# P-Channel 20-V (D-S) MOSFET

| PRODUCT SUMMARY | | |
|---|---|---|
| $V_{DS}$ (V) | $r_{DS(on)}$ (Ω) | $I_D$ (A) |
| –20 | 0.1 @ $V_{GS}$ = –4.5 V | –4.5 |
| | 0.135 @ $V_{GS}$ = –2.5 V | –3.8 |

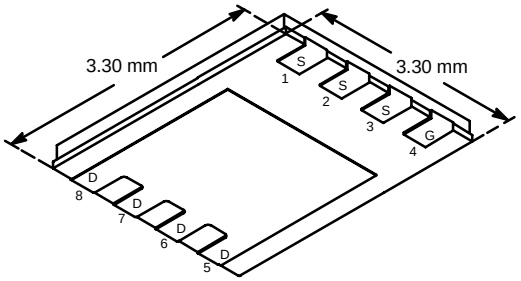
## FEATURES

- TrenchFET® Power MOSFETS: 2.5-V Rated
- New PowerPAK™ Package
  - Low Thermal Resistance, $R_{thJC}$
  - Low 1.07-mm Profile

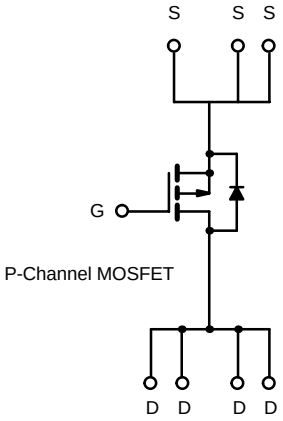
## APPLICATIONS

- Load Switching
- PA Switching

**PowerPAK™ 1212-8**




Bottom View




P-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25°C UNLESS OTHERWISE NOTED) | | | | | |
|---|---|---|---|---|---|
| Parameter | | Symbol | 10 secs | Steady State | Unit |
| Drain-Source Voltage | | $V_{DS}$ | –20 | | V |
| Gate-Source Voltage | | $V_{GS}$ | ±8 | | |
| Continuous Drain Current ($T_J$ = 150°C)[a] | $T_A$ = 25°C | $I_D$ | –4.5 | –2.9 | A |
| | $T_A$ = 85°C | | –3.2 | –2.1 | |
| Pulsed Drain Current | | $I_{DM}$ | –20 | | |
| continuous Source Current (Diode Conduction)[a] | | $I_S$ | –3.0 | –1.3 | |
| Maximum Power Dissipation[a] | $T_A$ = 25°C | $P_D$ | 3.5 | 1.5 | W |
| | $T_A$ = 85°C | | 1.9 | 0.8 | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | –55 to 150 | | °C |

| THERMAL RESISTANCE RATINGS | | | | | |
|---|---|---|---|---|---|
| Parameter | | Symbol | Typical | Maximum | Unit |
| Maximum Junction-to-Ambient[a] | t ≤ 10 sec | $R_{thJA}$ | 28 | 35 | °C/W |
| | Steady State | | 65 | 81 | |
| Maximum Junction-to-Case | Steady State | $R_{thJC}$ | 4.5 | 5.6 | |

Notes
a. Surface Mounted on 1” x 1” FR4 Board.

