

Dual N-Channel 30-V (D-S) MOSFET

| PRODUCT SUMMARY | | |
|-----------------|---------------------------|-----------|
| V_{DS} (V) | $r_{DS(on)}$ (Ω) | I_D (A) |
| 30 | 0.022 at $V_{GS} = 10$ V | 7.5 |
| | 0.030 at $V_{GS} = 4.5$ V | 6.5 |

FEATURES

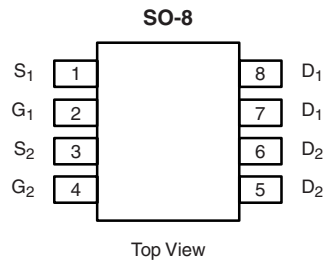
- TrenchFET[®] Power MOSFET
- PWM Optimized
- 100 % R_g Tested



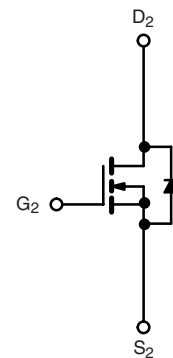
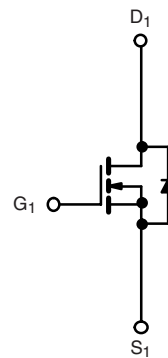
RoHS
COMPLIANT

APPLICATIONS

- Symmetrical Buck-Boost DC/DC Converter



Ordering Information: Si4804BDY-T1-E3 (Lead (Pb)-free)



| ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted | | | | | |
|--|----------------|---------------|--------------|------|---|
| Parameter | Symbol | 10 sec | Steady State | Unit | |
| Drain-Source Voltage | V_{DS} | 30 | | V | |
| Gate-Source Voltage | V_{GS} | ± 20 | | | |
| Continuous Drain Current ($T_J = 150$ °C) ^a | I_D | $T_A = 25$ °C | 7.5 | 5.7 | A |
| | | $T_A = 70$ °C | 6.0 | 4.6 | |
| Pulsed Drain Current | I_{DM} | 30 | | | |
| Continuous Source Current (Diode Conduction) ^a | I_S | 1.7 | 0.9 | | |
| Maximum Power Dissipation ^a | P_D | $T_A = 25$ °C | 2.0 | 1.1 | W |
| | | $T_A = 70$ °C | 1.3 | 0.7 | |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | - 55 to 150 | | °C | |

| THERMAL RESISTANCE RATINGS | | | | | |
|--|------------|-----------------|-----|------|------|
| Parameter | Symbol | Limits | | Unit | |
| | | Typ | Max | | |
| Maximum Junction-to-Ambient ^a | R_{thJA} | $t \leq 10$ sec | 52 | 62.5 | °C/W |
| | | Steady State | 93 | 110 | |
| Maximum Junction-to-Foot (Drain) | R_{thJF} | Steady State | 35 | 40 | |

Notes:

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

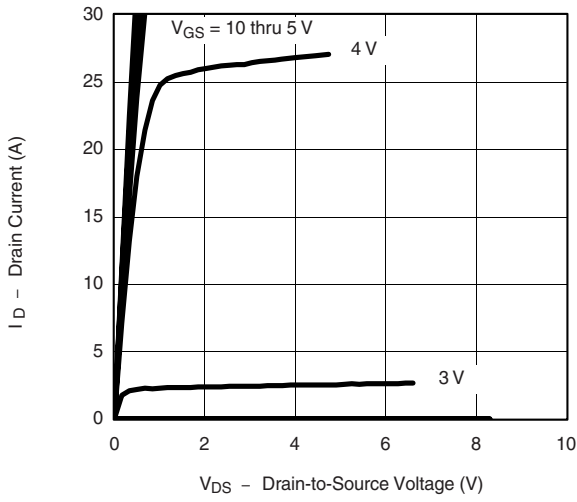
| MOSFET SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted | | | | | | |
|--|--------------|--|------|------------------|-----------|---------------|
| Parameter | Symbol | Test Conditions | Min | Typ ^a | Max | Unit |
| Static | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$ | 0.8 | | 3.0 | V |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$ | | | 1 | μA |
| | | $V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 85\text{ }^\circ\text{C}$ | | | 15 | |
| On-State Drain Current ^b | $I_{D(on)}$ | $V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$ | 20 | | | A |
| Drain-Source On-State Resistance ^b | $r_{DS(on)}$ | $V_{GS} = 10\text{ V}, I_D = 7.5\text{ A}$ | | 0.017 | 0.022 | Ω |
| | | $V_{GS} = 4.5\text{ V}, I_D = 6.5\text{ A}$ | | 0.024 | 0.030 | |
| Forward Transconductance ^b | g_{fs} | $V_{DS} = 15\text{ V}, I_D = 7.5\text{ A}$ | | 19 | | S |
| Diode Forward Voltage ^b | V_{SD} | $I_S = 1\text{ A}, V_{GS} = 0\text{ V}$ | | 0.75 | 1.2 | V |
| Dynamic^a | | | | | | |
| Total Gate Charge | Q_g | $V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 7.5\text{ A}$ | | 7 | 11 | nC |
| Gate-Source Charge | Q_{gs} | | | 2.9 | | |
| Gate-Drain Charge | Q_{gd} | | | 2.5 | | |
| Gate Resistance | R_g | | 0.5 | 1.5 | 2.6 | Ω |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD} = 15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}, V_{GEN} = 10\text{ V}, R_g = 6\text{ }\Omega$ | | 9 | 15 | ns |
| Rise Time | t_r | | | 10 | 17 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 19 | 30 | |
| Fall Time | t_f | | | 9 | 15 | |
| Source-Drain Reverse Recovery Time | t_{rr} | $I_F = 1.7\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$ | Ch-1 | | 35 | 55 |

Notes:

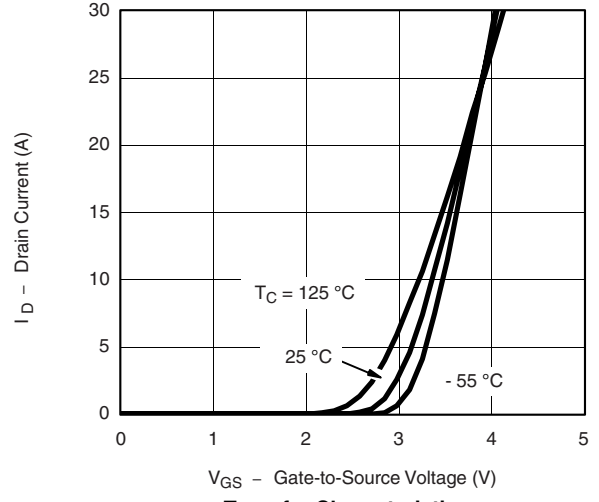
- a. Guaranteed by design, not subject to production testing.
 b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

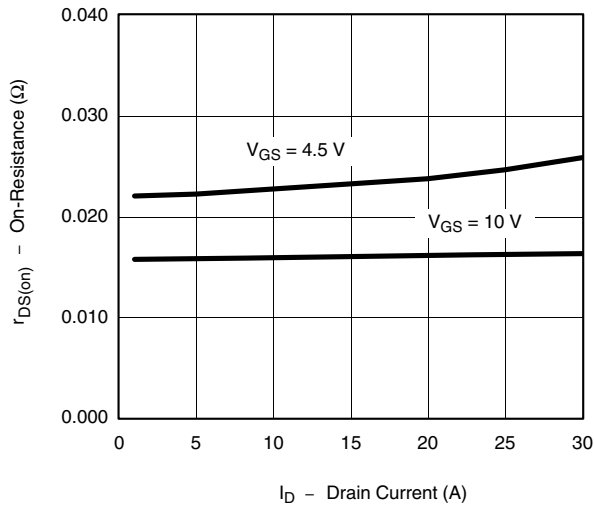
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



