Pin	Name	Type	Description
1	NC	-	
2	E1	Input	
3	E2	Input	
4	GND	Ground	
5	SDA	I/O	/
6	SCL	Input	
7	WCB	Input	
8	VCC	Power	

/ See Marking Instructions

Parameter	Symbol	Rating	Unit
Storage Temperature	T_{stg}	-65~+150	
Operation Temperature	T_{opr}	-40~+85	
Maximum Operation Voltage	V_{cc}	6.25	V
Voltage on Any Pin with Respect to Ground	V_{pin}	-1.0~ Vcc+1.0	V
DC Output Current	I_{out}	5.0	
Electro-Static discharge HBM mode	ESD	6000	

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Endurance	EDR	25 3.3V Page mode	1,000,000			Write cycles
Data retention	DRET		100			Years

Parameter Symbol

Parameter	Symbol	1.7V≤Vcc<2.5V			2.5V≤Vcc≤5.5V			Unit
		Min	Typ	Max	Min	Typ	Max	
Data In Hold Time	$t_{HD.DAT}$	0	-	-	0	-	-	us
Data In Setup Time	t							

SDA SDA SCL (1) SCL
SDA (1)

The SDA pin is normally pulled high with an external device. Data on the SDA pin may change only during SCL low time periods (see to Figure 1). Data changes during SCL high periods will indicate a start or stop condition as defined below.

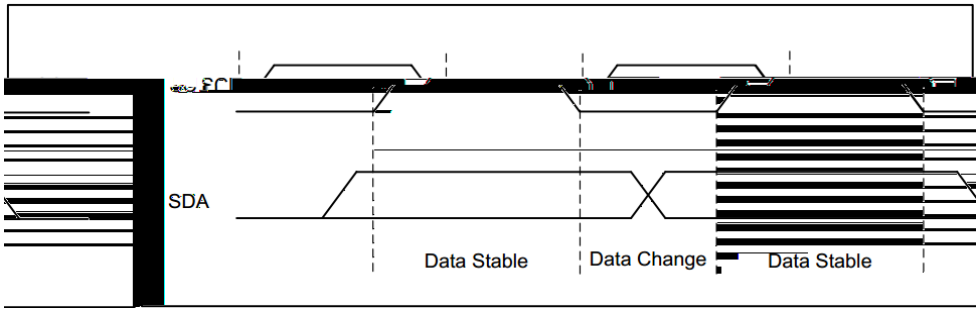


Figure 1 Data Validity

SCL SDA
2

A high-to-low transition of SDA with SCL high is a start condition which must precede any other command (see to Figure 2).

SCL SDA
BRCM24C04SC

A low-to-high transition of SDA with SCL high is a stop condition. After a read sequence, the stop command will place the BRCM24C04SC in a standby power mode (see Figure 2).

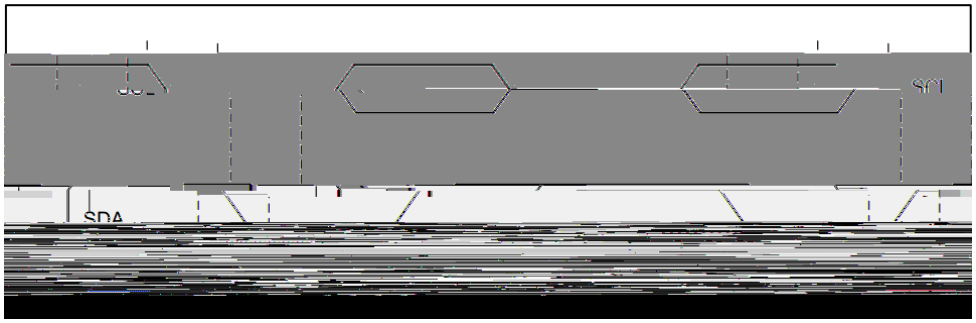


Figure 2 Start and Stop Definition

BRCM24C04SC BRCM24C04SC “ 0 ”
ACK 9

All addresses and data words are serially transmitted to and from the BRC M24C04SC in 8-bit words.

