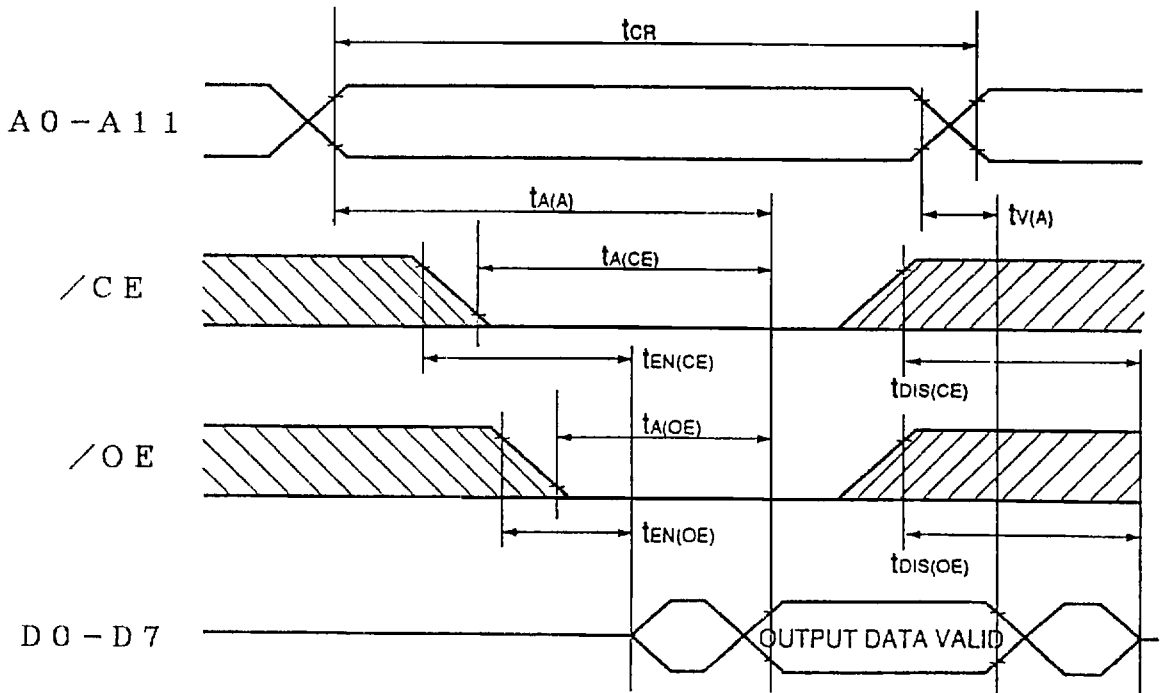
3-7. Read Timing of Common Memory



3-8. AC Electrical Characteristics at Read of Attribute Memory (2K Bytes EEPROM) ($T_a = 0 \sim 60^\circ\text{C}$, $V_{CC} = 5\text{ V} \pm 10\%$)

Symbol	Description	Min	Max	Unit
TCR	READ CYCLE TIME	300	—	nS
TA (A)	ADDRESS ACCESS TIME	—	300	nS
TA (CE)	/CE ACCESS TIME	—	300	nS
TA (OE)	/OE ACCESS TIME	—	150	nS
TDIS (CE)	OUTPUT DISABLE TIME FROM /CE	—	100	nS
TDIS (OE)	OUTPUT DISABLE TIME FROM /OE	—	100	nS
TEN (CE)	OUTPUT ENABLE TIME FROM /CE	5	—	nS
TEN (OE)	OUTPUT ENABLE TIME FROM /OE	5	—	nS
TV (A)	VALID DATA HOLD TIME FROM ADDRESS INVALID	0	—	nS

