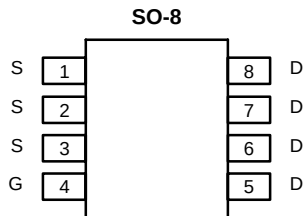


N-Channel Reduced  $Q_g$ , Fast Switching MOSFET

## PRODUCT SUMMARY

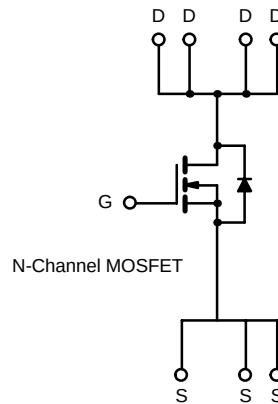
| $V_{DS}$ (V) | $r_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A) |
|--------------|---------------------------|-----------|
| 30           | 0.0105 @ $V_{GS} = 10$ V  | 12        |
|              | 0.0165 @ $V_{GS} = 4.5$ V | 10        |

**TrenchFET<sup>®</sup>**  
Power MOSFETs  
**High-Efficiency**  
PWM Optimized



Top View

Ordering Information: Si4884DY  
Si4884DY-T1 (with Tape and Reel)

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

| Parameter                                                              |                          | Symbol         | Limit      | Unit             |
|------------------------------------------------------------------------|--------------------------|----------------|------------|------------------|
| Drain-Source Voltage                                                   |                          | $V_{DS}$       | 30         | V                |
| Gate-Source Voltage                                                    |                          | $V_{GS}$       | $\pm 20$   |                  |
| Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a, b</sup> | $T_A = 25^\circ\text{C}$ | $I_D$          | 12         | A                |
|                                                                        | $T_A = 70^\circ\text{C}$ |                | 10         |                  |
| Pulsed Drain Current                                                   |                          | $I_{DM}$       | 50         |                  |
| Continuous Source Current (Diode Conduction) <sup>a, b</sup>           |                          | $I_S$          | 2.3        | W                |
| Maximum Power Dissipation <sup>a, b</sup>                              | $T_A = 25^\circ\text{C}$ | $P_D$          | 2.95       |                  |
|                                                                        | $T_A = 70^\circ\text{C}$ |                | 1.9        |                  |
| 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 (MOSFET) <sup>a</sup> | $t \leq 10$ sec | $R_{thJA}$ | 35      | 42      | $^\circ\text{C/W}$ |
|                                                   | Steady State    |            | 68      | 80      |                    |
| Maximum Junction-to-Foot                          |                 | $R_{thJF}$ | 18      | 23      |                    |

## Notes

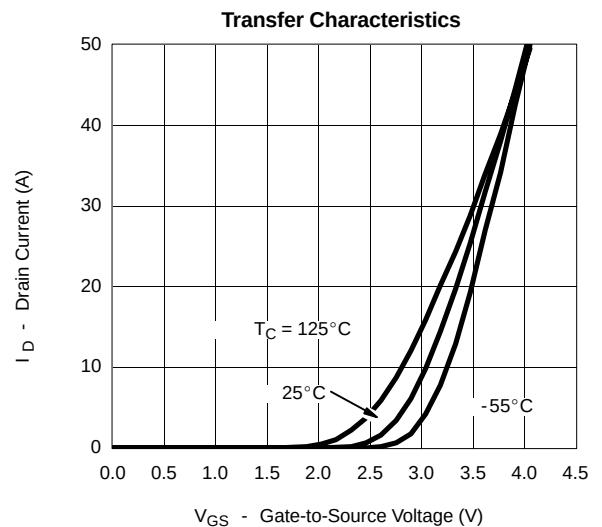
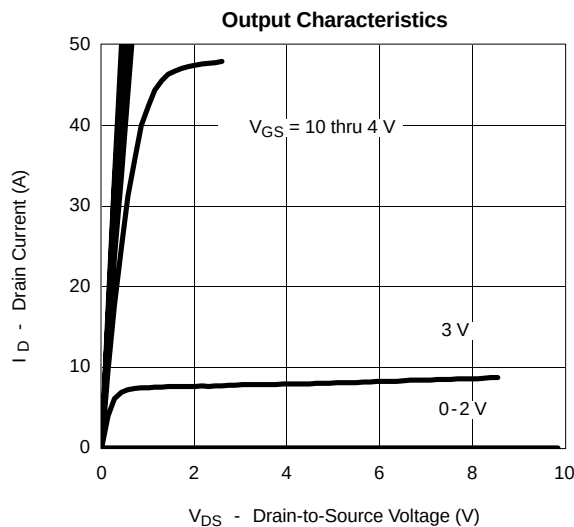
- a. Surface Mounted on FR4 Board.  
b.  $t \leq 10$  sec.

