

**JMSL10380PD**
**Features**

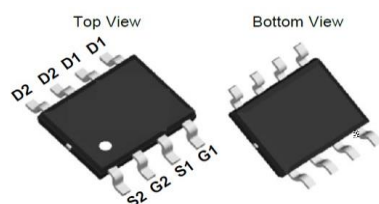
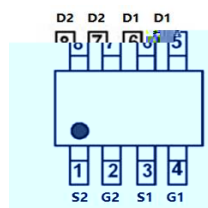
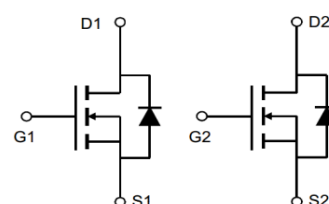
- Excellent  $R_{DS(ON)}$  and Low Gate Charge
- 100% UIS Tested
- Halogen-free; RoHS-compliant
- Pb-free plating

**Applications**

- Load Switch
- PWM Application
- Power Management

**Product Summary**

| Parameters                       | Value | Unit       |
|----------------------------------|-------|------------|
| $V_{DSS}$                        | 100   | V          |
| $V_{GS(th)}_{Typ}$               | 1.7   | V          |
| $I_D(@V_{GS}=10V)$               | 4.5   | A          |
| $R_{DS(ON)}_{Typ}(@V_{GS}=10V)$  | 28    | m $\Omega$ |
| $R_{DS(ON)}_{Typ}(@V_{GS}=4.5V)$ | 36    | m $\Omega$ |


**SOP-8L-Dual**

**Pin Assignment**

**Schematic Diagram**
**Ordering Information**

| Device         | Marking  | MSL | Form      | Package | Reel(pcs) | Per Carton (pcs) |
|----------------|----------|-----|-----------|---------|-----------|------------------|
| JMSL10380PD-13 | L10380PD | 3   | Tape&Reel | SOP-8   | 4000      | 48000            |

**Absolute Maximum Ratings** (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)

| Symbol         | Parameter                                     | Value                     | Unit             |
|----------------|-----------------------------------------------|---------------------------|------------------|
| $V_{DS}$       | Drain-to-Source Voltage                       | 100                       | V                |
| $V_{GS}$       | Gate-to-Source Voltage                        | $\pm 20$                  | V                |
| $I_D$          | Continuous Drain Current                      | $T_A = 25^\circ\text{C}$  | A                |
|                |                                               | $T_A = 100^\circ\text{C}$ |                  |
| $I_{DM}$       | Pulsed Drain Current <sup>(1)</sup>           | Refer to Fig.4            | A                |
| $E_{AS}$       | Single Pulsed Avalanche Energy <sup>(2)</sup> | 26                        | mJ               |
| $P_D$          | Power Dissipation                             | $T_A = 25^\circ\text{C}$  | W                |
|                |                                               | $T_A = 100^\circ\text{C}$ |                  |
| $T_J, T_{STG}$ | Junction & Storage Temperature Range          | -55 to 150                | $^\circ\text{C}$ |

**Thermal Characteristics**

| Symbol     | Parameter                                              | Max  | Unit               |
|------------|--------------------------------------------------------|------|--------------------|
| $R_\theta$ | Thermal Resistance, Junction to Ambient <sup>(3)</sup> | 88.9 | $^\circ\text{C/W}$ |



Electrical Characteristics ( $T_J = 25^\circ\text{C}$  unless otherwise specified)

