

## Dual N-Channel 30-V (D-S) MOSFET

### PRODUCT SUMMARY

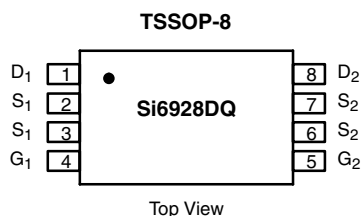
| $V_{DS}$ (V) | $R_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A) |
|--------------|---------------------------|-----------|
| 30           | 0.035 at $V_{GS} = 10$ V  | $\pm 4.0$ |
|              | 0.050 at $V_{GS} = 4.5$ V | $\pm 3.4$ |

### FEATURES

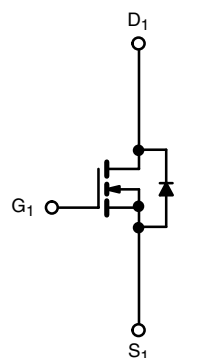
- Halogen-free Option Available



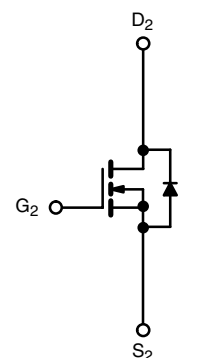
**RoHS\***  
COMPLIANT



**Ordering Information:** Si6928DQ-T1  
Si6928DQ-T1-GE3 (Lead (Pb)-free and Halogen-free)



N-Channel MOSFET



N-Channel MOSFET

### ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted

| Parameter                                                 | Symbol         | Limit       | Unit |
|-----------------------------------------------------------|----------------|-------------|------|
| Drain-Source Voltage                                      | $V_{DS}$       | 30          | V    |
| Gate-Source Voltage                                       | $V_{GS}$       | $\pm 20$    |      |
| Continuous Drain Current ( $T_J = 150$ °C) <sup>a</sup>   | $I_D$          | $\pm 4.0$   | A    |
|                                                           |                | $\pm 3.2$   |      |
| Pulsed Drain Current                                      | $I_{DM}$       | $\pm 20$    |      |
| Continuous Source Current (Diode Conduction) <sup>a</sup> | $I_S$          | 1.25        | W    |
| Maximum Power Dissipation <sup>a</sup>                    | $P_D$          | 1.0         |      |
|                                                           |                | 0.64        |      |
| Operating Junction and Storage Temperature Range          | $T_J, T_{stg}$ | - 55 to 150 | °C   |

### THERMAL RESISTANCE RATINGS

| Parameter                                | Symbol     | Limit | Unit |
|------------------------------------------|------------|-------|------|
| Maximum Junction-to-Ambient <sup>a</sup> | $R_{thJA}$ | 125   | °C/W |

Notes:

a. Surface Mounted on FR4 board,  $t \leq 10$  s.

For SPICE model information via the Worldwide Web: <http://www.vishay.com/www/product/spice.htm>.

\* Pb containing terminations are not RoHS compliant, exemptions may apply.

