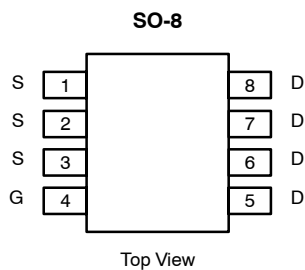


## P-Channel 30-V (D-S) MOSFET

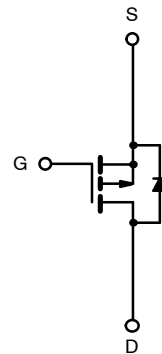
| PRODUCT SUMMARY |                           |           |
|-----------------|---------------------------|-----------|
| $V_{DS}$ (V)    | $r_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A) |
| -30             | 0.042 @ $V_{GS} = -10$ V  | -5.7      |
|                 | 0.055 @ $V_{GS} = -6$ V   | -5.0      |
|                 | 0.070 @ $V_{GS} = -4.5$ V | -4.4      |

### FEATURES

- TrenchFET® Power MOSFET



Ordering Information: Si9435BDY  
Si9435BDY-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  | $V_{DS}$       | -30                      |              | V                |   |
| Gate-Source Voltage   | $V_{GS}$       | $\pm 20$                 |              |                  |   |
| Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>         | $I_D$          | $T_A = 25^\circ\text{C}$ | -5.7         | -4.1             | A |
|   |                | $T_A = 70^\circ\text{C}$ | -4.6         | -3.2             |   |
| Pulsed Drain Current  | $I_{DM}$       | -30                      |              |                  |   |
| continuous Source Current (Diode Conduction) <sup>a</sup>                   | $I_S$          | -2.3                     | -1.1         |                  |   |
| Maximum Power Dissipation <sup>a</sup>                                      | $P_D$          | $T_A = 25^\circ\text{C}$ | 2.5          | 1.3              | W |
|   |                | $T_A = 70^\circ\text{C}$ | 1.6          | 0.8              |   |
| 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 | 40      | 50   | $^\circ\text{C/W}$ |
|  |            | Steady State    | 70      | 95   |                    |
| Maximum Junction-to-Foot (Drain)         | $R_{thJF}$ | 24              | 30      |      |                    |

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 <sup>a</sup> | 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  | -1.0                                      |                  | -3.0  | V    |
| Gate-Body Leakage  | I <sub>GSS</sub>    | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V  |   |                  | ±100  | nA   |
| Zero Gate Voltage Drain Current                                | I <sub>DSS</sub>    | V <sub>DS</sub> = -30 V, V <sub>GS</sub> = 0 V  |   |                  | -1    | μA   |
|  |                     | V <sub>DS</sub> = -30 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 70 °C  |   |                  | -5    |      |
| On-State Drain Current <sup>b</sup>                            | I <sub>D(on)</sub>  | V <sub>DS</sub> ≤ -10 V, V <sub>GS</sub> = -10 V  | -20                                       |                  |       | A    |
|  |                     | V <sub>DS</sub> ≤ -5 V, V <sub>GS</sub> = -4.5 V  | -5  |                  |       |      |
| Drain-Source On-State Resistance <sup>b</sup>                  | r <sub>DS(on)</sub> | V <sub>GS</sub> = -10 V, I <sub>D</sub> = -5.7 A  |   | 0.033            | 0.042 | Ω    |
|  |                     | V <sub>GS</sub> = -6 V, I <sub>D</sub> = -5 A   |   | 0.043            | 0.055 |      |
|  |                     | V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -4.4 A   |   | 0.056            | 0.070 |      |
| Forward Transconductance <sup>b</sup>                          | g <sub>fs</sub>     | V <sub>DS</sub> = -15 V, I <sub>D</sub> = -5.7 A  |   | 13               |       | S    |
| Diode Forward Voltage <sup>b</sup>                             | V <sub>SD</sub>     | I <sub>S</sub> = -2.3 A, V <sub>GS</sub> = 0 V  |   | -0.8             | -1.1  | V    |
| <b>Dynamic<sup>a</sup></b>                                     |                     |   |   |                  |       |      |
| Total Gate Charge  | Q <sub>g</sub>      | V <sub>DS</sub> = -15 V, V <sub>GS</sub> = -10 V, I <sub>D</sub> = -3.5 A   |   | 16               | 24    | nC   |
| Gate-Source Charge   | Q <sub>gs</sub>     |   | 2.3                                       |                  |       |      |
| Gate-Drain Charge  | Q <sub>gd</sub>     |   | 4.5                                       |                  |       |      |
| Gate Resistance  | R <sub>g</sub>      |   |   | 8.8              |       | Ω    |
| Turn-On Delay Time   | t <sub>d(on)</sub>  | V <sub>DD</sub> = -15 V, R <sub>L</sub> = 15 Ω<br>I <sub>D</sub> ≅ -1 A, V <sub>GEN</sub> = -10 V, R <sub>G</sub> = 6 Ω |   | 14               | 25    | ns   |
| Rise Time  | t <sub>r</sub>      |   |   | 14               | 25    |      |
| Turn-Off Delay Time  | t <sub>d(off)</sub> |   |   | 42               | 70    |      |
| Fall Time  | t <sub>f</sub>      |   |   | 30               | 50    |      |
| Source-Drain Reverse Recovery Time                             | t <sub>rr</sub>     |   | I <sub>F</sub> = -1.2 A, di/dt = 100 A/μs |                  | 30    |      |

