

## 1. Description

The IRF7341TRPBF(ES) is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product IRF7341TRPBF(ES) is Pb-free.

## 2. Features

- 60V,  $R_{DS(ON)}=30m\Omega(Typ.) @V_{GS}=10V$   
 $R_{DS(ON)}=36m\Omega(Typ.) @V_{GS}=4.5V$
- Use trench MOSFET technology
- High density cell design for low  $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

## 3. Applications

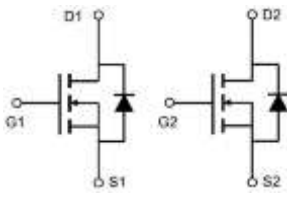
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

100% UIS TESTED

## 4. Ordering Information

| Part Number      | Package | Marking         | Material     | Packaging   | Quantity per Reel | Flammability Rating | Reel Sizes |
|------------------|---------|-----------------|--------------|-------------|-------------------|---------------------|------------|
| IRF7341TRPBF(ES) | SOP8    | ES4946D/LO<br>T | Halogen free | Tape & Reel | 3,000 PCS         | UL 94V-0            | 13 Inches  |

## 5. Pin Configuration and Functions

| Pin | Function | Outline | Circuit Diagram                                                                       |
|-----|----------|---------|---------------------------------------------------------------------------------------|
| 2   | Gate2    | Note b  |  |
| 1   | Source2  |         |                                                                                       |
| 7/8 | Drain2   |         |                                                                                       |
| 4   | Gate1    |         |                                                                                       |
| 3   | Source1  |         |                                                                                       |

|     |        |                                                                                   |  |
|-----|--------|-----------------------------------------------------------------------------------|--|
| 5/6 | Drain1 |  |  |
|-----|--------|-----------------------------------------------------------------------------------|--|

## 6. Specification

### Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

| Parameter                                     |                           | Symbol     | Limit      | Unit             |
|-----------------------------------------------|---------------------------|------------|------------|------------------|
| Drain-Source Voltage                          |                           | $BV_{DSS}$ | 60         | V                |
| Gate-Source Voltage                           |                           | $V_{GS}$   | $\pm 20$   | V                |
| Continuous Drain Current                      | $T_A = 25^\circ\text{C}$  | $I_D$      | 5          | A                |
|                                               | $T_A = 100^\circ\text{C}$ |            | 3.3        |                  |
| Maximum Power Dissipation                     |                           | $P_D$      | 2          | W                |
| Pulsed Drain Current                          |                           | $I_{DM}$   | 20         | A                |
| Avalanche Current, Single Pulsed <sup>a</sup> |                           | $I_{AS}$   | 11.5       | A                |
| Avalanche Energy, Single Pulsed <sup>a</sup>  |                           | $E_{AS}$   | 33         | mJ               |
| Operating Junction Temperature                |                           | $T_J$      | 150        | $^\circ\text{C}$ |
| Lead Temperature                              |                           | $T_L$      | 260        | $^\circ\text{C}$ |
| Storage Temperature Range                     |                           | $T_{stg}$  | -55 to 150 | $^\circ\text{C}$ |

### Thermal resistance ratings

| Single Operation                       |                 |         |         |                    |
|----------------------------------------|-----------------|---------|---------|--------------------|
| Parameter                              | Symbol          | Typical | Maximum | Unit               |
| Junction-to-Ambient Thermal Resistance | $R_{\theta JA}$ |         | 62.5    | $^\circ\text{C/W}$ |

Note:

a:  $T_J = 25^\circ\text{C}$ ,  $V_{DD} = 30\text{V}$ ,  $V_G = 10\text{V}$ ,  $L = 0.5\text{mH}$ ,  $R_g = 25\Omega$

b: This diagram is only an electrical schematic, and the actual pin size is based on POD.

