

### General Description

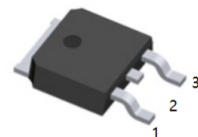
These N-channel enhancement mode power mosfets used advanced trench technology design, provided excellent  $R_{DS(on)}$  and low gate charge. Which accords with the RoHS standard.

### Features

- $V_{DS} = 60V, I_D = 25A$   
 $R_{DS(on)}, 23 m\Omega$  (Typ) @  $V_{GS} = 10V$   
 $R_{DS(on)}, 30 m\Omega$  (Typ) @  $V_{GS} = 4.5V$
- Fast Switching
- Low ON Resistance ( $R_{DS(on)} \leq 29 m\Omega$ )
- Low Gate Charge
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

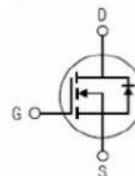
### Application

- Power switch circuit of adaptor and charger;
- LED backlight driver;
- Synchronousrectification



1.Date 2.Drain 3.Source  
TO-252(DPAK) top view

Inner Equivalent Principium Chart



### Package Marking and Ordering Information

| Device Marking | Device    | Device Package | Reel Size | Tape width | Quantity |
|----------------|-----------|----------------|-----------|------------|----------|
| UMW 25N06      | UMW 25N06 | TO-252         | 330mm     | 12mm       | 2500     |

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

| Parameter                                   |                     | Symbol    | Value       | Unit       |
|---------------------------------------------|---------------------|-----------|-------------|------------|
| Drain-Source Voltage                        |                     | $V_{DS}$  | 60          | V          |
| Gate-Source Voltage                         |                     | $V_{GS}$  | $\pm 20$    | V          |
| Continuous Drain Current                    | $T_C = 25^\circ C$  | $I_D$     | 25          | A          |
|                                             | $T_C = 100^\circ C$ |           | 17.5        | A          |
| Pulsed Drain Current <sup>1)</sup>          |                     | $I_{DM}$  | 100         | A          |
| Single Puise Avalanche Energy <sup>2)</sup> |                     | $E_{AS}$  | 56.2        | mJ         |
| Maximum Power Dissipation                   | $T_C = 25^\circ C$  | $P_D$     | 36.2        | W          |
| Storage Temperature Range                   |                     | $T_{STG}$ | -55 to +150 | $^\circ C$ |
| Operating Junction Temperature Range        |                     | $T_J$     | -55 to +150 | $^\circ C$ |

### Thermal Resistance

| Parameter                              | Symbol          | Min. | Typ. | Max   | Unit         |
|----------------------------------------|-----------------|------|------|-------|--------------|
| Thermal Resistance,Junction-to-Case    | $R_{\theta JC}$ | -    | -    | 3.45  | $^\circ C/W$ |
| Thermal Resistance,Junction to Ambient | $R_{\theta JA}$ | -    | -    | 111.5 | $^\circ C/W$ |

### Electrical Characteristics(T<sub>J</sub>=25℃ unless otherwise noted)

| OFF CHARACTERISTICS             |                   |                                             |      |      |      |      |
|---------------------------------|-------------------|---------------------------------------------|------|------|------|------|
| Parameter                       | Symbol            | Conditions                                  | Min. | Typ. | Max. | Unit |
| Drain-Source Breakdown Voltage  | BV <sub>DSS</sub> | V <sub>GS</sub> =0V, I <sub>DS</sub> =250uA | 60   | -    | -    | V    |
| Zero Gate Voltage Drain Current | I <sub>DSS</sub>  | V <sub>DS</sub> =60V, V <sub>GS</sub> =0V   | -    | -    | 1    | uA   |
| Gate-Body Leakage               | I <sub>GSS</sub>  | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V  | -    | -    | ±100 | nA   |

| ON CHARACTERISTICS               |                     |                                                           |      |      |      |      |
|----------------------------------|---------------------|-----------------------------------------------------------|------|------|------|------|
| Parameter                        | Symbol              | Conditions                                                | Min. | Typ. | Max. | Unit |
| Gate Threshold Voltage           | V <sub>GS(TH)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250uA | 1    | 1.5  | 2    | V    |
| Drain-Source On-State Resistance | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>DS</sub> =19A                | -    | 23   | 29   | mΩ   |
|                                  |                     | V <sub>GS</sub> =4.5V, I <sub>DS</sub> =19A               | -    | 30   | 38   | mΩ   |

