
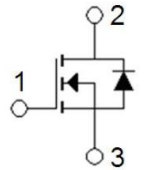


UMW SVT078R0ND

| | |
|---|--|
| <p>General Description</p> <p>These N-channel enhancement mode power mosfets used advanced trench technology design, provided excellent Rdson and low gate charge. Which accords with the RoHS standard.</p> <p>Features</p> <ul style="list-style-type: none"> ● $V_{DS} = 68V, I_D = 88A$ <li style="padding-left: 20px;">$R_{DS(ON)}, 6.3m\Omega$ (Typ) @ $V_{GS} = 10V$ ● Low On-Resistance ● Low gate charge ● Fast switching ● Low reverse transfer capacitances ● 100% single pulse avalanche energy test ● 100% ΔV_{DS} test <p>Application</p> <ul style="list-style-type: none"> ● Power switching applications ● DC-DC converters ● UPS power supply | <div style="text-align: center;">  <p>TO-252(DPAK) top view</p> </div> <div style="text-align: center; margin-top: 20px;">  <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div style="text-align: center;">1 Gate</div> <div style="text-align: center;">2 Drain</div> <div style="text-align: center;">3 Source</div> </div> </div> |
|---|--|

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|------------|----------------|-----------|------------|----------|
| SVT078R0ND | SVT078R0ND | TO-252 | 330mm | 12mm | 2500 |

Absolute Maximum Ratings(TA=25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|-----------|-------------|------|
| Drain-Source Voltage | V_{DS} | 68 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous ^{Note3} | I_D | TC=25°C | 88 |
| | | TC=100°C | 61 |
| Drain Current-Pulsed ^{Note1} | I_{DM} | 292 | A |
| Avalanche Energy ^{Note4} | E_{AS} | 550 | mJ |
| Maximum Power Dissipation | P_D | 167 | W |
| Storage Temperature Range | T_{STG} | -55 to +150 | °C |
| Operating Junction Temperature Range | T_J | -55 to +150 | °C |

Thermal Resistance

| Parameter | Symbol | Min. | Typ. | Max | Unit |
|---|-----------------|------|------|-----|------|
| Thermal Resistance, Junction to Case-sink | $R_{\theta JC}$ | - | - | 0.9 | °C/W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | - | - | 75 | °C/W |

Electrical Characteristics(T_J=25°C unless otherwise noted)

| OFF CHARACTERISTICS | | | | | | |
|---------------------------------|-------------------|---|------|------|------|------|
| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _{DS} =250uA | 68 | - | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =68V, V _{GS} =0V | - | - | 1.0 | uA |
| Gate-Body Leakage | I _{GSS} | V _{GS} =±20V, V _{DS} =0V | - | - | ±100 | nA |

| ON CHARACTERISTICS | | | | | | |
|----------------------------------|---------------------|---|------|------|------|------|
| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
| Gate Threshold Voltage | V _{GS(TH)} | V _{DS} =V _{GS} , I _{DS} =250uA | 2.5 | 3.0 | 3.5 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =10V, I _{DS} =30A | - | 6.3 | 7.5 | mΩ |

| DYNAMIC CHARACTERISTICS | | | | | | |
|------------------------------|------------------|--|------|------|------|------|
| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
| Input Capacitance | C _{ISS} | V _{DS} =30V, V _{GS} =0V, f=1MHz | - | 4100 | - | pF |
| Output Capacitance | C _{OSS} | | - | 323 | - | |
| Reverse Transfer Capacitance | C _{rss} | | - | 242 | - | |

| SWITCHING CHARACTERISTICS | | | | | | |
|-------------------------------|---------------------|--|------|------|------|------|
| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
| Turn-On Delay Time | T _{d(on)} | V _{DS} =30V, I _D =30A, V _{GS} =10V, R _{GEN} =6Ω | - | 25.5 | - | ns |
| Rise Time | t _r | | - | 92.9 | - | |
| Turn-Off Delay Time | T _{d(off)} | | - | 74.3 | - | |
| Fall Time | t _f | | - | 70.4 | - | |
| Total Gate Charge at 10V | Q _g | V _{DS} =30V, I _{DS} =20A, V _{GS} =10V | - | 86 | - | nC |
| Gate to Source Gate Charge | Q _{gs} | | - | 24.3 | - | |
| Gate to Drain "Miller" Charge | Q _{gd} | | - | 26.4 | - | |

| DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS | | | | | | |
|--|-----------------|---|------|------|------|------|
| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
| Drain-Source Diode Forward Voltage | V _{SD} | V _{GS} =0V, I _{DS} =30A | - | - | 1.3 | V |
| Reverse Recovery Time | t _{rr} | I _F =50A, di/dt=100A/us | - | 27.9 | - | nS |
| Reverse Recovery Charge | Q _{rr} | | - | 33.6 | - | nC |

Notes:

- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, t_l≤10sec.
- 3: Pulse width ≤ 300μs, duty cycle ≤ 2%.