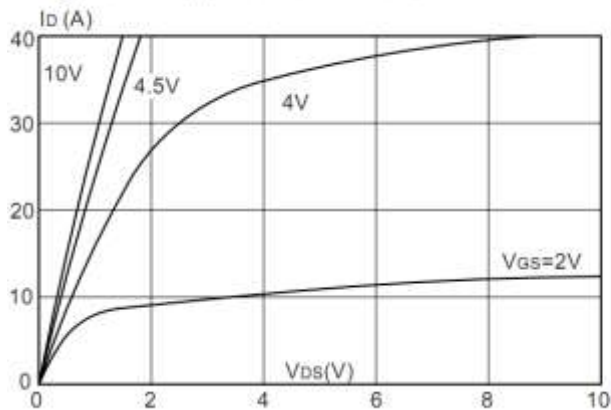
## Electrical Characteristics

At TA = 25°C unless otherwise specified

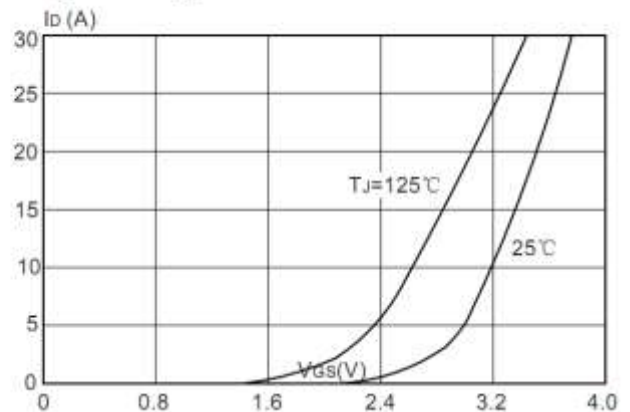
| Parameter                                 | Symbol              | Test Conditions                                                                         | Min. | Typ. | Max. | Unit |
|-------------------------------------------|---------------------|-----------------------------------------------------------------------------------------|------|------|------|------|
| OFF CHARACTERISTICS                       |                     |                                                                                         |      |      |      |      |
| Drain-to-Source Breakdown Voltage         | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA                                              | 60   |      |      | V    |
| Zero Gate Voltage Drain Current           | I <sub>DSS</sub>    | V <sub>DS</sub> =60V, V <sub>GS</sub> =0V                                               |      |      | 1    | uA   |
| Gate-to-source Leakage Current            | I <sub>GSS</sub>    | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V                                              |      |      | ±100 | nA   |
| ON CHARACTERISTICS                        |                     |                                                                                         |      |      |      |      |
| Gate Threshold Voltage                    | V <sub>GS(TH)</sub> | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA                                | 1.0  | 1.6  | 2.5  | V    |
| Drain-to-source On-resistance             | R <sub>DS(on)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =5A                                                |      | 30   | 40   | mΩ   |
|                                           |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A                                               |      | 36   | 50   |      |
| Forward transconductance                  | g <sub>fs</sub>     | V <sub>DS</sub> =5V, I <sub>D</sub> =5A                                                 |      |      | 40   | S    |
| CHARGES, CAPACITANCES AND GATE RESISTANCE |                     |                                                                                         |      |      |      |      |
| Input Capacitance                         | C <sub>ISS</sub>    | V <sub>GS</sub> =0V, f=1MHz,<br>V <sub>DS</sub> =25V                                    |      | 1150 |      | pF   |
| Output Capacitance                        | C <sub>OSS</sub>    |                                                                                         |      | 59   |      |      |
| Reverse Transfer Capacitance              | C <sub>RSS</sub>    |                                                                                         |      | 50   |      |      |
| Total Gate Charge                         | Q <sub>G(TOT)</sub> | V <sub>GS</sub> =10V, V <sub>DS</sub> =30V,<br>I <sub>D</sub> =2.5A                     |      | 21   |      | nC   |
| Gate-to-Source Charge                     | Q <sub>GS</sub>     |                                                                                         |      | 4    |      |      |
| Gate-to-Drain Charge                      | Q <sub>GD</sub>     |                                                                                         |      | 5.5  |      |      |
| SWITCHING CHARACTERISTICS                 |                     |                                                                                         |      |      |      |      |
| Turn-On Delay Time                        | t <sub>d(ON)</sub>  | V <sub>GS</sub> =10V, V <sub>DS</sub> =30V,<br>I <sub>D</sub> =5A, R <sub>G</sub> =1.8Ω |      | 8    |      | ns   |
| Rise Time                                 | t <sub>r</sub>      |                                                                                         |      | 20   |      |      |
| Turn-Off Delay Time                       | t <sub>d(OFF)</sub> |                                                                                         |      | 15   |      |      |
| Fall Time                                 | t <sub>f</sub>      |                                                                                         |      | 25   |      |      |
| BODY DIODE CHARACTERISTICS                |                     |                                                                                         |      |      |      |      |
| Forward Voltage                           | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =5A                                                 |      |      | 1.5  | V    |

