

## SuperESD - TPD4E05U06QDQARQ1-ES

## 1.Description

The TPD4E05U06QDQARQ1-ES is designed to protect voltage sensitive components from ESD and transient voltage events. Excellent clamping capability. Low leakage, and fast response time, make these parts ideal for ESD protection on designs where board space is at a premium.

## 2.Features

- IEC 61000-4-2 Level 4 ESD Protection
  - $\pm 20\text{kV}$  Contact Discharge
  - $\pm 20\text{kV}$  Air Discharge
- IEC 61000-4-4 EFT Protection
  - 40A (5/50ns)
- IEC 61000-4-5 Surge
  - 4.5A (8/20us)
- RoHS compliance
- Protecting four I/O lines
- Ultra-low Capacitance:0.6pF (Typical)
- Low clamping voltage
- Low leakage current
- Solid-state silicon technology

## 3.Applications

- HDMI/USB2.0
- Monitors and flat panel displays
- 10/100/1000 ethernet
- Notebook computers
- SIM ports
- ATM interface

## 4.Ordering Information

| Part Number              | Package     | Marking | Material     | Packing     | Quantity per reel | Flammability Rating | Reel Size |
|--------------------------|-------------|---------|--------------|-------------|-------------------|---------------------|-----------|
| TPD4E05U06Q<br>DQARQ1-ES | DFN2510-10L | .0524P  | Halogen free | Tape & Reel | 3000 PCS          | UL 94V-0            | 7 inches  |

Table-1 Ordering information

## 5.Pin Configuration and Functions

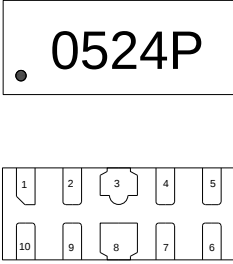
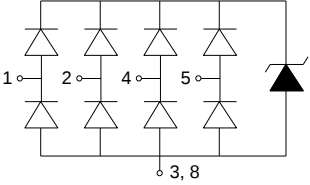
| Pin | Name | Description    | Outline                                                                                          | Circuit Diagram                                                                     |
|-----|------|----------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | IO   | Connect to IO  | <p>Note 1</p>  |  |
| 2   | IO   | Connect to IO  |                                                                                                  |                                                                                     |
| 3   | GND  | Connect to GND |                                                                                                  |                                                                                     |
| 4   | IO   | Connect to IO  |                                                                                                  |                                                                                     |
| 5   | IO   | Connect to IO  |                                                                                                  |                                                                                     |
| 6   | NC   | NO Connection  |                                                                                                  |                                                                                     |
| 7   | NC   | NO Connection  |                                                                                                  |                                                                                     |
| 8   | GND  | Connect to GND |                                                                                                  |                                                                                     |
| 9   | NC   | NO Connection  |                                                                                                  |                                                                                     |
| 10  | NC   | NO Connection  |                                                                                                  |                                                                                     |

Table-2 Pin configuration

Note1:

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

## 6.Specification

### 6.1. Absolute Maximum rating

Over operating free-air temperature range (unless otherwise noted)

| Parameters                                 | Symbol           | Min. | Max. | Unit |
|--------------------------------------------|------------------|------|------|------|
| Peak pulse power (tp=8/20us)@25°C          | P <sub>pk</sub>  | -    | 70   | W    |
| Peak pulse current (tp=8/20us)@25°C        | I <sub>PP</sub>  |      | 4.5  | A    |
| ESD (IEC61000-4-2 air discharge) @25°C     | V <sub>ESD</sub> | -    | ±20  | kV   |
| ESD (IEC61000-4-2 contact discharge) @25°C | V <sub>ESD</sub> | -    | ±20  | kV   |
| Junction temperature                       | T <sub>J</sub>   | -    | 150  | °C   |
| Operating temperature                      | T <sub>OP</sub>  | -40  | 125  | °C   |
| Storage temperature                        | T <sub>STG</sub> | -55  | 150  | °C   |
| Lead temperature                           | T <sub>L</sub>   | -    | 260  | °C   |

Table-3 Absolute Maximum rating

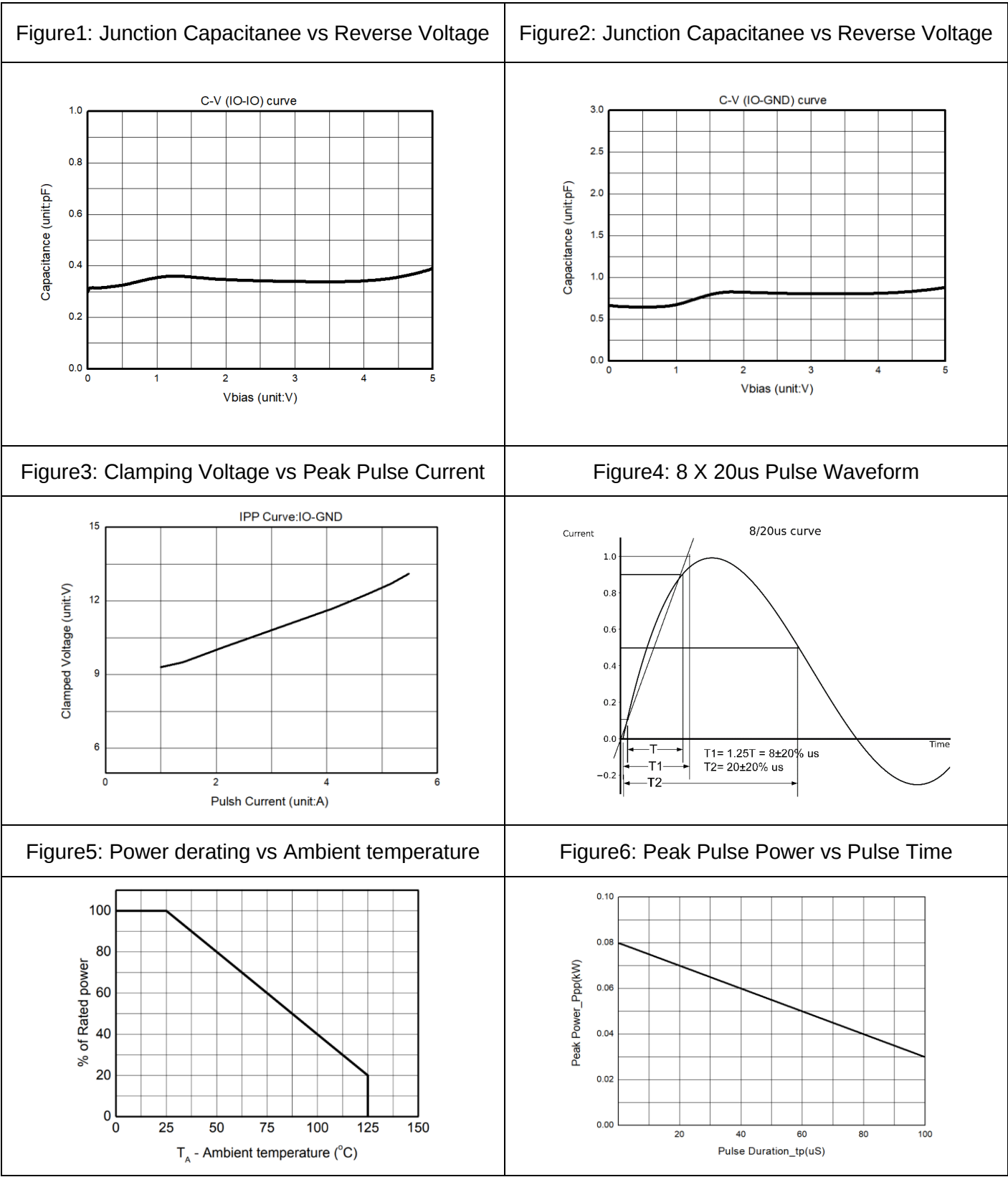
## 6.2. Eletrical Characteristics

At TA = 25°C unless otherwise noted

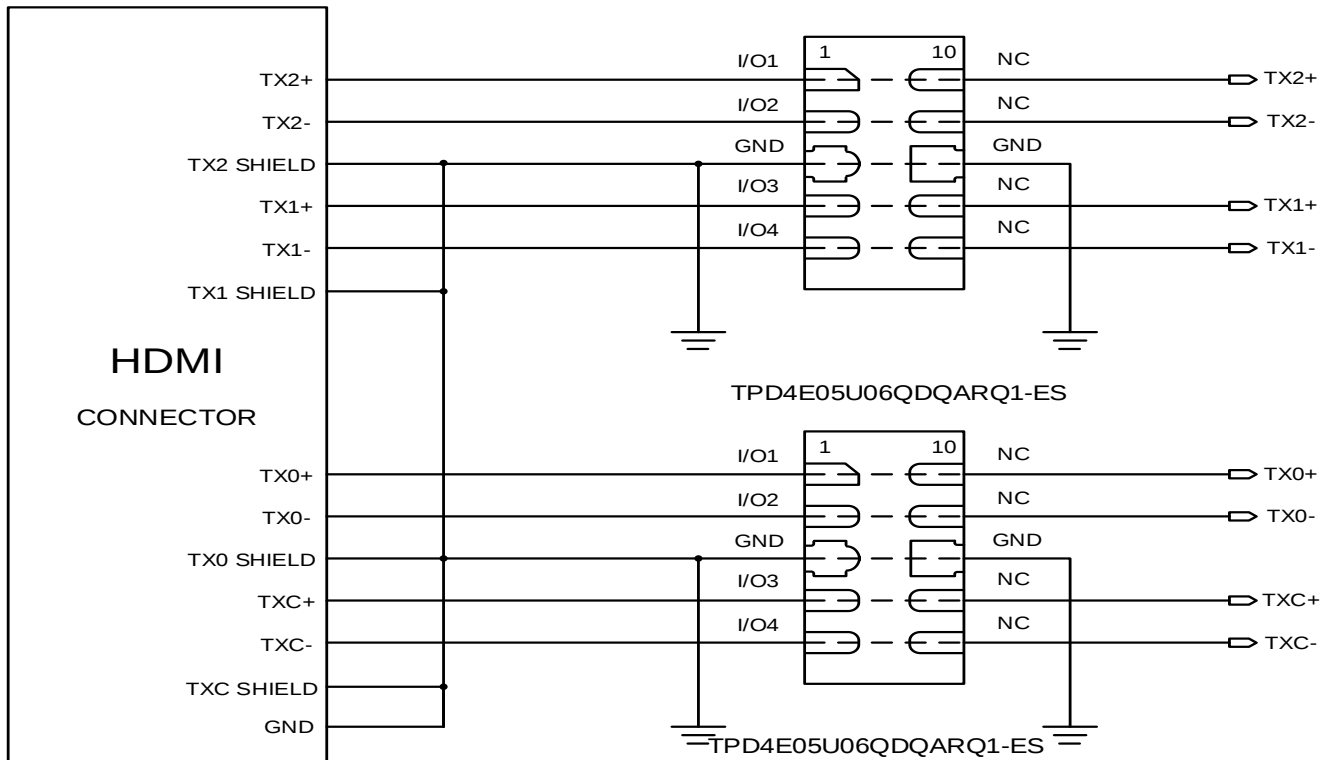
| Parameters                | Symbol    | conditions                                  | Min. | Typ. | Max. | Unit    |
|---------------------------|-----------|---------------------------------------------|------|------|------|---------|
| Reverse stand-off voltage | $V_{RWM}$ |                                             |      |      | 5.0  | V       |
| Reverse Breakdown Voltage | $V_{BR}$  | $I_T = 1mA$                                 | 6.0  |      |      | V       |
| Reverse Leakage Current   | $I_R$     | $V_{RWM} = 5V$                              |      |      | 1.0  | $\mu A$ |
| Peak Pulse Current        | $I_{PP}$  | $TP = 8/20\mu s @ 25^\circ C$               |      |      | 4.5  | A       |
| Clamping Voltage          | $V_{CL}$  | $I_{PP} = 1A; TP = 8/20\mu s$               |      | 9.0  | 11.0 | V       |
| Clamping Voltage          | $V_{CL}$  | $I_{PP} = 4.5A; TP = 8/20\mu s$             |      | 12.0 | 15.0 | V       |
| Junction capacitance      | $C_J$     | I/O pins to ground;<br>$V_R = 0V; f = 1MHz$ |      | 0.6  |      | pF      |
|                           |           | Between I/O pins;<br>$V_R = 0V; f = 1MHz$   |      | 0.3  |      |         |

Table-4 Electrical Characteristics

7. Typical Characteristic



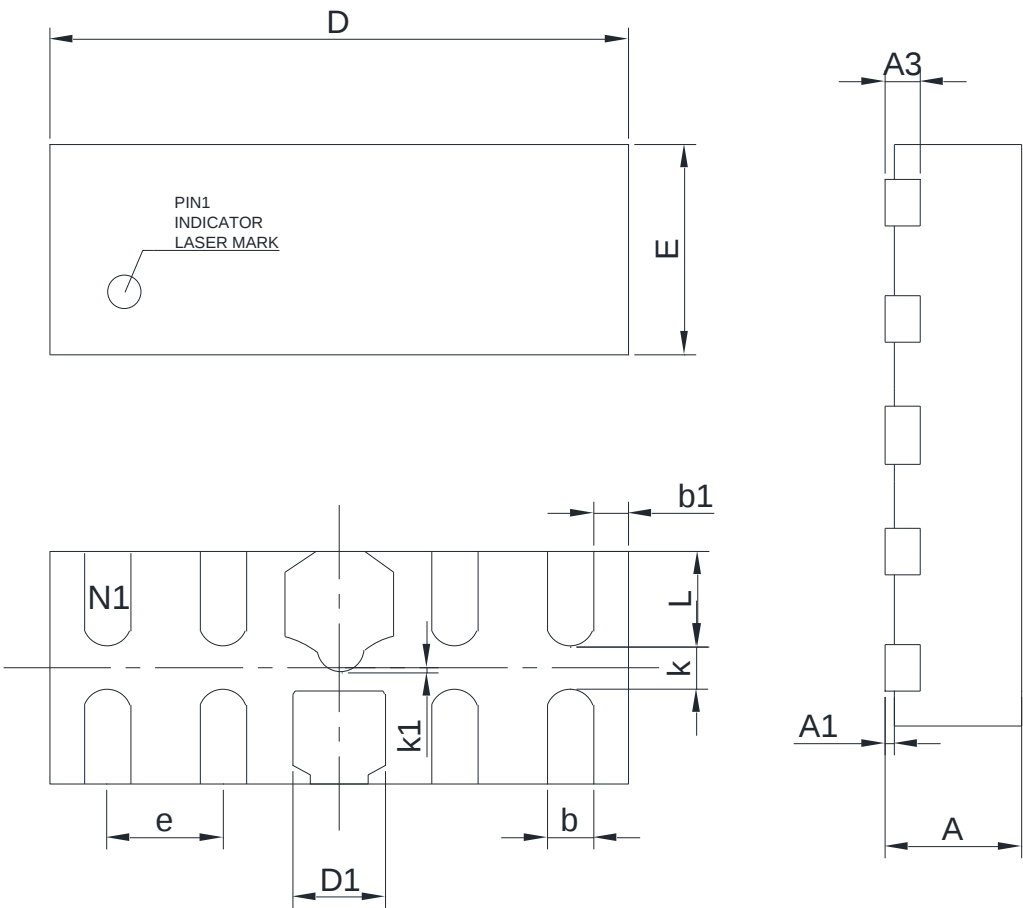
## 8. Typical Application



Typical HDMI Interface Application

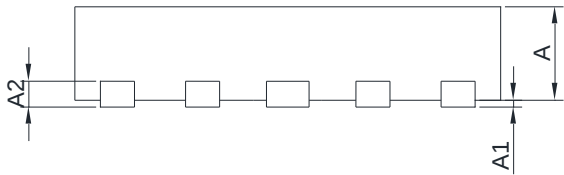
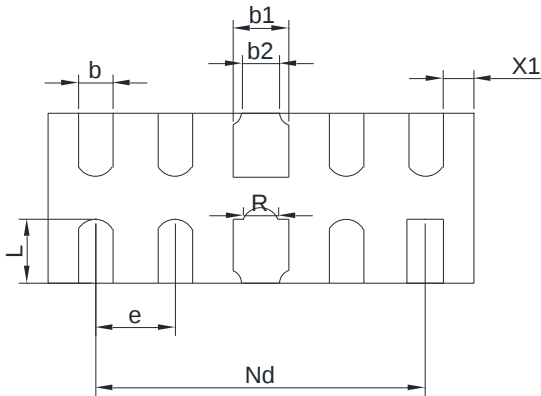
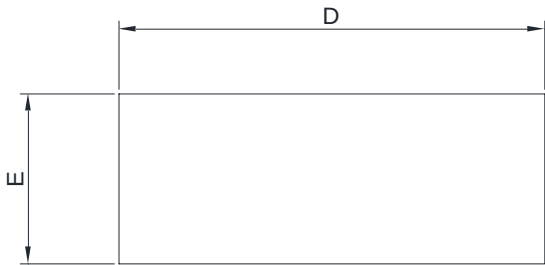
9.Dimension (DFN2510-10L)

POD A(C)



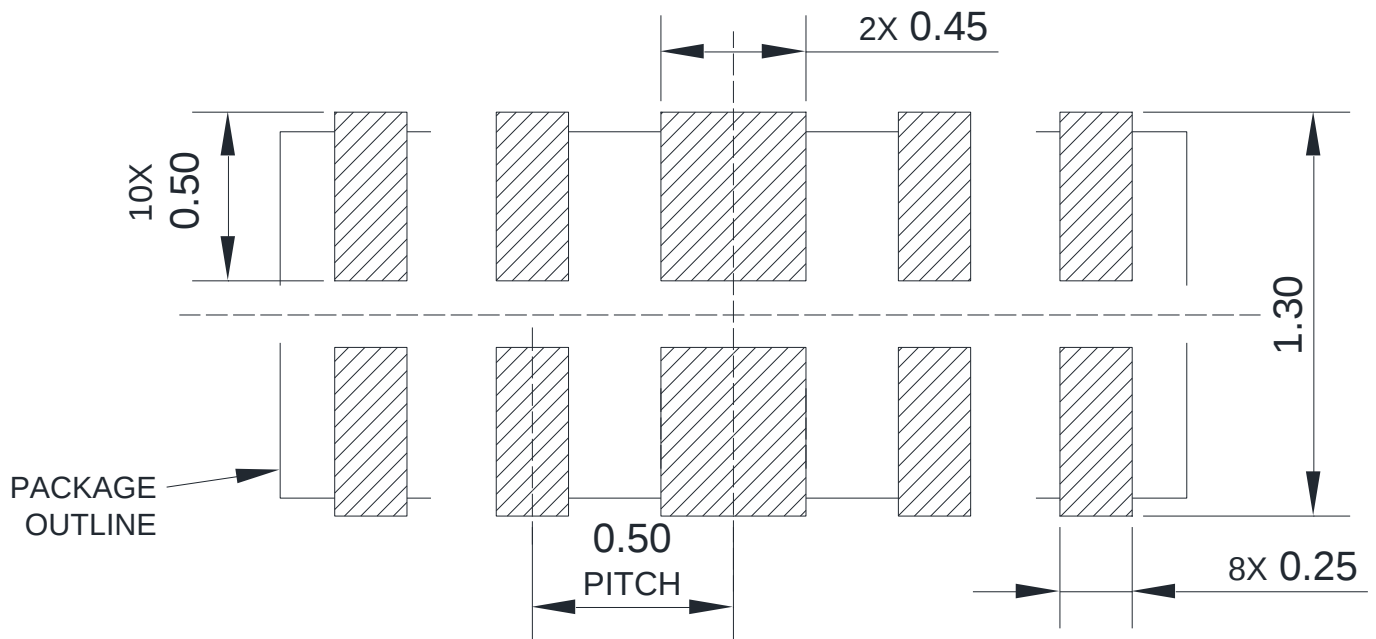
| Dimensions in Millimeter |           |       |       |        |           |       |       |
|--------------------------|-----------|-------|-------|--------|-----------|-------|-------|
| Symbol                   | Min.      | Nom.  | Max.  | Symbol | Min.      | Nom.  | Max.  |
| A                        | 0.450     | 0.500 | 0.550 | D      | 2.450     | 2.500 | 2.550 |
| A1                       | 0.000     | 0.025 | 0.050 | E      | 0.950     | 1.000 | 1.050 |
| A3                       | 0.110 REF |       |       | e      | 0.500 TYP |       |       |
| b                        | 0.180     | 0.220 | 0.260 | k1     | 0.060     | 0.080 | 0.100 |
| b1                       | 0.100     | 0.150 | 0.200 | L      | 0.350     | 0.400 | 0.450 |
| D1                       | 0.350     | 0.400 | 0.450 | K      | 0.210     | 0.220 | 0.230 |

POD B(A)



| Dimensions in Millimeter(mm) |         |      |        |         |      |
|------------------------------|---------|------|--------|---------|------|
| SYMBOL                       | MIN     | MAX  | SYMBOL | MIN     | MAX  |
| A                            | 0.50    | 0.60 | b2     | 0.20REF |      |
| A1                           | 0.00    | 0.05 | D      | 2.45    | 2.55 |
| A2                           | 0.15REF |      | E      | 0.95    | 1.05 |
| b                            | 0.15    | 0.25 | L      | 0.33    | 0.43 |
| b1                           | 0.35    | 0.45 | e      | 0.50BSC |      |
| Nd                           | 2.00BSC |      | X1     | 0.22    | 0.28 |

## 10. Recommended Soldering Footprint



DIMENSIONS: MILLIMETERS

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