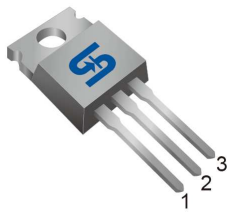


# TSM75N75

## 75V N-Channel Power MOSFET

TO-220



**Pin Definition:**

1. Gate
2. Drain
3. Source

**PRODUCT SUMMARY**

| V <sub>DS</sub> (V) | R <sub>DS(on)</sub> (mΩ)  | I <sub>D</sub> (A) |
|---------------------|---------------------------|--------------------|
| 75                  | 11 @ V <sub>GS</sub> =10V | 75                 |

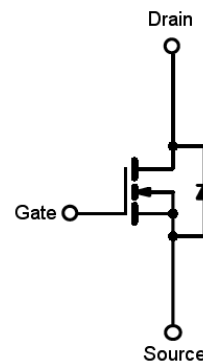
**Features**

- Advanced Trench Technology
- Low R<sub>DS(ON)</sub> 11mΩ (Max.)
- Low gate charge typical @ 81nC (Typ.)
- Low Crss typical @ 339pF (Typ.)

**Ordering Information**

| Part No.      | Package | Packing      |
|---------------|---------|--------------|
| TSM75N75CZ C0 | TO-220  | 50pcs / Tube |

**Block Diagram**



N-Channel MOSFET

**Absolute Maximum Rating** (Ta = 25°C unless otherwise noted)

| Parameter                            | Symbol                            | Limit                | Unit |
|--------------------------------------|-----------------------------------|----------------------|------|
| Drain-Source Voltage                 | V <sub>DS</sub>                   | 75                   | V    |
| Gate-Source Voltage                  | V <sub>GS</sub>                   | ±20                  | V    |
| Continuous Drain Current             | I <sub>D</sub>                    | T <sub>C</sub> =25°C | 75   |
|                                      |                                   | T <sub>C</sub> =70°C | 53   |
|                                      |                                   | T <sub>A</sub> =25°C | 11.5 |
|                                      |                                   | T <sub>A</sub> =70°C | 9.2  |
| Drain Current-Pulsed Note 1          | I <sub>DM</sub>                   | 300                  | A    |
| Avalanche Current, L=0.3mH           | I <sub>AS</sub> , I <sub>AR</sub> | 53                   | A    |
| Avalanche Energy, L=0.3mH            | E <sub>AS</sub> , E <sub>AR</sub> | 400                  | mJ   |
| Maximum Power Dissipation            | P <sub>D</sub>                    | T <sub>C</sub> =25°C | 87   |
|                                      |                                   | T <sub>C</sub> =70°C | 56   |
|                                      |                                   | T <sub>A</sub> =25°C | 2    |
|                                      |                                   | T <sub>A</sub> =70°C | 1.3  |
| Storage Temperature Range            | T <sub>STG</sub>                  | -55 to +150          | °C   |
| Operating Junction Temperature Range | T <sub>J</sub>                    | -55 to +150          | °C   |

\* Limited by maximum junction temperature

**Thermal Performance**

| Parameter                                | Symbol           | Limit | Unit |
|--|------------------|-------|------|
| Thermal Resistance - Junction to Case    | Rθ <sub>JC</sub> | 1.44  | °C/W |
| Thermal Resistance - Junction to Ambient | Rθ <sub>JA</sub> | 62.5  | °C/W |

Notes: Surface mounted on FR4 board t ≤ 10sec

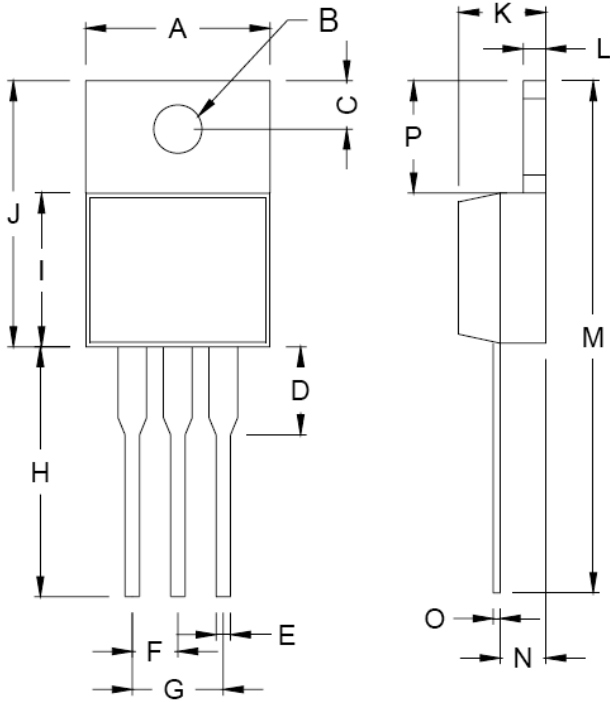
**Electrical Specifications** ( $T_a = 25^\circ\text{C}$  unless otherwise noted)