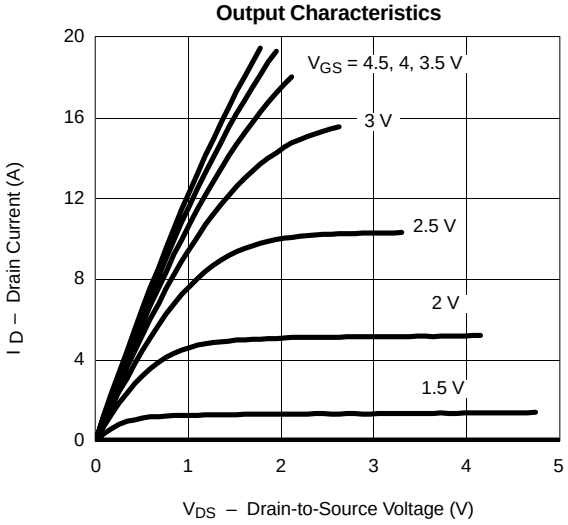
## SPECIFICATIONS ($T_J$ = 25°C UNLESS OTHERWISE NOTED)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = –250 μA | –0.45 | | | V |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ±4.5 V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = –20 V, $V_{GS}$ = 0 V | | | –1 | μA |
| | | $V_{DS}$ = –20 V, $V_{GS}$ = 0 V, $T_J$ = 70°C | | | –5 | |
| On-State Drain Current[a] | $I_{D(on)}$ | $V_{DS}$ = –5 V, $V_{GS}$ = –4.5 V | –10 | | | A |
| | | $V_{DS}$ = –5 V, $V_{GS}$ = –2.5 V | –4 | | | |
| Drain-Source On-State Resistance[a] | $r_{DS(on)}$ | $V_{GS}$ = –4.5 V, $I_D$ = –3.3 A | | 0.078 | 0.1 | Ω |
| | | $V_{GS}$ = –2.5 V, $I_D$ = –2.9 A | | 0.110 | 0.135 | |
| Forward Transconductance[a] | $g_{fs}$ | $V_{DS}$ = –10 V, $I_D$ = –3.3 A | | 8.8 | | S |
| Diode Forward Voltage[a] | $V_{SD}$ | $I_S$ = –1.6 A, $V_{GS}$ = 0 V | | 0.8 | –1.2 | V |
| **Dynamic[b]** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = –10 V, $V_{GS}$ = –4.5 V, $I_D$ = –4.5 A | | 8.6 | 14 | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 1.5 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 3.1 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$ = –10 V, $R_L$ = 10 Ω<br>$I_D$ ≅ –1.6 A, $V_{GEN}$ = –4.5 V, $R_G$ = 6 Ω | | 27 | 50 | ns |
| Rise Time | $t_r$ | | | 17 | 30 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 52 | 80 | |
| Fall Time | $t_f$ | | | 45 | 70 | |
| Source-Drain Reverse Recovery Time | $t_{rr}$ | $I_F$ = –1.6 A, di/dt = 100 A/μs | | 50 | 80 | |

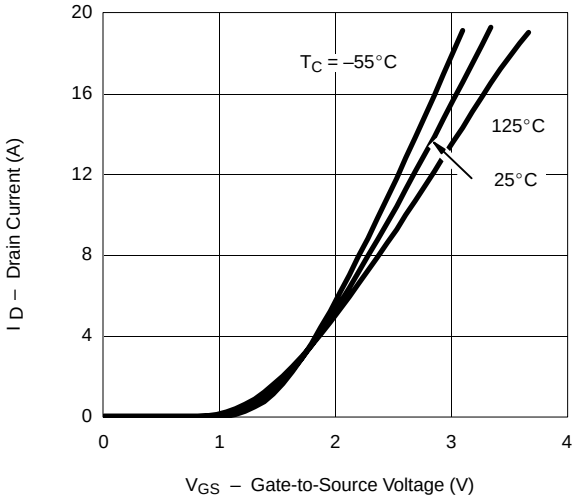
Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

