R1EV58256BxxN Series
R1EV58256BxxR Series

256K EEPROM (32-Kword × 8-bit) Ready/$\overline{\text{Busy}}$ and $\overline{\text{RES}}$ function (R1EV58256BxxR)

R10DS0208EJ0201
Rev.2.01
Apr. 01, 2020

Description

Renesas Electronics' R1EV58256BxxN series and R1EV58256BxxR series are electrically erasable and programmable EEPROM's organized as 32768-word × 8-bit. They have realized high speed, low power consumption and high reliability by employing advanced MONOS memory technology and CMOS process and circuitry technology. They also have a 64-byte page programming function to make their write operations faster.

Features

- Single supply: 2.7 to 5.5 V
- Access time:
  - 85 ns (max)/100 ns (max) at 4.5 V ≤ V_{CC} < 5.5 V
  - 120 ns (max) at 2.7 V ≤ V_{CC} ≤ 5.5 V
- Power dissipation:
  - Active: 20 mW/MHz (typ)
  - Standby: 110 µW (max)
- On-chip latches: address, data, $\overline{\text{CE}}$, $\overline{\text{OE}}$, $\overline{\text{WE}}$
- Automatic byte write: 10 ms (max)
- Automatic page write (64 bytes): 10 ms (max)
- Ready/$\overline{\text{Busy}}$ (only the R1EV58256BxxR series)
- $\overline{\text{Data}}$ polling and Toggle bit
- Data protection circuit on power on/off
- Conforms to JEDEC byte-wide standard
- Reliable CMOS with MONOS cell technology
- 10^5 or more erase/write cycles
- 10 or more years data retention
- Software data protection
- Write protection by $\overline{\text{RES}}$ pin (only the R1EV58256BxxR series)
- Temperature range: –40 to 85°C
- There are lead free products.

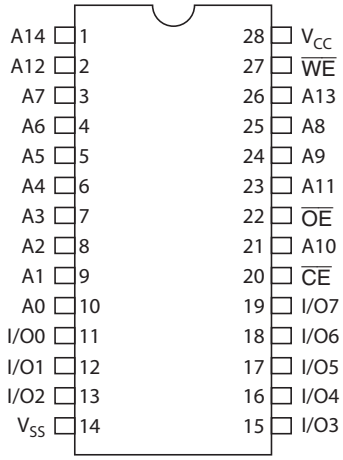
Ordering Information

Orderable Part Name	Access time	Package	Shipping Container	Quantity
R1EV58256BDANBI#B*	85ns/100ns/ 120ns	600mil 28-pin plastic DiP PRDP0028AB-A (DP-28V)	Tube	Max.13 pcs/tube Max. 325pcs/inner box
R1EV58256BSCNBI#B*	85ns/100ns/ 120ns	400mil 28-pin plastic SOP PRSP0028DC-A (FP-28DV)	Tube	Max. 25 pcs/tube Max. 1,000 pcs/inner box
R1EV58256BSCNBI#S*	85ns/100ns/ 120ns	400mil 28-pin plastic SOP PRSP0028DC-A (FP-28DV)	Tape and reel	1,000 pcs/reel
R1EV58256BTCNBI#B*	85ns/100ns/ 120ns	28-pin plastic TSOP PTSA0028ZB-A (TFP-28DBV)	Tray	Max. 60 pcs/tray Max. 600 pcs/inner box
R1EV58256BTDRBI#B*	85ns/100ns/ 120ns	32-pin plastic TSOP PTSA0032KD-A (TFP-32DAV)	Tray	Max. 60 pcs/tray Max. 600 pcs/inner box

Notes 1. *= Revision code (0,2 etc.)

Pin Arrangement

R1EV58256BDAN Series
R1EV58256BSCN Series



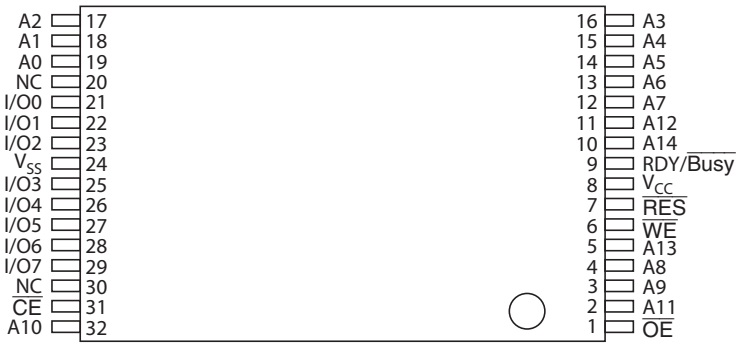
(Top view)

R1EV58256BTCN Series



(Top view)

R1EV58256BTDR Series



(Top view)

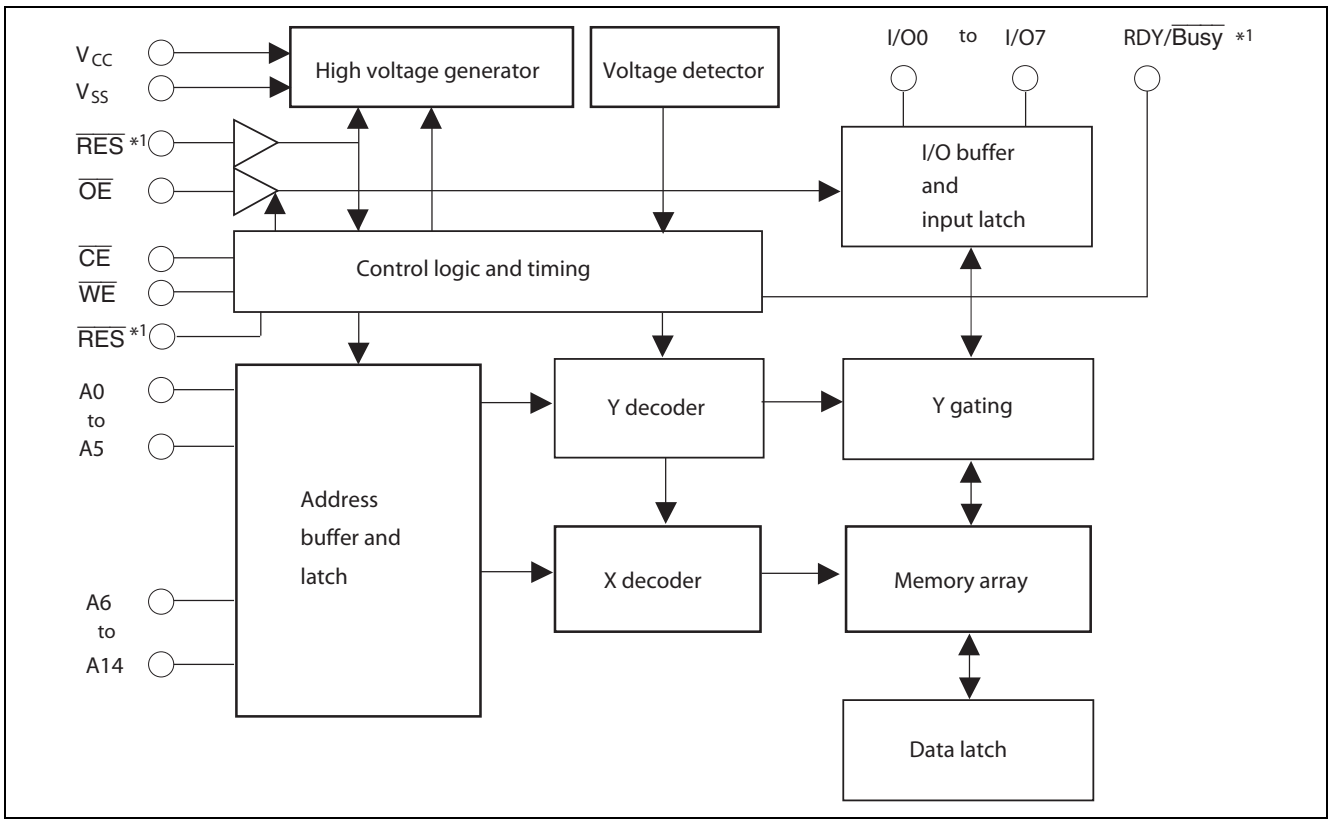
Pin Description

Pin name	Function
A0 to A14	Address input
I/O0 to I/O7	Data input/output
$\overline{OE}$	Output enable
$\overline{CE}$	Chip enable
$\overline{WE}$	Write enable
V_{CC}	Power supply
V_{SS}	Ground
RDY/$\overline{Busy}$*1	Ready busy
$\overline{RES}$*1	Reset
NC	No connection

Note: 1. This function is supported by only the R1EV58256BxxR series.

Block Diagram

Note: 1. This function is supported by only the R1EV58256BXXR series.



Operation Table

Operation	$\overline{CE}$	$\overline{OE}$	$\overline{WE}$	$\overline{RES}$*3	RDY/$\overline{Busy}$*3	I/O
Read	V_{IL}	V_{IL}	V_{IH}	V_H*1	High-Z	Dout
Standby	V_{IH}	×*2	×	×	High-Z	High-Z
Write	V_{IL}	V_{IH}	V_{IL}	V_H	High-Z to V_{OL}	Din
Deselect	V_{IL}	V_{IH}	V_{IH}	V_H	High-Z	High-Z
Write inhibit	×	×	V_{IH}	×	—	—
	×	V_{IL}	×	×	—	—
$\overline{Data}$ polling	V_{IL}	V_{IL}	V_{IH}	V_H	V_{OL}	Data out (I/O7)
Program reset	×	×	×	V_{IL}	High-Z	High-Z

Notes: 1. Refer to the recommended DC operating condition.
2. ×: Don't care
3. This function is supported by only the R1EV58256BxxR series.