Typical characteristics diagrams

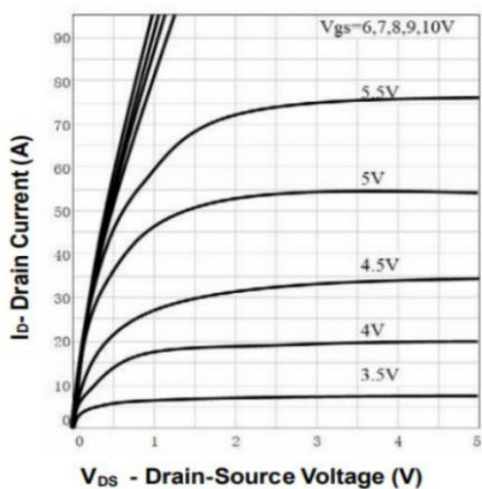


Fig 1. Output Characteristics

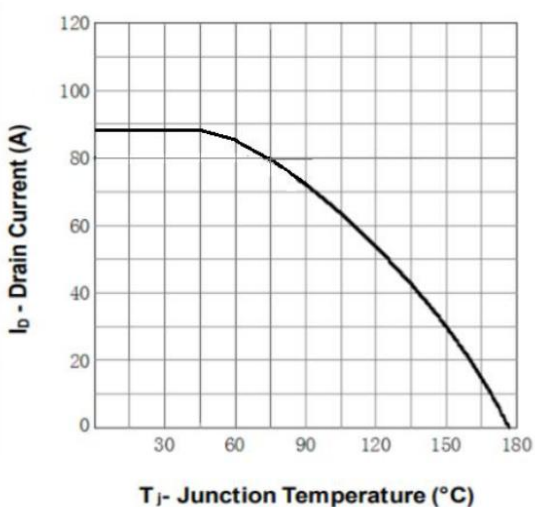


Fig 2. Drain Current

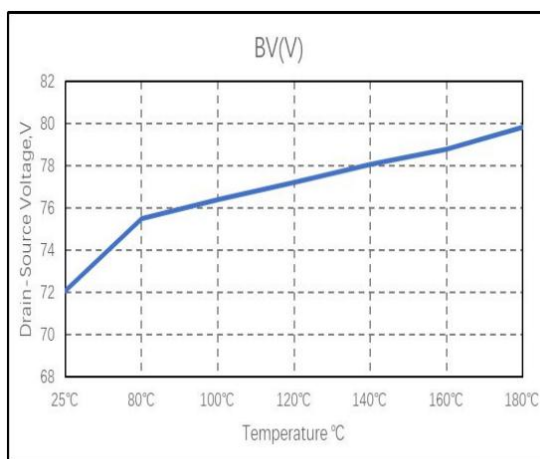


Fig 3 BVDSS vs Junction Temperature

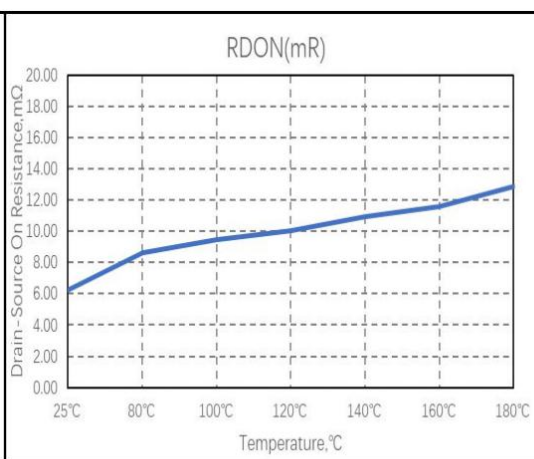


