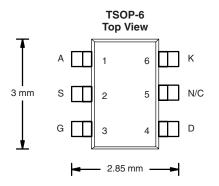


Vishay Siliconix

# P-Channel 30-V (D-S) MOSFET with Schottky Diode

| PRODUCT SUMMARY     |                                    |                    |  |  |  |
|---------------------|------------------------------------|--------------------|--|--|--|
| V <sub>DS</sub> (V) | <b>R<sub>DS(on)</sub> (</b> Ω)     | I <sub>D</sub> (A) |  |  |  |
| - 30                | 0.200 at V <sub>GS</sub> = - 10 V  | ± 1.8              |  |  |  |
|                     | 0.360 at V <sub>GS</sub> = - 4.5 V | ± 1.2              |  |  |  |

| SCHOTTKY PRODUCT SUMMARY |   |                    |  |  |  |  |
|--------------------------|---|--------------------|--|--|--|--|
| V <sub>KA</sub> (V)      | V <sub>F</sub> (V)<br>Diode Forward Voltage | I <sub>F</sub> (A) |  |  |  |  |
| 30                       | 0.5 V at 0.5 A                              | 0.5                |  |  |  |  |



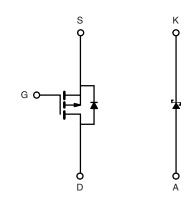
#### Ordering Information: Si3851DV-T1-E3 (Lead (Pb)-free) Si3851DV-T1-GE3 (Lead (Pb)-free and Halogen-free)

#### **FEATURES**

- Halogen-free According to IEC 61249-2-21
  Definition
- LITTLE FOOT<sup>®</sup> Plus
- Compliant to RoHS Directive 2002/95/EC



COMPLIANT HALOGEN FREE Available



P-Channel MOSFET

| Parameter  |                                   | Symbol          | 5 s    | Steady State | Unit |
|--|-----------------------------------|-----------------|--------|--------------|------|
| Drain-Source Voltage (MOSFET and Schottky)                               |                                   | V <sub>DS</sub> | - 30   |              |      |
| Reverse Voltage (Schottky)   |                                   | V <sub>KA</sub> | 30     |              | V    |
| Gate-Source Voltage (MOSFET)   |                                   | V <sub>GS</sub> | ± 20   | ± 20         |      |
|  | T <sub>A</sub> = 25 °C            | 1-              | ± 1.8  | ± 1.6        |      |
| Continuous Drain Current (T <sub>J</sub> = 150 °C) (MOSFET) <sup>a</sup> | T <sub>A</sub> = 70 °C            | I <sub>D</sub>  | ± 1.5  | ± 1.2        |      |
| Pulsed Drain Current (MOSFET)  |                                   | I <sub>DM</sub> | ±7     |              | •    |
| Continuous Source Current (MOSFET Diode Conduction) <sup>a</sup>         |                                   | I <sub>S</sub>  | - 1.05 | - 0.75       | A    |
| Average Forward Current (Schottky)                                       |                                   | ١ <sub>F</sub>  | 0.5    |              |      |
| Pulsed Foward Current (Schottky)   |                                   | I <sub>FM</sub> | 7      |              |      |
|  | T <sub>A</sub> = 25 °C            |                 | 1.15   | 0.83         | W    |
| Maximum Power Dissipation (MOSFET) <sup>a</sup>                          | T <sub>A</sub> = 70 °C            |                 | 0.73   | 0.53         |      |
|  | T <sub>A</sub> = 25 °C            | P <sub>D</sub>  | 1.0    | 0.76         | vv   |
| Maximum Power Dissipation (Schottky) <sup>a</sup>                        | T <sub>A</sub> = 70 °C            | [               | 0.64   | 0.48         |      |
| Operating Junction and Storage Temperature Range                         | T <sub>J</sub> , T <sub>stg</sub> | - 55 to 150     |        | °C           |      |

Notes:

a. Surface mounted on 1" x 1" FR4 board.