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply voltage relative to V_{SS}	V_{CC}	−0.6 to +7.0	V
Input voltage relative to V_{SS}	Vin	−0.5*1 to +7.0*3	V
Operating temperature range*2	Topr	–40 to +85	°C
Storage temperature range	Tstg	−55 to +125	°C

Notes: 1. Vin min = −3.0 V for pulse width ≤ 50 ns
2. Including electrical characteristics and data retention
3. Should not exceed V_{CC} + 1.0 V.

Recommended DC Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage	V_{CC}	2.7	3.0	5.5	V
	V_{SS}	0	0	0	V
Input voltage*5	V_{IL}	−0.3*1	—	0.8	V
	V_{IH}	1.9*2	—	V_{CC} + 0.3*3	V
	V_H*4	V_{CC} −0.5	—	V_{CC} + 1.0	V
Operating temperature	Topr	−40	—	+85	°C

Notes: 1. V_{IL} min: −1.0 V for pulse width ≤ 50 ns.
2. V_{IH} min for V_{CC} = 3.6 to 5.5 V is 2.2 V.
3. V_{IH} max: V_{CC} + 1.0 V for pulse width ≤ 50 ns.
4. This function is supported by only the R1EV58256BxxR series
5. Refer to the recommended AC operating condition during read and write operation.

DC Characteristics

($Ta = -40$ to $+85°C$, $V_{CC} = 2.7$ to 5.5 V)

Parameter	Symbol	Min	Typ	Max	Unit	Test conditions
Input leakage current	I_{LI}	—	—	2*1	μA	V_{CC} = 5.5 V, Vin = 5.5 V
Output leakage current	I_{LO}	—	—	2	μA	V_{CC} = 5.5 V, Vout = 5.5/0.4 V
Standby V_{CC} current	I_{CC1}	—	—	20	μA	$\overline{CE}$ = V_{CC}
	I_{CC2}	—	—	1	mA	$\overline{CE}$ = V_{IH}
Operating V_{CC} current	I_{CC3}	—	—	8	mA	Iout = 0 mA, Duty = 100%, Cycle = 1 μs, V_{CC} = 3.6 V
		—	—	12	mA	Iout = 0 mA, Duty = 100%, Cycle = 1 μs, V_{CC} = 5.5 V
		—	—	12	mA	Iout = 0 mA, Duty = 100%, Cycle = 120 ns, V_{CC} = 3.6 V
		—	—	30	mA	Iout = 0 mA, Duty = 100%, Cycle = 120 ns, V_{CC} = 5.5 V
Output low voltage	V_{OL}	—	—	0.4	V	I_{OL} = 2.1 mA
Output high voltage	V_{OH}	$V_{CC} \times 0.8$	—	—	V	I_{OH} = –400 μA

Note: 1. I_{LI} on $\overline{RES}$ = 100 μA max (only the R1EV58256BXXR series)

Capacitance

($Ta = +25°C$, $f = 1$ MHz)

Parameter	Symbol	Min	Typ	Max	Unit	Test conditions
Input capacitance*1	Cin	—	—	6	pF	Vin = 0 V
Output capacitance*1	Cout	—	—	12	pF	Vout = 0 V

Note: 1. This parameter is periodically sampled and not 100% tested.

AC Characteristics

($Ta = -40$ to $+85°C$, $V_{CC} = 4.5$V to 5.5V)

Test Conditions

- Input pulse levels: 0.4 V to 3.0 V, 0 V to V_{CC} ($\overline{RES}$ pin*2)
- Input rise and fall time: ≤ 5 ns
- Input timing reference levels: 0.8, 2.0 V
- Output load: 1TTL Gate +100 pF
- Output reference levels: 1.5 V, 1.5 V

Read Cycle

Parameter	Symbol	Min	Max	Unit	Test conditions
Address to output delay	t_{ACC}	—	85	ns	$\overline{CE}$ = $\overline{OE}$ = V_{IL},$\overline{WE}$ = V_{IH}
$\overline{CE}$ to output delay	t_{CE}	—	85	ns	$\overline{OE}$ = V_{IL}, $\overline{WE}$ = V_{IH}
$\overline{OE}$ to output delay	t_{OE}	10	40	ns	$\overline{CE}$ = V_{IL}, $\overline{WE}$ = V_{IH}
Address to output hold	t_{OH}	0	—	ns	$\overline{CE}$ = $\overline{OE}$ = V_{IL},$\overline{WE}$ = V_{IH}
$\overline{OE}$ ($\overline{CE}$) high to output float*1	t_{DF}	0	40	ns	$\overline{CE}$ = V_{IL}, $\overline{WE}$ = V_{IH}
$\overline{RES}$ low to output float*1, 2	t_{DFR}	0	350	ns	$\overline{CE}$ = $\overline{OE}$ = V_{IL},$\overline{WE}$ = V_{IH}
$\overline{RES}$ to output delay*2	t_{RR}	0	450	ns	$\overline{CE}$ = $\overline{OE}$ = V_{IL},$\overline{WE}$ = V_{IH}

Write Cycle

Parameter	Symbol	Min*3	Typ	Max	Unit	Test conditions
Address setup time	t_{AS}	0	—	—	ns	
Address hold time	t_{AH}	50	—	—	ns	
$\overline{CE}$ to write setup time ($\overline{WE}$ controlled)	t_{CS}	0	—	—	ns	
$\overline{CE}$ hold time ($\overline{WE}$ controlled)	t_{CH}	0	—	—	ns	
$\overline{WE}$ to write setup time ($\overline{CE}$ controlled)	t_{WS}	0	—	—	ns	
$\overline{WE}$ hold time ($\overline{CE}$ controlled)	t_{WH}	0	—	—	ns	
$\overline{OE}$ to write setup time	t_{OES}	0	—	—	ns	
$\overline{OE}$ hold time	t_{OEH}	0	—	—	ns	
Data setup time	t_{DS}	50	—	—	ns	
Data hold time	t_{DH}	0	—	—	ns	
$\overline{WE}$ pulse width ($\overline{WE}$ controlled)	t_{WP}	0.100	—	30	µs	
$\overline{CE}$ pulse width ($\overline{CE}$ controlled)	t_{CW}	0.100	—	30	µs	
Data latch time	t_{DL}	50	—	—	ns	
Byte load cycle	t_{BLC}	0.2	—	30	µs	
Byte load window	t_{BL}	100	—	—	µs	
Write cycle time	t_{WC}	—	—	10*4	ms	
Time to device busy	t_{DB}	120	—	—	ns	
Write start time	t_{DW}	0*5	—	—	ns	
Reset protect time*2	t_{RP}	100	—	—	µs	
Reset high time*2, 6	t_{RES}	1	—	—	µs	

Notes: 1. t_{DF} and t_{DFR} are defined as the time at which the outputs achieve the open circuit conditions and are no longer driven.
2. This function is supported by only the R1EV58256BxxR series.
3. Use this device in longer cycle than this value.
4. t_{WC} must be longer than this value unless polling techniques or RDY/$\overline{Busy}$ (only the R1EV58256BxxR series) are used. This device automatically completes the internal write operation within this value.
5. Next read or write operation can be initiated after t_{DW} if polling techniques or RDY/$\overline{Busy}$ (only the R1EV58256BxxR series) are used.
6. This parameter is sampled and not 100% tested.
7. A6 through A14 are page address and these addresses are latched at the first falling edge of $\overline{WE}$.
8. A6 through A14 are page address and these addresses are latched at the first falling edge of $\overline{CE}$.
9. See AC read characteristics.

AC Characteristics

(Ta = –40 to +85°C, V_{CC} = 2.7 to 5.5 V)

Test Conditions

- Input pulse levels: 0.4 V to 2.4 V ($V_{CC} \leq 3.6$V), 0.4V to 3.0 V ($V_{CC} > 3.6$ V), 0 V to V_{CC} ($\overline{RES}$ pin*2)
- Input rise and fall time: ≤ 5 ns
- Input timing reference levels: 0.8, 1.8 V
- Output load: 1TTL Gate +100 pF
- Output reference levels: 1.5 V, 1.5 V

Read Cycle

Parameter	Symbol	Min	Max	Unit	Test conditions
Address to output delay	t_{ACC}	—	120	ns	$\overline{CE}$ = $\overline{OE}$ = V_{IL}, $\overline{WE}$ = V_{IH}
$\overline{CE}$ to output delay	t_{CE}	—	120	ns	$\overline{OE}$ = V_{IL}, $\overline{WE}$ = V_{IH}
$\overline{OE}$ to output delay	t_{OE}	10	60	ns	$\overline{CE}$ = V_{IL}, $\overline{WE}$ = V_{IH}
Address to output hold	t_{OH}	0	—	ns	$\overline{CE}$ = $\overline{OE}$ = V_{IL}, $\overline{WE}$ = V_{IH}
$\overline{OE}$ ($\overline{CE}$) high to output float*1	t_{DF}	0	40	ns	$\overline{CE}$ = V_{IL}, $\overline{WE}$ = V_{IH}
$\overline{RES}$ low to output float*1, 2	t_{DFR}	0	350	ns	$\overline{CE}$ = $\overline{OE}$ = V_{IL}, $\overline{WE}$ = V_{IH}
$\overline{RES}$ to output delay*2	t_{RR}	0	600	ns	$\overline{CE}$ = $\overline{OE}$ = V_{IL}, $\overline{WE}$ = V_{IH}

