



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

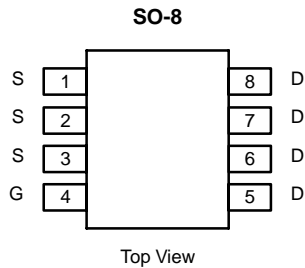
| PRODUCT SUMMARY |                             |           |
|-----------------|-----------------------------|-----------|
| $V_{DS}$ (V)    | $r_{DS(on)}$ ( $\Omega$ )   | $I_D$ (A) |
| -20             | 0.00775 @ $V_{GS} = -4.5$ V | -14       |
|                 | 0.01225 @ $V_{GS} = -2.5$ V | -11       |

### FEATURES

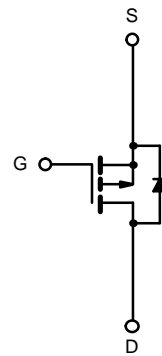
- TrenchFET® Power MOSFET

### APPLICATIONS

- Load Switch



Ordering Information: Si4493DY  
Si4493DY-T1 (with Tape and Reel)



P-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) |                |                          |              |                  |   |
|---|----------------|--------------------------|--------------|------------------|---|
| Parameter   | Symbol         | 10 secs                  | Steady State | Unit             |   |
| Drain-Source Voltage  | $V_{DS}$       | -20                      |              | V                |   |
| Gate-Source Voltage   | $V_{GS}$       | $\pm 12$                 |              |                  |   |
| Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>         | $I_D$          | $T_A = 25^\circ\text{C}$ | -14          | -10              | A |
|   |                | $T_A = 70^\circ\text{C}$ | -11          | -8               |   |
| Pulsed Drain Current  | $I_{DM}$       | -50                      |              |                  |   |
| continuous Source Current (Diode Conduction) <sup>a</sup>                   | $I_S$          | -2.7                     | -1.36        |                  |   |
| Maximum Power Dissipation <sup>a</sup>                                      | $P_D$          | $T_A = 25^\circ\text{C}$ | 3.0          | 1.5              | W |
|   |                | $T_A = 70^\circ\text{C}$ | 1.9          | 0.95             |   |
| Operating Junction and Storage Temperature Range                            | $T_J, T_{stg}$ | -55 to 150               |              | $^\circ\text{C}$ |   |

| THERMAL RESISTANCE RATINGS               |            |                 |         |      |                    |
|--|------------|-----------------|---------|------|--------------------|
| Parameter                                | Symbol     | Typical         | Maximum | Unit |                    |
| Maximum Junction-to-Ambient <sup>a</sup> | $R_{thJA}$ | $t \leq 10$ sec | 33      | 42   | $^\circ\text{C/W}$ |
|  |            | Steady State    | 70      | 84   |                    |
| Maximum Junction-to-Foot (Drain)         | $R_{thJF}$ | 16              | 21      |      |                    |

