



## N-Channel 150-V (D-S) MOSFET

## PRODUCT SUMMARY

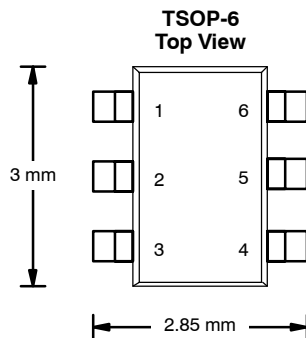
| $V_{DS}$ (V) | $r_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A) |
|--------------|---------------------------|-----------|
| 150          | 0.375 @ $V_{GS} = 10$ V   | 1.5       |
|              | 0.400 @ $V_{GS} = 6.0$ V  | 1.4       |

## FEATURES

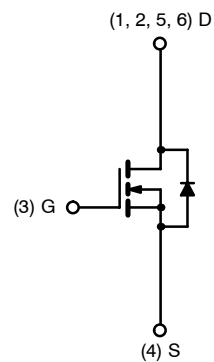
- TrenchFET® Power MOSFET
- PWM Optimized for Fast Switching In Small Footprint
- 100%  $R_g$  Tested

## APPLICATIONS

- Primary Side Switch for Low Power DC/DC Converters



Ordering Information: Si3440DV-T1—E3



N-Channel MOSFET

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

| Parameter                                                      |                       | Symbol                            | 5 secs     | Steady State | Unit |
|----------------------------------------------------------------|-----------------------|-----------------------------------|------------|--------------|------|
| Drain-Source Voltage                                           |                       | V <sub>DS</sub>                   | 150        |              | V    |
| Gate-Source Voltage                                            |                       | V <sub>GS</sub>                   | ± 20       |              |      |
| Continuous Drain Current (T <sub>J</sub> = 175°C) <sup>a</sup> | T <sub>A</sub> = 25°C | I <sub>D</sub>                    | 1.5        | 1.2          | A    |
|                                                                | T <sub>A</sub> = 85°C |                                   | 1.1        | 0.8          |      |
| Pulsed Drain Current                                           |                       | I <sub>DM</sub>                   | 6          |              |      |
| Single Avalanche Current                                       | L = 0.1 mH            | I <sub>AS</sub>                   | 4          |              |      |
| Single Avalanche Energy (Duty Cycle ≤ 1%)                      |                       | E <sub>AS</sub>                   | 0.8        |              | mJ   |
| Continuous Source Current (Diode Conduction) <sup>a</sup>      |                       | I <sub>S</sub>                    | 1.7        | 1.0          | A    |
| Maximum Power Dissipation <sup>a</sup>                         | T <sub>A</sub> = 25°C | P <sub>D</sub>                    | 2.0        | 1.14         | W    |
|                                                                | T <sub>A</sub> = 85°C |                                   | 1.0        | 0.59         |      |
| Operating Junction and Storage Temperature Range               |                       | T <sub>J</sub> , T <sub>stg</sub> | -55 to 150 |              | °C   |

## THERMAL RESISTANCE RATINGS

| Parameter                                |                | Symbol     | Typical | Maximum | Unit               |
|------------------------------------------|----------------|------------|---------|---------|--------------------|
| Maximum Junction-to-Ambient <sup>a</sup> | $t \leq 5$ sec | $R_{thJA}$ | 45      | 62.5    | $^\circ\text{C/W}$ |
|                                          | Steady State   |            | 90      | 110     |                    |
| Maximum Junction-to-Foot (Drain)         | Steady State   | $R_{thJF}$ | 25      | 30      |                    |

