OKI Semiconductor

This version: Feb. 1999
Previous version: May. 1997

MSM66V84B

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

GENERAL DESCRIPTION

MSM66V84B 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.
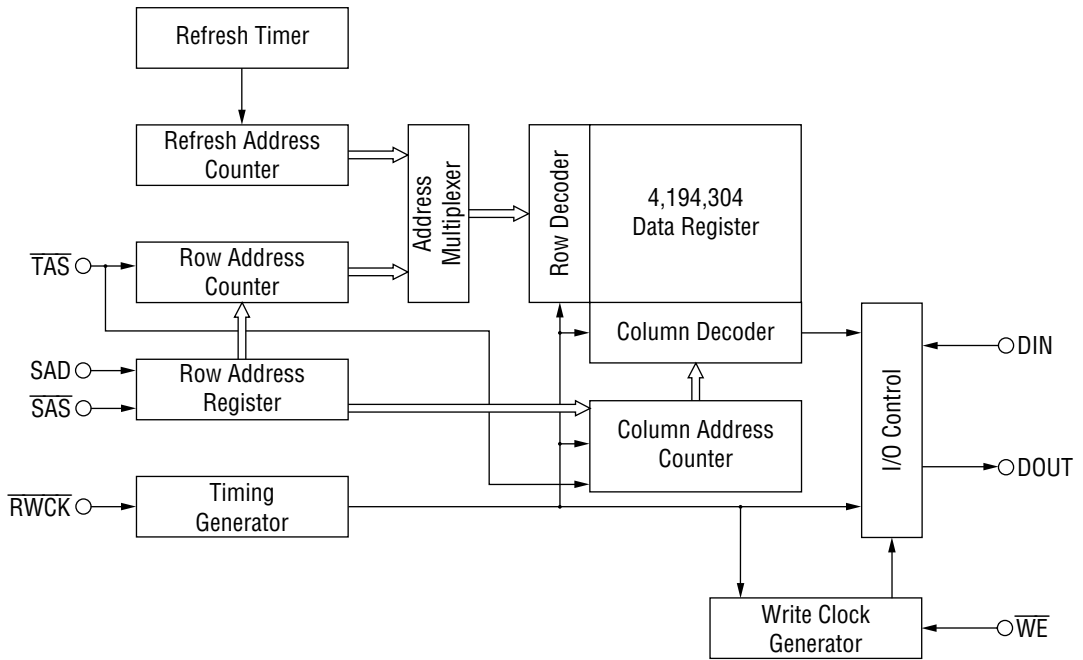
The device is packaged in 26/20-pin SOJ or 26/20 TSOP having a width of 300 mil.

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.
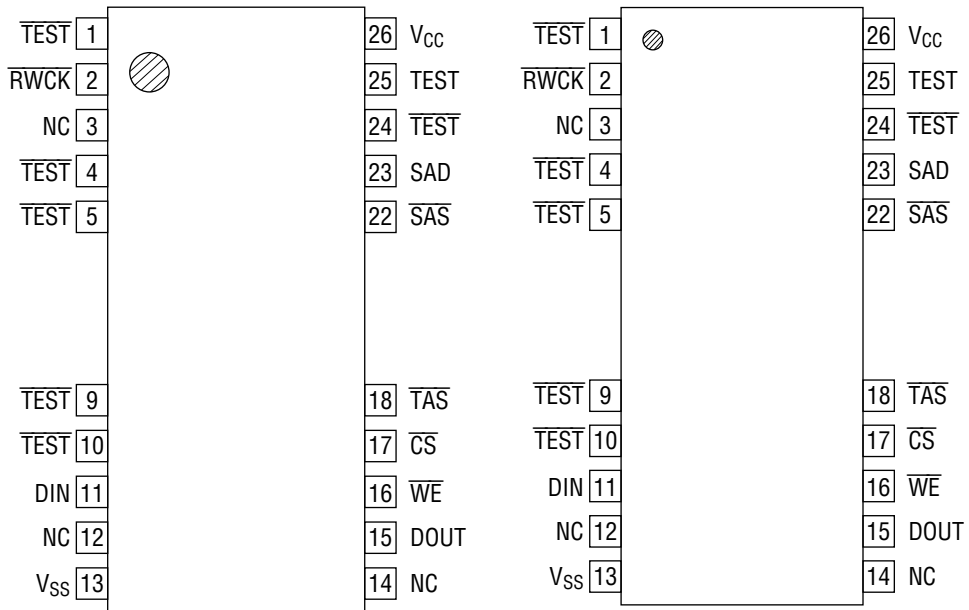
FEATURES

