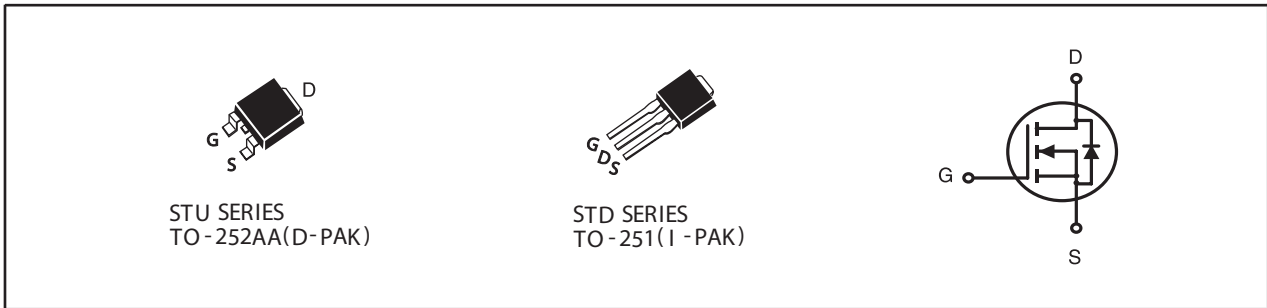


**N-Channel Logic Level Enhancement Mode Field Effect Transistor****PRODUCT SUMMARY**

| VDSS | ID | RDS(ON) (mΩ) Max |
|------|----|------------------|
| 100V | 6A | 353 @ VGS=10V    |
|      |    | 553 @ VGS=4.5V   |

**FEATURES**

- Super high dense cell design for low RDS(ON).
- Rugged and reliable.
- TO-252 and TO-251 Package.

**ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub>=25°C unless otherwise noted)**

| Symbol                            | Parameter  | Limit                | Units |
|-----------------------------------|--|----------------------|-------|
| V <sub>DS</sub>                   | Drain-Source Voltage                             | 100                  | V     |
| V <sub>GS</sub>                   | Gate-Source Voltage                              | ±20                  | V     |
| I <sub>D</sub>                    | Drain Current-Continuous <sup>a e</sup>          | T <sub>C</sub> =25°C | 6     |
|                                   |  | T <sub>C</sub> =70°C | 4.8   |
| I <sub>DM</sub>                   | -Pulsed <sup>b</sup>                             | 17                   | A     |
| E <sub>AS</sub>                   | Single Pulse Avalanche Energy <sup>d</sup>       | 3.6                  | mJ    |
| P <sub>D</sub>                    | Maximum Power Dissipation                        | T <sub>C</sub> =25°C | 42    |
|                                   |  | T <sub>C</sub> =70°C | 27    |
| T <sub>J</sub> , T <sub>STG</sub> | Operating Junction and Storage Temperature Range | -55 to 150           | °C    |

**THERMAL CHARACTERISTICS**

|                  |   |    |      |
|------------------|---|----|------|
| R <sub>θJC</sub> | Thermal Resistance, Junction-to-Case    | 3  | °C/W |
| R <sub>θJA</sub> | Thermal Resistance, Junction-to-Ambient | 50 | °C/W |

