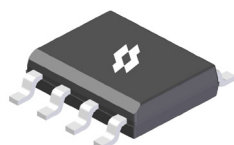


**Product Summary**

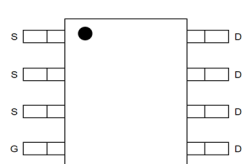
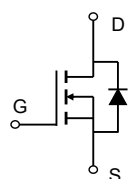
| $V_{DS}$ | $R_{DS(ON\_TYP)}$      | $I_{D\_MAX}$ |
|----------|------------------------|--------------|
| 150 V    | 53 mΩ @ $V_{GS} = 10V$ | 4.5 A        |

**SOP-8L**


Top View



Bottom View


 PIN Configuration  
(Top View)


Schematic Diagram

**Features**

- Low On-Resistance
- Excellent FoM (figure of merit)
- 100%  $\Delta V_{DS}$  & UIS & Rg Tested


**Applications**

- Motor controls
- DC/DC in Telecoms and Industrial
- High frequency switching, synchronous rectification

**Mechanical Data**

- Green Molding Compound
- Moisture Sensitivity: Level 3 per J-STD-020
- UL Flammability Classification Rating 94V-0

**Ordering Information**

| Orderable Part Number | Package Type | Device Marking | Form          | Quantity (pcs) |
|-----------------------|--------------|----------------|---------------|----------------|
| SMT15T60AHX           | SOP-8L       | 15T60AH        | 13" Tape&Reel | 4,000          |

**Maximum Ratings** (@  $T_C = 25^\circ\text{C}$ , unless otherwise specified.)

| Parameter                                                  | Symbol         | Value                            | Unit             |
|------------------------------------------------------------|----------------|----------------------------------|------------------|
| Drain - Source Voltage                                     | $V_{DS}$       | 150                              | V                |
| Gate - Source Voltage                                      | $V_{GS}$       | $\pm 20$                         | V                |
| Continuous Drain Current ( $V_{GS} = 10V$ ) <sup>(1)</sup> | $I_D$          | $T_C = 25^\circ\text{C}$<br>4.5  | A                |
|                                                            |                | $T_C = 100^\circ\text{C}$<br>2.8 | A                |
| Pulsed Drain Current <sup>(2)</sup>                        | $I_{DM}$       | 18                               | A                |
| Single Pulse Avalanche Energy <sup>(3)</sup>               | $E_{AS}$       | 78                               | mJ               |
| Single Pulse Avalanche Current ( $L = 0.1\text{mH}$ )      | $I_{AS}$       | 22                               | A                |
| Power Dissipation                                          | $P_D$          | $T_C = 25^\circ\text{C}$<br>2.8  | W                |
|                                                            |                | $T_C = 100^\circ\text{C}$<br>1.1 | W                |
| Junction & Storage Temperature Range                       | $T_J, T_{STG}$ | -55 ~ +150                       | $^\circ\text{C}$ |

**Thermal Characteristics**

| Parameter                                              | Symbol          | Typ. | Max. | Unit               |
|--------------------------------------------------------|-----------------|------|------|--------------------|
| Thermal Resistance, Junction-to-Ambient <sup>(4)</sup> | $R_{\theta JA}$ | 60   | 80   | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Case <sup>(5)</sup>    | $R_{\theta JC}$ | 40   | 45   | $^\circ\text{C/W}$ |

