

# 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.

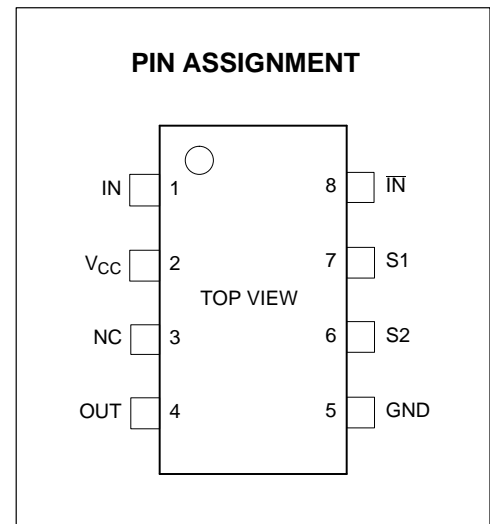
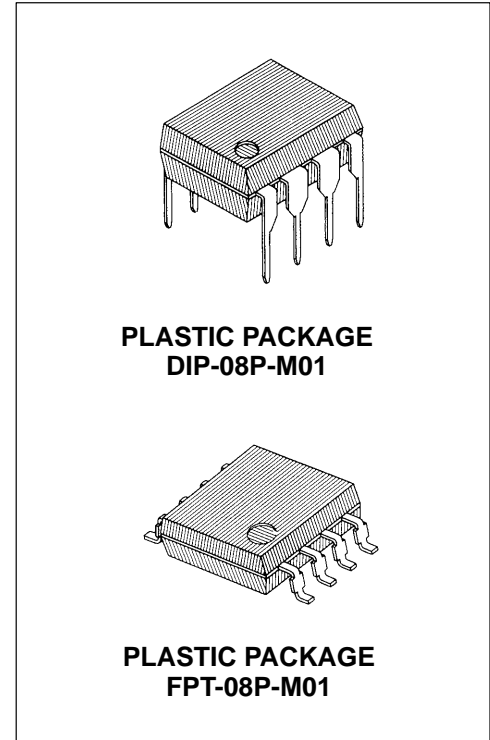
### FEATURES

- 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°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	°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.



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.

