

## 1. Description

The AO3422(ES) is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product AO3422(ES) is Pb-free.

## 2. Features

- 60V,  $R_{DS(ON)}=75m\Omega(Typ.) @V_{GS}=10V$
- $R_{DS(ON)}=85m\Omega(Typ.) @V_{GS}=4.5V$
- High density cell design for low  $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

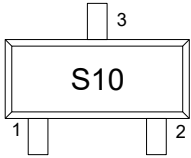
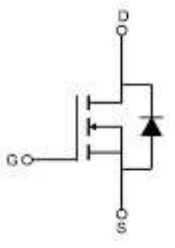
## 3. Applications

- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

## 4. Ordering Information

| Part Number | Package | Marking | Material     | Packing     | Quantity per Reel | Flammability Rating | Reel Size |
|-------------|---------|---------|--------------|-------------|-------------------|---------------------|-----------|
| AO3422(ES)  | SOT-23  | S10     | Halogen free | Tape & Reel | 3,000 PCS         | UL 94V-0            | 7 inches  |

## 5. Pin Configuration and Functions

| Pin | Function | Outline                                                                             | Circuit Diagram                                                                       |
|-----|----------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1   | Gate     |  |  |
| 2   | Source   |                                                                                     |                                                                                       |
| 3   | Drain    |                                                                                     |                                                                                       |

## 6. Specification

### Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

| Parameter                      |                    | Symbol     | Limit      | Unit |
|--------------------------------|--------------------|------------|------------|------|
| Drain-Source Voltage           |                    | $BV_{DSS}$ | 60         | V    |
| Gate-Source Voltage            |                    | $V_{GS}$   | ±20        | V    |
| Continuous Drain Current       | $T_A=25^{\circ}C$  | $I_D$      | 3.0        | A    |
|                                | $T_A=100^{\circ}C$ |            | 2.0        |      |
| Maximum Power Dissipation      |                    | $P_D$      | 1.5        | W    |
| Pulsed Drain Current           |                    | $I_{DM}$   | 12         | A    |
| Operating Junction Temperature |                    | $T_J$      | 150        | °C   |
| Lead Temperature               |                    | $T_L$      | 260        | °C   |
| Storage Temperature Range      |                    | $T_{stg}$  | -55 to 150 | °C   |

### Thermal resistance ratings

| Single Operation                       |                 |         |         |      |
|----------------------------------------|-----------------|---------|---------|------|
| Parameter                              | Symbol          | Typical | Maximum | Unit |
| Junction-to-Ambient Thermal Resistance | $R_{\theta JA}$ |         | 83      | °C/W |