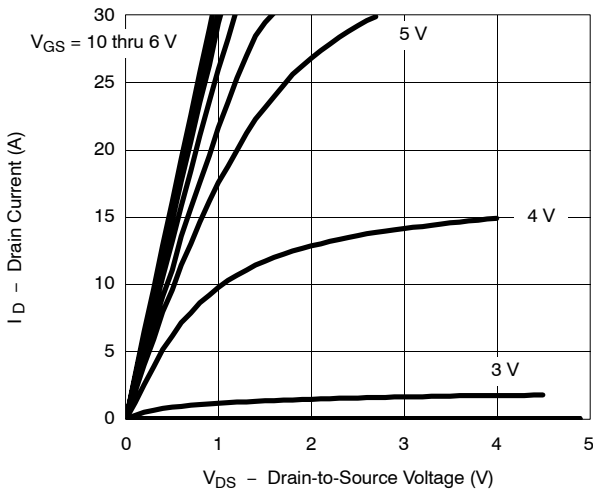
## Notes

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

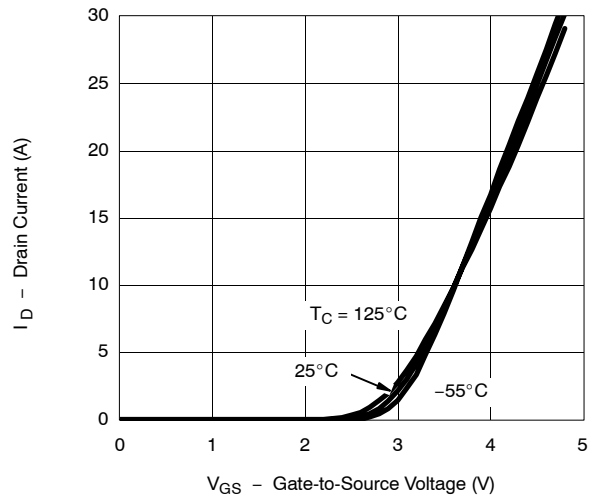


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

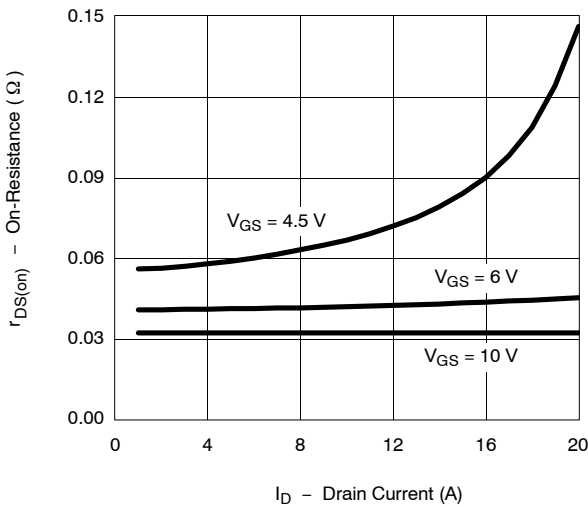
Output Characteristics



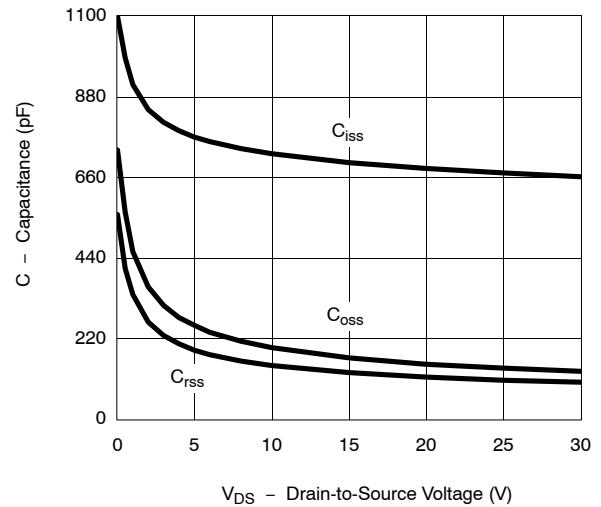
Transfer Characteristics



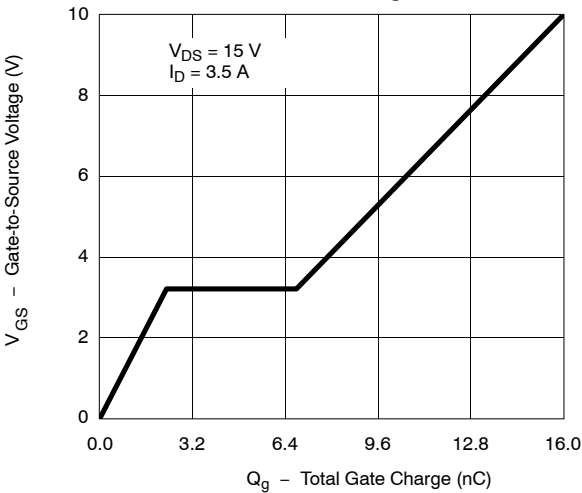
