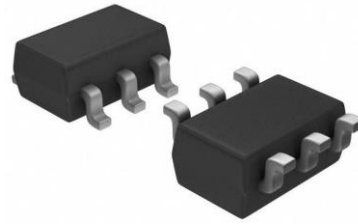
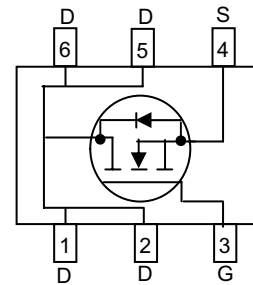


**WNM01N11**
**Single N-Channel, 110V, 1.8A, Power MOSFET**
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

| V <sub>DS</sub> (V) | Typical R <sub>ds(on)</sub> (Ω) |
|---------------------|---------------------------------|
| 110                 | 0.230@ V <sub>GS</sub> =10V     |
|                     | 0.250@ V <sub>GS</sub> =4.5V    |


**SOT-23-6L**

**Pin configuration (Top view)**
**Descriptions**

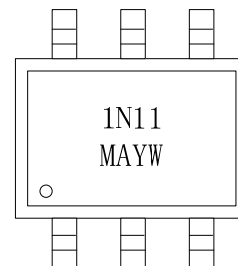
The WNM01N11 is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent R<sub>DS (ON)</sub> with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WNM01N11 is Pb-free and Halogen-free.

**Features**

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Small package SOT-23-6L

**Applications**

- Driver for Relay, Solenoid, Motor, LED etc.
- DC-DC converter circuit
- Power Switch
- Load Switch
- Charging


**1N11 = Device Code**
**MA= Special Code**
**YW= Year&Week**
**Marking**
**Order information**

| Device        | Package   | Shipping       |
|---------------|-----------|----------------|
| WNM01N11-6/TR | SOT-23-6L | 3000/Reel&Tape |

**Absolute Maximum ratings**

| Parameter                                |                        | Symbol    | 1S         | 10 S | Steady State | Unit             |
|--|------------------------|-----------|------------|------|--------------|------------------|
| Drain-Source Voltage                     |                        | $V_{DS}$  | 110        |      |              | V                |
| Gate-Source Voltage                      |                        | $V_{GS}$  | $\pm 20$   |      |              |                  |
| Continuous Drain Current <sup>a d</sup>  | $T_A=25^\circ\text{C}$ | $I_D$     | 2.13       | 1.80 | 1.50         | A                |
|  | $T_A=70^\circ\text{C}$ |           | 1.70       | 1.44 | 1.20         |                  |
| Maximum Power Dissipation <sup>a d</sup> | $T_A=25^\circ\text{C}$ | $P_D$     | 2.50       | 1.78 | 1.25         | W                |
|  | $T_A=70^\circ\text{C}$ |           | 1.60       | 1.14 | 0.80         |                  |
| Continuous Drain Current <sup>b d</sup>  | $T_A=25^\circ\text{C}$ | $I_D$     | 1.80       | 1.59 | 1.40         | A                |
|  | $T_A=70^\circ\text{C}$ |           | 1.44       | 1.27 | 1.12         |                  |
| Maximum Power Dissipation <sup>b d</sup> | $T_A=25^\circ\text{C}$ | $P_D$     | 1.78       | 1.39 | 1.08         | W                |
|  | $T_A=70^\circ\text{C}$ |           | 1.14       | 0.88 | 0.69         |                  |
| Pulsed Drain Current <sup>c</sup>        |                        | $I_{DM}$  | 7          |      |              | A                |
| Operating Junction Temperature           |                        | $T_J$     | -55 to 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**

| Parameter   |                       | Symbol          | Typical         | Maximum | Unit               |
|---|-----------------------|-----------------|-----------------|---------|--------------------|
| Junction-to-Ambient Thermal Resistance <sup>a</sup> | $t \leq 1 \text{ s}$  | $R_{\theta JA}$ | 36              | 50      | $^\circ\text{C/W}$ |
|   | $t \leq 10 \text{ s}$ |                 | 50              | 70      |                    |
|   | Steady State          |                 | 75              | 100     |                    |
| Junction-to-Ambient Thermal Resistance <sup>b</sup> | $t \leq 1 \text{ s}$  | $R_{\theta JA}$ | 50              | 70      |                    |
|   | $t \leq 10 \text{ s}$ |                 | 75              | 90      |                    |
|   | Steady State          |                 | 95              | 115     |                    |
| Junction-to-Case Thermal Resistance                 |                       | Steady State    | $R_{\theta JC}$ | 55      | 70                 |

