



## **Z8051 Series 8-Bit Microcontrollers**

# **ZGFI7101 Earth Leakage Detector**

## **Product Specification**

PS030402-0212

PRELIMINARY





**Warning:** DO NOT USE THIS PRODUCT IN LIFE SUPPORT SYSTEMS.

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## Revision History

Each instance in this document's revision history reflects a change from its previous edition. For more details, refer to the corresponding page(s) or appropriate links furnished in the table below.

| Date     | Revision Level | Description                                      | Page |
|----------|----------------|--------------------------------------------------|------|
| Feb 2012 | 02             | Removed references to wafer sale product option. | All  |
| Jan 2012 | 01             | Original Zilog issue.                            | All  |

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## 1. General Description

The ZGFI7101 is designed for use in earth leakage circuit interrupters for operation directly off the AC Line in breakers. It contains pre-regulator, main-regulator, after-regulator, differential amplifier, level comparator, latch circuit. The input in the differential amplifier is connected to the secondary node of zero current transformer. The level comparator generates high level when earth leakage current is greater than some level.

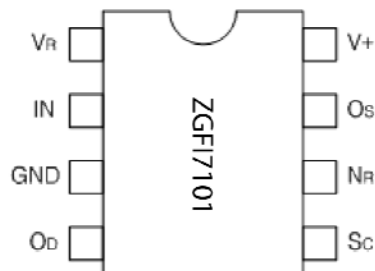
## 2. Features

- Low Power consumption (PD = 5mW) 100V/ 200V
- 100V/200V Common Built-in Voltage Regulator
- High Gain Differential Amplifier
- High Input Sensitivity (VT = 13.5mV Typ.)
- Minimum External Parts
- Large Surge Margin
- Wide Operating Temperature Range (T<sub>A</sub> = -30 to 85°C)
- High Noise Immunity
- GL7101,M54122 pin compatible

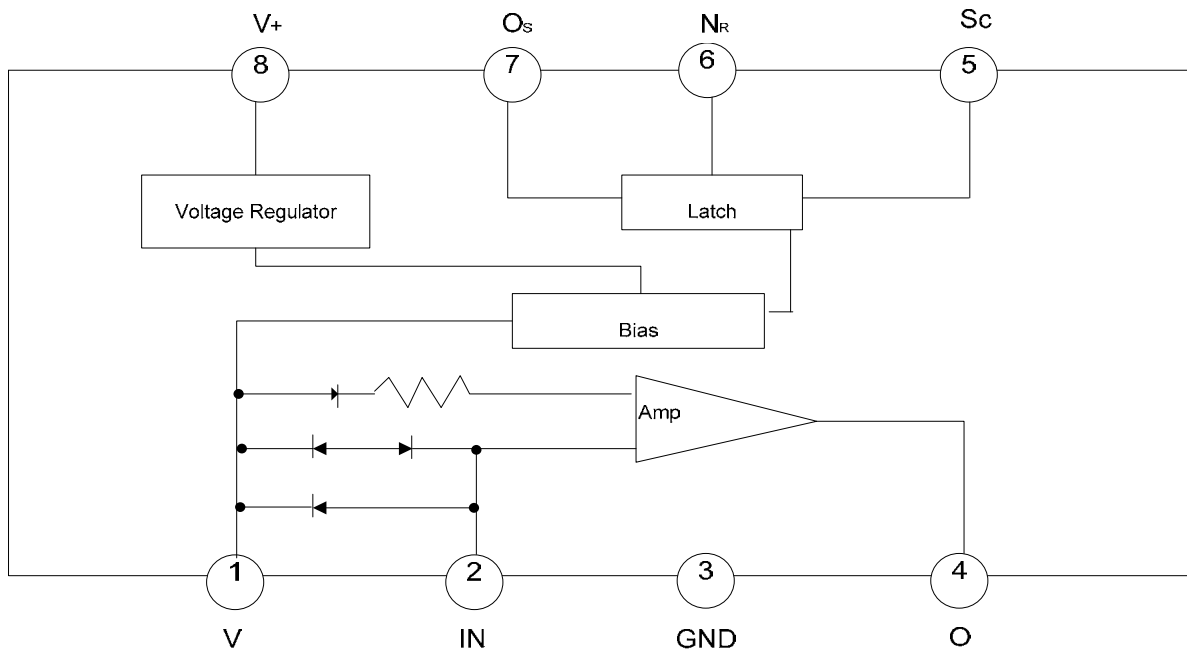
## 3. Ordering Information

| Device Name | Package |
|-------------|---------|
| ZGFI7101JBT | 8_SOP   |
| ZGFI7101PBT | 8_PDIP  |

