

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

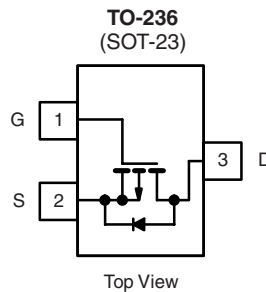
| PRODUCT SUMMARY | | |
|-----------------|-----------------------------|------------------------|
| V_{DS} (V) | $R_{DS(on)}$ (Ω) | I_D (A) ^b |
| - 30 | 0.078 at $V_{GS} = - 10$ V | - 3.2 |
| | 0.130 at $V_{GS} = - 4.5$ V | - 2.5 |

FEATURES

- Halogen-free Option Available
- TrenchFET[®] Power MOSFET



RoHS
COMPLIANT



Si2307BDS (L7)*
* Marking Code

Ordering Information: Si2307BDS-T1-E3 (Lead (Pb)-free)
Si2307BDS-T1-GE3 (Lead (Pb)-free and Halogen-free)

| ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted | | | | | |
|--|----------------|---------------|--------------|-------|---|
| Parameter | Symbol | 5 s | Steady State | Unit | |
| Drain-Source Voltage | V_{DS} | - 30 | | V | |
| Gate-Source Voltage | V_{GS} | ± 20 | | | |
| Continuous Drain Current ($T_J = 150$ °C) ^b | I_D | $T_A = 25$ °C | - 3.2 | - 2.5 | A |
| | | $T_A = 70$ °C | - 2.6 | - 2.0 | |
| Pulsed Drain Current ^a | I_{DM} | - 12 | | | |
| Continuous Source Current (Diode Conduction) ^b | I_S | - 1.25 | - 0.75 | | |
| Power Dissipation ^b | P_D | $T_A = 25$ °C | 1.25 | 0.75 | W |
| | | $T_A = 70$ °C | 0.8 | 0.48 | |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | - 55 to 150 | | °C | |

| THERMAL RESISTANCE RATINGS | | | | |
|--|------------|---------|---------|------|
| Parameter | Symbol | Typical | Maximum | Unit |
| Maximum Junction-to-Ambient ^b | R_{thJA} | 80 | 100 | °C/W |
| Maximum Junction-to-Ambient ^c | | 130 | 166 | |

Notes:

- Pulse width limited by maximum junction temperature.
- Surface Mounted on FR4 board, $t \leq 5$ s.
- Surface Mounted on FR4 board.