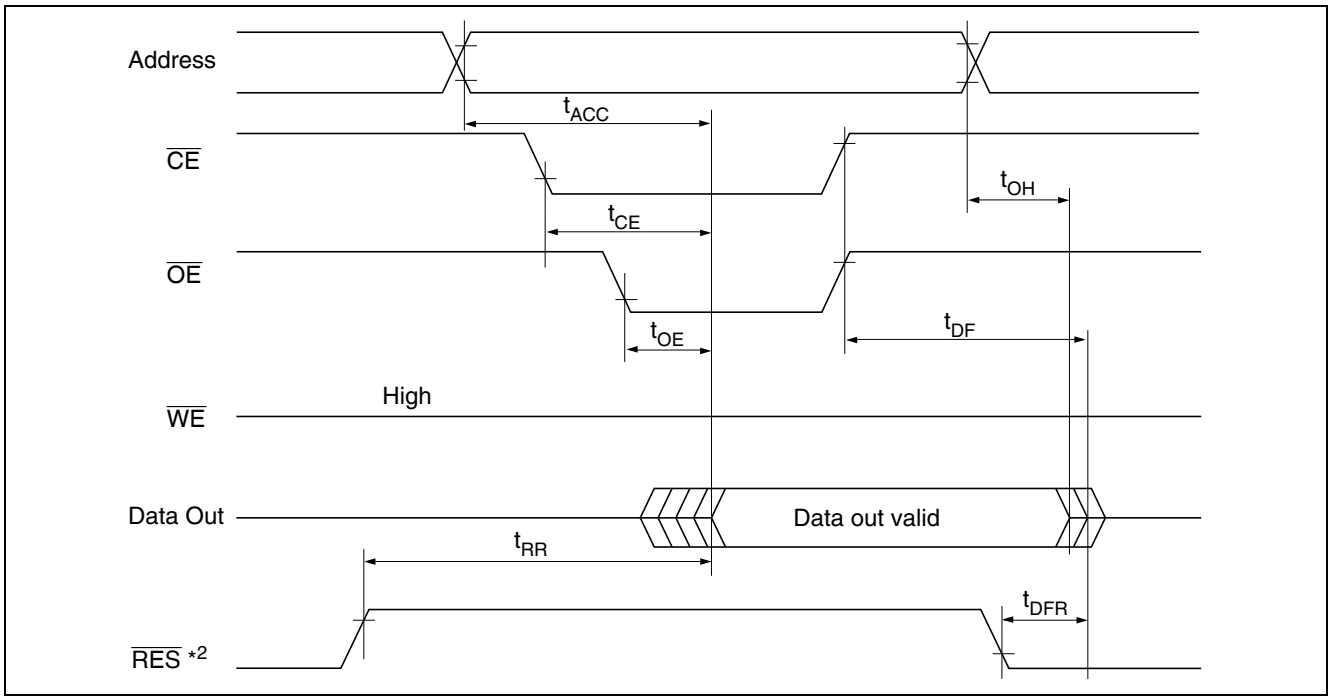
Write Cycle

Parameter	Symbol	Min*3	Typ	Max	Unit	Test conditions
Address setup time	t_{AS}	0	—	—	ns	
Address hold time	t_{AH}	50	—	—	ns	
$\overline{CE}$ to write setup time ($\overline{WE}$ controlled)	t_{CS}	0	—	—	ns	
$\overline{CE}$ hold time ($\overline{WE}$ controlled)	t_{CH}	0	—	—	ns	
$\overline{WE}$ to write setup time ($\overline{CE}$ controlled)	t_{WS}	0	—	—	ns	
$\overline{WE}$ hold time ($\overline{CE}$ controlled)	t_{WH}	0	—	—	ns	
$\overline{OE}$ to write setup time	t_{OES}	0	—	—	ns	
$\overline{OE}$ hold time	t_{OEH}	0	—	—	ns	
Data setup time	t_{DS}	70	—	—	ns	
Data hold time	t_{DH}	0	—	—	ns	
$\overline{WE}$ pulse width ($\overline{WE}$ controlled)	t_{WP}	0.200	—	30	µs	
$\overline{CE}$ pulse width ($\overline{CE}$ controlled)	t_{CW}	0.200	—	30	µs	
Data latch time	t_{DL}	100	—	—	ns	
Byte load cycle	t_{BLC}	0.3	—	30	µs	
Byte load window	t_{BL}	100	—	—	µs	
Write cycle time	t_{WC}	—	—	10*4	ms	
Time to device busy	t_{DB}	120	—	—	ns	
Write start time	t_{DW}	0*5	—	—	ns	
Reset protect time*2	t_{RP}	100	—	—	µs	
Reset high time*2, 6	t_{RES}	1	—	—	µs	

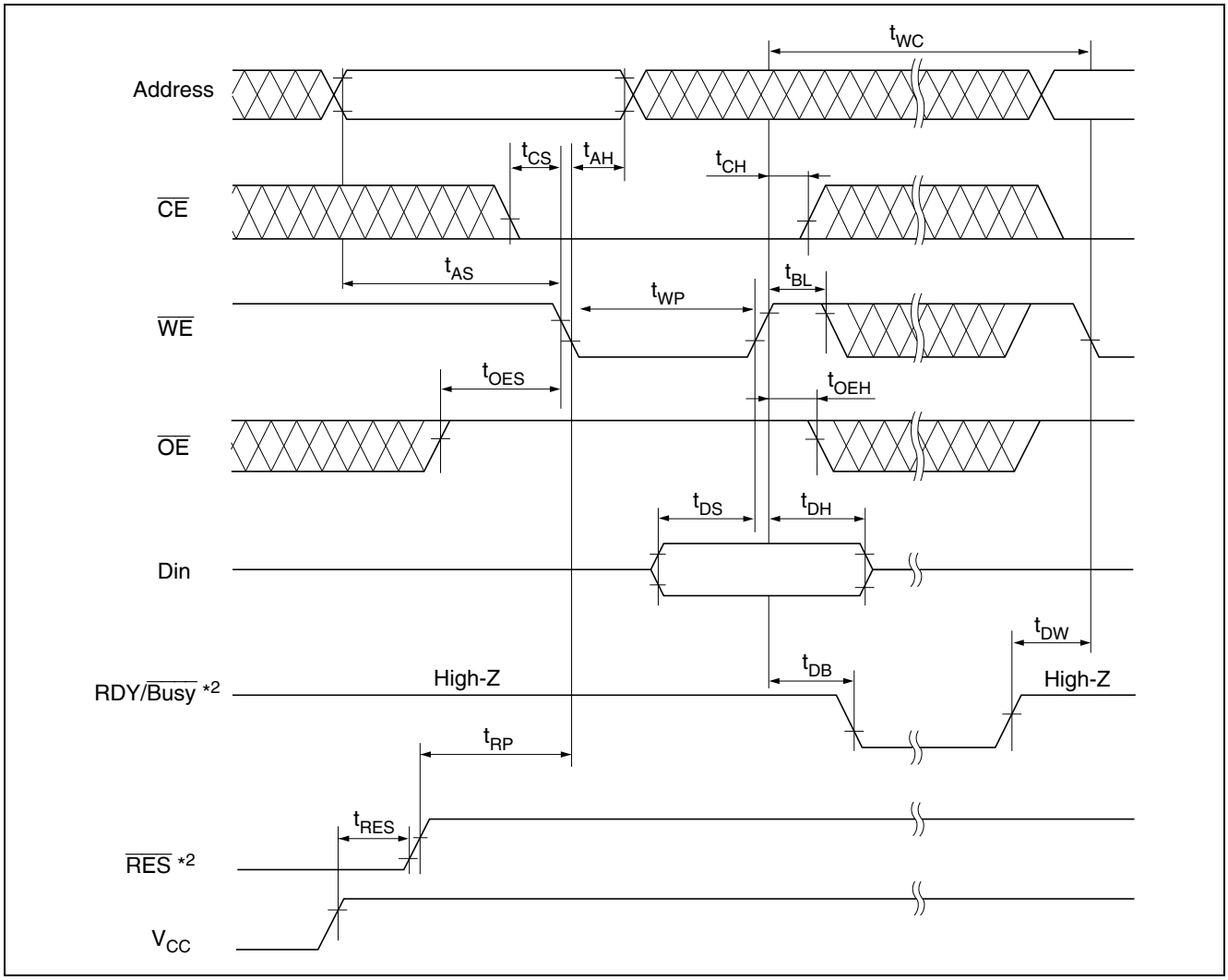
Notes: 1. t_{DF} and t_{DFR} are defined as the time at which the outputs achieve the open circuit conditions and are no longer driven.
2. This function is supported by only the R1EV58256BxxR series.
3. Use this device in longer cycle than this value.
4. t_{WC} must be longer than this value unless polling techniques or RDY/$\overline{Busy}$ (only the R1EV58256BxxR series) are used. This device automatically completes the internal write operation within this value.
5. Next read or write operation can be initiated after t_{DW} if polling techniques or RDY/$\overline{Busy}$ (only the R1EV58256BxxR series) are used.
6. This parameter is sampled and not 100% tested.
7. A6 through A14 are page addresses and these addresses are latched at the first falling edge of $\overline{WE}$.
8. A6 through A14 are page addresses and these addresses are latched at the first falling edge of $\overline{CE}$.
9. See AC read characteristics.

