



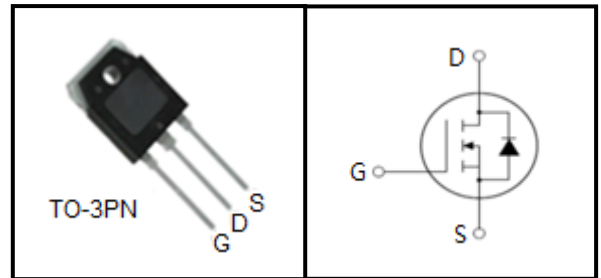
200V N-Channel MOSFET

FEATURES

- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)



| Device Marking and Package Information | | |
|--|---------|---------|
| Device | Package | Marking |
| TMV40N20H | TO-220F | A40N20H |



| Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted | | | |
|--|----------------|----------|------------------|
| Parameter | Symbol | Value | Unit |
| Drain-Source Voltage ($V_{GS} = 0\text{V}$) | V_{DSS} | 200 | V |
| Continuous Drain Current | I_D | 40 | A |
| Pulsed Drain Current (note1) | I_{DM} | 160 | A |
| Gate-Source Voltage | V_{GSS} | ± 20 | V |
| Single Pulse Avalanche Energy (note2) | E_{AS} | 605 | mJ |
| Avalanche Current (note1) | I_{AR} | 20 | A |
| Repetitive Avalanche Energy (note1) | E_{AR} | 10 | mJ |
| Power Dissipation ($T_C = 25^\circ\text{C}$) | P_D | 200 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55~+150 | $^\circ\text{C}$ |

| Thermal Resistance | | | |
|---|------------|-------|---------------------------|
| Parameter | Symbol | Value | Unit |
| Thermal Resistance, Junction-to-Case | R_{thJC} | 0.63 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Ambient | R_{thJA} | 62.5 | |



| Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted | | | | | | |
|--|---------------|--|-------|------|-----------|------------|
| Parameter | Symbol | Test Conditions | Value | | | Unit |
| | | | Min. | Typ. | Max. | |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$ | 200 | -- | -- | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 200V, V_{GS} = 0V, T_J = 25^\circ\text{C}$ | -- | -- | 1 | μA |
| Gate-Source Leakage | I_{GSS} | $V_{GS} = \pm 20V$ | -- | -- | ± 100 | nA |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 2.0 | -- | 4.0 | V |
| Drain-Source On-Resistance (Note3) | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 20A$ | -- | 50 | 60 | m Ω |
| Dynamic | | | | | | |
| Input Capacitance | C_{iss} | $V_{GS} = 0V,$ $V_{DS} = 25V,$ $f = 1.0\text{MHz}$ | -- | 3140 | -- | pF |
| Output Capacitance | C_{oss} | | -- | 360 | -- | |
| Reverse Transfer Capacitance | C_{rss} | | -- | 140 | -- | |
| Total Gate Charge | Q_g | $V_{DD} = 160V, I_D = 40A,$ $V_{GS} = 10V$ | -- | 126 | -- | nC |
| Gate-Source Charge | Q_{gs} | | -- | 10 | -- | |
| Gate-Drain Charge | Q_{gd} | | -- | 36 | -- | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD} = 100V, I_D = 40A,$ $R_G = 25\Omega$ | -- | 35 | -- | ns |
| Turn-on Rise Time | t_r | | -- | 60 | -- | |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 101 | -- | |
| Turn-off Fall Time | t_f | | -- | 95 | -- | |
| Drain-Source Body Diode Characteristics | | | | | | |
| Continuous Body Diode Current | I_S | $T_C = 25^\circ\text{C}$ | -- | -- | 40 | A |
| Pulsed Diode Forward Current | I_{SM} | | -- | -- | 160 | |
| Body Diode Voltage | V_{SD} | $T_J = 25^\circ\text{C}, I_{SD} = 40A, V_{GS} = 0V$ | -- | -- | 1.4 | V |
| Reverse Recovery Time | t_{rr} | $V_{GS} = 0V, I_S = 40A,$ $di_F/dt = 100A/\mu s$ | -- | 250 | -- | ns |
| Reverse Recovery Charge | Q_{rr} | | -- | 2 | -- | μC |

