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Edition 2.0a

FUJITSU

DATA SHEET

MB511

1GHz HIGH SPEED PRESCALER

HIGH SPEED PRESCALER

The Fujitsu MB511 is a 1.0GHz high speed prescaler that forms a Phase Locked Loop (PLL) circuit when combined with a Fujitsu frequency synthesizer. Based on Fujitsu's advanced Bipolar processing, the MB511 maintains a consistent low power consumption of 23mA @ 5V. In addition, it can detect low amplitude input signals with a sensitivity of -20dBm min.

The MB511 will divide the input frequency a modulus of 1, 2, or 8, and is well suited for applications in CATV and electronically tuned TV.

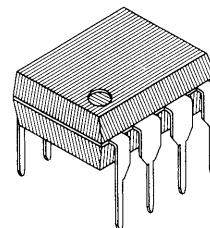
FEATURES

- Wide operating frequency range:
 $f_{in} = 50$ to 1000MHz ($V_{in} = -20$ dBm)
- Maximum operating frequency depends upon a divide ratio:
1/1: 250MHz max. (Buffer through)
1/2: 500MHz max.
1/8: 1000MHz max.
- Low supply current: 23mA @5V
- High input sensitivity: -20dBm min.
- Stable Output Amplitude: 800mVp-p ($C_L \leq 5$ pF)
- Wide temperature range: $T_A = -40$ to $+85^\circ\text{C}$
- Plastic 8-pin Dual-In-Line package (Suffix: -P)
Plastic 8-pin Flat package (Suffix: -PF)

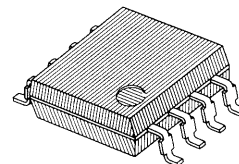
ABSOLUTE MAXIMUM RATINGS (See Note)

Rating	Symbol	Value	Unit
Power Supply Voltage	V_{CC}	-0.5 to +7.0	V
Input Voltage	V_{IN}	-0.5 to $V_{CC} + 0.5$	V
Output Current	I_O	10	mA
Storage Temperature	T_{STG}	-55 to +125	$^\circ\text{C}$

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 operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

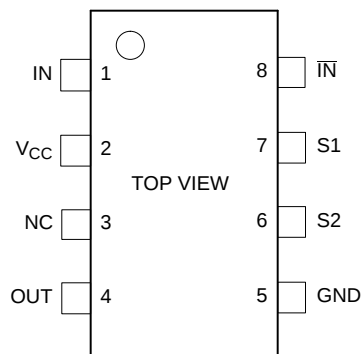


**PLASTIC PACKAGE
DIP-08P-M01**



**PLASTIC PACKAGE
FPT-08P-M01**

PIN ASSIGNMENT



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.