On-Resistance vs. Drain Current



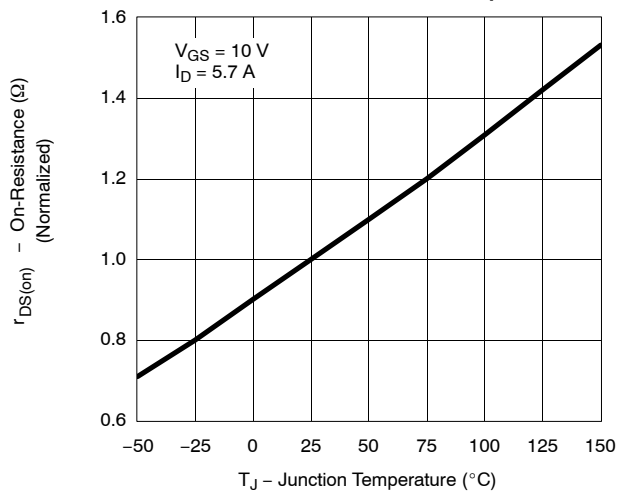
Capacitance



Gate Charge

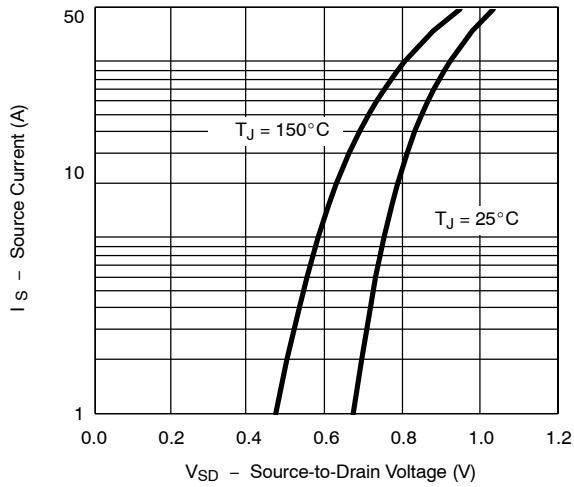


On-Resistance vs. Junction Temperature

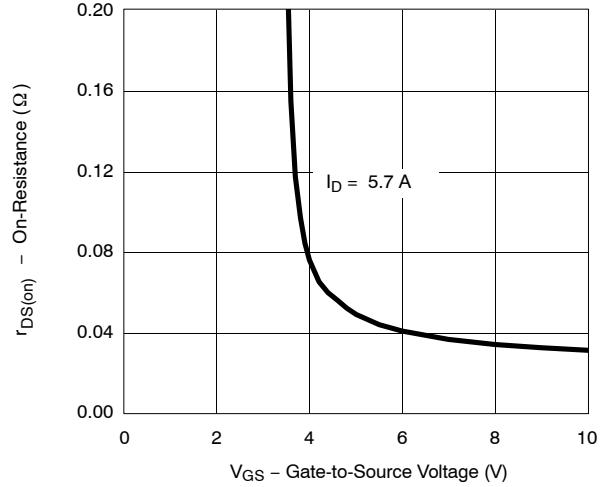


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

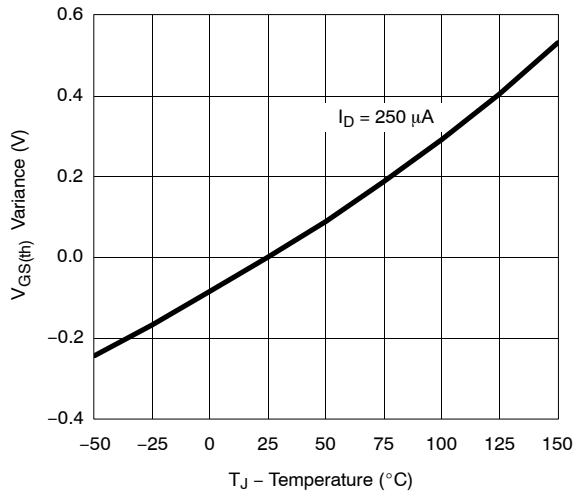
Source-Drain Diode Forward Voltage