## 7. Typical Characteristic

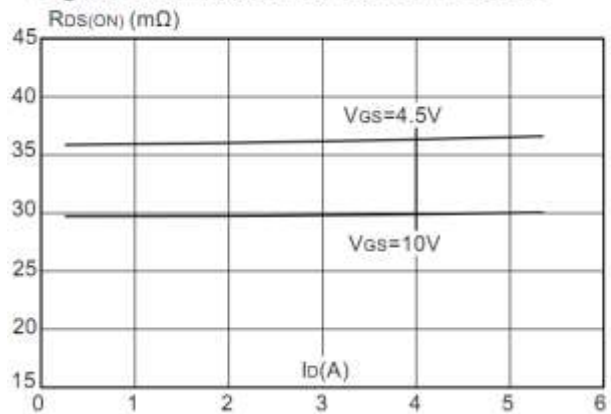
**Figure1: Output Characteristics**



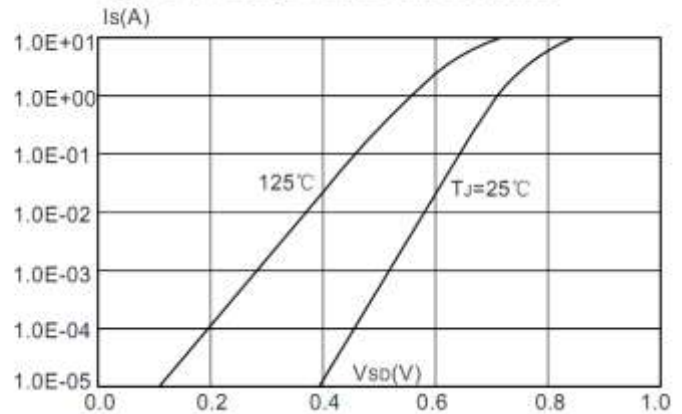
**Figure 2: Typical Transfer Characteristics**



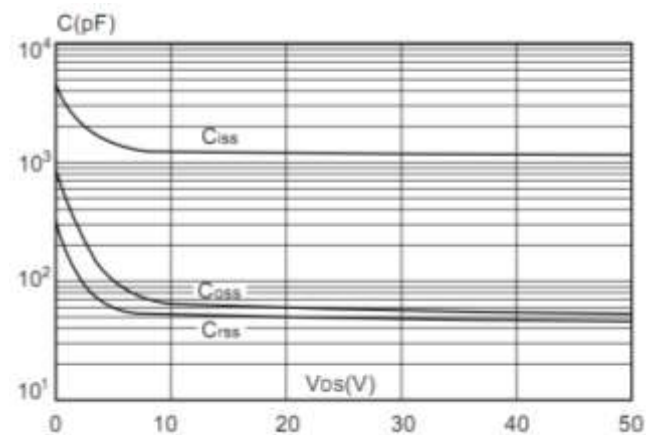
**Figure 3: On-resistance vs. Drain Current**



