OKI Semiconductor

MSM6684B

4,194,304-word x 1-bit Serial Register

GENERAL DESCRIPTION

MSM6684B is a serial register organized as 4,194,304 words x one bit, characterized by medium-speed, low power consumption operation.

This device has a built-in internal address generation circuit allowing continuous serial read/write operation by external clock input.

Read/write operation causes the internal address to be incremented automatically by +1.

External address input enables addressing in units of 1024 words. Furthermore, a refresh timer and a refresh address counter are installed, which makes an external refresh circuit unnecessary. In addition, this configuration allows lower power consumption.

The device is packaged in 26/20-pin SOJ having a width of 300 mil.

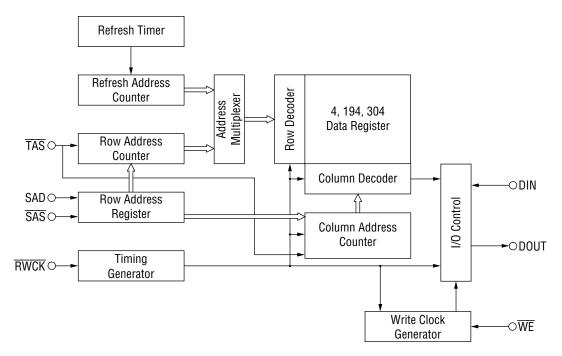
It is well adapted for storing much data by means of a battery backup. Its combination with our recording and playback LSI enables the easy implementation of a solid recording and playback system.

FEATURES

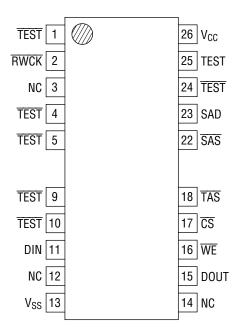
- Configuration 4,194,304 x 1 bit
- Serial access operation Serial access time : 1.5 μs Serial read/write time : 2.5 μs
- Low current drain 150 μ A max. (V_{CC} = 4 V with data stored and under standard conditions)
- Refresh operation A self-refresh function is supported.
- Wide operation voltage range Single 3.5 to 5.5 V
- Addressing Units of 1024 words
- Process
 - $0.45\,\mu m$ double well CMOS process
- Package :

26/20-pin plastic SOJ (SOJ26/20-P-300-1.27) (Product name : MSM6684BJS)

BLOCK DIAGRAM



PIN CONFIGURATION (TOP VIEW)



NC : No connection

26/20-pin plastic SOJ

PIN DESCRIPTION

Pin	Symbol	Description		
25	TEST	Test input		
1, 4, 5, 9, 10, 24	TEST	Test input		
2	RWCK	Read/write clock		
11	DIN	Data input		
13	V _{SS}	Ground (0 V)		
15	DOUT	Data output		
16	WE	Write enable		
17	CS	Chip select		
18	TAS	Transfer address strobe		
22	SAS	Serial address strobe		
23	SAD	Serial address data		
26	V _{CC}	Power supply (5 V)		

Note : All TEST pins are to be connected to the power supply. The TEST pin is to be referenced to the ground level.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Condition	Rating	Unit
Pin Voltage	VT	Against V_{SS} at Ta = 25 °C	-1.0 to +7.0	V
Output Short-Circuit Current	los	Ta = 25 °C	50	mA
Power Dissipation	PD	Ta = 25 °C	1	W
Operating Temperature	T _{op}	—	0 to 70	°C
Storage Temperature	T _{STG}	_	-55 to +150	°C

RECOMMENDED OPERATING CONDITIONS

					(Ta=0 to 70°C)
Parameter	Symbol	Min.	Тур.	Max.	Unit
Supply Voltage	V _{CC}	3.5	4.5	5.5	V
Supply Voltage	V _{SS}	0	0	0	V
"H" Input Voltage	V _{IH}	$V_{CC} - 0.5$	V _{CC}	V _{CC} + 0.2	V
"L" Input Voltage	V _{IL}	-0.2	0	+0.5	V