Notes

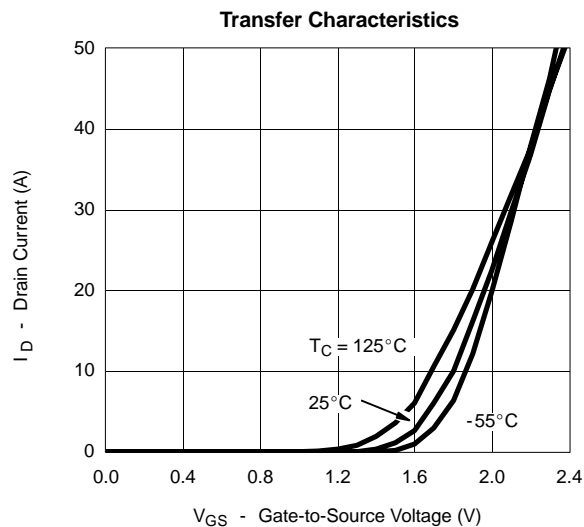
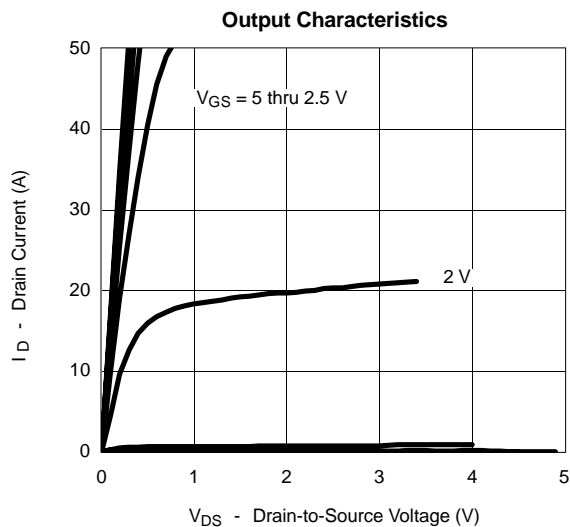
a. Surface Mounted on 1" x 1" FR4 Board.

**SPECIFICATIONS (T<sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)**

| Parameter                                     | Symbol              | Test Condition   | Min  | Typ    | Max     | Unit |
|---|---------------------|--|------|--------|---------|------|
| <b>Static</b>                                 |                     |  |      |        |         |      |
| Gate Threshold Voltage                        | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 μA   | -0.6 |        | -1.4    | V    |
| Gate-Body Leakage                             | I <sub>GSS</sub>    | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±12 V   |      |        | ±100    | nA   |
| Zero Gate Voltage Drain Current               | I <sub>DSS</sub>    | V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V   |      |        | -1      | μA   |
|   |                     | V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 70 °C   |      |        | -10     |      |
| On-State Drain Current <sup>a</sup>           | I <sub>D(on)</sub>  | V <sub>DS</sub> = -5 V, V <sub>GS</sub> = -4.5 V   | -30  |        |         | A    |
| Drain-Source On-State Resistance <sup>a</sup> | r <sub>DS(on)</sub> | V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -14 A   |      | 0.0065 | 0.00775 | Ω    |
|   |                     | V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -11 A   |      | 0.010  | 0.01225 |      |
| Forward Transconductance <sup>a</sup>         | g <sub>fs</sub>     | V <sub>DS</sub> = -10 V, I <sub>D</sub> = -14 A  |      | 60     |         | S    |
| Diode Forward Voltage <sup>a</sup>            | V <sub>SD</sub>     | I <sub>S</sub> = -2.7 A, V <sub>GS</sub> = 0 V   |      | -0.68  | -1.1    | V    |
| <b>Dynamic<sup>b</sup></b>                    |                     |  |      |        |         |      |
| Total Gate Charge                             | Q <sub>g</sub>      | V <sub>DS</sub> = -10 V, V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -14 A  |      | 65     | 110     | nC   |
| Gate-Source Charge                            | Q <sub>gs</sub>     |  |      | 14.5   |         |      |
| Gate-Drain Charge                             | Q <sub>gd</sub>     |  |      | 21     |         |      |
| Turn-On Delay Time                            | t <sub>d(on)</sub>  | V <sub>DD</sub> = -10 V, R <sub>L</sub> = 10 Ω<br>I <sub>D</sub> ≅ -1 A, V <sub>GEN</sub> = -4.5 V, R <sub>G</sub> = 6 Ω |      | 110    | 165     | ns   |
| Rise Time                                     | t <sub>r</sub>      |  |      | 150    | 225     |      |
| Turn-Off Delay Time                           | t <sub>d(off)</sub> |  |      | 220    | 330     |      |
| Fall Time                                     | t <sub>f</sub>      |  |      | 140    | 210     |      |
| Gate Resistance                               | R <sub>g</sub>      |  |      | 3.8    |         | Ω    |
| Source-Drain Reverse Recovery Time            | t <sub>rr</sub>     | I <sub>F</sub> = -2.7 A, di/dt = 100 A/μs  |      | 85     | 130     | ns   |