**Output Characteristics**

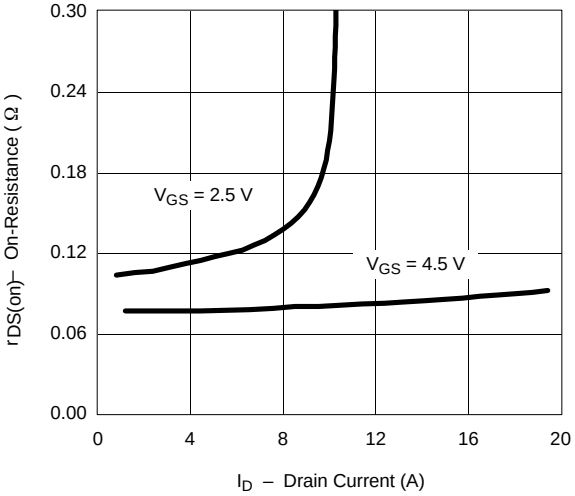



**Transfer Characteristics**

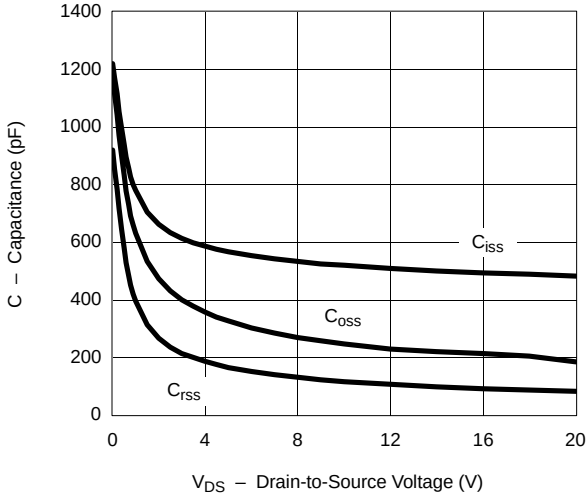


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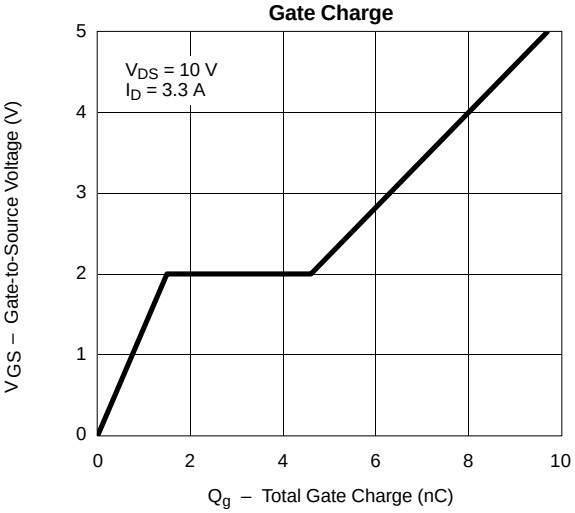
**On-Resistance vs. Drain Current**