| Symbol                     | Parameter                                        | Conditions                                                                                | Min. | Typ. | Max. | Unit |
|----------------------------|--------------------------------------------------|-------------------------------------------------------------------------------------------|------|------|------|------|
| Off Characteristics        |                                                  |                                                                                           |      |      |      |      |
| V <sub>(BR)DSS</sub>       | Drain-Source Breakdown Voltage                   | I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V                                              | 100  | -    | -    | V    |
| I <sub>DSS</sub>           | Zero Gate Voltage Drain Current                  | V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V                                               | -    | -    | 1.0  | μA   |
| I <sub>GSS</sub>           | Gate-Body Leakage Current                        | V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V                                              | -    | -    | ±100 | nA   |
| On Characteristics         |                                                  |                                                                                           |      |      |      |      |
| V <sub>GS(th)</sub>        | Gate Threshold Voltage                           | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                | 1.0  | 1.7  | 2.5  | V    |
| R <sub>DS(ON)</sub>        | Static Drain-Source ON-Resistance <sup>(4)</sup> | V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A                                               | -    | 28   | 36   | mΩ   |
|                            |                                                  | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 15A                                              | -    | 36   | 47   | mΩ   |
| Dynamic Characteristics    |                                                  |                                                                                           |      |      |      |      |
| R <sub>g</sub>             | Gate Resistance                                  | f = 1MHz                                                                                  | -    | 1.2  | -    | Ω    |
| C <sub>iss</sub>           | Input Capacitance                                | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 50V,<br>f = 1MHz                                  | -    | 536  | 724  | pF   |
| C <sub>oss</sub>           | Output Capacitance                               |                                                                                           | -    | 176  | 237  | pF   |
| C <sub>rss</sub>           | Reverse Transfer Capacitance                     |                                                                                           | -    | 10   | 50   | pF   |
| Q <sub>g</sub>             | Total Gate Charge                                | V <sub>GS</sub> = 0 to 10V<br>V <sub>DS</sub> = 50V, I <sub>D</sub> = 20A                 | -    | 10   | -    | nC   |
| Q <sub>gs</sub>            | Gate Source Charge                               |                                                                                           | -    | 2.3  | -    | nC   |
| Q <sub>gd</sub>            | Gate Drain("Miller") Charge                      |                                                                                           | -    | 2.2  | -    | nC   |
|                            |                                                  |                                                                                           |      |      |      |      |
| Switching Characteristics  |                                                  |                                                                                           |      |      |      |      |
| t <sub>d(on)</sub>         | Turn-On DelayTime                                | V <sub>GS</sub> = 10V, V <sub>DD</sub> = 50V<br>I <sub>D</sub> = 20A, R <sub>GEN</sub> =3 | -    | 5.0  | -    | ns   |
| t <sub>r</sub>             | Turn-On Rise Time                                |                                                                                           | -    | 15   | -    | ns   |
| t <sub>d(off)</sub>        | Turn-Off DelayTime                               |                                                                                           | -    | 12   | -    | ns   |
| t <sub>f</sub>             | Turn-Off Fall Time                               |                                                                                           | -    | 3    | -    | ns   |
| Body Diode Characteristics |                                                  |                                                                                           |      |      |      |      |
| I <sub>S</sub>             | Maximum Continuous Body Diode Forward Current    |                                                                                           | -    | -    | 4.5  | A    |
| I <sub>SM</sub>            | Maximum Pulsed Body Diode Forward Current        |                                                                                           | -    | -    | 18   | A    |
| V <sub>SD</sub>            | Body Diode Forward Voltage                       | V <sub>GS</sub> = 0V, I <sub>S</sub> = 20A                                                | -    |      | 1.2  | V    |
| trr                        | Body Diode Reverse Recovery Time                 | I <sub>F</sub> = 20A, di/dt = 100A/us                                                     | 15   | 29   | 44   | ns   |
| Qrr                        | Body Diode Reverse Recovery Charge               |                                                                                           | -    | 27   | -    | nC   |

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
  2.  $E_{AS}$  condition: Starting  $T_J = 25^\circ\text{C}$ ,  $V_{DD} = 50\text{V}$ ,  $V_{GS} = 10\text{V}$ ,  $R_G = 25\text{ohm}$ ,  $L = 3\text{mH}$ ,  $I_{AS} = 4.2\text{A}$ ,  $V_{DD} = 0\text{V}$  during time in avalanche.
  3.  $R_{\theta}$  is measured with the device mounted on a  $1\text{inch}^2$  pad of 2oz copper FR4 PCB.

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## Typical Performance Characteristics