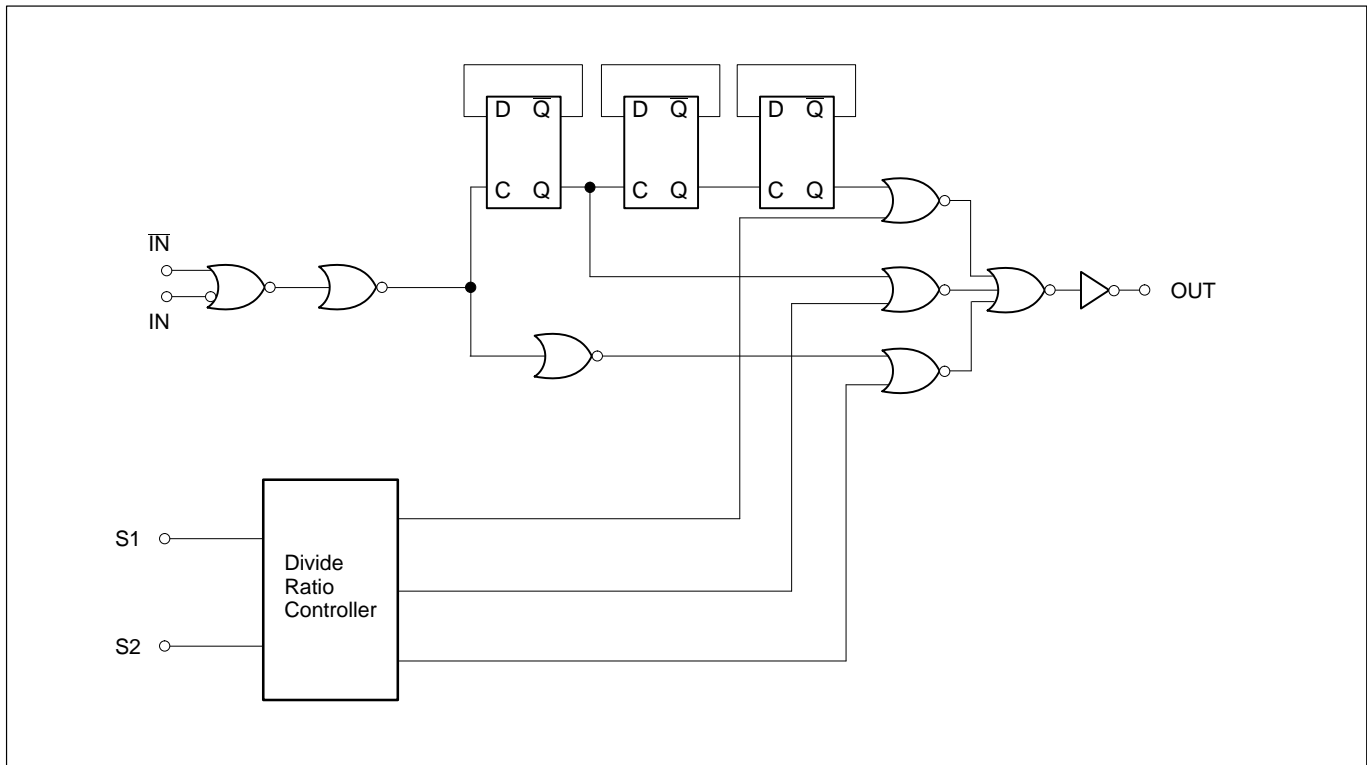


Figure 1. MB511 Block Diagram

**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<sub>CC</sub>  
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 <sub>CC</sub>	—	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	$V_{CC} = 5V$