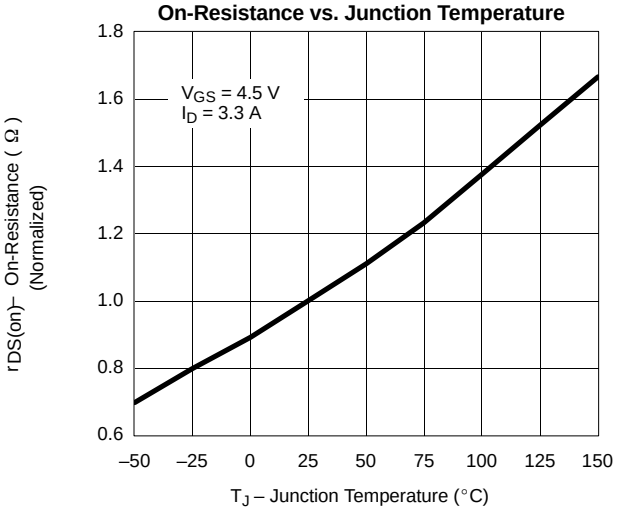

**Capacitance**



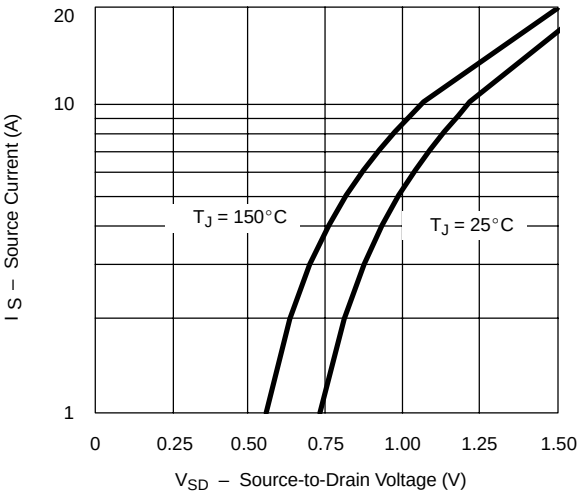

**Gate Charge**



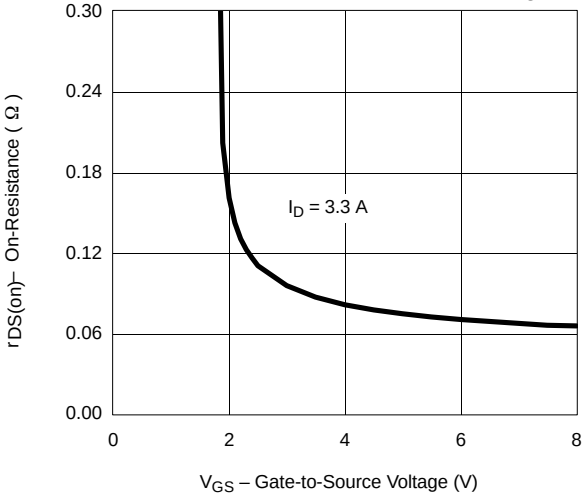

**On-Resistance vs. Junction Temperature**




**Source-Drain Diode Forward Voltage**

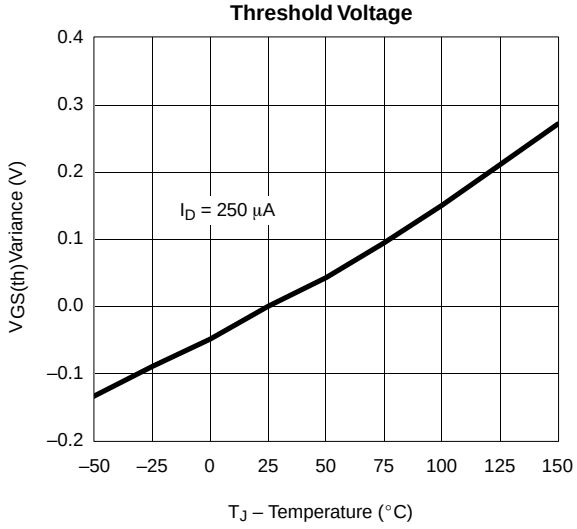



**On-Resistance vs. Gate-to-Source Voltage**

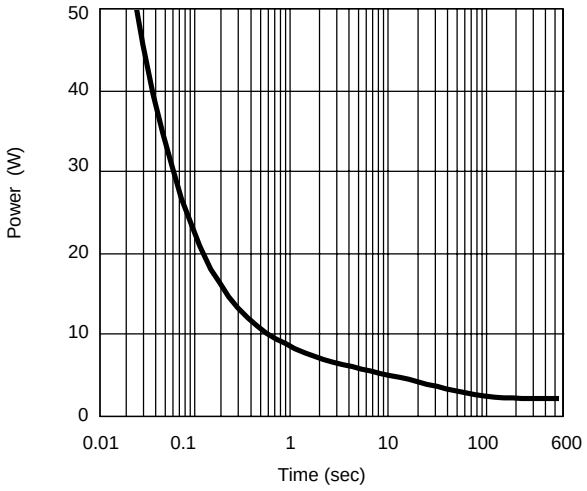


