

N-Channel 500-V (D-S) MOSFET

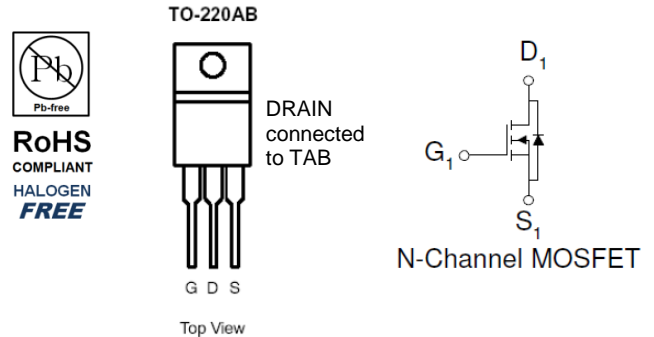
Key Features:

- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

Typical Applications:

- Off-line Power Supplies
- Electronic Ballasts
- High Power LED Lighting

| PRODUCT SUMMARY | | |
|-----------------|----------------------------|-----------------|
| V_{DS} (V) | $r_{DS(on)}$ (m Ω) | I_D (A) |
| 500 | 520 @ $V_{GS} = 10V$ | 12 ^a |



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ UNLESS OTHERWISE NOTED)

| Parameter | Symbol | Limit | Units |
|---|----------------|------------|------------|
| Drain-Source Voltage | V_{DS} | 500 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current ^a | I_D | 12 | A |
| Pulsed Drain Current ^b | I_{DM} | 50 | A |
| Continuous Source Current (Diode Conduction) ^a | I_S | 12 | A |
| Power Dissipation | P_D | 150 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 to 175 | $^\circ C$ |

THERMAL RESISTANCE RATINGS

| Parameter | Symbol | Maximum | Units |
|--|-----------------|---------|--------------|
| Maximum Junction-to-Ambient ^a | $R_{\theta JA}$ | 62.5 | $^\circ C/W$ |
| Maximum Junction-to-Case | $R_{\theta JC}$ | 1 | $^\circ C/W$ |

Notes

- Calculated continuous current based on maximum allowable junction temperature.
- Pulse width limited by maximum junction temperature

Electrical Characteristics

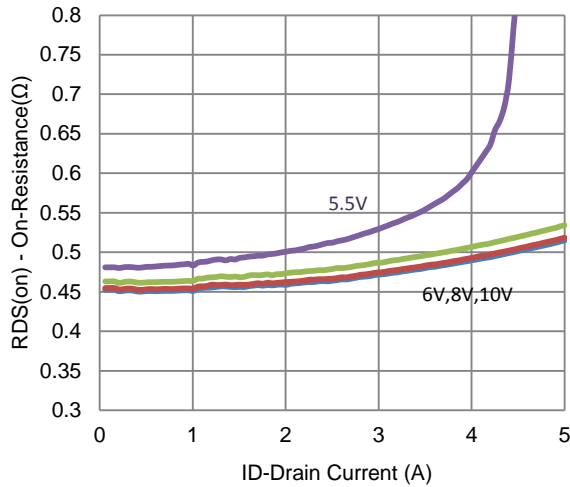
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|--------------|--|-----|------|-----------|------------|
| Static | | | | | | |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250 \mu A$ | 1 | | | V |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0 V, V_{GS} = \pm 20 V$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 400 V, V_{GS} = 0 V$ | | | 1 | uA |
| | | $V_{DS} = 400 V, V_{GS} = 0 V, T_J = 55^\circ C$ | | | 25 | |
| On-State Drain Current ^a | $I_{D(on)}$ | $V_{DS} = 5 V, V_{GS} = 10 V$ | 20 | | | A |
| Drain-Source On-Resistance ^a | $r_{DS(on)}$ | $V_{GS} = 10 V, I_D = 6 A$ | | | 520 | m Ω |
| Forward Transconductance ^a | g_{fs} | $V_{DS} = 15 V, I_D = 6 A$ | | 38 | | S |
| Diode Forward Voltage ^a | V_{SD} | $I_S = 6 A, V_{GS} = 0 V$ | | 0.9 | | V |
| Dynamic ^b | | | | | | |
| Total Gate Charge | Q_g | $V_{DS} = 250 V, V_{GS} = 10 V,$ $I_D = 6 A$ | | 44 | | nC |
| Gate-Source Charge | Q_{gs} | | | 12 | | |
| Gate-Drain Charge | Q_{gd} | | | 12 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DS} = 250 V, R_L = 50 \Omega,$ $I_D = 6 A,$ $V_{GEN} = 10 V, R_{GEN} = 6 \Omega$ | | 25 | | ns |
| Rise Time | t_r | | | 11 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 71 | | |
| Fall Time | t_f | | | 13 | | |
| Input Capacitance | C_{iss} | $V_{DS} = 15 V, V_{GS} = 0 V, f = 1 \text{ Mhz}$ | | 2396 | | pF |
| Output Capacitance | C_{oss} | | | 147 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 31 | | |