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| THERMAL RESISTANCE RATINGS |              |          |                   |         |         |      |  |
|----------------------------|--------------|----------|-------------------|---------|---------|------|--|
| Parameter                  |              | Device   | Symbol            | Typical | Maximum | Unit |  |
| Junction-to-Ambient        | $t \le 5 s$  | MOSFET   | R <sub>thJA</sub> | 93      | 110     |      |  |
|                            |              | Schottky |                   | 103     | 125     |      |  |
|                            | Steady State | MOSFET   |                   | 130     | 150     | °C/W |  |
|                            |              | Schottky |                   | 140     | 165     | 0/00 |  |
| Junction-to-Foot           | Steady State | MOSFET   | R <sub>thJF</sub> | 75      | 90      |      |  |
|                            |              | Schottky |                   | 80      | 95      | ]    |  |

| Parameter                                     | Symbol              | Test Conditions Min.  |     | Тур.   | Max.   | Unit |
|---|---------------------|---|-----|--------|--------|------|
| Static  |                     |   |     |        |        |      |
| Gate Threshold Voltage                        | V <sub>GS(th)</sub> | $V_{DS} = V_{GS}, I_{D} = -250 \ \mu A$                                     | - 1 |        |        | V    |
| Gate-Body Leakage                             | I <sub>GSS</sub>    | $V_{DS} = 0 V, V_{GS} = \pm 20 V$   |     |        | ± 100  | nA   |
| Zaus Osta Malta da Dusia Ourrant              |                     | $V_{DS} = -24 V, V_{GS} = 0 V$  | -1  |        | - 1    |      |
| Zero Gate Voltage Drain Current               | I <sub>DSS</sub>    | $V_{DS}$ = - 24 V, $V_{GS}$ = 0 V, $T_{J}$ = 75 °C                          |     |        | - 10   | μA   |
| On-State Drain Current <sup>a</sup>           | I <sub>D(on)</sub>  | $V_{DS} \ge -5 V, V_{GS} = -10 V$   | - 5 |        |        | Α    |
| Drain Source On State Desistance              | R <sub>DS(on)</sub> | V <sub>GS</sub> = - 10 V, I <sub>D</sub> = - 1.8 A                          |     | 0.165  | 0.200  | 0    |
| Drain-Source On-State Resistance <sup>a</sup> |                     | V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 1.2 A                         |     | 0.298  | 0.360  | Ω    |
| Forward Transconductance <sup>a</sup>         | 9 <sub>fs</sub>     | V <sub>DS</sub> = - 15 V, I <sub>D</sub> = - 1.8 A                          |     | 2.4    |        | S    |
| Diode Forward Voltage <sup>a</sup>            | V <sub>SD</sub>     | I <sub>S</sub> = - 1.05 V, V <sub>GS</sub> = 0 V                            |     | - 0.83 | - 1.10 | V    |
| Dynamic <sup>b</sup>                          |                     |   |     |        |        |      |
| Total Gate Charge                             | Qg                  |   |     | 2.4    | 3.6    |      |
| Gate-Source Charge                            | Q <sub>gs</sub>     | V <sub>DS</sub> = - 15 V, V <sub>GS</sub> = - 5 V, I <sub>D</sub> = - 1.8 A |     | 0.9    |        | nC   |
| Gate-Drain Charge                             | Q <sub>gd</sub>     |   |     | 0.8    |        |      |
| Turn-On Delay Time                            | t <sub>d(on)</sub>  |   |     | 8      | 12     |      |
| Rise Time                                     | t <sub>r</sub>      | $V_{DD}$ = - 15 V, R <sub>L</sub> = 15 Ω                                    |     | 12     | 18     | 1    |
| Turn-Off DelayTime                            | t <sub>d(off)</sub> | $I_D \cong$ - 1 Å, $V_{GEN}$ = - 10 V, $R_g$ = 6 $\Omega$                   |     | 12     | 18     | ns   |
| Fall Time                                     | t <sub>f</sub>      | 1   |     | 7      | 11     |      |
| Body Diode Reverse Recovery Time              | t <sub>rr</sub>     | I <sub>F</sub> = - 1.05 A, dl/dt = 100 A/μs                                 |     | 30     | 60     |      |

Notes:

a. Pulse test; pulse width  $\leq$  300 µs, duty cycle  $\leq$  2 %.

