# N-Channel 2.5-V (G-S) MOSFET

| PRODUCT SUMMARY | | |
|---|---|---|
| $V_{DS}$ (V) | $r_{DS(on)}$ (Ω) | $I_D$ (A) |
| 12 | 0.020 @ $V_{GS}$ = 4.5 V | 9.5 |
| | 0.025 @ $V_{GS}$ = 2.5 V | 8.5 |

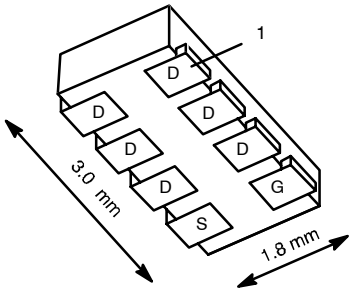
## FEATURES

- TrenchFET® Power MOSFETS: 2.5-V Rated
- Low Thermal Resistance

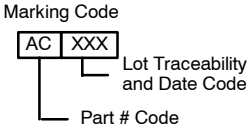
## APPLICATIONS

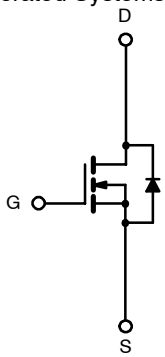
- Load/Power Switching for Cell Phones and Pagers
- PA Switch in Cellular Devices
- Battery Operated Systems

**1206-8 ChipFET™**




Bottom View




N-Channel MOSFET

**Ordering Information:** Si5406DC-T1

| ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25°C UNLESS OTHERWISE NOTED) | | | | | |
|---|---|---|---|---|---|
| Parameter | | Symbol | 5 secs | Steady State | Unit |
| Drain-Source Voltage | | $V_{DS}$ | 12 | | V |
| Gate-Source Voltage | | $V_{GS}$ | ±8 | | |
| Continuous Drain Current ($T_J$ = 150°C)[a] | $T_A$ = 25°C | $I_D$ | 9.5 | 6.9 | A |
| | $T_A$ = 85°C | | 6.8 | 4.9 | |
| Pulsed Drain Current | | $I_{DM}$ | 20 | | |
| Continuous Source Current (Diode Conduction)[a] | | $I_S$ | 2.1 | 1.1 | |
| Maximum Power Dissipation[a] | $T_A$ = 25°C | $P_D$ | 2.5 | 1.3 | W |
| | $T_A$ = 85°C | | 1.3 | 0.7 | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | −55 to 150 | | °C |
| Soldering Recommendations (Peak Temperature)[b, c] | | | 260 | | |

| THERMAL RESISTANCE RATINGS | | | | | |
|---|---|---|---|---|---|
| Parameter | | Symbol | Typical | Maximum | Unit |
| Maximum Junction-to-Ambient[a] | t ≤ 5 sec | $R_{thJA}$ | 40 | 50 | °C/W |
| | Steady State | | 80 | 95 | |
| Maximum Junction-to-Foot (Drain) | Steady State | $R_{thJF}$ | 15 | 20 | |

Notes
a. Surface Mounted on 1" x 1" FR4 Board.
b. See Reliability Manual for profile. The ChipFET is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
c. Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.