Timing Waveforms

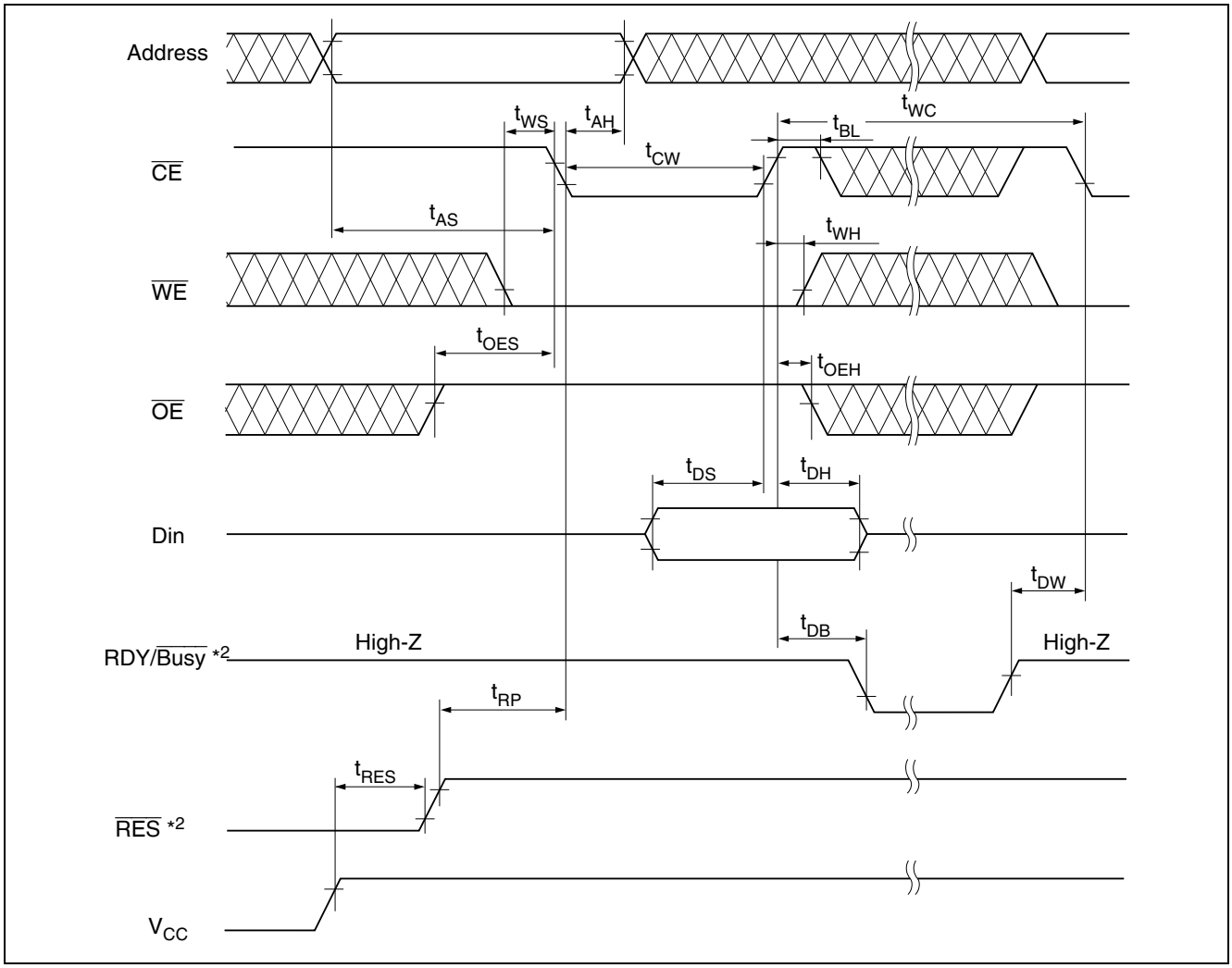
Read Timing Waveform



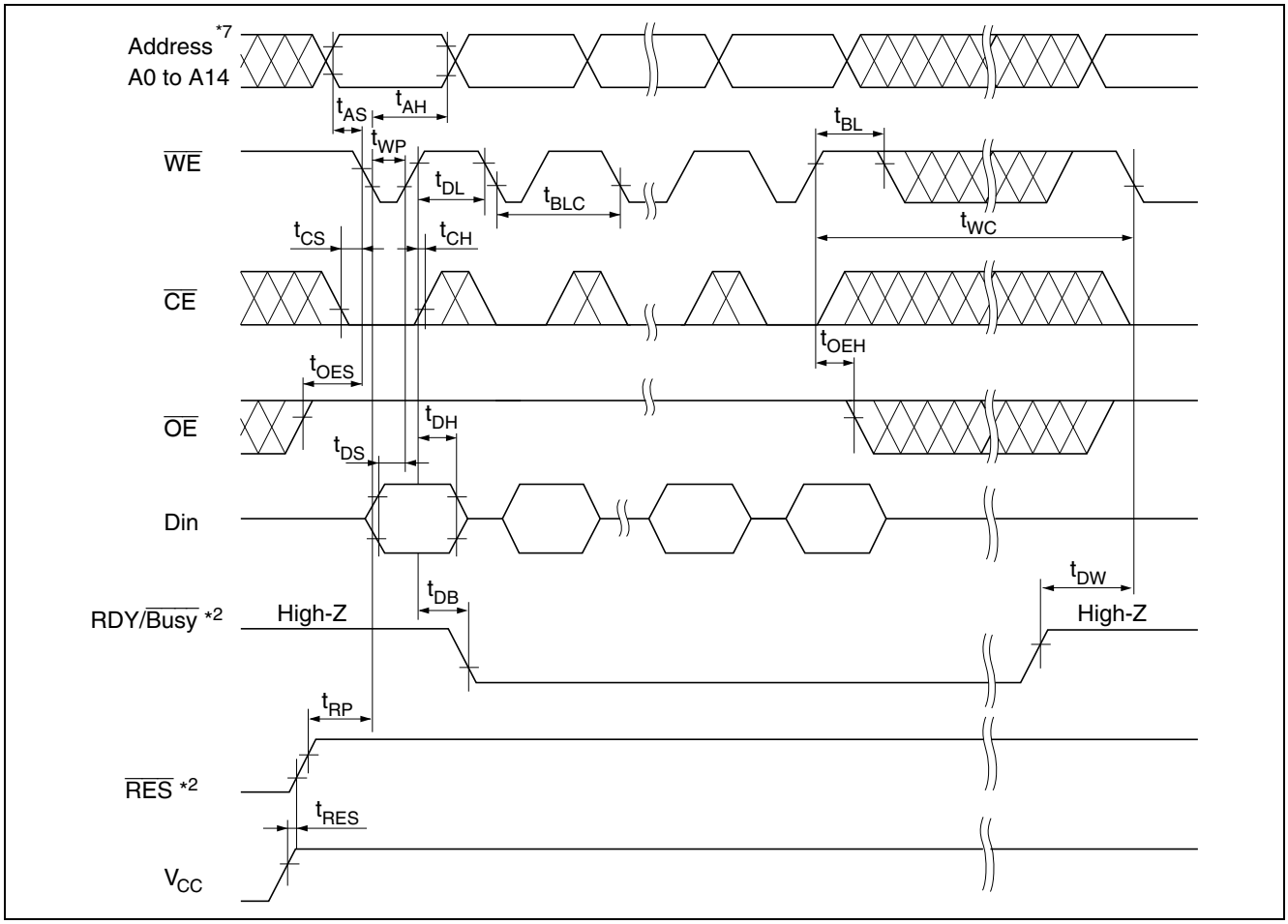
Byte Write Timing Waveform (1) ($\overline{WE}$ Controlled)



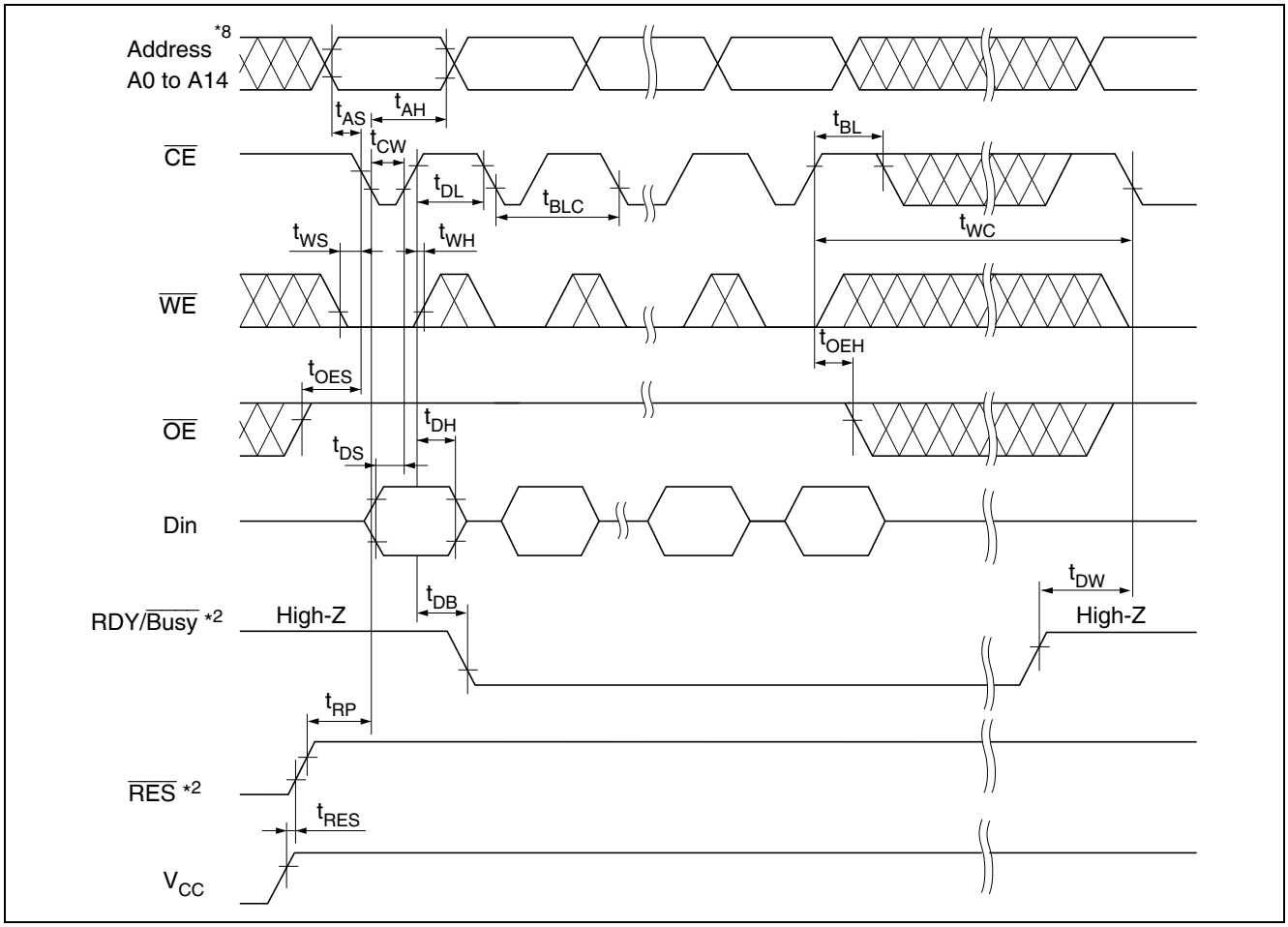
Byte Write Timing Waveform (2) ($\overline{CE}$ Controlled)



