

ASSP

DUAL COMPARATOR

MB47393

■ DESCRIPTION

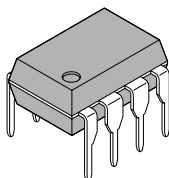
The Fujitsu MB47393 is a dual comparator which is designed to operate from a single power supply over a wide range of voltage. The input characteristics is equivalent of current industry standard comparator. Even though operated from a single power supply, the input common mode voltage range includes ground. Owing to adoption of clamp circuitry in input pins, mis-operation is prevented by negative input. The MB47393 is compatible with LM393.

■ FEATURES

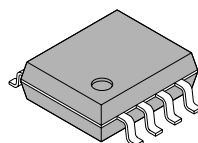
- Wide power supply voltage range
 - Single power supply — 2V to 30V
 - Dual power supplies — $\pm 1V$ to $\pm 15V$
- Wide input common-mode voltage range
0V to $(V_{CC} - 1.5)V$
- Low input bias current — 25nA typ.
- High sink current capability because of open collector output 40mA min.
- Package
 - Plastic 8 pin DIP package (Suffix: -P)
 - Plastic 8 pin FPT package (Suffix: -PF)
 - Plastic 9 pin SIP package (Suffix: -PS)

■ PACKAGE

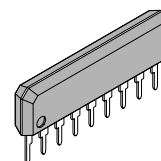
PLAPMSTIC PACKAGE
DIP-08P-M01



PLAPMSTIC PACKAGE
FPT-08P-M01

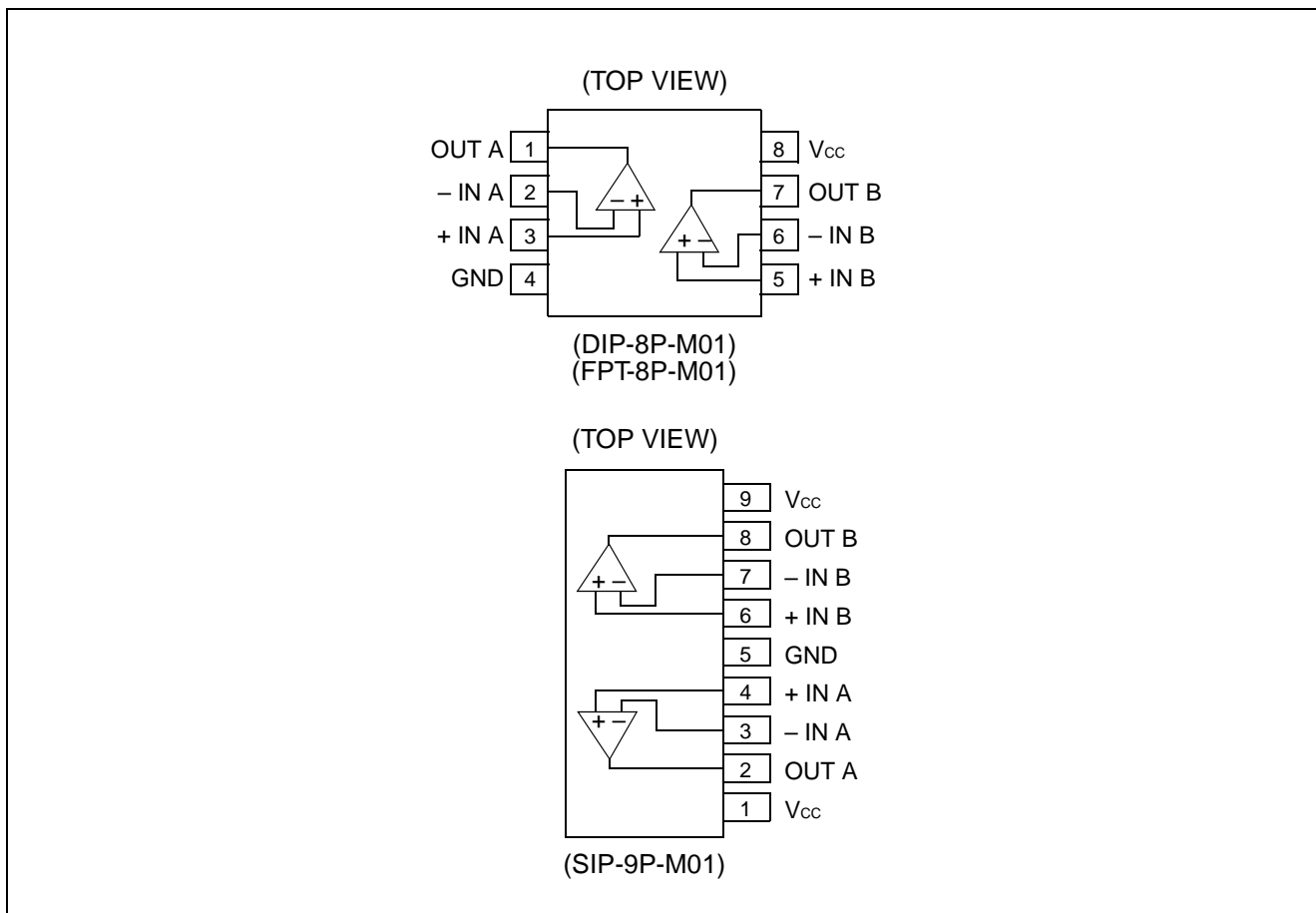


PLAPMSTIC PACKAGE
SIP-09P-M01



MB47393

■ PIN ASSIGNMENT



■ ABSOLUTE MAXIMUM RATINGS (see NOTE)

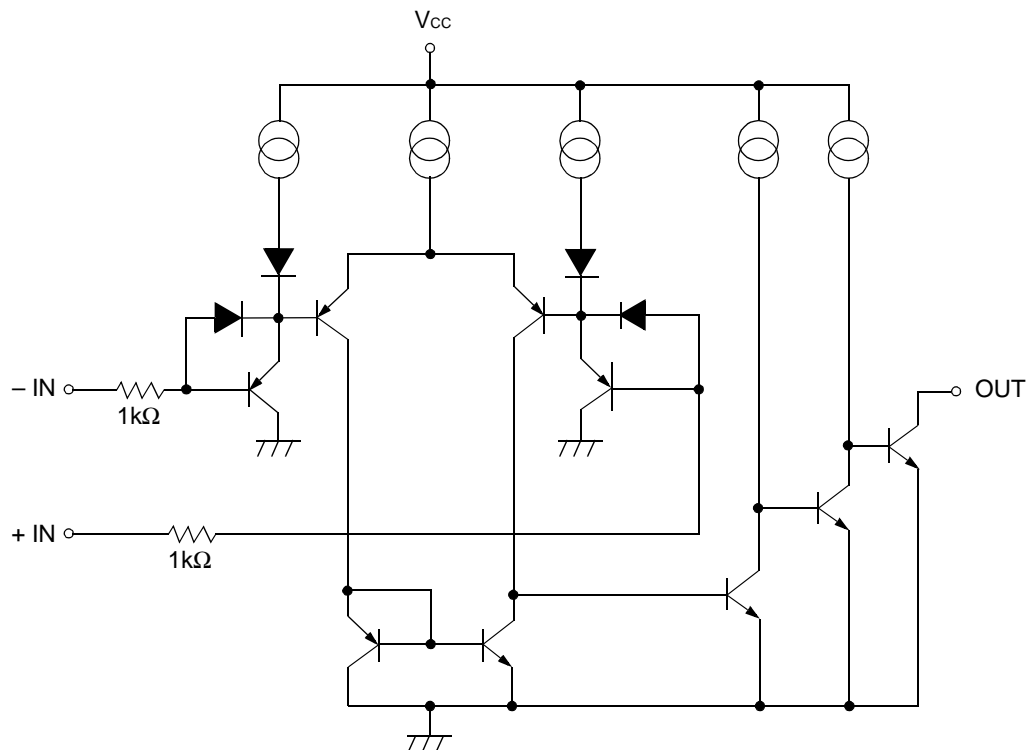
T_a = 25°C

Rating	Symbol	Value	Unit
Power Supply Voltage	V _{CC}	36	V
Differential Input Voltage	V _{ID}	36	V
Common-Mode Input Voltage	V _I	-5 to +36	V
Output Short Current to GND	—	Infinite*	—
Power Dissipation	P _D	350 (T _a 55°C)	mW
Operating Temperature	T _a	-20 to +75	°C
Storage Temperature	T _{STG}	-55 to +125	°C

* : This value is specified with respect to the short circuit from output to GND. However, short circuit from the output to V_{CC} cause device destruction.

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.

