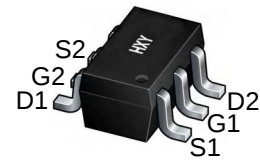




## Description

The 3439KDW uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



SOT-363

## General Features

$V_{DS} = 20V$   $I_D = 0.75A$

$R_{DS(ON)} < 380m\Omega$  @  $V_{GS} = 4.5V$

$V_{DS} = -20V$   $I_D = -0.66A$

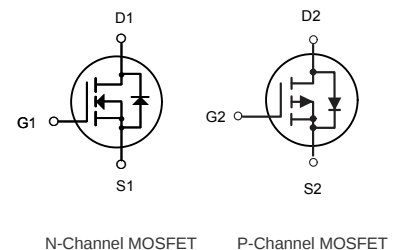
$R_{DS(ON)} < 570m\Omega$  @  $V_{GS} = -4.5V$

## Application

Wireless charging

Boost driver

Brushless motor



N-Channel MOSFET

P-Channel MOSFET

## Package Marking and Ordering Information

| Product ID | Pack    | Marking | Qty(PCS) |
|------------|---------|---------|----------|
| 3439KDW    | SOT-363 |         | 3000     |

## Absolute Maximum Ratings ( $T_c = 25^\circ C$ unless otherwise noted)

| Symbol                 | Parameter                                             | Rating     |            | Units        |
|------------------------|-------------------------------------------------------|------------|------------|--------------|
|                        |                                                       | N-Channel  | P-Channel  |              |
| $V_{DS}$               | Drain-Source Voltage                                  | 20         | -20        | V            |
| $V_{GS}$               | Gate-Source Voltage                                   | $\pm 12$   | $\pm 12$   | V            |
| $I_{D@T_A=25^\circ C}$ | Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup> | 0.75       | -0.66      | A            |
| IDM                    | Pulsed Drain Current <sup>2</sup>                     | 1.8        | -1.2       | A            |
| TSTG                   | Storage Temperature Range                             | -55 to 150 | -55 to 150 | $^\circ C$   |
| $T_J$                  | Operating Junction Temperature Range                  | -55 to 150 | -55 to 150 | $^\circ C$   |
| $R_{\theta JA}$        | Thermal Resistance Junction-Ambient <sup>1</sup>      | 833        |            | $^\circ C/W$ |



**N-ch MOSFET ELECTRICAL CHARACTERISTICS(T<sub>a</sub>=25°C unless otherwise noted)**

| Parameter                            | Symbol               | Test Condition                                                                               | Min  | Typ  | Max | Unit |
|--------------------------------------|----------------------|----------------------------------------------------------------------------------------------|------|------|-----|------|
| STATIC CHARACTERISTICS               |                      |                                                                                              |      |      |     |      |
| Drain-source breakdown voltage       | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA                                                  | 20   |      |     | V    |
| Zero gate voltage drain current      | I <sub>DSS</sub>     | V <sub>DS</sub> =20V, V <sub>GS</sub> = 0V                                                   |      |      | 1   | μA   |
| Gate-body leakage current            | I <sub>GSS</sub>     | V <sub>GS</sub> =±10V, V <sub>DS</sub> = 0V                                                  |      |      | ±20 | uA   |
| Gate threshold voltage (note 2)      | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                     | 0.35 |      | 1.1 | V    |
| Drain-source on-resistance(note 2)   | R <sub>DS(on)</sub>  | V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.65A                                                 |      | 210  | 380 | mΩ   |
|                                      |                      | V <sub>GS</sub> =2.5V, I <sub>D</sub> =0.55A                                                 |      | 320  | 450 | mΩ   |
|                                      |                      | V <sub>GS</sub> =1.8V, I <sub>D</sub> =0.45A                                                 |      | 390  | 800 | mΩ   |
| Forward tranconductance(note 2)      | g <sub>FS</sub>      | V <sub>DS</sub> =10V, I <sub>D</sub> =0.8A                                                   |      | 1.6  |     | S    |
| Diode forward voltage                | V <sub>SD</sub>      | I <sub>S</sub> =0.15A, V <sub>GS</sub> = 0V                                                  |      |      | 1.2 | V    |
| DYNAMIC CHARACTERISTICS (note 4)     |                      |                                                                                              |      |      |     |      |
| Input Capacitance                    | C <sub>iss</sub>     | V <sub>DS</sub> =16V, V <sub>GS</sub> =0V, f =1MHz                                           |      | 79   | 120 | pF   |
| Output Capacitance                   | C <sub>oss</sub>     |                                                                                              |      | 13   | 20  | pF   |
| Reverse Transfer Capacitance         | C <sub>rss</sub>     |                                                                                              |      | 9    | 15  | pF   |
| SWITCHING CHARACTERISTICS (note 3,4) |                      |                                                                                              |      |      |     |      |
| Turn-on delay time                   | t <sub>d(on)</sub>   | V <sub>GS</sub> =4.5V, V <sub>DS</sub> =10V,<br>I <sub>D</sub> =500mA, R <sub>GEN</sub> =10Ω |      | 6.7  |     | ns   |
| Turn-on rise time                    | t <sub>r</sub>       |                                                                                              |      | 4.8  |     | ns   |
| Turn-off delay time                  | t <sub>d(off)</sub>  |                                                                                              |      | 17.3 |     | ns   |
| Turn-off fall time                   | t <sub>f</sub>       |                                                                                              |      | 7.4  |     | ns   |