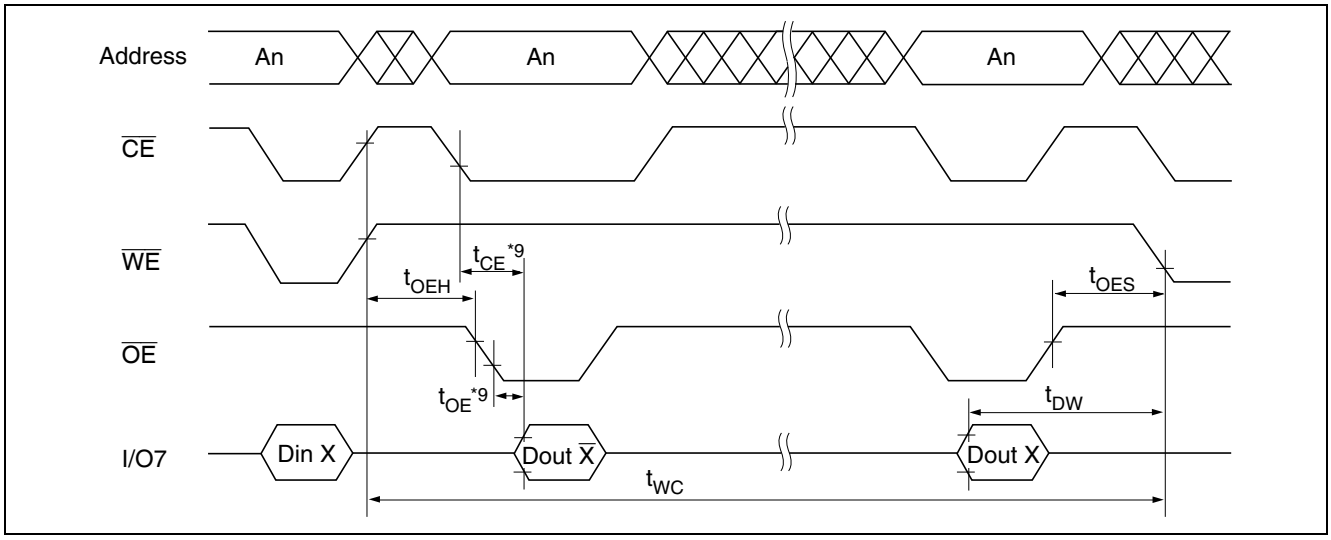
Page Write Timing Waveform (1) ($\overline{WE}$ Controlled)



Page Write Timing Waveform (2) ($\overline{CE}$ Controlled)



$\overline{\text{Data}}$ Polling Timing Waveform

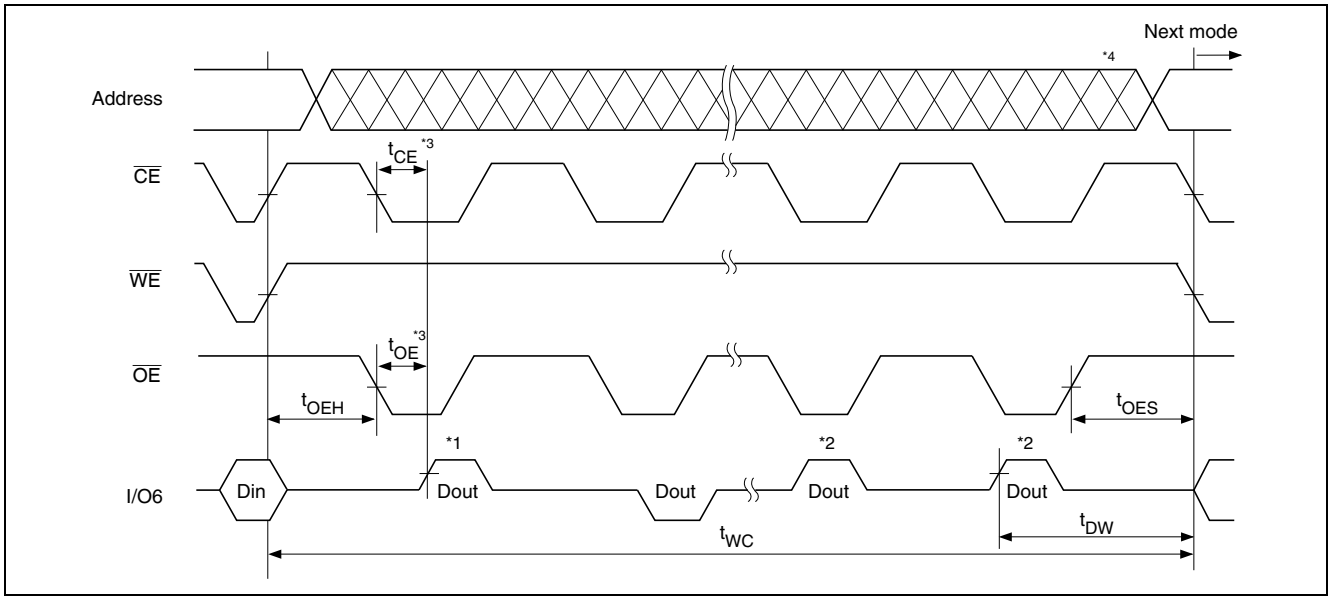


Toggle bit

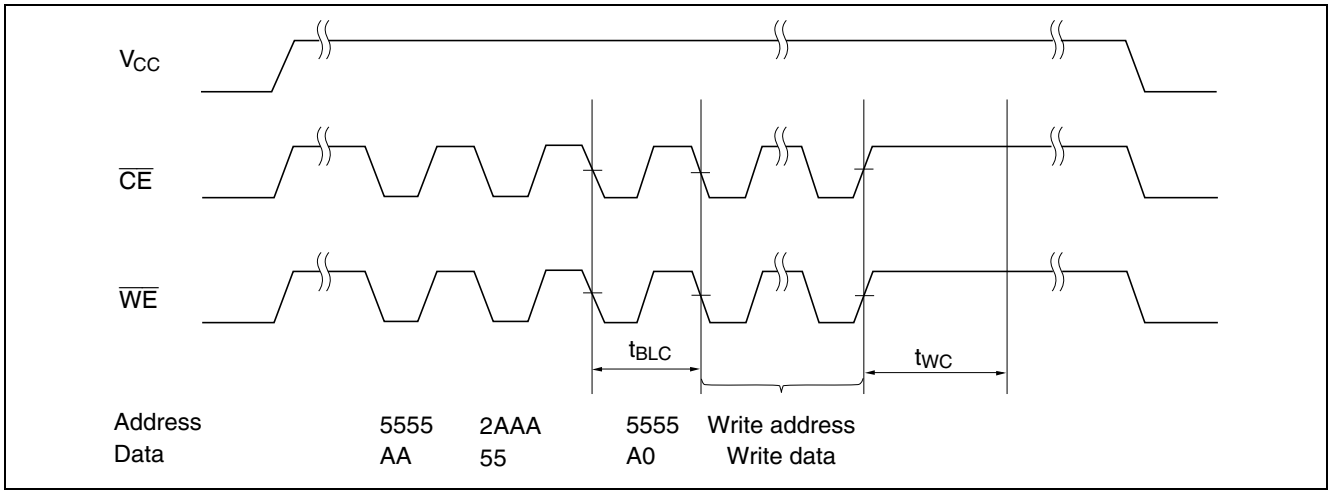
This device provide another function to determine the internal programming cycle. If the EEPROM is set to read mode during the internal programming cycle, I/O6 will charge from “1” to “0” (toggling) for each read. When the internal programming cycle is finished, toggling of I/O6 will stop and the device can be accessible for next read or program.