ELECTRICAL CHARACTERISTICS

DC characteristics

(V_{CC}=3.5 V to 5.5 V, Ta=0 to 70°C)

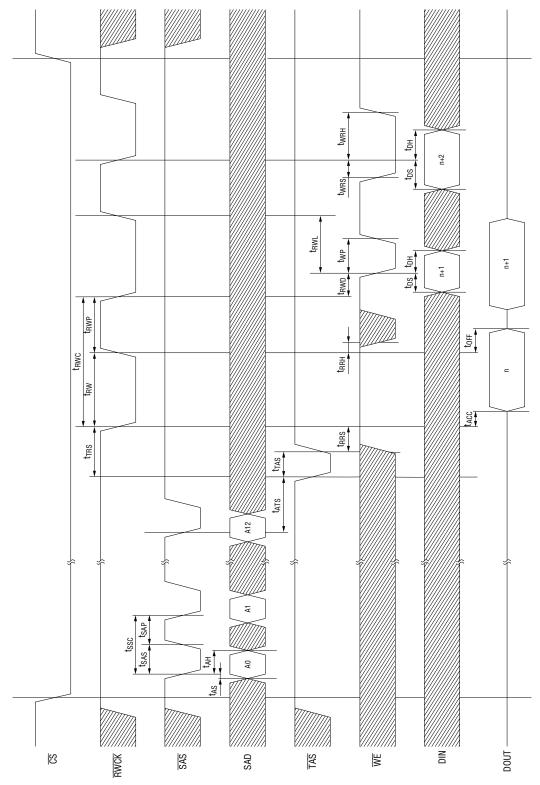
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Parameter	Symbol	Condition	Min.	Max.	Unit
"H" Output Voltage	V _{OH}	I _{OH} =–0.5 mA	V _{CC} – 0.5	_	V
"L" Output Voltage	V _{OL}	I _{OL} =0.5 mA	—	0.4	V
Input Leakage Current	IIL	V _I =0 V to V _{CC}	-1	+1	μA
Output Leakage Current	I _{OL}	V ₀ =0 V to V _{CC}	-1	+1	μA
Supply Current (Operation)	I _{CC1}	V _{CC} =4 V, t _{RWC} =1 µs	_	20	mA
Supply Current (Standby)	I _{CC2}	V _{CC} =4 V	—	150	μA

AC characteristics

Parameter	Symbol	Min.	Max.	Units
Read/Write Cycle Time	t _{RWC}	2,500	_	ns
Access Time	t _{ACC}	—	1,500	ns
Output Turn-off Delay Time	toff	0	50	ns
I/O Signal Rise Time	tT	3	50	ns
RWCK Pre-charge Time	t _{RWP}	1,000	_	ns
RWCK Pulse Time	t _{RW}	1,500	10,000	ns
SAS Cycle Time	tssc	100	_	ns
SAS Pre-charge Time	t _{SAP}	50	_	ns
SAS Pulse Width	t _{SAS}	50	_	ns
Address Setup Time	t _{AS}	0	_	ns
Adress Hold Time	t _{AH}	50	_	ns
TAS Setup Time	t _{ATS}	50	_	ns
TAS . RWCK Setup Time	t _{TRS}	50	_	ns
TAS Pulse Width	t _{TAS}	50	_	ns
Read Instruction Setup Time	t _{RRS}	0		ns
Read Instruction Hold Time	t _{RRH}	250	_	ns
Write Instruction Setup Time	twrs	0	_	ns
Write Instruction Hold Time	t _{WRH}	50	_	ns
Write Instruction Pulse Width	t _{WP}	50	_	ns
WE. RWCK Read Time	t _{RWL}	50	_	ns
Data Setup Time	t _{DS}	0	—	ns
Data Hold Time	t _{DH}	50	—	ns
RWCK. WE Delay Time	t _{RWD}	50	_	ns

TIMING DIAGRAM

Read/write and read/modify/write cycles



PIN FUNCTIONS AND OPERATING MODES

• Serial address input (SAD)

Pin used to enter start address for reading/writing. An address can be specified in units of 1024 words. 1024 words of address data can be entered through the pin as 13 bits (A0 to A12) of serial data. The 13th bit must be A12 as a dummy address, however. The A12 input level must be either "H" or "L".