# STU06L01

## STD06L01

Ver 1.1

### ELECTRICAL CHARACTERISTICS (T<sub>C</sub>=25°C unless otherwise noted)

| Symbol   | Parameter                        | Conditions   | Min | Typ  | Max  | Units |
|--|----------------------------------|--|-----|------|------|-------|
| <b>OFF CHARACTERISTICS</b>   |                                  |  |     |      |      |       |
| BV <sub>DSS</sub>  | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V , I <sub>D</sub> =10mA   | 100 |      |      | V     |
| I <sub>DSS</sub>   | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =80V , V <sub>GS</sub> =0V   |     |      | 1    | μA    |
| I <sub>GSS</sub>   | Gate-Body Leakage Current        | V <sub>GS</sub> = ±20V , V <sub>DS</sub> =0V   |     |      | ±100 | nA    |
| <b>ON CHARACTERISTICS</b>  |                                  |  |     |      |      |       |
| V <sub>GS(th)</sub>  | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                       | 1   | 2    | 3    | V     |
| R <sub>DS(ON)</sub>  | Drain-Source On-State Resistance | V <sub>GS</sub> =10V , I <sub>D</sub> =3A  |     | 282  | 353  | m ohm |
|  |                                  | V <sub>GS</sub> =4.5V , I <sub>D</sub> =2A   |     | 410  | 553  | m ohm |
| g <sub>FS</sub>  | Forward Transconductance         | V <sub>DS</sub> =10V , I <sub>D</sub> =3A  |     | 4.5  |      | S     |
| <b>DYNAMIC CHARACTERISTICS <sup>c</sup></b>                                    |                                  |  |     |      |      |       |
| C <sub>ISS</sub>   | Input Capacitance                | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V<br>f=1.0MHz  |     | 273  |      | pF    |
| C <sub>OSS</sub>   | Output Capacitance               |  |     | 25   |      | pF    |
| C <sub>RSS</sub>   | Reverse Transfer Capacitance     |  |     | 18   |      | pF    |
| <b>SWITCHING CHARACTERISTICS <sup>c</sup></b>                                  |                                  |  |     |      |      |       |
| t <sub>D(ON)</sub>   | Turn-On Delay Time               | V <sub>DD</sub> =50V<br>I <sub>D</sub> =1A<br>V <sub>GS</sub> =10V<br>R <sub>GEN</sub> = 6 ohm |     | 8.5  |      | ns    |
| t <sub>r</sub>   | Rise Time                        |  |     | 9.6  |      | ns    |
| t <sub>D(OFF)</sub>  | Turn-Off Delay Time              |  |     | 15.2 |      | ns    |
| t <sub>f</sub>   | Fall Time                        |  |     | 2.5  |      | ns    |
| Q <sub>g</sub>   | Total Gate Charge                | V <sub>DS</sub> =50V, I <sub>D</sub> =3A, V <sub>GS</sub> =10V                                 |     | 4.3  |      | nC    |
| Q <sub>gs</sub>  | Gate-Source Charge               | V <sub>DS</sub> =50V, I <sub>D</sub> =3A,<br>V <sub>GS</sub> =10V                              |     | 1    |      | nC    |
| Q <sub>gd</sub>  | Gate-Drain Charge                |  |     | 1.6  |      | nC    |
| <b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>                  |                                  |  |     |      |      |       |
| V <sub>SD</sub>  | Diode Forward Voltage            | V <sub>GS</sub> =0V, I <sub>S</sub> =1A  |     | 0.8  | 1.3  | V     |
| <b>Notes</b>   |                                  |  |     |      |      |       |
| a.Surface Mounted on FR4 Board, t ≤ 10sec.                                     |                                  |  |     |      |      |       |
| b.Pulse Test:Pulse Width ≤ 300us, Duty Cycle ≤ 2%.                             |                                  |  |     |      |      |       |
| c.Guaranteed by design, not subject to production testing.                     |                                  |  |     |      |      |       |
| d.Starting T <sub>J</sub> =25°C, L=0.5mH, V <sub>DD</sub> = 50V.(See Figure13) |                                  |  |     |      |      |       |
| e.Drain current limited by maximum junction temperature.                       |                                  |  |     |      |      |       |

