

N-Channel 2.5-V (G-S) MOSFET

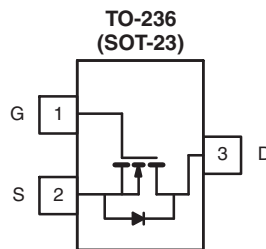
| PRODUCT SUMMARY | | |
|-----------------|---------------------------|-----------|
| V_{DS} (V) | $R_{DS(on)}$ (Ω) | I_D (A) |
| 20 | 0.060 at $V_{GS} = 4.5$ V | 2.4 |
| | 0.115 at $V_{GS} = 2.5$ V | 2.0 |

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE
Available



Top View
Si2302ADS (2A)*
* Marking Code

Ordering Information: Si2302ADS-T1-E3 (Lead (Pb)-free)
Si2302ADS-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} | 20 | | V | |
| Gate-Source Voltage | V_{GS} | ± 8 | | | |
| Continuous Drain Current ($T_J = 150$ °C) ^a | I_D | $T_A = 25$ °C | 2.4 | 2.1 | A |
| | | $T_A = 70$ °C | 1.9 | 1.7 | |
| Pulsed Drain Current ^a | I_{DM} | 10 | | | |
| Continuous Source Current (Diode Conduction) ^a | I_S | 0.94 | 0.6 | | |
| Power Dissipation ^a | P_D | $T_A = 25$ °C | 0.9 | 0.7 | W |
| | | $T_A = 70$ °C | 0.57 | 0.46 | |
| 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 ^a | R_{thJA} | $t \leq 5$ s | 115 | 140 | °C/W |
| | | Steady State | 140 | 175 | |

Notes:

a. Surface mounted on FR4 board.