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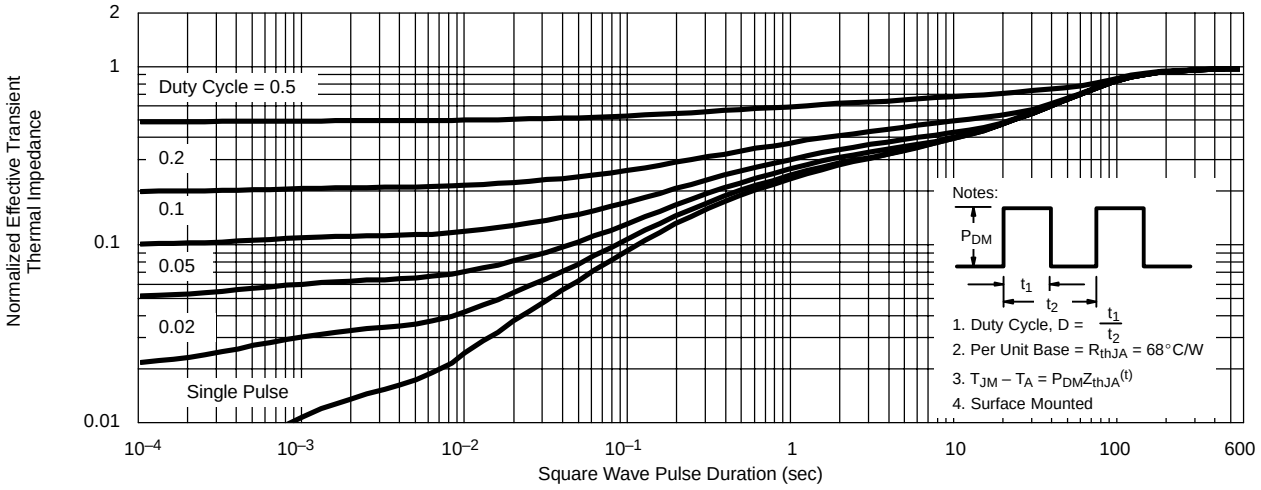
**Threshold Voltage**



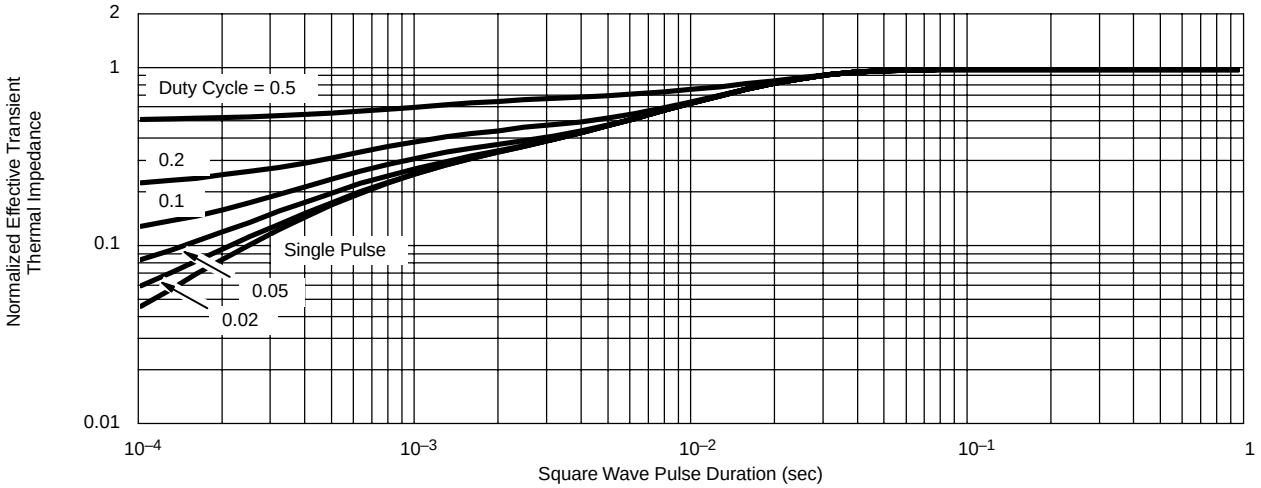

**Single Pulse Power, Juncion-To-Ambient**




**Normalized Thermal Transient Impedance, Junction-to-Ambient**




**Normalized Thermal Transient Impedance, Junction-to-Case**






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