| DYNAMIC CHARACTERISTICS      |                  |                                                       |      |      |      |      |
|------------------------------|------------------|-------------------------------------------------------|------|------|------|------|
| Parameter                    | Symbol           | Conditions                                            | Min. | Typ. | Max. | Unit |
| Input Capacitance            | C <sub>iss</sub> | V <sub>DS</sub> =30V, V <sub>GS</sub> = 0V,<br>f=1MHz | -    | 939  | -    | pF   |
| Output Capacitance           | C <sub>oss</sub> |                                                       | -    | 73.5 | -    |      |
| Reverse Transfer Capacitance | C <sub>rss</sub> |                                                       | -    | 52.7 | -    |      |
| Gate Resisitance             | R <sub>g</sub>   | V <sub>DD</sub> =0V, V <sub>GS</sub> =0V,<br>F=1MHz   | -    | 1.9  | -    | Ω    |

| SWITCHING CHARACTERISTICS   |                     |                                                                                            |      |      |      |      |
|-----------------------------|---------------------|--------------------------------------------------------------------------------------------|------|------|------|------|
| Parameter                   | Symbol              | Conditions                                                                                 | Min. | Typ. | Max. | Unit |
| Turn-On Delay Time          | T <sub>d(on)</sub>  | V <sub>GS</sub> =10V, V <sub>DS</sub> =30V,<br>R <sub>GEN</sub> =3Ω<br>I <sub>D</sub> =20A | -    | 8.4  | -    | ns   |
| Rise Time                   | t <sub>r</sub>      |                                                                                            | -    | 8.5  | -    |      |
| Turn-Off Delay Time         | T <sub>d(off)</sub> |                                                                                            | -    | 35.4 | -    |      |
| Fall Time                   | t <sub>f</sub>      |                                                                                            | -    | 4.8  | -    |      |
| Total Gate Charge           | Q <sub>g</sub>      | V <sub>DS</sub> =30V, I <sub>DS</sub> =20A,<br>V <sub>GS</sub> =10V                        | -    | 21.2 | -    | nC   |
| Gate to Source Gate Charge  | Q <sub>gs</sub>     |                                                                                            | -    | 3.6  | -    |      |
| Gate to Drain“Miller”Charge | Q <sub>gd</sub>     |                                                                                            | -    | 5.5  | -    |      |

| DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS |                 |                                           |      |      |      |      |
|--------------------------------------------------------|-----------------|-------------------------------------------|------|------|------|------|
| Parameter                                              | Symbol          | Conditions                                | Min. | Typ. | Max. | Unit |
| Drain-Source Diode Forward Voltage                     | V <sub>SD</sub> | V <sub>GS</sub> =0V, I <sub>DS</sub> =20A | -    | -    | 1.2  | V    |
| Reverse Recovery Time                                  | t <sub>rr</sub> | T <sub>J</sub> =25℃, I <sub>F</sub> =20A  | -    | 18.8 | -    | nS   |
| Reverse Recovery Charge                                | Q <sub>rr</sub> | di/dt=100A/us                             | -    | 13.4 | -    | nC   |

### Notes:

- 1) Repetitive rating; pulse width limited by maximum junction temperature .
- 2) L=0.5mH, V<sub>DD</sub>=30V, I<sub>as</sub>=15A Start T<sub>J</sub>=25℃
- 3) Recommend soldering temperature defined by IPC/JEDEC J-STD 020

