

Features

- DIOFET utilizes a unique patented process to monolithically integrate a MOSFET and a Schottky in a single die to deliver:
 - Low $R_{DS(ON)}$ - minimizes conduction losses
 - Low V_{SD} - reducing the losses due to body diode conduction
 - Low Q_{rr} - lower Q_{rr} of the integrated Schottky reduces body diode switching losses
 - Low gate capacitance (Q_g/Q_{gs}) ratio - reduces risk of shoot-through or cross conduction currents at high frequencies
 - Avalanche rugged - I_{AR} and E_{AR} rated
- Lead Free, RoHS Compliant (Note 1)**
- "Green" Device (Note 2)**
- Qualified to AEC-Q101 Standards for High Reliability**

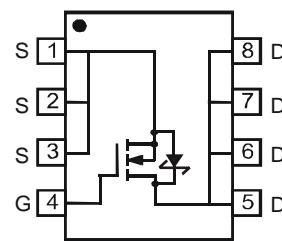
Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Page 5
- Ordering Information: See Page 5
- Weight: 0.072 grams (approximate)

DIOFET



Top View

Top View
Internal Schematic

Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | | | Symbol | Value | Unit |
|--|--------------|--|-----------|-------------|-------------|
| Drain-Source Voltage | | | V_{DSS} | 30 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 12 | V |
| Continuous Drain Current (Note 3) $V_{GS} = 4.5\text{V}$ | Steady State | $\begin{matrix} TA = 25^\circ\text{C} \\ TA = 85^\circ\text{C} \end{matrix}$ | I_D | 10.4 6.6 | A |
| Pulsed Drain Current (Note 4) | | | I_{DM} | 63 | A |
| Avalanche Current (Notes 4 & 5) | | | I_{AR} | 30 | A |
| Repetitive Avalanche Energy (Notes 4 & 5) $L = 0.1\text{mH}$ | | | E_{AR} | 45 | mJ |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|-----------------|-------------|---------------------------|
| Power Dissipation (Note 3) | P_D | 1.55 | W |
| Thermal Resistance, Junction to Ambient @ $T_A = 25^\circ\text{C}$ (Note 3) | $R_{\theta JA}$ | 81.3 | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

Notes:

- No purposefully added lead.
- Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
- Device mounted on 1in * 1in FR-4 PCB with 2oz. Copper. The value in any given application depends on the user's specific board design.
- Repetitive rating, pulse width limited by junction temperature.
- I_{AR} and E_{AR} rating are based on low frequency and duty cycles to keep $T_J = 25^\circ\text{C}$.

Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise stated

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|-----------------------------|------|---------|-----------|------------------|--|
| OFF CHARACTERISTICS (Note 6) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | 30 | - | - | V | $\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_D = 250\mu\text{A}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | - | - | 100 | μA | $\text{V}_{\text{DS}} = 30\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$ |
| Gate-Source Leakage | I_{GSS} | - | - | ± 100 | nA | $\text{V}_{\text{GS}} = \pm 12\text{V}$, $\text{V}_{\text{DS}} = 0\text{V}$ |
| ON CHARACTERISTICS (Note 6) | | | | | | |
| Gate Threshold Voltage | $\text{V}_{\text{GS(th)}}$ | 1.0 | - | 2.2 | V | $\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$, $\text{I}_D = 250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $\text{R}_{\text{DS (ON)}}$ | - | 9 10 | 13 14 | $\text{m}\Omega$ | $\text{V}_{\text{GS}} = 10\text{V}$, $\text{I}_D = 10.4\text{A}$ $\text{V}_{\text{GS}} = 4.5\text{V}$, $\text{I}_D = 10.4\text{A}$ |
| Forward Transfer Admittance | $ \text{Y}_{\text{fs}} $ | - | 23 | - | S | $\text{V}_{\text{DS}} = 5\text{V}$, $\text{I}_D = 10.4\text{A}$ |
| Diode Forward Voltage | V_{SD} | - | 0.37 | 0.5 | V | $\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_S = 1\text{A}$ |
| Maximum Body-Diode + Schottky Continuous Current | I_S | - | - | 5 | A | - |
| DYNAMIC CHARACTERISTICS (Note 7) | | | | | | |
| Input Capacitance | C_{iss} | - | 2296 | - | pF | $\text{V}_{\text{DS}} = 15\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1.0\text{MHz}$ |
| Output Capacitance | C_{oss} | - | 164 | - | pF | |
| Reverse Transfer Capacitance | C_{rss} | - | 120 | - | pF | |
| Gate Resistance | R_{g} | 0.26 | 1.3 | 2.34 | Ω | $\text{V}_{\text{DS}} = 0\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1\text{MHz}$ |
| Total Gate Charge $\text{V}_{\text{GS}} = 4.5\text{V}$ | Q_{g} | - | 19.3 | - | nC | $\text{V}_{\text{DS}} = 15\text{V}$, $\text{V}_{\text{GS}} = 10\text{V}$, $\text{I}_D = 10.4\text{A}$ |
| Total Gate Charge $\text{V}_{\text{GS}} = 10\text{V}$ | Q_{g} | - | 45.7 | - | nC | |
| Gate-Source Charge | Q_{gs} | - | 5.0 | - | nC | |
| Gate-Drain Charge | Q_{gd} | - | 2.9 | - | nC | |
| Turn-On Delay Time | $\text{t}_{\text{D(on)}}$ | - | 5.5 | - | ns | $\text{V}_{\text{GS}} = 10\text{V}$, $\text{V}_{\text{DS}} = 15\text{V}$, $\text{R}_{\text{G}} = 3\Omega$, $\text{R}_{\text{L}} = 1.2\Omega$ |
| Turn-On Rise Time | t_{r} | - | 24.4 | - | ns | |
| Turn-Off Delay Time | $\text{t}_{\text{D(off)}}$ | - | 33.1 | - | ns | |
| Turn-Off Fall Time | t_{f} | - | 6.6 | - | ns | |