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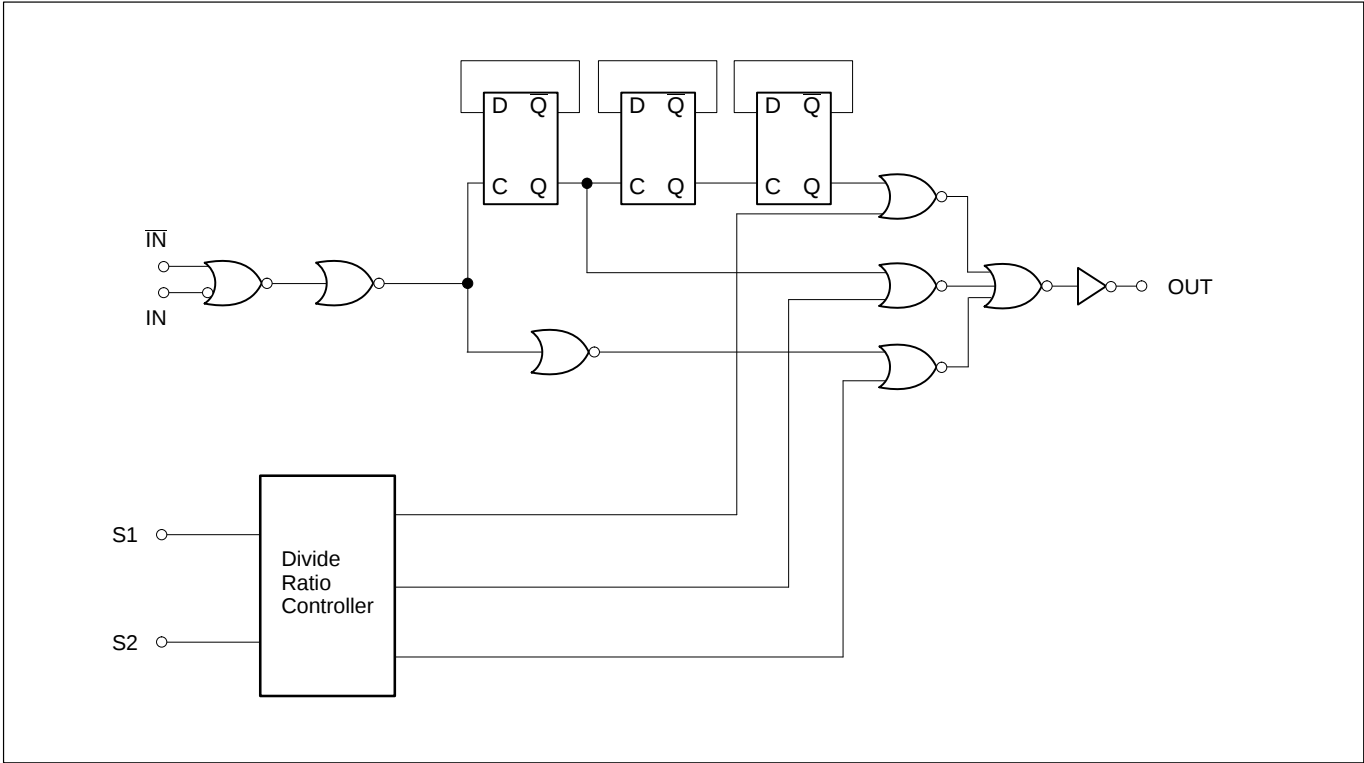


Figure 1. MB511 Block Diagram

FUNCTION TABLE

S1	S2	Divide Ratio	Operating Frequency
L	L	Not used	—
L	H	1	250MHz
H	L	2	500MHz
H	H	8	1000MHz

