

60V N-Channel MOSFET

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | I_D |
|---------------|-----------------|-------|
| 60V | 5Ω@10V | 340mA |
| | 5.3Ω@4.5V | |

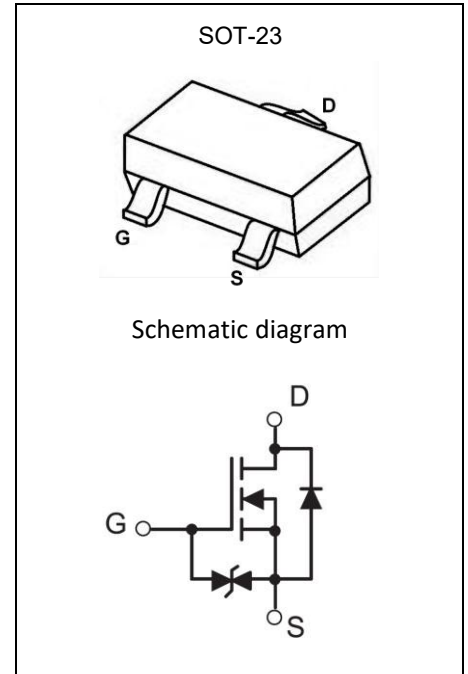
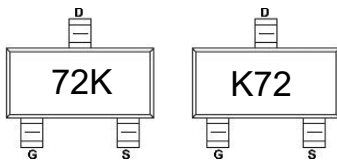
Feature

- High density cell design for Low $R_{DS(on)}$
- Voltage controlled small signal switch
- Rugged and reliable
- ESD protected GateHBM2.0KV
- AEC-Q101 qualified (Automotive grade with suffix "Q")
- Exsemi technology

Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch

MARKING:

ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|-----------------|-----------|---------------------------|
| Drain-Source Voltage | V_{DS} | 60 | V |
| Gate-Source Voltage | V_{GS} | ±20 | V |
| Continuous Drain Current | I_D | 340 | mA |
| Power Dissipation | P_D | 0.35 | W |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 357 | $^\circ\text{C}/\text{W}$ |
| Junction Temperature | T_J | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{STG} | -55~ +150 | $^\circ\text{C}$ |