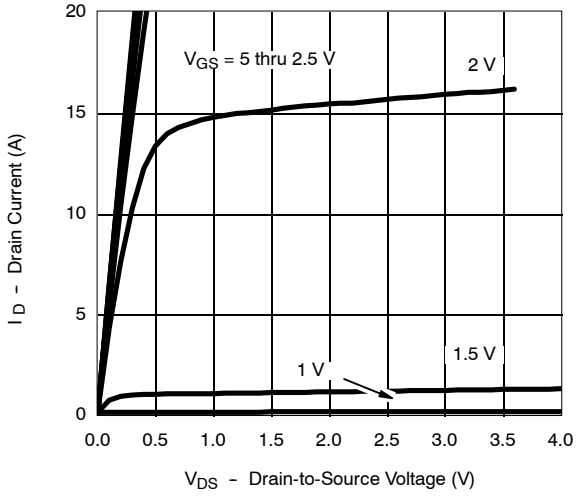
## SPECIFICATIONS ($T_J$ = 25°C UNLESS OTHERWISE NOTED)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 1.2 mA | 0.6 | | | V |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ±8 V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 9.6 V, $V_{GS}$ = 0 V | | | 1 | µA |
| | | $V_{DS}$ = 9.6 V, $V_{GS}$ = 0 V, $T_J$ = 85°C | | | 5 | |
| On-State Drain Current[a] | $I_{D(on)}$ | $V_{DS}$ ≥ 5 V, $V_{GS}$ = 4.5 V | 20 | | | A |
| Drain-Source On-State Resistance[a] | $r_{DS(on)}$ | $V_{GS}$ = 4.5 V, $I_D$ = 6.9 A | | 0.017 | 0.020 | Ω |
| | | $V_{GS}$ = 2.5 V, $I_D$ = 2 A | | 0.021 | 0.025 | |
| Forward Transconductance[a] | $g_{fs}$ | $V_{DS}$ = 10 V, $I_D$ = 6.9 A | | 30 | | S |
| Diode Forward Voltage[a] | $V_{SD}$ | $I_S$ = 1.1 A, $V_{GS}$ = 0 V | | 0.7 | 1.2 | V |
| **Dynamic[b]** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = 6 V, $V_{GS}$ = 4.5 V, $I_D$ = 6.9 A | | 13.7 | 20 | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 2.3 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 4.1 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$ = 6 V, $R_L$ = 6 Ω<br>$I_D$ ≅ 1 A, $V_{GEN}$ = 4.5 V, $R_G$ = 6 Ω | | 17 | 25 | ns |
| Rise Time | $t_r$ | | | 46 | 70 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 54 | 80 | |
| Fall Time | $t_f$ | | | 29 | 45 | |
| Source-Drain Reverse Recovery Time | $t_{rr}$ | $I_F$ = 1.1 A, di/dt = 100 A/µs | | 35 | 70 | |

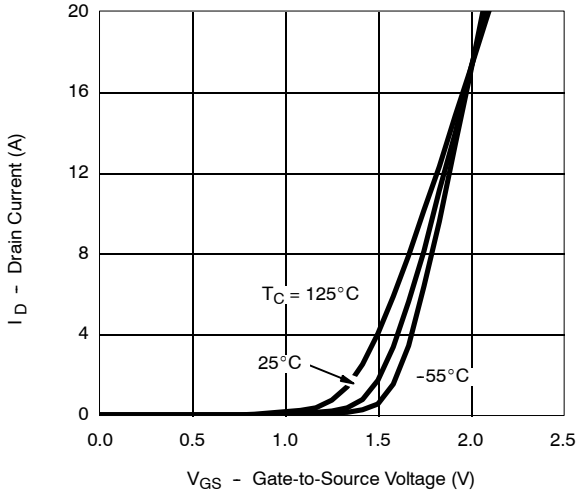
Notes
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