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

| Parameter                                         | Symbol               | Test Condition                                                                               | Min. | Typ. | Max. | Unit |
|---------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|------|------|------|------|
| Off Characteristics <sup>(6)</sup>                |                      |                                                                                              |      |      |      |      |
| Drain-Source Breakdown Voltage                    | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA                                                 | 150  | -    | -    | V    |
| Zero Gate Voltage Drain Current                   | I <sub>DSS</sub>     | V <sub>DS</sub> = 150V, V <sub>GS</sub> = 0V                                                 | -    | -    | 1.0  | μA   |
|                                                   |                      | T <sub>J</sub> = 125°C                                                                       | -    | -    | 100  | μA   |
| Gate-Source Leakage Current                       | I <sub>GSS</sub>     | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                                 | -    | -    | ±100 | nA   |
| On Characteristics <sup>(6)</sup>                 |                      |                                                                                              |      |      |      |      |
| Gate Threshold Voltage                            | V <sub>GS(th)</sub>  | V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250μA                                   | 2.5  | 3.4  | 4.5  | V    |
| Static Drain-Source On-Resistance                 | R <sub>DS(ON)</sub>  | V <sub>GS</sub> = 10V, I <sub>D</sub> = 4A                                                   | -    | 53   | 60   | mΩ   |
| Forward Transconductance                          | g <sub>fs</sub>      | V <sub>DS</sub> = 5.0V, I <sub>D</sub> = 4A                                                  | -    | 18   | -    | S    |
| Diodes Forward Voltage                            | V <sub>SD</sub>      | I <sub>S</sub> = 2.0A, V <sub>GS</sub> = 0V                                                  | -    | 0.7  | 1.2  | V    |
| Dynamic Characteristics <sup>(7)</sup>            |                      |                                                                                              |      |      |      |      |
| Input Capacitance                                 | C <sub>iss</sub>     | V <sub>DS</sub> = 75V, V <sub>GS</sub> = 0V, f = 1MHz                                        | -    | 732  | -    | pF   |
| Output Capacitance                                | C <sub>oss</sub>     |                                                                                              | -    | 65   | -    | pF   |
| Reverse Transfer Capacitance                      | C <sub>rss</sub>     |                                                                                              | -    | 7.2  | -    | pF   |
| Gate Resistance                                   | R <sub>g</sub>       | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V, f = 1MHz                                         | -    | 0.9  | -    | Ω    |
| Switching Characteristics <sup>(7)</sup>          |                      |                                                                                              |      |      |      |      |
| Turn-On DelayTime                                 | t <sub>d(on)</sub>   | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 75V<br>I <sub>D</sub> = 4A, R <sub>GEN</sub> = 3.0Ω | -    | 4.0  | -    | ns   |
| Rise Time                                         | t <sub>r</sub>       |                                                                                              | -    | 3.0  | -    | ns   |
| Turn-Off DelayTime                                | t <sub>d(off)</sub>  |                                                                                              | -    | 5.9  | -    | ns   |
| Fall Time                                         | t <sub>f</sub>       |                                                                                              | -    | 2.1  | -    | ns   |
| Gate Charge Characteristics <sup>(7)</sup>        |                      |                                                                                              |      |      |      |      |
| Total Gate Charge (V <sub>GS</sub> = 10V)         | Q <sub>g</sub>       | V <sub>DS</sub> = 75V, I <sub>D</sub> = 4A<br>V <sub>GS</sub> = 10V                          | -    | 6.9  | -    | nC   |
| Total Gate Charge (V <sub>GS</sub> = 7.0V)        | Q <sub>g</sub>       |                                                                                              | -    | 5.1  | -    | nC   |
| Gate-Source Charge                                | Q <sub>gs</sub>      |                                                                                              | -    | 2.3  | -    | nC   |
| Gate-Drain Charge                                 | Q <sub>gd</sub>      |                                                                                              | -    | 1.9  | -    | nC   |
| Gate Plateau Voltage                              | V <sub>plateau</sub> |                                                                                              | -    | 5.5  | -    | V    |
| Drain-Source Diode Characteristics <sup>(7)</sup> |                      |                                                                                              |      |      |      |      |
| Body Diode Reverse Recovery Time                  | t <sub>rr</sub>      | I <sub>F</sub> = 4A, dI/dt = 100A/μs,<br>T <sub>J</sub> = 25°C                               | -    | 58   | -    | ns   |
| Body Diode Reverse Recovery Charge                | Q <sub>rr</sub>      |                                                                                              | -    | 120  | -    | nC   |
| Diode Forward Current                             | I <sub>S</sub>       | T <sub>C</sub> = 25°C                                                                        | -    | -    | 4    | A    |

**Notes:**

1. This current is chip limited, which is calculated based on  $R_{thjc}$ .
2. This current is calculated on single pulse with 10us Single Pulse.
3. Defined by design, not subject to production test,  $E_{AS}$  condition:  $T_J = 25^\circ\text{C}$ ,  $V_{DD} = 75V$ ,  $V_{GS} = 10V$ ,  $L = 1.0\text{mH}$ .
4. Device mounted on FR-4 substrate PC board with 2oz copper in 1inch square cooling area.
5. Thermal resistance from junction to the exposed pad.
6. Short duration pulse test used to minimize self-heating effect.
7. Defined by design, not subject to production.