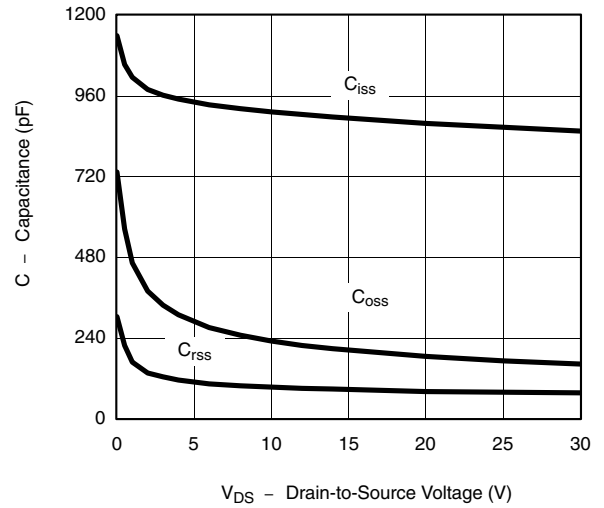
Output Characteristics



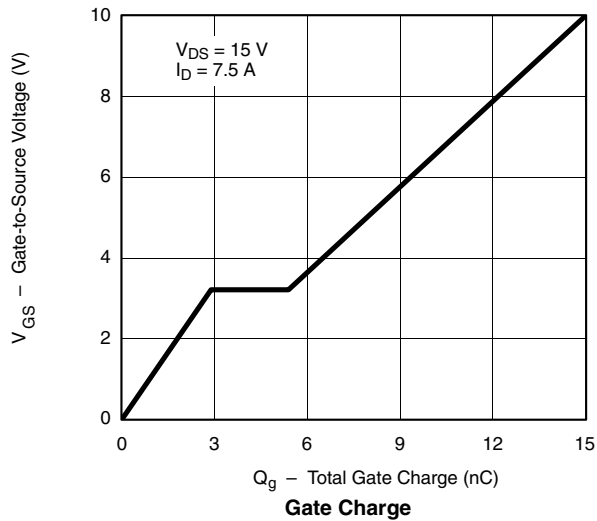
Transfer Characteristics



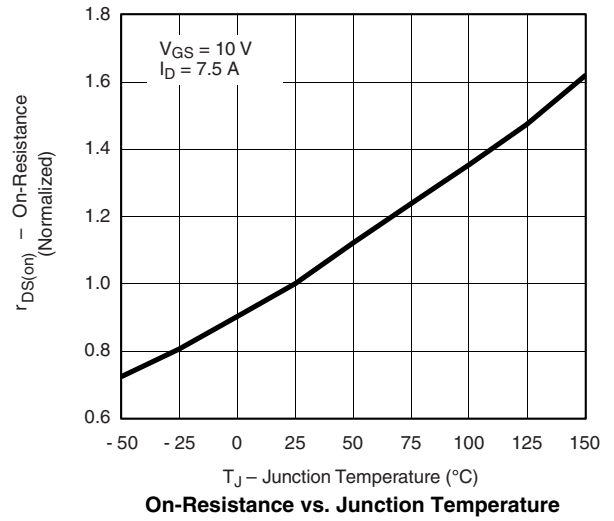
On-Resistance vs. Drain Current