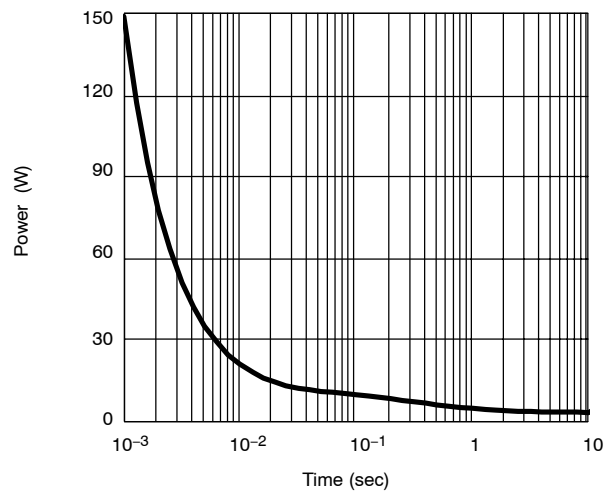
On-Resistance vs. Gate-to-Source Voltage



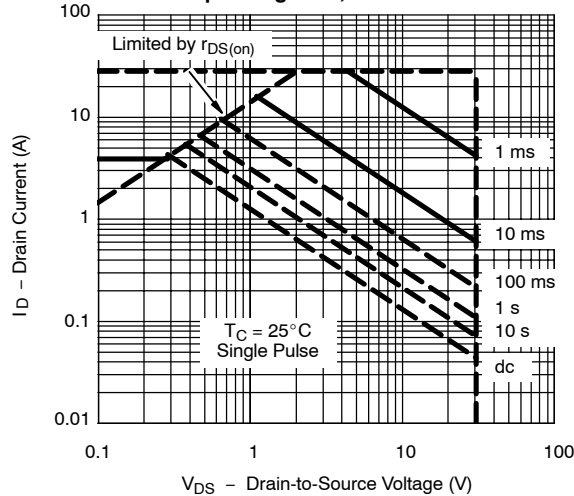
Threshold Voltage



Single Pulse Power, Junction-to-Ambient



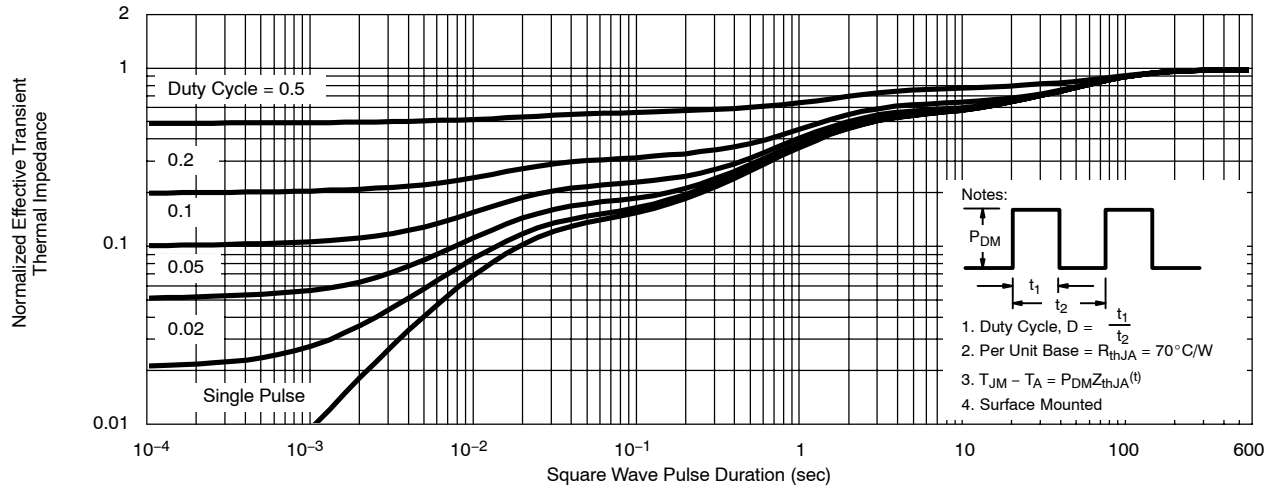
Safe Operating Area, Junction-to-Foot





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

Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