### Typical Electrical and Thermal Characteristics

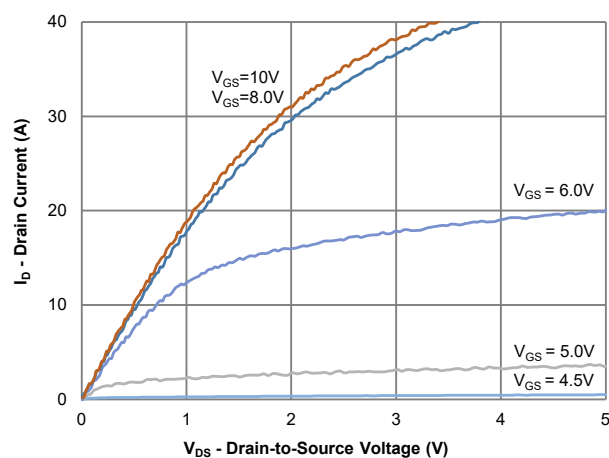


Figure 1: Output Characteristics

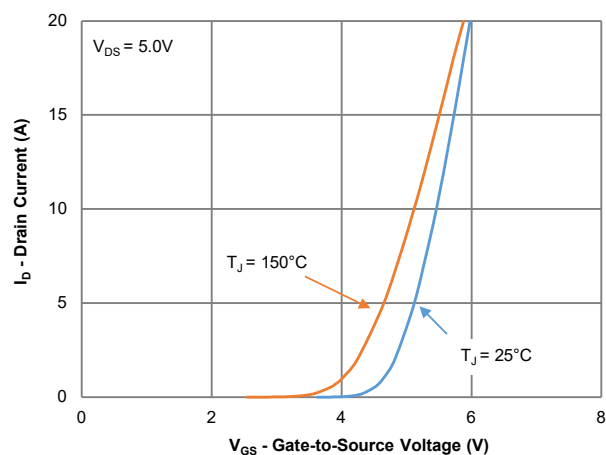


Figure 2: Transfer Characteristics

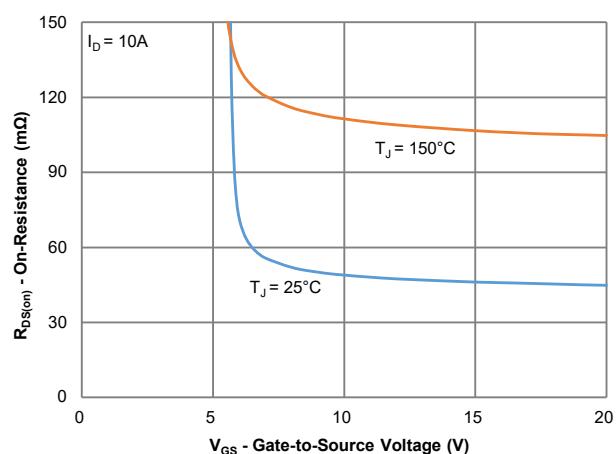


Figure 3: On-Resistance vs. Gate-Source Voltage

