

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | I_D |
|---------------|-----------------|-------|
| 40V | 100mΩ@10V | 2.5A |
| | 140mΩ@6V | |

Feature

- Voltage controlled small signal switch
- Low input capacitance
- Fast switching speed
- Low input / output leakage
- ESD protected
- Suffix "-Q1" for AEC-Q101

Application

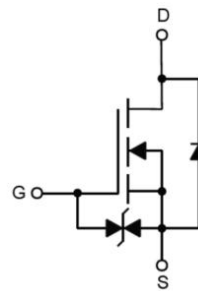
- Battery operated systems
- Solid-state relays
- Direct logic-level interface:TTL/CMOS
- 12V Automotive systems

Package

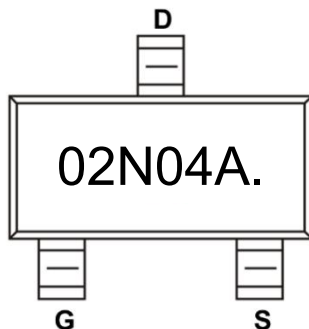


SOT-23

Circuit diagram



Marking



Absolute maximum ratings (T_A=25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--|------------------|------------|------|
| Drain-Source Voltage | V _{DS} | 40 | V |
| Gate-Source Voltage | V _{GS} | ±20 | V |
| Continuous Drain Current | I _D | 2.5 | A |
| Pulsed Drain Current ¹⁾ | I _{DM} | 12 | A |
| Power Dissipation | P _D | 1.1 | W |
| Thermal Resistance Junction to Ambient ²⁾ | R _{θJA} | 110 | °C/W |
| Operating Junction Temperature | T _J | -55 ~ +150 | °C |
| Storage Temperature | T _{STG} | -55 ~ +150 | °C |

Electrical characteristics (T_J=25°C unless otherwise noted)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|----------------------|--|------|------|------|------|
| Static Characteristics | | | | | | |
| Drain-source breakdown voltage | V _{(BR)DSS} | V _{GS} = 0V, I _D = 250μA | 40 | | | V |
| Zero gate voltage drain current | I _{DSS} | V _{DS} = 40V, V _{GS} = 0V | | | 1 | μA |
| Gate-body leakage current | I _{GSS} | V _{DS} = 0V, V _{GS} = ±20V | | | ±10 | μA |
| Gate threshold voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = 250μA | 1 | 1.6 | 2.5 | V |
| Drain-source on-resistance | R _{DS(on)} | V _{GS} = 10V, I _D = 2.5A | | 70 | 100 | mΩ |
| | | V _{GS} = 4.5V, I _D = 2A | | 98 | 140 | |
| Dynamic characteristics³⁾ | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} = 25V, V _{GS} = 0V, f = 1MHz | | 150 | | pF |
| Output Capacitance | C _{oss} | | | 23 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 15 | | |
| Total Gate Charge | Q _g | V _{DS} = 20V, V _{GS} = 10V, I _D = 2.5A | | 4.45 | | nC |
| Gate-Source Charge | Q _{gs} | | | 1.25 | | |
| Gate-Drain Charge | Q _{gd} | | | 0.8 | | |
| Turn-on delay time | t _{d(on)} | V _{DS} = 20V, V _{GS} = 10V, I _D = 2.5A R _G = 3Ω | | 3.68 | | nS |
| Turn-on rise time | t _r | | | 1.54 | | |
| Turn-off delay time | t _{d(off)} | | | 8.75 | | |
| Turn-off fall time | t _f | | | 1.25 | | |
| Source-Drain Diode characteristics | | | | | | |
| Diode Forward Current | I _S | | | | 2.5 | A |
| Diode Forward voltage | V _{SD} | V _{GS} = 0V, I _S = 2A | | | 1.2 | V |
| Reverse recovery time | T _{rr} | I _F = 2.5A, di/dt = -100 A/μs | | 16.3 | | nS |
| Reverse recovery charge | Q _{rr} | | | | 6.1 | |

Notes:

- 1) Repetitive rating; pulse width limited by max. junction temperature.
- 2) The value of R_{θJA} is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in the still air environment with T_A = 25°C. The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
- 3) Guaranteed by design, not subject to production testing.