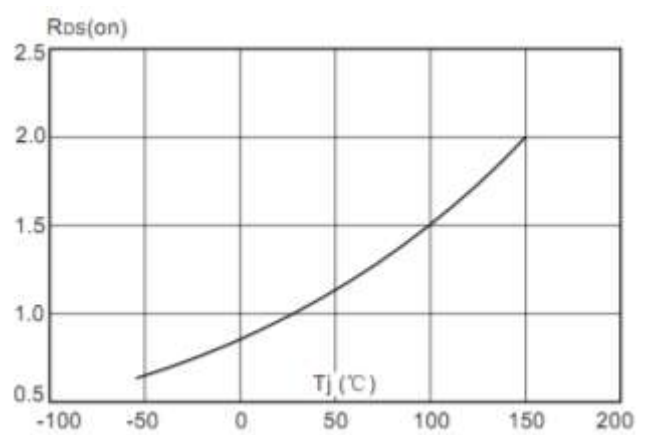
**Figure 4: Body Diode Characteristics**



**Figure 5: Capacitance Characteristics**

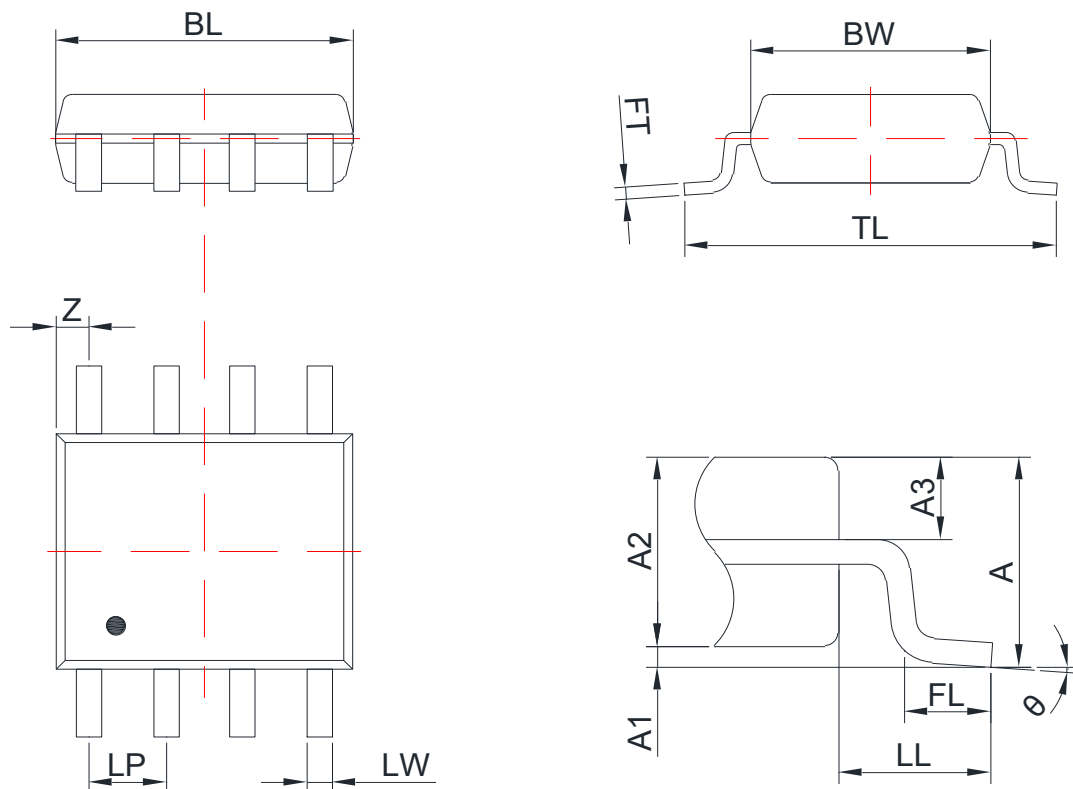


**Figure 6: Normalized on Resistance vs. Junction Temperature**



## 8. Dimension (SOP8)

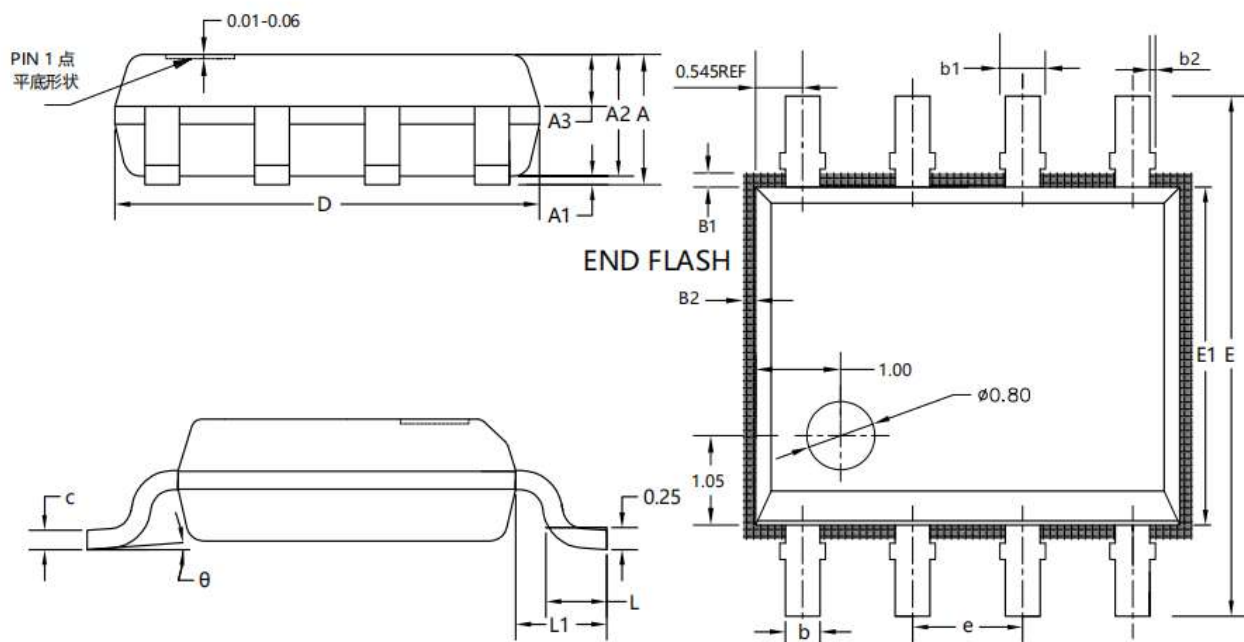
POD A(Y)



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

| Symbol | Dimensions |      | Symbol | Dimensions |      |
|--------|------------|------|--------|------------|------|
|        | Min.       | Max. |        | Min.       | Max. |
| A      | 1.75       |      | FL     | 0.50       | 0.80 |
| A1     | 0.05       | 0.15 | LP     | 1.25       | 1.30 |
| A2     | 1.40       | 1.50 | LL     | 1.1 BSC    |      |
| A3     | 0.623 BSC  |      | LW     | 0.38       | 0.43 |
| BL     | 4.92       | 5.08 | TL     | 5.90       | 6.10 |
| BW     | 3.70       | 4.10 | Z      | 0.54       |      |
| FT     | 0.20       | 0.21 | θ      | 0°         | 8°   |