Notes:

6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to production testing.

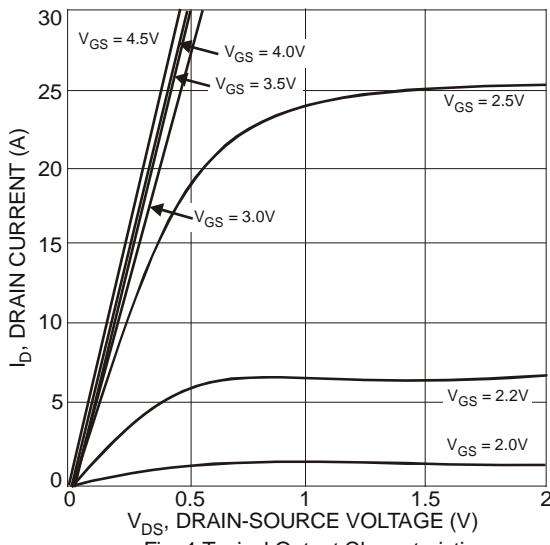


Fig. 1 Typical Output Characteristic

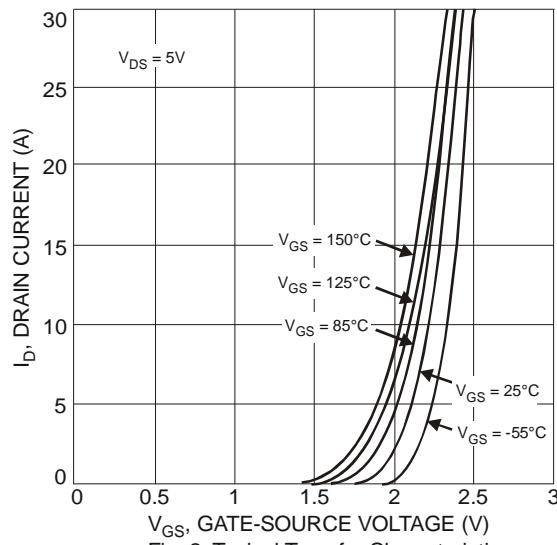


Fig. 2 Typical Transfer Characteristic

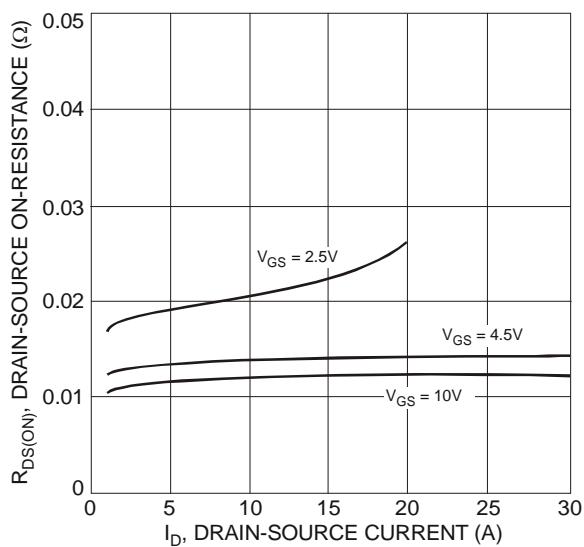


