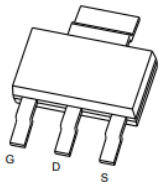
# N-Channel Enhancement Mode Power MOSFET

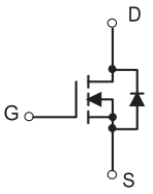
## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---|---|---|
| 60V | 70mΩ@10V | 3A |
| | 82mΩ@4.5V | |

**SOT-223**




**Schematic diagram**



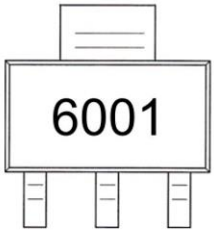

## Feature

- Trench Technology Power MOSFET
- Low $R_{DS(ON)}$
- Low Gate Charge
- Low Gate Resistance
- AEC-Q101 qualified (Automotive grade with suffix "Q".)
- Expsemi electronics

## Application

- Load Switch
- PWM

## MARKING:




6001 = Device Code

## ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25℃ unless otherwise noted)

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain - Source Voltage | | $V_{DS}$ | 60 | V |
| Gate - Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $T_C$ = 25℃ | $I_D$ | 3 | A |
| Pulsed Drain Current[1] | | $I_{DM}$ | 10 | A |
| Power Dissipation[3] | $T_A$ = 25℃ | $P_D$ | 2 | W |
| Thermal Resistance from Junction to Ambient[4] | | $R_{\theta JA}$ | 100 | ℃/W |
| Junction Temperature | | $T_J$ | 150 | ℃ |
| Storage Temperature | | $T_{STG}$ | -55~ +150 | ℃ |

## Electrical Characteristics

(Ta=25℃ unless otherwise specified)

| Parameter | Symbol | Test Condition | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain - Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 60 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 60V, $V_{GS}$ = 0V | | | 1 | μA |
| Gate - Body Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±20V, $V_{DS}$ = 0V | | | ±100 | nA |
| **On Characteristics[2]** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 0.5 | 1.2 | 2 | V |
| Drain-source On-resistance | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 3A | | 70 | 90 | mΩ |
| | | $V_{GS}$ = 4.5V, $I_D$ = 3A | | 82 | 125 | |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$ = 15V, $I_D$ = 2A | | 2.5 | | S |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = 30V, $V_{GS}$ = 0V, f = 1MHz | | 414.3 | | pF |
| Output Capacitance | $C_{oss}$ | | | 29.05 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 23.06 | | |
| Gate Resistance | $R_g$ | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1MHz | | 2.35 | | Ω |
| **Switching Characteristics** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = 30V, $V_{GS}$ = 4.5V, $I_D$ = 3A | | 7 | | nC |
| Gate-source Charge | $Q_{gs}$ | | | 1.2 | | |
| Gate-drain Charge | $Q_{gd}$ | | | 1.5 | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$ = 30V, $V_{GS}$ = 10V, $R_L$ = 10Ω $R_G$ = 3Ω | | 4.7 | | ns |
| Turn-on Rise Time | $t_r$ | | | 1.8 | | |
| Turn-off Delay Ttime | $t_{d(off)}$ | | | 20 | | |
| Turn-off Fall Time | $t_f$ | | | 17.5 | | |
| **Source - Drain Diode Characteristics** | | | | | | |
| Diode Forward Voltage[2] | $V_{SD}$ | $V_{GS}$ = 0V, $I_S$ = 3A | | | 1.2 | V |

Notes :

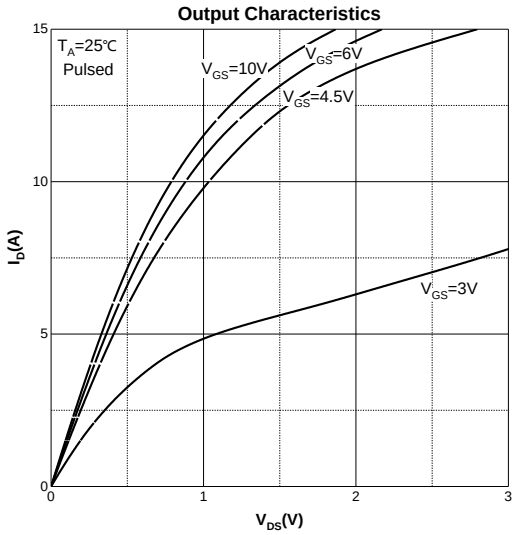
1.Pulse Test : Pulse Width ≤ 10μs, duty cycle ≤ 1%.