Figure 1: Power De-rating

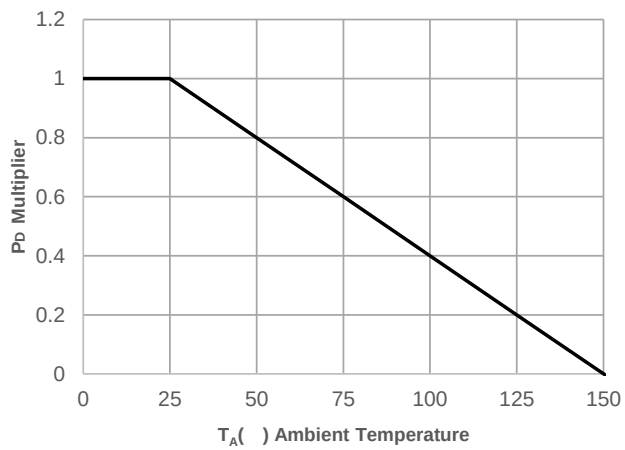
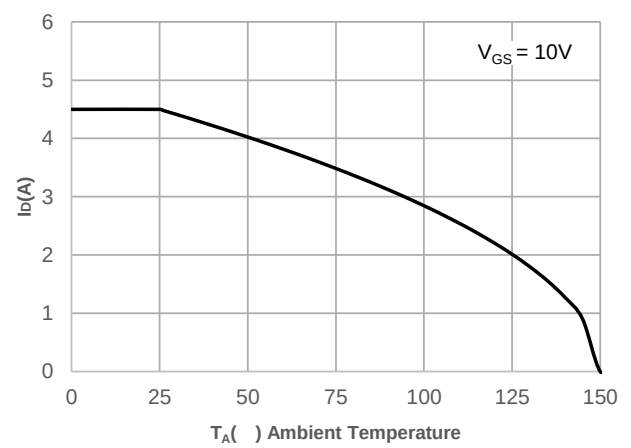
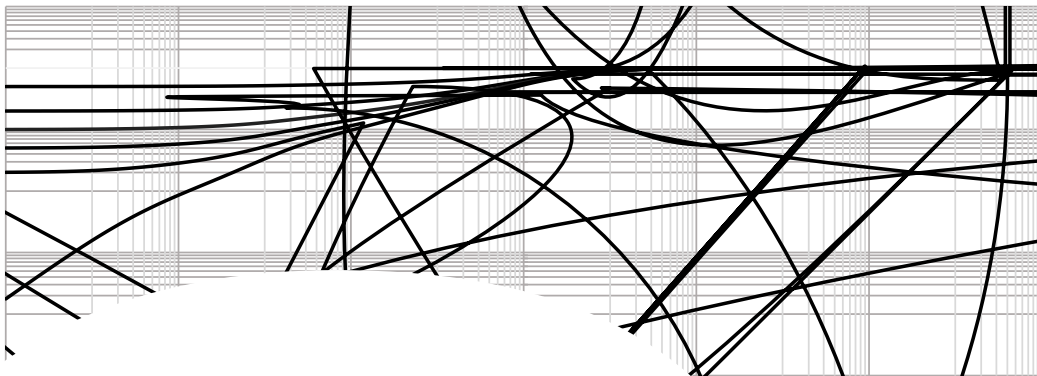
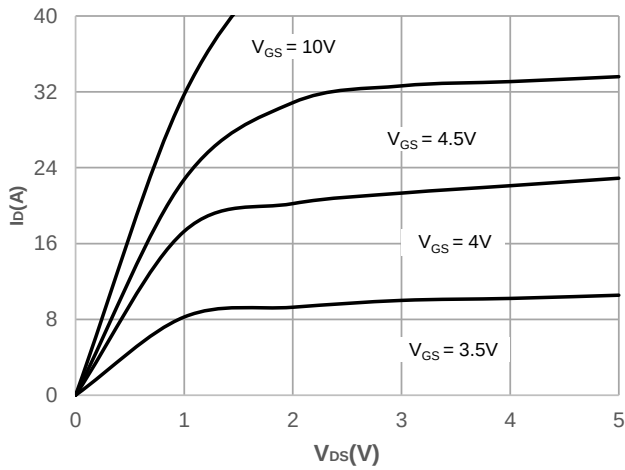