## 4. Pin Assignment



## 5. Block Diagram



## 6. Absolute Maximum Rating (TA = 25°C)

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|                       |            |    |
|-----------------------|------------|----|
| Supply voltage        | 20         | V  |
| Supply Current        | 8          | mA |
| Power Dissipation     | 200        | mW |
| Operating Temperature | -30 to 85  |    |
| Storage Temperature   | -55 to 125 |    |

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## 7. Recommended Operating Condition : Ta = -30°C to 85°C

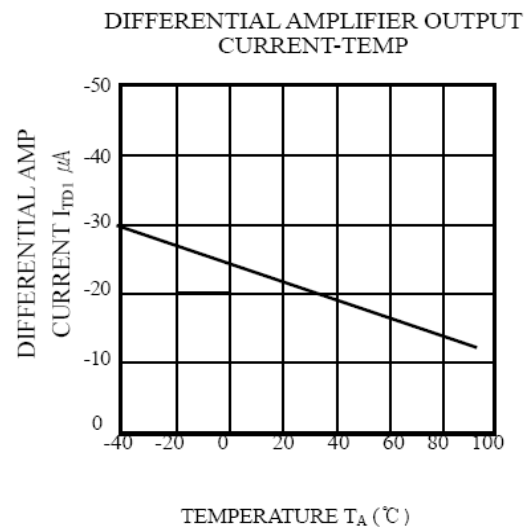
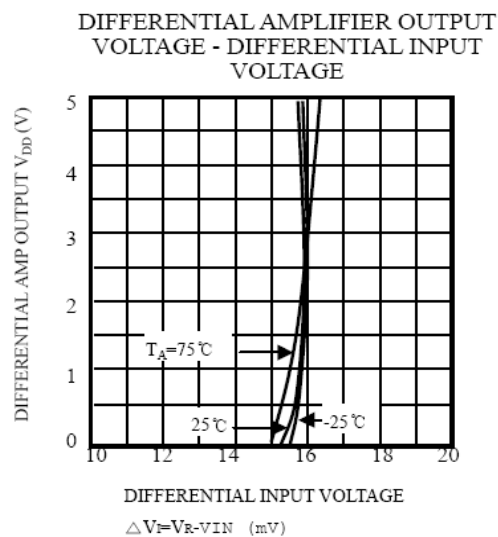
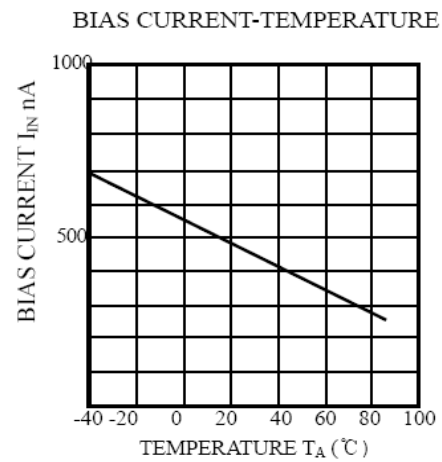
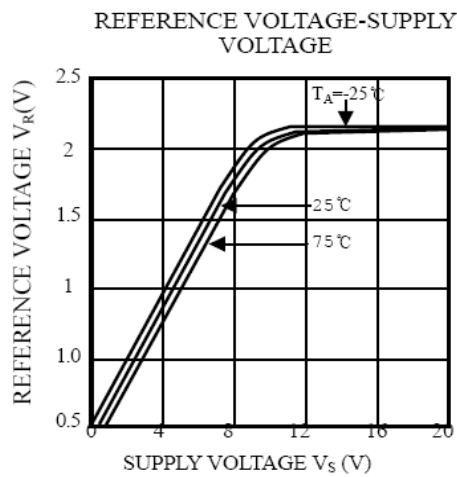
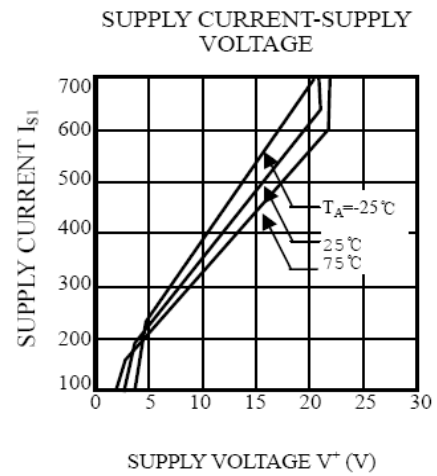
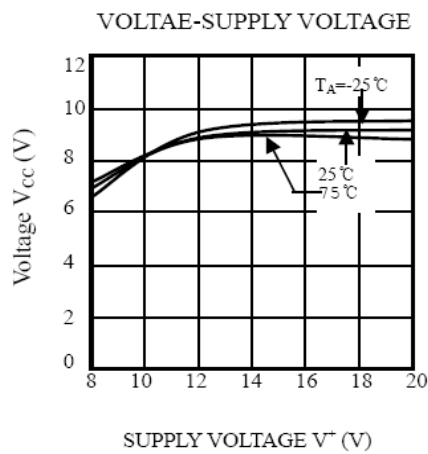
| PARAMETER        | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|------------------|--------|------|------|------|------|
| Supply Voltage   | V+     | 12   |      |      | V    |
| Vs-GND Capacitor | Cvs    | 1    |      |      | uF   |
| Os-GND Capacitor | Cos    |      |      | 1    | uF   |