Typical Characteristics

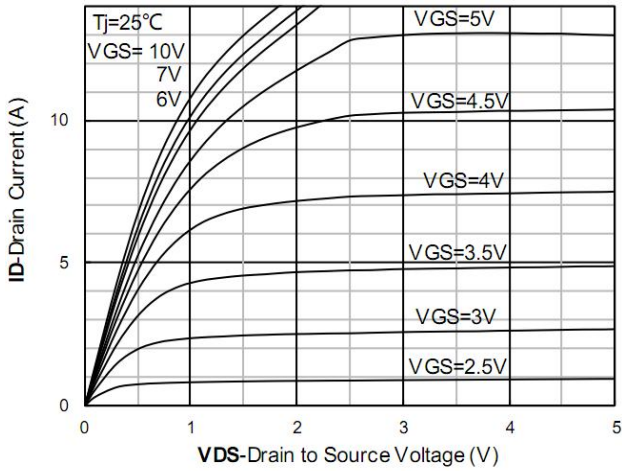


Figure1. Output Characteristics

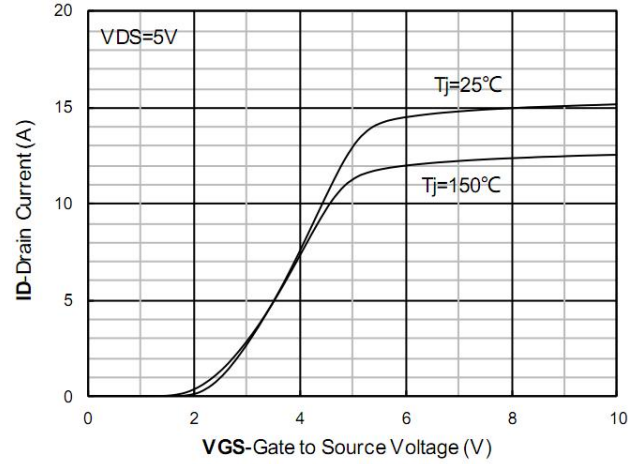


Figure2. Transfer Characteristics

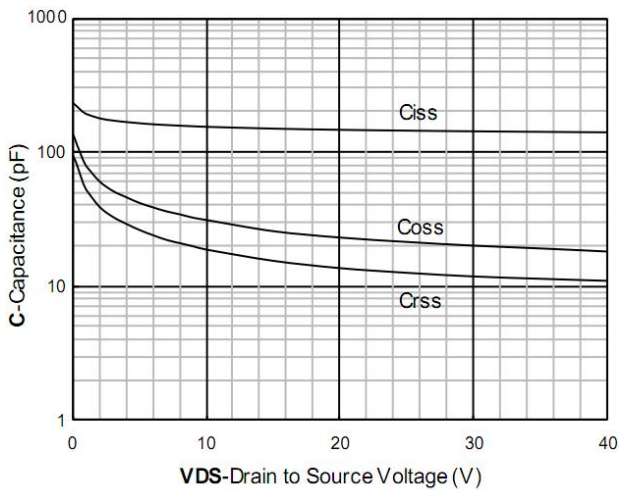


Figure3. Capacitance Characteristics

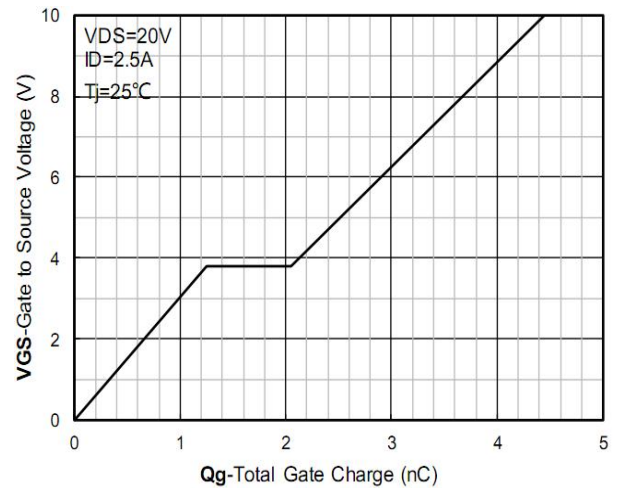


Figure4. Gate Charge

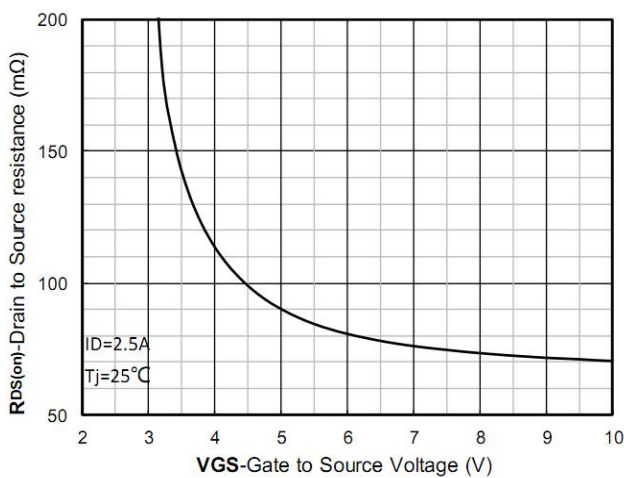