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

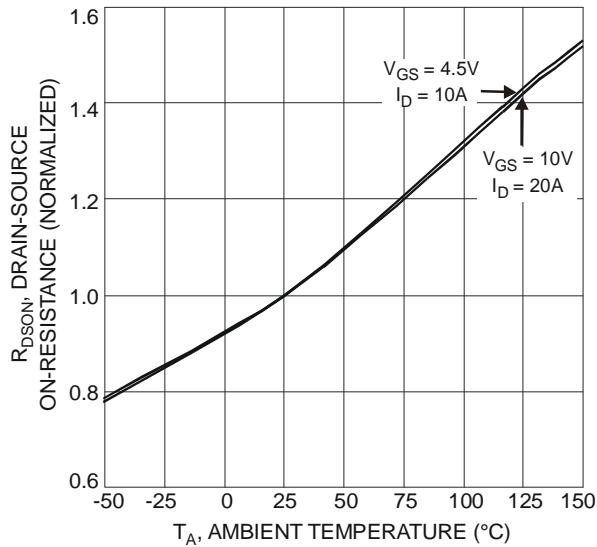


Fig. 5 On-Resistance Variation with Temperature

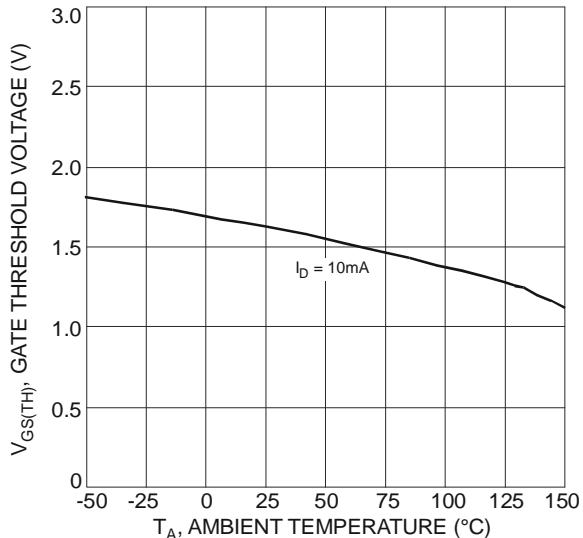


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

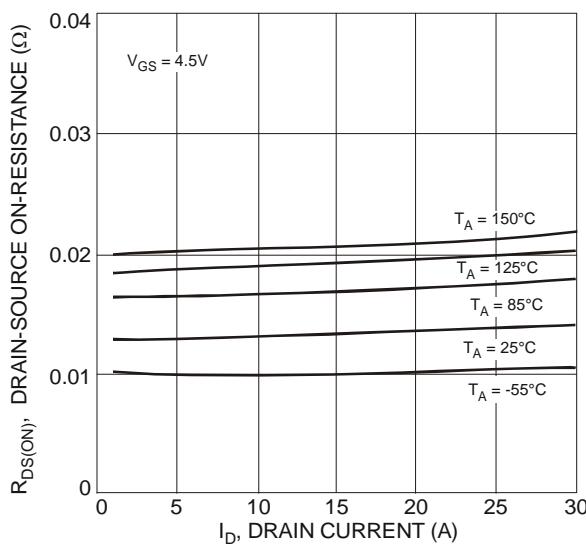


Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