Notes

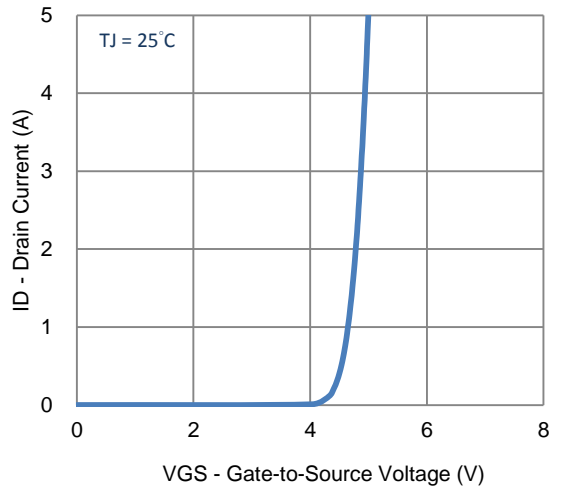
- Pulse test: $PW \leq 300 \mu s$ duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.

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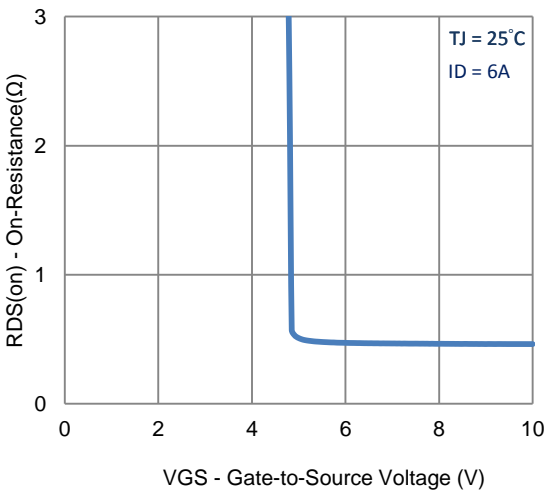
Typical Electrical Characteristics



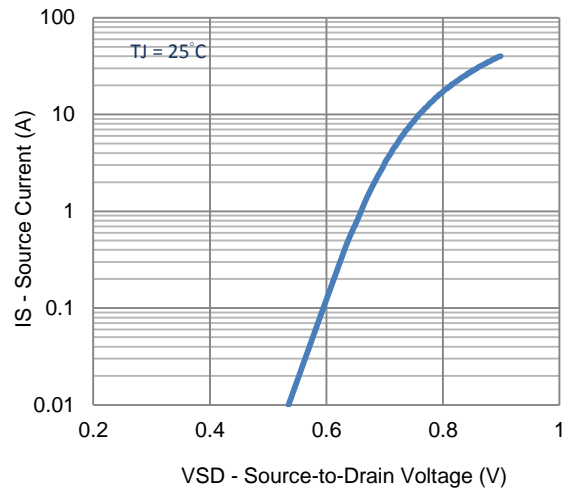
1. On-Resistance vs. Drain Current



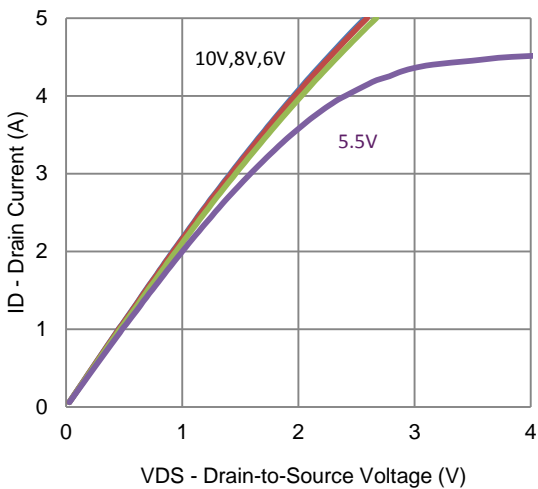
2. Transfer Characteristics



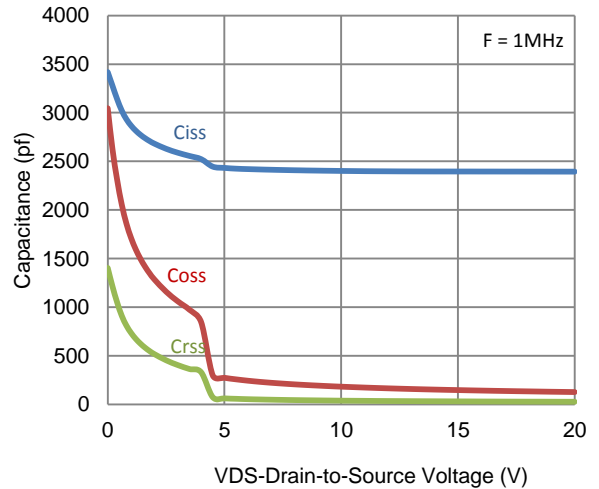
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