H = V_{CC}
L = OPEN

PIN DESCRIPTIONS

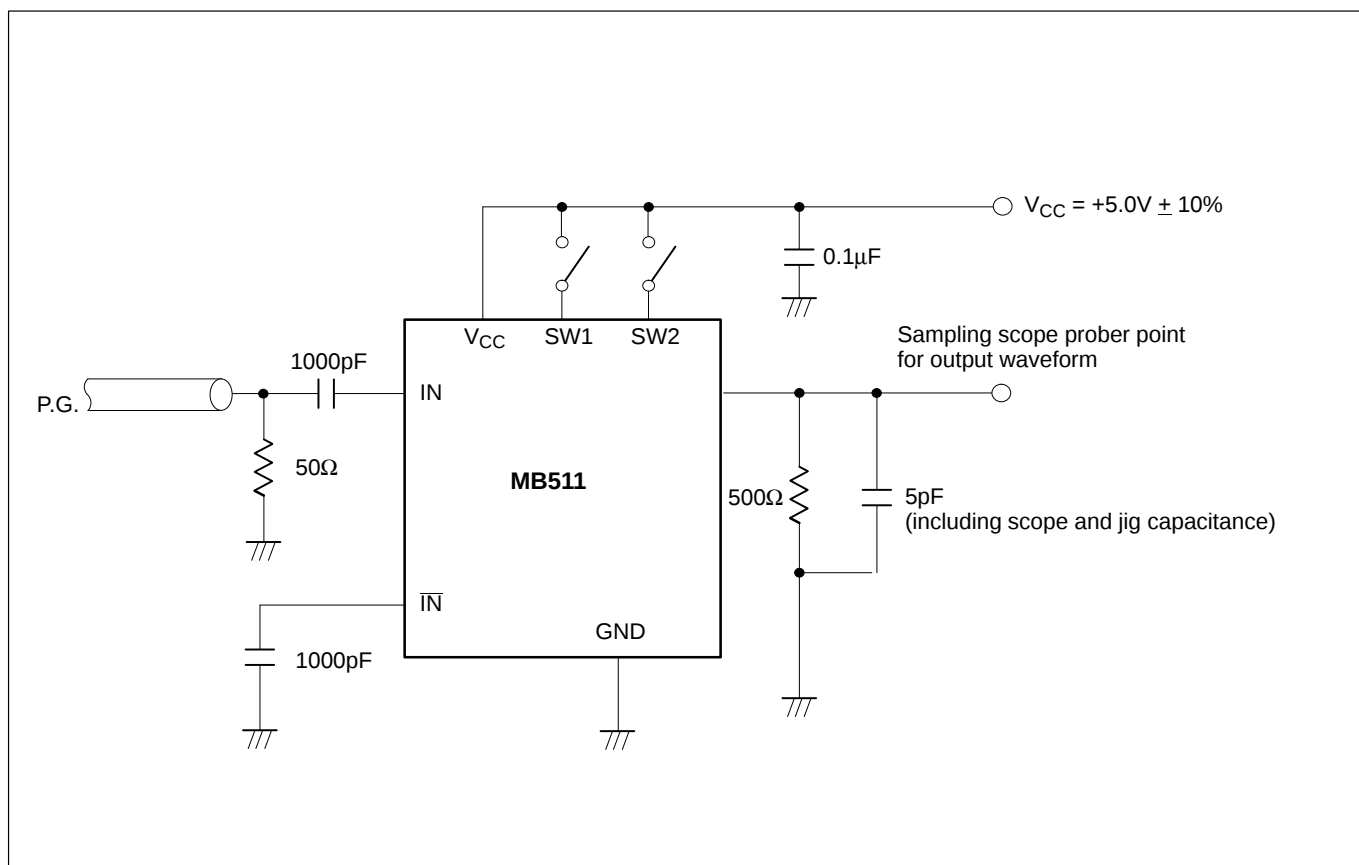
Pin Number	Symbol	I/O	Descriptions
1	IN	I	Input. The connection with VCO should be an AC connection.
2	V _{CC}	—	Power supply voltage input.
3	NC	—	No connection.
4	OUT	O	Output. Termination resistor is necessary due to emitter follower output.
5	GND	—	Ground.
6	S2	I	Divide ratio control input.
7	S1	I	Divide ratio control input.
8	IN-bar	I	Complementary Input.

RECOMMENDED OPERATING CONDITIONS

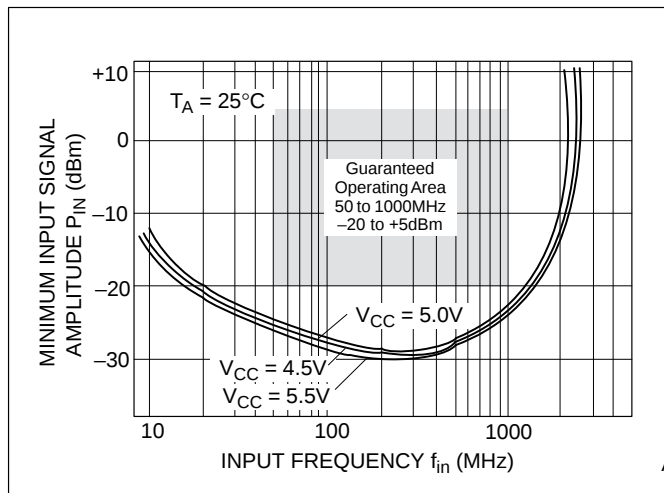
Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Supply Voltage	V_{CC}	4.5	5.0	5.5	V	
Operating Temperature	T_A	-40		+85	°C	
Load Capacitance	C_L			5	pF	Termination resistor 500Ω