Capacitance

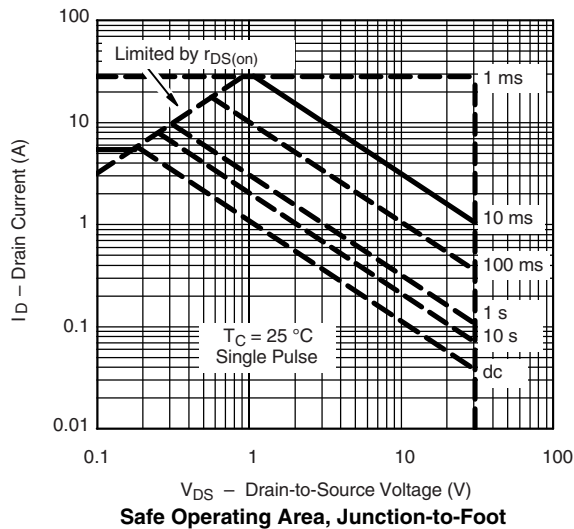
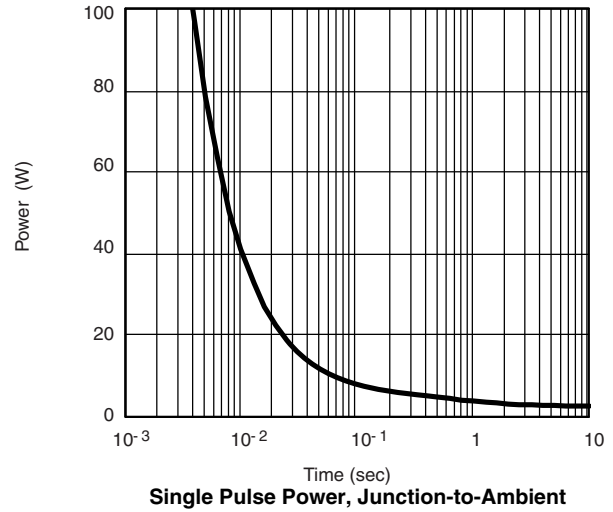
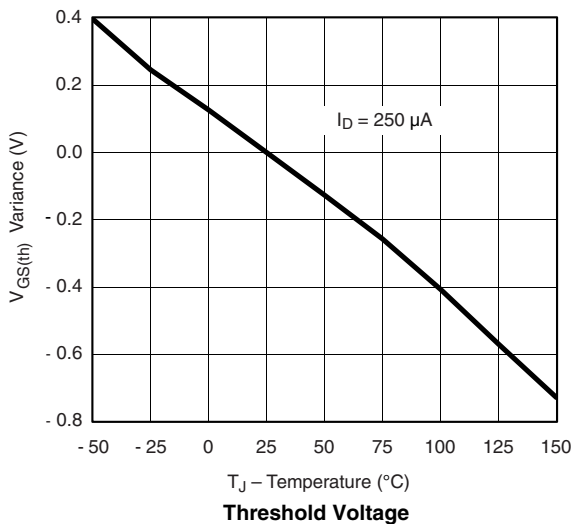
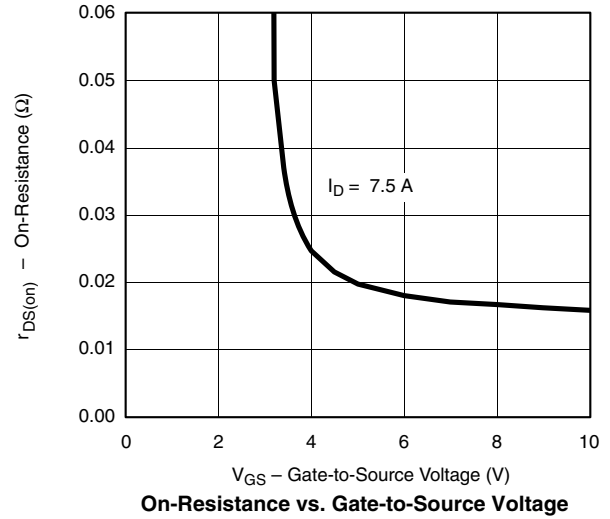
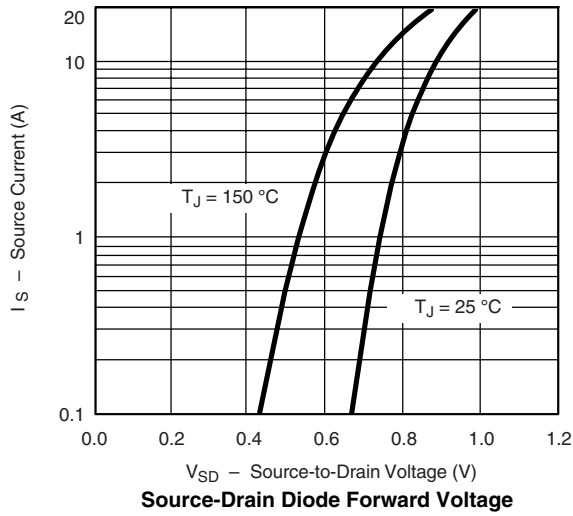