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

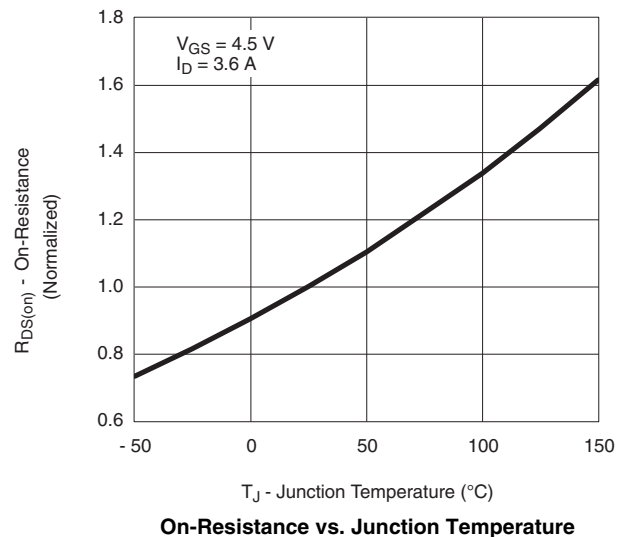
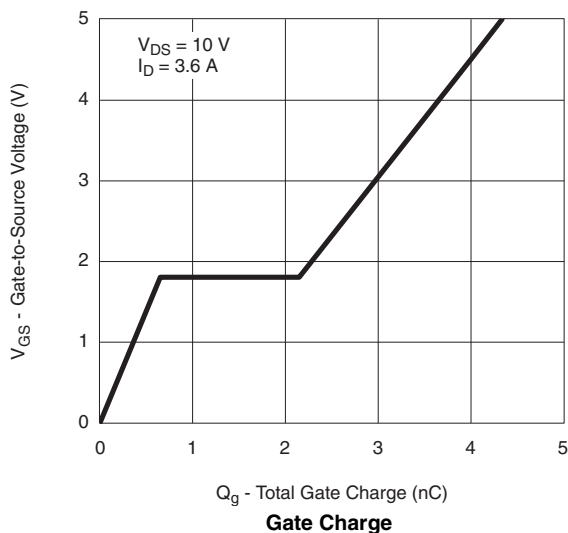
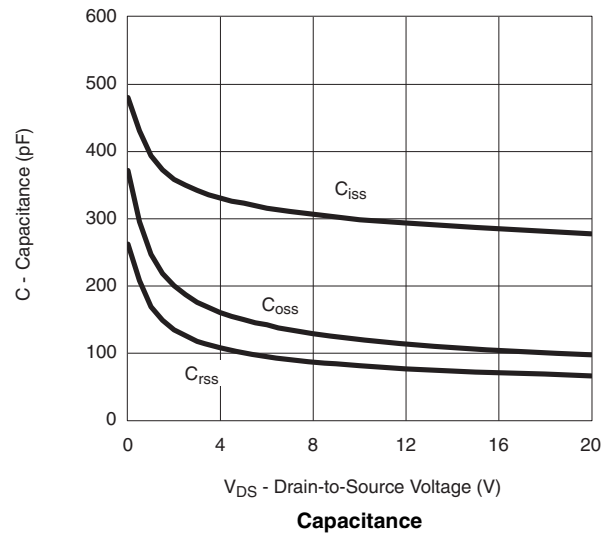
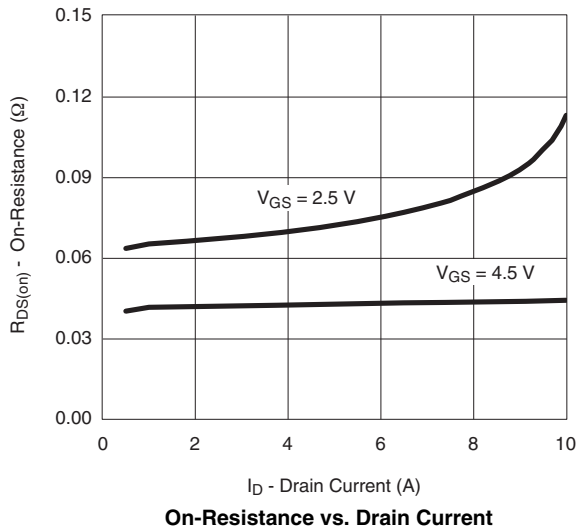
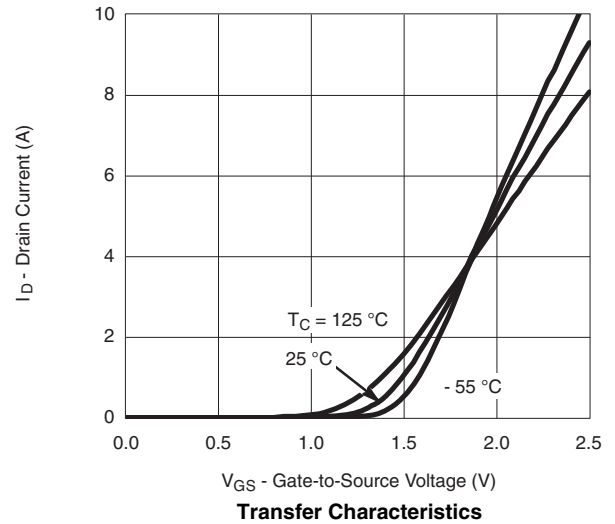
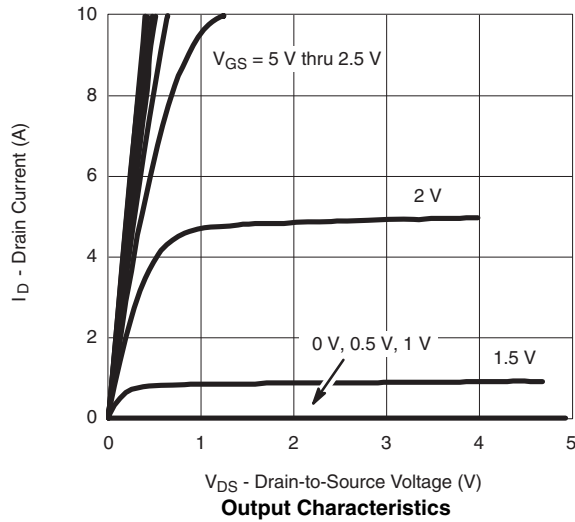
| SPECIFICATIONS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted) | | | | | | |
|--|---------------|--|------|-------|--------------------|---------------|
| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0\text{ V}, I_D = 10\text{ }\mu\text{A}$ | 20 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 50\text{ }\mu\text{A}$ | 0.65 | 0.95 | 1.2 | |
| Gate Body Leakage | I_{GSS} | $V_{DS} = 0\text{ V}, V_{GS} = \pm 8\text{ V}$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}$ | | | 0.1 | μA |
| | | $V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$ | | | 2.0 | |
| On-State Drain Current ^a | $I_{D(on)}$ | $V_{DS} \geq 5\text{ V}, V_{GS} = 4.5\text{ V}$ | 6 | | | A |
| | | $V_{DS} \geq 5\text{ V}, V_{GS} = 2.5\text{ V}$ | 4 | | | |
| Drain-Source On-Resistance ^a | $R_{DS(on)}$ | $V_{GS} = 4.5\text{ V}, I_D = 3.6\text{ A}$ | | 0.045 | 0.060 ^b | Ω |
| | | $V_{GS} = 2.5\text{ V}, I_D = 3.1\text{ A}$ | | 0.070 | 0.115 | |
| Forward Transconductance ^a | g_{fs} | $V_{DS} = 5\text{ V}, I_D = 3.6\text{ A}$ | | 8 | | S |
| Diode Forward Voltage | V_{SD} | $I_S = 0.94\text{ A}, V_{GS} = 0\text{ V}$ | | 0.76 | 1.2 | V |
| Dynamic | | | | | | |
| Total Gate Charge | Q_g | $V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 3.6\text{ A}$ | | 4.0 | 10 | nC |
| Gate-Source Charge | Q_{gs} | | | 0.65 | | |
| Gate-Drain Charge | Q_{gd} | | | 1.5 | | |
| Input Capacitance | C_{iss} | $V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$ | | 300 | | pF |
| Output Capacitance | C_{oss} | | | 120 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 80 | | |
| Gate Resistance | R_g | $f = 1\text{ MHz}$ | 0.5 | 1 | 2 | Ω |
| Switching | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD} = 10\text{ V}, R_L = 2.8\text{ }\Omega$ $I_D \cong 3.6\text{ A}, V_{GEN} = 4.5\text{ V}, R_g = 6\text{ }\Omega$ | | 7 | 15 | ns |
| Rise Time | t_r | | | 55 | 80 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 16 | 60 | |
| Fall Time | t_f | | | 10 | 25 | |