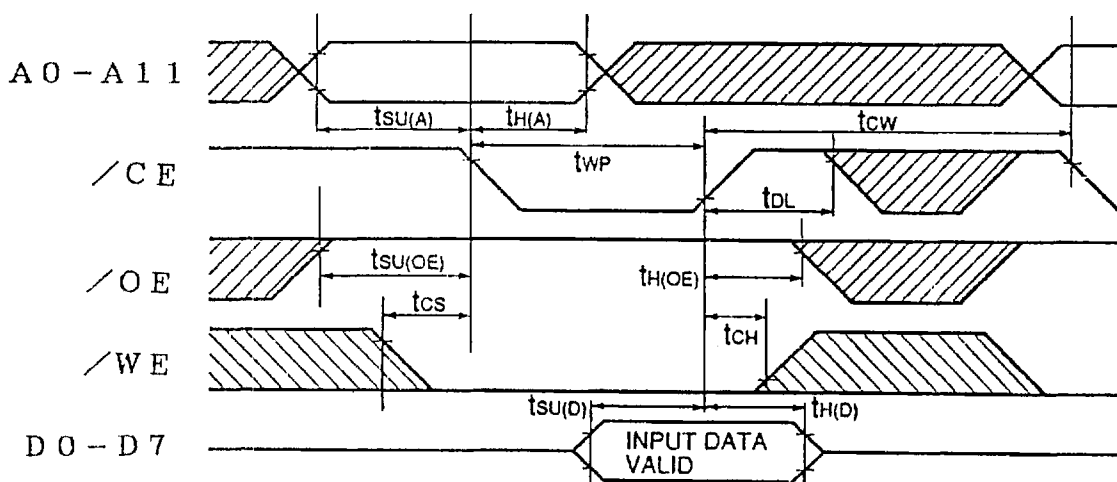
3-9. Read Timing of Attribute Memory (2K Bytes EEPROM)



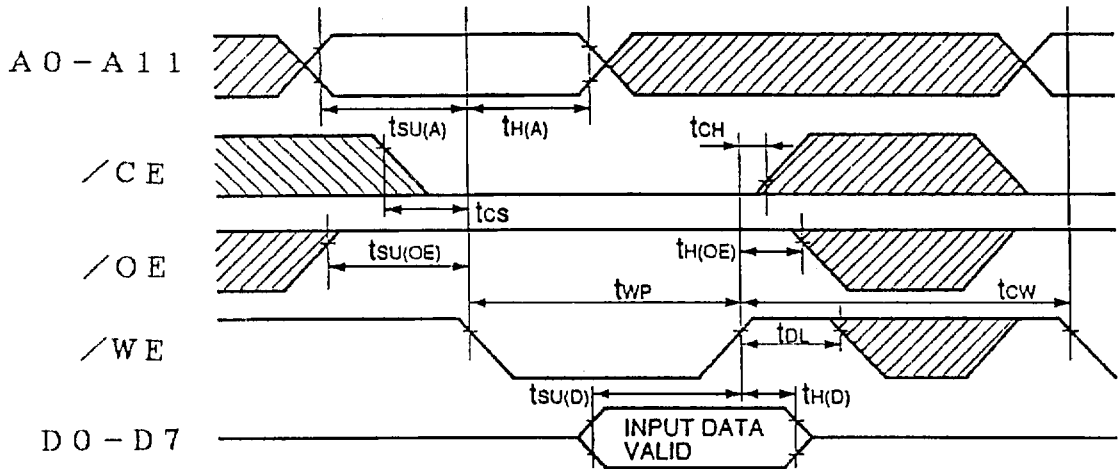
3-10. AC Electrical Characteristics ar Write of Attribute Memory (2K Bytes EEPROM) ($T_a = 0 \sim 60^\circ\text{C}$, $V_{CC} = 5\text{ V} \pm 10\%$)

Symbol	Description	Min	Max	Unit
TCW	WRITE CYCLE TIME	15	—	mS
TWP	WRITE PULSE WIDTH	150	—	nS
TSU (A)	ADDRESS SETUP TIME	30	—	nS
TSU (D)	DATA SETUP TIME	80	—	nS
TH (D)	DATA HOLD TIME	30	—	nS
TSU (OE)	/OE SETUP TIME	15	—	nS
TH (OE)	/OE HOLD TIME	15	—	nS
TH (A)	ADDRESS HOLD TIME	100	—	nS
TCS	WRITE HOLD TIME	30	—	nS
TCH	WRITE HOLD TIME	0	—	nS
TDL	DATA LATCH TIME	50	—	nS

3-11. Write Timing of Attribute Memory (2K Bytes EEPROM) (/CE Controlled Write)



3-12. Write Timing of Attribute Memory (2K Bytes EEPROM) (/WE Control)



3-13. AC Test Conditions

VCC	: 5 V $\pm$ 10%
Ta	: 0 ~ 60°C
Input pulse level	: $V_{IH} = V_{CC} \times 0.8$ V $V_{IL} = V_{CC} \times 0.1$ V
I/O timing reference level	: 1.5 V
Output load	: 100 pF + 1 TTL gate (including oscilloscope and jig)