**MOSFET SPECIFICATIONS ( $T_J = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)**

| Parameter                                     | Symbol       | Test Condition                                                                                                           | Min | Typ    | Max       | Unit          |
|-----------------------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------|-----|--------|-----------|---------------|
| <b>Static</b>                                 |              |                                                                                                                          |     |        |           |               |
| Gate Threshold Voltage                        | $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250\ \mu\text{A}$                                                                             | 1.0 |        |           | V             |
| Gate-Body Leakage                             | $I_{GSS}$    | $V_{DS} = 0\ \text{V}$ , $V_{GS} = \pm 20\ \text{V}$                                                                     |     |        | $\pm 100$ | nA            |
| Zero Gate Voltage Drain Current               | $I_{DSS}$    | $V_{DS} = 24\ \text{V}$ , $V_{GS} = 0\ \text{V}$                                                                         |     |        | 1         | $\mu\text{A}$ |
|                                               |              | $V_{DS} = 24\ \text{V}$ , $V_{GS} = 0\ \text{V}$ , $T_J = 55^\circ\text{C}$                                              |     |        | 5         |               |
| On-State Drain Current <sup>a</sup>           | $I_{D(on)}$  | $V_{DS} \geq 5\ \text{V}$ , $V_{GS} = 10\ \text{V}$                                                                      | 40  |        |           | A             |
| Drain-Source On-State Resistance <sup>a</sup> | $r_{DS(on)}$ | $V_{GS} = 10\ \text{V}$ , $I_D = 12\ \text{A}$                                                                           |     | 0.0086 | 0.0105    | $\Omega$      |
|                                               |              | $V_{GS} = 4.5\ \text{V}$ , $I_D = 10\ \text{A}$                                                                          |     | 0.0135 | 0.0165    |               |
| Forward Transconductance <sup>a</sup>         | $g_{fs}$     | $V_{DS} = 15\ \text{V}$ , $I_D = 12\ \text{A}$                                                                           |     | 26     |           | S             |
| Diode Forward Voltage <sup>a</sup>            | $V_{SD}$     | $I_S = 2.3\ \text{A}$ , $V_{GS} = 0\ \text{V}$                                                                           |     | 0.74   | 1.1       | V             |
| <b>Dynamic<sup>b</sup></b>                    |              |                                                                                                                          |     |        |           |               |
| Total Gate Charge                             | $Q_g$        | $V_{DS} = 15\ \text{V}$ , $V_{GS} = 5.0\ \text{V}$ , $I_D = 12\ \text{A}$                                                |     | 15.3   | 20        | nC            |
| Gate-Source Charge                            | $Q_{gs}$     |                                                                                                                          |     | 5.8    |           |               |
| Gate-Drain Charge                             | $Q_{gd}$     |                                                                                                                          |     | 4.8    |           |               |
| Gate Resistance                               | $R_g$        |                                                                                                                          | 0.5 |        | 2.2       | $\Omega$      |
| Turn-On Delay Time                            | $t_{d(on)}$  | $V_{DD} = 15\ \text{V}$ , $R_L = 15\ \Omega$<br>$I_D \approx 1\ \text{A}$ , $V_{GEN} = 10\ \text{V}$ , $R_G = 6\ \Omega$ |     | 13     | 20        | ns            |
| Rise Time                                     | $t_r$        |                                                                                                                          |     | 7      | 12        |               |
| Turn-Off Delay Time                           | $t_{d(off)}$ |                                                                                                                          |     | 55     | 82        |               |
| Fall Time                                     | $t_f$        |                                                                                                                          |     | 16     | 30        |               |
| Source-Drain Reverse Recovery Time            | $t_{rr}$     | $I_F = 2.3\ \text{A}$ , $di/dt = 100\ \text{A}/\mu\text{s}$                                                              |     | 40     | 70        |               |