Toggle bit Waveform

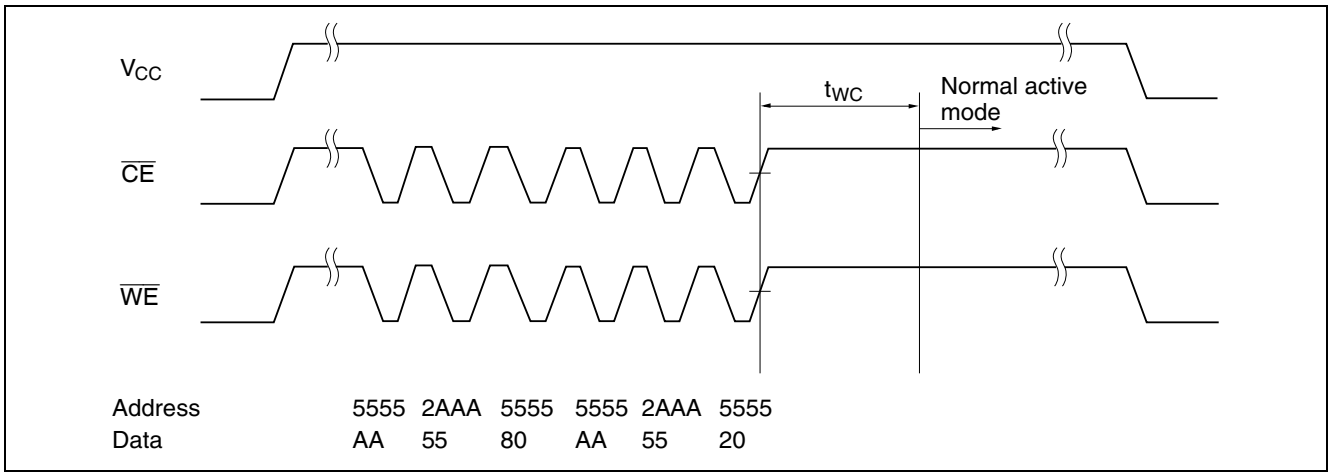
Notes: 1. I/O6 beginning state is “1”.
2. I/O6 ending state will vary.
3. See AC read characteristics.
4. Any address location can be used, but the address must be fixed.



Software Data Protection Timing Waveform (1) (in protection mode)



Software Data Protection Timing Waveform (2) (in non-protection mode)



Functional Description

Automatic Page Write

Page-mode write feature allows 1 to 64 bytes of data to be written into the EEPROM in a single write cycle. Following the initial byte cycle, an additional 1 to 63 bytes can be written in the same manner. Each additional byte load cycle must be started within 30 µs from the preceding falling edge of $\overline{WE}$ or $\overline{CE}$. When $\overline{CE}$ or $\overline{WE}$ is high for 100 µs after data input, the EEPROM enters write mode automatically and the input data are written into the EEPROM.

$\overline{Data}$ Polling

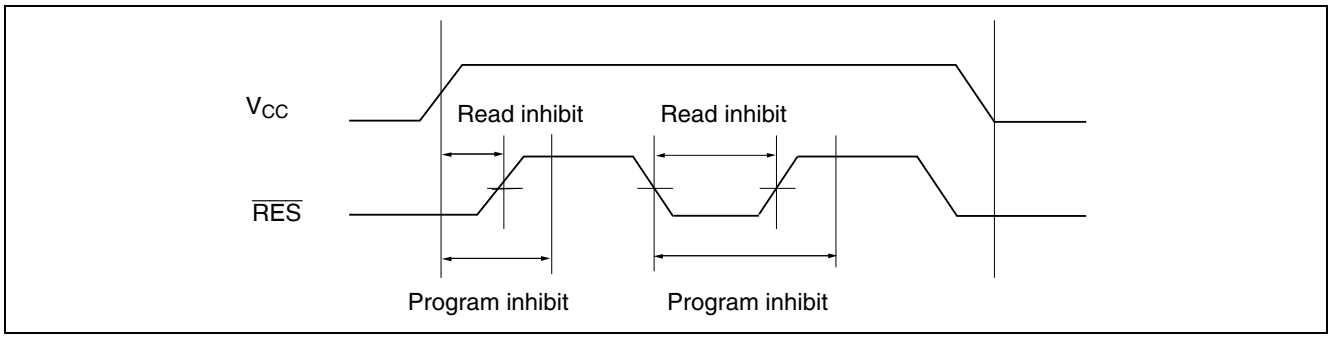
$\overline{Data}$ polling indicates the status that the EEPROM is in a write cycle or not. If EEPROM is set to read mode during a write cycle, an inversion of the last byte of data outputs from I/O7 to indicate that the EEPROM is performing a write operation.

RDY/$\overline{Busy}$ Signal (only the R1EV58256BxxR series)

RDY/$\overline{Busy}$ signal also allows the status of the EEPROM to be determined. The RDY/$\overline{Busy}$ signal has high impedance except in write cycle and is lowered to V_{OL} after the first write signal. At the end of a write cycle, the RDY/$\overline{Busy}$ signal changes state to high impedance.

$\overline{RES}$ Signal (only the R1EV58256BxxR series)

When $\overline{RES}$ is low, the EEPROM cannot be read or programmed. Therefore, data can be protected by keeping $\overline{RES}$ low when V_{CC} is switched. $\overline{RES}$ should be high during read and programming because it doesn't provide a latch function.



$\overline{WE}$, $\overline{CE}$ Pin Operation

During a write cycle, addresses are latched by the falling edge of $\overline{WE}$ or $\overline{CE}$, and data is latched by the rising edge of $\overline{WE}$ or $\overline{CE}$.

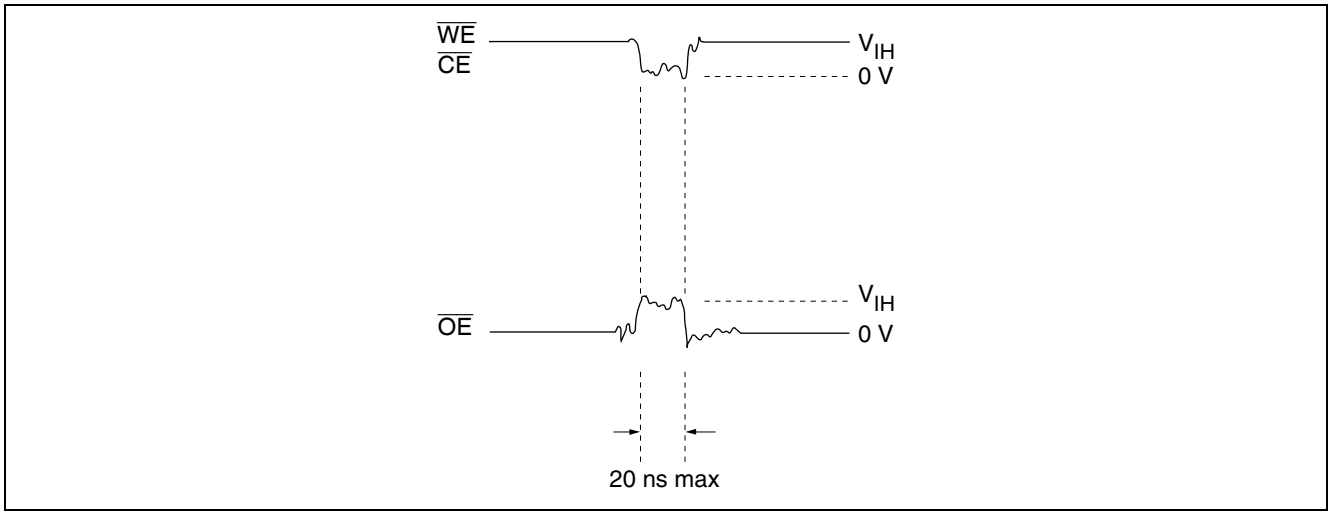
Write/Erase Endurance and Data Retention Time

The endurance is 10^5 cycles (1% cumulative failure rate). The data retention time is more than 10 years.

Data Protection

To prevent this phenomenon, this device has a noise cancellation function that cuts noise if its width is 20 ns or less.

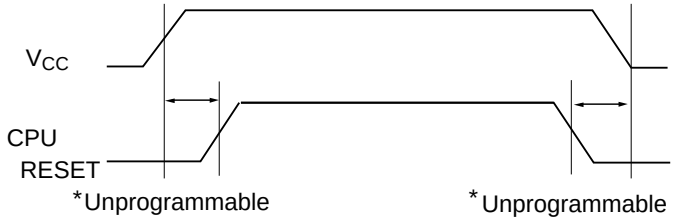
1. Data Protection against Noise on Control Pins ($\overline{CE}$, $\overline{OE}$, $\overline{WE}$) during Operation
   During readout or standby, noise on the control pins may act as a trigger and turn the EEPROM to programming mode by mistake. Be careful not to allow noise of a width of more than 20 ns on the control pins.



2. Data Protection at V_{CC} On/Off

When V_{CC} is turned on or off, noise on the control pins generated by external circuits (CPU, etc) may act as a trigger and turn the EEPROM to program mode by mistake. To prevent this unintentional programming, the EEPROM must be kept in an unprogrammable state while the CPU is in an unstable state.

Note: The EPROM should be kept in unprogrammable state during V_{CC} on/off by using CPU RESET signal.



2.1 Protection by $\overline{CE}$, $\overline{OE}$, $\overline{WE}$

To realize the unprogrammable state, the input level of control pins must be held as shown in the table below.