Oct,30,2013

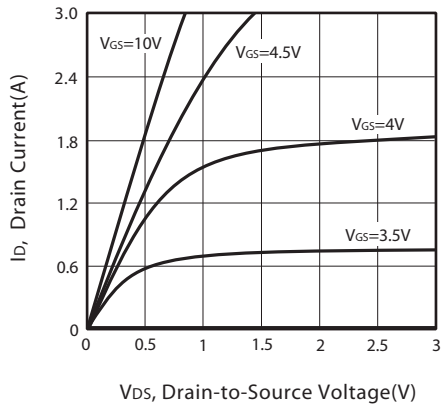


Figure 1. Output Characteristics

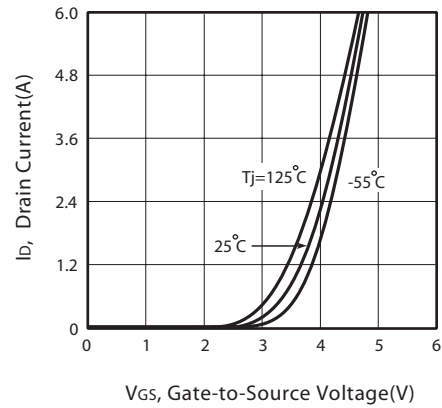


Figure 2. Transfer Characteristics

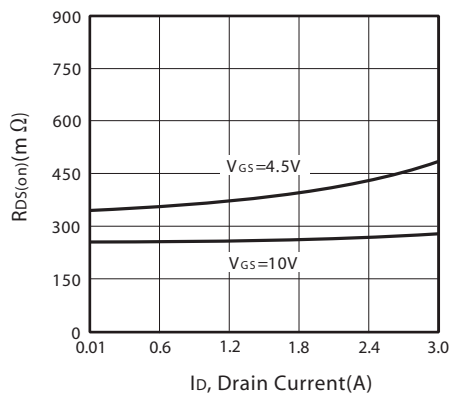


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

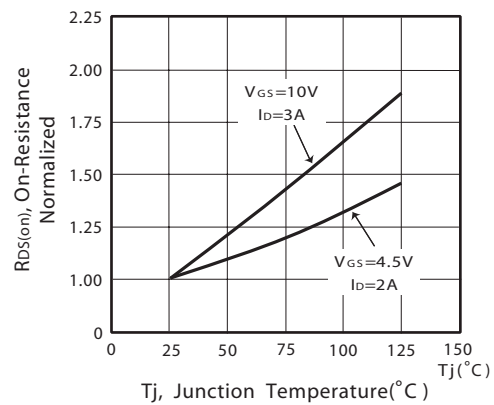


Figure 4. On-Resistance Variation with Drain Current and Temperature

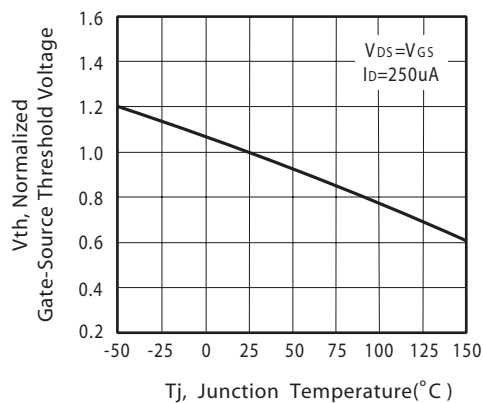


Figure 5. Gate Threshold Variation with Temperature

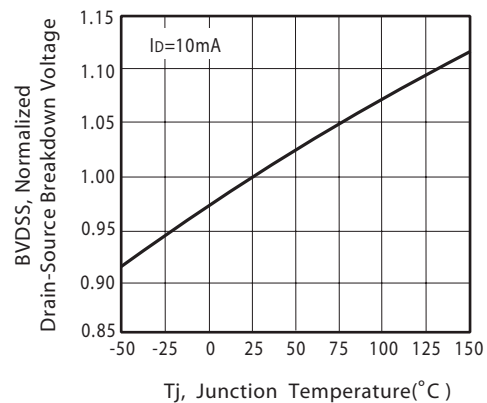


Figure 6. Breakdown Voltage Variation with Temperature

# STU06L01 STD06L01

Ver 1.1

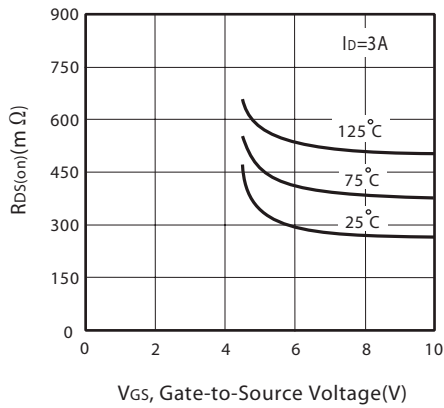