a Surface mounted on FR-4 Board using 1 square inch pad size, 1oz copper

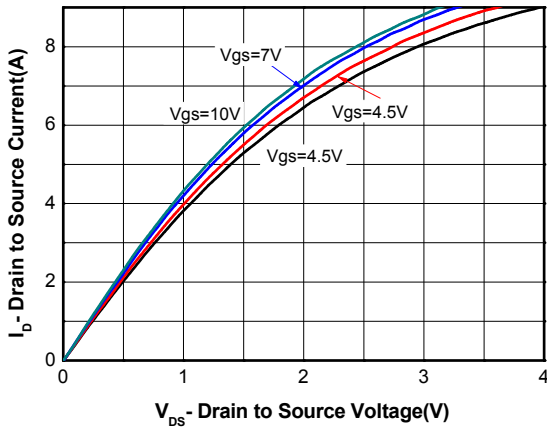
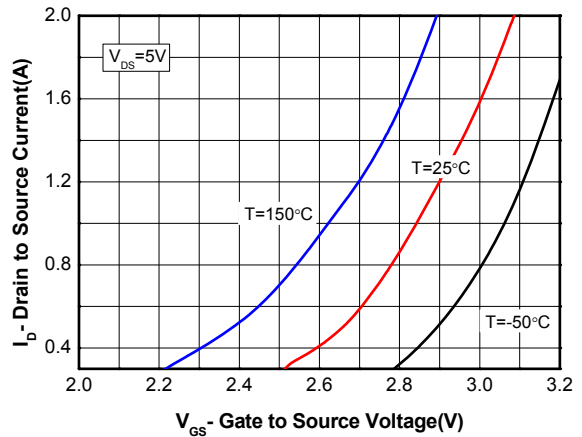
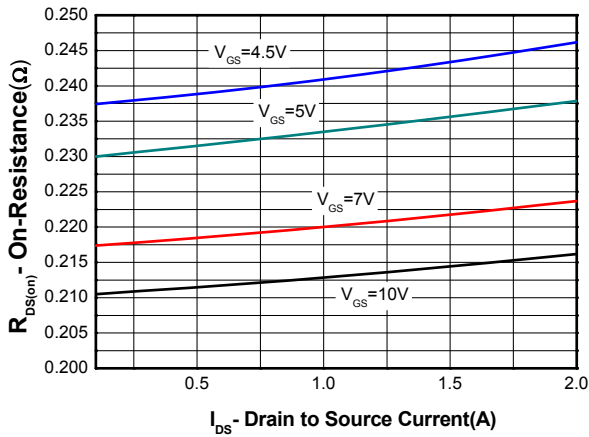
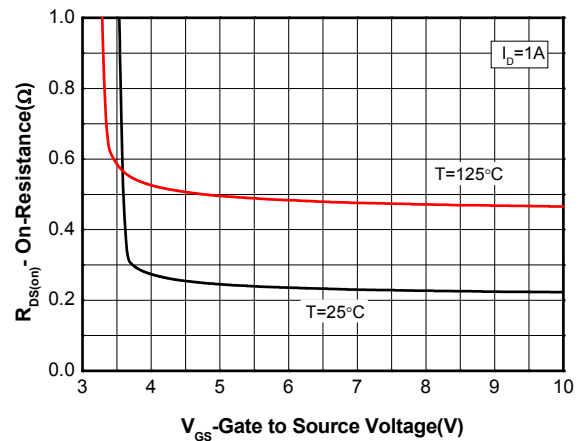
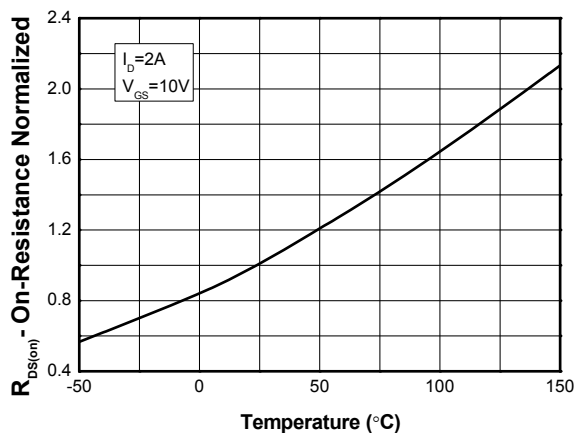
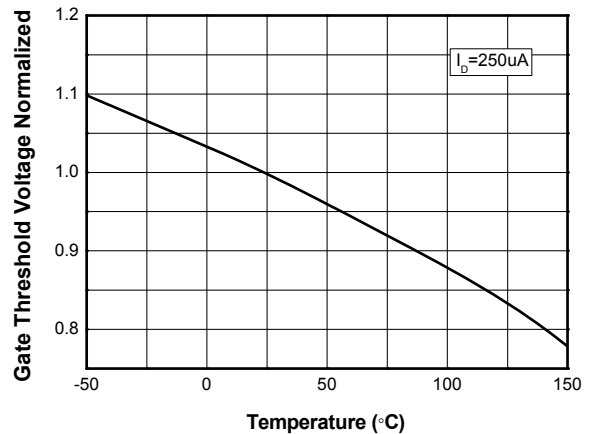
b Surface mounted on FR-4 board using minimum pad size, 1oz copper