$\overline{CE}$	V_{CC}	×	×
$\overline{OE}$	×	V_{SS}	×
$\overline{WE}$	×	×	V_{CC}

×: Don't care.

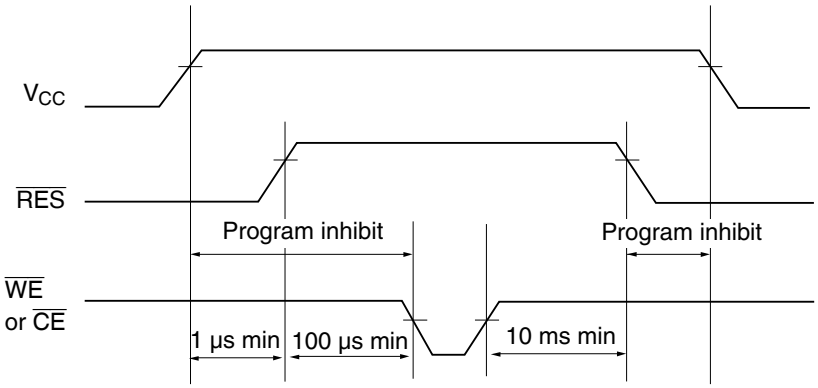
V_{CC}: Pull-up to V_{CC} level.

V_{SS}: Pull-down to V_{SS} level.

2.2 Protection by $\overline{RES}$ (only the R1EV58256BxxR series)

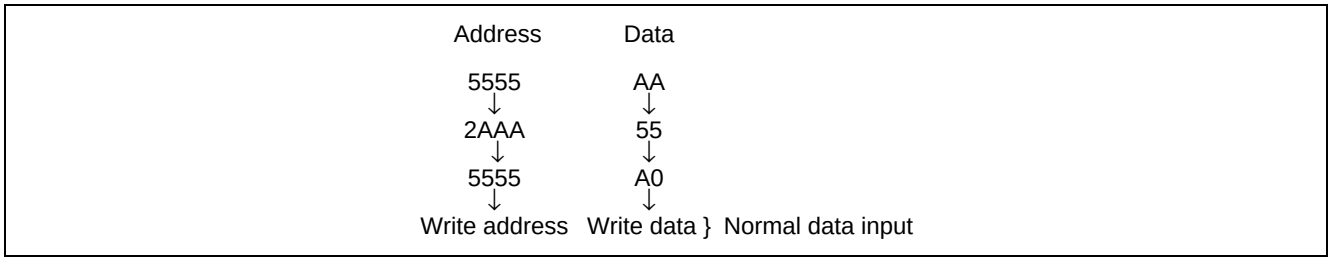
The unprogrammable state can be realized by that the CPU's reset signal inputs directly to the EEPROM's $\overline{RES}$ pin. $\overline{RES}$ should be kept V_{SS} level during V_{CC} on/off.

The EEPROM breaks off programming operation when $\overline{RES}$ becomes low, programming operation doesn't finish correctly in case that $\overline{RES}$ falls low during programming operation. $\overline{RES}$ should be kept high for 10 ms after the last data input.

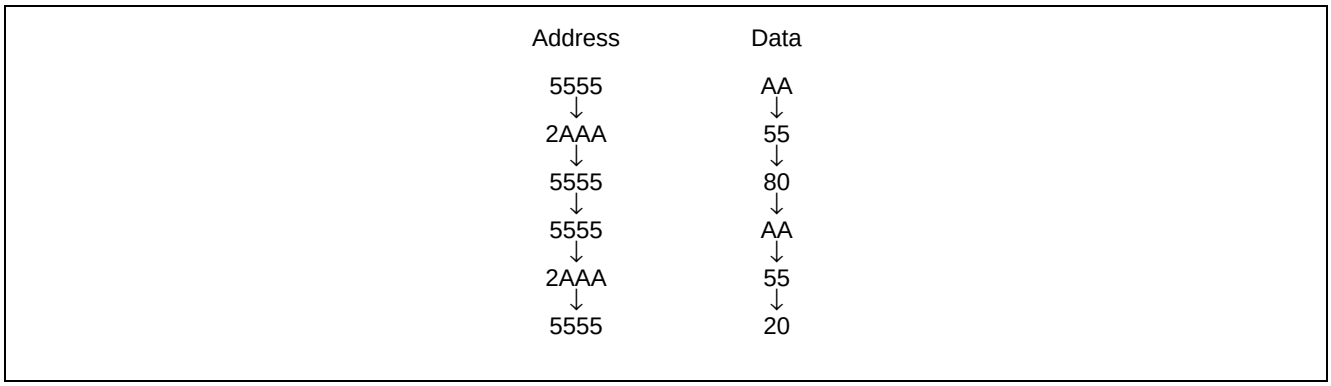


3. Software data protection

To prevent unintentional programming, this device has the software data protection (SDP) mode. The SDP is enabled by inputting the following 3 bytes code and write data. SDP is not enabled if only the 3 bytes code is input. To program data in the SDP enable mode, 3 bytes code must be input before write data.



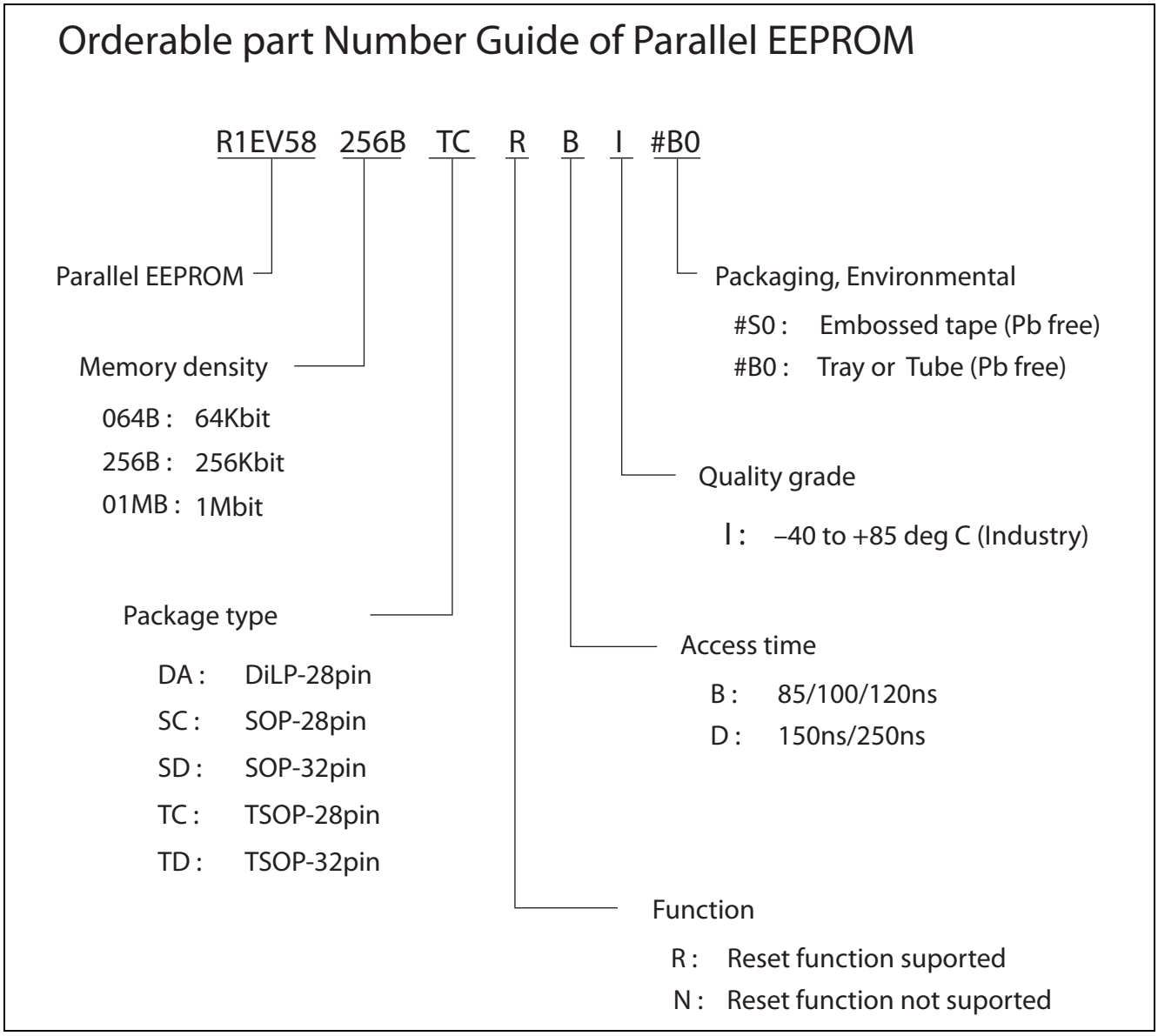
The SDP mode is disabled by inputting the following 6 bytes code. Note that, if data is input in the SDP disable cycle, data can not be written.



The software data protection is not enabled at the shipment.

Note: There are some differences between Renesas Electronics' and other company's for enable/disable sequence of software data protection. If there are any questions , please contact with Renesas Electronics' sales offices.