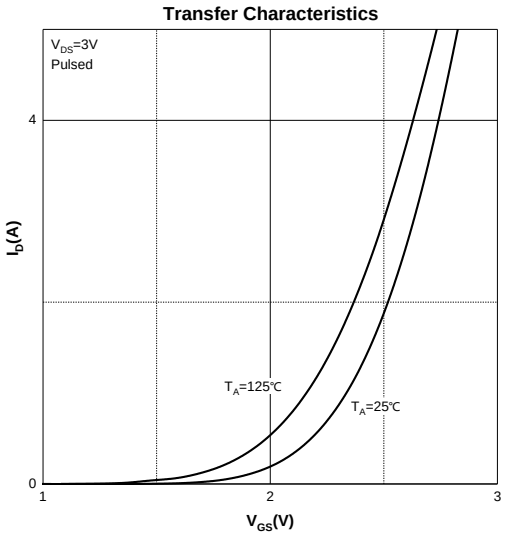
2.Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.

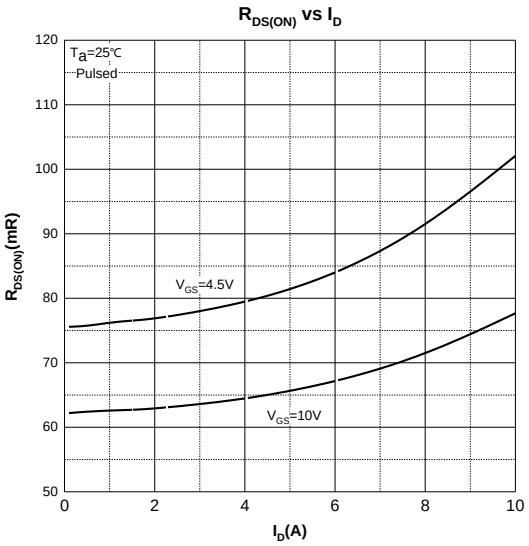
3.The power dissipation $P_D$ is limited by $T_{J(MAX)}$ = 150°C.

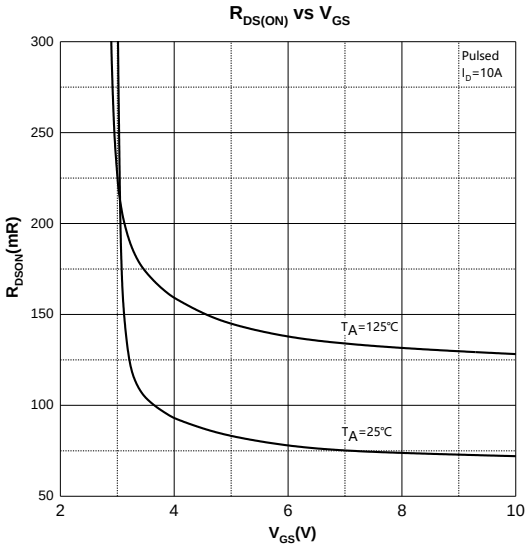
4.Device mounted on 1in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$ =25°C.