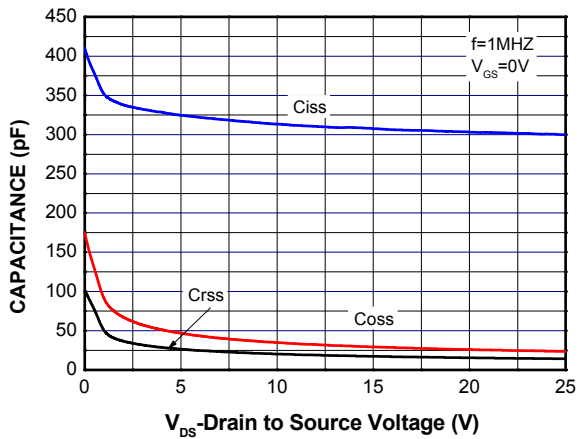
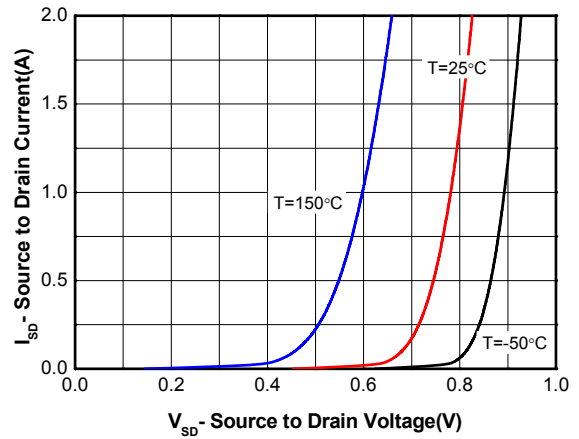
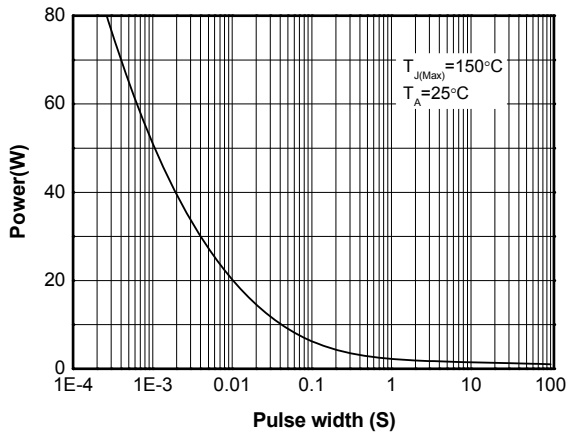
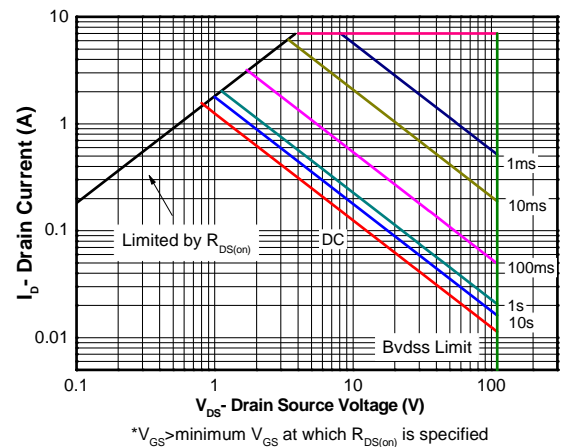
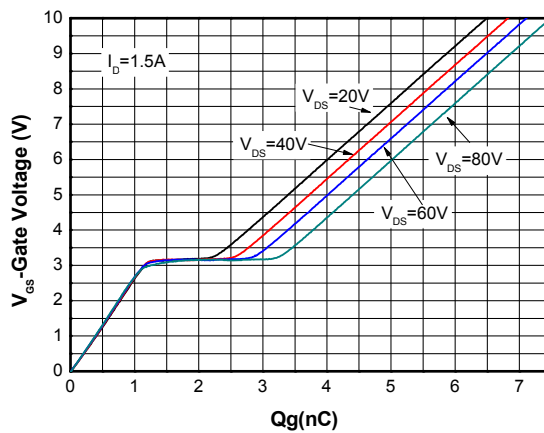
c Pulse width < 380 $\mu\text{s}$ , Duty Cycle < 2%