- 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
  100 µA max. (V_{CC} = 3.6 V with data stored and under standard conditions)
- Refresh operation
  A self-refresh function is supported.
- Wide operation voltage range
  Single 2.7 to 3.6 V
- Addressing
  Units of 1024 words
- Process
  0.45 µm double well CMOS process
- Package options :
  26/20-pin plastic SOJ (SOJ26/20-P-300-1.27) (Product name : MSM66V84BJS)
  26/20-pin plastic TSOP (TSOPII26/20-P-300-1.27-K) (Product name : MSM66V84BTS-K)

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BLOCK DIAGRAM

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PIN CONFIGURATION (TOP VIEW)

$\overline{\text{TEST}}$ 1	26 V_{CC}
$\overline{\text{RWCK}}$ 2	25 TEST
NC 3	24 $\overline{\text{TEST}}$
$\overline{\text{TEST}}$ 4	23 SAD
$\overline{\text{TEST}}$ 5	22 $\overline{\text{SAS}}$
$\overline{\text{TEST}}$ 9	18 $\overline{\text{TAS}}$
$\overline{\text{TEST}}$ 10	17 $\overline{\text{CS}}$
DIN 11	16 $\overline{\text{WE}}$
NC 12	15 DOUT
V_{SS} 13	14 NC

NC : No connection

26/20-pin plastic SOJ

$\overline{\text{TEST}}$ 1	26 V_{CC}
$\overline{\text{RWCK}}$ 2	25 TEST
NC 3	24 $\overline{\text{TEST}}$
$\overline{\text{TEST}}$ 4	23 SAD
$\overline{\text{TEST}}$ 5	22 $\overline{\text{SAS}}$
$\overline{\text{TEST}}$ 9	18 $\overline{\text{TAS}}$
$\overline{\text{TEST}}$ 10	17 $\overline{\text{CS}}$
DIN 11	16 $\overline{\text{WE}}$
NC 12	15 DOUT
V_{SS} 13	14 NC

NC : No connection

**26/20-pin plastic TSOP
(K type)**

PIN DESCRIPTION

Pin	Symbol	Description
25	TEST	Test input
1, 4, 5 9, 10, 24	$\overline{\text{TEST}}$	Test input
2	$\overline{\text{RWCK}}$	Read/write clock
11	DIN	Data input
13	V_{SS}	Ground (0 V)
15	DOUT	Data output
16	$\overline{\text{WE}}$	Write enable
17	$\overline{\text{CS}}$	Chip select
18	$\overline{\text{TAS}}$	Transfer address strobe
22	$\overline{\text{SAS}}$	Serial address strobe
23	SAD	Serial address data
26	V_{CC}	Power supply (2.7 V to 3.6 V)

Note : All $\overline{\text{TEST}}$ pins are to be connected to the power supply.
The TEST pin is to be referenced to the ground level.

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ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Condition	Rating	Unit
Pin Voltage	V_T	Against V_{SS} at Ta = 25 °C	−0.5 to +4.6	V
Output Short-Circuit Current	I_{OS}	Ta = 25 °C	50	mA
Power Dissipation	P_D	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.	Typ.	Max.	Unit
Supply Voltage	V_{CC}	2.7	3.0	3.6	V
Supply Voltage	V_{SS}	0	0	0	V
"H" Input Voltage	V_{IH}	$V_{CC} - 0.3$	V_{CC}	$V_{CC} + 0.2$	V
"L" Input Voltage	V_{IL}	−0.2	0	+0.5	V

ELECTRICAL CHARACTERISTICS

DC characteristics

(V_{CC} = 2.7 V to 3.6 V, Ta = 0 to 70°C)

Parameter	Symbol	Condition	Min.	Max.	Unit
"H" Output Voltage	V_{OH}	$I_{OH} = -0.1$ mA	$V_{CC} - 0.5$	—	V
"L" Output Voltage	V_{OL}	$I_{OL} = 0.1$ mA	—	0.4	V
Input Leakage Current	I_{IL}	$V_I = 0$ V to V_{CC}	−1	+1	µA
Output Leakage Current	I_{OL}	$V_O = 0$ V to V_{CC}	−1	+1	µA
Supply Current (Operation)	I_{CC1}	$V_{CC} = 3.6$ V, $t_{RWC} = 2.5$ µs	—	10	mA
Supply Current (Standby)	I_{CC2}	$V_{CC} = 3.6$ V	—	100	µA

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AC Characteristics

(V_{CC} = 2.7 V to 3.6 V, Ta = 0 to 70°C)