Notes

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

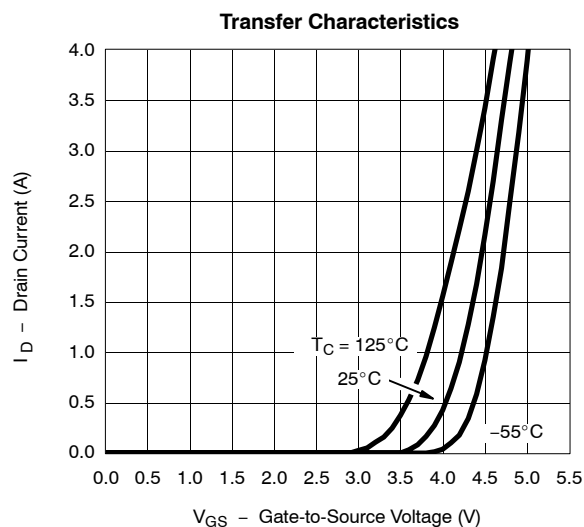
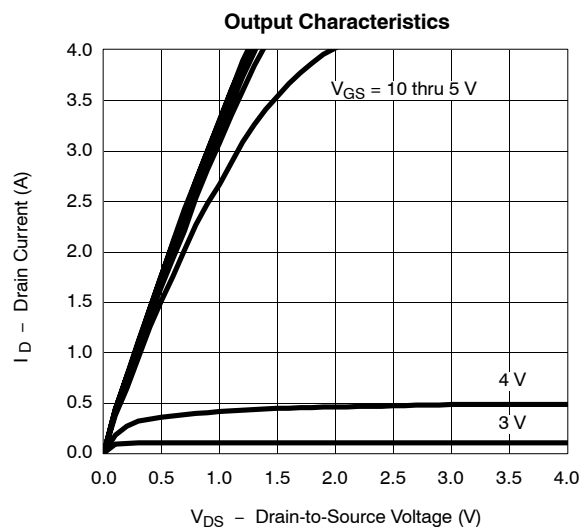
**SPECIFICATIONS ( $T_J = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)**

