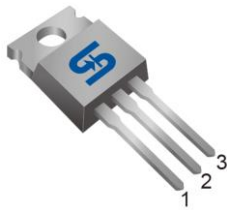




TO-220



Pin Definition:

1. Gate
2. Drain
3. Source

PRODUCT SUMMARY

| V _{DS} (V) | R _{DS(on)} (mΩ) | I _D (A) |
|---------------------|--------------------------|--------------------|
| 75 | 8 @ V _{GS} =10V | 80 |

Features

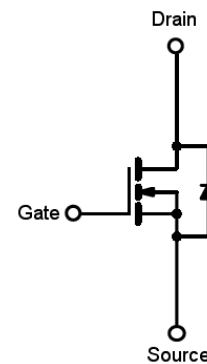
- Advanced Trench Technology
- Low R_{DS(ON)} 8mΩ (Max.)
- Low gate charge typical @ 91.5nC (Typ.)
- Low Crss typical @ 203pF (Typ.)

Ordering Information

| Part No. | Package | Packing |
|----------------|---------|--------------|
| TSM80N08CZ C0G | TO-220 | 50pcs / Tube |

Note: "G" denotes for Halogen Free

Block Diagram



N-Channel MOSFET

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

| Parameter | Symbol | Limit | Unit | |
|--------------------------------------|------------------|----------------------|-------|---|
| Drain-Source Voltage | V _{DS} | 75 | V | |
| Gate-Source Voltage | V _{GS} | ±25 | V | |
| Continuous Drain Current | I _D | T _C =25°C | 80 | A |
| | | T _C =70°C | 60 | |
| | | T _A =25°C | 12 | |
| | | T _A =70°C | 9 | |
| Drain Current-Pulsed Note 1 | I _{DM} | 320 | A | |
| Avalanche Current, L=0.3mH | I _{AS} | 35 | A | |
| Avalanche Energy, L=0.3mH | E _{AS} | 183 | mJ | |
| Maximum Power Dissipation | P _D | T _C =25°C | 113.6 | W |
| | | T _C =70°C | 72.7 | |
| | | T _A =25°C | 2 | |
| | | T _A =70°C | 1.3 | |
| Storage Temperature Range | T _{STG} | -55 to +150 | °C | |
| Operating Junction Temperature Range | T _J | -55 to +150 | °C | |

* Limited by maximum junction temperature

Thermal Performance

| Parameter | Symbol | Limit | Unit |
|--|------------------|-------|------|
| Thermal Resistance - Junction to Case | Rθ _{JC} | 1.1 | °C/W |
| Thermal Resistance - Junction to Ambient | Rθ _{JA} | 62.5 | °C/W |

Notes: Surface mounted on FR4 board t ≤ 10sec

Electrical Specifications (Ta = 25°C unless otherwise noted)

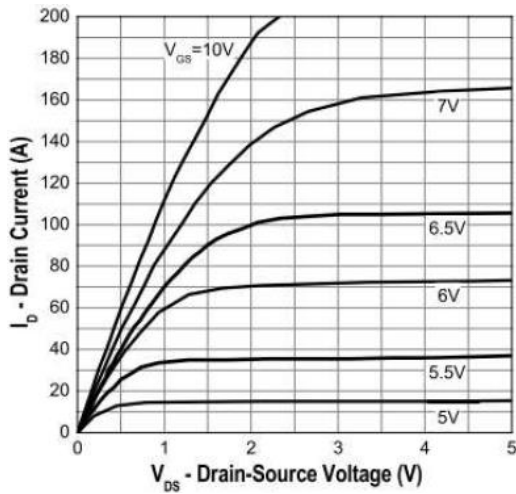
| Parameter | Conditions | Symbol | Min | Typ | Max | Unit |
|--|--|--------------|-----|------|------|------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{GS} = 0V, I_D = 250\mu A$ | BV_{DSS} | 75 | -- | -- | V |
| Drain-Source On-State Resistance | $V_{GS} = 10V, I_D = 40A$ | $R_{DS(ON)}$ | -- | 6 | 8 | mΩ |
| 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 | μA |
| Gate Body Leakage | $V_{GS} = \pm 25V, V_{DS} = 0V$ | I_{GSS} | -- | -- | ±100 | nA |
| Dynamic | | | | | | |
| Total Gate Charge | $V_{DS} = 30V, I_D = 40A,$ $V_{GS} = 10V$ | Q_g | -- | 91.5 | -- | nC |
| Gate-Source Charge | | Q_{gs} | -- | 34 | -- | |
| Gate-Drain Charge | | Q_{gd} | -- | 19.9 | -- | |
| Input Capacitance | $V_{DS} = 30V, V_{GS} = 0V,$ $f = 1.0MHz$ | C_{iss} | -- | 3905 | -- | pF |
| Output Capacitance | | C_{oss} | -- | 371 | -- | |
| Reverse Transfer Capacitance | | C_{rss} | -- | 203 | -- | |
| Switching | | | | | | |
| Turn-On Delay Time | $V_{GS} = 10V, V_{DS} = 30V,$ $I_D = 1A, R_G = 3.3\Omega$ | $t_{d(on)}$ | -- | 21.5 | -- | nS |
| Turn-On Rise Time | | t_r | -- | 11 | -- | |
| Turn-Off Delay Time | | $t_{d(off)}$ | -- | 73 | -- | |
| Turn-Off Fall Time | | t_f | -- | 66 | -- | |
| Drain-Source Diode Characteristics and Maximum Rating | | | | | | |
| Drain-Source Diode Forward Voltage | $V_{GS}=0V, I_S=20A$ | V_{SD} | - | 0.8 | 1.3 | V |
| Reverse Recovery Time | $I_S = 40A, T_J=25^\circ C$ $di/dt = 100A/\mu s$ | t_{fr} | | 36 | | nS |
| Reverse Recovery Charge | | Q_{fr} | | 45 | | nC |

Notes:

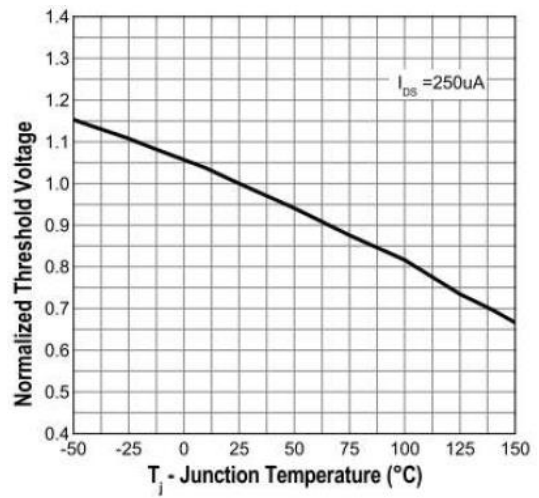
- Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- $R\theta_{JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R\theta_{JC}$ is guaranteed by design while $R\theta_{CA}$ is determined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

Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

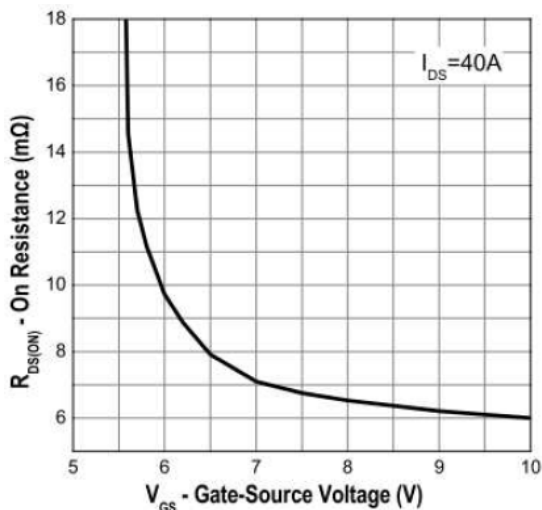
Output Characteristics



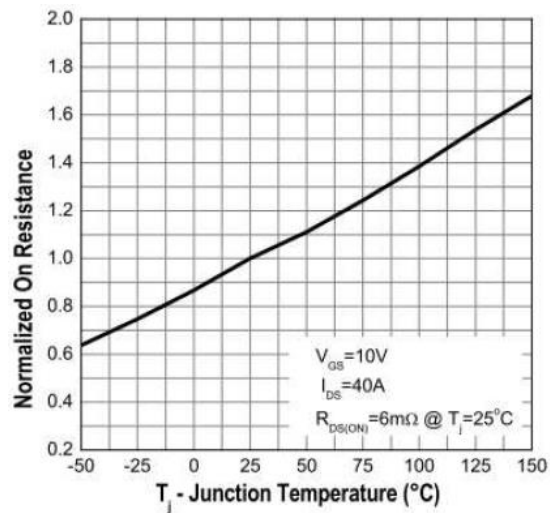
Gate Threshold Voltage



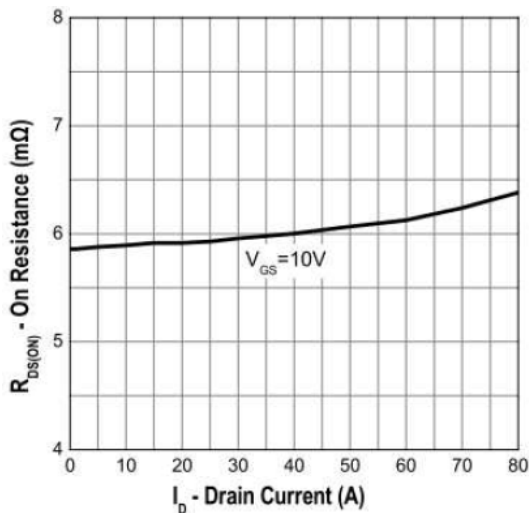
Gate Source On Resistance



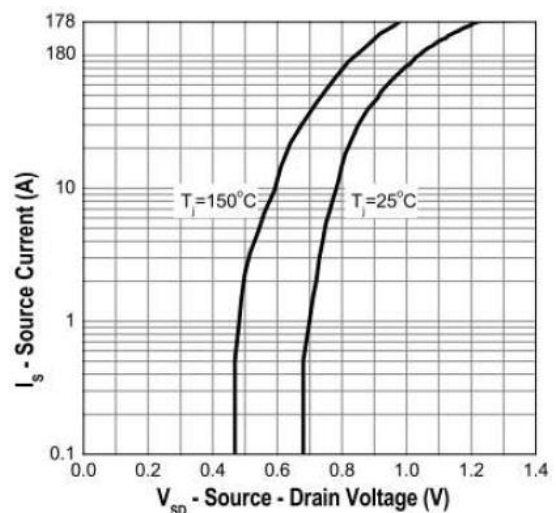
Drain-Source On Resistance



Drain-Source On-Resistance

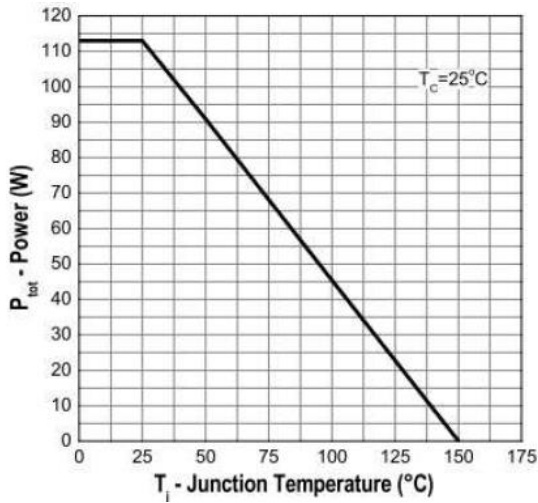


Source-Drain Diode Forward Voltage

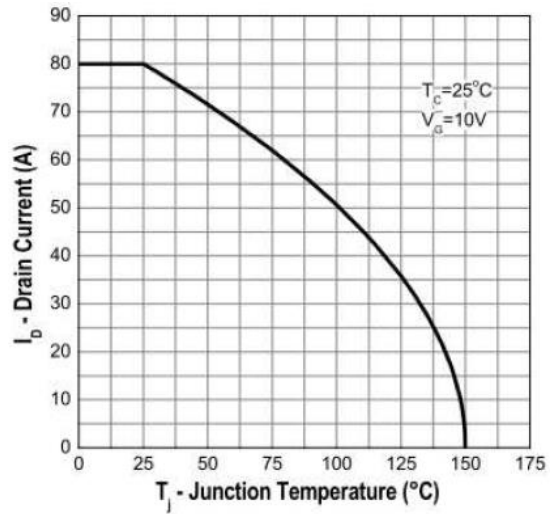


Electrical Characteristics Curve ($T_a = 25^\circ\text{C}$, unless otherwise noted)