Notes:

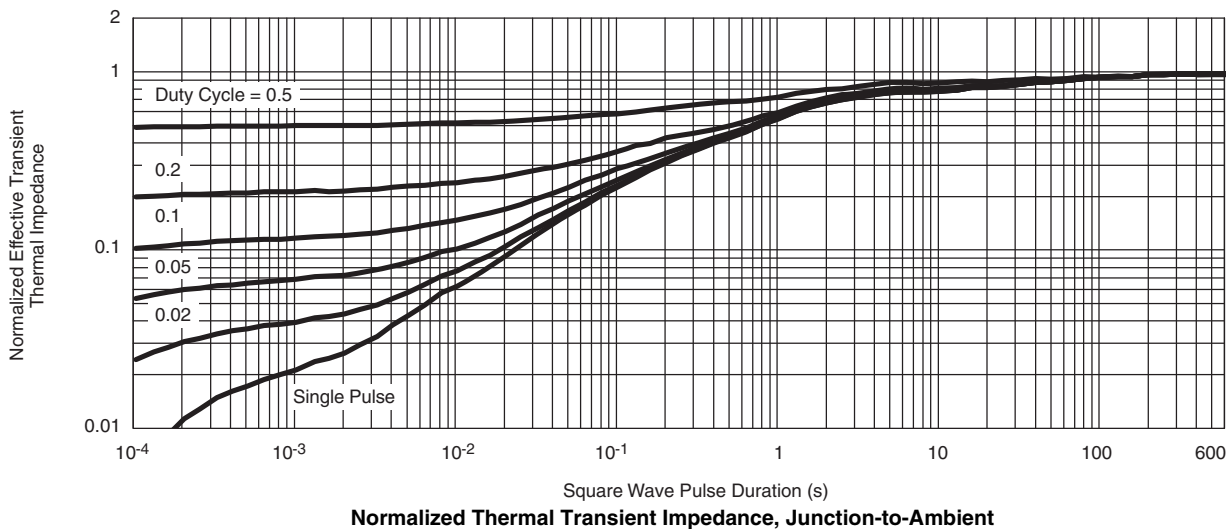
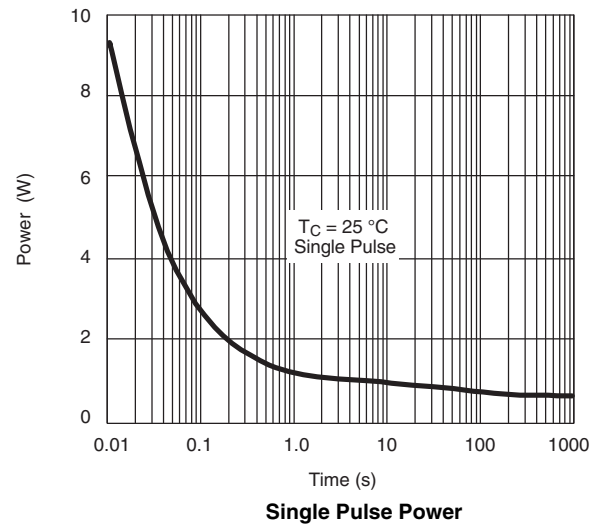
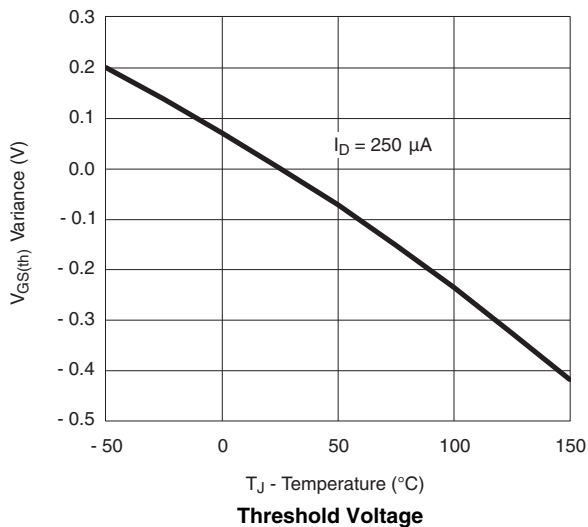
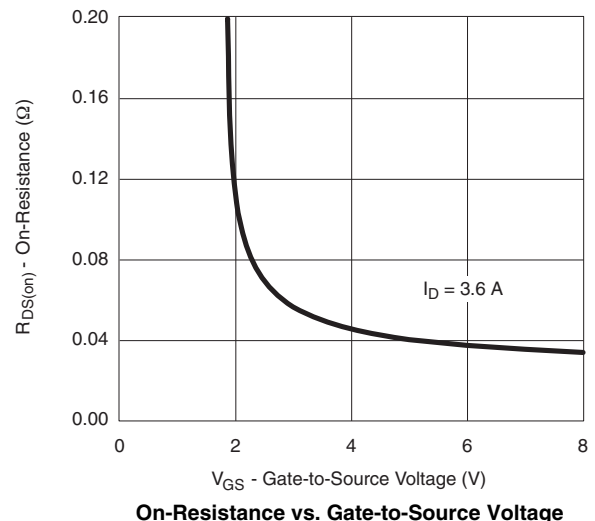
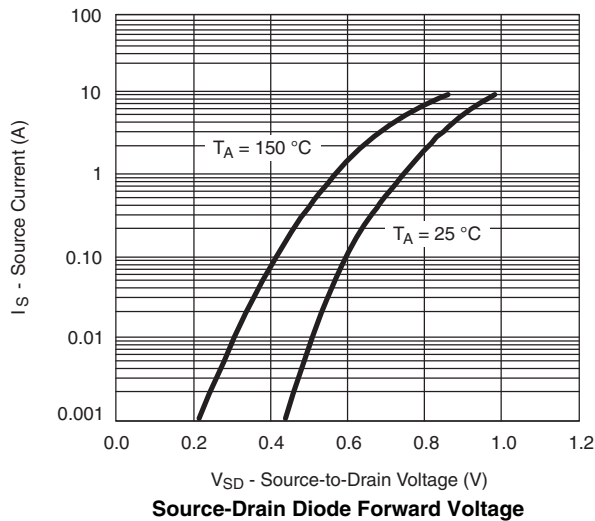
- a. Pulse test; $PW \leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Effective for production 10/04.