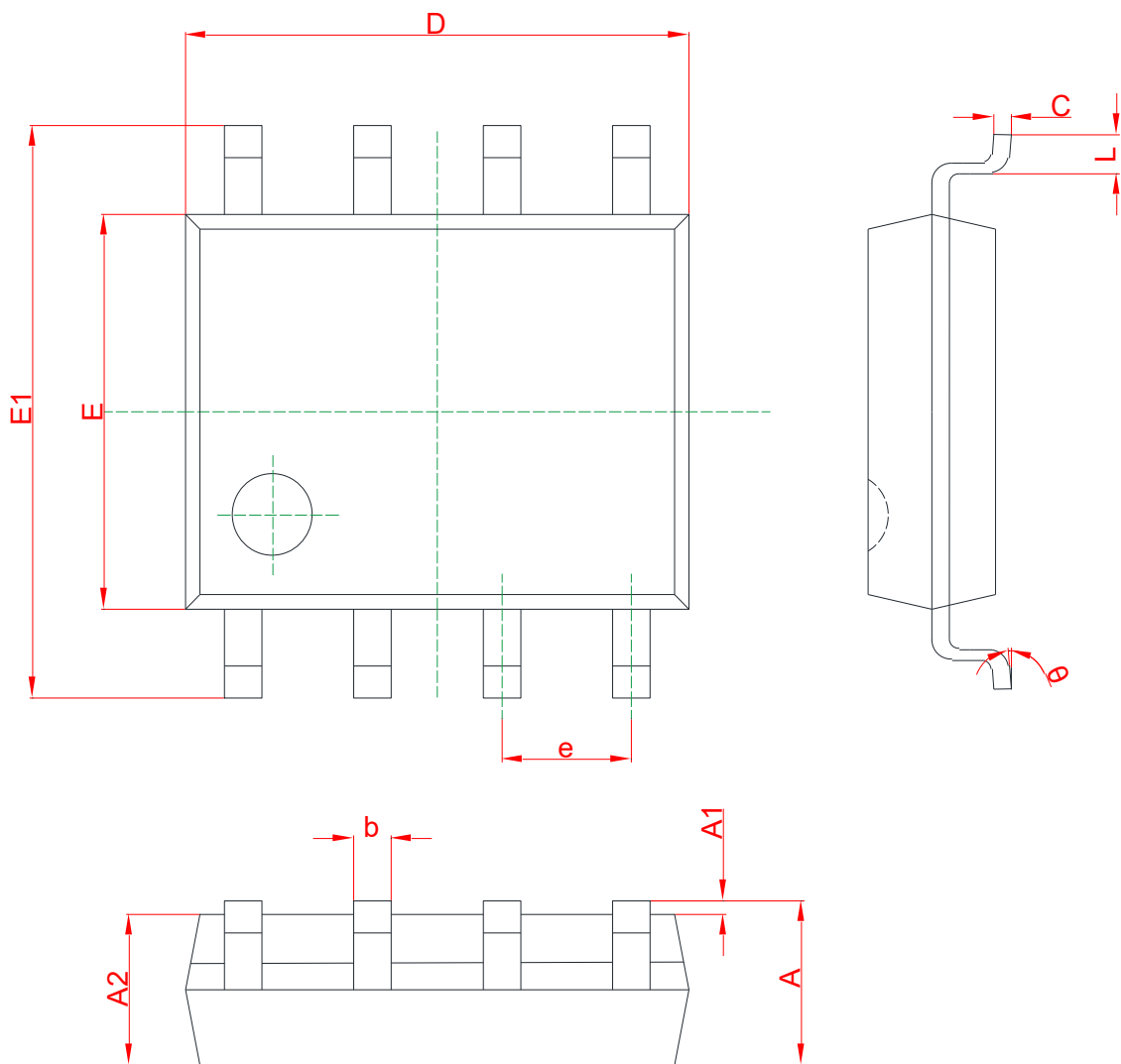
POD B(C)