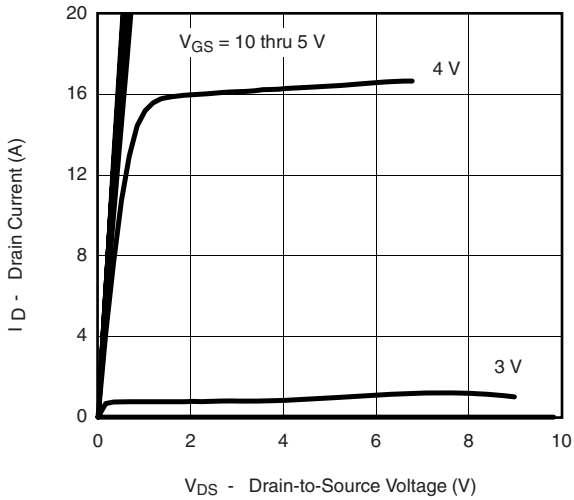
| <b>SPECIFICATIONS</b> $T_J = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted |              |                                                                                                                                |      |       |           |               |
|-----------------------------------------------------------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------|------|-------|-----------|---------------|
| Parameter                                                                         | Symbol       | Test Conditions                                                                                                                | Min. | Typ.  | Max.      | Unit          |
| <b>Static</b>                                                                     |              |                                                                                                                                |      |       |           |               |
| Gate Threshold Voltage                                                            | $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250\text{ }\mu\text{A}$                                                                             | 1.0  |       |           | 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                                                   | $I_{DSS}$    | $V_{DS} = 30\text{ V}$ , $V_{GS} = 0\text{ V}$                                                                                 |      |       | 1         | $\mu\text{A}$ |
|                                                                                   |              | $V_{DS} = 30\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 55\text{ }^{\circ}\text{C}$                                            |      |       | 5         |               |
| On-State Drain Current <sup>a</sup>                                               | $I_{D(on)}$  | $V_{DS} \geq 5\text{ V}$ , $V_{GS} = 10\text{ V}$                                                                              | 20   |       |           | A             |
| Drain-Source On-State Resistance <sup>a</sup>                                     | $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$ , $I_D = 4.0\text{ A}$                                                                                  |      | 0.027 | 0.035     | $\Omega$      |
|                                                                                   |              | $V_{GS} = 4.5\text{ V}$ , $I_D = 3.4\text{ A}$                                                                                 |      | 0.038 | 0.050     |               |
| Forward Transconductance <sup>a</sup>                                             | $g_{fs}$     | $V_{DS} = 15\text{ V}$ , $I_D = 4.0\text{ A}$                                                                                  |      | 13    |           | S             |
| Diode Forward Voltage <sup>a</sup>                                                | $V_{SD}$     | $I_S = 1.25\text{ A}$ , $V_{GS} = 0\text{ V}$                                                                                  |      | 0.73  | 1.2       | V             |
| <b>Dynamic<sup>b</sup></b>                                                        |              |                                                                                                                                |      |       |           |               |
| Gate Charge                                                                       | $Q_g$        | $V_{DS} = 15\text{ V}$ , $V_{GS} = 5\text{ V}$ , $I_D = 4.0\text{ A}$                                                          |      | 9     | 14        | nC            |
| Total Gate Charge                                                                 | $Q_{gt}$     | $V_{DS} = 15\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 4.0\text{ A}$                                                         |      | 17.5  | 30        |               |
| Gate-Source Charge                                                                | $Q_{gs}$     |                                                                                                                                |      | 4.0   |           |               |
| Gate-Drain Charge                                                                 | $Q_{gd}$     |                                                                                                                                |      | 2.5   |           |               |
| Turn-On Delay Time                                                                | $t_{d(on)}$  | $V_{DD} = 15\text{ V}$ , $R_L = 6\text{ }\Omega$<br>$I_D \cong 1\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_G = 6\text{ }\Omega$ |      | 12    | 20        | ns            |
| Rise Time                                                                         | $t_r$        |                                                                                                                                |      | 9     | 20        |               |
| Turn-Off Delay Time                                                               | $t_{d(off)}$ |                                                                                                                                |      | 25    | 50        |               |
| Fall Time                                                                         | $t_f$        |                                                                                                                                |      | 20    | 40        |               |
| Source-Drain Reverse Recovery Time                                                | $t_{rr}$     | $I_F = 1.25\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$                                                                     |      | 25    | 60        |               |

## Notes:

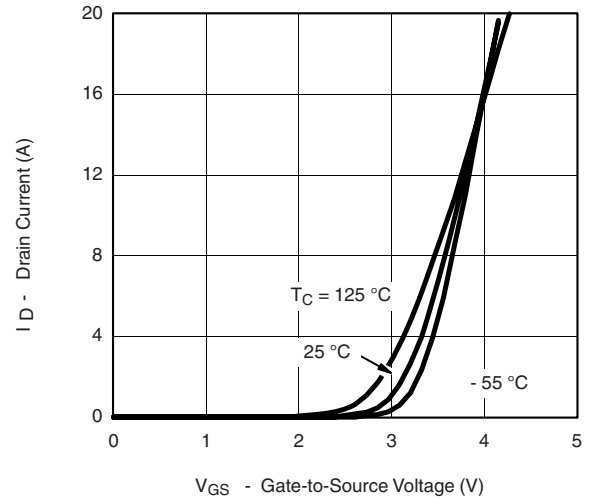
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
b. Guaranteed by design, not subject to production testing.

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.

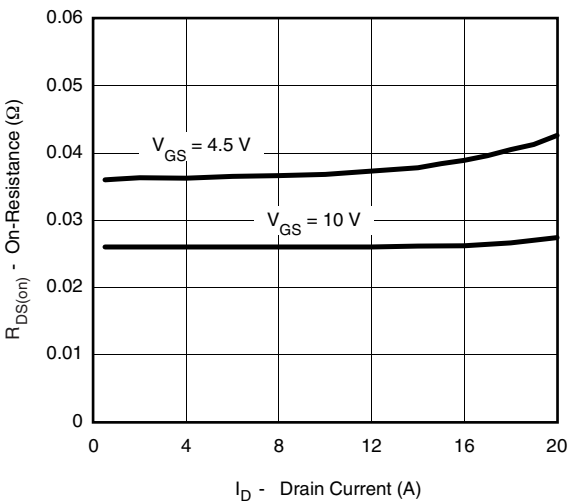
## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