3-14. Operating Modes of Common Memory

Operating Mode	/REG	A0	/CE1	/CE2	/OE	/WE	D0 ~ D7	D8 ~ D15
STANDBY	*	*	V _{IH}	V _{IH}	*	*	Hi-Z	Hi-Z
EVEN DATA READ	V _{IH}	V _{IL}	V _{IL}	V _{IH}	V _{IL}	V _{IH}	OUTPUT	Hi-Z
ODD DATA READ 1	V _{IH}	V _{IH}	V _{IL}	V _{IH}	V _{IL}	V _{IH}	OUTPUT	Hi-Z
ODD DATA READ 2	V _{IH}	*	V _{IH}	V _{IL}	V _{IL}	V _{IH}	Hi-Z	OUTPUT
WORD READ	V _{IH}	*	V _{IL}	V _{IL}	V _{IL}	V _{IH}	OUTPUT	OUTPUT

Hi-Z : High impedance

* : V_{IH} or V_{IL}

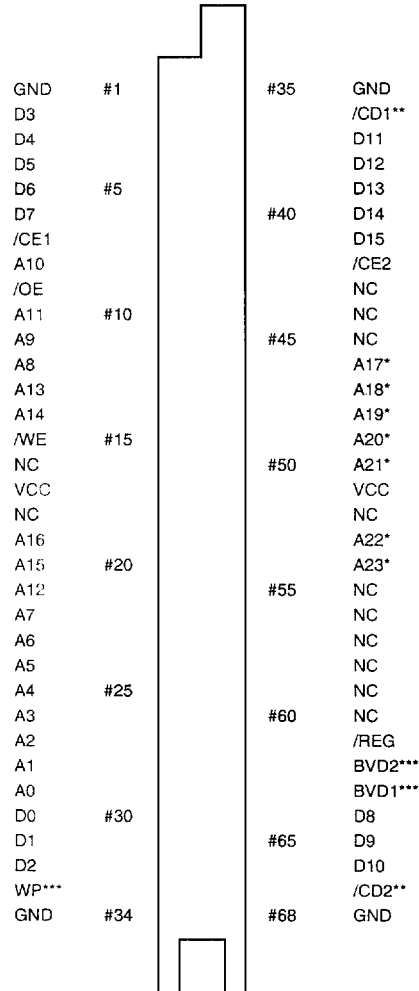
3-15. Operating Modes of Attribute Memory (2K Bytes EEPROM)

Operating Mode	/REG	A0	/CE1	/CE2	/OE	/WE	D0 ~ D7	D8 ~ D15
BYTE DATA READ	V _{IL}	V _{IL}	V _{IL}	V _{IH}	V _{IL}	V _{IH}	OUTPUT	Hi-Z
	V _{IL}	V _{IH}	V _{IL}	V _{IH}	V _{IL}	V _{IH}	Hi-Z	Hi-Z
WORD DATA READ	V _{IL}	*	V _{IL}	V _{IL}	V _{IL}	V _{IH}	OUTPUT	Hi-Z
BYTE DATA WRITE	V _{IL}	V _{IL}	V _{IL}	V _{IH}	V _{IH}	V _{IL}	INPUT	Hi-Z
	V _{IL}	V _{IH}	V _{IL}	V _{IH}	V _{IH}	V _{IL}	INVALID	Hi-Z
WORD DATA WRITE	V _{IL}	*	V _{IL}	V _{IL}	V _{IH}	V _{IL}	INPUT	INVALID

Hi-Z : High impedance

* : V_{IH} or V_{IL}

4. PIN ASSIGNMENT



A17* : KWB257, KWB513, KWB101, KWB201, KWB401, KWB801, KWB161

A18* : KWB513, KWB101, KWB201, KWB401, KWB801, KWB161

A19* : KWB101, KWB201, KWB401, KWB801, KWB161

A20* : KWB201, KWB401, KWB801, KWB161

A21* : KWB401, KWB801, KWB161

A22* : KWB801, KWB161

A23* : KWB161

/CD1**, /CD2**: Connect to GND in the card.

WP***, BVD1***, BVD2***

: Connect to VCC in the card.

NC : No connect.