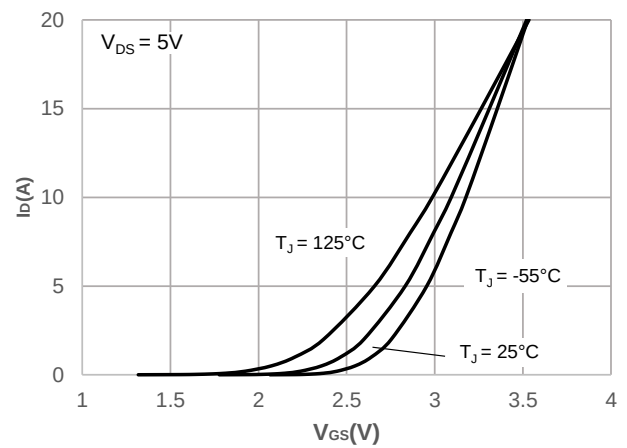
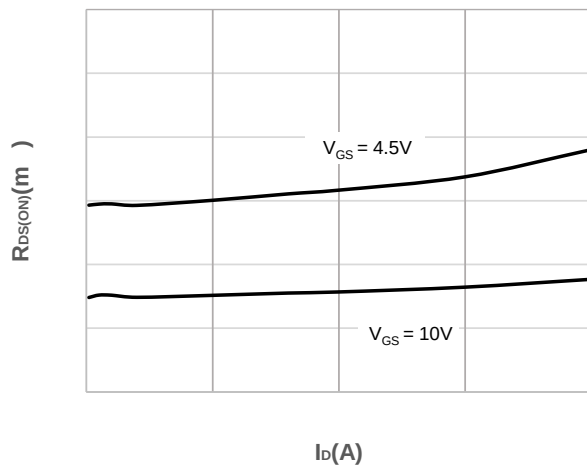
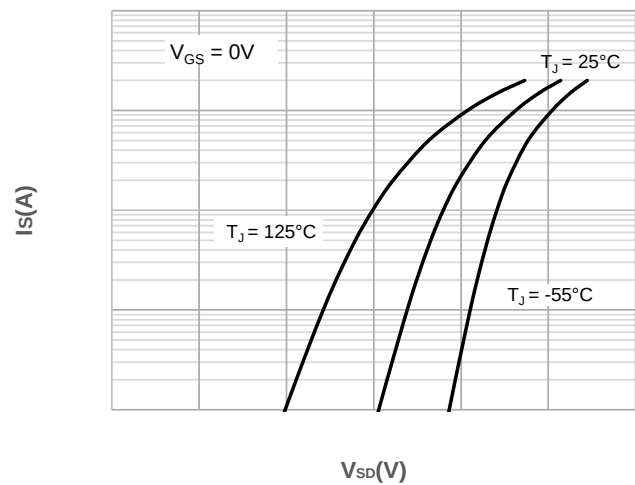
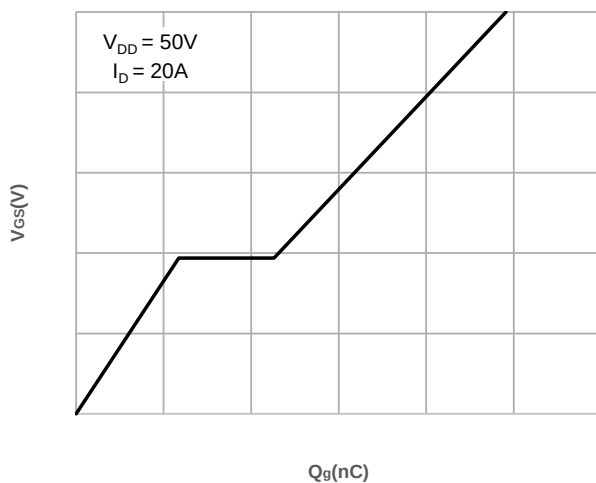
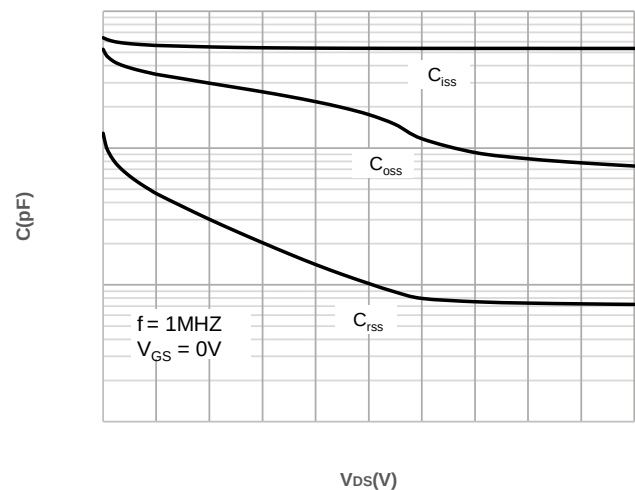