Fig 4 RDS(on) vs Junction Temperature

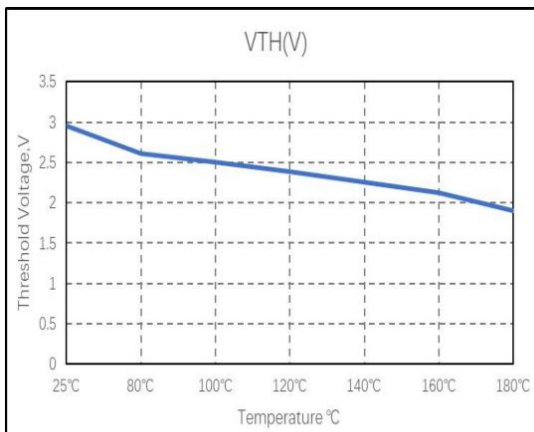


Fig 5 VTH vs Junction Temperature

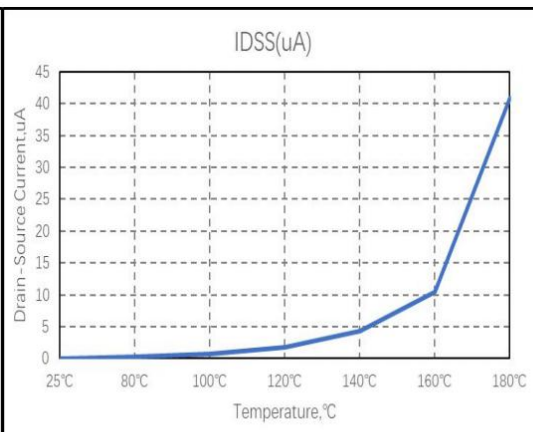


Fig 6 IDSS vs Junction Temperature

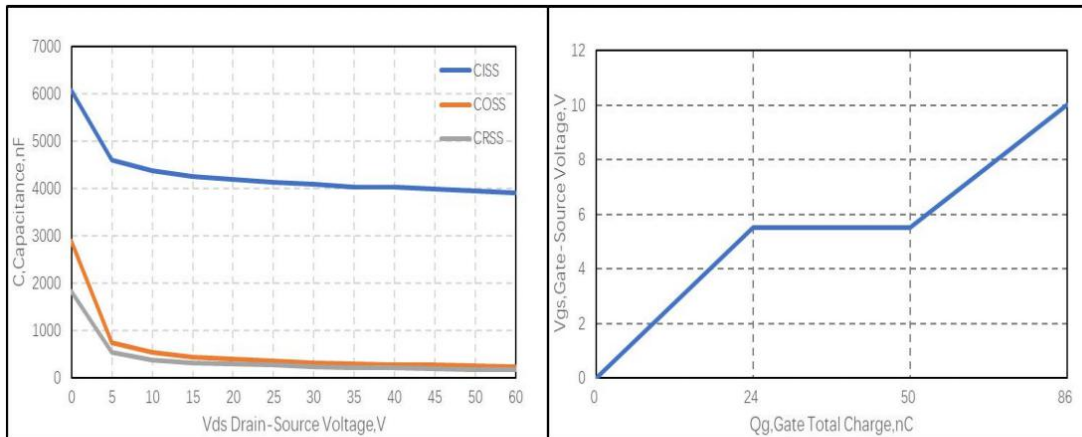


Fig 7 Capacitances vs Vds

Fig 8 Gate Charge

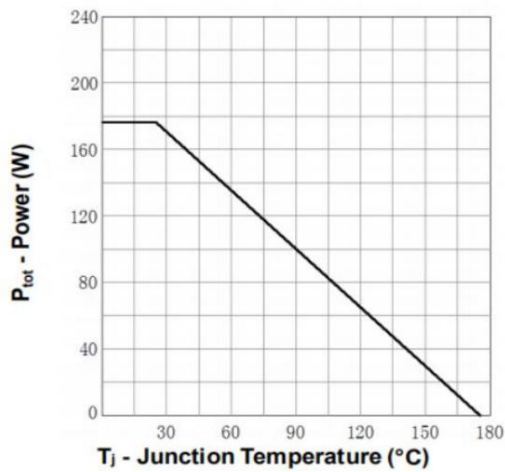


