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December 2011

## FDS6911 Dual N-Channel Logic Level PowerTrench<sup>®</sup> MOSFET 20V, 7.5A, 13mΩ

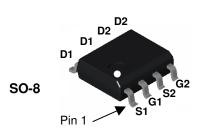
### **General Description**

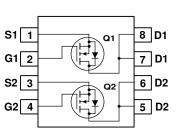
These N-Channel Logic Level MOSFETs are produced using Fairchild Semiconductor's advanced PowerTrench process that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

These devices are well suited for low voltage and battery powered applications where low in-line power loss and fast switching are required.

### Features

- $r_{DS(on)} = 13 \text{ m}\Omega @ V_{GS} = 10 \text{ V}$  $r_{DS(on)} = 17 \text{ m}\Omega @ V_{GS} = 4.5 \text{ V}$
- Fast switching speed
- Low gate charge
- High performance trench technology for extremely low R<sub>DS(ON)</sub>
- High power and current handling capability





## Absolute Maximum Ratings T<sub>A</sub>=25°C unless otherwise noted

| Symbol                            | Para   | meter   |           | Ratings     | Units      |  |
|-----------------------------------|--|---|-----------|-------------|------------|--|
| V <sub>DSS</sub>                  | Drain-Source Voltage                             | rce Voltage                                   |           | 20          | V          |  |
| V <sub>GSS</sub>                  | Gate-Source Voltage                              |   |           | ± 20        | V          |  |
| ID                                | Drain Current - Continuc                         | bus   | (Note 1a) | 7.5         | A          |  |
|                                   | – Pulsed   |   |           | 20          |            |  |
| PD                                | Power Dissipation for Sing                       | er Dissipation for Single Operation (Note 1a) |           |             |            |  |
|                                   |  |   | (Note 1b) | 1.0         |            |  |
|                                   |  |   | (Note 1c) | 0.9         |            |  |
| T <sub>J</sub> , T <sub>STG</sub> | Operating and Storage Junction Temperature Range |   |           | -55 to +150 |            |  |
| Therma                            | I Characteristics                                |   |           |             |            |  |
| R <sub>0JA</sub>                  | Thermal Resistance, Junct                        | al Resistance, Junction-to-Ambient (Note 1a)  |           | 78          | °C/W       |  |
| $R_{\theta JC}$                   | Thermal Resistance, Junction-to-Case (Note 1)    |   |           | 40          |            |  |
| Packag                            | e Marking and Orc                                | dering Info                                   | ormation  |             |            |  |
| Device                            | -  |   | eel Size  | Tape width  | Quantity   |  |
| FDS                               | 6911 FDS691                                      | 1   | 13"       | 12mm        | 2500 units |  |