Figure5. On-Resistance vs Gate to Source Voltage

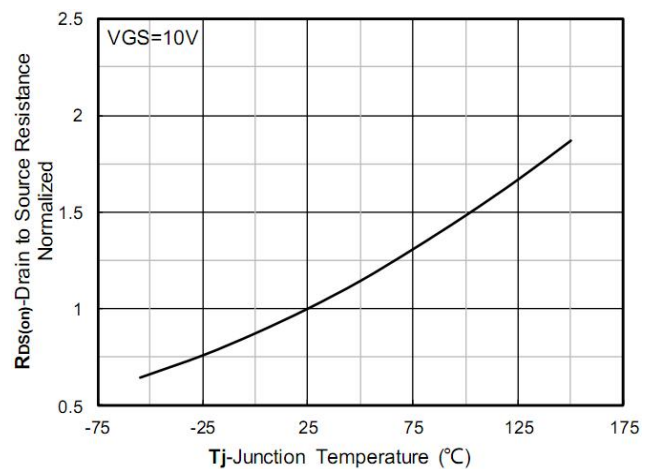


Figure6. Normalized On-Resistance

Typical Characteristics

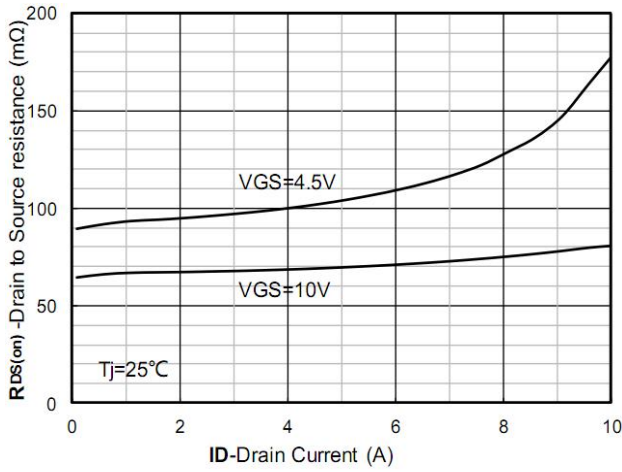


Figure 7. RDS(on) VS Drain Current

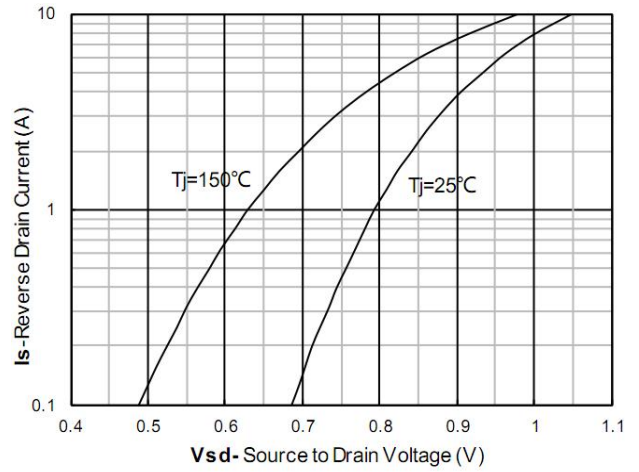


Figure 8. Forward characteristics of reverse diode

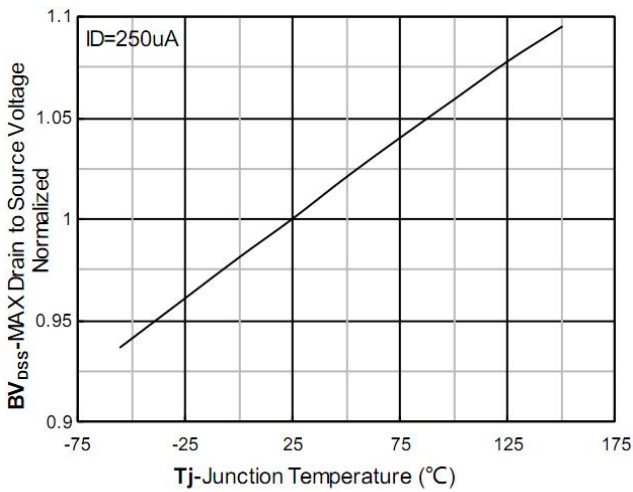