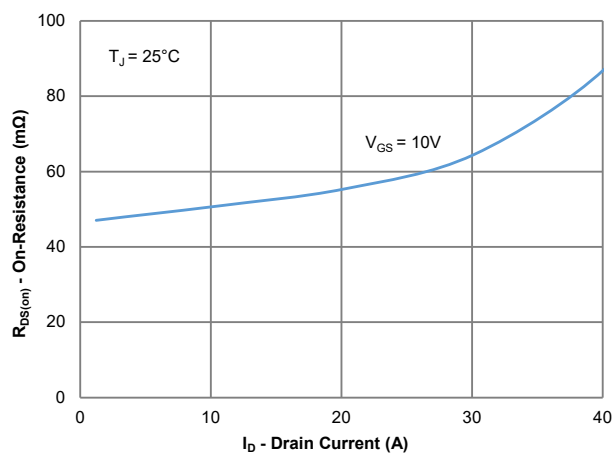


Figure 4: On-Resistance vs. Drain Current and Gate Voltage

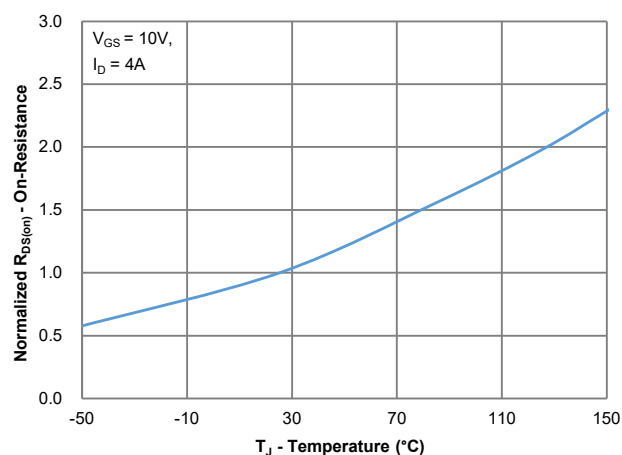


Figure 5: On-Resistance vs. Junction Temperature

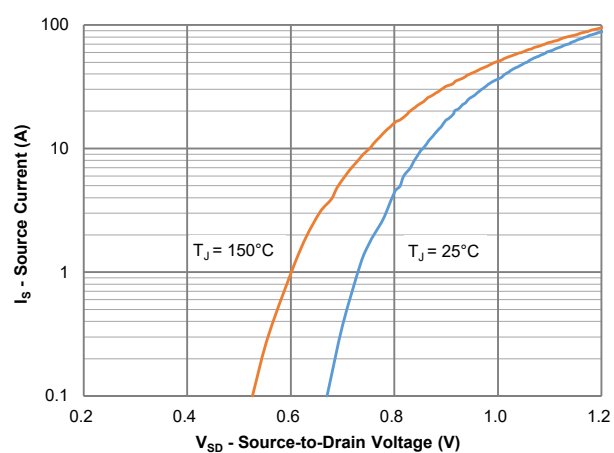
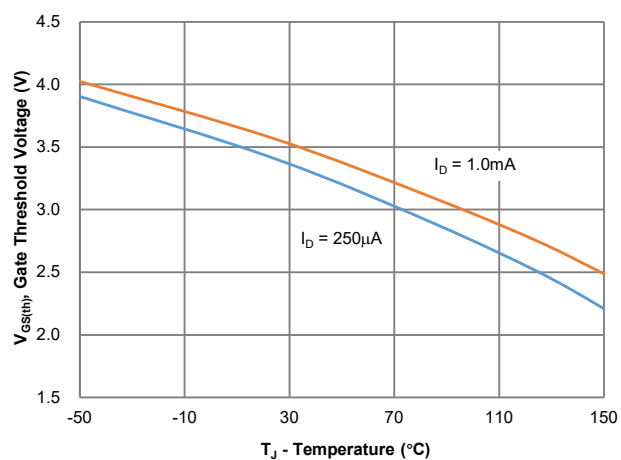