**P-ch MOSFET ELECTRICAL CHARACTERISTICS(T<sub>a</sub>=25°C unless otherwise noted)**

| Parameter                             | Symbol               | Test Condition                                                                                  | Min   | Typ  | Max  | Unit |
|---------------------------------------|----------------------|-------------------------------------------------------------------------------------------------|-------|------|------|------|
| STATIC CHARACTERISTICS                |                      |                                                                                                 |       |      |      |      |
| Drain-source breakdown voltage        | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> =-250μA                                                    | -20   |      |      | V    |
| Zero gate voltage drain current       | I <sub>DSS</sub>     | V <sub>DS</sub> =-20V, V <sub>GS</sub> = 0V                                                     |       |      | -1   | μA   |
| Gate-body leakage current             | I <sub>GSS</sub>     | V <sub>GS</sub> =±10V, V <sub>DS</sub> = 0V                                                     |       |      | ±20  | uA   |
| Gate threshold voltage (note 2)       | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                       | -0.35 |      | -1.1 | V    |
| Drain-source on-resistance(note 2)    | R <sub>DS(on)</sub>  | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1A                                                     |       | 430  | 570  | mΩ   |
|                                       |                      | V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-0.8A                                                   |       | 624  | 700  | mΩ   |
|                                       |                      | V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-0.5A                                                   |       | 950  |      | mΩ   |
| Forward tranconductance(note 2)       | g <sub>FS</sub>      | V <sub>DS</sub> =-10V, I <sub>D</sub> =-0.54A                                                   |       | 1.2  |      | S    |
| Diode forward voltage                 | V <sub>SD</sub>      | I <sub>S</sub> =-0.5A, V <sub>GS</sub> = 0V                                                     |       |      | -1.2 | V    |
| DYNAMIC CHARACTERISTICS (note 4)      |                      |                                                                                                 |       |      |      |      |
| Input Capacitance                     | C <sub>iss</sub>     | V <sub>DS</sub> =-16V, V <sub>GS</sub> =0V, f =1MHz                                             |       | 113  | 170  | pF   |
| Output Capacitance                    | C <sub>oss</sub>     |                                                                                                 |       | 15   | 25   | pF   |
| Reverse Transfer Capacitance          | C <sub>rss</sub>     |                                                                                                 |       | 9    | 15   | pF   |
| SWITCHING CHARACTERISTICS (note 3, 4) |                      |                                                                                                 |       |      |      |      |
| Turn-on delay time                    | t <sub>d(on)</sub>   | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-10V,<br>I <sub>D</sub> =-200mA, R <sub>GEN</sub> =10Ω |       | 9    |      | ns   |
| Turn-on rise time                     | t <sub>r</sub>       |                                                                                                 |       | 5.8  |      | ns   |
| Turn-off delay time                   | t <sub>d(off)</sub>  |                                                                                                 |       | 32.7 |      | ns   |
| Turn-off fall time                    | t <sub>f</sub>       |                                                                                                 |       | 20.3 |      | ns   |