Figure 1 MB47393 EQUIVALENT CIRCUIT



RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Value	Unit
Power Supply Voltage	V _{CC}	2 to 30	V
		±1.0 to ±15	
Operating Temperature	T _a	-20 to +75	°C
Output Sink Current	I _{SINK}	40	mA

ELECTRICAL CHARACTERISTICS

($T_a = 25^\circ\text{C}$, $V_{CC} = 5\text{V}$)

Parameter	Symbol	Condition	Value			Unit
			Min.	Typ.	Max.	
Input Offset Voltage	V_{IO}	$V_O = V_{REF} = 1.4\text{V}$	—	2	5	mV
Input Offset Current	I_{IO}	—	—	5	50	nA
Input Bias Current	I_{IN*1}	—	—	25	250	nA
Common-Mode Input Voltage	V_{CM*2}	—	0	—	$V_{CC}-1.5$	V
Power Supply Current	I_{CC}	$R_L = \infty$	—	2	3	mA
Voltage Gain	A_v	$R_L = 15\text{k}\Omega$, $V_{CC} = 15\text{V}$	—	200	—	V/mV
Response Time	—	$R_L = 1\text{k}\Omega$	—	2	—	μs
Output Sink Current	I_{SINK}	$V_{IN(+)} = 0$, $V_{IN(-)} = 1\text{V}$, $V_{OL} \geq 1.5\text{V}$	40	—	—	mA
Output Saturation Voltage	V_{OL}	$V_{IN(+)} = 0$, $V_{IN(-)} = 1\text{V}$, $I_{SINK} = 30\text{mA}$	—	0.2	0.4	V
Output Leakage Current	I_{LEAK}	$V_{IN(+)} = 1\text{V}$, $V_{IN(-)} = 0\text{V}$, $V_O = 30\text{V}$	—	—	1	μA

Notes:

- *1: I_{IN} is measured when $V_I \approx 0$ and direction of the input current flows from IC. When negative voltage is applied to input pin, the pin is equivalently connected the GND through a $1\text{k}\Omega$ of resistor. When low voltage below than -5V is applied, please connect a resistor serially to input pin in order to prevent the high current flow.
- *2: Positive input voltage may exceed the power supply voltage. As long as the other voltage remains in the common-mode input voltage range, the comparator will provide a proper output state. When $V_{CC} = 5\text{V}$, your are requested to use V_{IN} below 25V .

TYPICAL CHARACTERISTIC CURVES

Figure 2 POWER SUPPLY CURRENT vs POWER SUPPLY VOLTAGE

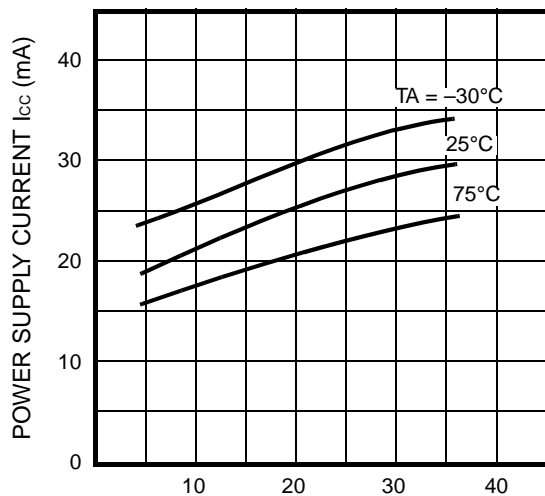
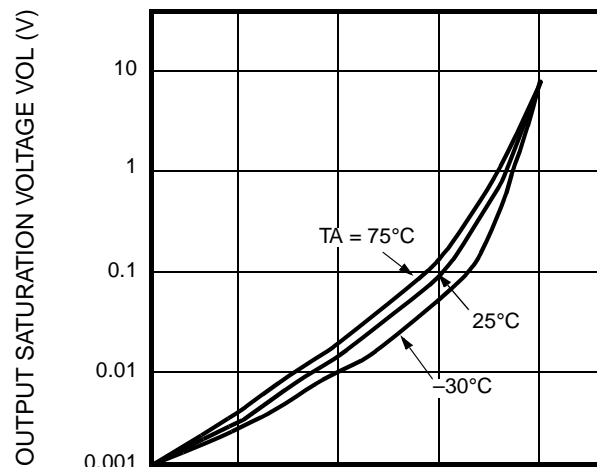


Figure 3 OUTPUT SATURATION VOLTAGE vs OUTPUT SINK CURRENT



■ TYPICAL CHARACTERISTIC CURVES (Continued)