# Characteristics Curve:

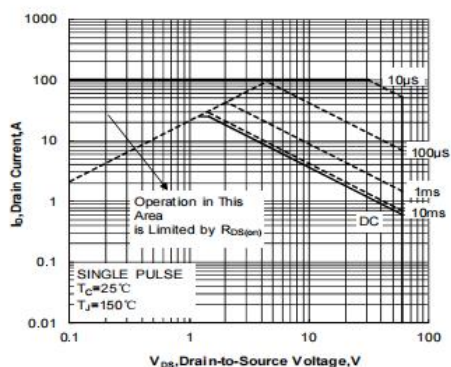


Figure 1 . Maximum Safe Operating Area

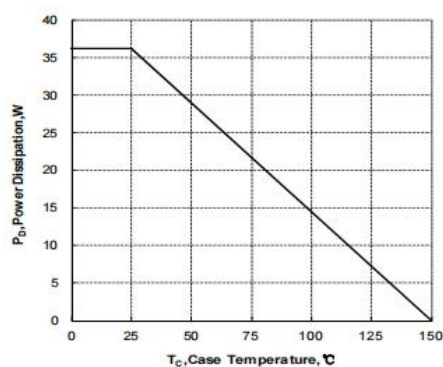


Figure 2. Maximum Power Dissipation vs Case Temperature

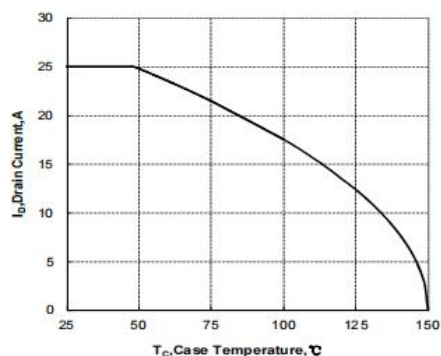


Figure 3. Maximum Continuous Drain Current vs Case Temperature

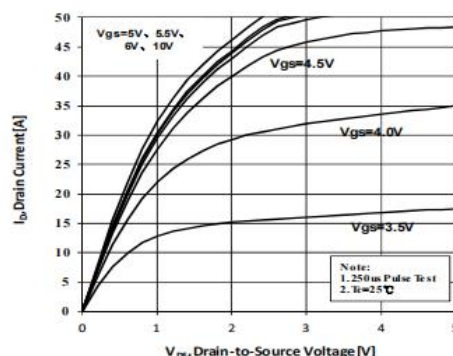


Figure 4. Typical output Characteristics

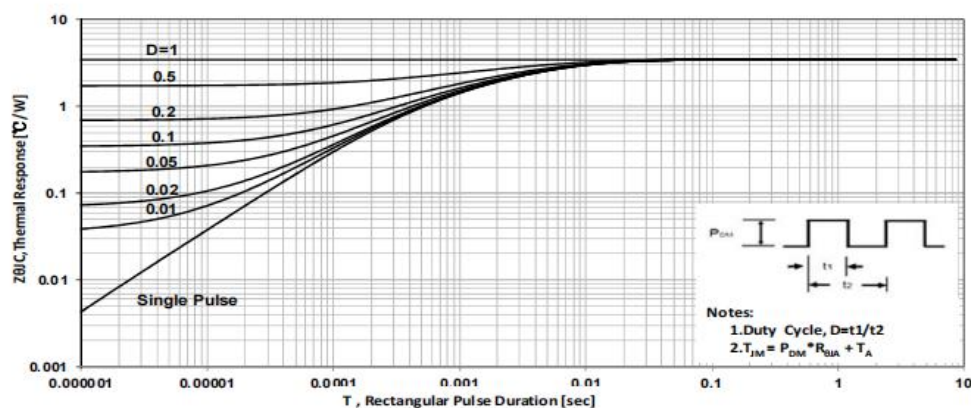


Figure 5 Maximum Effective Thermal Impedance , Junction to Case

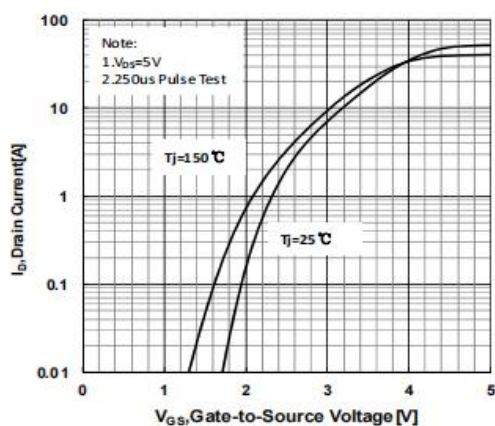


Figure 6 Typical Transfer Characteristics

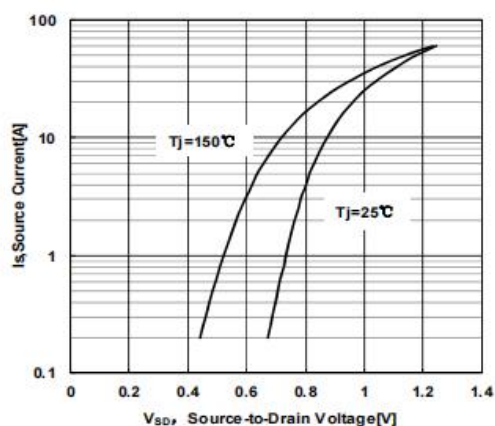


Figure 7 Typical Body Diode Transfer Characteristics