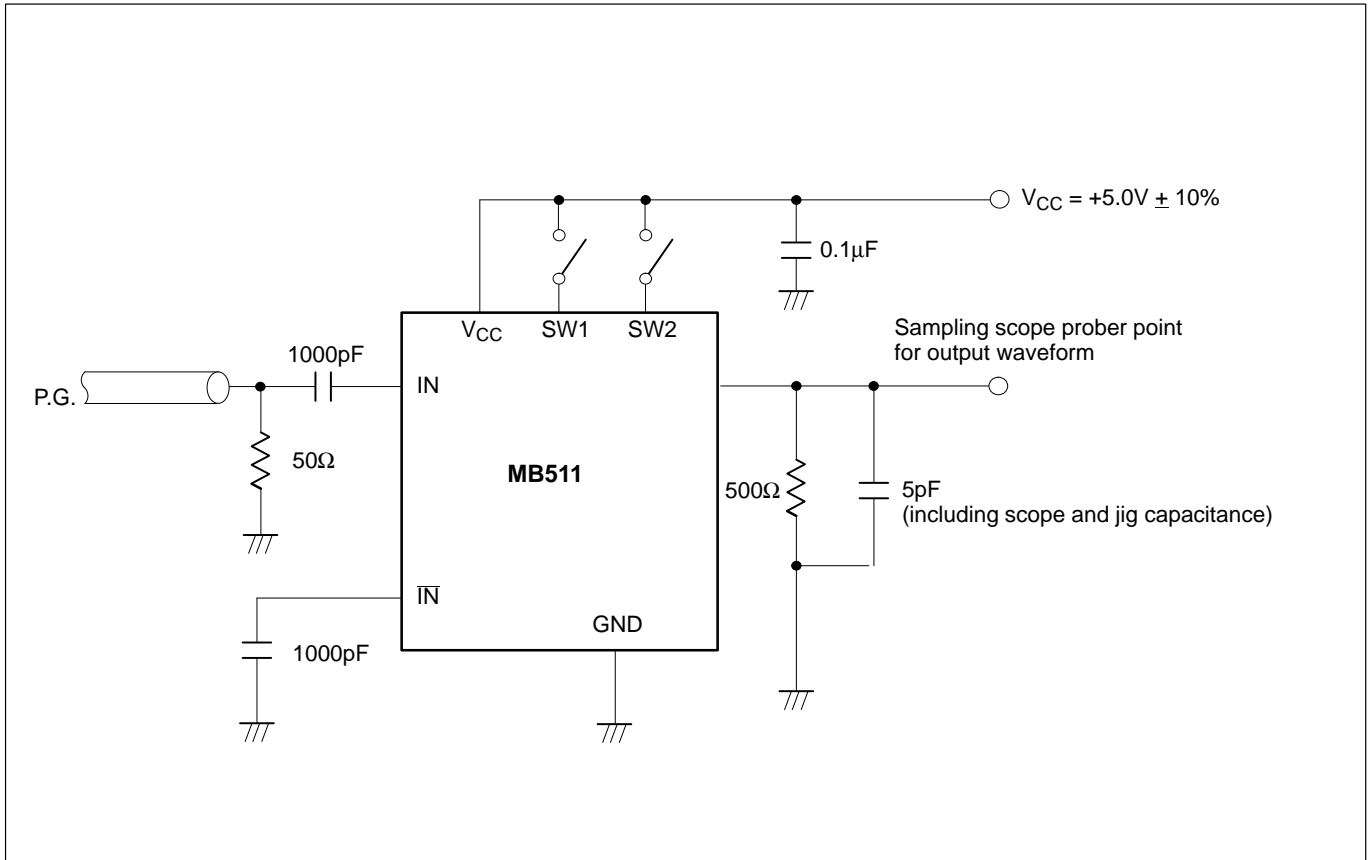
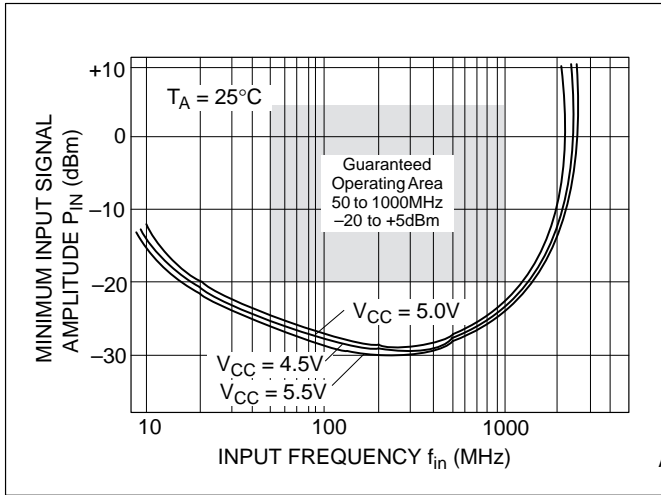
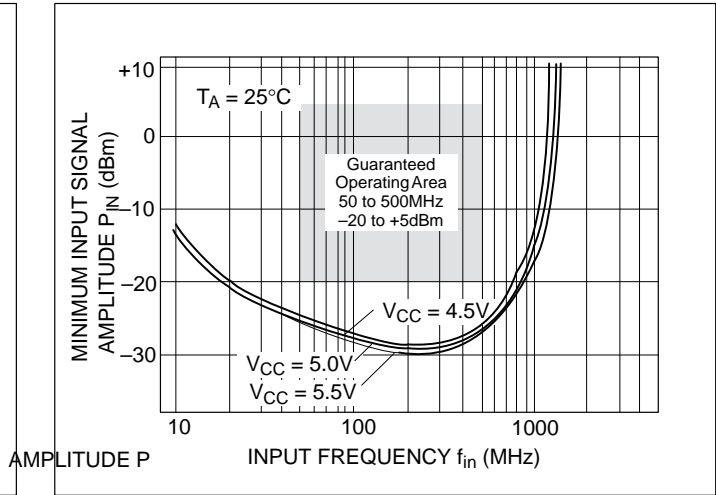