Chip	Access area	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

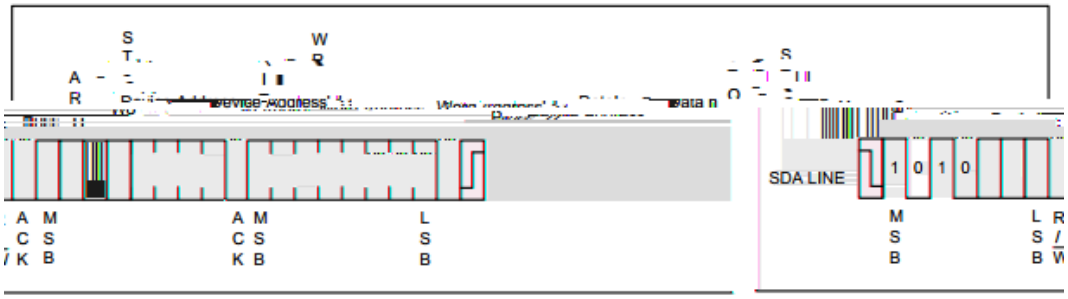


Figure 5 Byte Write

BRCM24C04SC BRCM24C04SC

“ 0 ”

A page write is initiated the same as a byte write, but the master does not send a stop condition after the first data word is clocked in. Instead, after the BRCM24C04SC acknowledges receipt of the first data word, the master can transmit more data words. The BRCM24C04SC will respond with a “0” after each data word received. The microcontroller must terminate the page write sequence with a stop condition.

Figure 6 Page Write

4

BRCM24C04SC 16

BRCM24C04SC

/ BRCM24C04SC

“ 0 ”

Once the internally timed write cycle has started and the BRCM24C04SC inputs are disabled, acknowledge polling can be initiated. This involves sending a start condition followed by the device address word. The read/write bit is representative of the operation desired. Only if the internal write cycle has completed will the BRCM24C04SC respond with a “0”, allowing the read or write sequence to continue.

16

(a) 1011b

(b) A5 / A4 0 1 A7 / A6 “ 00 ”

(c) A3 / A0

NoACK

The Identification Page (16 bytes) is an additional page which can be written and (later) permanently locked in Read-only mode. It is written by the Write Identification Page instruction. This instruction uses the same protocol and format as Page Write (into memory array), except for the following differences:

(a)Device type identifier = 1011b.

(b)Address bits A5/A4 are don’t care while address bit A7/A6 which must be ‘00’.

(c)Address bits A3/A0 define the byte address inside the Identification page. If the Identification page is locked, the data bytes transferred during the Write Identification Page instruction are not acknowledged (NoACK).

ID Lock ID

(a) 1011b;

(b) A6 1 ;

(c) xxxx xx1x x 0 1

The Lock Identification Page instruction (Lock ID) permanently locks the Identification page in Read-only mode. The Lock ID instruction is similar to Byte Write (into memory array) with the following specific conditions:

(a)Device type identifier = 1011b.

(b)Address bit A6 must be ‘1’ all other address bits are don’t care.

(c)The data byte must be equal to the binary value xxxx xx1x, where x is don’t care.

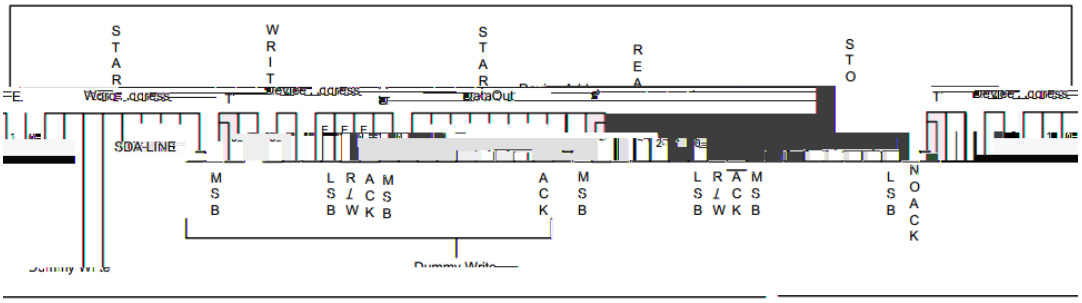


Figure 8 Random Address Read

BRCM24C04SC

“ 0 ”

9

Sequential Reads are initiated by either a Current Address Read or a Random Address Read. After the microcontroller receives a data word, it responds with acknowledge. As long as the BRCM24C04SC receives acknowledge, it will continue to increment the data word address and serially clock out sequential data words. When the memory address limit is reached, the data word address will roll-over and the Sequential Read will continue. The Sequential Read operation is terminated when the microcontroller does not respond with a “0” but does generate a following stop condition (see Figure 9).