## 8. Electrical Characteristics

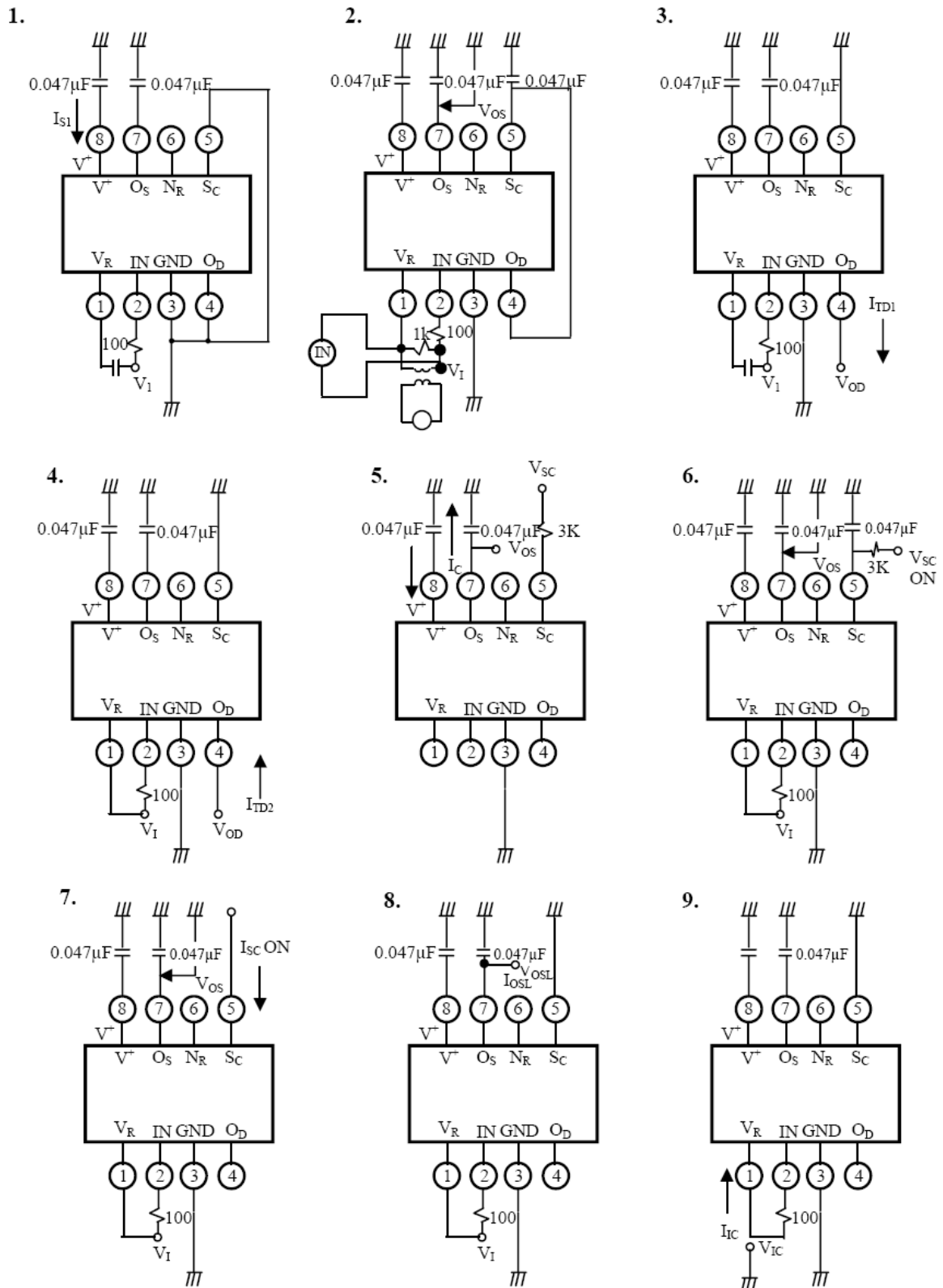
| PARAMETER                              | SYMBOL | CONDITONS                       | TEMP (°C)  | MIN. | TYP. | MAX. | UNIT    | TEST CIRCUT |
|----------------------------------------|--------|---------------------------------|------------|------|------|------|---------|-------------|
| SupplyCurrent1                         | IS1    | V+=12V, VR-VI=30mV              | -30        | -    | -    | 580  | uA      | 1           |
|                                        |        |                                 | 25         | -    | 400  | 530  |         |             |
|                                        |        |                                 | 85         | -    | -    | 480  |         |             |
| *Trip Voltage                          | VT     | V+=16V. VR-VI=X                 | -30~85     | 9    | 13.5 | 18   | mV(rms) | 2           |
| Differential Amplifier Output Current1 | ITD1   | V+=16V, VR-VI=30mV<br>VOD=1.2V  | 25         | -12  | -    | -30  | uA      | 3           |
| Differential Amplifier Output Current2 | ITD2   | V+=16V, VR-VI=short<br>VOD=0.8V | 25         | 17   | -    | 37   | uA      | 4           |
| Output Current                         | Io     | VSC=1.4V<br>VOS=0.8V            | IS1=580 uA | -30  | -200 | -    | uA      | 5           |
|                                        |        |                                 | IS1=530 uA | 25   | -100 | -    |         |             |