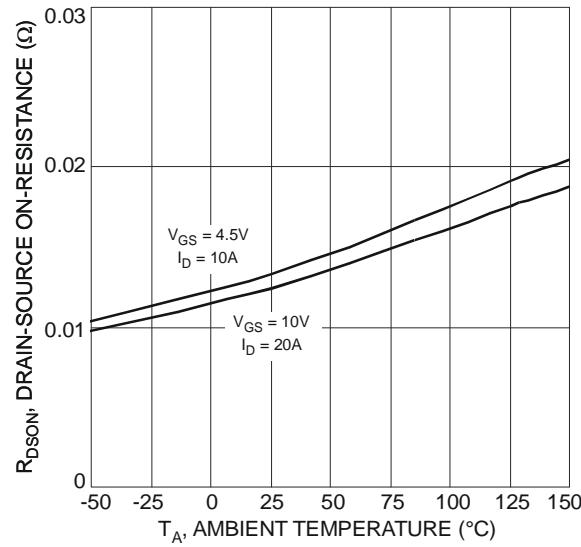


Fig. 6 On-Resistance Variation with Temperature

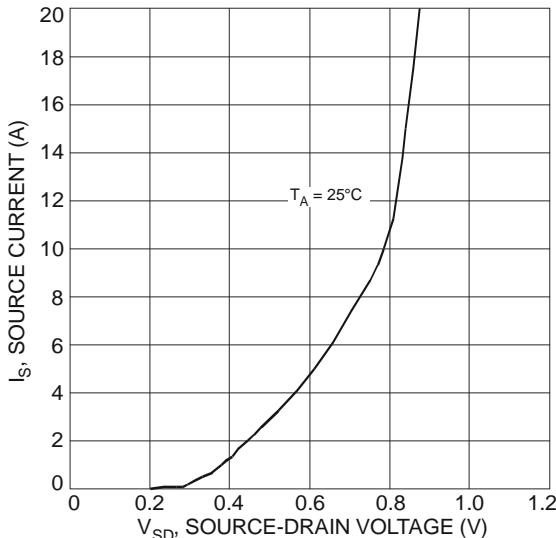
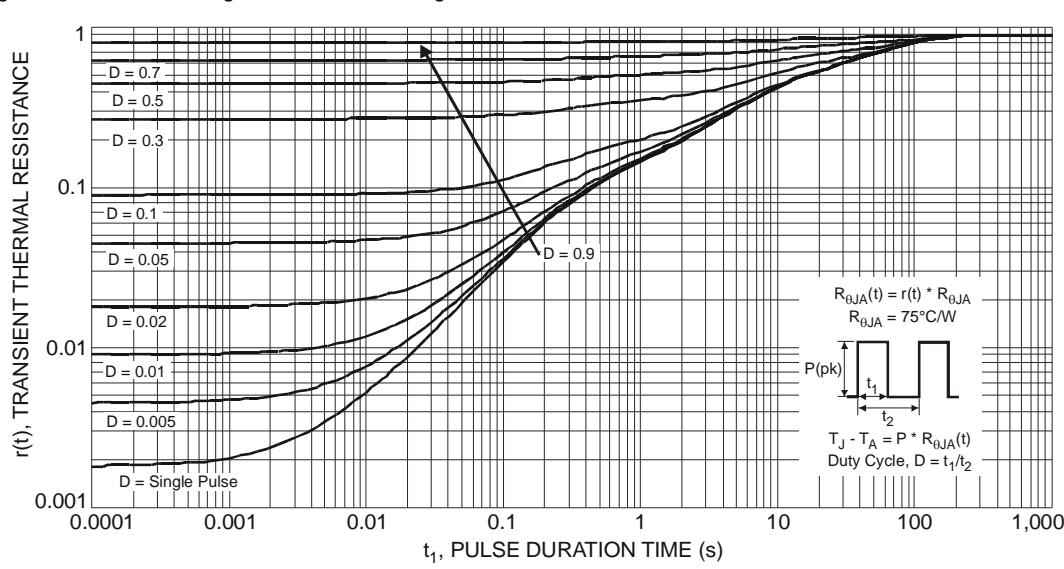
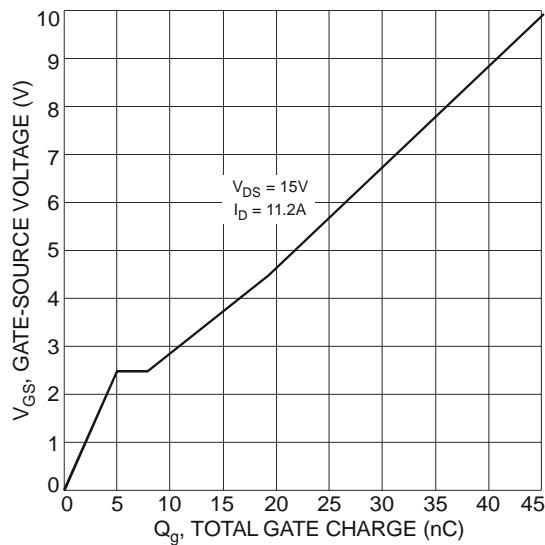
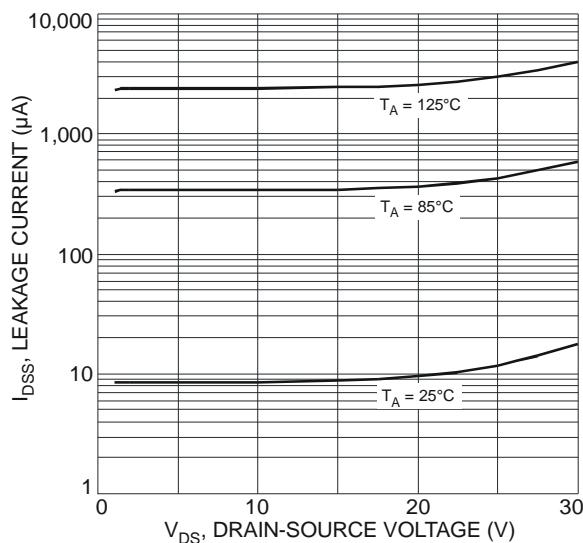
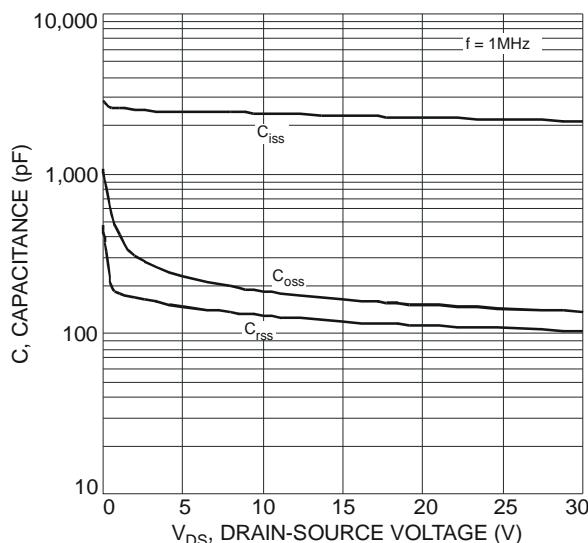