Figure 7. On-Resistance vs. Gate-Source Voltage

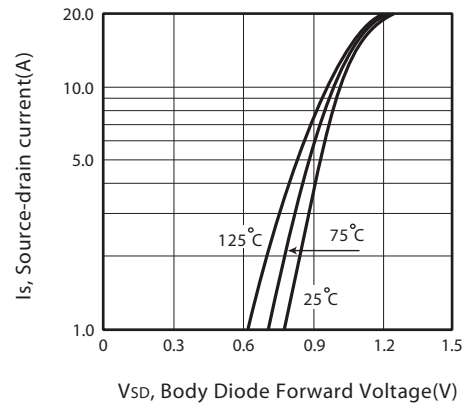


Figure 8. Body Diode Forward Voltage Variation with Source Current

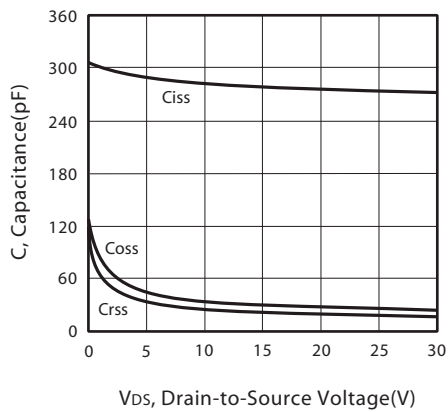


Figure 9. Capacitance

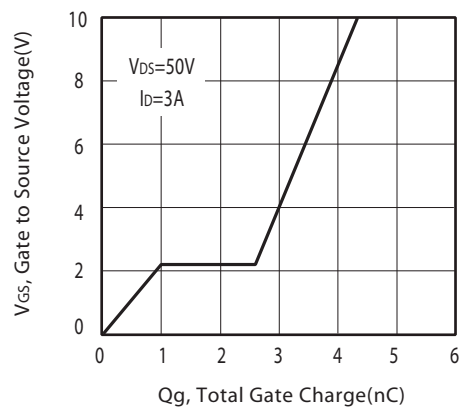


Figure 10. Gate Charge

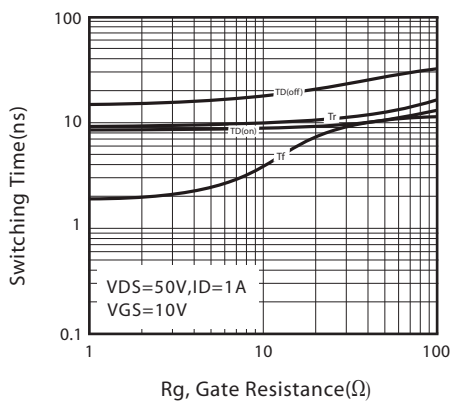


Figure 11. switching characteristics

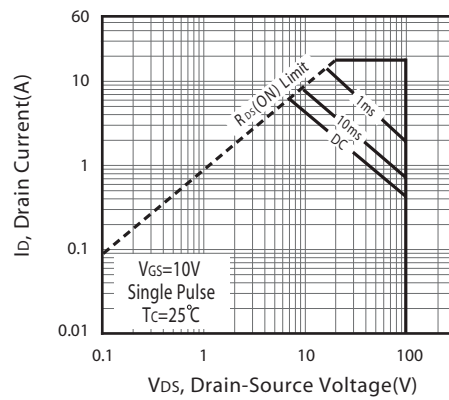
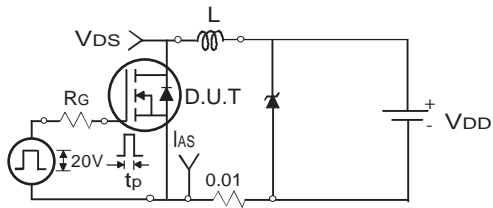


Figure 12. Maximum Safe Operating Area

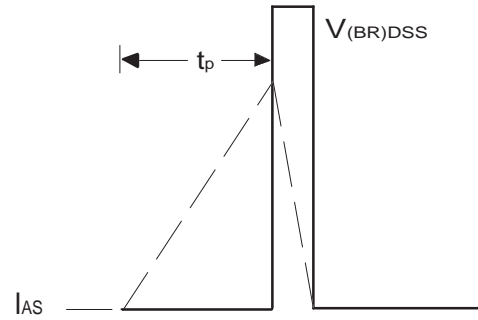
Oct,30,2013

# STU06L01 STD06L01



Uncamped Inductive Test Circuit

Figure 13a.



Uncamped Inductive Waveforms

Figure 13b.