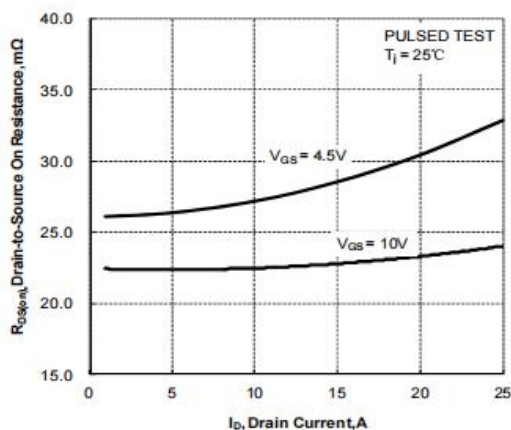


Figure 8. Drain-to-Source On Resistance vs Drain Current

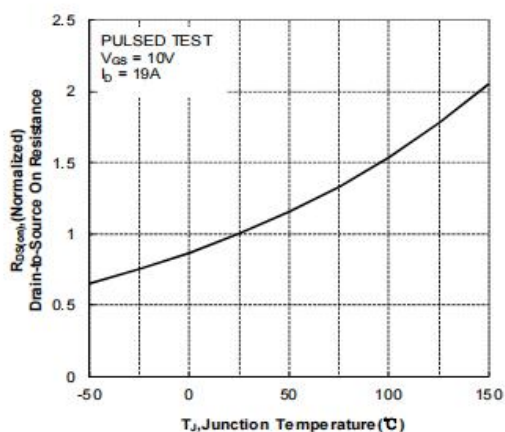


Figure 9. Normalized On Resistance vs Junction Temperature

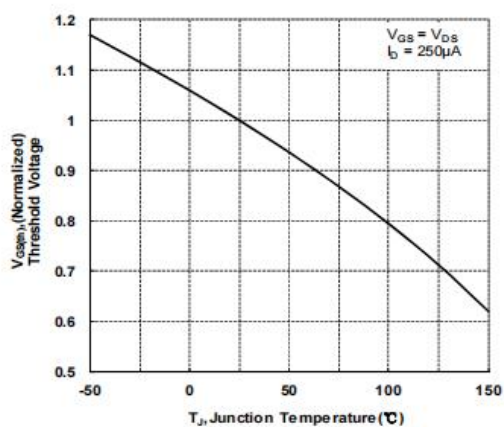


Figure 10. Normalized Threshold Voltage vs Junction Temperature

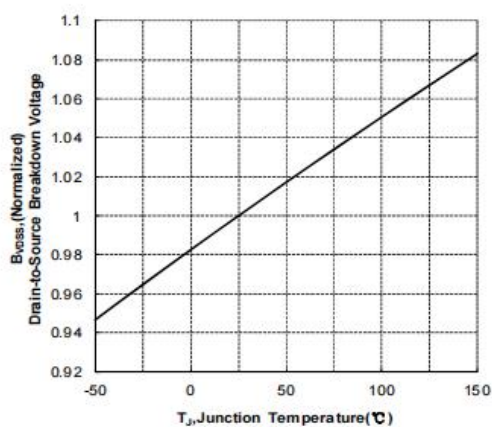


Figure 11. Normalized Breakdown Voltage vs Junction Temperature

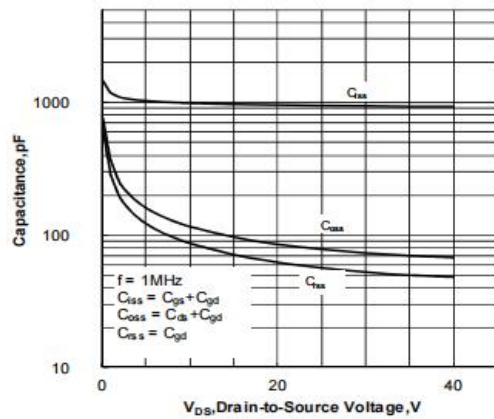


Figure 12. Capacitance Characteristics

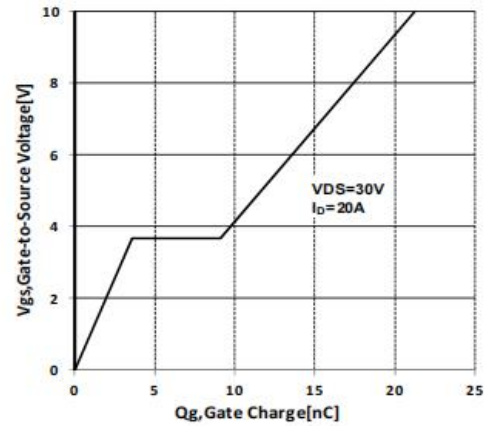


Figure 13 Typical Gate Charge vs Gate to Source Voltage

### Test Circuit and Waveform

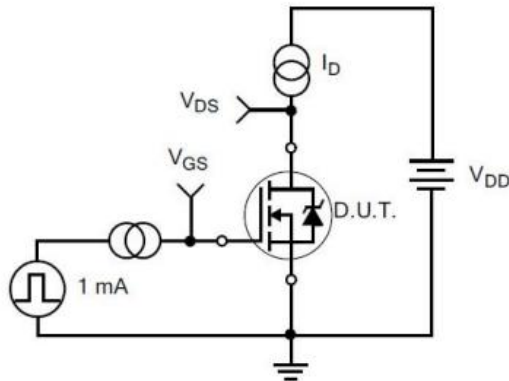