| Symbol                                 | Parameter   | Test Conditions  | Min | Тур                | Max            | Units |
|--|---|--|-----|--------------------|----------------|-------|
| Off Char                               | acteristics                                       |  |     |                    |                |       |
| BV <sub>DSS</sub>                      | Drain-Source Breakdown Voltage                    | $V_{GS} = 0 V$ , $I_D = 250 \mu A$   | 20  |                    |                | V     |
| $\frac{\Delta BV_{DSS}}{\Delta T_J}$   | Breakdown Voltage Temperature<br>Coefficient      | $I_D = 250 \ \mu\text{A}$ , Referenced to $25^{\circ}\text{C}$   |     | 28                 |                | mV/°C |
| I <sub>DSS</sub>                       | Zero Gate Voltage Drain Current                   |  |     |                    | 1<br>10        | μA    |
| I <sub>GSS</sub>                       | Gate-Source Leakage                               | $V_{GS}=\pm 20~V,~V_{DS}=0~V$  |     |                    | ±100           | nA    |
| On Chara                               | acteristics (Note 2)                              |  |     |                    |                |       |
| $V_{GS(th)}$                           | Gate Threshold Voltage                            | $V_{DS} = V_{GS}, \qquad I_D = 250 \ \mu A$  | 1   | 1.8                | 3              | V     |
| $\frac{\Delta V_{GS(th)}}{\Delta T_J}$ | Gate Threshold Voltage<br>Temperature Coefficient | $I_D = 250 \ \mu\text{A}$ , Referenced to $25^{\circ}\text{C}$   |     | -4.7               |                | mV/°C |
| r <sub>DS(on)</sub>                    | Static Drain–Source<br>On–Resistance              | $ \begin{array}{ll} V_{GS} = 10 \ V, & I_D = 7.5 \ A \\ V_{GS} = 4.5 \ V, & I_D = 6.5 \ A \\ V_{GS} = 10 \ V, \ I_D = 7.5 \ A, T_J = 125^\circ C \end{array} $ |     | 10.6<br>13<br>14.5 | 13<br>17<br>20 | mΩ    |
| I <sub>D(on)</sub>                     | On-State Drain Current                            | $V_{GS} = 10 \text{ V},  V_{DS} = 5 \text{ V}$   | 20  |                    |                | А     |
| <b>g</b> <sub>FS</sub>                 | Forward Transconductance                          | $V_{DS} = 5 V$ , $I_{D} = 7.5 A$   |     | 36                 |                | S     |
| Dvnamic                                | Characteristics                                   |  |     |                    |                |       |
| Ciss                                   | Input Capacitance                                 | $V_{DS} = 15 V$ , $V_{GS} = 0 V$ ,   |     | 1130               |                | pF    |
| Coss                                   | Output Capacitance                                | f = 1.0 MHz  |     | 300                |                | pF    |
| C <sub>rss</sub>                       | Reverse Transfer Capacitance                      |  |     | 100                |                | pF    |
| R <sub>G</sub>                         | Gate Resistance                                   | $V_{GS} = 15 \text{ mV}, \text{ f} = 1.0 \text{ MHz}$  |     | 2.4                |                | Ω     |
| Switchin                               | g Characteristics (Note 2)                        |  |     |                    |                |       |
| t <sub>d(on)</sub>                     | Turn–On Delay Time                                | $V_{DD} = 15 V$ , $I_D = 1 A$ ,  |     | 9                  | 18             | ns    |
| tr                                     | Turn–On Rise Time                                 | $V_{GS} = 10 \text{ V},  R_{GEN} = 6 \Omega$   |     | 5                  | 10             | ns    |
| t <sub>d(off)</sub>                    | Turn-Off Delay Time                               | 7  |     | 26                 | 42             | ns    |
| t <sub>f</sub>                         | Turn-Off Fall Time                                |  |     | 7                  | 14             | ns    |
| Q <sub>g(TOT)</sub>                    | Total Gate Charge at Vgs=10V                      |  |     | 17                 | 24             | nC    |
| Qg                                     | Total Gate Charge at Vgs=5V                       | $V_{DD} = 15 V$ , $I_D = 7.5 A$ ,  |     | 9                  | 13             | nC    |
| Q <sub>gs</sub>                        | Gate-Source Charge                                |  |     | 3.1                |                | nC    |
| Q <sub>gd</sub>                        | Gate-Drain Charge                                 | ]  |     | 2.7                |                | nC    |

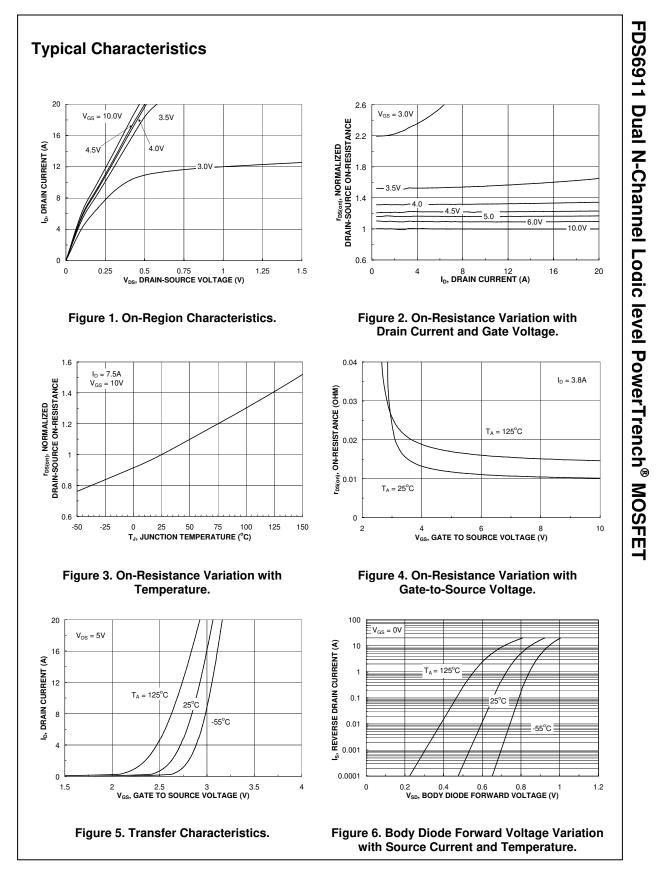
FDS6911 Dual N-Channel Logic level PowerTrench<sup>®</sup> MOSFET