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	t_{OFF}	0	50	ns
I/O Signal Rise Time	t_T	3	50	ns
$\overline{RWCK}$ Pre-charge Time	t_{RWP}	1,000	—	ns
$\overline{RWCK}$ Pulse Time	t_{RW}	1,500	10,000	ns
$\overline{SAS}$ Cycle Time	t_{SSC}	100	—	ns
$\overline{SAS}$ Pre-charge Time	t_{SAP}	50	—	ns
$\overline{SAS}$ Pulse Width	t_{SAS}	50	—	ns
Address Setup Time	t_{AS}	0	—	ns
Adress Hold Time	t_{AH}	50	—	ns
$\overline{TAS}$ Setup Time	t_{ATS}	50	—	ns
$\overline{TAS}$. $\overline{RWCK}$ Setup Time	t_{TRS}	50	—	ns
$\overline{TAS}$ 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	t_{WRS}	0	—	ns
Write Instruction Hold Time	t_{WRH}	50	—	ns
Write Instruction Pulse Width	t_{WP}	50	—	ns
$\overline{WE}$. $\overline{RWCK}$ Read Time	t_{RWL}	50	—	ns
Data Setup Time	t_{DS}	0	—	ns
Data Hold Time	t_{DH}	50	—	ns
$\overline{RWCK}$. $\overline{WE}$ Delay Time	t_{RWD}	50	—	ns

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TIMING DIAGRAM

Read/write and read/modify/write cycles

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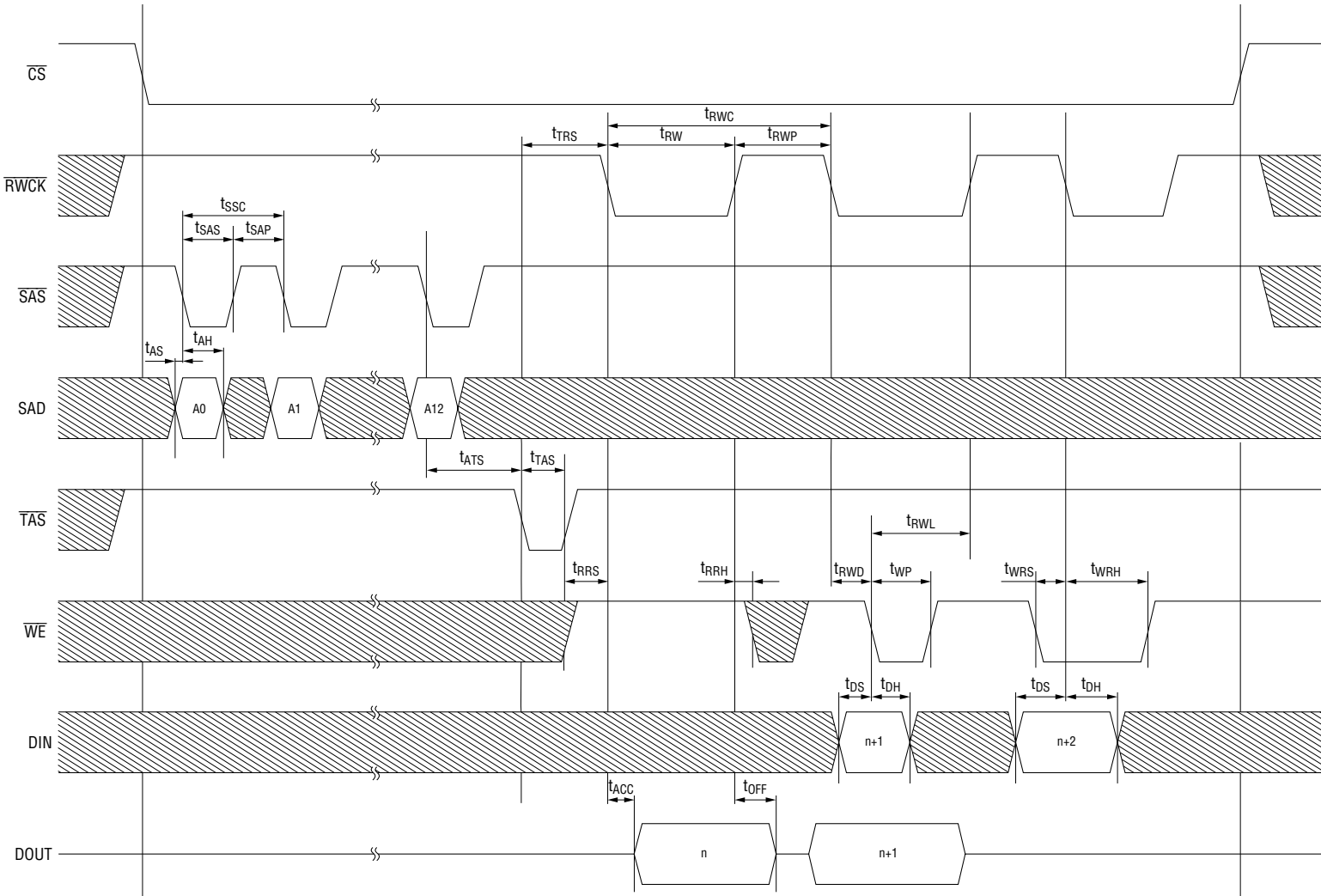
PIN FUNCTIONS AND OPERATING MODES