Figure 9. Normalized breakdown voltage

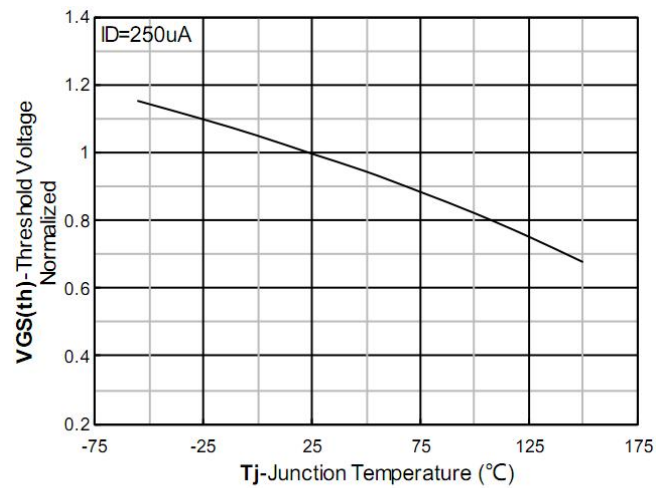


Figure 10. Normalized Threshold voltage

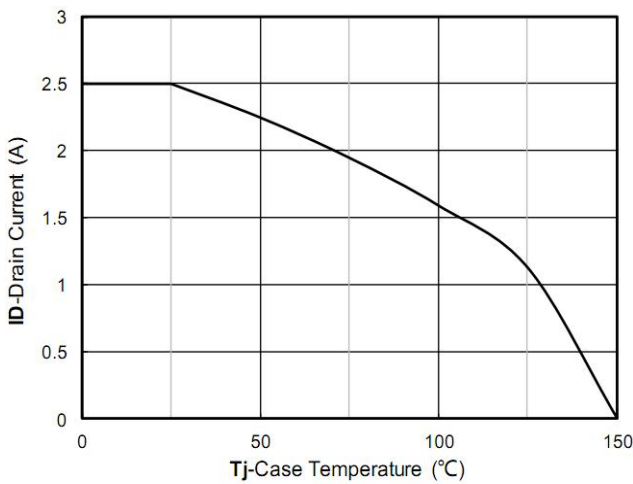


Figure 11. Current dissipation

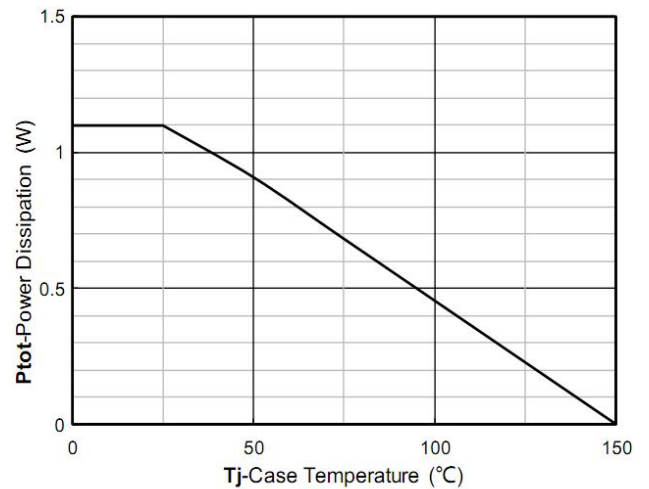


Figure 12. Power dissipation

Typical Characteristics

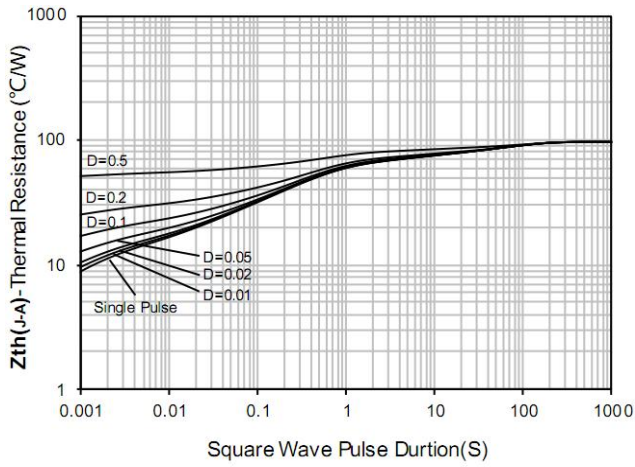