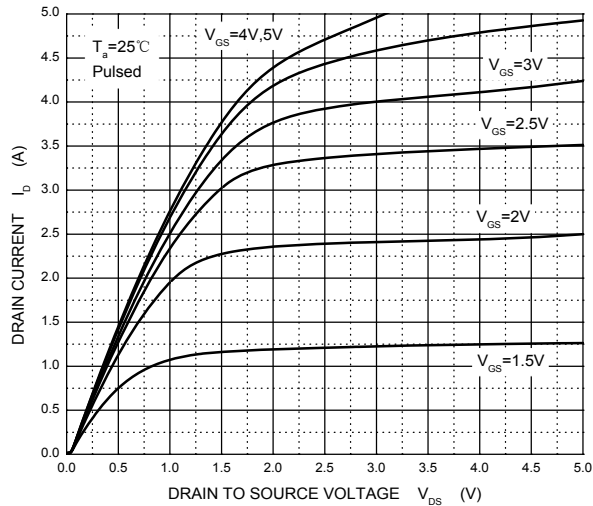
**Notes :**

- 1.Surface mounted on FR4 board using the minimum recommended pad size.
2. Pulse Test : Pulse width=300μs, duty cycle≤2%.
3. Switching characteristics are independent of operating junction temperature.
4. Garanted by design, not subject to producing.