Gate Charge

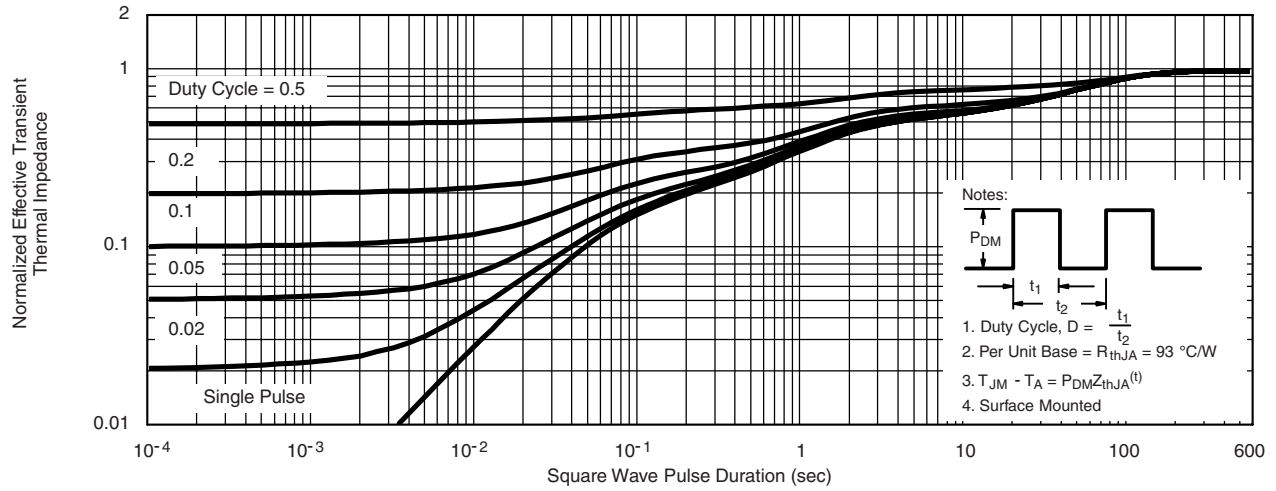


On-Resistance vs. Junction Temperature

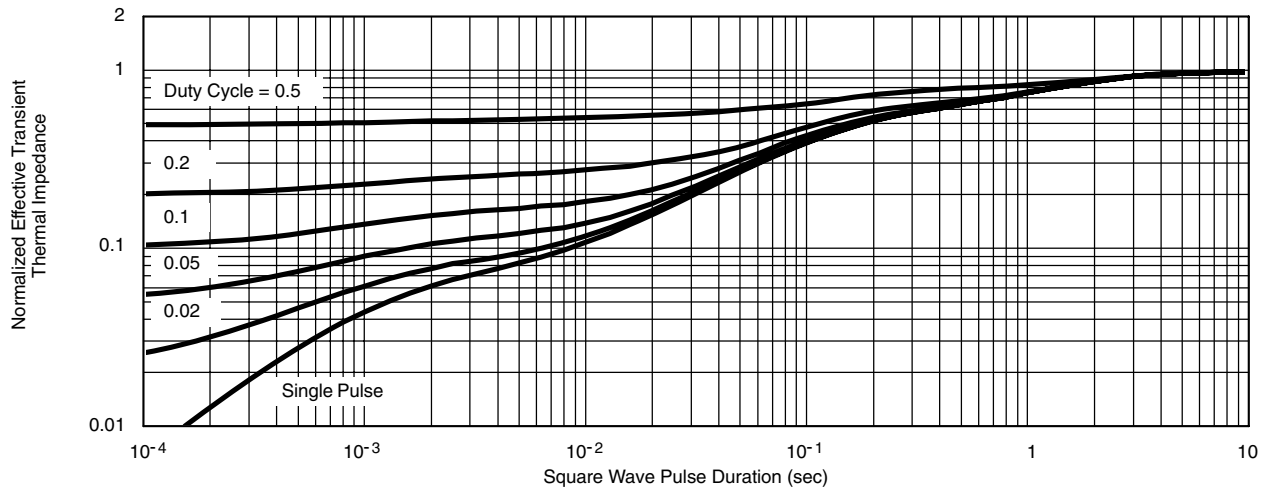
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

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