Figure 13. Maximum Transient Thermal Impedance

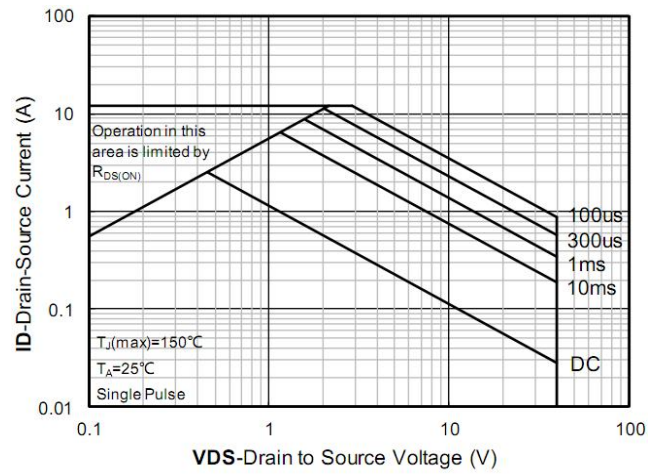
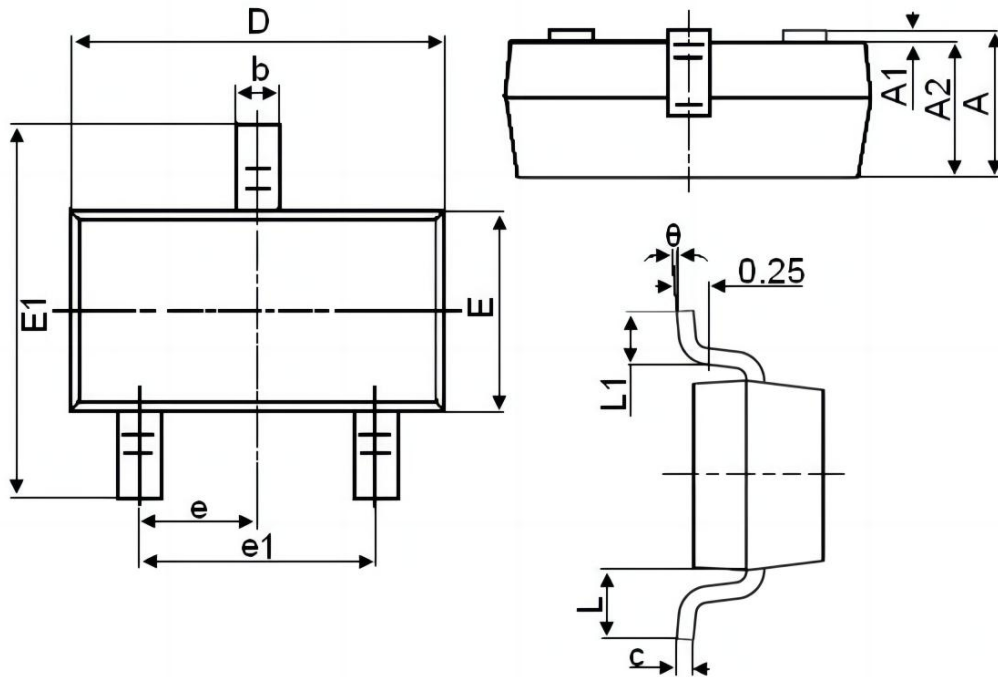


Figure 14. Safe Operation Area

SOT-23 Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP. | | 0.037 TYP. | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF. | | 0.022 REF. | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |