



## Voltage Detectors, ME2807 Series

### General Description

ME2807 Series are a set of three-terminal low power voltage detectors implemented in CMOS technology. Each voltage detector in the series detects a particular fixed voltage ranging from 2.0V to 7.0V. The voltage detectors consist of a high precision and low power consumption standard voltage source, a comparator, hysteresis circuit, and an output driver. CMOS technology ensures low power consumption.

### Features

- Highly accuracy Detection voltage:  $\pm 1\%$
- Low power consumption: TYP 1.8uA ( $V_{in}=3V$ )
- Detection voltage range: 2.0V~7.0V in 0.1V increments
- Operating voltage range: 1.5V~18V
- Detect voltage temperature characteristics:  
TYP  $\pm 0.9mV/^{\circ}C$
- Output configuration: CMOS

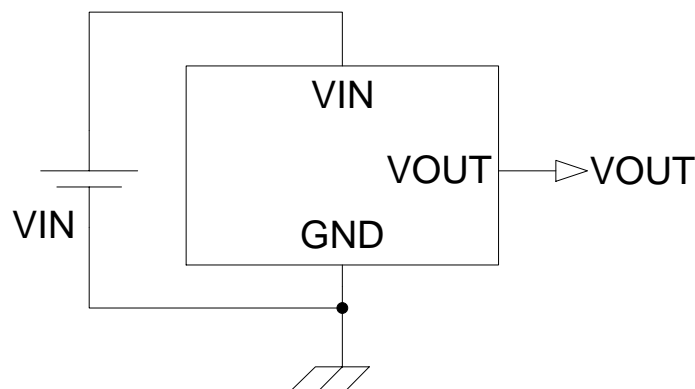
### Typical Application

- battery checkers
- Level selectors
- Power failure detectors
- Microcomputer reset
- Battery backup of Memories
- Store non-volatile RAM signal protectors