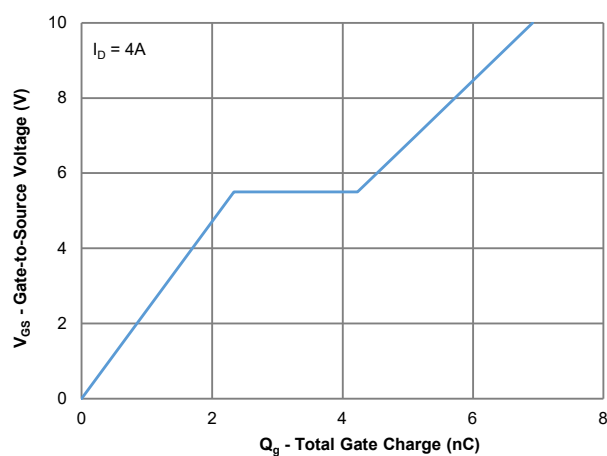
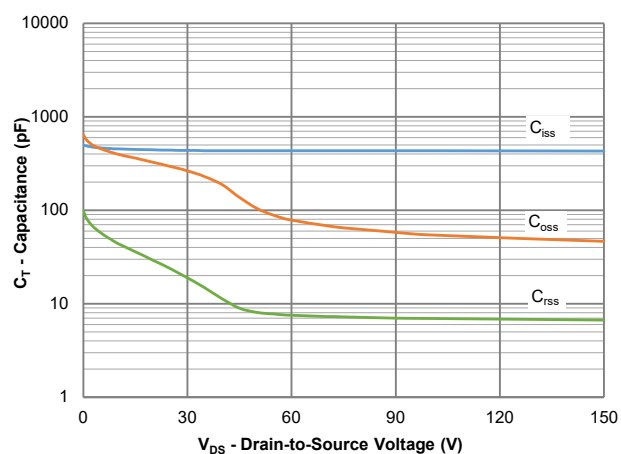
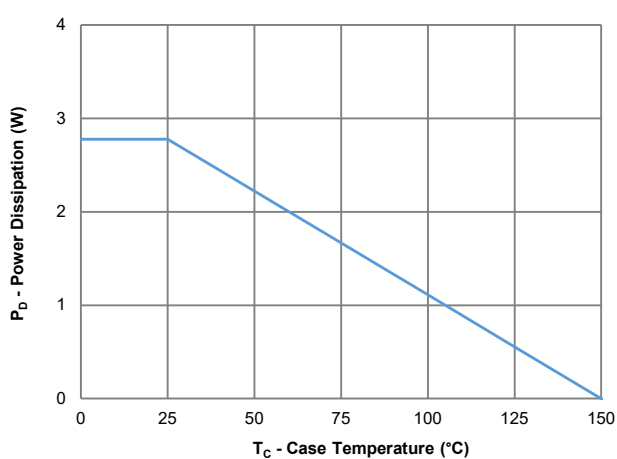
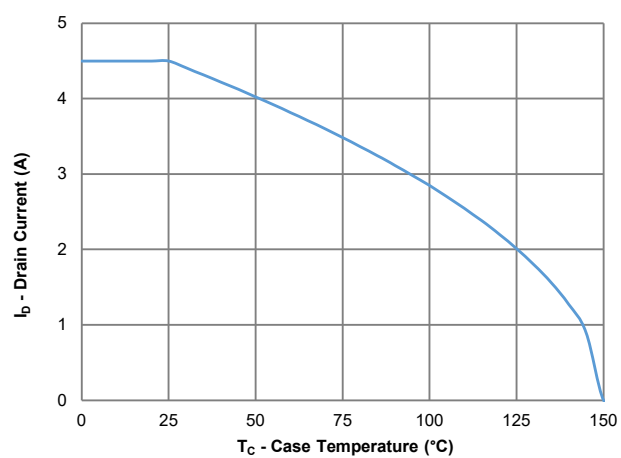
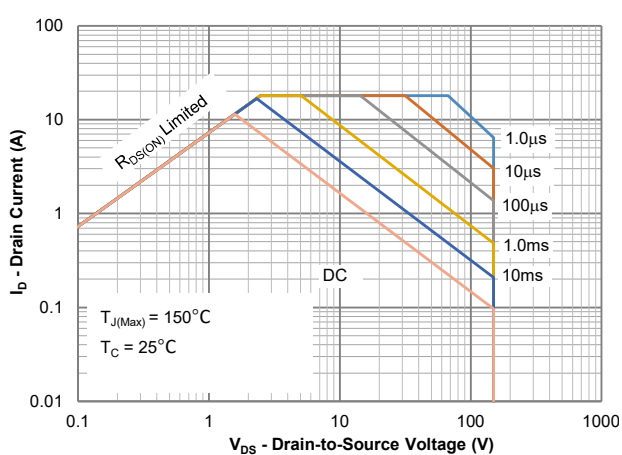
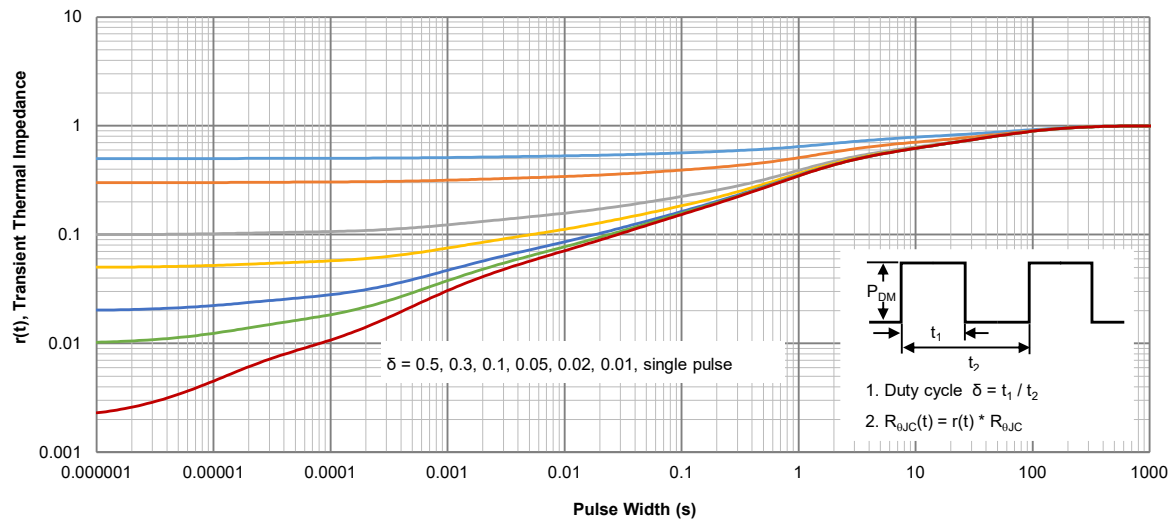
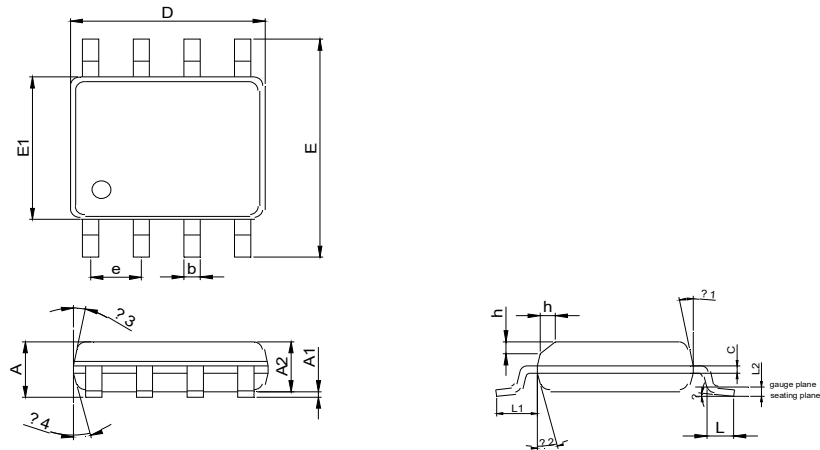