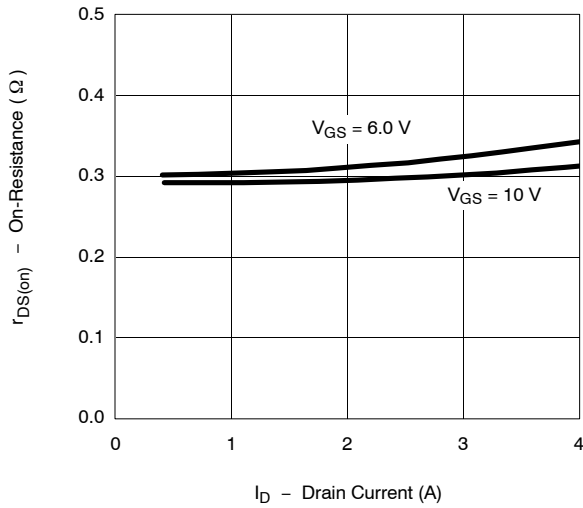
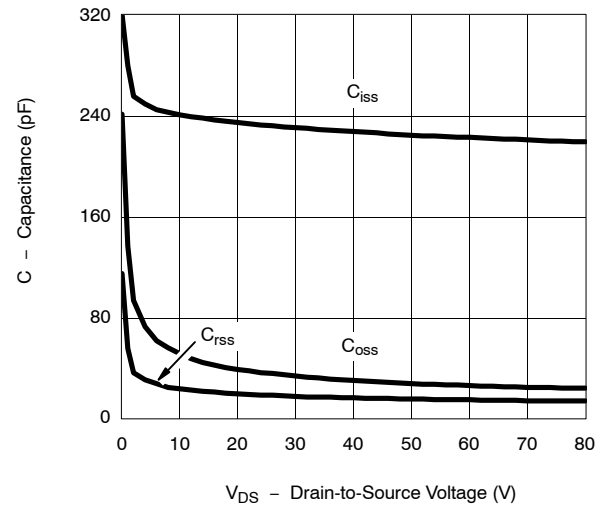
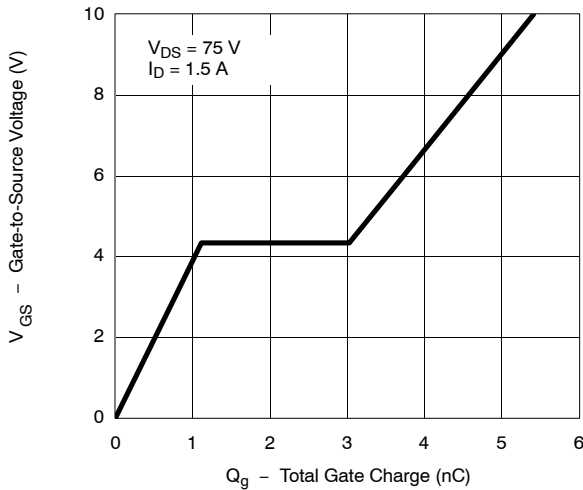
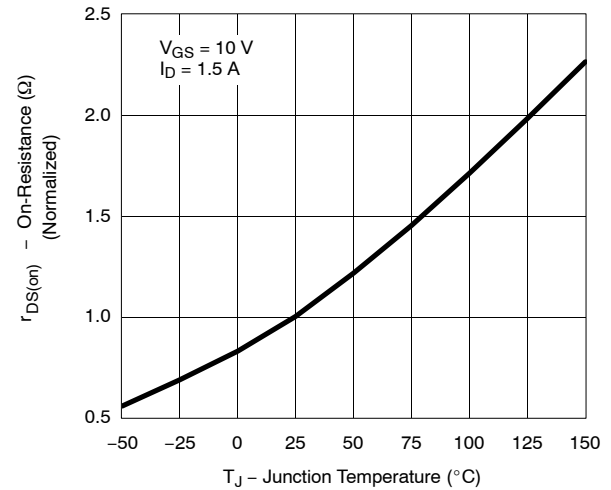
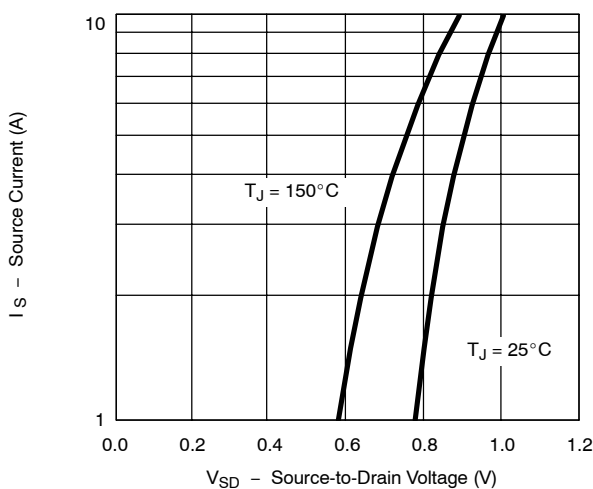
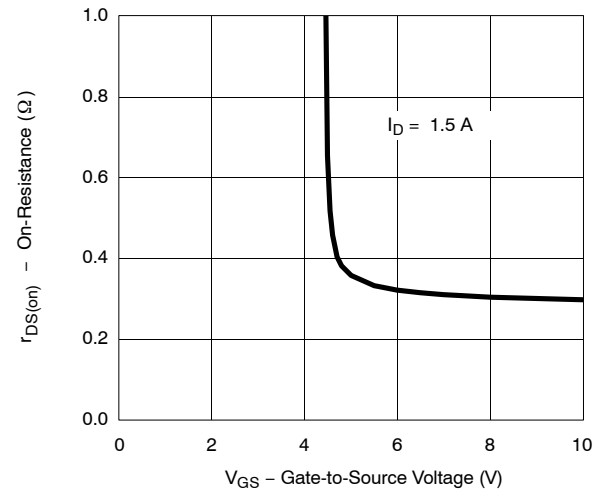
| Parameter                                     | Symbol       | Test Condition                                                                                                         | Min | Typ   | Max       | Unit          |
|-----------------------------------------------|--------------|------------------------------------------------------------------------------------------------------------------------|-----|-------|-----------|---------------|
| <b>Static</b>                                 |              |                                                                                                                        |     |       |           |               |
| Gate Threshold Voltage                        | $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250\ \mu\text{A}$                                                                           | 2   |       | 4         | 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               | $I_{DSS}$    | $V_{DS} = 150\ \text{V}$ , $V_{GS} = 0\ \text{V}$                                                                      |     |       | 1         | $\mu\text{A}$ |
|                                               |              | $V_{DS} = 150\ \text{V}$ , $V_{GS} = 0\ \text{V}$ , $T_J = 85^\circ\text{C}$                                           |     |       | 5         |               |
| On-State Drain Current <sup>a</sup>           | $I_{D(on)}$  | $V_{DS} \geq 5\ \text{V}$ , $V_{GS} = 10\ \text{V}$                                                                    | 4   |       |           | A             |
| Drain-Source On-State Resistance <sup>a</sup> | $r_{DS(on)}$ | $V_{GS} = 10\ \text{V}$ , $I_D = 1.5\ \text{A}$                                                                        |     | 0.310 | 0.375     | $\Omega$      |
|                                               |              | $V_{GS} = 6.0\ \text{V}$ , $I_D = 1.4\ \text{A}$                                                                       |     | 0.330 | 0.400     |               |
| Forward Transconductance <sup>a</sup>         | $g_{fs}$     | $V_{DS} = 15\ \text{V}$ , $I_D = 1.5\ \text{A}$                                                                        |     | 4.1   |           | S             |