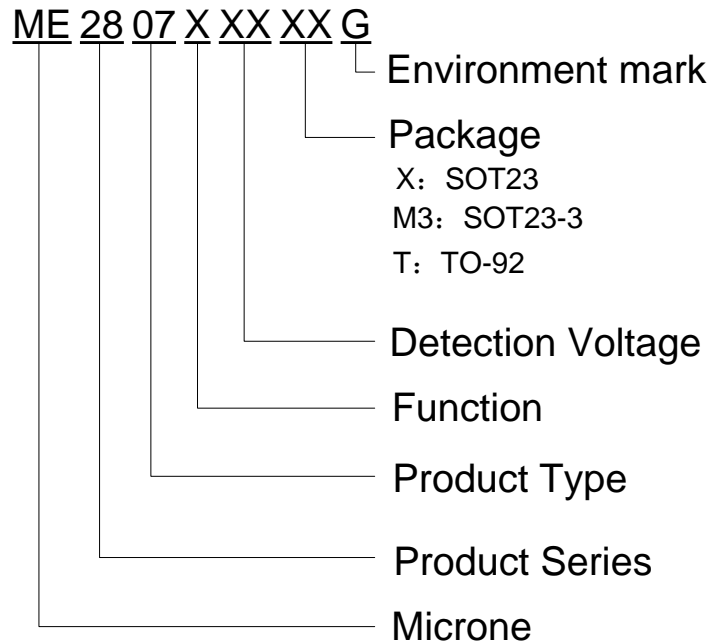
### Package

- 3-pin SOT23、SOT23-3、TO-92

### Typical Application Circuit



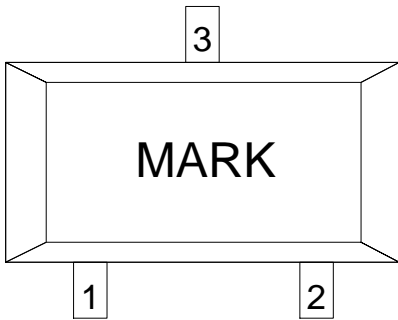
## Selection Guide



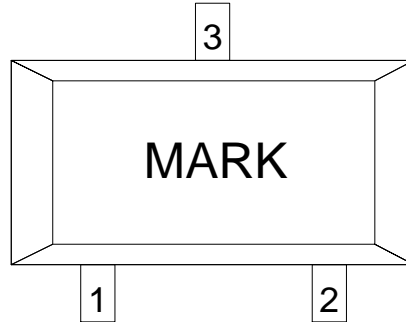
| product series | product description   |
|----------------|---|
| ME2807A27XG    | VIN=H→L V <sub>DET</sub> =2.7V;<br>VIN Falling edge detection; Package: SOT23   |
| ME2807A33XG    | VIN=H→L V <sub>DET</sub> =3.3V;<br>VIN Falling edge detection; Package: SOT23   |
| ME2807A22M3G   | VIN=H→L V <sub>DET</sub> =2.2V;<br>VIN Falling edge detection; Package: SOT23-3 |
| ME2807A33M3G   | VIN=H→L V <sub>DET</sub> =3.3V;<br>VIN Falling edge detection; Package: SOT23-3 |
| ME2807A22TG    | VIN=H→L V <sub>DET</sub> =2.2V;<br>VIN Falling edge detection; Package: TO-92   |
| ME2807B33M3G   | VIN=L→H V <sub>DET</sub> =3.3V;<br>VIN Rising edge detection; Package: SOT23-3  |

**NOTE:** At present ,there are seventeen kinds of detection voltage value: 2.2V、2.4V、2.5V、2.7V、2.8V、3.0V、3.2V、3.3V、3.5V、3.6V、3.8V、3.9V、4.0V、4.2V、4.3V、4.5V、5.0V。If you need other detection voltage and package, please contact our sales staff.

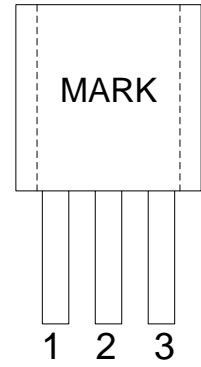
## Pin Configuration



SOT23



SOT23-3

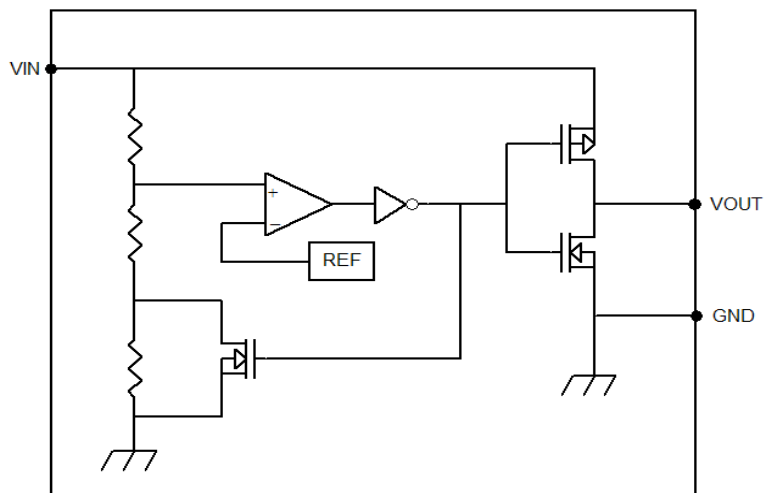


TO-92

## Pin Assignment

| Pin Number |         |       | Pin Name  | Functions      |
|------------|---------|-------|-----------|----------------|
| SOT23      | SOT23-3 | TO-92 |           |                |
| 2          | 2       | 3     | GND       | Ground         |
| 1          | 1       | 1     | $V_{OUT}$ | Output Voltage |
| 3          | 3       | 2     | $V_{IN}$  | Input Voltage  |

## Block Diagram



## Absolute Maximum Ratings

| PARAMETER                            |         | SYMBAL              | RATINGS                       | UNITS |
|--------------------------------------|---------|---------------------|-------------------------------|-------|
| V <sub>IN</sub> Input Voltage        |         | V <sub>INmax</sub>  | 18                            | V     |
| Output Current                       |         | I <sub>OUTmax</sub> | 20                            | mA    |
| Output Voltage                       | CMOS    | V <sub>OUT</sub>    | GND-0.3~ V <sub>IN</sub> +0.3 | V     |
| Continuous Total Power Dissipation   | SOT23   | P <sub>D</sub>      | 0.38                          | W     |
|                                      | SOT23-3 |                     | 0.54                          |       |
|                                      | TO-92   |                     | 0.83                          |       |
| Thermal resistance (Junction to air) | SOT23   | θ <sub>JA</sub>     | 330                           | °C /W |
|                                      | SOT23-3 |                     | 230                           |       |
|                                      | TO-92   |                     | 150                           |       |
| Maximum junction temperature         |         | T <sub>J</sub>      | -40~+150                      | °C    |
| Operating Ambient Temperature        |         | T <sub>Op</sub>     | -40~+85                       | °C    |
| Storage Temperature                  |         | T <sub>stg</sub>    | -55~+150                      | °C    |
| Soldering temperature and time       |         | T <sub>solder</sub> | 260°C, 10s                    |       |

## Electrical Characteristics (V<sub>DET</sub> = 2.0V to 7.0V, T<sub>A</sub> = 25°C, unless otherwise noted)

| Parameter                   | Symbol                             | Conditions   | Min.   | Typ.                   | Max.                   | Units |
|-----------------------------|------------------------------------|--|--|------------------------|------------------------|-------|
| Detect Voltage              | V <sub>DET</sub>                   | ME2807A V <sub>IN</sub> =H → L   | V <sub>DET</sub> ×0.99                           | V <sub>DET</sub>       | V <sub>DET</sub> ×1.01 | V     |
|                             |                                    | ME2807B V <sub>IN</sub> =L → H   |  |                        |                        |       |
| Hysteresis Width            | V <sub>HYS</sub>                   | V <sub>IN</sub> =L → H → L<br>V <sub>HYS</sub> = V <sub>DET(+)</sub> - V <sub>DET(-)</sub> | V <sub>DET</sub> ×0.02                           | V <sub>DET</sub> ×0.05 | V <sub>DET</sub> ×0.1  | V     |
| Operating Current           | I <sub>IN</sub>                    | V <sub>DET</sub> =2.0V~ 2.8V V <sub>IN</sub> = 3.0V  | -  | 1.8                    | 4                      | μA    |
|                             |                                    | V <sub>DET</sub> =2.8V~ 3.6V V <sub>IN</sub> = 4.0V  | -  | 1.8                    | 4                      |       |
|                             |                                    | V <sub>DET</sub> =3.6V~ 4.7V V <sub>IN</sub> = 5.0V  | -  | 2.1                    | 7                      |       |
|                             |                                    | V <sub>DET</sub> = 4.7V~7.0V V <sub>IN</sub> = 6.0V  | -  | 2.5                    | 7                      |       |
| Operating Voltage           | V <sub>IN</sub>                    | V <sub>DET</sub> = 2.0V ~ 7.0V   | 0.7  | -                      | 18                     | V     |
| Output Sink Current         | I <sub>OL</sub>                    | V <sub>DET</sub> =2.2V   | V <sub>IN</sub> = 2V<br>V <sub>OUT</sub> =0.2V   | 0.5                    | 1                      | mA    |
|                             |                                    | V <sub>DET</sub> =2.4V   |  |                        |                        |       |
|                             |                                    | V <sub>DET</sub> =2.7V   |  |                        |                        |       |
| Output Source Current       | I <sub>OH</sub>                    | V <sub>DET</sub> =2.2V   | V <sub>IN</sub> = 2.5V<br>V <sub>OUT</sub> =2.2V | -0.3                   | -0.5                   | mA    |
|                             |                                    | V <sub>DET</sub> =2.4V   | V <sub>IN</sub> = 3V<br>V <sub>OUT</sub> =2.7V   | -0.3                   | -0.5                   |       |
|                             |                                    | V <sub>DET</sub> =2.7V   | V <sub>IN</sub> = 3.2V<br>V <sub>OUT</sub> =2.9V | -0.3                   | -0.5                   |       |
| Temperature characteristics | ΔV <sub>DET</sub> /ΔT <sub>A</sub> | 0°C ≤ T <sub>opr</sub> ≤ 70°C  |  | ±0.9                   |                        | mV/°C |

## Functional Description

The ME2807 series is a set of voltage detectors equipped with a high stability voltage reference which is connected to the negative input of a comparator — denoted as  $V_{REF}$  in the following figure (Fig. 1). When the voltage drop to the positive input of the comparator (i.e.,  $V_B$ ) is higher than  $V_{REF}$ ,  $V_{OUT}$  goes high, M1 turns off, and  $V_B$  is expressed as  $V_{BH} = V_{IN} \times (R_B + R_C) / (R_A + R_B + R_C)$ . If  $V_{IN}$  is decreased so that  $V_B$  falls to a value that is less than  $V_{REF}$ , the comparator output inverts (from high to low),  $V_{OUT}$  goes low,  $V_C$  is high, M1 turns on,  $R_C$  is bypassed, and  $V_B$  becomes:  $V_{BL} = V_{IN} \times R_B / (R_A + R_B)$ , which is less than  $V_{BH}$ . By so doing the comparator out-put will stay low to prevent the circuit from oscillating when  $V_B \approx V_{REF}$ . If  $V_{IN}$  falls below the minimum operating voltage, the output becomes undefined. When  $V_{IN}$  goes from low to  $V_{IN} \times R_B / (R_A + R_B) > V_{REF}$ , the comparator output goes high and  $V_{OUT}$  goes high again.

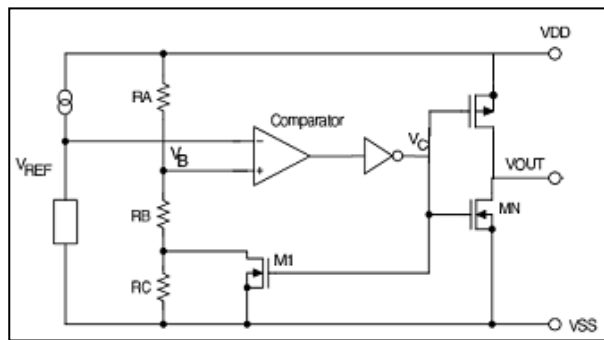


Fig.1 CMOS output voltage detector (ME2807)

### ME2807A: The detection voltage is as defined:

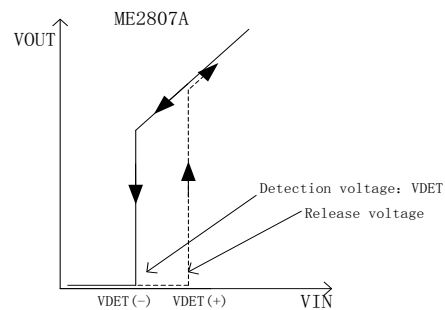
$$V_{DET(-)} = (R_A + R_B + R_C) \times V_{REF} / (R_B + R_C)$$

The release voltage is as defined:

$$V_{DET(+)} = (R_A + R_B) \times V_{REF} / R_B$$

The hysteresis width is:

$$V_{HYS} = V_{DET(+)} - V_{DET(-)}$$



### ME2807B: The detection voltage is as defined:

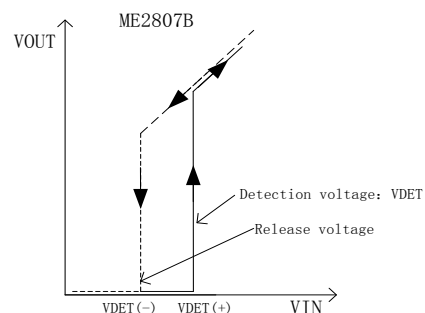
$$V_{DET(+)} = (R_A + R_B) \times V_{REF} / R_B$$

The release voltage is as defined:

$$V_{DET(-)} = (R_A + R_B + R_C) \times V_{REF} / (R_B + R_C)$$

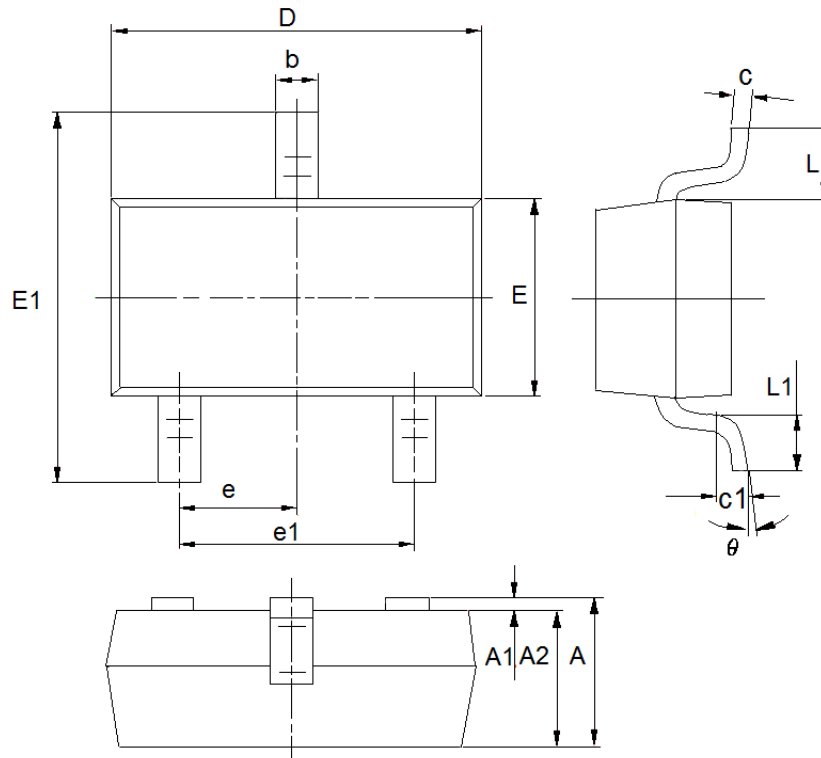
The hysteresis width is:

$$V_{HYS} = V_{DET(+)} - V_{DET(-)}$$



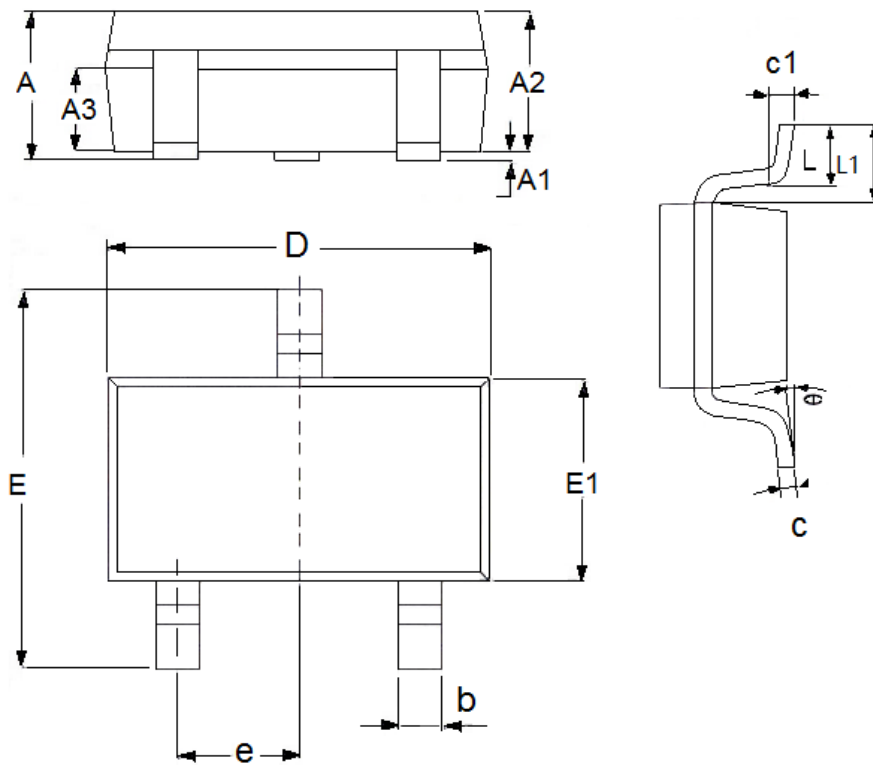
## Packaging Information

- SOT23



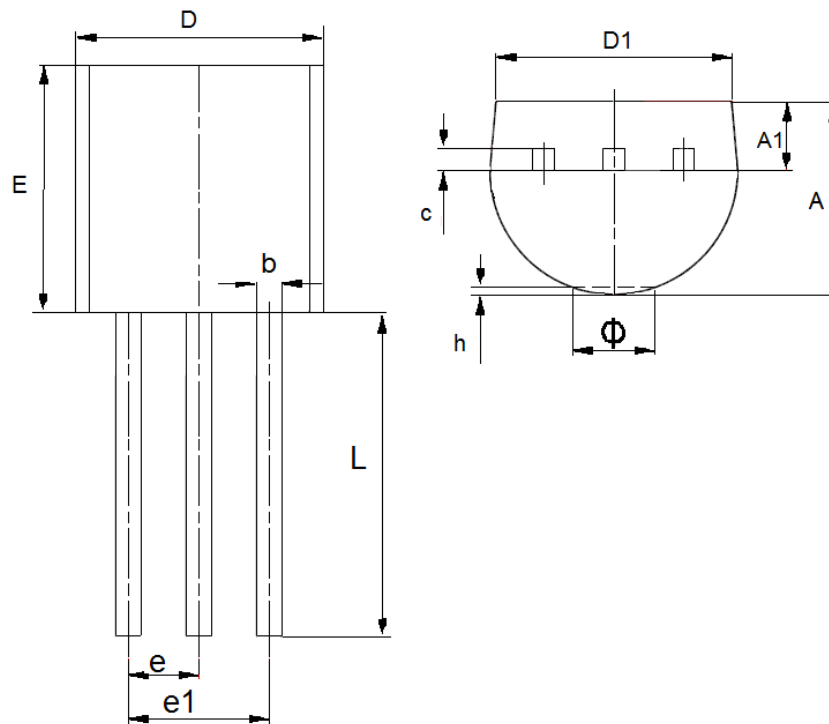
| DIM | Millimeters |      | Inches      |        |
|-----|-------------|------|-------------|--------|
|     | Min         | Max  | Min         | Max    |
| A   | 0.9         | 1.15 | 0.0354      | 0.0453 |
| A1  | 0           | 0.14 | 0.0000      | 0.0055 |
| A2  | 0.9         | 1.05 | 0.0354      | 0.0413 |
| b   | 0.28        | 0.52 | 0.0110      | 0.0205 |
| c   | 0.07        | 0.23 | 0.0028      | 0.0091 |
| D   | 2.8         | 3.0  | 0.1102      | 0.1181 |
| e1  | 1.8         | 2.0  | 0.0709      | 0.0787 |
| E   | 1.2         | 1.4  | 0.0472      | 0.0551 |
| E1  | 2.2         | 2.6  | 0.0866      | 0.1024 |
| e   | 0.95(TYP)   |      | 0.0374(TYP) |        |
| L   | 0.55(TYP)   |      | 0.0217(TYP) |        |
| L1  | 0.25        | 0.55 | 0.0098      | 0.0217 |
| θ   | 0           | 8°   | 0.0000      | 8°     |
| c1  | 0.25(TYP)   |      | 0.0098(TYP) |        |

● SOT23-3



| DIM | Millimeters |      | Inches      |        |
|-----|-------------|------|-------------|--------|
|     | Min         | Max  | Min         | Max    |
| A   | 1.05        | 1.45 | 0.0413      | 0.0571 |
| A1  | 0           | 0.15 | 0.0000      | 0.0059 |
| A2  | 0.9         | 1.3  | 0.0354      | 0.0512 |