| Parameter  | Conditions  | Symbol       | Min | Typ  | Max       | Unit       |
|--|---|--------------|-----|------|-----------|------------|
| <b>Static</b>  |   |              |     |      |           |            |
| Drain-Source Breakdown Voltage                               | $V_{GS} = 0V, I_D = 250\mu A$                       | $BV_{DSS}$   | 75  | --   | --        | V          |
| Drain-Source On-State Resistance                             | $V_{GS} = 10V, I_D = 20A$                           | $R_{DS(ON)}$ | --  | 8    | 11        | m $\Omega$ |
| Gate Threshold Voltage                                       | $V_{DS} = V_{GS}, I_D = 250\mu A$                   | $V_{GS(TH)}$ | 2   | 3    | 4         | V          |
| Zero Gate Voltage Drain Current                              | $V_{DS} = 60V, V_{GS} = 0V$                         | $I_{DSS}$    | --  | --   | 1         | $\mu A$    |
| Gate Body Leakage  | $V_{GS} = \pm 20V, V_{DS} = 0V$                     | $I_{GSS}$    | --  | --   | $\pm 100$ | nA         |
| <b>Dynamic</b>   |   |              |     |      |           |            |
| Total Gate Charge  | $V_{DS} = 30V, I_D = 20A,$<br>$V_{GS} = 10V$        | $Q_g$        | --  | 81   | --        | nC         |
| Gate-Source Charge   |   | $Q_{gs}$     | --  | 23   | --        |            |
| Gate-Drain Charge  |   | $Q_{gd}$     | --  | 24   | --        |            |
| Input Capacitance  | $V_{DS} = 30V, V_{GS} = 0V,$<br>$f = 1.0\text{MHz}$ | $C_{iss}$    | --  | 4382 | --        | pF         |
| Output Capacitance   |   | $C_{oss}$    | --  | 668  | --        |            |
| Reverse Transfer Capacitance                                 |   | $C_{rss}$    | --  | 339  | --        |            |
| <b>Switching</b>   |   |              |     |      |           |            |
| Turn-On Delay Time   | $V_{GS} = 10V, V_{DS} = 30V,$<br>$R_G = 3.3\Omega$  | $t_{d(on)}$  | --  | 25   | --        | nS         |
| Turn-On Rise Time  |   | $t_r$        | --  | 19   | --        |            |
| Turn-Off Delay Time  |   | $t_{d(off)}$ | --  | 85   | --        |            |
| Turn-Off Fall Time   |   | $t_f$        | --  | 43   | --        |            |
| <b>Drain-Source Diode Characteristics and Maximum Rating</b> |   |              |     |      |           |            |
| Drain-Source Diode Forward Voltage                           | $V_{GS}=0V, I_S=20A$                                | $V_{SD}$     | -   | 0.8  | 1.3       | V          |
| Reverse Recovery Time  | $I_S = 20A, T_J=25^\circ\text{C}$                   | $t_{fr}$     |     | 36   |           | nS         |
| Reverse Recovery Charge                                      | $di/dt = 100A/\mu s$                                | $Q_{fr}$     |     | 53   |           | nC         |

**Notes:**

- Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
- $R\theta_{JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R\theta_{JC}$  is guaranteed by design while  $R\theta_{CA}$  is determined by the user's board design.  $R\theta_{JA}$  shown below for single device operation on FR-4 in still air

**TO-220 Mechanical Drawing**



| TO-220 DIMENSION |             |        |        |       |
|------------------|-------------|--------|--------|-------|
| DIM              | MILLIMETERS |        | INCHES |       |
|                  | MIN         | MAX    | MIN    | MAX   |
| A                | 10.000      | 10.500 | 0.394  | 0.413 |
| B                | 3.740       | 3.910  | 0.147  | 0.154 |
| C                | 2.440       | 2.940  | 0.096  | 0.116 |
| D                | --          | 6.350  | --     | 0.250 |
| E                | 0.381       | 1.106  | 0.015  | 0.040 |
| F                | 2.345       | 2.715  | 0.092  | 0.058 |
| G                | 4.690       | 5.430  | 0.092  | 0.107 |
| H                | 12.700      | 14.732 | 0.500  | 0.581 |
| J                | 14.224      | 16.510 | 0.560  | 0.650 |
| K                | 3.556       | 4.826  | 0.140  | 0.190 |
| L                | 0.508       | 1.397  | 0.020  | 0.055 |
| M                | 27.700      | 29.620 | 1.060  | 1.230 |
| N                | 2.032       | 2.921  | 0.080  | 0.115 |
| O                | 0.255       | 0.610  | 0.010  | 0.024 |
| P                | 5.842       | 6.858  | 0.230  | 0.270 |

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