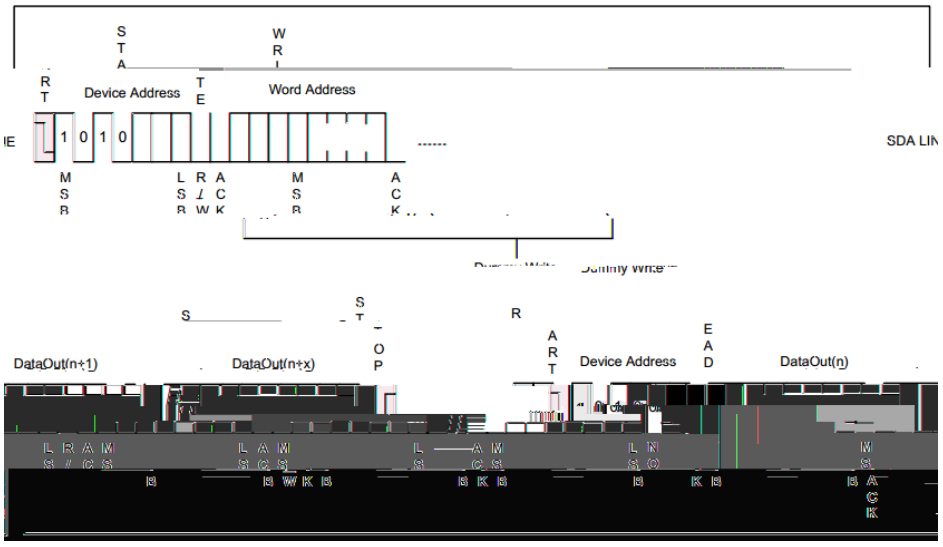


Figure 9 Sequential Read

16

1011b A7 / A6 0 A5 A4 / A0 ID
10d 6 ID

16

The Identification Page (16 bytes) is an additional page which can be written and (later) permanently locked in Read-only mode. The Identification Page can be read by Read Identification Page instruction which uses the same protocol and format as the Read Command (from memory array) with device type identifier defined as 1011b. The MSB address bits A7/A6 must be 0 while A5 is don't care, and the LSB address bits A4/A0 define the byte address inside the Identification Page. The number of bytes to read in the ID page must not exceed the page boundary (e.g. when reading the Identification Page from location 10d, the number of bytes should be less than or equal to 6, as the ID page boundary is 16 bytes).

[+] /
ACK NoACK,(10)

The locked/unlocked status of the Identification page can be checked by transmitting a specific truncated command [Identification Page Write instruction + one data byte] to the device. The device returns an acknowledge bit if the Identification page is unlocked, otherwise a NoACK bit if the Identification page is locked (see Figure 10).

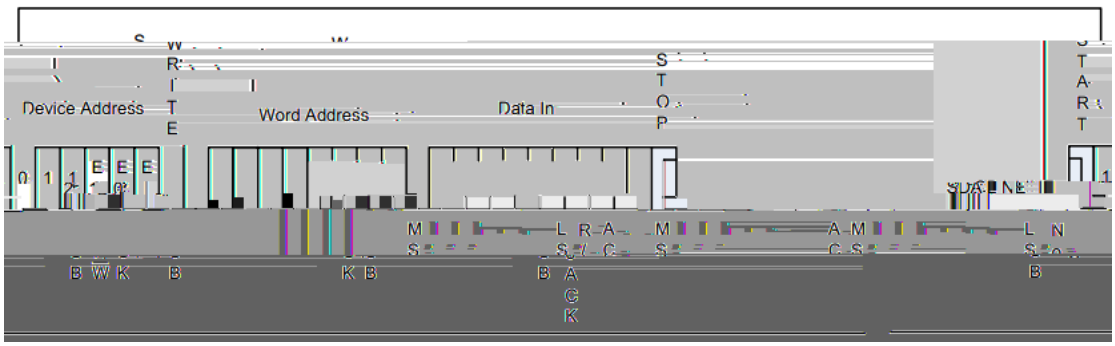


Figure 10 Lock Status Read (When Identification page locked, return NoACK after one data byte)