Fig 9. Power Dissipation

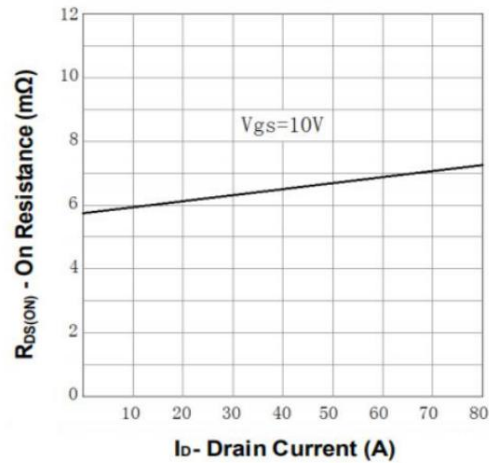


Fig 10. Drain-Source On Resistance

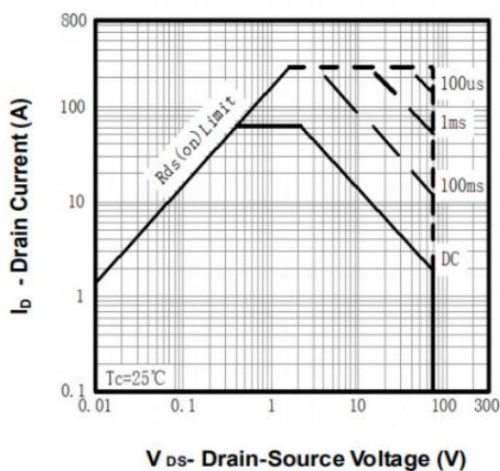


Fig 11. Safe Operation Area

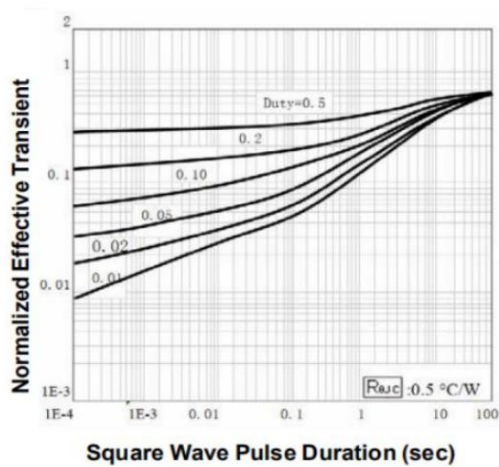
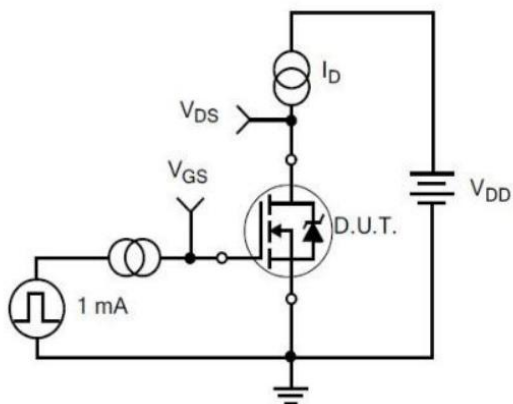
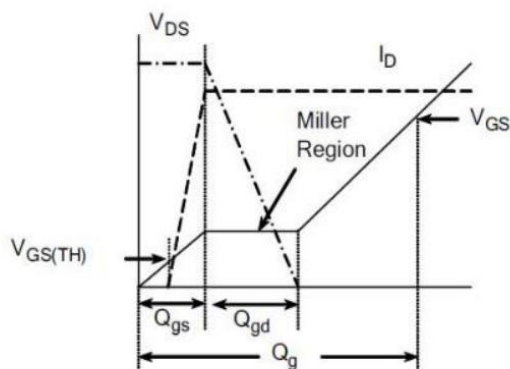