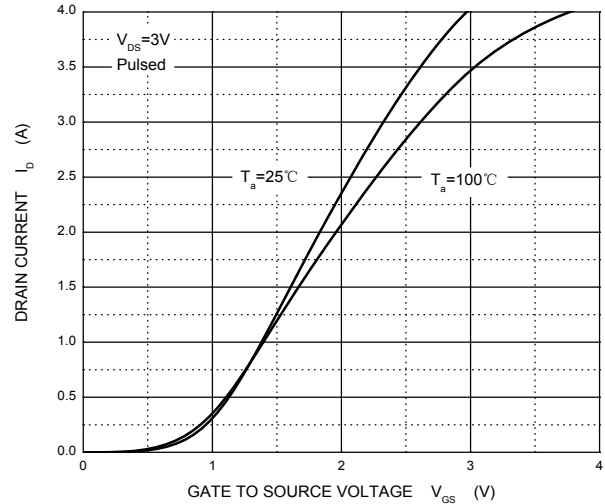


## N-Channel Typical Characteristics

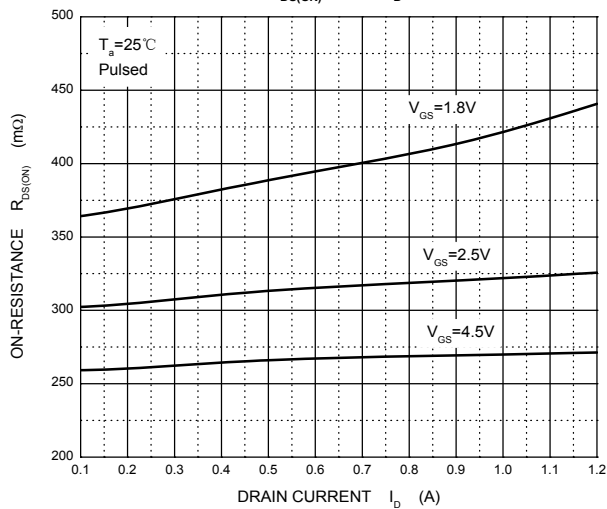
Output Characteristics



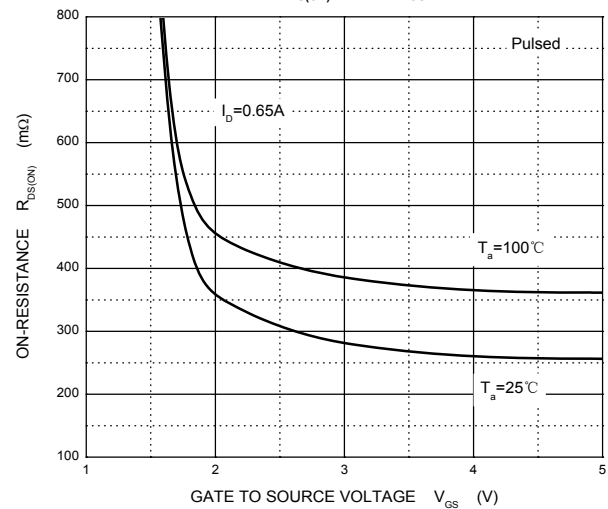
Transfer Characteristics



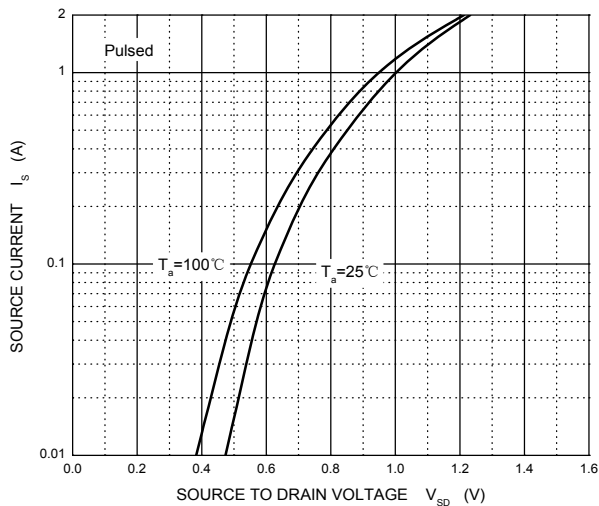
$R_{DS(ON)}$  —  $I_D$