16

1

128

EEPROM “ ”

EEPROM

1

A7 A6 “ 10 ” 2 “ 10 ”

80h

128 16

128 ACK

7

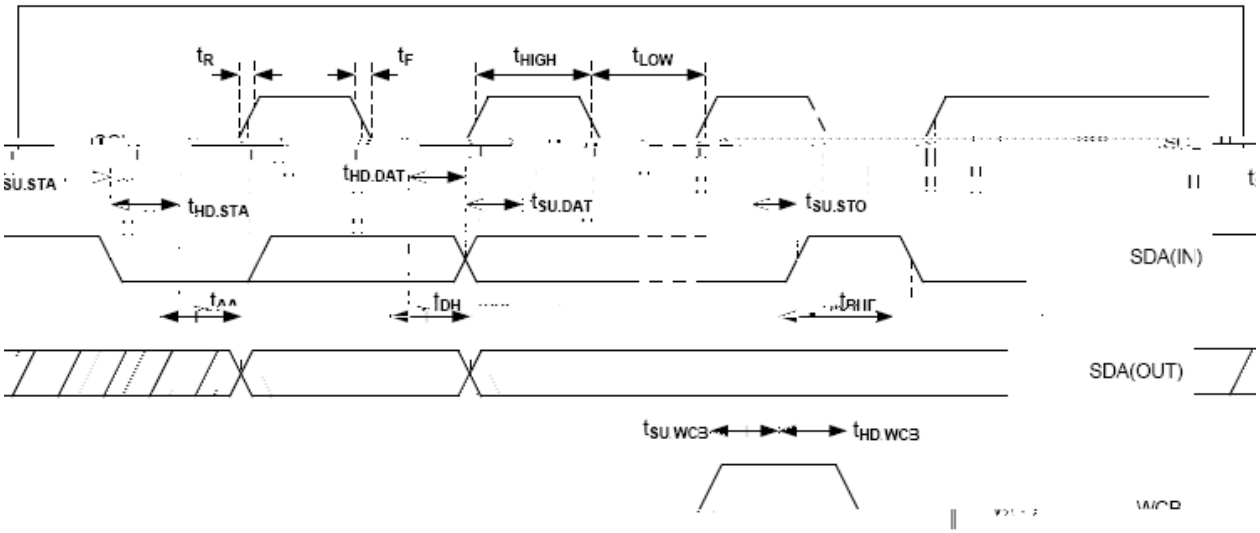
The Identification Page (16 bytes) is an additional page which can be written and (later) permanently locked in Read-only mode.

Reading the serial number is similar to the sequential read sequence but requires use of the device address seen in Table 1 on page 9, a dummy write, and the use of a specific word address. The entire 128-bit value must be read from the starting address of the serial number block to guarantee a unique number.

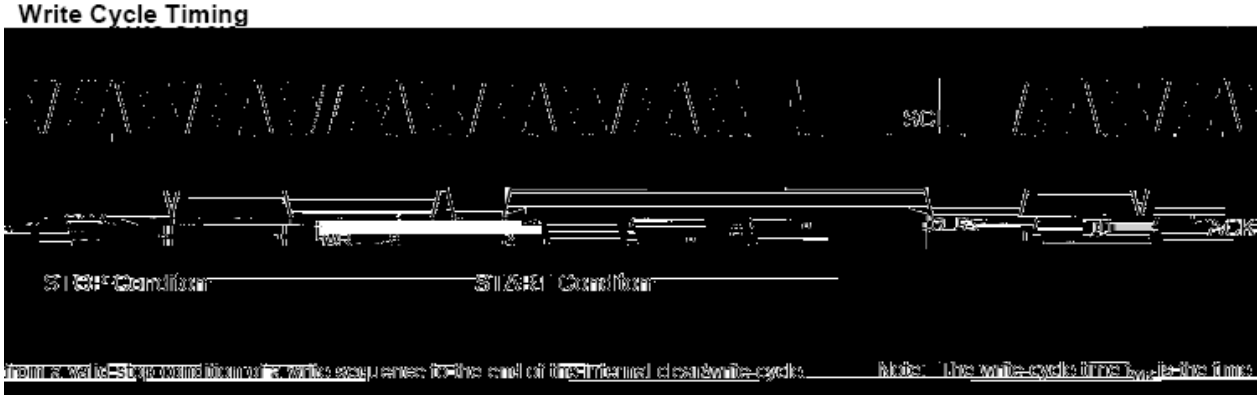
Since the address pointer of the device is shared between the regular EEPROM array and the serial number block, a dummy write sequence, as part of a Random Read or Sequential Read protocol, should be performed to ensure the address pointer is set to zero. A Current Address Read of the serial number block is supported but if the previous operation was to the EEPROM array, the address pointer will retain the last location accessed, incremented by one. Reading the serial number from a location other than the first address of the block will not result in a unique serial number.