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_{AS} = 20A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse width $\leq 250\mu s$, Duty Cycle $\leq 1\%$



Figure A: Gate Charge Test Circuit and Waveform

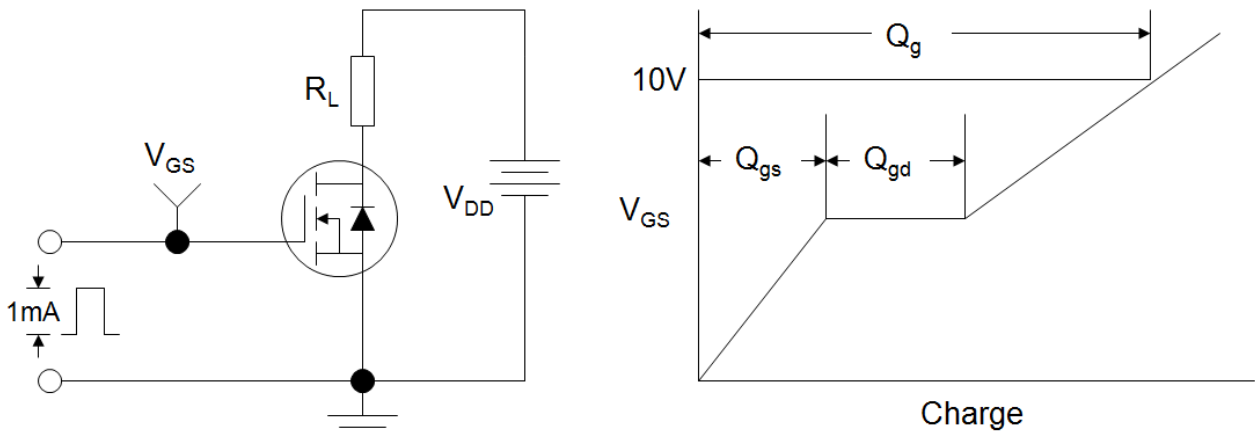
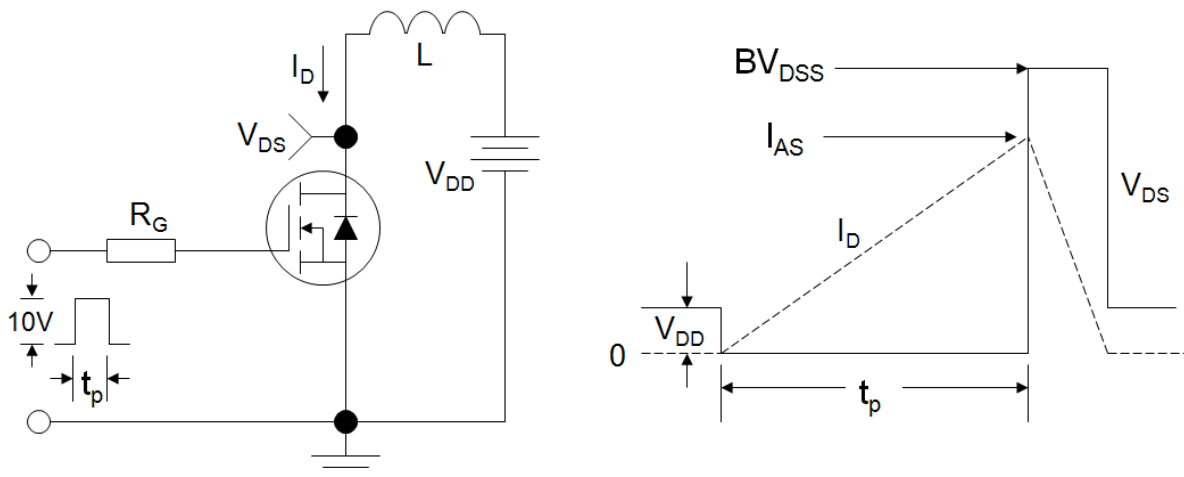