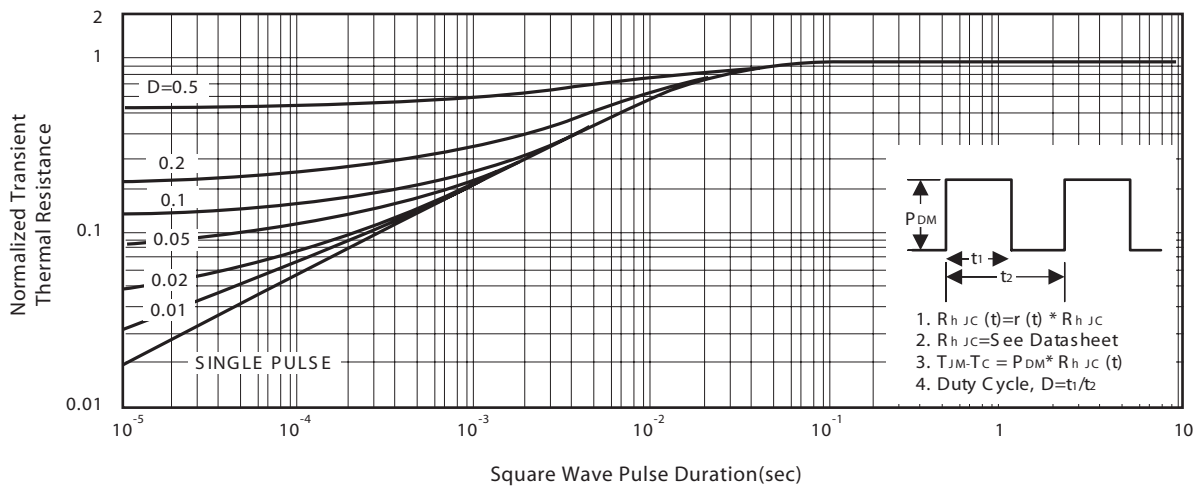
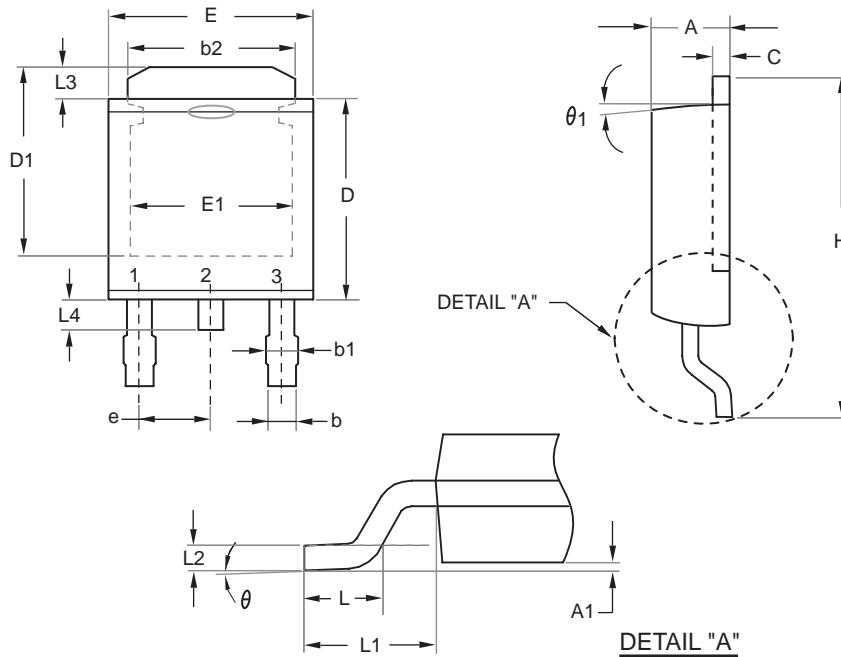