Figure 4 INPUT CURRENT vs INPUT VOLTAGE

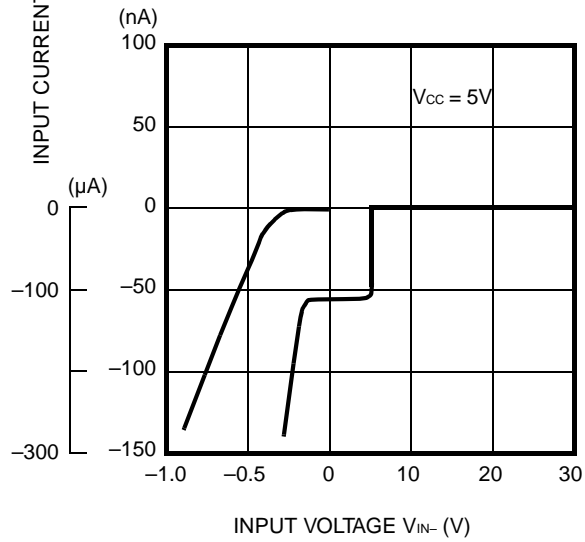


Figure 5 INPUT VOLTAGE/OUTPUT VOLTAGE vs RESPONSE TIME

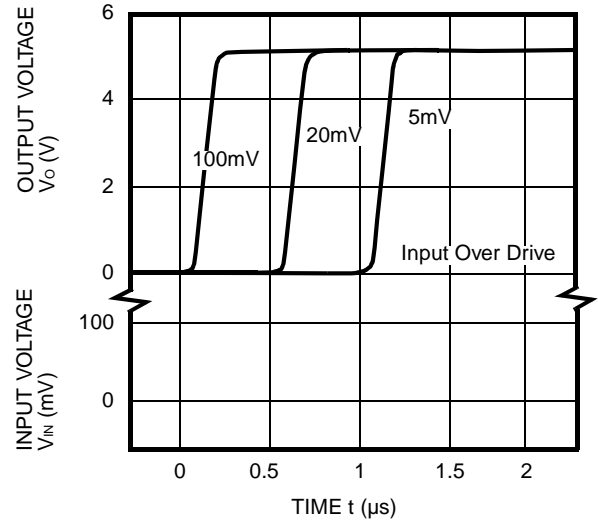