|                                        |        |                                 | IS1=480 uA | 85   | -75  | -    |         |             |
| Sc On Voltage                          | VSC ON | V+=16V                          | 25         | 0.7  | -    | 1.4  | V       | 6           |
| Sc Input Current                       | ISC ON | V+=12V                          | 25         | -    | -    | 5    | uA      | 7           |
| Output "L" Current                     | IOSL   | V+12V, VOSL =0.2V               | -30~85     | 200  | -    | -    | uA      | 8           |
| Input Clamp Voltage                    | VIC    | V+=12V, VIC=20mA                | -30~85     | 4.3  | -    | 6.7  | V       | 9           |
| Differential Input Clamp Voltage       | VIDC   | IIDC = 100mV                    | -30~85     | 0.4  | -    | 2    | V       | 10          |
| Max Current voltage                    | VSM    | ISM=7mA                         | 25         | 20   | -    | 28   | V       | 11          |
| Supply Current 2                       | IS2    | VOS=0.5V, VR-VI=X               | -30~85     | -    | -    | 900  | uA      | 12          |
| Latch Circuit Off Supply Voltage       | V+OFF  |                                 | 25         | 0.5  | -    |      | V       | 13          |
| Response Time                          | TON    | V+=16V, VR-VI=0.3V              | 25         | 1    | -    | 4    | ms      | 14          |