ELECTRICAL CHARACTERISTICS

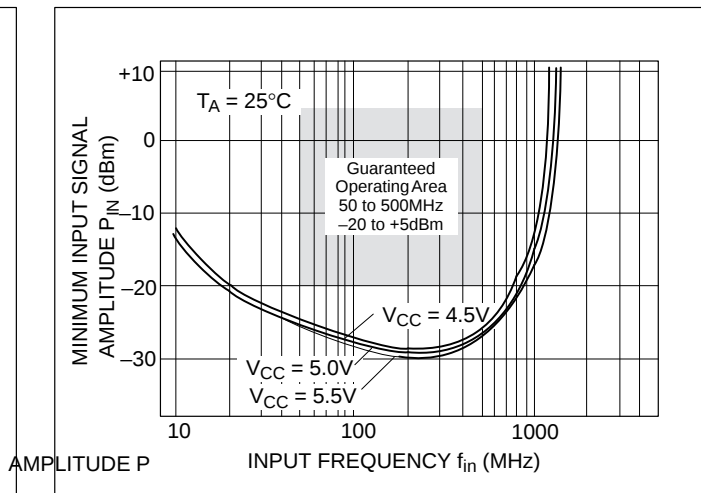
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Current		I_{CC}	15	23	32	mA	Except termination output current.
Output Amplitude		V_O	0.4	0.8	1.2	V_{p-p}	500Ω termination, $C_L = 5pF$ max.
Input Frequency	1/1	f_1	50		250	MHz	Min. value is measured with coupling capacitor of 1000pF.
	1/2	f_2	50		500	MHz	
	1/8	f_3	50		1000	MHz	
Input Signal Amplitude		P_{IN}	-20		+10	dBm	50Ω
High Level Input Voltage	S1, S2	V_{IH}	$V_{CC} - 0.7$	V_{CC}	$V_{CC} + 0.5$	V	
Low Level Input Voltage		V_{IL}		OPEN		V	
Low Level Input Current	S1, S2	I_{IH}	40		160	μA	$V_{CC} = 5V$

MB511**Figure 2. Test Circuit**

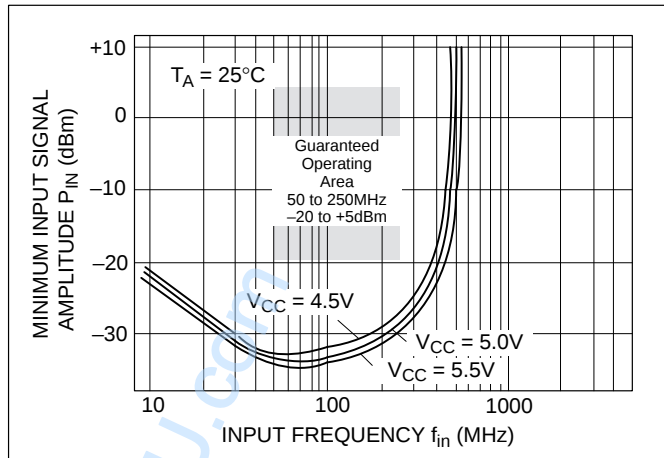
TYPICAL CHARACTERISTICS CURVES



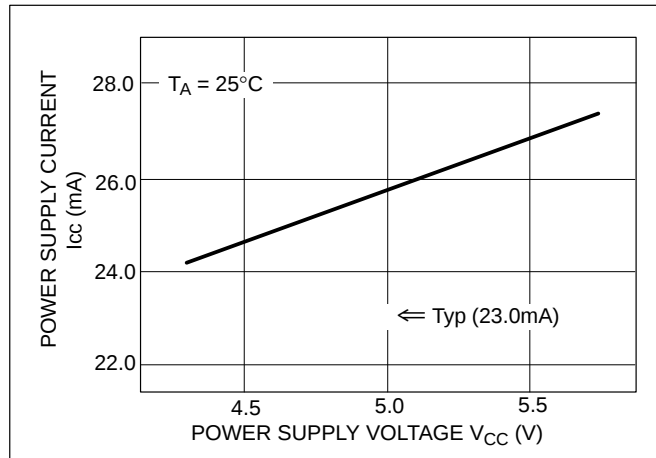
**Figure 3. Input Sensitivity Curve (1/8 Divide Ratio)
Power Supply Voltage Dependency**