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

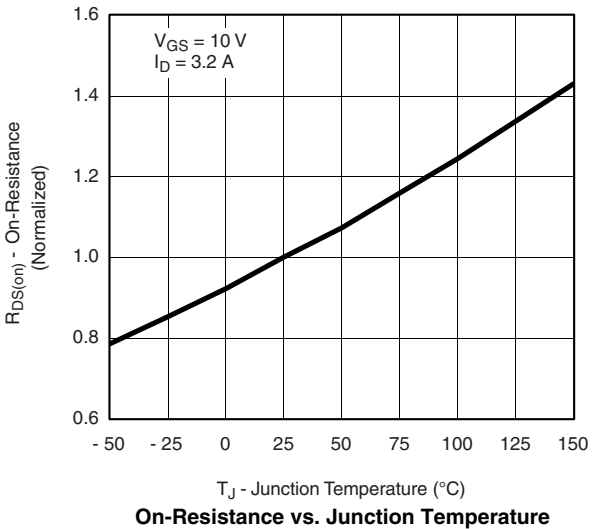
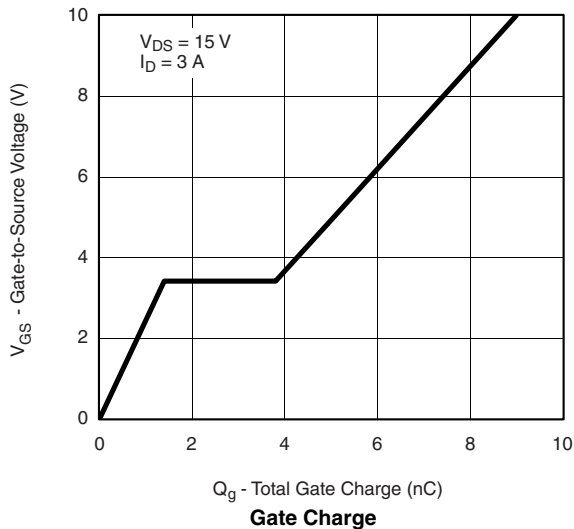
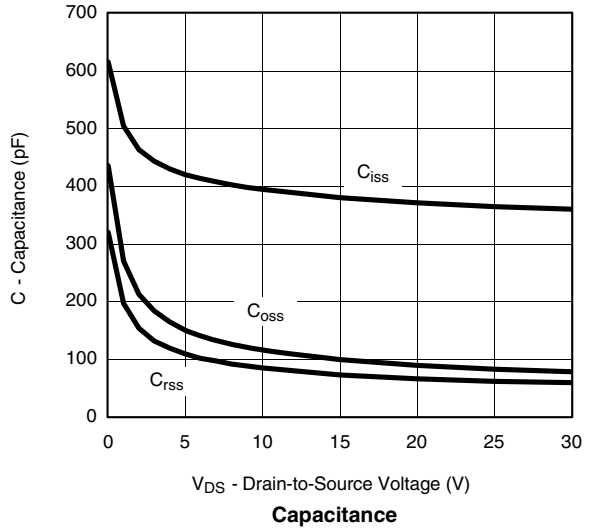
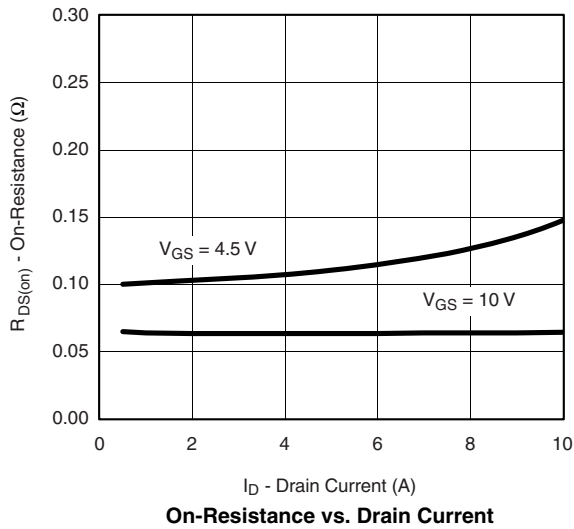
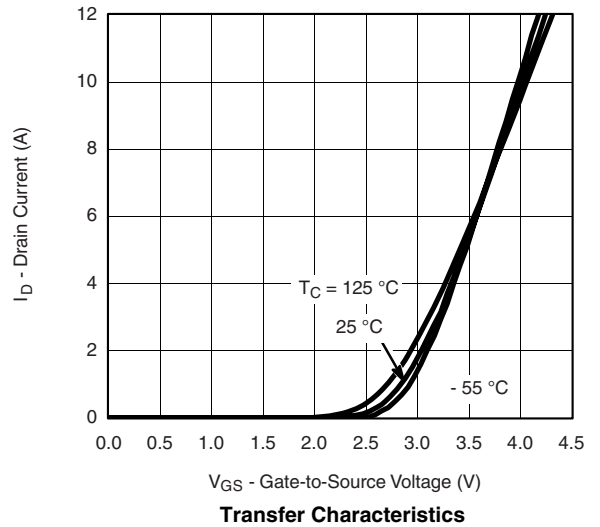
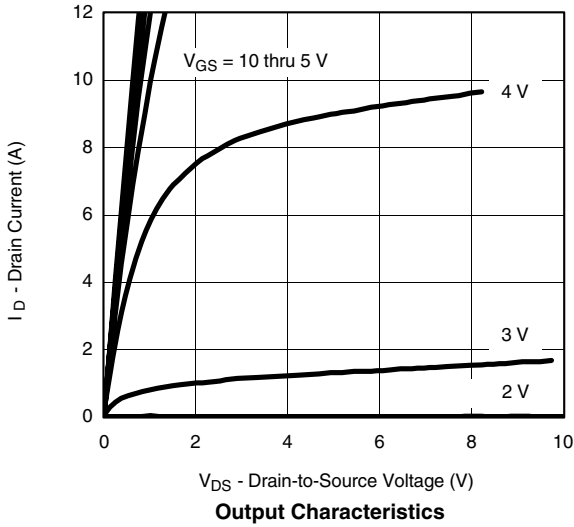
| SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted | | | | | | |
|--|--------------|--|--------|-------|-----------|---------------|
| Parameter | Symbol | Test Conditions | Limits | | | Unit |
| | | | Min. | Typ. | Max. | |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V_{DS} | $V_{GS} = 0\text{ V}$, $I_D = -10\text{ }\mu\text{A}$ | -30 | | | V |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = -250\text{ }\mu\text{A}$ | -1.0 | | -3.0 | V |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = -30\text{ V}$, $V_{GS} = 0\text{ V}$ | | | -1 | μA |
| | | $V_{DS} = -30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55\text{ }^\circ\text{C}$ | | | -10 | |
| On-State Drain Current ^a | $I_{D(on)}$ | $V_{DS} \leq -10\text{ V}$, $V_{GS} = -10\text{ V}$ | -6 | | | A |
| Drain-Source On-Resistance ^a | $R_{DS(on)}$ | $V_{GS} = -10\text{ V}$, $I_D = -3.2\text{ A}$ | | 0.063 | 0.078 | Ω |