## Notes

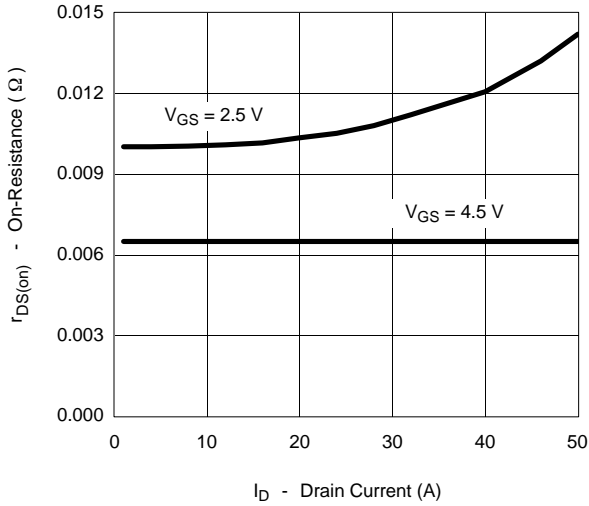
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.  
b. Guaranteed by design, not subject to production testing.

**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

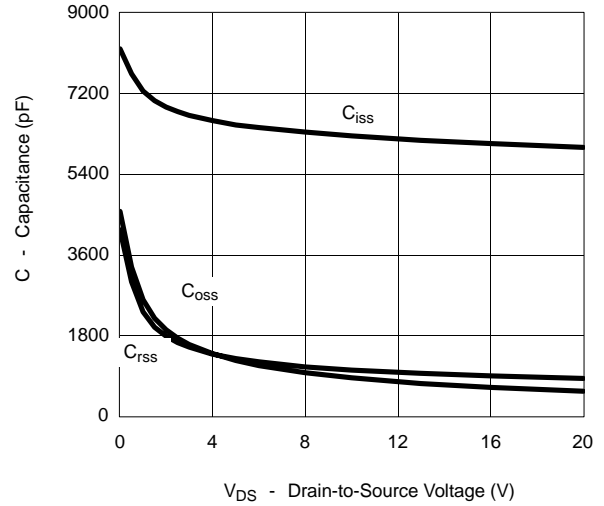


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