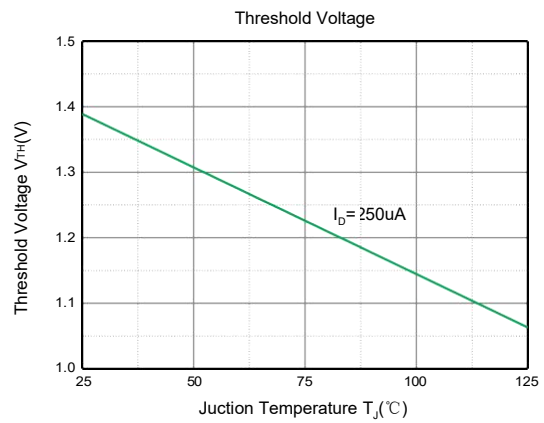
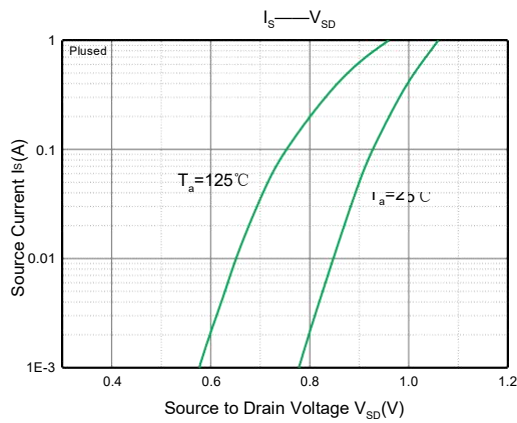
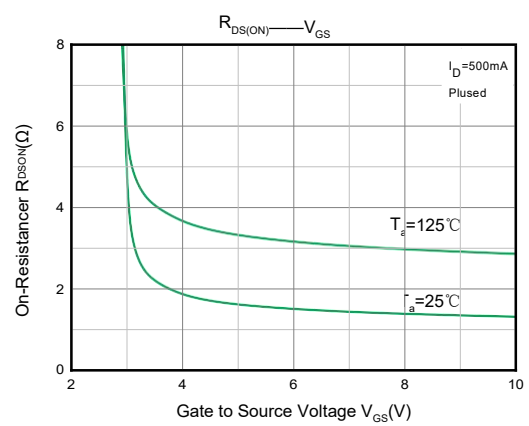
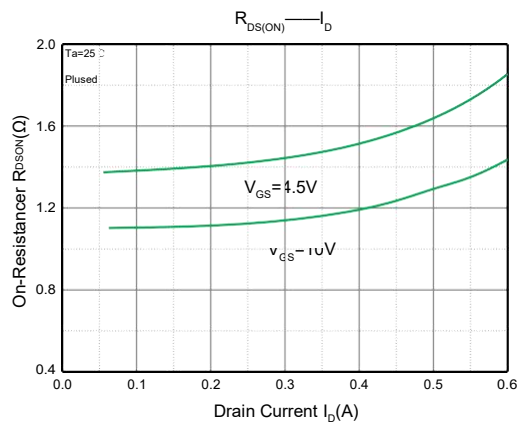
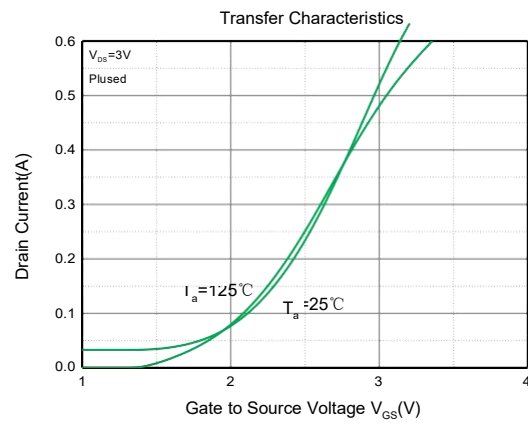
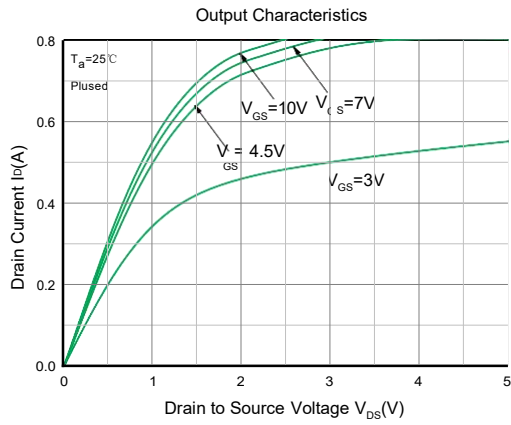
MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Test Condition | Min | Type | Max | Unit |
|---|---------------|---|------------|------|-----------|----------|
| Static Characteristics | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$ | 60 | | | V |
| Zero gate voltage drain current | I_{DSS} | $V_{DS} = 48V, V_{GS} = 0V$ | | | 1 | μA |
| Gate-body leakage current | I_{GSS1} | $V_{GS} = \pm 20V, V_{DS} = 0V$ | | | ± 10 | μA |
| | I_{GSS2} | $V_{GS} = \pm 10V, V_{DS} = 0V$ | | | ± 200 | nA |
| | I_{GSS2} | $V_{GS} = \pm 5V, V_{DS} = 0V$ | | | ± 100 | nA |
| Gate threshold voltage* | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 1 | 1.4 | 2.5 | V |
| Drain-source on-resistance* | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 500mA$ | | 1.3 | 5 | Ω |
| | | $V_{GS} = 4.5V, I_D = 200mA$ | | 1.4 | 5.3 | |
| Recovered charge | Q_r | $V_{GS} = 0V, I_S = 300mA, V_R = 25V,$ $di_S/dt = -100A/\mu S$ | | 30 | | nC |
| Dynamic characteristics** | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$ | | | 40 | pF |
| Output Capacitance | C_{oss} | | | | 30 | |
| Reverse Transfer Capacitance | C_{rss} | | | | 10 | |
| Switching Characteristics** | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{GS} = 10V, V_{DD} = 50V, R_G = 50\Omega$ | | | 10 | ns |
| Turn-off delay time | $t_{d(off)}$ | $R_{GS} = 50\Omega, R_L = 250\Omega$ | | | 15 | |
| Reverse recovery Time | t_{rr} | $V_{GS} = 0V, I_S = 300mA, V_R = 25V,$ $di_S/dt = -100A/\mu S$ | | 30 | | |
| Source-Drain Diode characteristics | | | | | | |
| Diode Forward voltage | V_{SD} | $V_{GS} = 0V, I_S = 300mA$ | | 0.97 | 1.5 | V |
| GATE-SOURCE ZENER DIODE | | | | | | |
| Gate-Source Breakdown Voltage | BV_{GSO} | $I_{GS} = \pm 1mA$ (Open Drain) | ± 21.5 | | ± 30 | V |

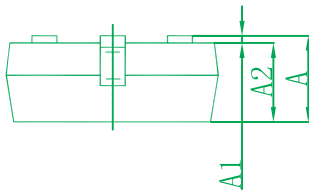
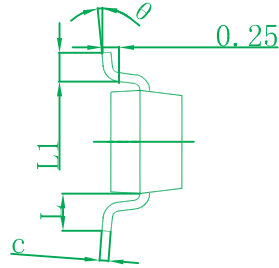
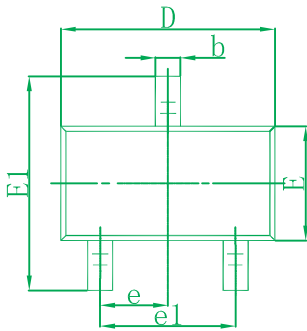
Notes:*Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

**These parameters have no way to verify.

Typical Characteristics

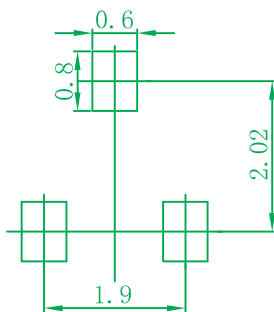


SOT-23 Package Information



| 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 | 1.150 | 0.035 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.050 | 0.110 | 0.120 |
| 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 | 0.360 REF | | 0.014 REF | |
| θ | 0° | 8° | 0° | 8° |

SOT-23 Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

Ordering information

| Device | Package | Shipping |
|---------|---------|-------------------------|
| 2N7002K | SOT-23 | 3000/Tape&Reel(7inches) |