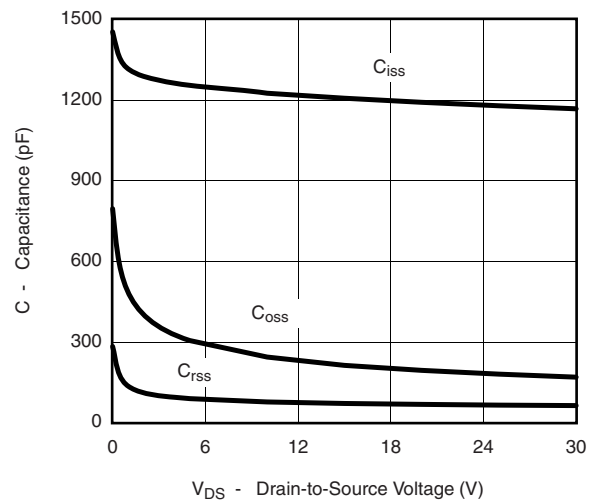
Output Characteristics



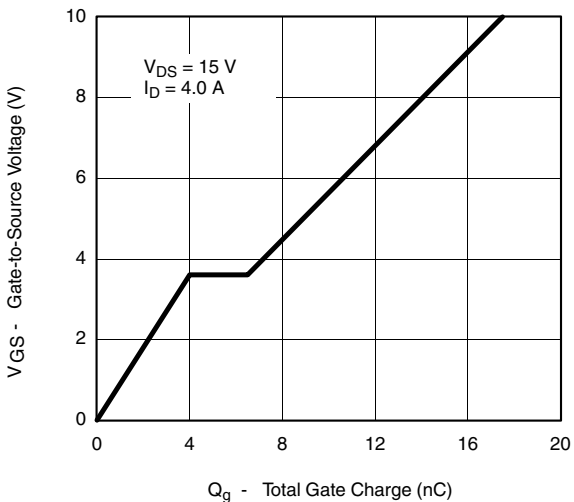
Transfer Characteristics



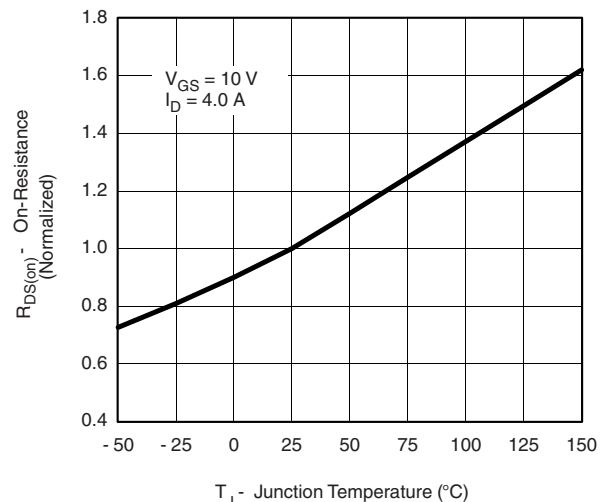
On-Resistance vs. Drain Current



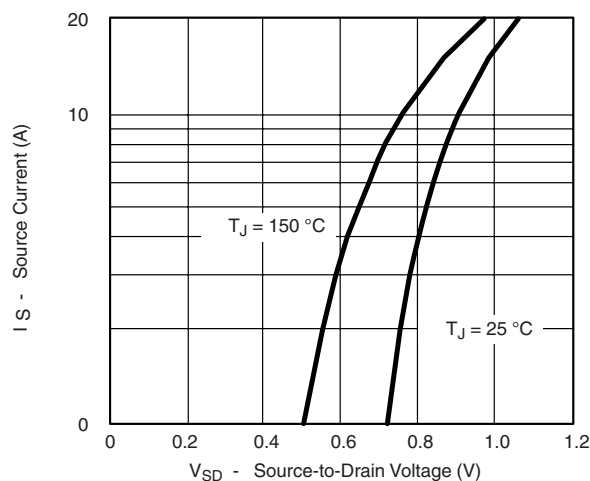
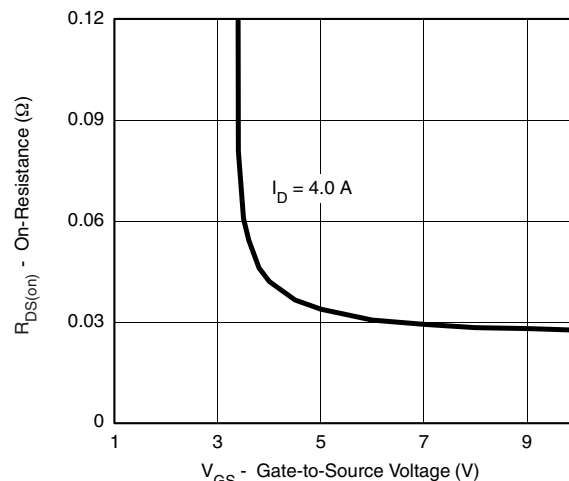
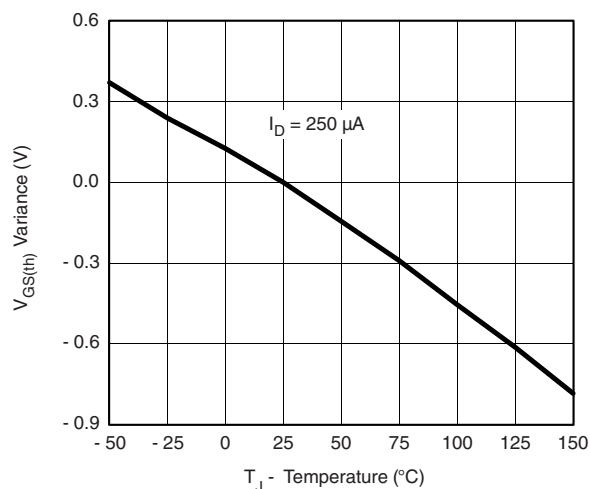
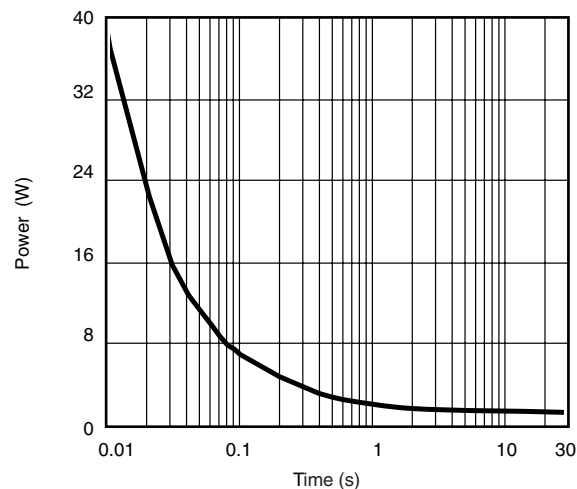