| | | $V_{GS} = -4.5\text{ V}$, $I_D = -2.5\text{ A}$ | | 0.105 | 0.130 | |
| Forward Transconductance ^a | g_{fs} | $V_{DS} = -10\text{ V}$, $I_D = -3.2\text{ A}$ | | 5.0 | | S |
| Diode Forward Voltage | V_{SD} | $I_S = -0.75\text{ A}$, $V_{GS} = 0\text{ V}$ | | -0.85 | -1.2 | V |
| Dynamic^b | | | | | | |
| Total Gate Charge | Q_g | $V_{DS} = -15\text{ V}$, $V_{GS} = -10\text{ V}$ $I_D \cong -1.7\text{ A}$ | | 9.0 | 15 | nC |
| Gate-Source Charge | Q_{gs} | | | 1.4 | | |
| Gate-Drain Charge | Q_{gd} | | | 2.4 | | |
| Gate Resistance | R_g | $f = 1.0\text{ MHz}$ | | 8.0 | | Ω |
| Input Capacitance | C_{iss} | $V_{DS} = -15\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$ | | 380 | | μF |
| Output Capacitance | C_{oss} | | | 100 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 75 | | |
| Switching^c | | | | | | |
| Turn-On Time | $t_{d(on)}$ | $V_{DD} = -15\text{ V}$, $R_L = 15\text{ }\Omega$ $I_D \cong -1.0\text{ A}$, $V_{GEN} = -4.5\text{ V}$ $R_g = 6\text{ }\Omega$ | | 9 | 20 | ns |
| | t_r | | | 12 | 20 | |
| Turn-Off Time | $t_{d(off)}$ | | | 25 | 40 | |
| | t_f | | | 14 | 21 | |