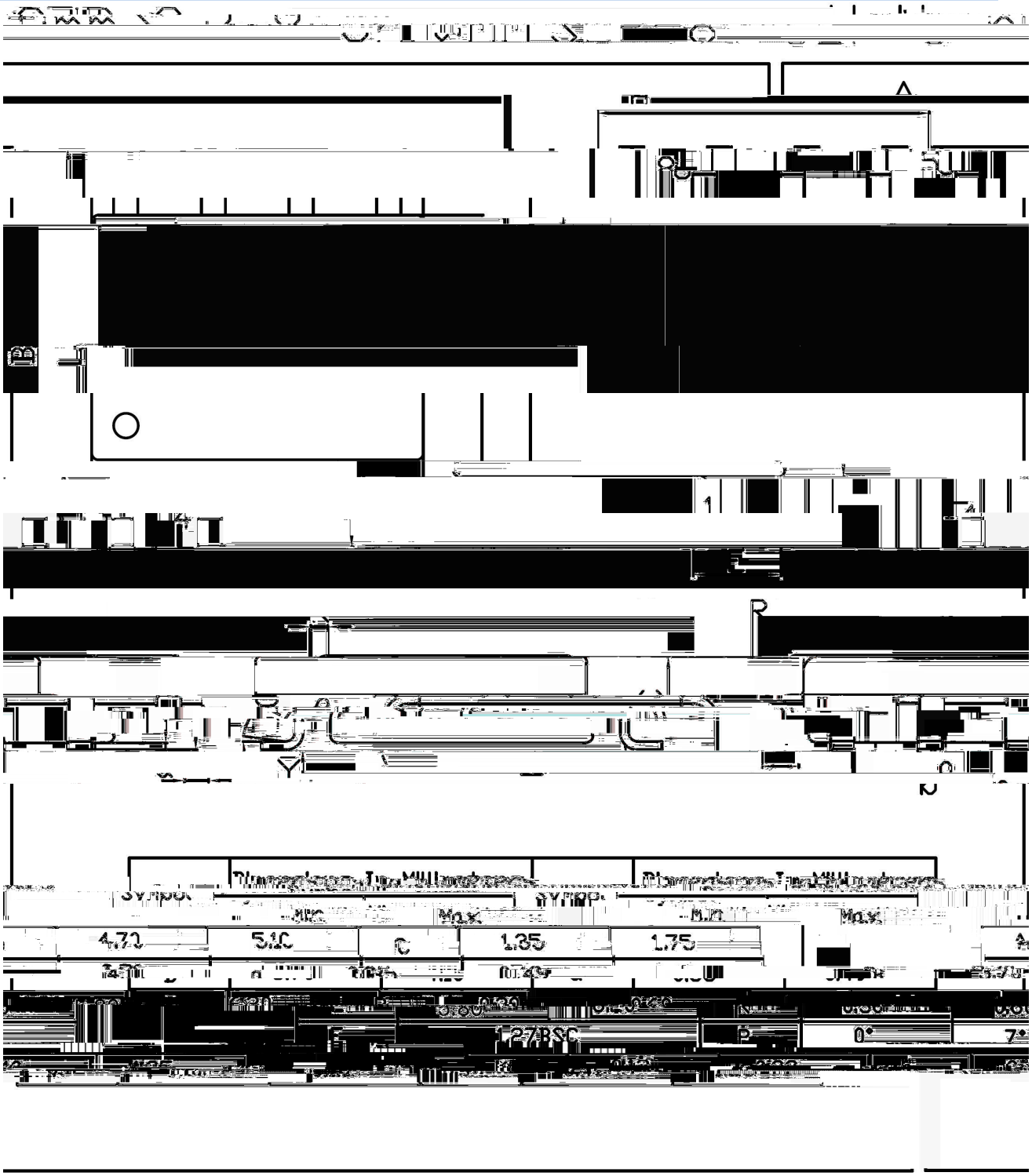
Additionally, the word address contains a „10□ sequence in bit A7 and A6 of the word address,