**Output Characteristics**

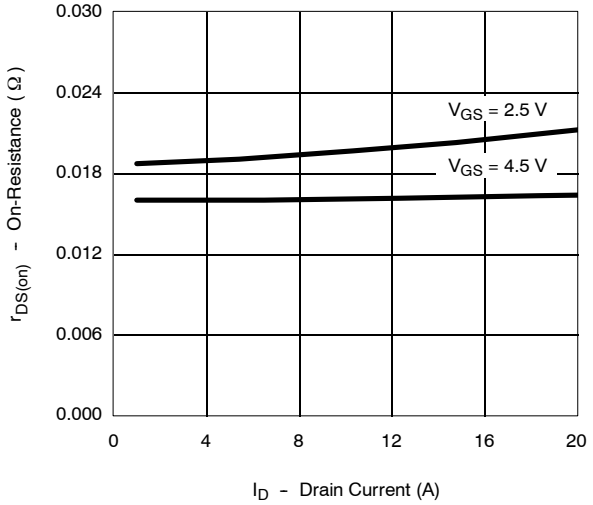



**Transfer Characteristics**

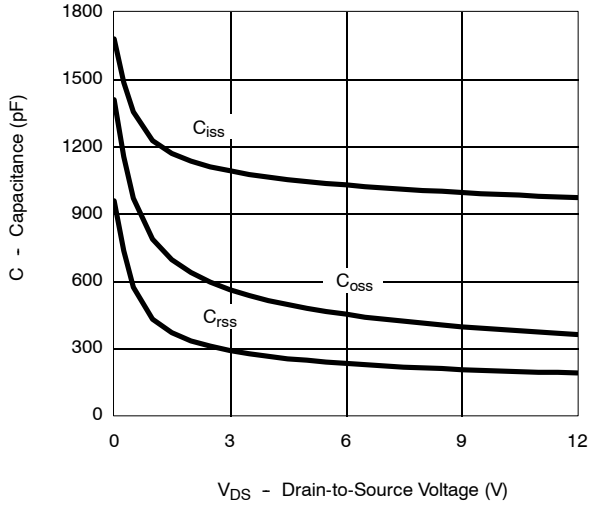


## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

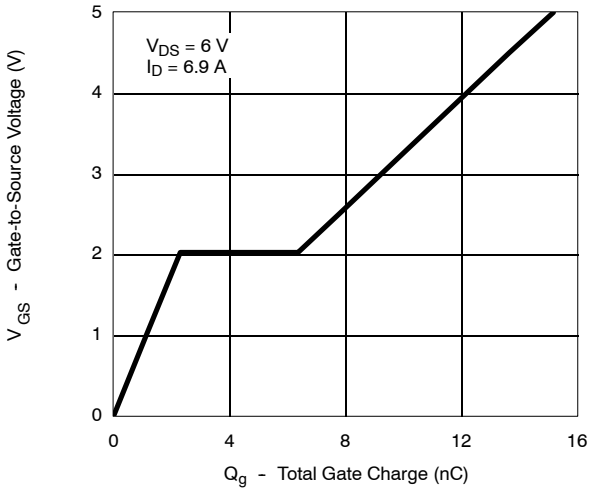
**On-Resistance vs. Drain Current**



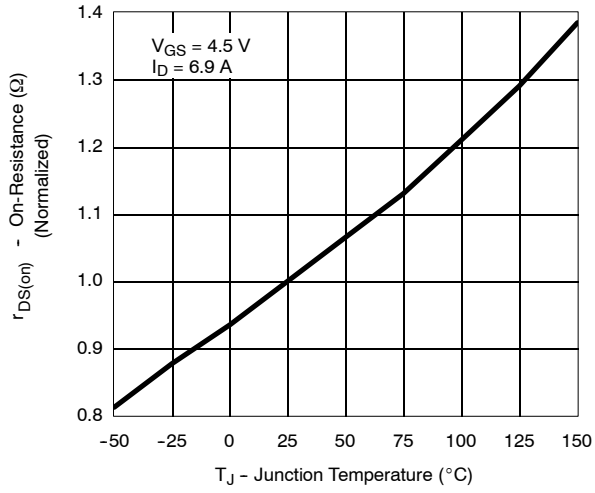

**Capacitance**



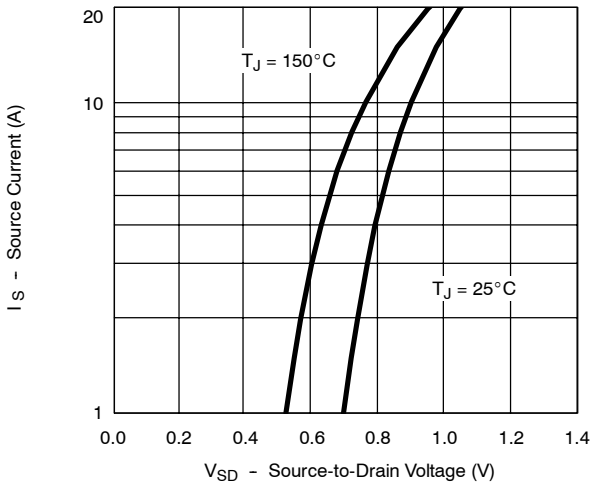

**Gate Charge**



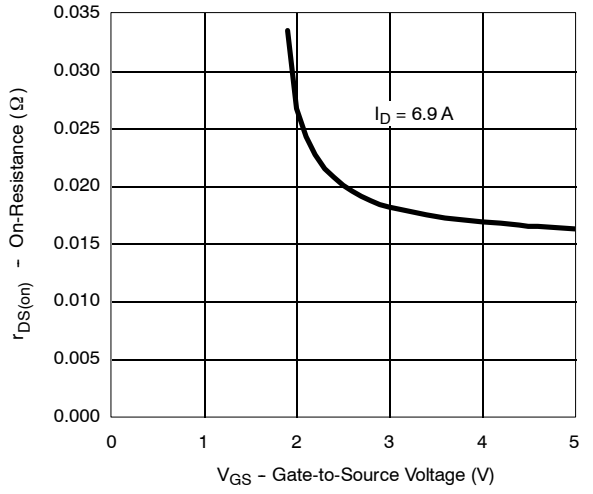