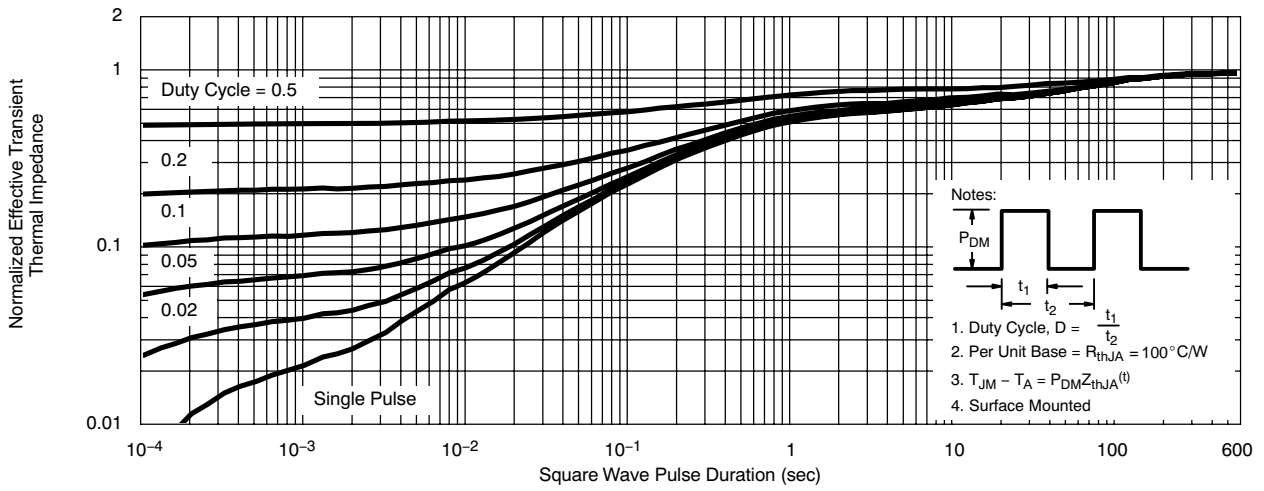
d Maximum junction temperature  $T_J=150^\circ\text{C}$ .