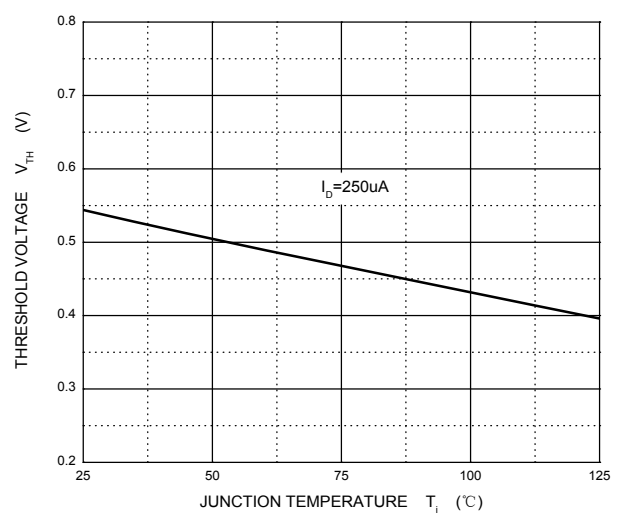
$R_{DS(ON)}$  —  $V_{GS}$



$I_S$  —  $V_{SD}$



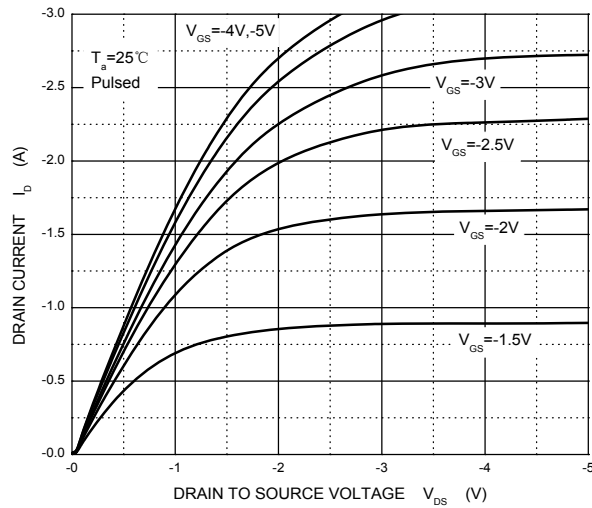
Threshold Voltage



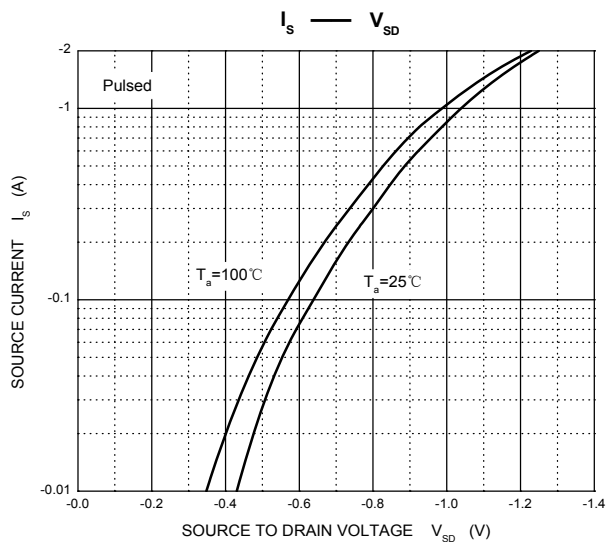
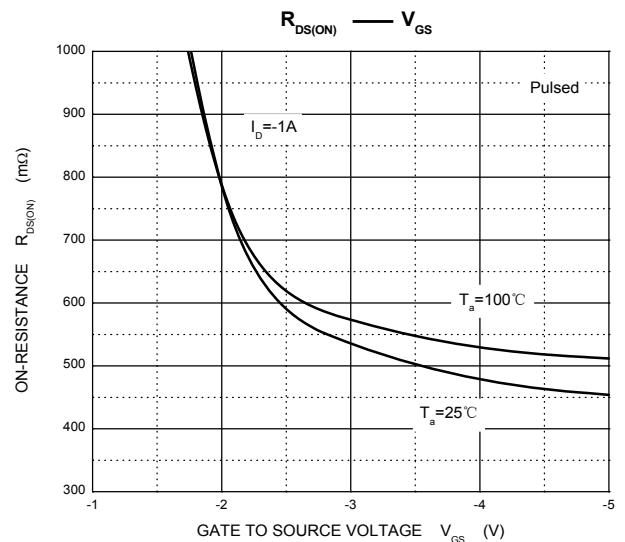
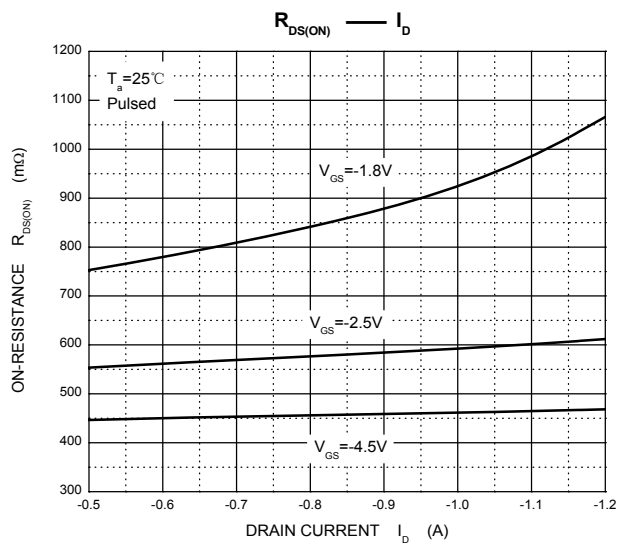
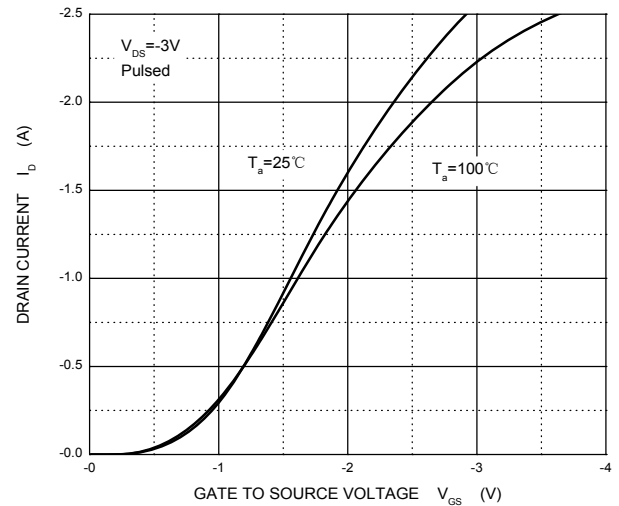