Figure 14. Gate Charge Test Circuit

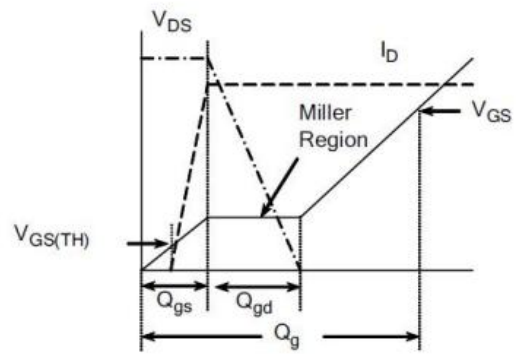


Figure 15. Gate Charge Waveforms

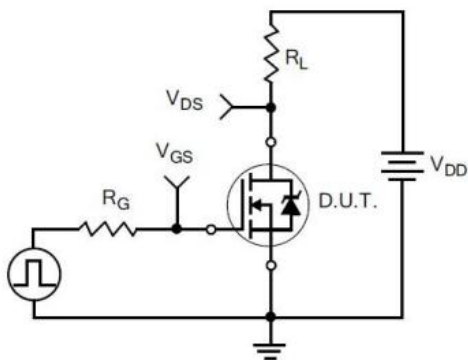


Figure 16. Resistive Switching Test Circuit

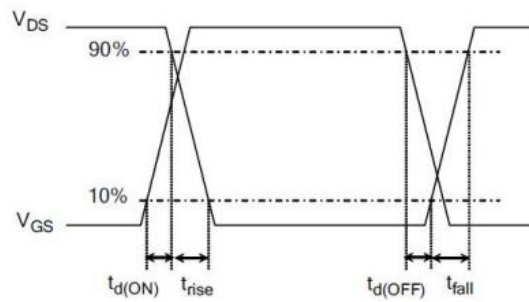


Figure 17. Resistive Switching Waveforms

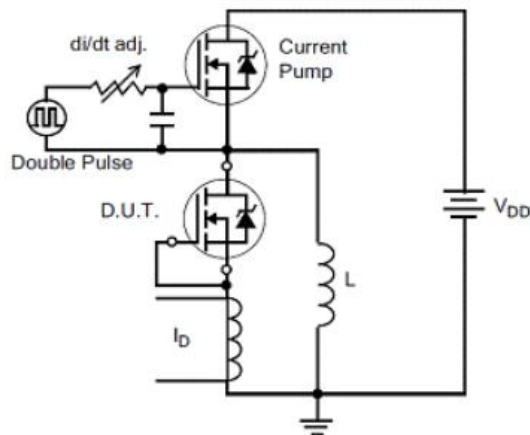


Figure 18. Diode Reverse Recovery Test Circuit

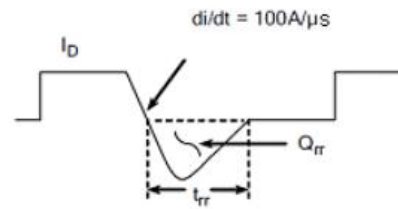


Figure 19. Diode Reverse Recovery Waveform

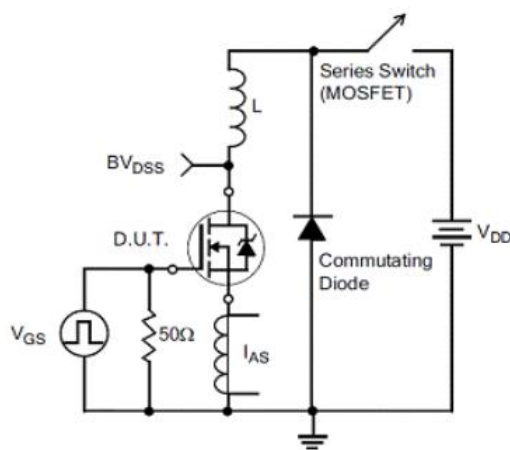


Figure20. Unclamped Inductive Switching Test Circuit

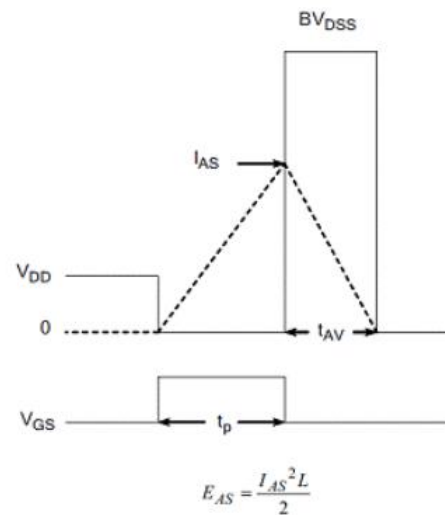
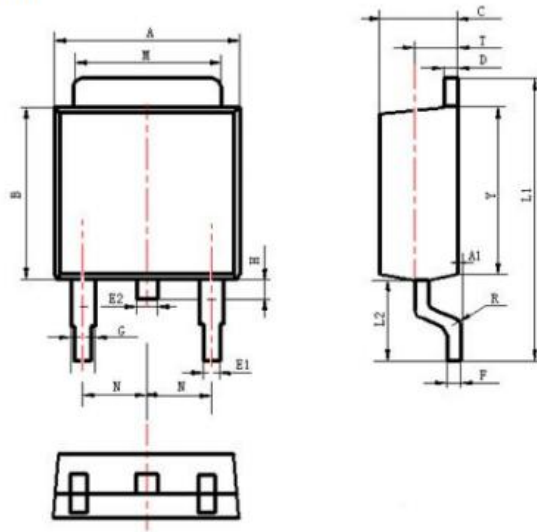


Figure21. Unclamped Inductive Switching Waveform

**Package Information:**



| Items | Values(mm) |       |
|-------|------------|-------|
|       | MIN        | MAX   |
| A     | 6.30       | 6.90  |
| A1    | 0          | 0.16  |
| B     | 5.70       | 6.30  |
| C     | 2.10       | 2.50  |
| D     | 0.30       | 0.70  |
| E1    | 0.60       | 0.90  |
| E2    | 0.70       | 1.00  |
| F     | 0.30       | 0.60  |
| G     | 0.70       | 1.20  |
| L1    | 9.60       | 10.50 |
| L2    | 2.70       | 3.10  |
| H     | 0.40       | 1.00  |
| M     | 5.10       | 5.50  |
| N     | 2.09       | 2.49  |
| R     | 0.3        |       |
| T     | 1.40       | 1.60  |
| Y     | 5.10       | 6.30  |

TO-252 Package