\* A :9~12.55 ,B :11.5~15.5 ,C :14.5 ~ 18

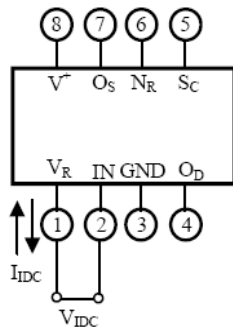
## 9. Typical Performance Curves



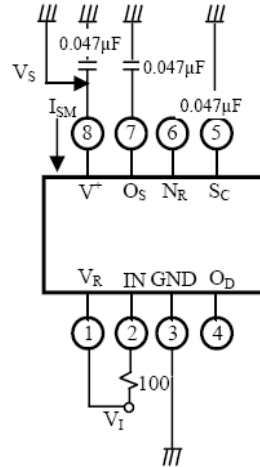
## 10. Test Circuit



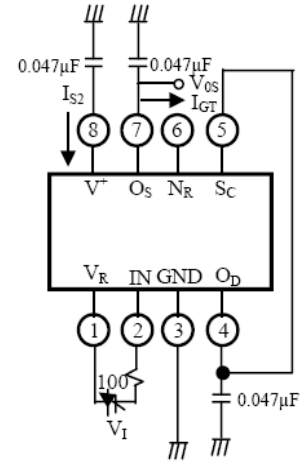
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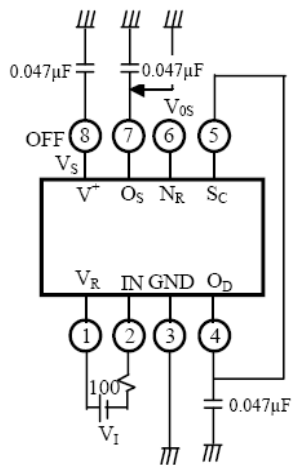
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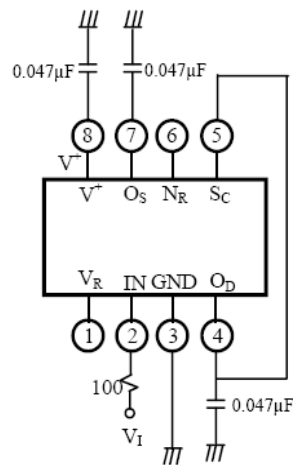