Notes:

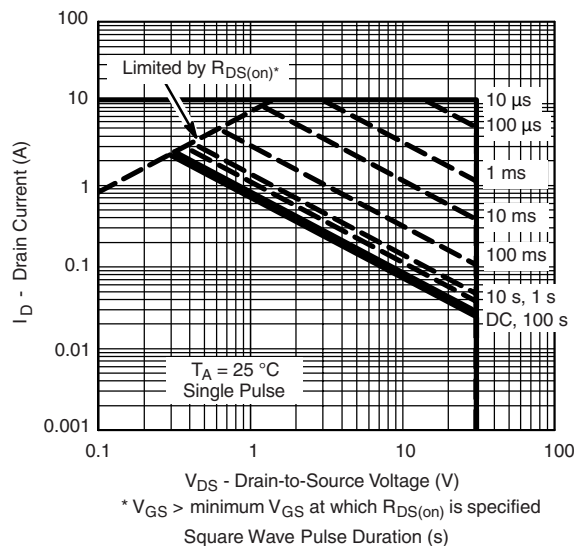
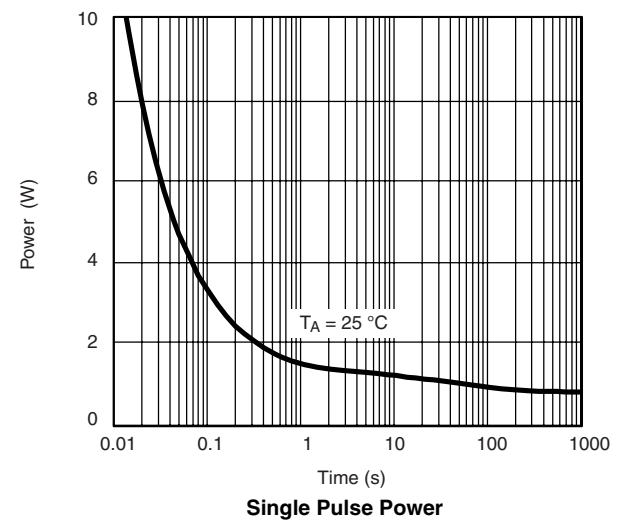
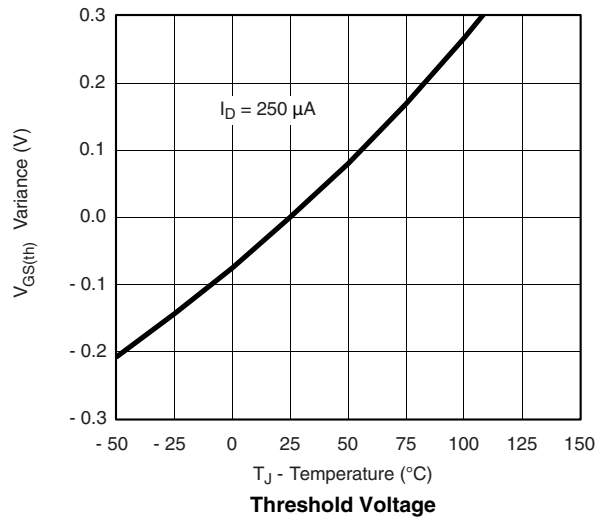
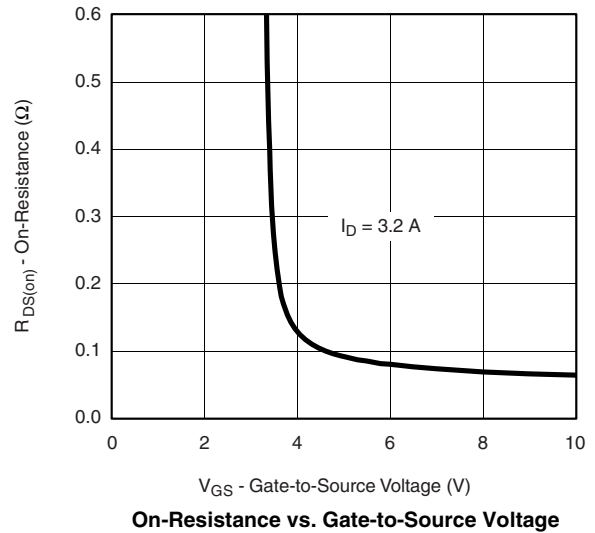
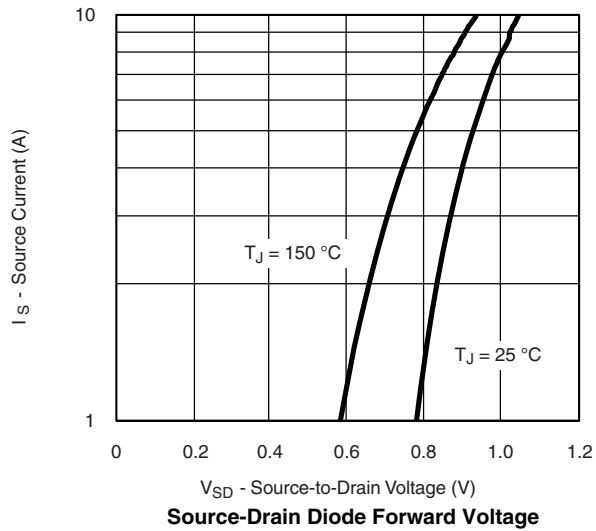
- a. Pulse test: pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. For DESIGN AID ONLY, not subject to production testing.
c. Switching time is essentially independent of operating temperature.