Figure 2. Test Circuit

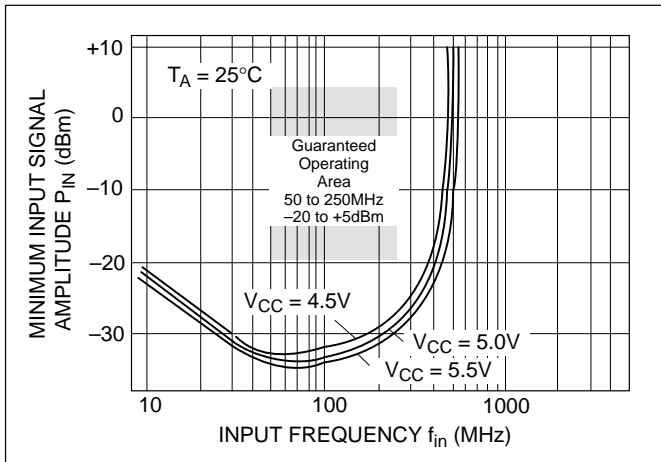
**TYPICAL CHARACTERISTICS CURVES**



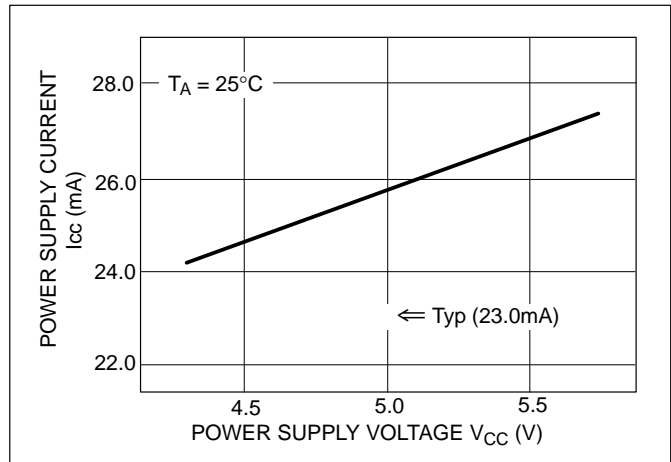
**Figure 3. Input Sensitivity Curve (1/8 Divide Ratio) Power Supply Voltage Dependency**



**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**

TYPICAL CHARACTERISTICS CURVES (Continued)

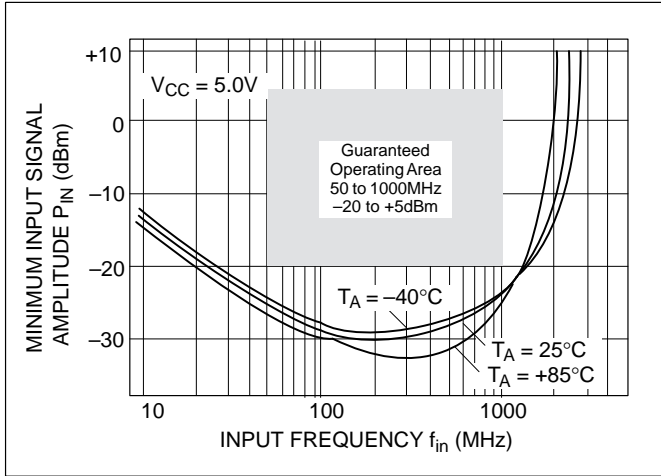


Figure 7. Input Sensitivity Curve (1/8 Divide Ratio) Temperature Dependency

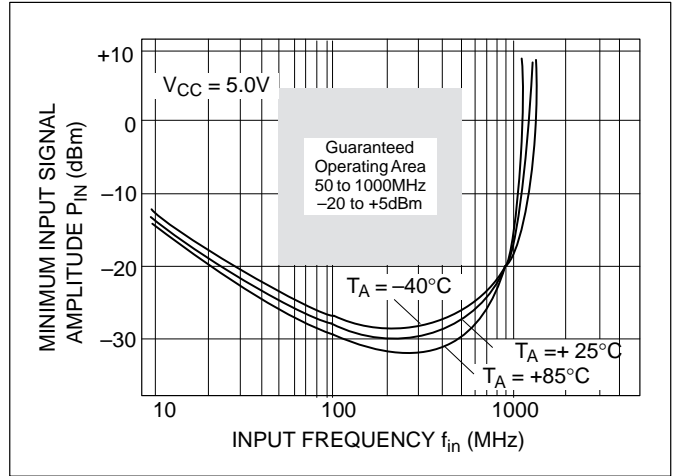


Figure 6. Input Sensitivity Curve (1/2 Divide Ratio) Temperature Dependency

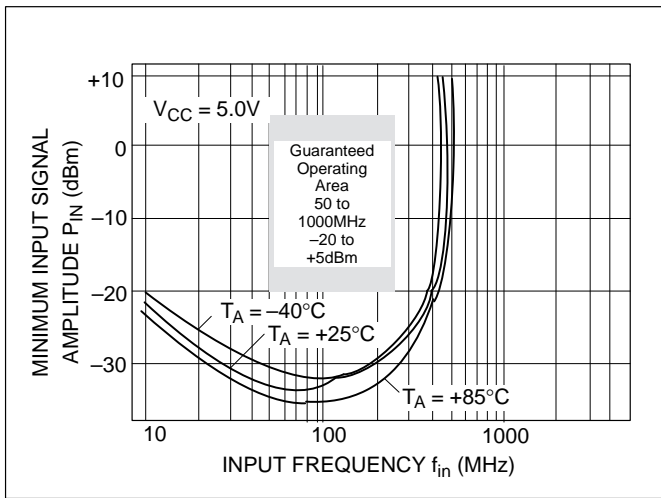


Figure 9. Input Sensitivity Curve (1/1 Divide Ratio) Temperature Dependency

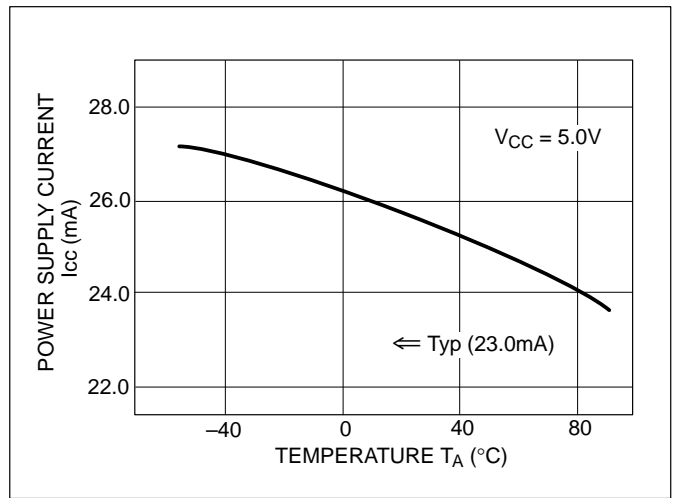
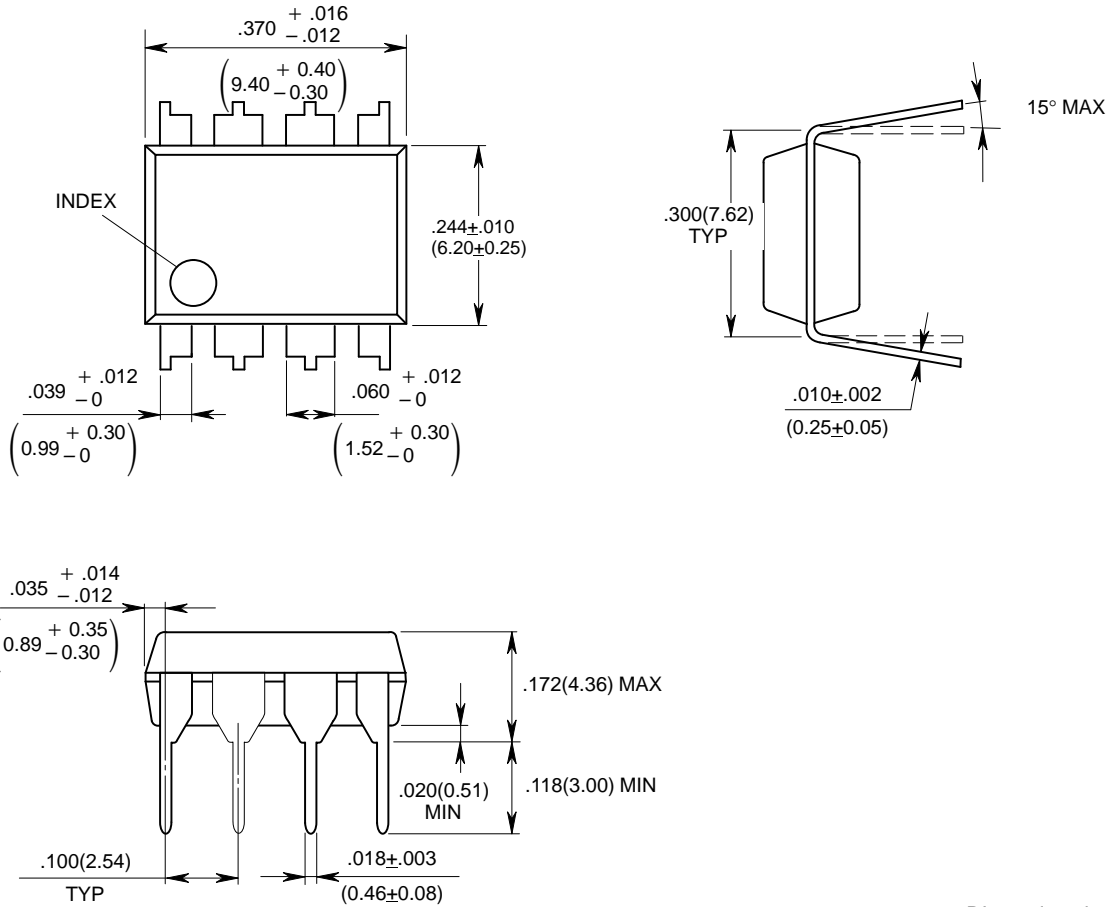