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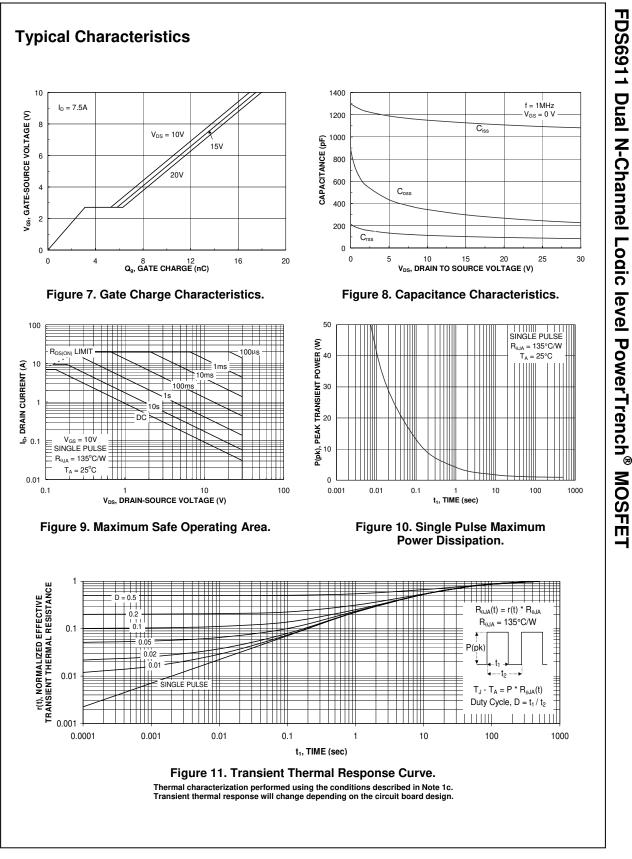
| Symbol             | Parameter   | -                    | Test Conditio   | ons      | Min  | Тур      | Max        | Units    |
|--------------------|---|----------------------|---|----------|------|----------|------------|----------|
| Drain–So           | urce Diode Characteristic   | s and Maxir          | num Ratings   | ;        |      |          |            |          |
| s                  | Maximum Continuous Drain-Sc   |                      | -   |          |      |          | 1.3        | Α        |
| / <sub>SD</sub>    | Drain–Source Diode Forward  | $V_{GS} = 0$         | $V,  I_{\rm S}=1.3 \ A$                                   | (Note 2) |      |          | 1.2        | V        |
| rr                 | Voltage<br>Diode Reverse Recovery Time  | I <sub>F</sub> = 7.5 | A, $d_{iF}/d_t = 100$                                     | A/uc     |      | 24       |            | nS       |
| n<br>Qrr           | Diode Reverse Recovery Charg  |                      | $A, u_{iF}/u_t = 100$                                     | Α/μδ     |      | 13       |            | nC       |
| <b>x</b> rr        | Didde Heverse Hecovery charge   | jc                   |   |          |      | 10       |            | no       |
| icale 1 : 1 on let | a) 78°C/W when<br>mounted on a<br>0.5 in <sup>2</sup> pad of 2 oz<br>copper Ø | moun                 | 2/W when<br>ted on a .02 in <sup>2</sup><br>f 2 oz copper |          | C) I | 35°C/W w | rhen mourn | ted on a |
|                    |   |                      |   |          |      |          |            |          |

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