**Figure 4. Input Sensitivity Curve (1/2 Divide Ratio)
Power Supply Voltage Dependency**



**Figure 5. Input Sensitivity Curve (1/1 Divide Ratio)
Power Supply Voltage Dependency**



**Figure 6. Power Supply Current
vs. Power Supply Voltage**

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TYPICAL CHARACTERISTICS CURVES (Continued)

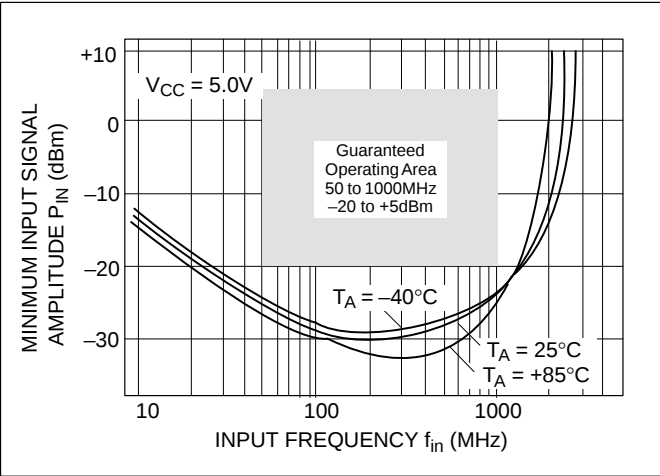