Figure B: Resistive Switching Test Circuit and Waveform

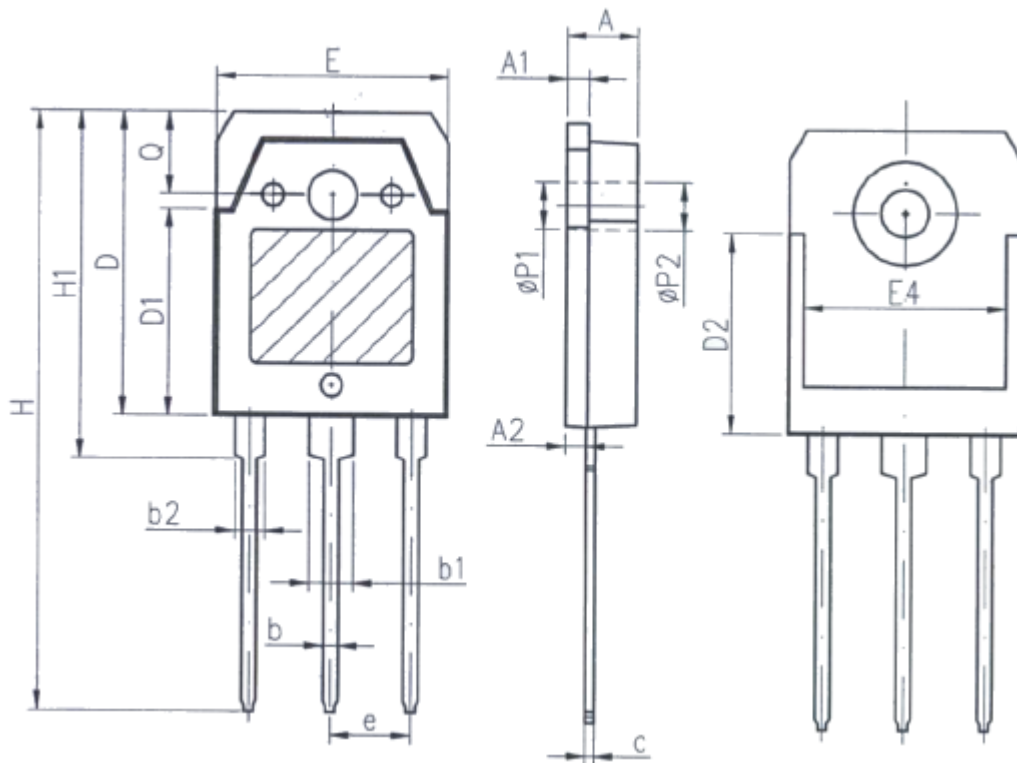


Figure C: Unclamped Inductive Switching Test Circuit and Waveform





TO-3PN



| Unit:mm | | |
|---------|---------|-------|
| Symbol | Min. | Max. |
| A | 4.6 | 5 |
| A1 | 1.4 | 1.65 |
| A2 | 1.18 | 1.58 |
| b | 0.8 | 1.2 |
| b1 | 2.8 | 3.2 |
| b2 | 1.8 | 2.2 |
| c | 0.5 | 0.75 |
| D | 19.6 | 20.2 |
| D1 | 13.55 | 14.25 |
| D2 | 12.9REF | |
| E | 15.35 | 15.85 |
| E4 | 12.6 | - |
| e | 5.45TYP | |
| H | 40.1 | 40.9 |
| H1 | 23.15 | 23.65 |
| P1 | 3.2REF | |
| P2 | 3.5REF | |



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