- 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 ($\overline{\text{SAS}}$)

  This is a clock pin for latching serial address data into an internal register.

- Address transfer strobe ($\overline{\text{TAS}}$)

  This is an input pin for loading the internal address counter with serial address data latched in the address register.

- Read/write clock ($\overline{\text{RWCK}}$)

  This is a clock input pin for reading and writing information in the data register. The trailing edge of $\overline{\text{RWCK}}$ 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 ($\overline{\text{WE}}$)

  This is an input pin for selecting the read mode, the write mode, or the read-modify-write mode. When $\overline{\text{WE}}$ is "H", the read mode is set up and, when $\overline{\text{WE}}$ is "L", the write mode is set up. When the level is lowered from "H" to "L" with $\overline{\text{RWCK}}$ 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 $\overline{\text{RWCK}}$ is encountered in the write mode and that of $\overline{\text{WE}}$ is encountered in the read/modify mode.

- Data output (DOUT)

  The data output pin always provides high impedance as long as $\overline{\text{RWCK}}$ or $\overline{\text{CS}}$ is kept at "H". When "H" or "L" information is read, the output pin set at "H" or "L", and information read until $\overline{\text{RWCK}}$ 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 ($\overline{\text{CS}}$)

  This is an input pin for disabling all input pins. This pin allows the use of two or more MSM66V84B devices with data input and output pins connected in parallel.

- Test (TEST, $\overline{\text{TEST}}$)

  The TEST pin must always be fixed at "L" and the $\overline{\text{TEST}}$ pin at "H".

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NOTES ON ENERGIZATION

MSM66V84B 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 $\overline{TEST}$ 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 $\overline{RWCK}$.

NOTES ON SUPPLY VOLTAGE VARIATION

When using MSM66V84B, take precautions so that the supply voltage does not vary over one volt within a period of 1,000µs or less in the active state.