Fig 12. Thermal Transient Impedance

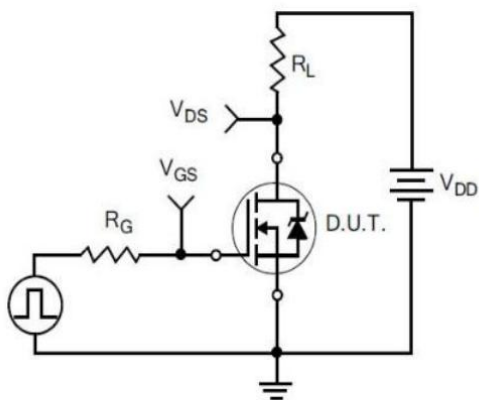
Typical Test Circuit and Waveform



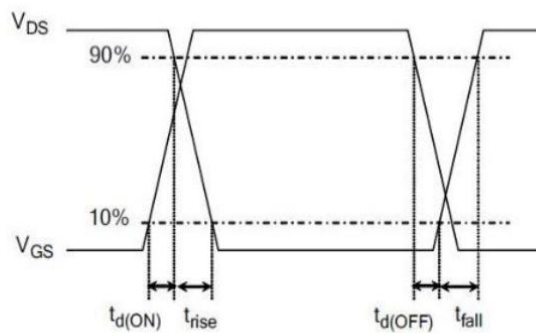
1) Gate Charge Test Circuit



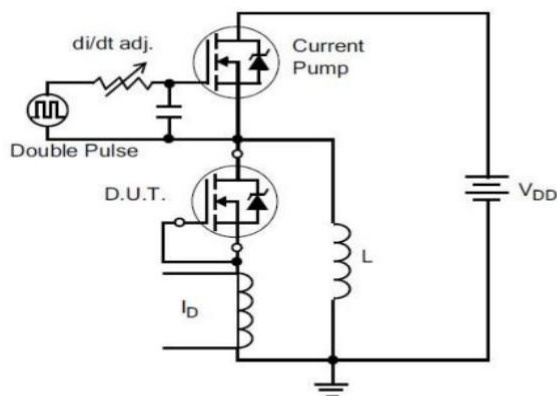
2) Gate Charge Waveform



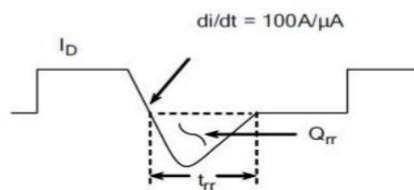
3) Resistive Switching Test Circuit



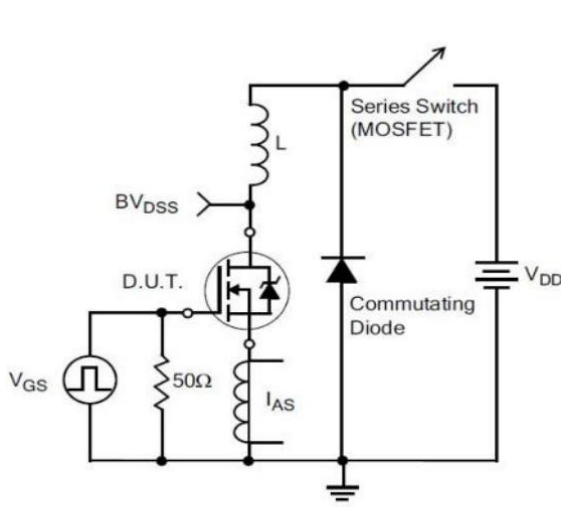
4) Resistive Switching Waveforms



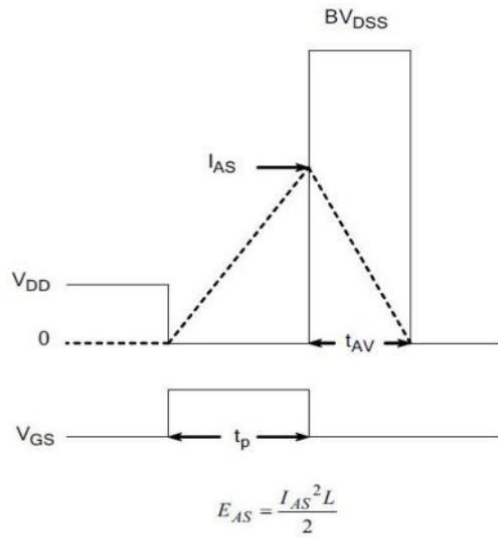
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform

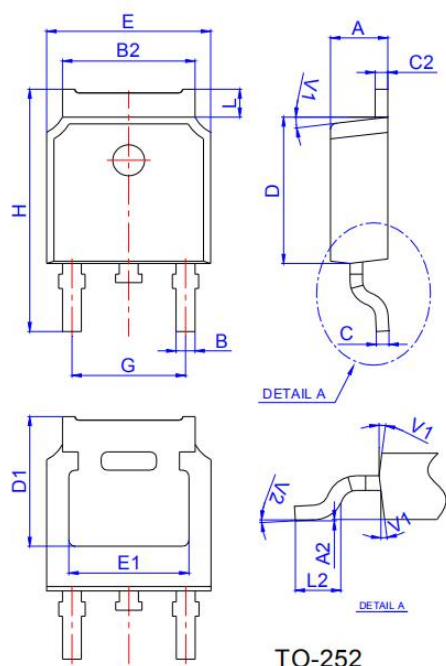


7) . Unclamped Inductive Switching Test Circuit



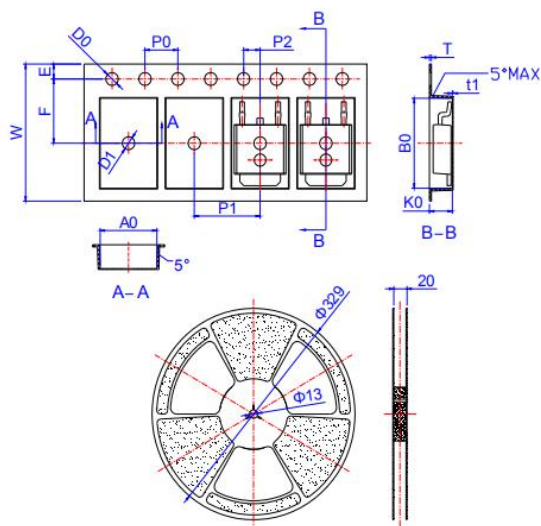
8) Unclamped Inductive Switching Waveforms

Package Mechanical Data



| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|----------|------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.10 | | 2.50 | 0.083 | | 0.098 |
| A2 | 0 | | 0.10 | 0 | | 0.004 |
| B | 0.66 | | 0.86 | 0.026 | | 0.034 |
| B2 | 5.18 | | 5.48 | 0.202 | | 0.216 |
| C | 0.40 | | 0.60 | 0.016 | | 0.024 |
| C2 | 0.44 | | 0.58 | 0.017 | | 0.023 |
| D | 5.90 | | 6.30 | 0.232 | | 0.248 |
| D1 | 5.30REF | | | 0.209REF | | |
| E | 6.40 | | 6.80 | 0.252 | | 0.268 |
| E1 | 4.63 | | | 0.182 | | |
| G | 4.47 | | 4.67 | 0.176 | | 0.184 |
| H | 9.50 | | 10.70 | 0.374 | | 0.421 |
| L | 1.09 | | 1.21 | 0.043 | | 0.048 |
| L2 | 1.35 | | 1.65 | 0.053 | | 0.065 |
| V1 | | 7° | | | 7° | |
| V2 | 0° | | 6° | 0° | | 6° |

Reel Specification-TO-252



| Ref. | Dimensions | | | | | |
|------|-------------|-------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| W | 15.90 | 16.00 | 16.10 | 0.626 | 0.630 | 0.634 |
| E | 1.65 | 1.75 | 1.85 | 0.065 | 0.069 | 0.073 |
| F | 7.40 | 7.50 | 7.60 | 0.291 | 0.295 | 0.299 |
| D0 | 1.40 | 1.50 | 1.60 | 0.055 | 0.059 | 0.063 |
| D1 | 1.40 | 1.50 | 1.60 | 0.055 | 0.059 | 0.063 |
| P0 | 3.90 | 4.00 | 4.10 | 0.154 | 0.157 | 0.161 |
| P1 | 7.90 | 8.00 | 8.10 | 0.311 | 0.315 | 0.319 |
| P2 | 1.90 | 2.00 | 2.10 | 0.075 | 0.079 | 0.083 |
| A0 | 6.85 | 6.90 | 7.00 | 0.270 | 0.271 | 0.276 |
| B0 | 10.45 | 10.50 | 10.60 | 0.411 | 0.413 | 0.417 |
| K0 | 2.68 | 2.78 | 2.88 | 0.105 | 0.109 | 0.113 |
| T | 0.24 | | 0.27 | 0.009 | | 0.011 |
| t1 | 0.10 | | | 0.004 | | |
| 10P0 | 39.80 | 40.00 | 40.20 | 1.567 | 1.575 | 1.583 |