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

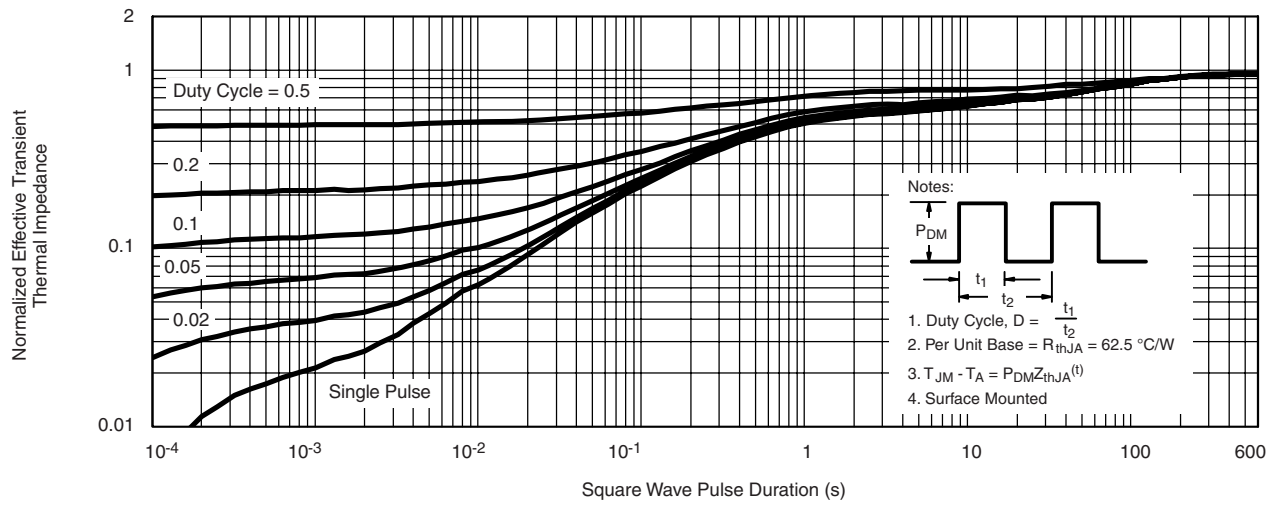


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified
 Square Wave Pulse Duration (s)

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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SOT-23 (TO-236): 3-LEAD



| Dim | MILLIMETERS | | INCHES | |
|----------------|-------------|------|------------|-------|
| | Min | Max | Min | Max |
| A | 0.89 | 1.12 | 0.035 | 0.044 |
| A ₁ | 0.01 | 0.10 | 0.0004 | 0.004 |
| A ₂ | 0.88 | 1.02 | 0.0346 | 0.040 |
| b | 0.35 | 0.50 | 0.014 | 0.020 |
| c | 0.085 | 0.18 | 0.003 | 0.007 |
| D | 2.80 | 3.04 | 0.110 | 0.120 |
| E | 2.10 | 2.64 | 0.083 | 0.104 |
| E ₁ | 1.20 | 1.40 | 0.047 | 0.055 |
| e | 0.95 BSC | | 0.0374 Ref | |
| e ₁ | 1.90 BSC | | 0.0748 Ref | |
| L | 0.40 | 0.60 | 0.016 | 0.024 |
| L ₁ | 0.64 Ref | | 0.025 Ref | |
| S | 0.50 Ref | | 0.020 Ref | |
| q | 3° | 8° | 3° | 8° |

ECN: S-03946-Rev. K, 09-Jul-01
 DWG: 5479

RECOMMENDED MINIMUM PADS FOR SOT-23



Recommended Minimum Pads
Dimensions in Inches/(mm)

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