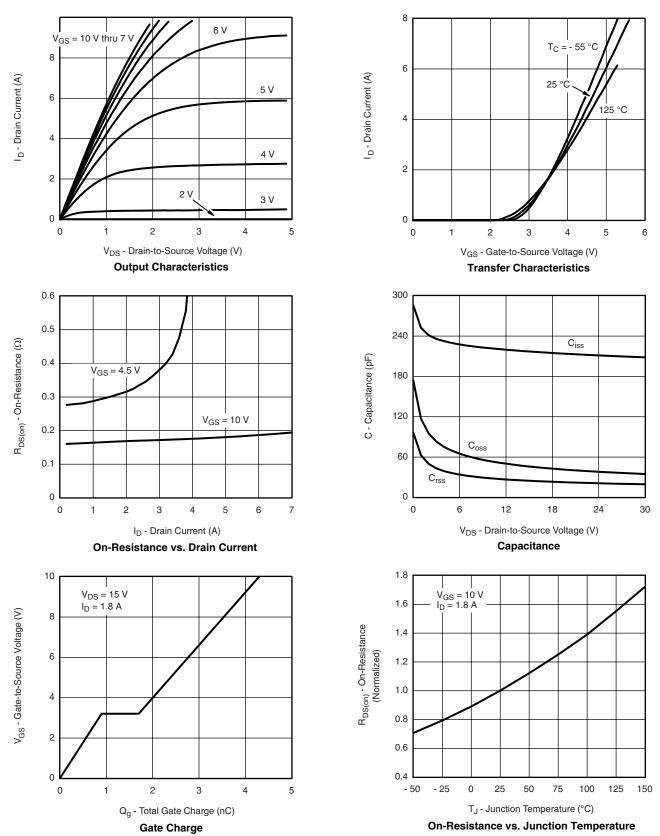
b. Guaranteed by design, not subject to production testing.

| <b>SCHOTTKY SPECIFICATIONS</b> $T_J = 25 \text{ °C}$ , unless otherwise noted |                 |   |      |       |       |      |  |  |
|---|-----------------|---|------|-------|-------|------|--|--|
| Parameter   | Symbol          | Test Conditions                                 | Min. | Тур.  | Max.  | Unit |  |  |
| Forward Voltage Drop  | V <sub>F</sub>  | I <sub>F</sub> = 0.5 A                          |      | 0.45  | 0.5   | V    |  |  |
|   |                 | I <sub>F</sub> = 0.5 A, T <sub>J</sub> = 125 °C |      | 0.35  | 0.4   | v    |  |  |
| Maximum Reverse Leakage Current   |                 | V <sub>R</sub> = 30 V                           |      | 0.002 | 0.100 |      |  |  |
|   | I <sub>rm</sub> | V <sub>R</sub> = 30 V, T <sub>J</sub> = 75 °C   |      | 0.06  | 1     | mA   |  |  |
|   |                 | V <sub>R</sub> = 30 V, T <sub>J</sub> = 125 °C  |      | 1.5   | 10    |      |  |  |
| Junction Capacitance  | CT              | V <sub>R</sub> = 10 V                           |      | 24    |       | pF   |  |  |

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.



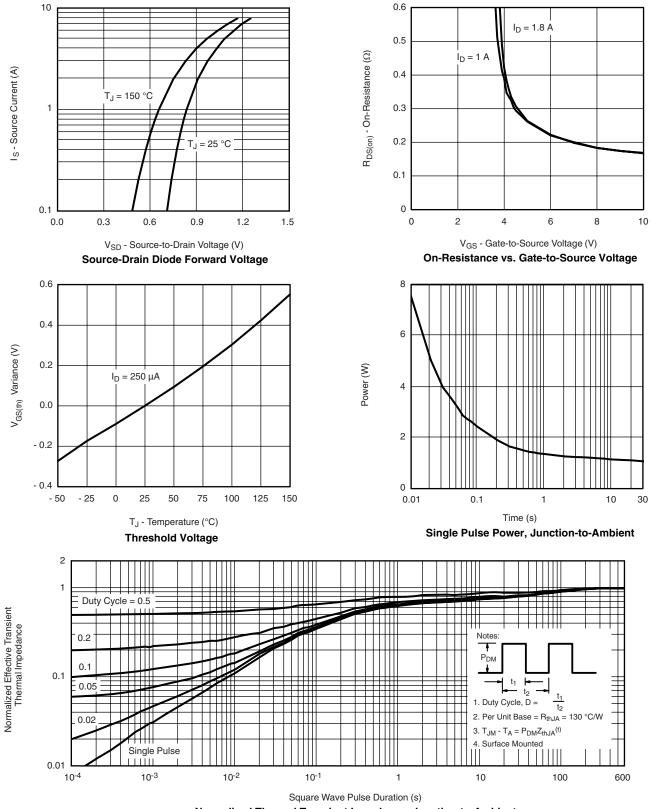
#### **MOSFET TYPICAL CHARACTERISTICS** $T_A = 25$ °C, unless otherwise noted