Figure 6 INPUT VOLTAGE/OUTPUT VOLTAGE vs RESPONSE TIME

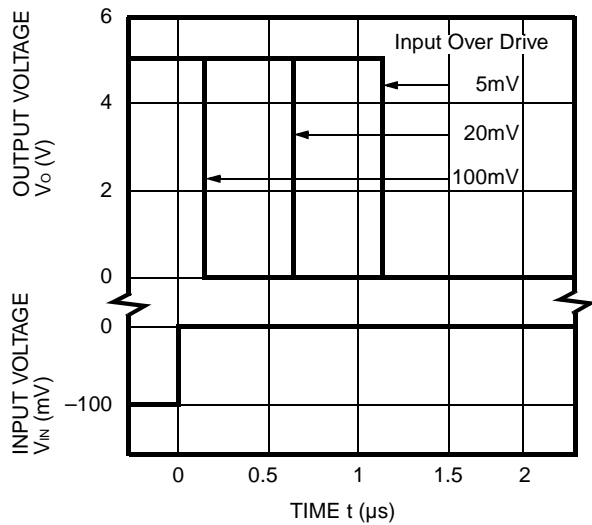
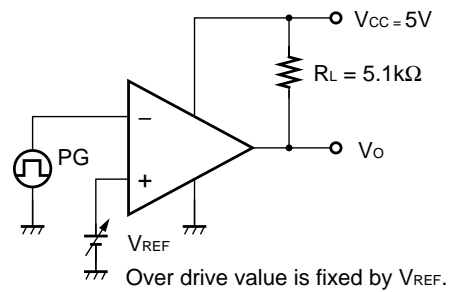
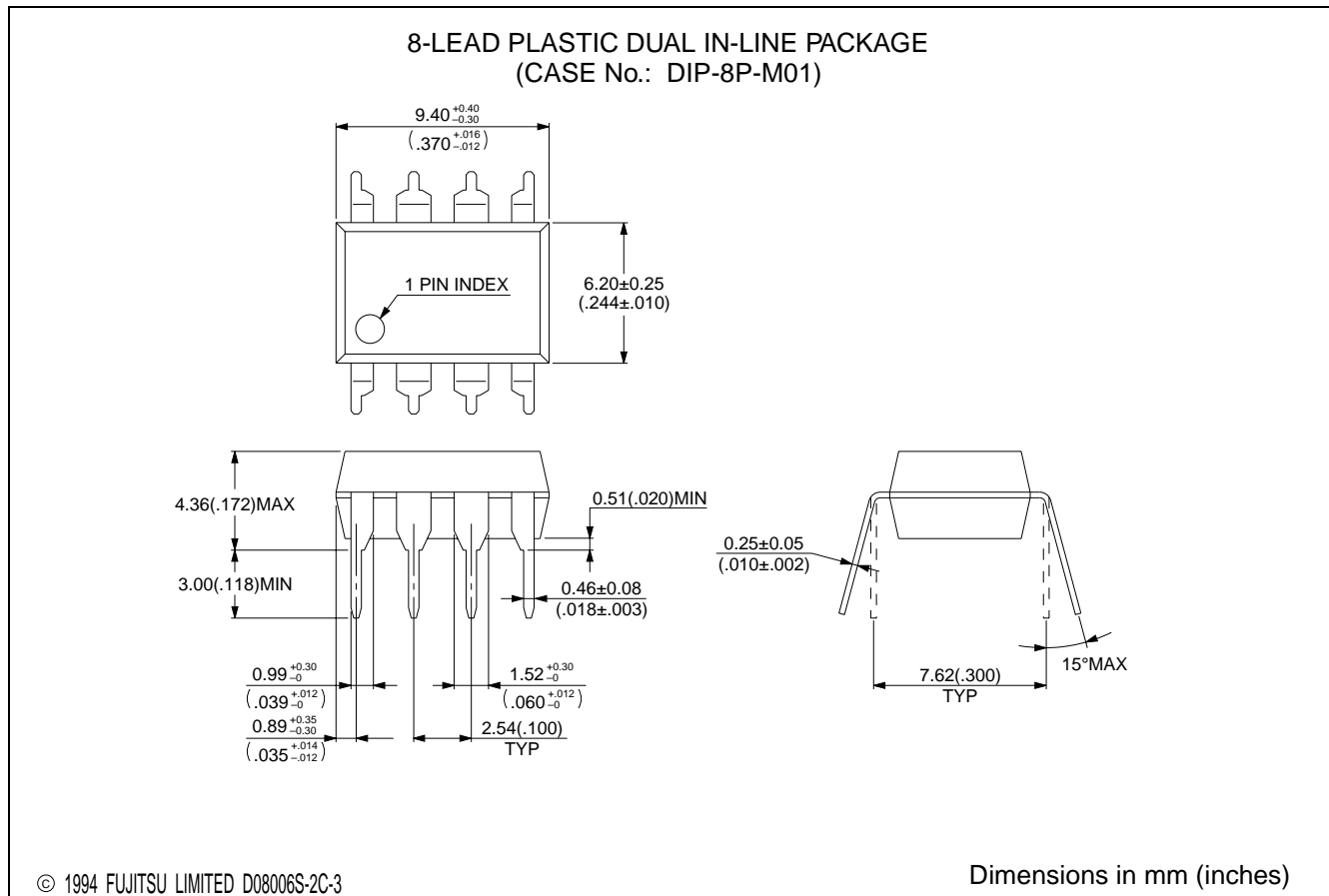