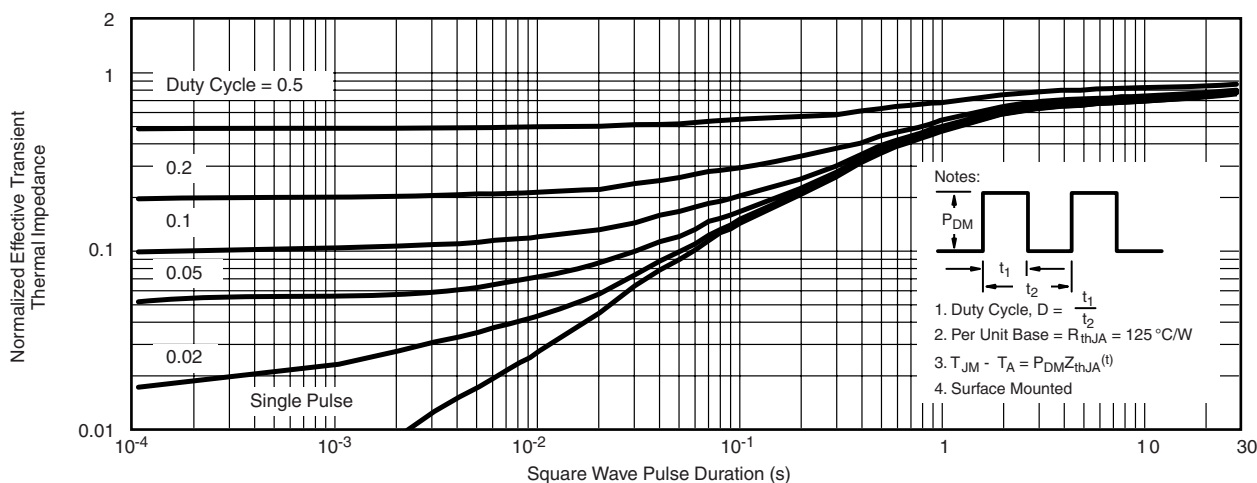
Capacitance



Gate Charge



On-Resistance vs. Junction Temperature

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted**Source-Drain Diode Forward Voltage****On-Resistance vs. Gate-to-Source Voltage****Threshold Voltage****Single Pulse Power****Normalized Thermal Impedance, Junction-to-Ambient**

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