Fig. 8 Diode Forward Voltage vs. Current

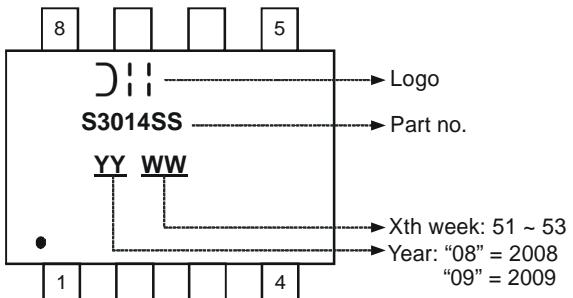


Ordering Information (Note 8)

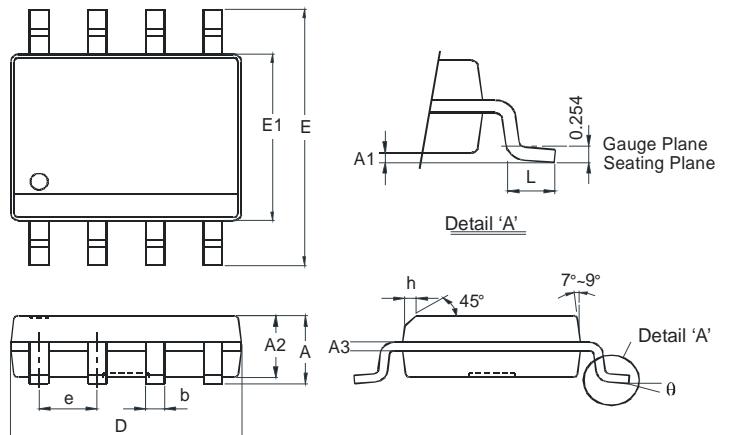
| Part Number | Case | Packaging |
|---------------|------|--------------------|
| DMS3014SSS-13 | SO-8 | 2500 / Tape & Reel |

Notes: 8. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information

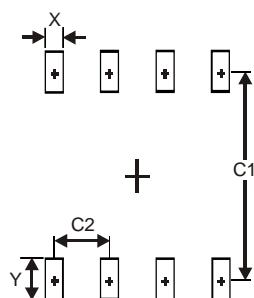


Package Outline Dimensions



| SO-8 | | |
|----------------------|----------|------|
| Dim | Min | Max |
| A | - | 1.75 |
| A1 | 0.10 | 0.20 |
| A2 | 1.30 | 1.50 |
| A3 | 0.15 | 0.25 |
| b | 0.3 | 0.5 |
| D | 4.85 | 4.95 |
| E | 5.90 | 6.10 |
| E1 | 3.85 | 3.95 |
| e | 1.27 Typ | |
| h | - | 0.35 |
| L | 0.62 | 0.82 |
| θ | 0° | 8° |
| All Dimensions in mm | | |

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| X | 0.60 |
| Y | 1.55 |
| C1 | 5.4 |
| C2 | 1.27 |

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