Figure 7 TEST CIRCUIT

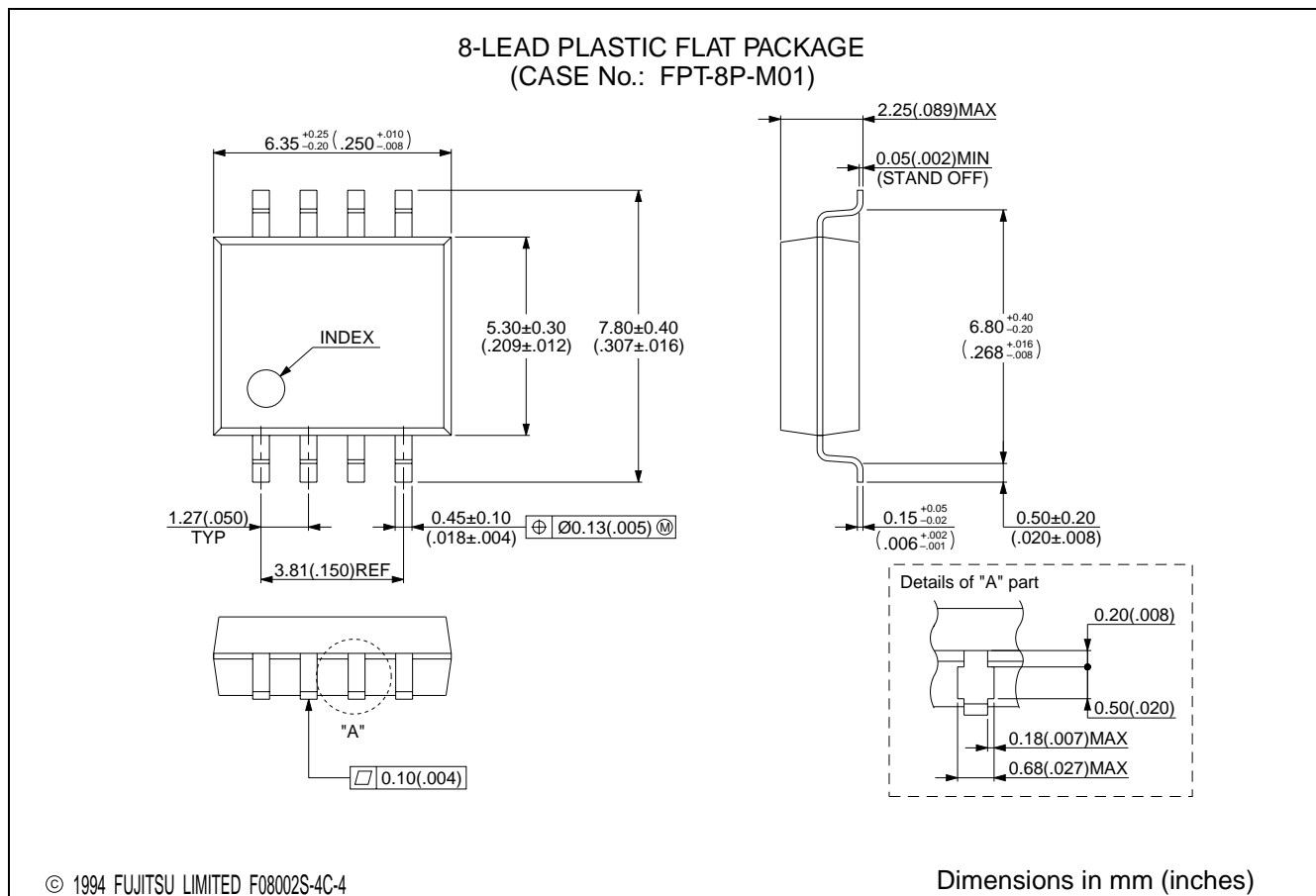


MB47393

■ PACKAGE DIMENSIONS



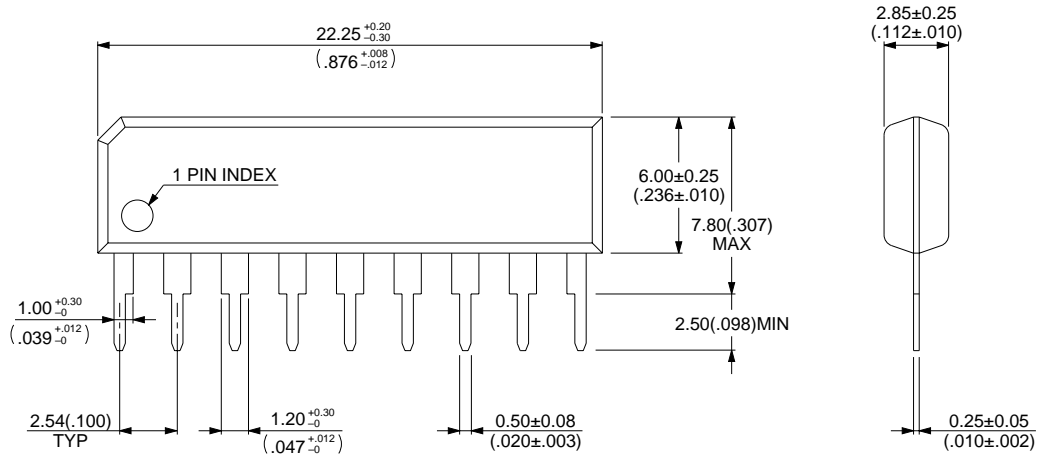
■ PACKAGE DIMENSIONS (Continued)



MB47393

■ PACKAGE DIMENSIONS (Continued)

9-LEAD PLASTIC SINGLE IN-LINE PACKAGE
(CASE No.: SIP-9P-M01)



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Dimensions in mm (inches)

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