- Serial address strobe (SAS) This is a clock pin for latching serial address data into an internal register.
- Address transfer strobe (TAS) This is an input pin for loading the internal address counter with serial address data latched in the address register.
- Read/write clock (RWCK) This is a clock input pin for reading and writing information in the data register. The trailing edge of RWCK triggers off internal operation. In the reading mode, information in the data register is output to the DOUT pin. In the writing mode, the data register is loaded with DIN information. At the leading edge of RWCK, the internal address counter is incremented automatically by +1.
- Write enable (WE)
 This is an input pin for selecting the read mode, the write mode, or the read-modify-write mode.
 When WE is "H", the read mode is set up and, when WE is "L", the write mode is set up. When the level is lowered from "H" to "L" with RWCK active, the read-modify-write mode is set up.
- Data input (DIN) This is a pin for entering write data. Information on the data input pin is latched when the trailing edge of RWCK is encountered in the write mode and that of WE is encountered in the read/modify mode.
- Data output (DOUT)

The data output pin always provides high impedance as long as \overline{RWCK} or \overline{CS} is kept at "H". When "H" or "L" information is read, the output pin set at "H" or "L", and information read until \overline{RWCK} returns to "H" is held. In the early write mode, the output pin is maintained at high impedance, so that, connect of DIN and DOUT enables "I/O common operation".

• Chip selection (\overline{CS})

This is an input pin for disabling all input pins. This pin allows the use of two or more MSM6684B devices with data input and output pins connected in parallel.

• Test (TEST, TEST)

The TEST pin must always be fixed at "L" and the TEST pin at "H".

NOTES ON POWER-UP

MSM6684B has built-in board bias generation and inner power supply circuits. Thus, energization must be followed by a pause period of 1 ms or more for internal circuit stabilization. Furthermore, the TEST pin must be brought "L" concurrently with or prior to V_{CC} , and all clock input pins and TEST pins must be brought "H" concurrently with or prior to V_{CC} .

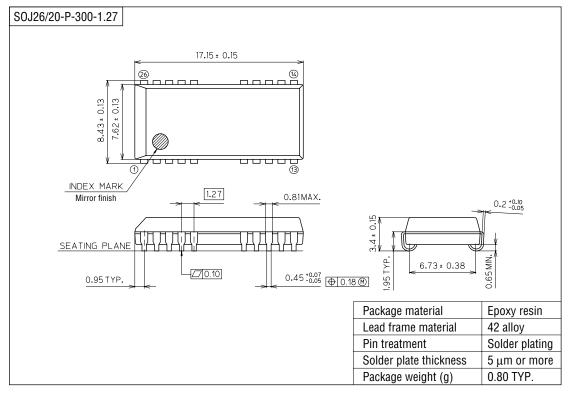
To achieve proper operation of internal circuits, the initial pause above must be followed by minimum ten dummy read cycles with **RWCK**.

NOTES ON SUPPLY VOLTAGE VARIATION

When using MSM6684B, take precautions so that the supply voltage does not vary over one volt within a period of $1,000\mu$ s or less in the active state.

PACKAGE DIMENSIONS

(Unit : mm)



Notes for Mounting the Surface Mount Type Package

The SOP, QFP, TSOP, SOJ, QFJ (PLCC), SHP and BGA are surface mount type packages, which are very susceptible to heat in reflow mounting and humidity absorbed in storage.

Therefore, before you perform reflow mounting, contact Oki's responsible sales person for the product name, package name, pin number, package code and desired mounting conditions (reflow method, temperature and times).