Figure 7. Input Sensitivity Curve (1/8 Divide Ratio) Temperature Dependency

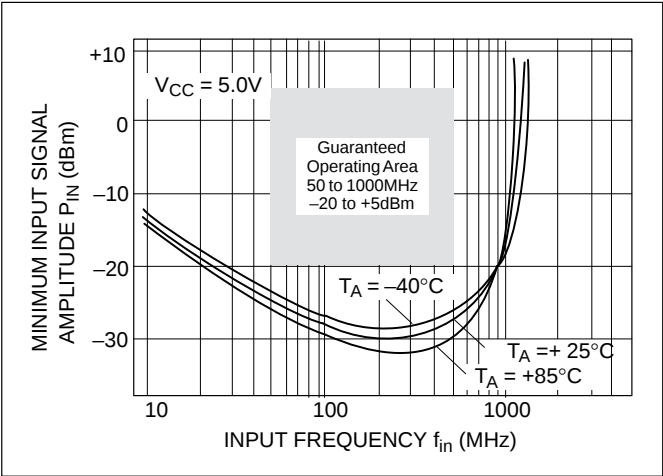


Figure 6. Input Sensitivity Curve (1/2 Divide Ratio) Temperature Dependency

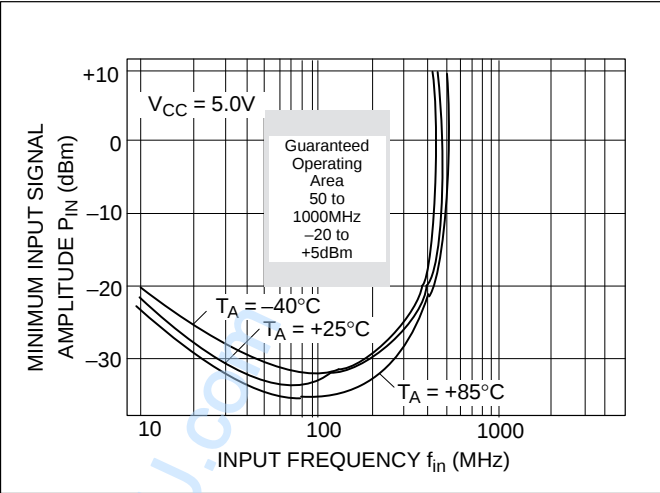


Figure 9. Input Sensitivity Curve (1/1 Divide Ratio) Temperature Dependency

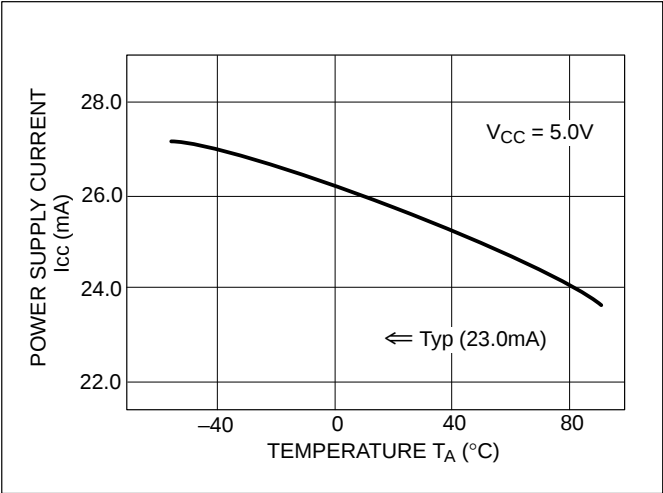
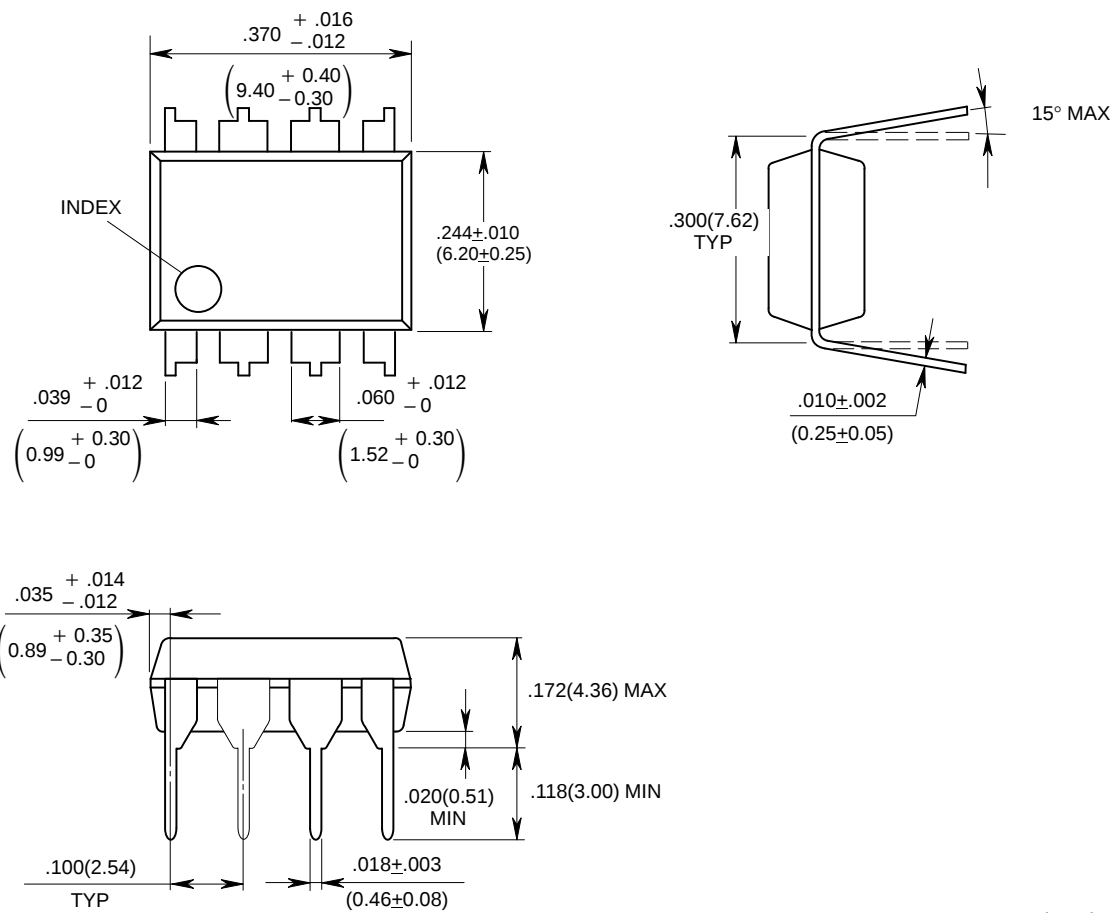