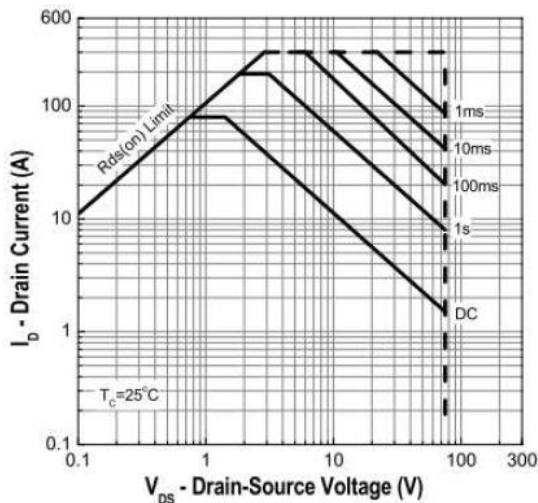
Power Derating



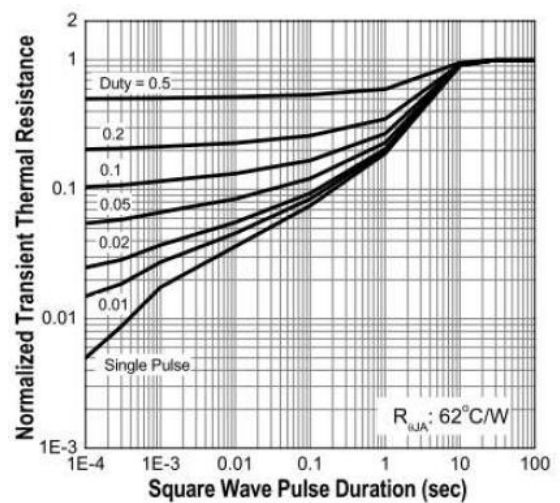
Drain Current vs. Junction Temperature



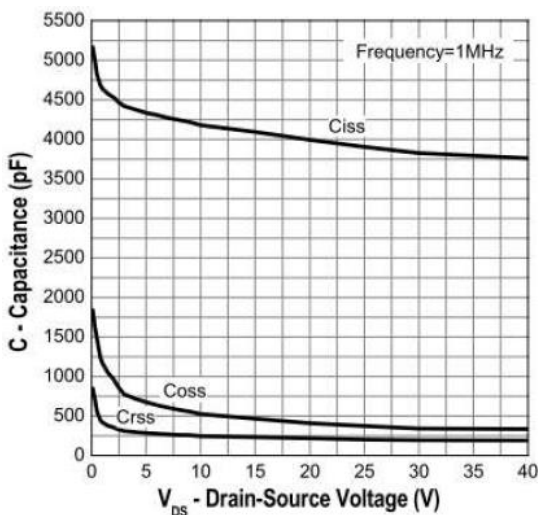
Safe Operation Area



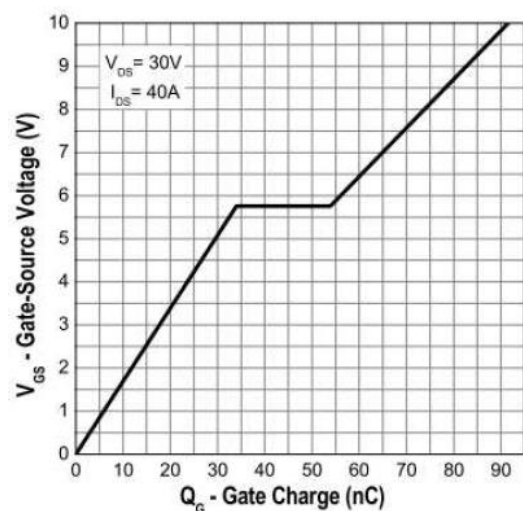
Transient Thermal Impedance



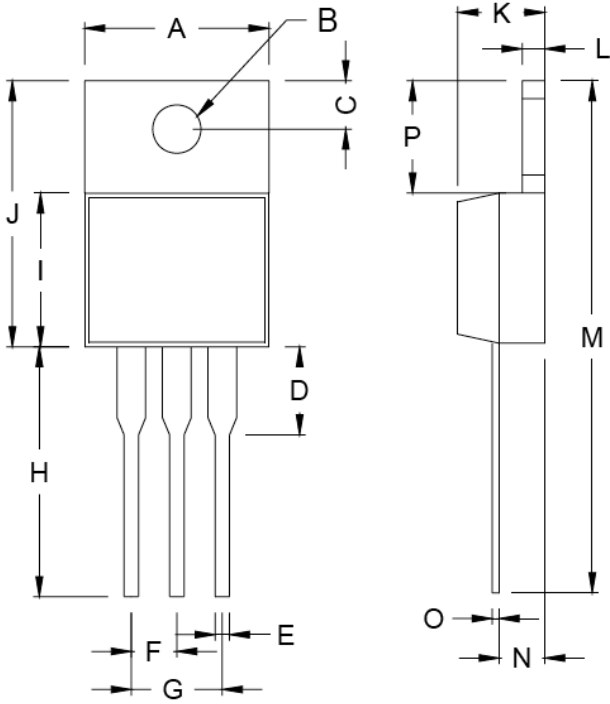
Capacitance



Gate Charge



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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