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PACKAGE DIMENSIONS

(Unit : mm)
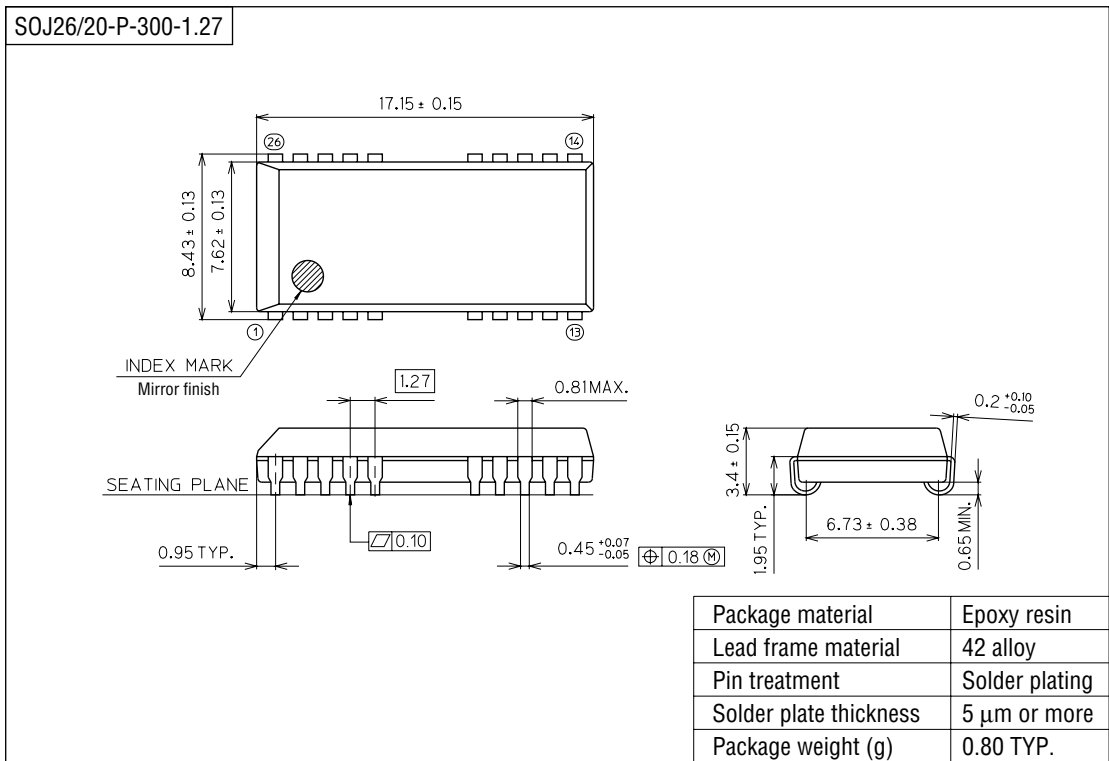
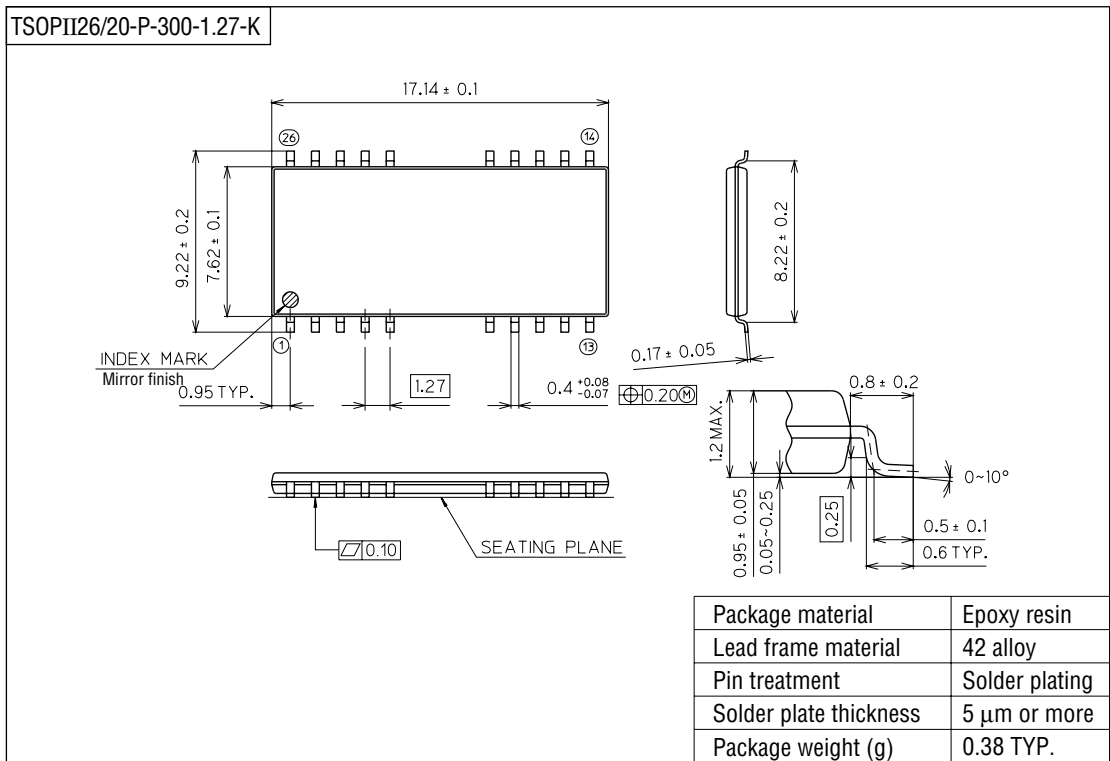| Package material	Epoxy resin
Lead frame material	42 alloy
Pin treatment	Solder plating
Solder plate thickness	5 μm or more
Package weight (g)	0.80 TYP.

Notes for Mounting the Surface Mount Type Package

The SOP, QFP, TSOP, TQFP, LQFP, 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 on the product name, package name, pin number, package code and desired mounting conditions (reflow method, temperature and times).

(Unit : mm)

TSOPII26/20-P-300-1.27-K

Package material	Epoxy resin
Lead frame material	42 alloy
Pin treatment	Solder plating
Solder plate thickness	5 µm or more
Package weight (g)	0.38 TYP.

Notes for Mounting the Surface Mount Type Package

The SOP, QFP, TSOP, TQFP, LQFP, 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 on the product name, package name, pin number, package code and desired mounting conditions (reflow method, temperature and times).

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