## P-Channel Typical Characteristics

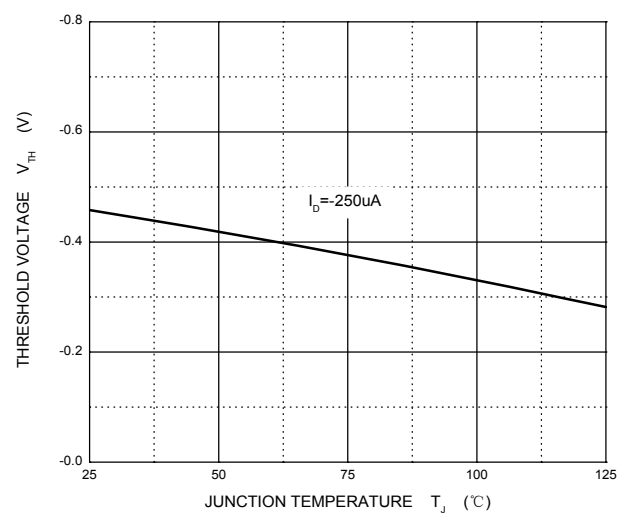
Output Characteristics



Transfer Characteristics

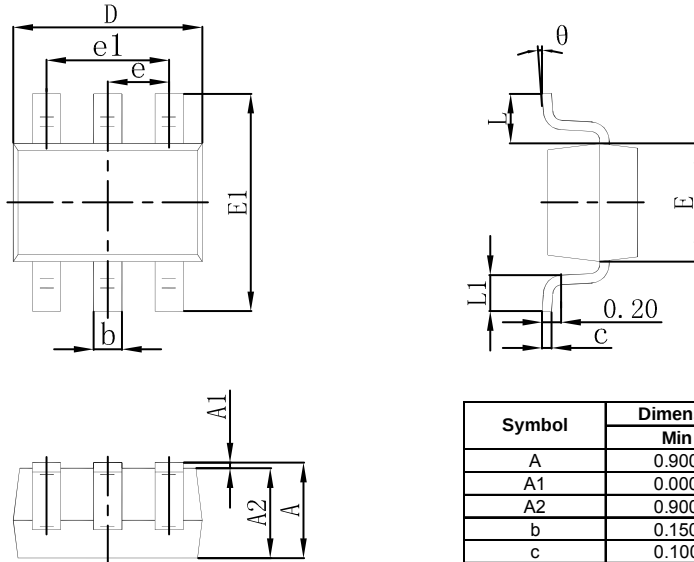


Threshold Voltage



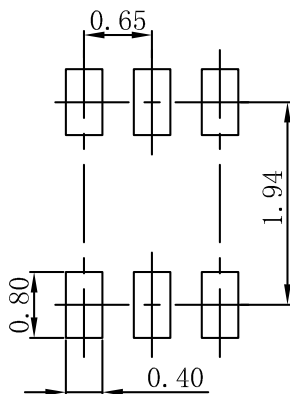


## SOT-363 Package Outline Dimensions



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min                       | Max   | Min                  | Max   |
| A        | 0.900                     | 1.100 | 0.035                | 0.043 |
| A1       | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2       | 0.900                     | 1.000 | 0.035                | 0.039 |
| b        | 0.150                     | 0.350 | 0.006                | 0.014 |
| c        | 0.100                     | 0.150 | 0.004                | 0.006 |
| D        | 2.000                     | 2.200 | 0.079                | 0.087 |
| E        | 1.150                     | 1.350 | 0.045                | 0.053 |
| E1       | 2.150                     | 2.400 | 0.085                | 0.094 |
| e        | 0.650 TYP                 |       | 0.026 TYP            |       |
| e1       | 1.200                     | 1.400 | 0.047                | 0.055 |
| L        | 0.525 REF                 |       | 0.021 REF            |       |
| L1       | 0.260                     | 0.460 | 0.010                | 0.018 |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |

## SOT-363 Suggested Pad Layout



### Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.



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