



**THE DATASHEET OF
2N7002E**



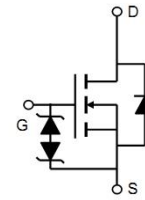
N-Channel Power MOSFET

General Features

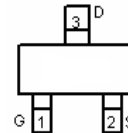
- $V_{DS} = 60V, I_D = 300mA$
 $R_{DS(ON)} < 3\Omega @ V_{GS}=10V$
 $R_{DS(ON)} < 3.5\Omega @ V_{GS}=5V$
- High power and current handling capability
- Lead free product is acquired
- Surface mount package

Application

- PWM applications
- Load switch
- Power management



Schematic diagram



Marking and Pin Assignment



SOT-23 top view

MAXIMUM RATINGS

| Characteristic | Symbol | Max | Unit |
|----------------------------|------------|----------|------|
| Drain-Source Voltage | BV_{DSS} | 60 | V |
| Gate- Source Voltage | V_{GS} | ± 20 | V |
| Drain Current (continuous) | I_{DR} | 300 | mA |
| Drain Current (pulsed) | I_{DRM} | 500 | mA |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|--|-----------------|---------------------------------------|----------------|
| Total Device Dissipation $T_A=25^\circ C$ | P_D | 225 | mW |
| Derate above $25^\circ C$ | | 1.8 | mW/ $^\circ C$ |
| Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 417 | $^\circ C/W$ |
| Junction and Storage Temperature | T_J, T_{stg} | 150 $^\circ C$, -55to+150 $^\circ C$ | |

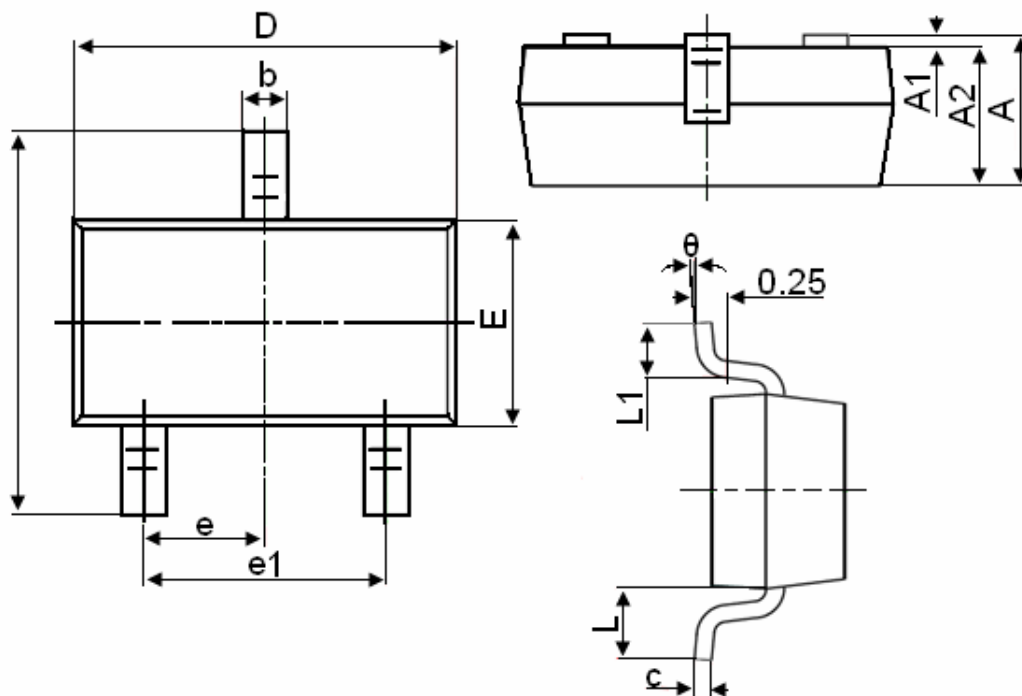
ELECTRICAL CHARACTERISTICS

 (T_A=25°C unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---------------------|-----------|-----|---------------|------|
| Drain-Source Breakdown Voltage (I _D =250uA, V _{GS} =0V) | BV _{DSS} | 60 | — | — | V |
| Gate Threshold Voltage (I _D =250uA, V _{GS} = V _{DS}) | V _{GS(th)} | 1.0 | — | 2.5 | V |
| Drain-Source On Voltage (I _D =50mA, V _{GS} =5V) (I _D =500mA, V _{GS} =10V) | V _{DS(ON)} | — | — | 0.375 3.75 | V |
| Diode Forward Voltage Drop (I _{SD} =200mA, V _{GS} =0V) | V _{SD} | — | — | 1.5 | V |
| Zero Gate Voltage Drain Current (V _{GS} =0V, V _{DS} = BV _{DSS}) | I _{DSS} | — | — | 1 | uA |
| Gate Body Leakage (V _{GS} =±10V, V _{DS} =0V) (V _{GS} =±20V, V _{DS} =0V) | I _{GSS} | — | — | ±1 ±10 | uA |
| Static Drain-Source On-State Resistance (I _D =500mA, V _{GS} =10V) (I _D =50mA, V _{GS} =5V) | R _{DS(ON)} | — | — | 3 3.5 | Ω |
| ESD Rating | ESD | 1000V HBM | | | |

1. FR-5=1.0×0.75×0.062in.
2. Alumina=0.4×0.3×0.024in.99.5%alumina.
3. Pulse Width≤300 μ s; Duty Cycle≤2.0%.

SOT-23 Package Information



| Symbol | Dimensions in Millimeters | |
|----------|---------------------------|-------|
| | MIN. | MAX. |
| A | 0.900 | 1.150 |
| A1 | 0.000 | 0.100 |
| A2 | 0.900 | 1.050 |
| b | 0.300 | 0.500 |
| c | 0.080 | 0.150 |
| D | 2.800 | 3.000 |
| E | 1.200 | 1.400 |
| E1 | 2.250 | 2.550 |
| e | 0.950TYP | |
| e1 | 1.800 | 2.000 |
| L | 0.550REF | |
| L1 | 0.300 | 0.500 |
| θ | 0° | 8° |

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