**Electronics Characteristics (Ta=25°C, unless otherwise noted)**

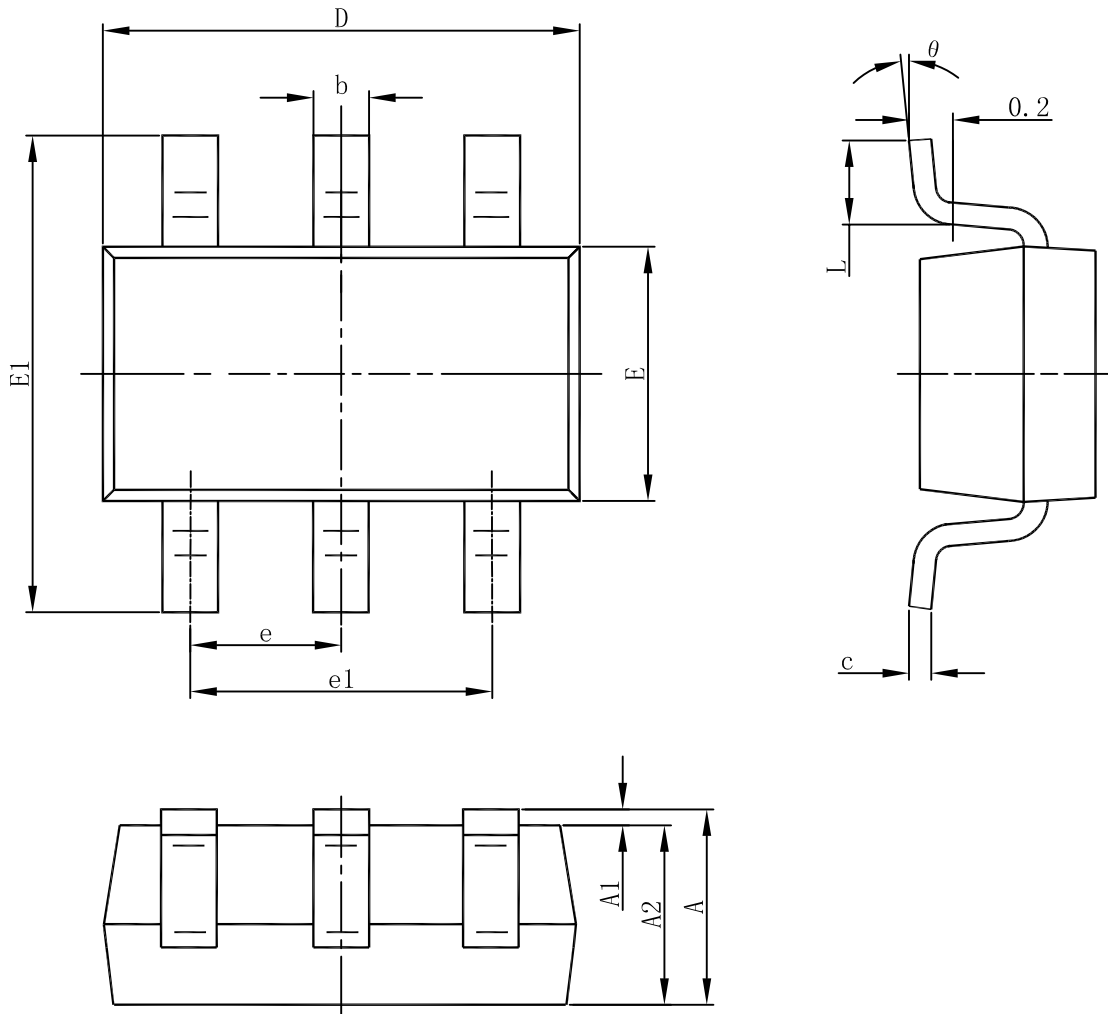
| Parameter                                     | Symbol       | Test Conditions  | Min | Typ  | Max       | Unit       |
|---|--------------|--|-----|------|-----------|------------|
| <b>OFF CHARACTERISTICS</b>                    |              |  |     |      |           |            |
| Drain-to-Source Breakdown Voltage             | $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu A$  | 110 |      |           | V          |
| Zero Gate Voltage Drain Current               | $I_{DSS}$    | $V_{DS} = 90V, V_{GS} = 0V$  |     |      | 1         | $\mu A$    |
| Gate-to-source Leakage Current                | $I_{GSS}$    | $V_{DS} = 0V, V_{GS} = \pm 20V$  |     |      | $\pm 100$ | nA         |
| <b>ON CHARACTERISTICS</b>                     |              |  |     |      |           |            |
| Gate Threshold Voltage                        | $V_{GS(TH)}$ | $V_{GS} = V_{DS}, I_D = 250\mu A$  | 1   | 1.9  | 2.5       | V          |
| Drain-to-source On-resistance <sup>b, c</sup> | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 1.4A$   |     | 230  | 310       | m $\Omega$ |
|   |              | $V_{GS} = 4.5V, I_D = 1.3A$  |     | 250  | 350       |            |
| Forward Trans conductance                     | $g_{fs}$     | $V_{DS} = 10V, I_D = 3A$   |     | 1.1  |           | S          |
| <b>CAPACITANCES, CHARGES</b>                  |              |  |     |      |           |            |
| Input Capacitance                             | $C_{ISS}$    | $V_{GS} = 0V,$<br>$f = 1.0\text{ MHz},$<br>$V_{DS} = 25V$                    |     | 300  |           | pF         |