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### **MOSFET TYPICAL CHARACTERISTICS** $T_A = 25$ °C, unless otherwise noted



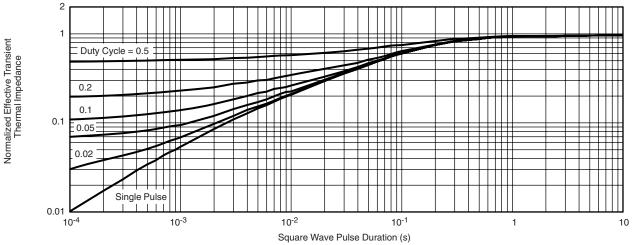
Normalized Thermal Transient Impedance, Junction-to-Ambient



# Si3851DV

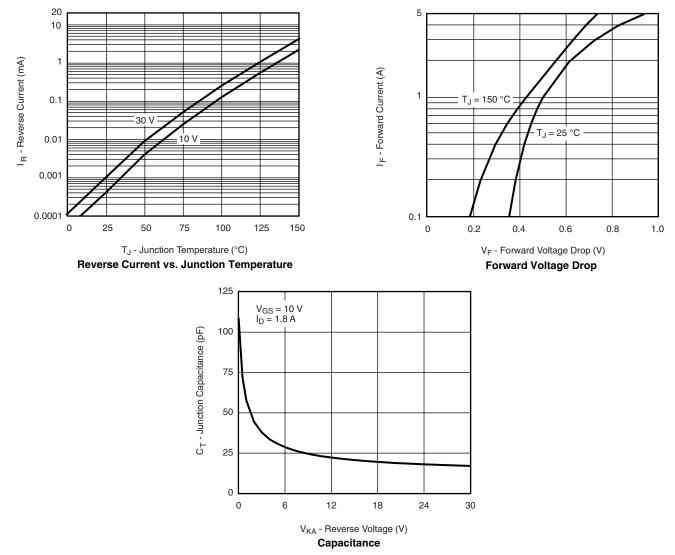
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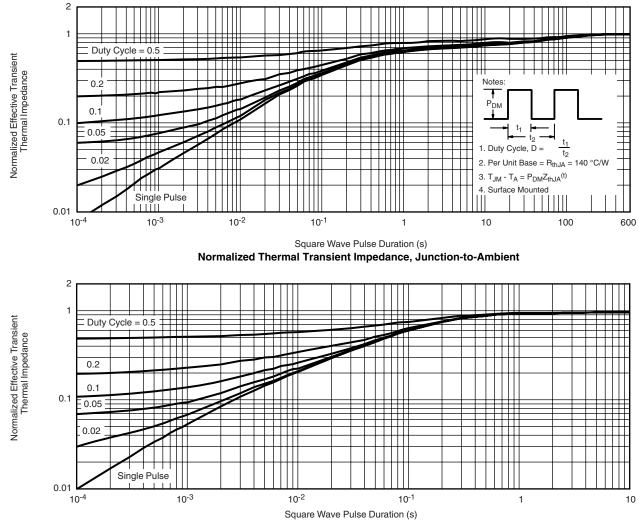












#### SCHOTTKY TYPICAL CHARACTERISTICS $T_A = 25 \text{ °C}$ , unless otherwise noted

Normalized Thermal Transient Impedance, Junction-to-Foot

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