| Diode Forward Voltage <sup>a</sup>            | $V_{SD}$     | $I_S = 1.7\ \text{A}$ , $V_{GS} = 0\ \text{V}$                                                                         |     | 0.8   | 1.2       | V             |
| <b>Dynamic<sup>b</sup></b>                    |              |                                                                                                                        |     |       |           |               |
| Total Gate Charge                             | $Q_g$        | $V_{DS} = 75\ \text{V}$ , $V_{GS} = 10\ \text{V}$ , $I_D = 1.5\ \text{A}$                                              |     | 5.4   | 8         | nC            |
| Gate-Source Charge                            | $Q_{gs}$     |                                                                                                                        |     | 1.1   |           |               |
| Gate-Drain Charge                             | $Q_{gd}$     |                                                                                                                        |     | 1.9   |           |               |
| Gate Resistance                               | $R_g$        | $f = 1\ \text{MHz}$                                                                                                    | 4   | 9     | 15        | $\Omega$      |
| Turn-On Delay Time                            | $t_{d(on)}$  | $V_{DD} = 75\ \text{V}$ , $R_L = 75\ \Omega$<br>$I_D \cong 1\ \text{A}$ , $V_{GEN} = 10\ \text{V}$ , $R_G = 6\ \Omega$ |     | 8     | 15        | ns            |
| Rise Time                                     | $t_r$        |                                                                                                                        |     | 10    | 15        |               |
| Turn-Off Delay Time                           | $t_{d(off)}$ |                                                                                                                        |     | 20    | 30        |               |
| Fall Time                                     | $t_f$        |                                                                                                                        |     | 15    | 25        |               |
| Source-Drain Reverse Recovery Time            | $t_{rr}$     | $I_F = 1.7\ \text{A}$ , $di/dt = 100\ \text{A}/\mu\text{s}$                                                            |     | 40    | 60        | ns            |