| Output Capacitance                            | $C_{OSS}$    |  |     | 25.6 |           |            |
| Reverse Transfer Capacitance                  | $C_{RSS}$    |  |     | 15.6 |           |            |
| Total Gate Charge                             | $Q_{G(TOT)}$ | $V_{GS} = 10V,$<br>$V_{DD} = 80V,$<br>$I_D = 1.5A$                           |     | 7.5  |           | nC         |
| Threshold Gate Charge                         | $Q_{G(TH)}$  |  |     | 0.7  |           |            |
| Gate-to-Source Charge                         | $Q_{GS}$     |  |     | 1.1  |           |            |
| Gate-to-Drain Charge                          | $Q_{GD}$     |  |     | 2.1  |           |            |
| <b>SWITCHING CHARACTERISTICS</b>              |              |  |     |      |           |            |
| Turn-On Delay Time                            | $t_d(ON)$    | $V_{GS} = 10V,$<br>$V_{DD} = 50V,$<br>$R_L = 50\Omega,$<br>$R_G = 3.3\Omega$ |     | 11.8 |           | ns         |
| Rise Time                                     | $t_r$        |  |     | 13.2 |           |            |
| Turn-Off Delay Time                           | $t_d(OFF)$   |  |     | 32.8 |           |            |
| Fall Time                                     | $t_f$        |  |     | 4.8  |           |            |
| <b>BODY DIODE CHARACTERISTICS</b>             |              |  |     |      |           |            |
| Forward Voltage                               | $V_{SD}$     | $V_{GS} = 0V, I_S = 1A$  |     | 0.8  | 1.2       | V          |