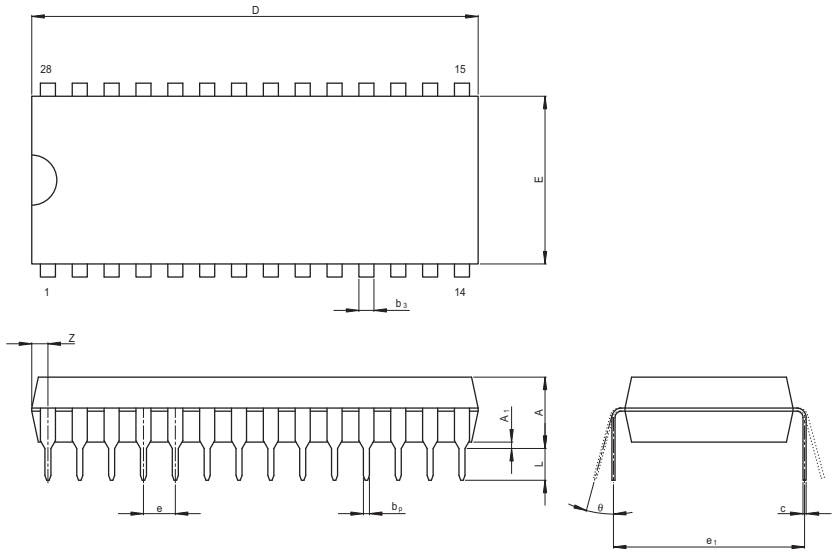
Orderable part Number Guide



Package Dimensions

R1EV58256BDA Series (PRDP0028AB-A / Previous Code:DP-28DV)

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-DIP28-13.4x35.6-2.54	PRDP0028AB-A	DP-28/DP-28V	4.6g

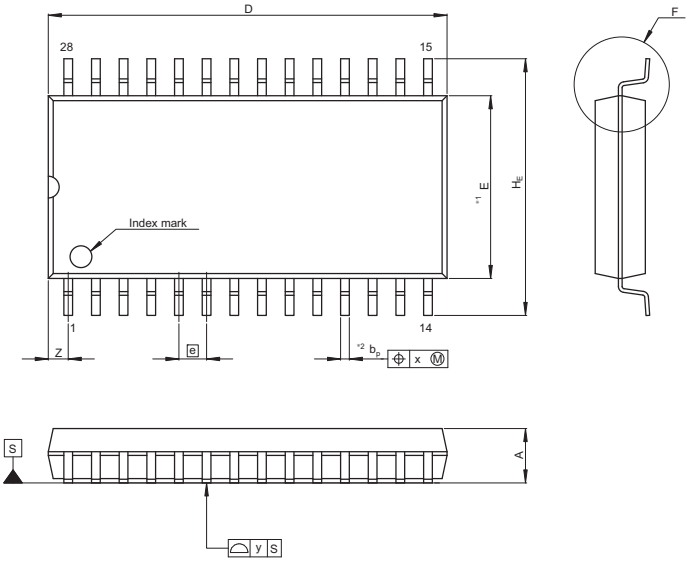


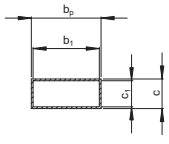
Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e_1	—	15.24	—
D	—	35.6	36.5
E	—	13.4	14.6
A	—	—	5.70
A_1	0.51	—	—
b_p	0.38	0.48	0.58
b_3	—	1.2	—
c	0.20	0.25	0.36
θ	0°	—	15°
e	2.29	2.54	2.79
Z	—	—	1.9
L	2.54	—	—

R1EV58256BSC Series (PRSP0028DC-A / Previous Code:FP-28DV)

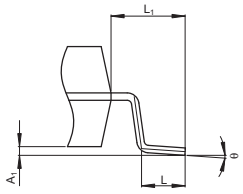
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP28-8.4x18.3-1.27	PRSP0028DC-A	FP-28D	0.7g

NOTE)
1. DIMENSION"*1"DOES NOT INCLUDE MOLD FLASH.
2. DIMENSION"*2"DOES NOT INCLUDE TRIM OFFSET.





Terminal cross section



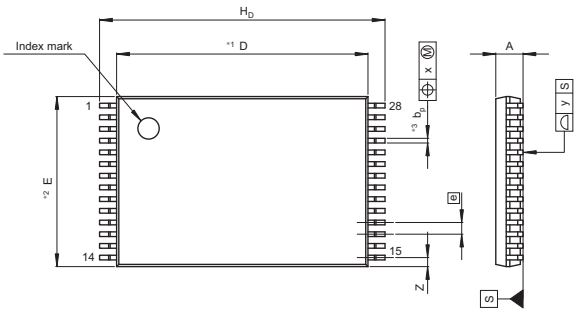
Detail F

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	18.3	18.8
E	—	8.4	—
A_2	—	—	—
A_1	0.10	0.20	0.30
A	—	—	2.50
b_p	0.32	0.40	0.48
b_1	—	0.38	—
c	0.12	0.17	0.22
c_1	—	0.15	—
θ	0°	—	8°
H_E	11.5	11.8	12.1
e	—	1.27	—
x	—	—	0.20
y	—	—	0.15
Z	—	—	1.12
L	0.8	1.0	1.2
L_1	—	1.7	—

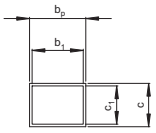
R1EV58256BTC Series (PTSA0028ZB-A / Previous Code : TFP-28DBV)

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-TSOP(1)28-8x11.8-0.55	PTSA0028ZB-A	TFP-28DB/TFP-28DBV	0.23g

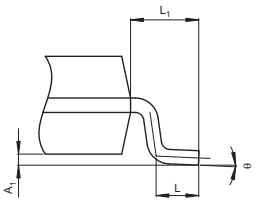
NOTE)
1. DIMENSION"*1"AND"*2(Nom)" DO NOT INCLUDE MOLD FLASH.
2. DIMENSION"*3"DOES NOT INCLUDE TRIM OFFSET.







Terminal cross section



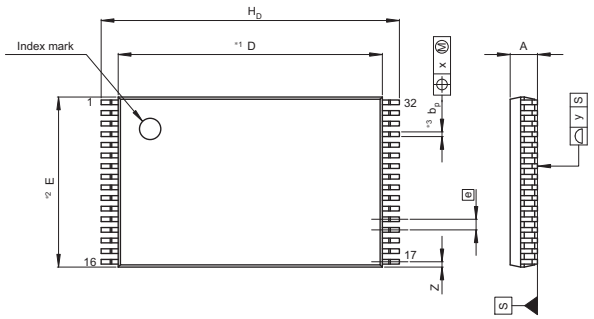
Detail F

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	11.80	—
E	—	8.00	8.20
A_2	—	—	—
A_1	0.05	0.13	0.20
A	—	—	1.20
b_p	0.14	0.22	0.30
b_1	—	0.20	—
c	0.12	0.17	0.22
c_1	—	0.15	—
θ	0°	—	5°
H_D	13.10	13.40	13.70
e	—	0.55	—
x	—	—	0.10
y	—	—	0.10
Z	—	—	0.45
L	0.40	0.50	0.60
L_1	—	0.80	—

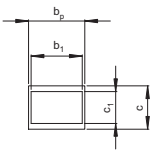
R1EV58256BTD Series (PTSA0032KD-A / Previous Code: TFP-32DAV)

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-TSOP(1)32-8x12.4-0.50	PTSA0032KD-A	TFP-32DA/TFP-32DAV	0.26g

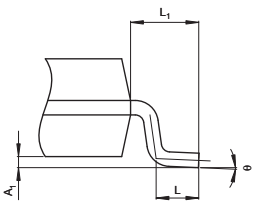
NOTE)
1. DIMENSION"*1"AND"*2(Nom)" DO NOT INCLUDE MOLD FLASH.
2. DIMENSION"*3"DOES NOT INCLUDE TRIM OFFSET.







Terminal cross section



Detail F

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	12.40	—
E	—	8.00	8.20
A_2	—	—	—
A_1	0.08	0.13	0.18
A	—	—	1.20
b_p	0.14	0.22	0.30
b_1	—	0.20	—
c	0.12	0.17	0.22
c_1	—	0.125	—
θ	0	—	5
H_D	13.80	14.00	14.20
e	—	0.50	—
x	—	—	0.08
y	—	—	0.10
Z	—	—	0.45
L	0.40	0.50	0.60
L_1	—	0.80	—

Revision History	R1EV58256BxxNSeries/R1EV58256BxxRSeries Data Sheet

Rev.	Date	Description	
		Page	Summary
0.01	Oct 17, 2013	—	Initial issue
0.02	Oct 18, 2013	2	Ordering Information: Addition of 85ns and 120ns for Access time.
		5	AC Characteristics: Deletion of 100ns spec for Read Cycle.
		21	Orderable part Number Guide: Deletion of A and C for access time.
0.03	Nov 05, 2013	4	Recommended DC Operating Conditions: Change V_{IL}(max) = 0.6V to 0.8V. Note 2: V_{CC} = 3.6 to 5.5 V is 2.4 V → V_{CC} = 3.6 to 5.5 V is 2.2 V
1.00	Jun 09, 2014	—	Delete preliminary
2.00	May 12, 2016	4	DC Operating Conditions: Addition of Note 5.
		6	AC Characteristics: Addition of Max. 30us for $\overline{WE}$ pulse width (tWP) AC Characteristics: Addition of Max. 30us for $\overline{CE}$ pulse width (tCW)
		8	AC Characteristics: Addition of Max. 30us for $\overline{WE}$ pulse width (tWP) AC Characteristics: Addition of Max. 30us for $\overline{CE}$ pulse width (tCW)
2.01	Apr. 01,2020	2	Revised ordering Information
		5	Operating VCC current: Change “Cycle = 1 ns” to “Cycle = 1 μs”, “Cycle = 120μs” to “Cycle = 120ns”
		Last page	Updated the Notice to the latest version

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