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

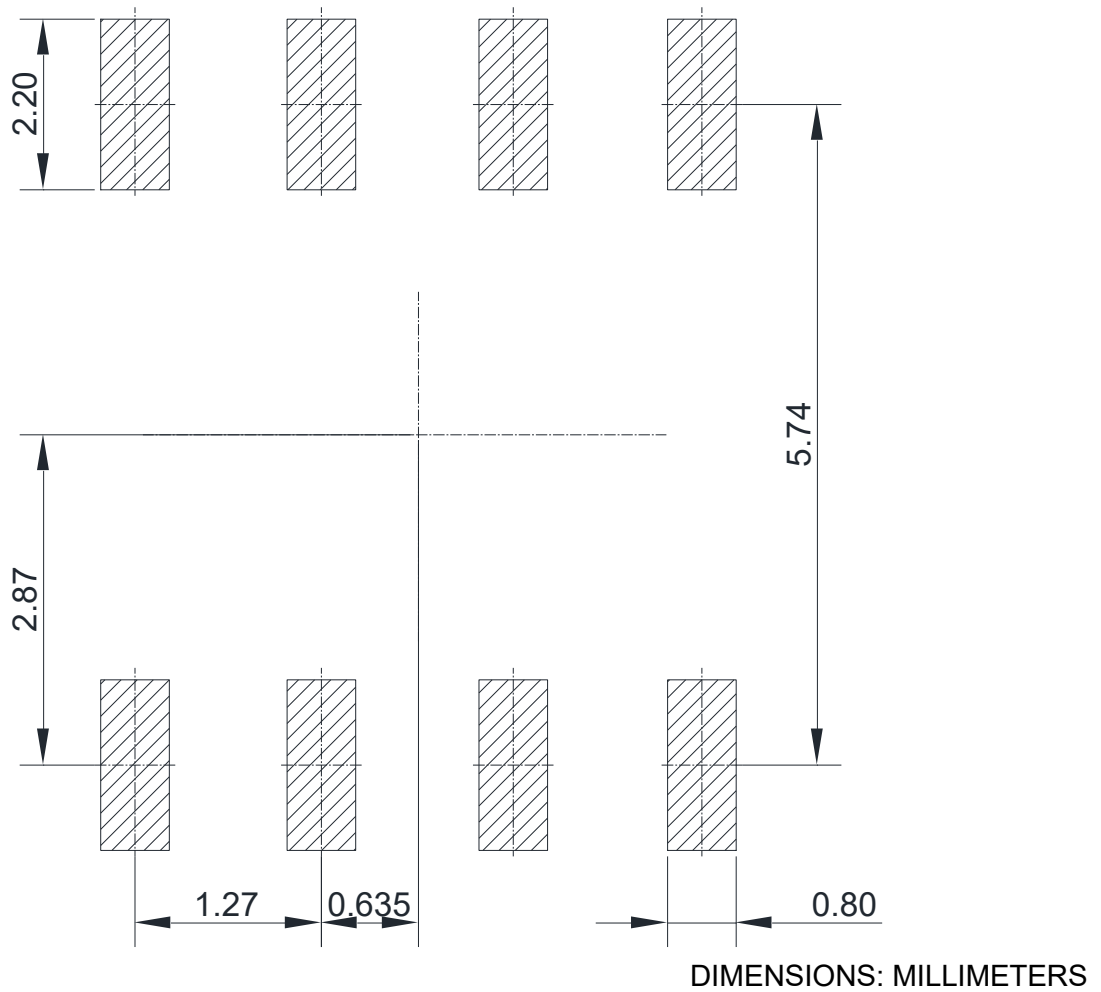
| Symbol | Dimensions |      |      | Symbol   | Dimensions |      |      |
|--------|------------|------|------|----------|------------|------|------|
|        | Min.       | NOM. | Max. |          | Min.       | NOM. | Max. |
| A      | 1.55       | 1.65 | 1.75 | L        | 0.50       | 0.60 | 0.70 |
| A1     | 0.06       | 0.11 | 0.16 | L1       | 0.90       | 1.05 | 1.20 |
| A2     | 1.35       | 1.45 | 1.55 | $\theta$ | 0°         | 4°   | 8°   |
| A3     | 0.60       | 0.70 | 0.80 | B1       | 0.14MAX    |      |      |
| b      | 0.30       | 0.40 | 0.50 | B2       | 0.12MAX    |      |      |
| c      | 0.17       | 0.20 | 0.25 | b1       | 0.66MAX    |      |      |
| D      | 4.80       | 4.90 | 5.00 | b2       | 0          | 0.04 | 0.08 |
| E      | 5.80       | 6.00 | 6.20 | e        | 1.27BSC    |      |      |
| E1     | 3.80       | 3.90 | 4.00 |          |            |      |      |

POD C(X)



| Symbol | Dimensions |      | Symbol | Dimensions |      |
|--------|------------|------|--------|------------|------|
|        | Min.       | Max. |        | Min.       | Max. |
| L      | 0.40       | 0.60 | e      | 1.27 TYP   |      |
| D      | 4.95       | 5.05 | c      | 0.15       | 0.25 |
| E      | 3.8        | 4.0  | A2     | 1.33       | 1.50 |
| E1     | 5.80       | 6.20 | A1     | 0.04       | 0.20 |
| b      | 0.4 TYP    |      | θ      | 0°         | 8°   |

## 9. Recommended Soldering Footprint



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