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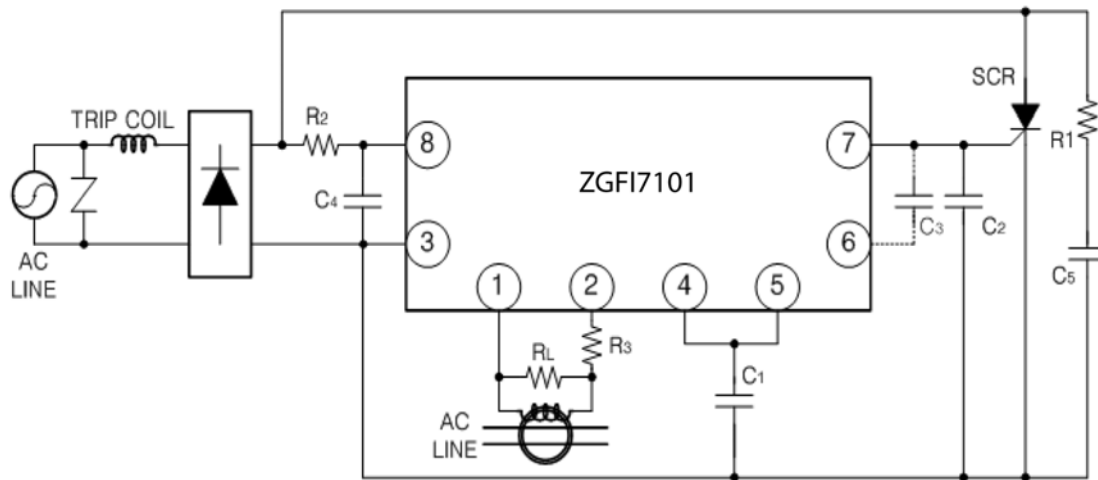
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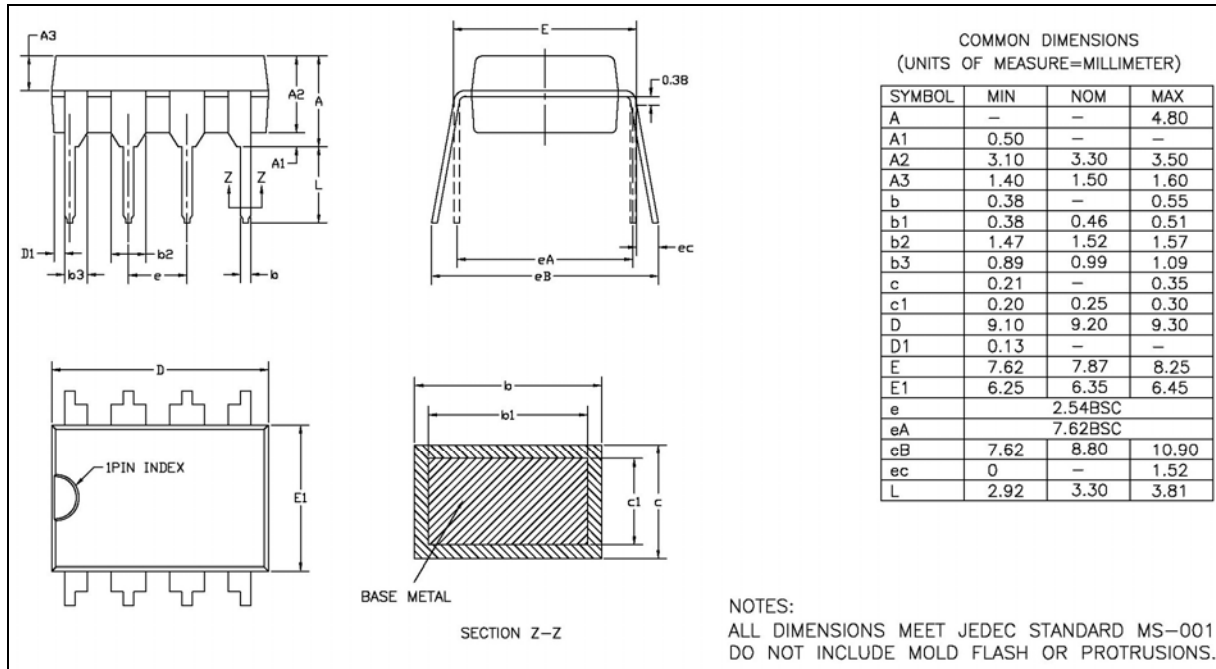
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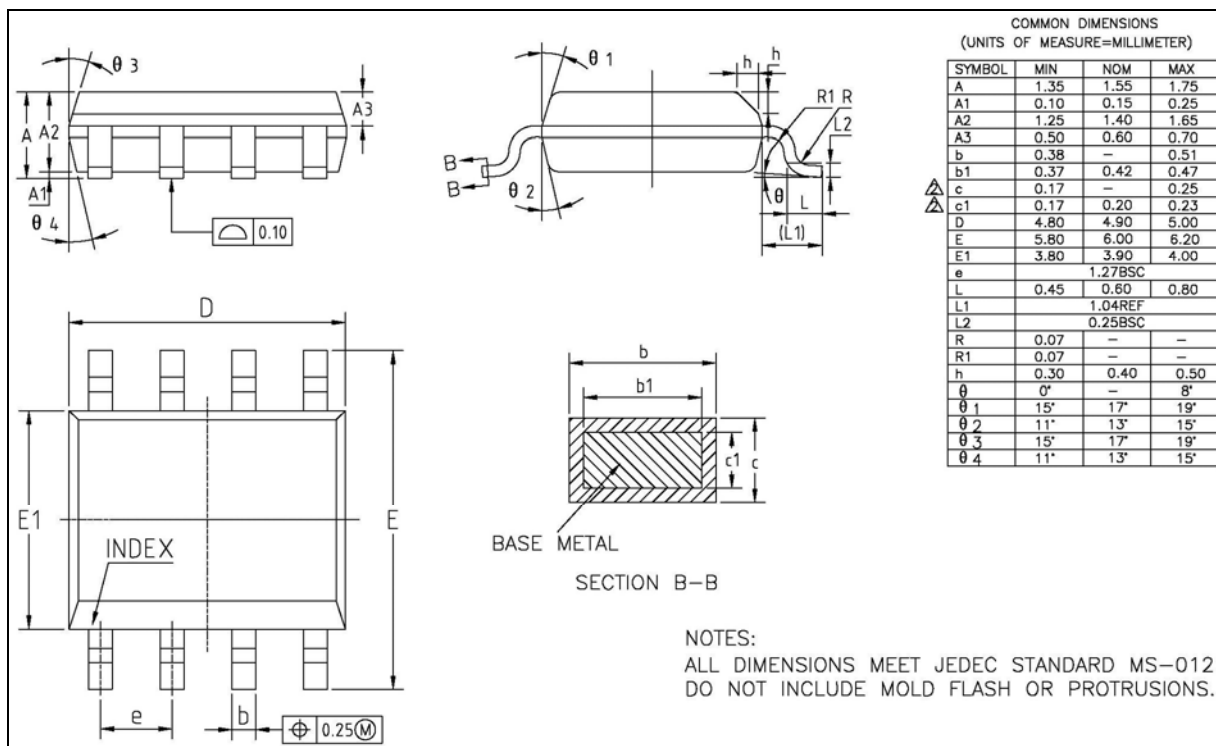
## 11. Typical Application



## 12. Package Dimensions 8DIP



## 8SOP



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