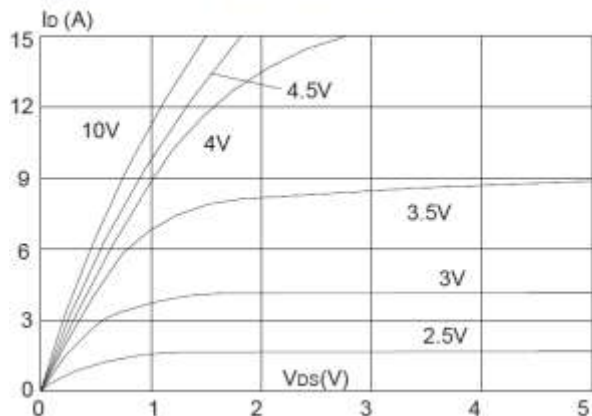
## Electrical Characteristics

At TA = 25°C unless otherwise specified

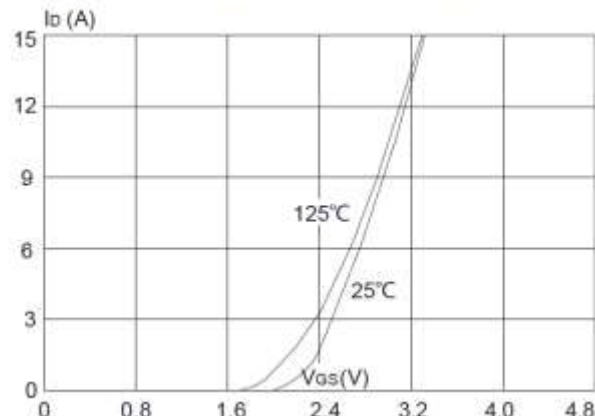
| Parameter                                 | Symbol              | Test Conditions                                                                       | Min. | Typ. | Max. | Unit |
|-------------------------------------------|---------------------|---------------------------------------------------------------------------------------|------|------|------|------|
| OFF CHARACTERISTICS                       |                     |                                                                                       |      |      |      |      |
| Drain-to-Source Breakdown Voltage         | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA                                            | 60   |      |      | V    |
| Zero Gate Voltage Drain Current           | I <sub>DSS</sub>    | V <sub>DS</sub> =60V, V <sub>GS</sub> =0V                                             |      |      | 1.0  | uA   |
| Gate-to-source Leakage Current            | I <sub>GSS</sub>    | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V                                            |      |      | ±100 | nA   |
| ON CHARACTERISTICS                        |                     |                                                                                       |      |      |      |      |
| Gate Threshold Voltage                    | V <sub>GS(TH)</sub> | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA                              | 1.0  | 1.4  | 2.0  | V    |
| Drain-to-source On-resistance             | R <sub>DS(on)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =3A                                              |      | 75   | 100  | mΩ   |
|                                           |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =2A                                             |      | 85   | 120  |      |
| CHARGES, CAPACITANCES AND GATE RESISTANCE |                     |                                                                                       |      |      |      |      |
| Input Capacitance                         | C <sub>ISS</sub>    | V <sub>GS</sub> =0V, f=1MHz,<br>V <sub>DS</sub> =25V                                  |      | 352  |      | pF   |
| Output Capacitance                        | C <sub>OSS</sub>    |                                                                                       |      | 30   |      |      |
| Reverse Transfer Capacitance              | C <sub>RSS</sub>    |                                                                                       |      | 23   |      |      |
| Total Gate Charge                         | Q <sub>G(TOT)</sub> | V <sub>GS</sub> =10V, V <sub>DD</sub> =30V,<br>I <sub>D</sub> =3A                     |      | 9    |      | nC   |
| Gate-to-Source Charge                     | Q <sub>GS</sub>     |                                                                                       |      | 1.5  |      |      |
| Gate-to-Drain Charge                      | Q <sub>GD</sub>     |                                                                                       |      | 2    |      |      |
| SWITCHING CHARACTERISTICS                 |                     |                                                                                       |      |      |      |      |
| Turn-On Delay Time                        | t <sub>d(ON)</sub>  | V <sub>GS</sub> =10V, V <sub>DD</sub> =30V,<br>I <sub>D</sub> =2A, R <sub>G</sub> =3Ω |      | 5    |      | ns   |
| Rise Time                                 | t <sub>r</sub>      |                                                                                       |      | 7    |      |      |
| Turn-Off Delay Time                       | t <sub>d(OFF)</sub> |                                                                                       |      | 37   |      |      |
| Fall Time                                 | t <sub>f</sub>      |                                                                                       |      | 22   |      |      |
| BODY DIODE CHARACTERISTICS                |                     |                                                                                       |      |      |      |      |
| Forward Voltage                           | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =2A                                               |      |      | 1.5  | V    |

## 7. Typical Characteristics

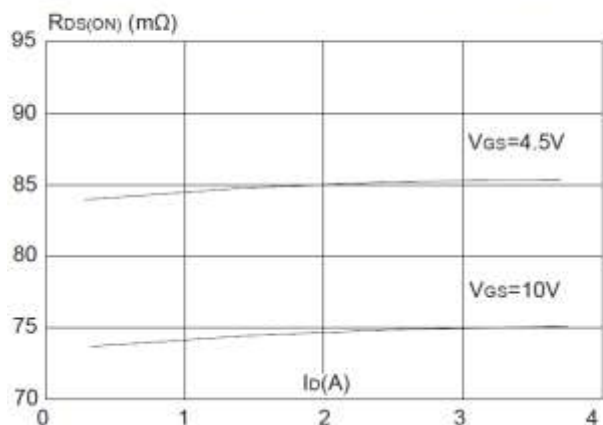
**Figure1: Output Characteristics**



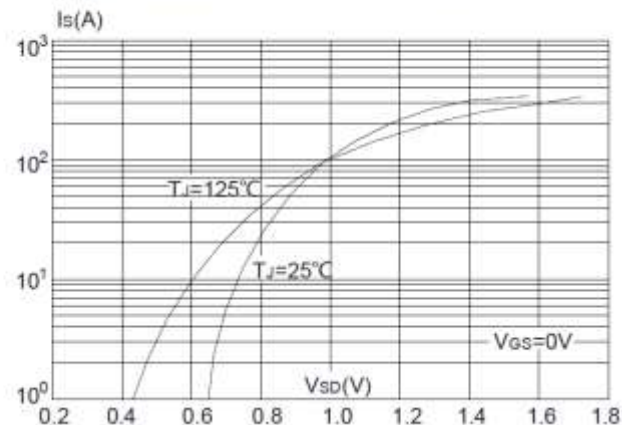
**Figure 2: Typical Transfer Characteristics**