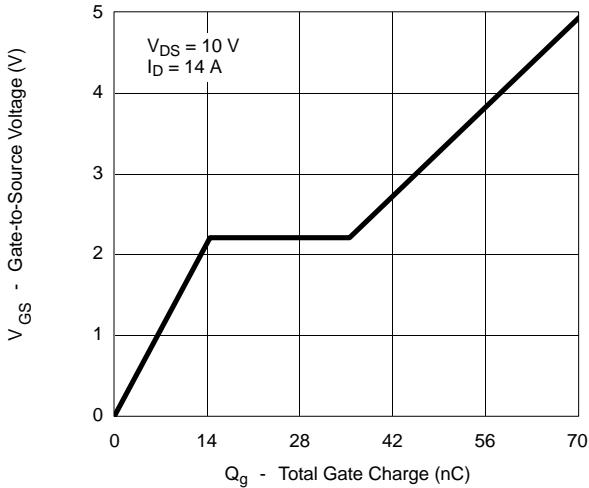
**On-Resistance vs. Drain Current**



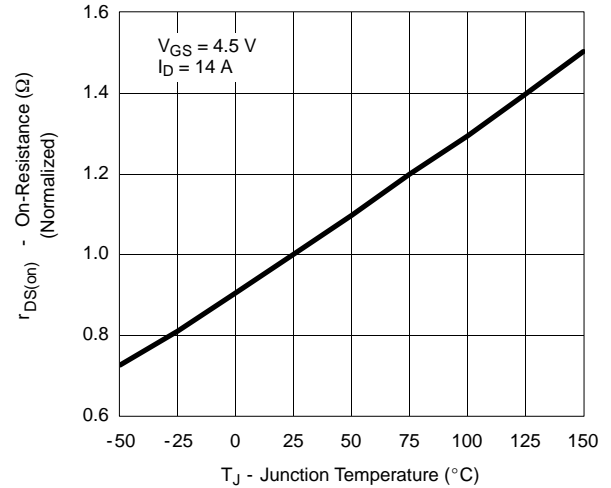
**Capacitance**



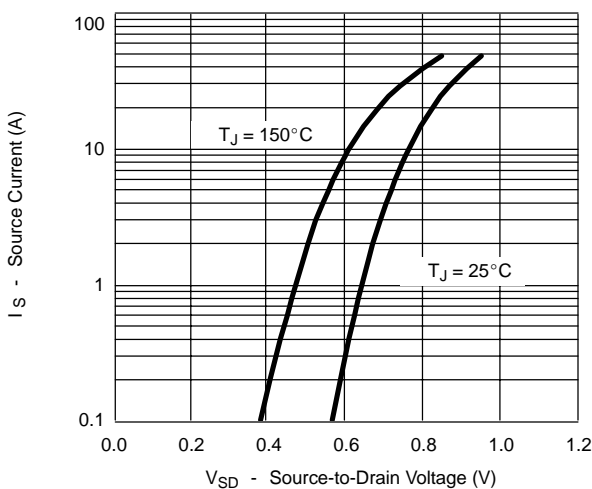
**Gate Charge**



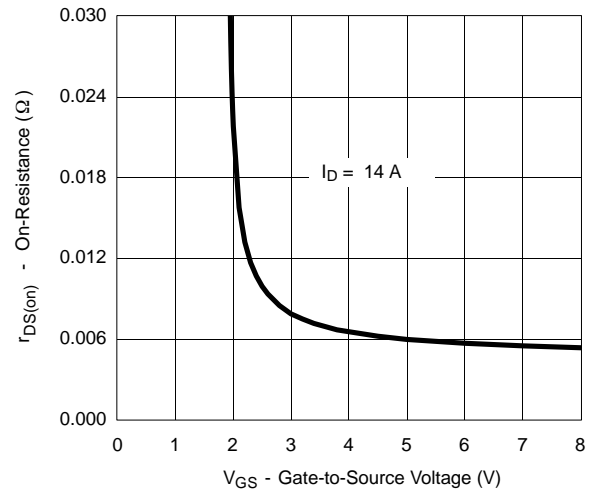
**On-Resistance vs. Junction Temperature**