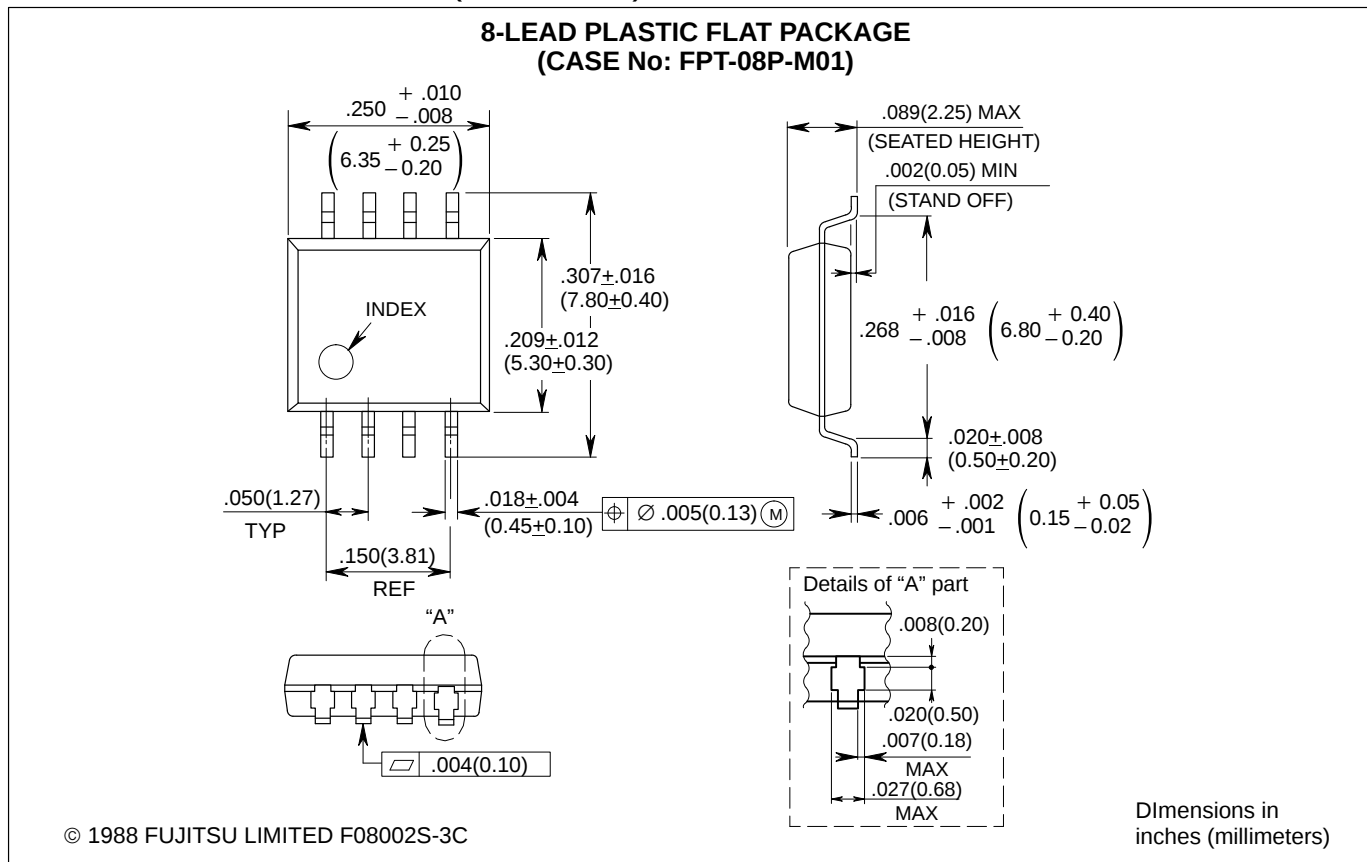
Figure 10. Power Supply Current vs. Temperature

PACKAGE DIMENSIONS

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

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Dimensions in
inches (millimeters)

MB511**PACKAGE DIMENSIONS (Continued)**

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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.

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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.
Semiconductor 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-Buchsschlag,
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