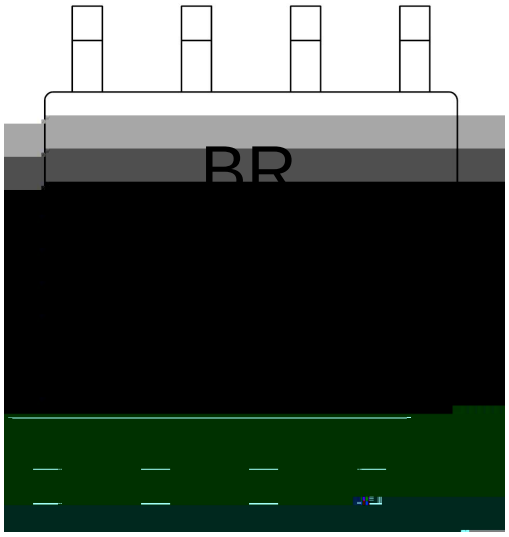
Bus Timing



Write Cycle Timing




4.71
5.10
1.35
1.75
1.27BSC
0°



BR

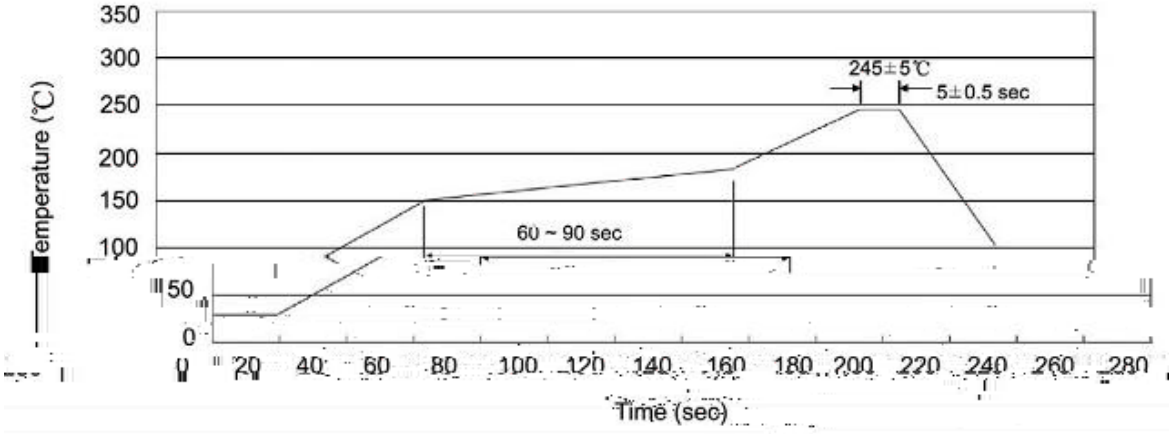
24C04

****

Note:

BR:	Company Code.
24C04:	Product Type.
****:	Lot No. Code, code change with Lot No.

Temperature Profile for IR Reflow Soldering(Pb-Free)



Note:

1 150 180 60 90sec;

2 245±5 5±0.5sec;

3 2 10 /sec.

1.Preheating:150~180 , Time:60~90sec.

2.Peak Temp.:245±5 , Duration:5±0.5sec.

3. Cooling Speed: 2~10 /sec.

`Y

[redacted] Temp.:260±5 Time:10±1 sec

/ REEL

Package Type	Units					Dimension (unit mm^3)		
	Units/Reel /	Reels/Inner Box /	Units/Inner Box /	Inner Boxes/Outer Box /	Units/Outer Box /	Reel	Inner Box	Outer Box
SOP/ESOP-8	4,000	2	8,000	6	48,000	13 ×12	360×360×50	380×335×366×12