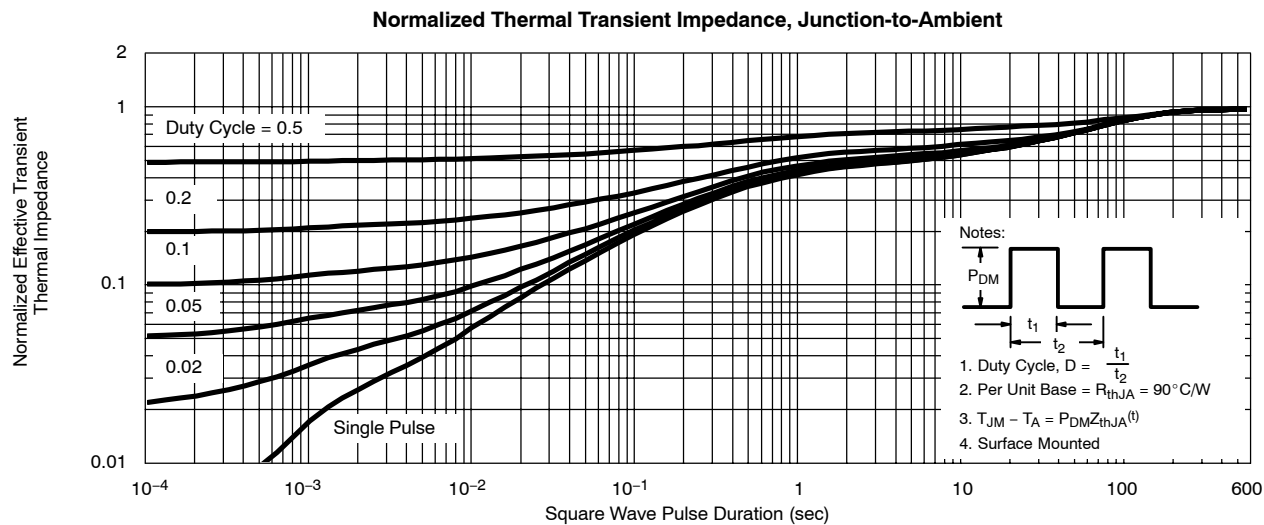
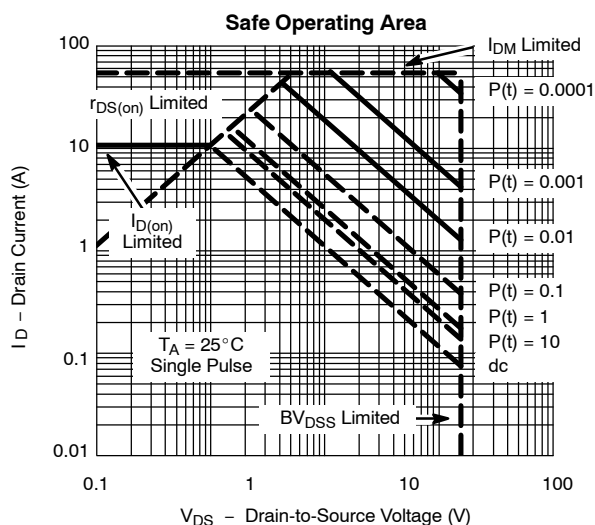
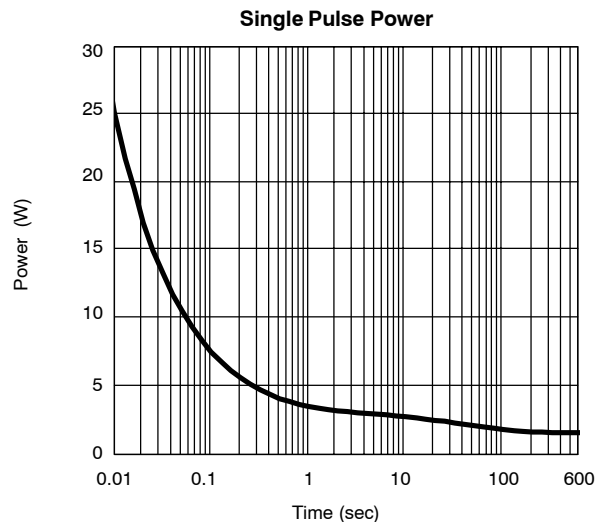
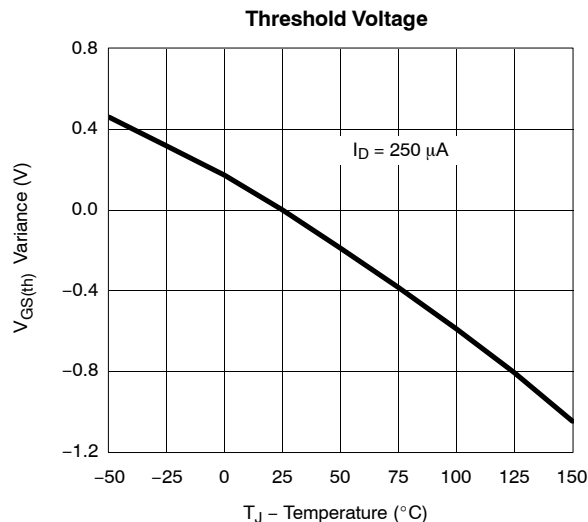
## Notes

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)****On-Resistance vs. Drain Current****Capacitance****Gate Charge****On-Resistance vs. Junction Temperature****Source-Drain Diode Forward Voltage****On-Resistance vs. Gate-to-Source Voltage**

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




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