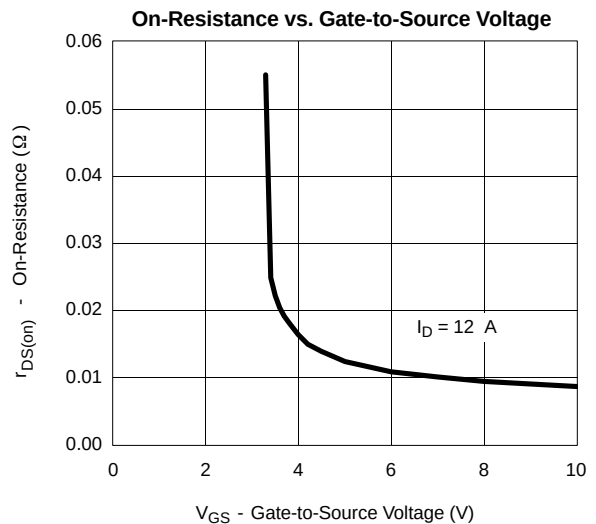
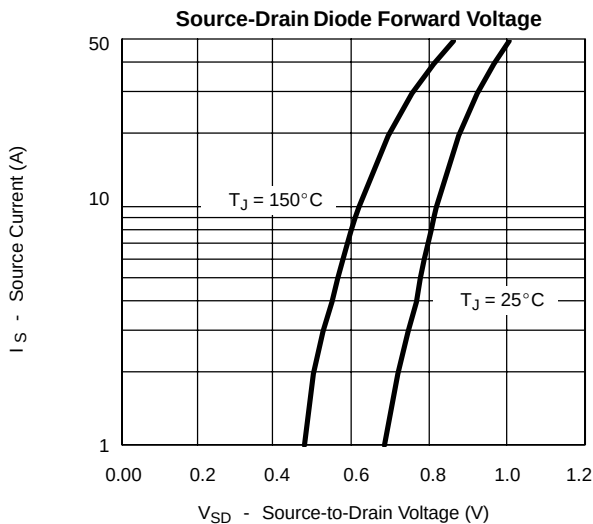
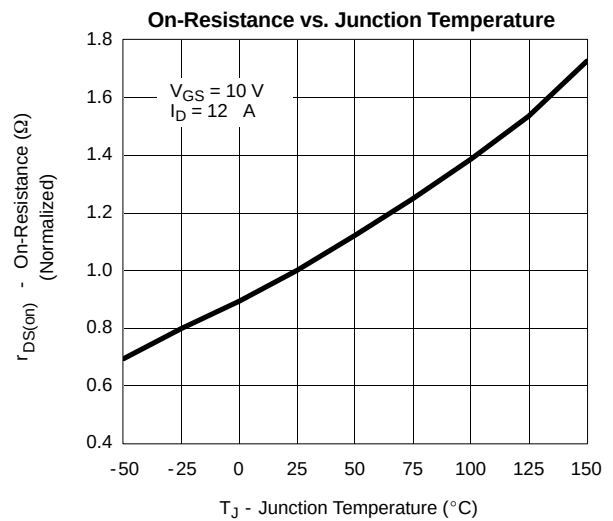
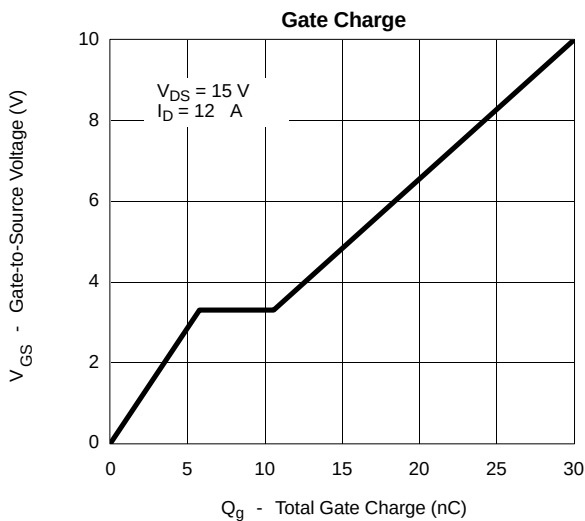
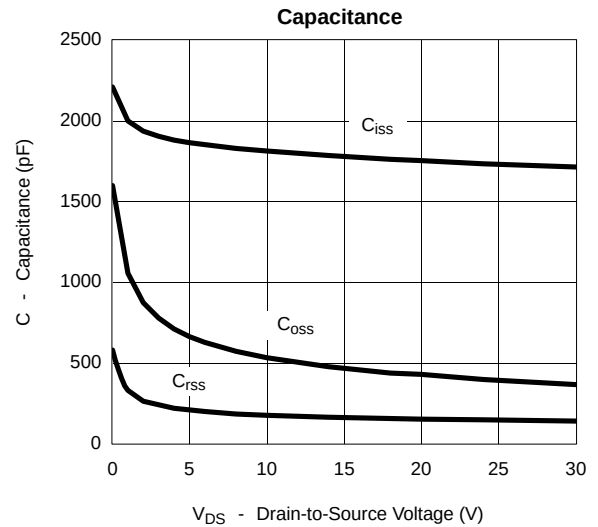
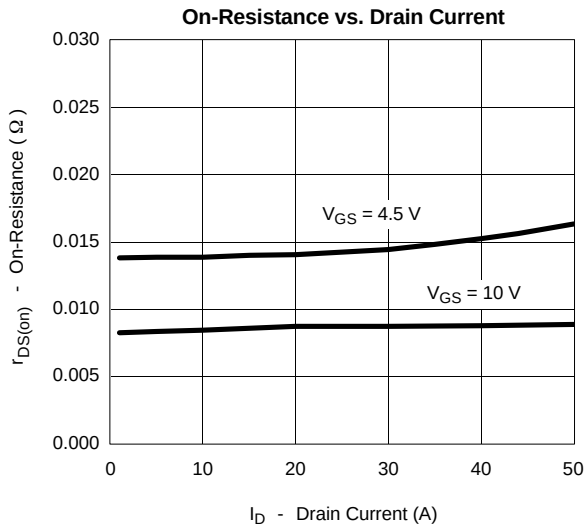
## Notes

