**MB506**

**ULTRA HIGH FREQUENCY PRESCALER**

The Fujitsu MB506 is a high frequency, up to 2.4GHz, prescaler used with a frequency synthesizer to form a Phase Locked Loop (PLL). It will divide the input frequency by the modulus of 128 or 256 and the output level is 1.6V peak to peak on ECL level. Operation in the 1.6GHz range meets the specification for applications in Direct Broadcasting Satellite Systems (DBS), CATV systems, and UHF Transceivers.

**FEATURES**

- High Frequency Operation 2.4GHz max.
- Power Dissipation 90mW typ.
- Wide Operation Temperature -40°C to +85°C
- Stable Output Amplitude $V_{OUT} = 1.6V_{p-p}$
- Complete PLL synthesizer circuit with the Fujitsu MB87006A, PLL synthesizer IC
- Plastic 8-pin Standard Dual-In-Line Package or Flat Package

**ABSOLUTE MAXIMUM RATINGS (See Note)**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>$V_{CC}$</td>
<td>-0.5 to +7.0</td>
<td>V</td>
</tr>
<tr>
<td>Input Voltage</td>
<td>$V_{IN}$</td>
<td>-0.5 to $V_{CC}$</td>
<td>V</td>
</tr>
<tr>
<td>Output Current</td>
<td>$I_O$</td>
<td>10</td>
<td>mA</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>$T_{STG}$</td>
<td>-55 to +125</td>
<td>°C</td>
</tr>
</tbody>
</table>

**Note:** Permanent device damage may occur if the above Absolute Maximum Ratings are exceeded. Functional operation should be restricted to the conditions as detailed in the specifications.

---

This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields. However, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit.
the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

![Image of MB506 Block Diagram]

**Figure 1. MB506 Block Diagram**

**PIN DESCRIPTION**

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Symbol</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IN</td>
<td>Input</td>
</tr>
<tr>
<td>2</td>
<td>VCC</td>
<td>Power Supply Voltage</td>
</tr>
<tr>
<td>3</td>
<td>SW1</td>
<td>Divide Ratio Control Input Selecting Divide Ratio (See Divide Ratio Table)</td>
</tr>
<tr>
<td>4</td>
<td>OUT</td>
<td>Output</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>6</td>
<td>SW2</td>
<td>Divide Ratio Control Input Selecting Divide Ratio (See Divide Ratio Table)</td>
</tr>
<tr>
<td>7</td>
<td>NC</td>
<td>No Connection</td>
</tr>
<tr>
<td>8</td>
<td>IN</td>
<td>Complementary Input</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SW1</th>
<th>SW2</th>
<th>Divide Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>H</td>
<td>1/64</td>
</tr>
<tr>
<td>L</td>
<td>H</td>
<td>1/128</td>
</tr>
<tr>
<td>H</td>
<td>L</td>
<td>1/128</td>
</tr>
<tr>
<td>L</td>
<td>L</td>
<td>1/256</td>
</tr>
</tbody>
</table>

**Note:** H = VCC, L = open
RECOMMENDED OPERATING CONDITIONS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>$V_{CC}$</td>
<td>4.5, 5.0, 5.5</td>
<td>V</td>
</tr>
<tr>
<td>Output Current</td>
<td>$I_O$</td>
<td>1.2</td>
<td>mA</td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>$T_A$</td>
<td>–40, +85</td>
<td>°C</td>
</tr>
<tr>
<td>Load Capacitance</td>
<td>$C_L$</td>
<td>12</td>
<td>pF</td>
</tr>
</tbody>
</table>

ELECTRICAL CHARACTERISTICS
(Recommended operating conditions unless otherwise noted.)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Current</td>
<td>$I_{CC}$</td>
<td></td>
<td>18</td>
<td>mA</td>
</tr>
<tr>
<td>Output Amplitude</td>
<td>$V_O$</td>
<td></td>
<td>1.0, 1.6</td>
<td>$V_{p-p}$</td>
</tr>
<tr>
<td>Input Frequency</td>
<td>$f_{IN}$</td>
<td>with input coupling capacitor 1000pF, $T_A = -40^\circ$C to 85°C, $T_A = -40^\circ$C to 60°C</td>
<td>100, 2200</td>
<td>MHz</td>
</tr>
<tr>
<td>Input Signal Amplitude</td>
<td>$P_{IN}$</td>
<td>$f_{IN} = 100$MHz to 1.3GHz, $f_{IN} = 1.3$MHz to 2.4GHz</td>
<td>–16, 5.5</td>
<td>dBm</td>
</tr>
<tr>
<td>High Level Input Voltage for SW</td>
<td>$V_{IHS}$</td>
<td>$V_{CC} - 0.1$, $V_{CC}$, $V_{CC} + 0.1$</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Low Level Input Voltage for SW</td>
<td>$V_{ILS}$</td>
<td>Open</td>
<td>V</td>
<td></td>
</tr>
</tbody>
</table>

Note: *Design Guarantee

Figure 2. Input Signal Amplitude vs. Input Frequency
PACKAGE DIMENSIONS

8-LEAD PLASTIC DUAL-IN-LINE PACKAGE (CASE No.: DIP-08P-M01)

Dimensions in inches (millimeters)

8-LEAD PLASTIC FLAT PACKAGE (CASE No.: FPT-08P-M01)

Dimensions in inches (millimeters)

All Rights Reserved. Circuit diagrams utilizing Fujitsu products are included as a means of illustrating typical semiconductor applications. Complete information sufficient for construction purposes is not necessarily given. The information contained in this document has been carefully checked and is believed to be reliable. However, Fujitsu assumes no responsibility for inaccuracies.

FUJITSU LIMITED

For further information please contact:

Japan
FUJITSU LIMITED
International Marketing Div.
Furukawa Sogo Bldg., 6-1, Marunouchi 2-chome
Chiyoda-ku, Tokyo 100, Japan
Tel: (03) 3216-3211
Telex: 781-2224361
FAX: (03) 3215-0662

North and South America
FUJITSU MICROELECTRONICS, INC.
Integrated Circuits Division
3545 North First Street
San Jose, CA 95134-1804, USA
Tel: 408-922-9000
FAX: 408-432-9044

Europe
FUJITSU MIKROELEKTRONIK GmbH
Am Siebenstein 6-10,
6072 Dreieich-Buchschlag,
Germany
Tel: (06103) 690-0
Telex: 411963
FAX: (06103) 690-122

Asia
FUJITSU MICROELECTRONICS ASIA PTE LIMITED
51 Bras Basah Road,
Plaza By The Park,
#06-04 to #06-07
Singapore 0719
Tel: 336-1600
Telex: 55573
FAX: 336-1609

©FUJITSU LIMITED 1990
Printed in Japan PV0050–902A3