**Typical Characteristics (Ta=25°C, unless otherwise noted)**

**Output characteristics**

**Transfer characteristics**

**On-Resistance vs. Drain current**

**On-Resistance vs. Gate-to-Source voltage**

**On-Resistance vs. Junction temperature**

**Threshold voltage vs. Junction temperature**

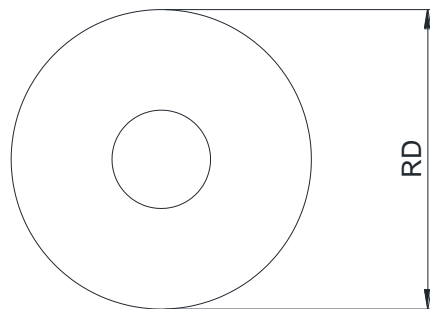
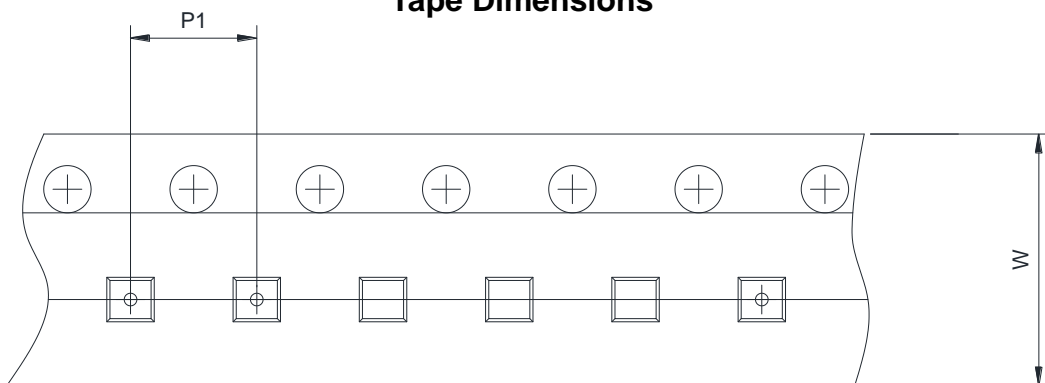
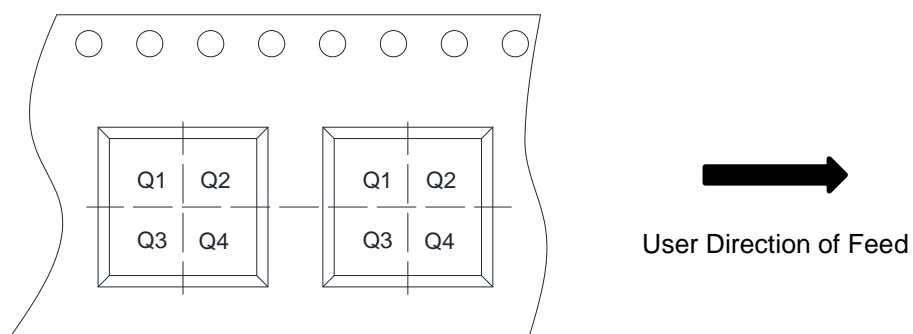

**Capacitance**

**Body diode forward voltage**

**Single pulse power**

**Safe operating power**

**Gate charge Characteristics**



**Transient thermal response (Junction-to-Ambient)**

**Package outline dimensions**
**SOT-23-6L**


| Symbol   | Dimensions in Millimeters |      |      |
|----------|---------------------------|------|------|
|          | Min.                      | Typ. | Max. |
| A        | 1.05                      | -    | 1.45 |
| A1       | 0                         | -    | 0.15 |
| A2       | 1.00                      | 1.15 | 1.30 |
| b        | 0.30                      | 0.40 | 0.50 |
| c        | 0.10                      | -    | 0.21 |
| D        | 2.72                      | 2.92 | 3.12 |
| E1       | 2.60                      | 2.80 | 3.00 |
| E        | 1.40                      | 1.60 | 1.80 |
| e        | 0.85                      | 0.95 | 1.05 |
| e1       | 1.80                      | 1.90 | 2.00 |
| L        | 0.30                      | -    | 0.60 |
| L1       | 0.25 BSC                  |      |      |
| $\theta$ | 0 °                       | -    | 8 °  |

**TAPE AND REEL INFORMATION**
**Reel Dimensions**

**Tape Dimensions**

**Quadrant Assignments For PIN1 Orientation In Tape**


|      |   |   |  |
|------|---|---|--|
| RD   | Reel Dimension                          | <input checked="" type="checkbox"/> 7inch | <input type="checkbox"/> 13inch  |
| W    | Overall width of the carrier tape       | <input checked="" type="checkbox"/> 8mm   | <input type="checkbox"/> 12mm <input type="checkbox"/> 16mm                                    |
| P1   | Pitch between successive cavity centers | <input type="checkbox"/> 2mm              | <input checked="" type="checkbox"/> 4mm <input type="checkbox"/> 8mm                           |
| Pin1 | Pin1 Quadrant                           | <input type="checkbox"/> Q1               | <input type="checkbox"/> Q2 <input checked="" type="checkbox"/> Q3 <input type="checkbox"/> Q4 |



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