- a. Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .  
b. Guaranteed by design, not subject to production testing.

**TYPICAL CHARACTERISTICS ( $25^\circ\text{C}$  UNLESS NOTED)**

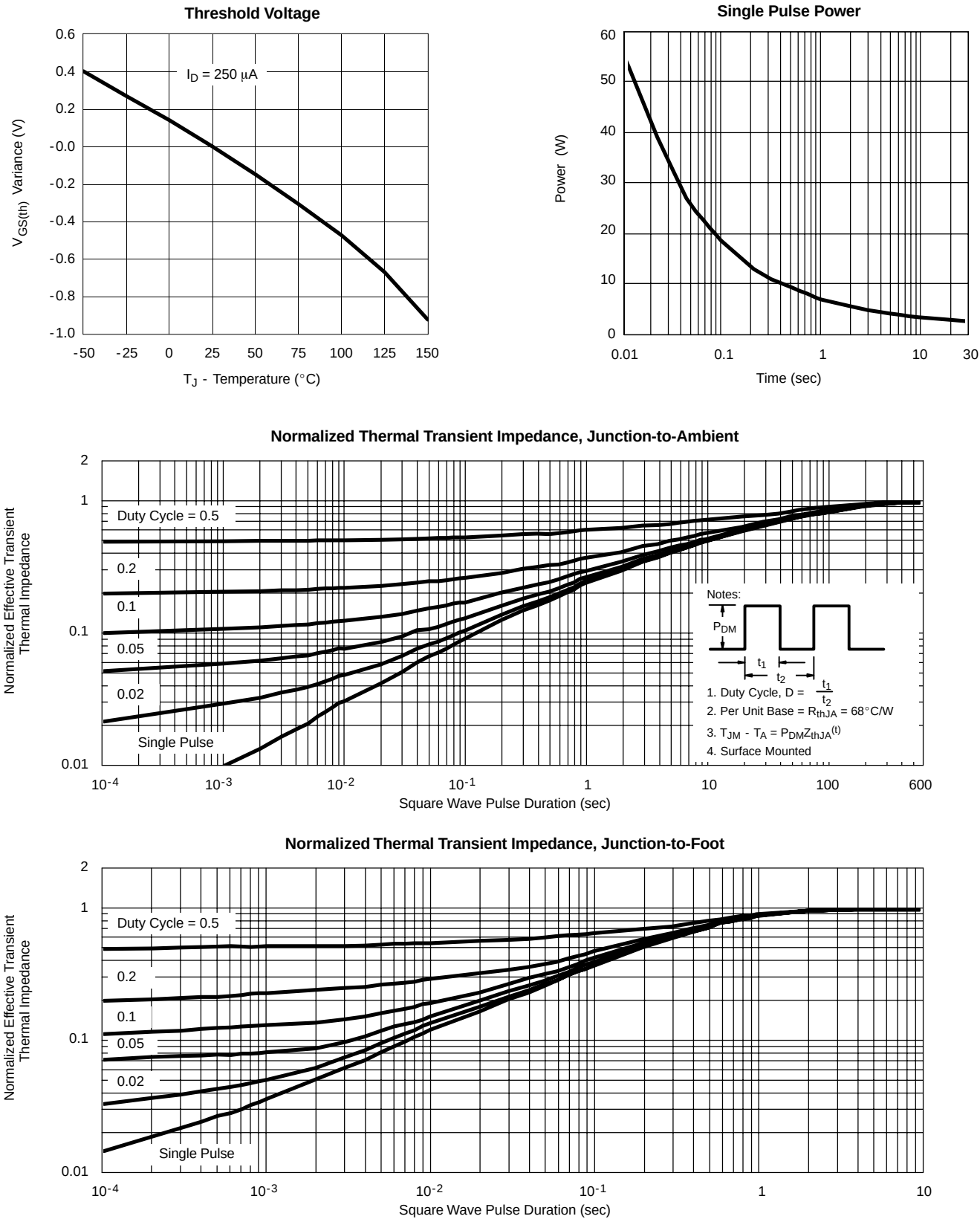


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**





TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)





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