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 ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



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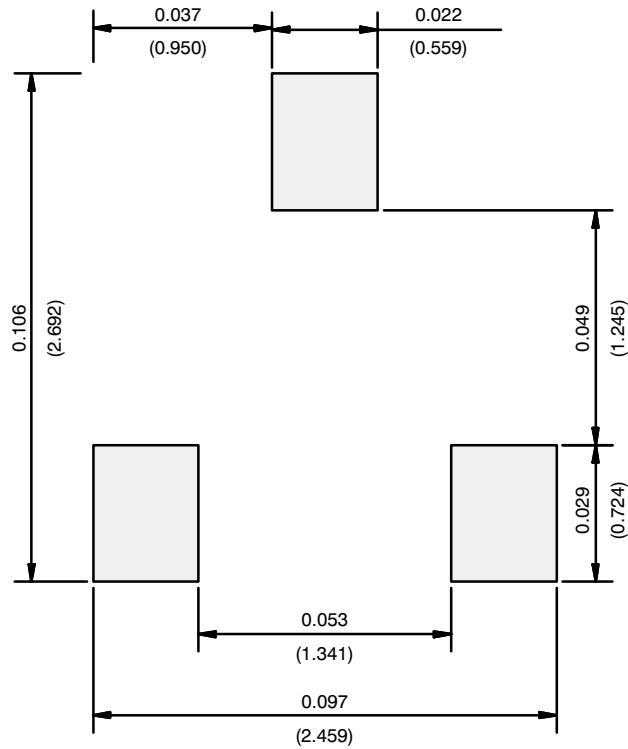
SOT-23 (TO-236): 3-LEAD



| 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)

[Return to Index](#)



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