Figure 14. Normalized Thermal Transient Impedance Curve

# STU06L01 STD06L01

Ver 1.1

TO-252



| SYMBOLS | MILLIMETERS |        | INCHES     |       |
|---------|-------------|--------|------------|-------|
|         | MIN         | MAX    | MIN        | MAX   |
| A       | 2.100       | 2.500  | 0.083      | 0.098 |
| A1      | 0.000       | 0.200  | 0.000      | 0.008 |
| b       | 0.400       | 0.889  | 0.016      | 0.035 |
| b1      | 0.770       | 1.140  | 0.030      | 0.045 |
| b2      | 4.800       | 5.460  | 0.189      | 0.215 |
| C       | 0.400       | 0.600  | 0.016      | 0.024 |
| D       | 5.300       | 6.223  | 0.209      | 0.245 |
| D1      | 4.900       | 5.515  | 0.193      | 0.217 |
| E       | 6.300       | 6.731  | 0.248      | 0.265 |
| E1      | 4.400       | 5.004  | 0.173      | 0.197 |
| e       | 2.290 REF   |        | 0.090 BSC  |       |
| H       | 8.900       | 10.400 | 0.350      | 0.409 |
| L       | 1.397       | 1.770  | 0.055      | 0.070 |
| L1      | 2.743 REF.  |        | 0.108 REF. |       |
| L2      | 0.508 REF.  |        | 0.020 REF. |       |
| L3      | 0.890       | 1.700  | 0.035      | 0.067 |
| L4      | 0.500       | 1.100  | 0.020      | 0.043 |
| theta   | 0°          | 10°    | 0°         | 10°   |
| theta1  | 7° REF.     |        | 7° REF.    |       |

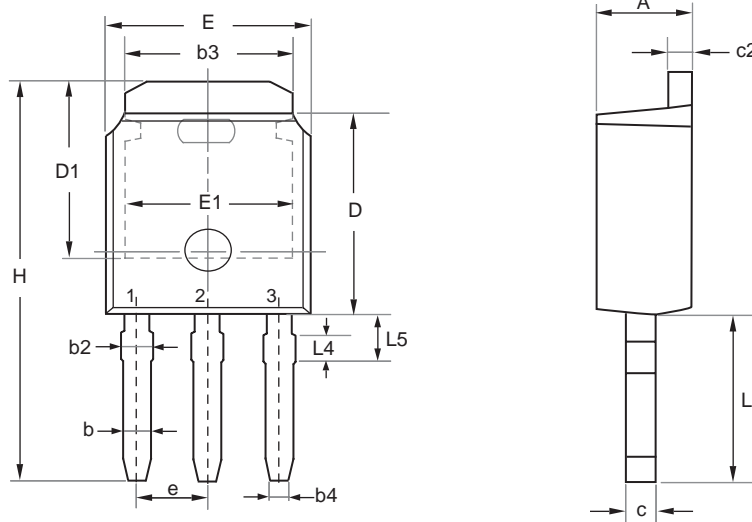
Oct,30,2013

# STU06L01 STD06L01

Ver 1.1

## PACKAGE OUTLINE DIMENSIONS

TO-251



| SYMBOL | MILLIMETERS |        | INCHES    |       |
|--------|-------------|--------|-----------|-------|
|        | MIN         | MAX    | MIN       | MAX   |
| E      | 6.400       | 6.731  | 0.252     | 0.265 |
| L      | 3.980       | 4.280  | 0.157     | 0.169 |
| L4     | 0.698 REF   |        | 0.027 REF |       |
| L5     | 0.972       | 1.226  | 0.038     | 0.048 |
| D      | 6.000       | 6.223  | 0.236     | 0.245 |
| H      | 11.050      | 11.450 | 0.435     | 0.450 |
| b      | 0.640       | 0.880  | 0.025     | 0.035 |
| b2     | 0.770       | 1.140  | 0.030     | 0.045 |
| b3     | 5.210       | 5.460  | 0.205     | 0.215 |
| b4     | 0.450       | 0.550  | 0.018     | 0.022 |
| e      | 2.286 BSC   |        | 0.090 BSC |       |
| A      | 2.200       | 2.380  | 0.087     | 0.094 |
| c      | 0.400       | 0.600  | 0.016     | 0.024 |
| c2     | 0.400       | 0.600  | 0.016     | 0.024 |
| D1     | 5.100       | ---    | 0.201     | ---   |
| E1     | 4.400       | ---    | 0.173     | ---   |