Figure 2: Current De-rating



## Typical Performance Characteristics

**Figure 5: Output Characteristics**

**Figure 6: Typical Transfer Characteristics**

**Figure 7: On-resistance vs. Drain Current**

**Figure 8: Body Diode Characteristics**

**Figure 9: Gate Charge Characteristics**

**Figure 10: Capacitance Characteristics**


# Typical Performance Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

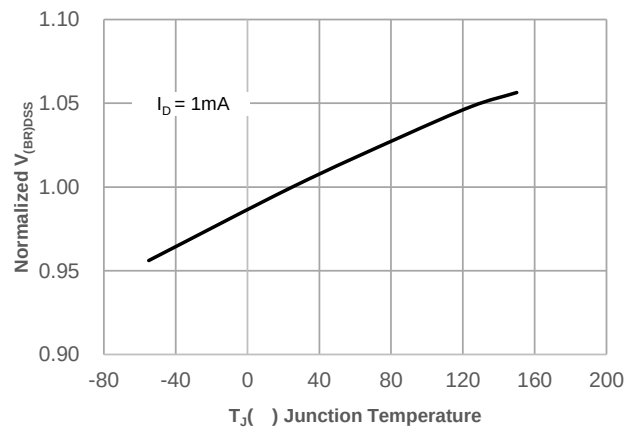
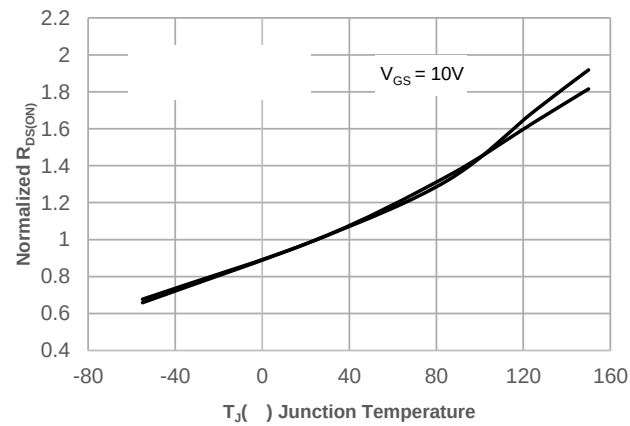