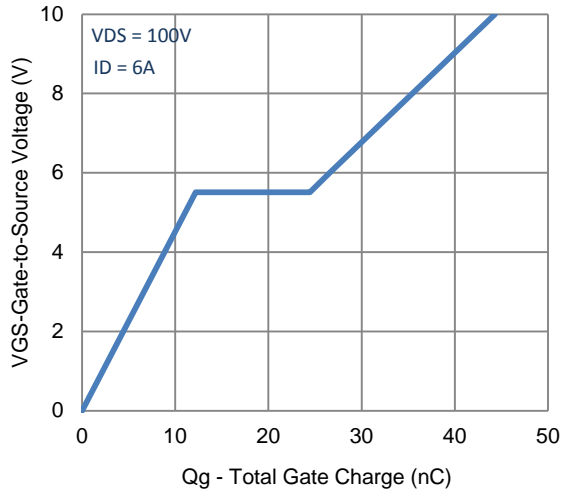


5. Output Characteristics

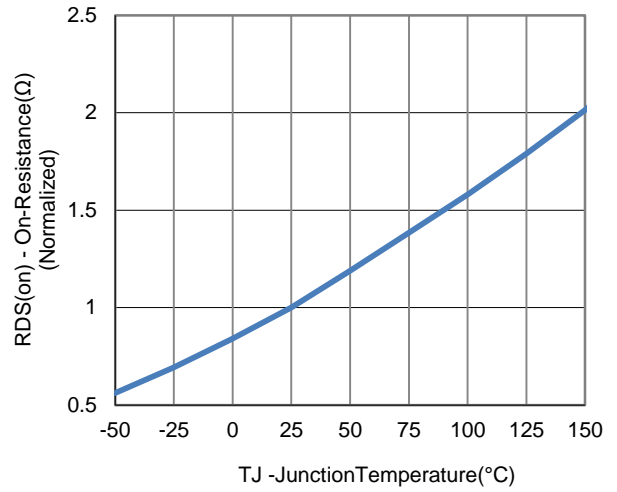


6. Capacitance

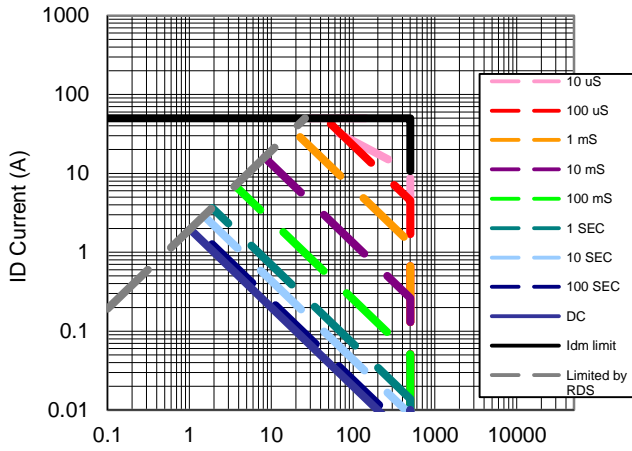
Typical Electrical Characteristics



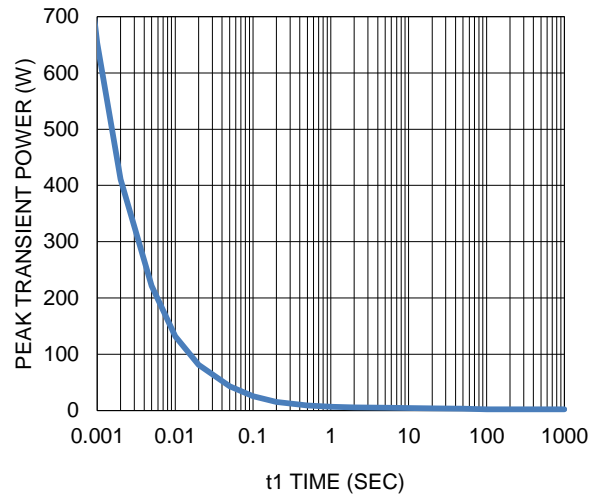
7. Gate Charge



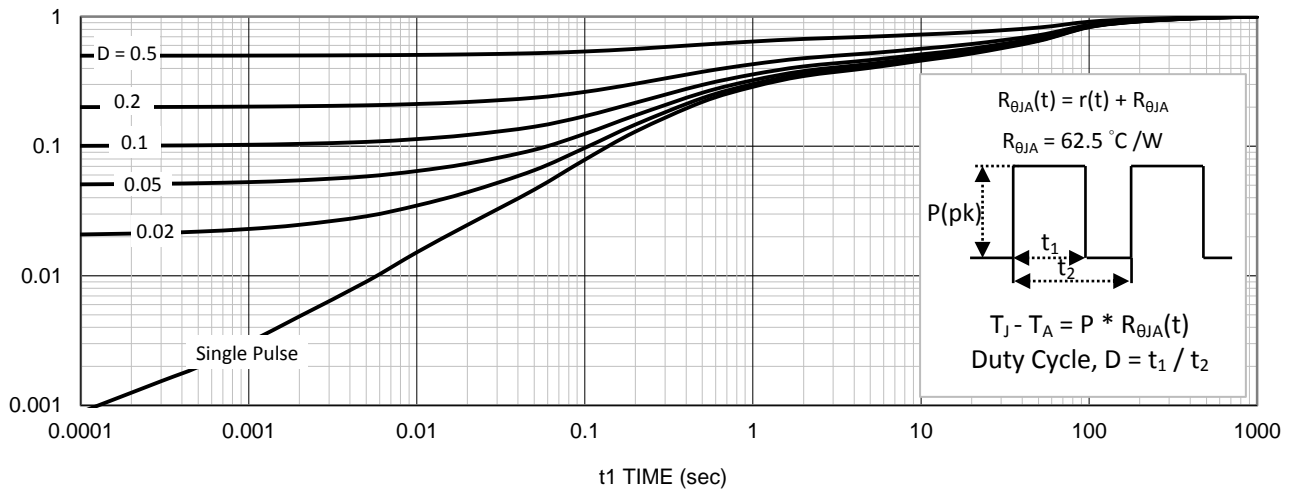
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information