Figure 10. Power Supply Current vs. Temperature

PACKAGE DIMENSIONS

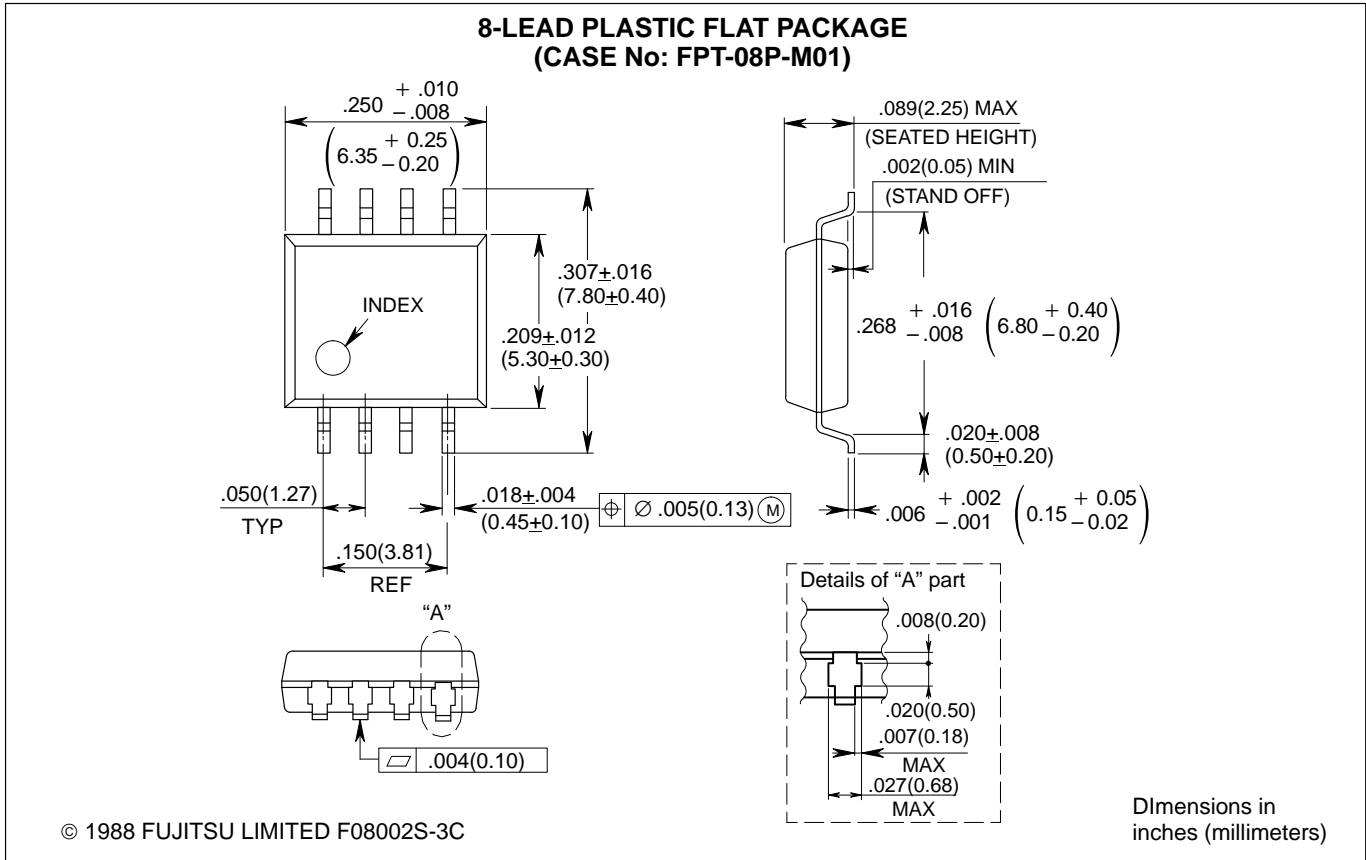
8-LEAD PLASTIC DUAL IN-LINE PACKAGE  
(CASE No: DIP-08P-M01)



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Dimensions in inches (millimeters)

PACKAGE DIMENSIONS (Continued)



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