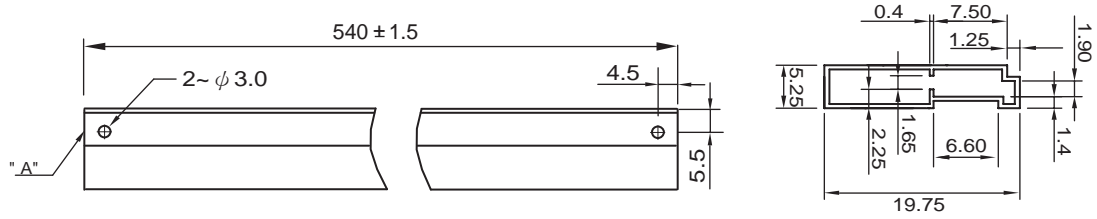
Oct,30,2013

# STU06L01 STD06L01

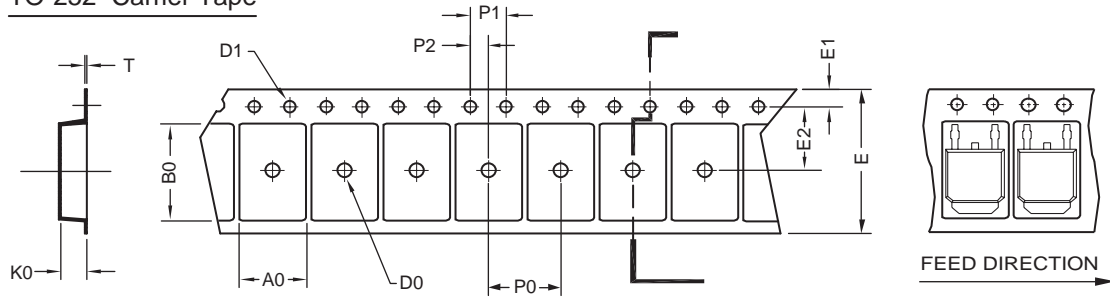
Ver 1.1

## TO-251 Tube/TO-252 Tape and Reel Data

### TO-251 Tube



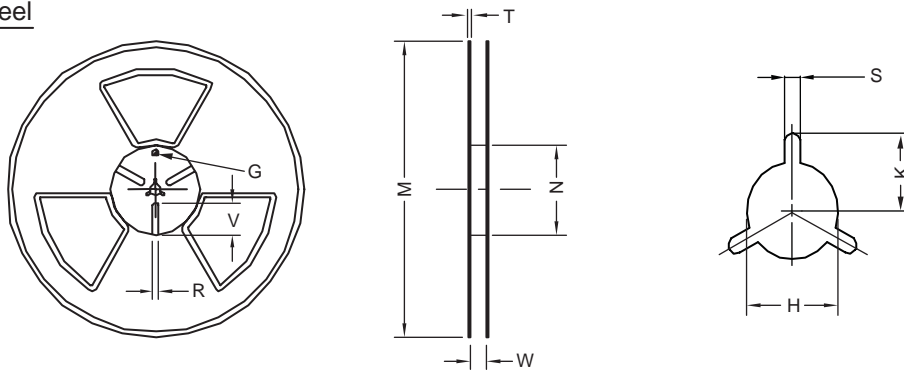
### TO-252 Carrier Tape



UNIT:mm

| PACKAGE           | A0           | B0            | K0           | D0  | D1                   | E            | E1           | E2           | P0          | P1          | P2           | T            |
|-------------------|--------------|---------------|--------------|-----|----------------------|--------------|--------------|--------------|-------------|-------------|--------------|--------------|
| TO-252<br>(16 mm) | 6.96<br>±0.1 | 10.49<br>±0.1 | 2.79<br>±0.1 | φ 2 | φ 1.5<br>+0.1<br>- 0 | 16.0<br>±0.3 | 1.75<br>±0.1 | 7.5<br>±0.15 | 8.0<br>±0.1 | 4.0<br>±0.1 | 2.0<br>±0.15 | 0.3<br>±0.05 |

### TO-252 Reel



UNIT:mm

| TAPE SIZE | REEL SIZE | M              | N             | W                    | T   | H                        | K    | S           | G   | R   | V   |
|-----------|-----------|----------------|---------------|----------------------|-----|--------------------------|------|-------------|-----|-----|-----|
| 16 mm     | φ 330     | φ 330<br>± 0.5 | φ 97<br>± 1.0 | 17.0<br>+ 1.5<br>- 0 | 2.2 | φ 13.0<br>+ 0.5<br>- 0.2 | 10.6 | 2.0<br>±0.5 | --- | --- | --- |