**On-Resistance vs. Junction Temperature**




**Source-Drain Diode Forward Voltage**

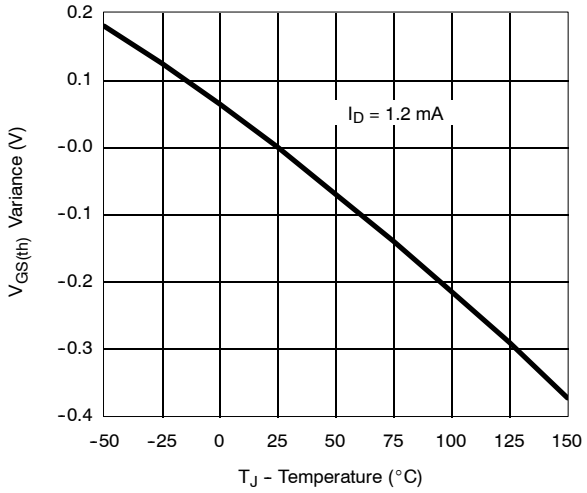



**On-Resistance vs. Gate-to-Source Voltage**

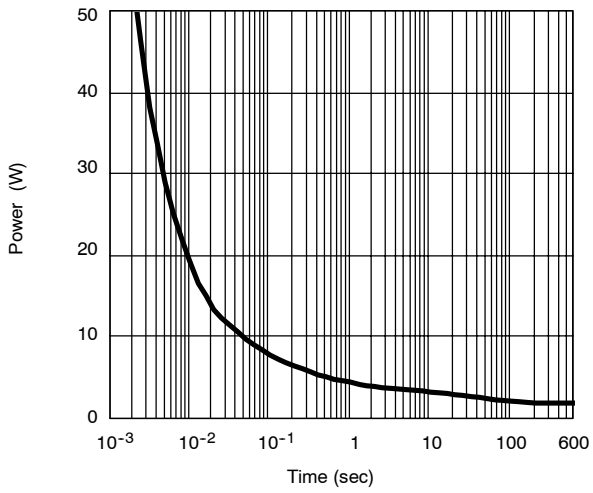


## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

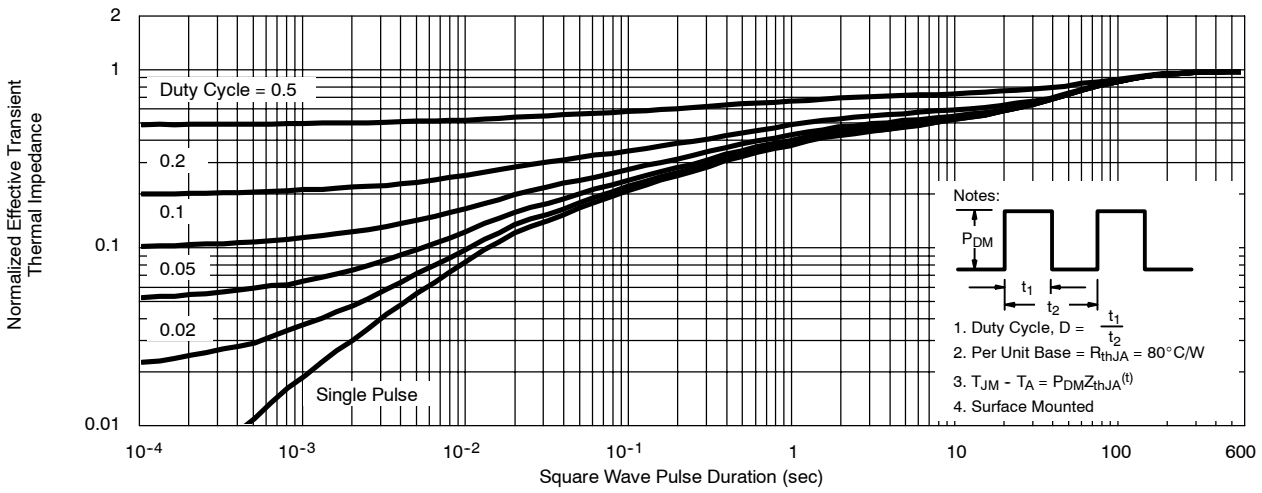
**Threshold Voltage**




**Single Pulse Power**




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




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