Figure 6: Source-Drain Diode Forward Voltage

**Typical Electrical and Thermal Characteristics**

**Figure 7: Gate Threshold Variation vs. Junction Temperature**

**Figure 8: Gate Charge Characteristics**

**Figure 9: Capacitance Characteristics**

**Figure 10: Power Derating**

**Figure 11: Current Derating**

**Figure 12: Safe Operating Area**

**Typical Electrical and Thermal Characteristics**

**Figure 13: Normalized Maximum Transient Thermal Impedance**

**SOP-8L Package Outline**
**Package Outline**


| DIM | MILLIMETER |      |      |
|-----|------------|------|------|
|     | MIN.       | NOM. | MAX. |
| A   | 1.35       | 1.50 | 1.70 |
| A1  | 0.05       | 0.10 | 0.15 |
| A2  | 1.35       | 1.40 | 1.50 |
| b   | 0.35       | --   | 0.50 |
| c   | 0.17       | --   | 0.25 |
| D   | 4.80       | 4.90 | 5.10 |
| E   | 5.80       | 6.00 | 6.20 |
| E1  | 3.80       | 3.90 | 4.10 |
| e   | 1.27(BSC)  |      |      |
| L   | 0.45       | 0.60 | 0.80 |
| L1  | 1.04 REF   |      |      |
| L2  | 0.25 BSC   |      |      |
| h   | 0.30       | 0.40 | 0.50 |
| ?   | 0°         | --   | 8°   |
| ? 1 | 10°        | 12°  | 14°  |
| ? 2 | 8°         | 10°  | 12°  |
| ? 3 | 10°        | 12°  | 14°  |
| ? 4 | 8°         | 10°  | 12°  |

**Recommended Soldering Footprint**