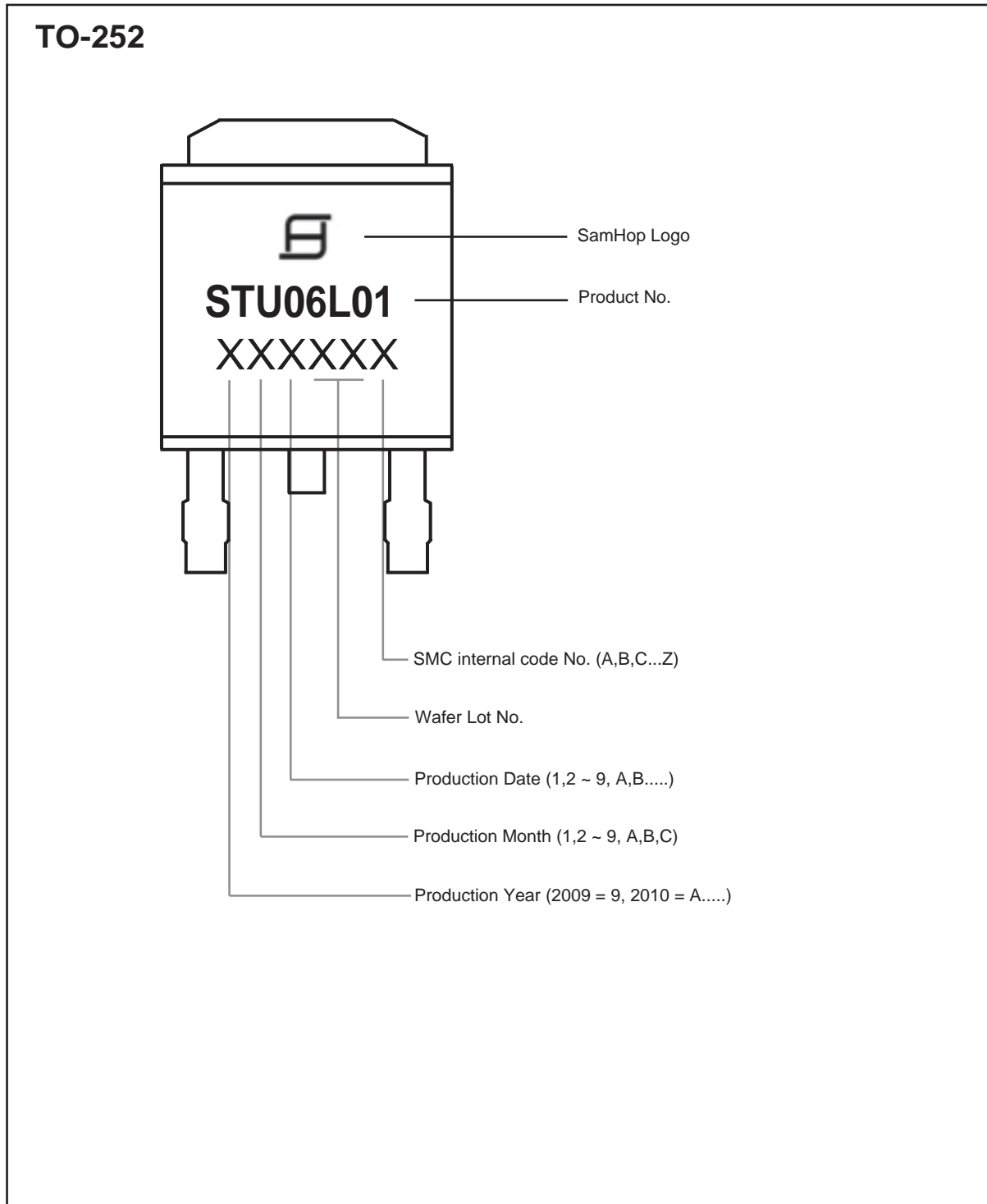
Oct,30,2013



# STU06L01 STD06L01

Ver 1.1

## TOP MARKING DEFINITION



Oct,30,2013

# STU06L01 STD06L01

## TOP MARKING DEFINITION