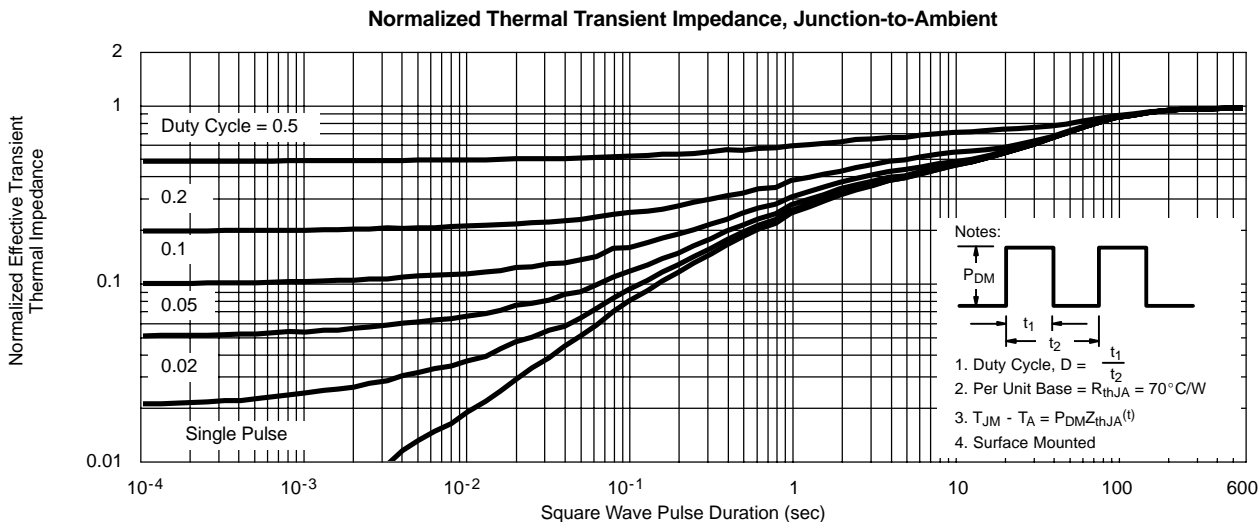
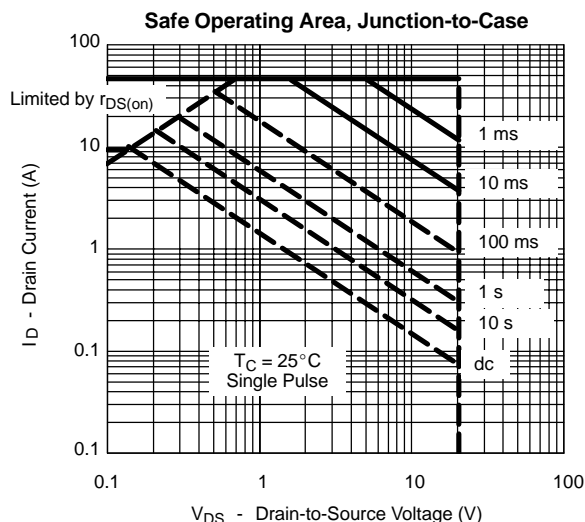
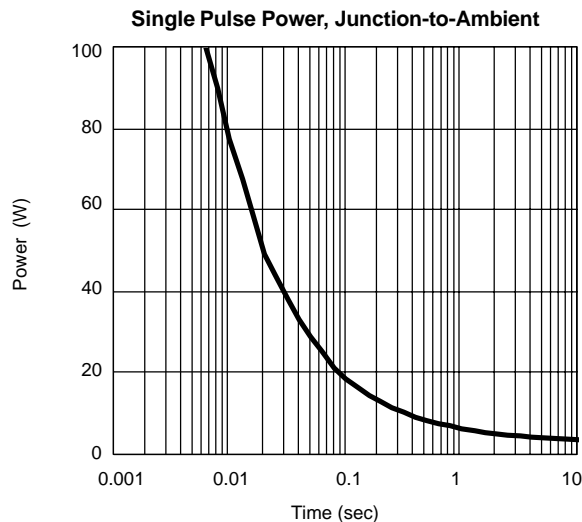
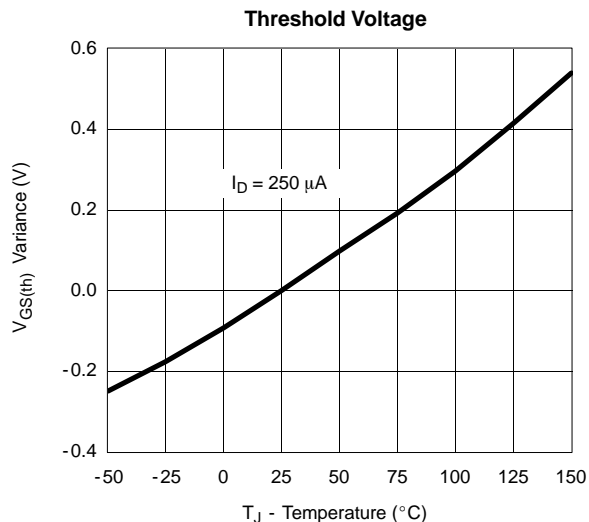
**Source-Drain Diode Forward Voltage**



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



**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**





**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