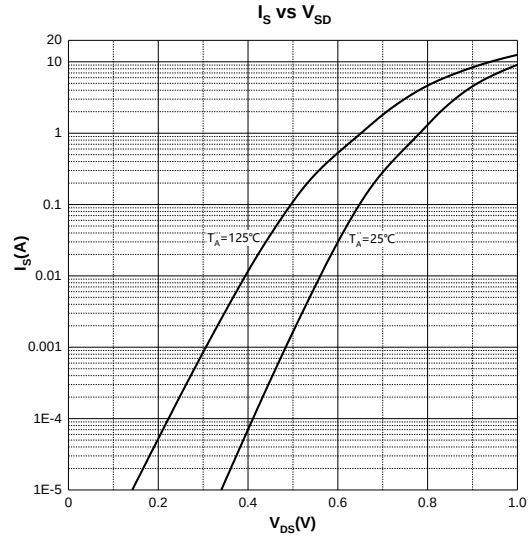
## Typical Characteristic Curves

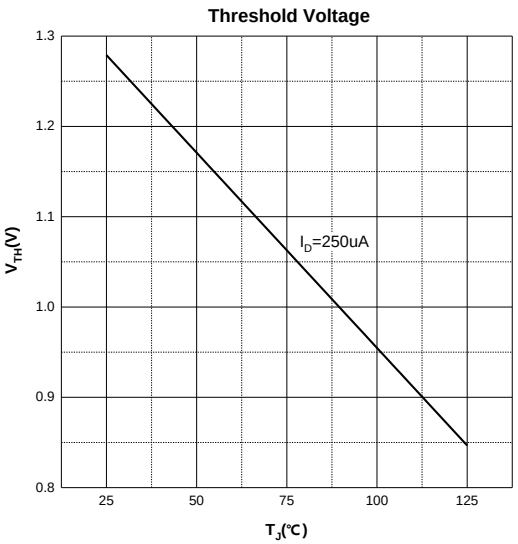


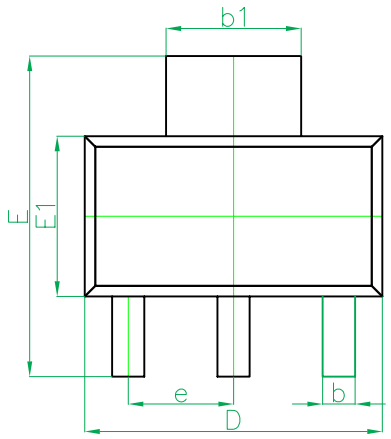



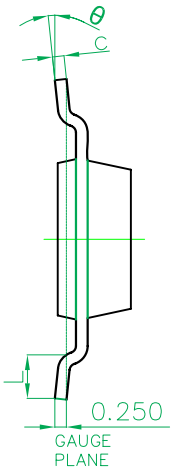



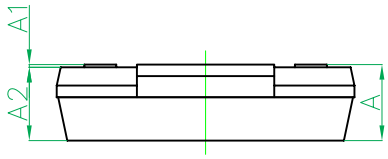



## SOT-223 Package Outline Dimensions

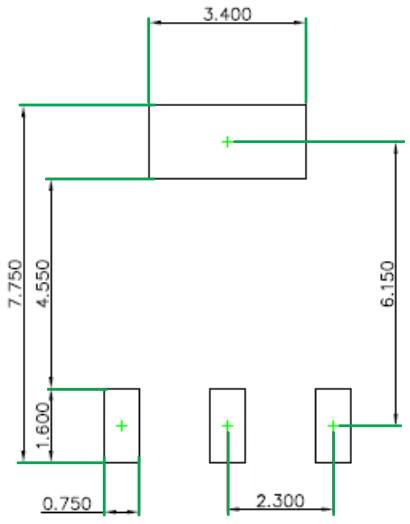



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | —— | 1.800 | —— | 0.071 |
| A1 | 0.020 | 0.100 | 0.001 | 0.004 |
| A2 | 1.500 | 1.700 | 0.059 | 0.067 |
| b | 0.660 | 0.840 | 0.026 | 0.033 |
| b1 | 2.900 | 3.100 | 0.114 | 0.122 |
| c | 0.230 | 0.350 | 0.009 | 0.014 |
| D | 6.300 | 6.700 | 0.248 | 0.264 |
| E | 6.700 | 7.300 | 0.264 | 0.287 |
| E1 | 3.300 | 3.700 | 0.130 | 0.146 |
| e | 2.300(BSC) | | 0.091(BSC) | |
| L | 0.750 | —— | 0.030 | —— |
| θ | 0° | 10° | 0° | 10° |

## SOT-223 Suggested Pad Layout




**Note:**
1.Controlling dimension:in millimeters.
2.General tolerance:±0.050mm.
3.The pad layout is for reference purposes only.

## Ordering information

| Device | Package | Reel |
|---|---|---|
| EP6001SA | SOT-223 | 2500/Tape |