Figure 12: Normalized on Resistance vs. Junction Temperature



## Test Circuit



Figure 1: Gate Charge Test Circuit & Waveform

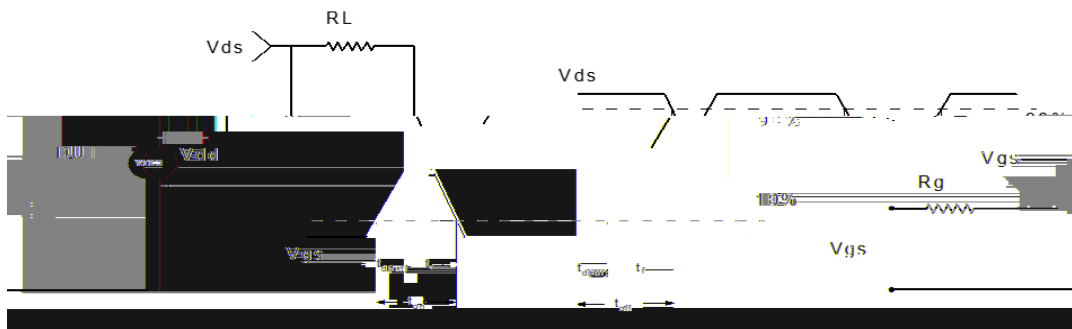


Figure 2: Resistive Switching Test Circuit & Waveform

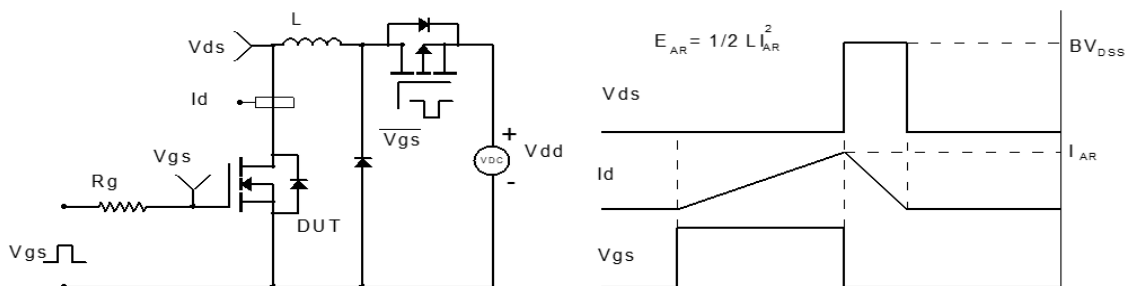


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

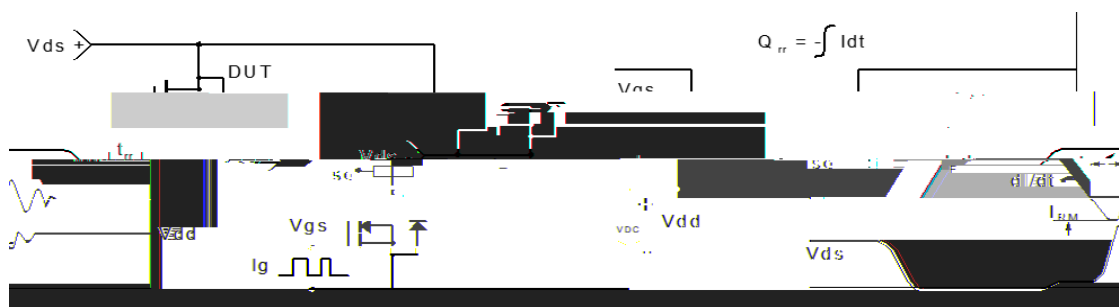
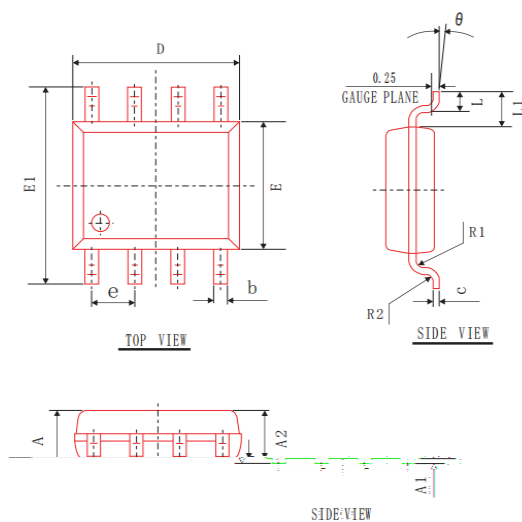


Figure 4: Diode Recovery Test Circuit & Waveform

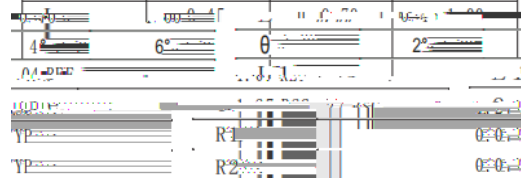
## Package Mechanical Data(SOP-8)

### Package Outline

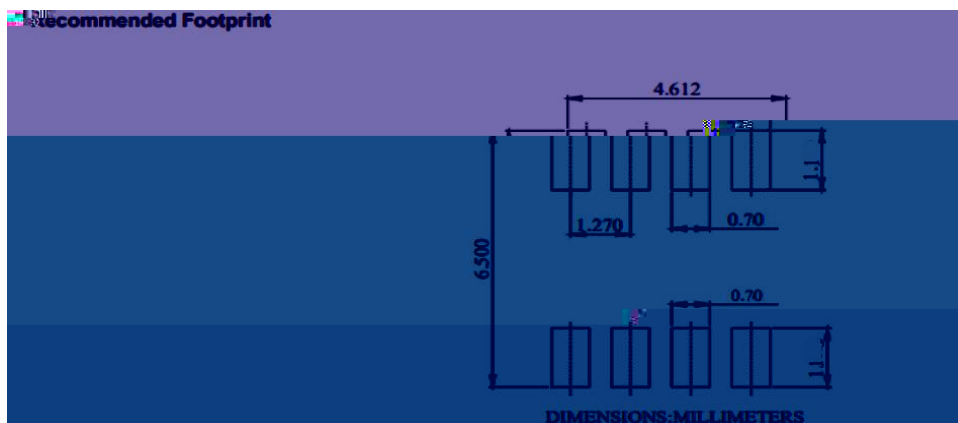


COMMON DIMENSIONS  
(UNITS OF MEASURE=mm)

| SYMBOL | MIN   | NOM   | MAX   |
|--------|-------|-------|-------|
| A      | 1.40  | 1.60  | 1.80  |
| A1     | 0.05  | 0.15  | 0.25  |
| A2     | 1.35  | 1.45  | 1.55  |
| b      | 0.30  | 0.40  | 0.50  |
| c      | 0.153 | 0.203 | 0.253 |
| D      | 4.80  | 4.90  | 5.00  |
| E      | 3.80  | 3.90  | 4.00  |
| E1     | 5.80  | 6.00  | 6.20  |



### Recommended Footprint



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