| A3  | 0.6         | 0.7  | 0.0236      | 0.0276 |
| b   | 0.25        | 0.5  | 0.0098      | 0.0197 |
| c   | 0.1         | 0.25 | 0.0039      | 0.0098 |
| D   | 2.8         | 3.1  | 0.1102      | 0.1220 |
| E   | 2.6         | 3.1  | 0.1023      | 0.1220 |
| E1  | 1.5         | 1.8  | 0.0591      | 0.0709 |
| e   | 0.95(TYP)   |      | 0.0374(TYP) |        |
| L   | 0.25        | 0.6  | 0.0098      | 0.0236 |
| L1  | 0.59(TYP)   |      | 0.0232(TYP) |        |
| θ   | 0           | 8°   | 0.0000      | 8°     |
| c1  | 0.2(TYP)    |      | 0.0079(TYP) |        |

● TO-92



| DIM | Millimeters |      | Inches  |        |
|-----|-------------|------|---------|--------|
|     | Min         | Max  | Min     | Max    |
| A   | 3.3         | 3.7  | 0.1299  | 0.1457 |
| A1  | 1.1         | 1.4  | 0.0433  | 0.0551 |
| b   | 0.38        | 0.55 | 0.015   | 0.0217 |
| c   | 0.36        | 0.51 | 0.0142  | 0.0201 |
| D   | 4.3         | 4.7  | 0.1693  | 0.185  |
| D1  | 3.43        | —    | 0.135   | —      |
| E   | 4.3         | 4.7  | 0.1693  | 0.185  |
| e   | 1.27TYP     |      | 0.05TYP |        |
| e1  | 2.44        | 2.64 | 0.0961  | 0.1039 |
| L   | 14.1        | 14.5 | 0.5551  | 0.5709 |
| h   | 0           | 0.38 | 0       | 0.015  |
| Φ   | —           | 1.6  | —       | 0.063  |



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