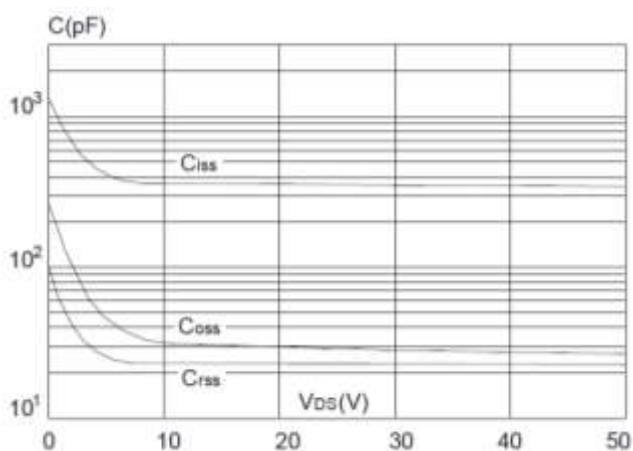
**Figure 3: On-resistance vs. Drain Current**



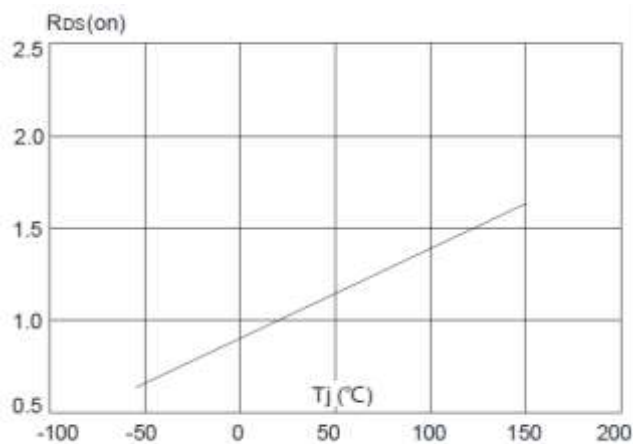
**Figure 4: Body Diode Characteristics**



**Figure 5: Capacitance Characteristics**

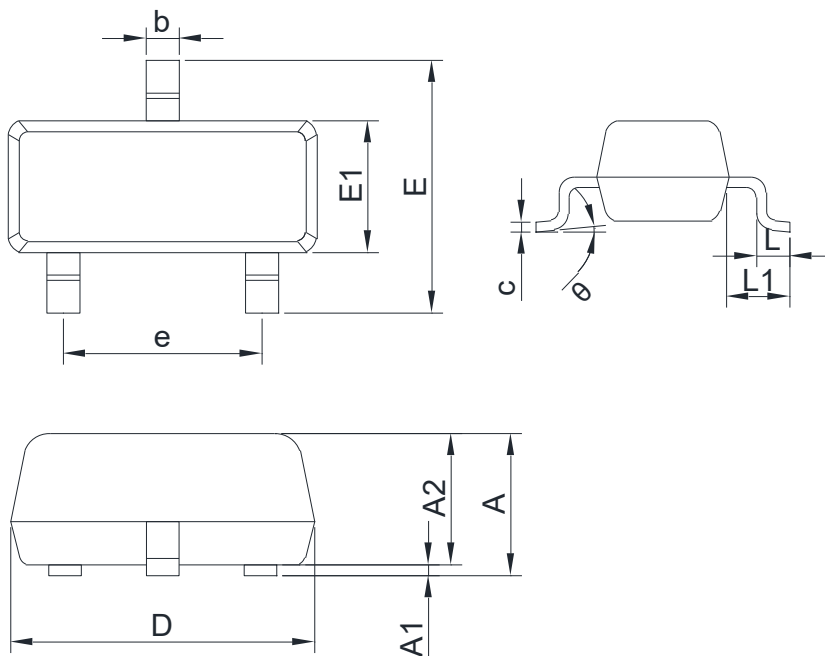


**Figure 6: Normalized on Resistance vs Junction Temperature**



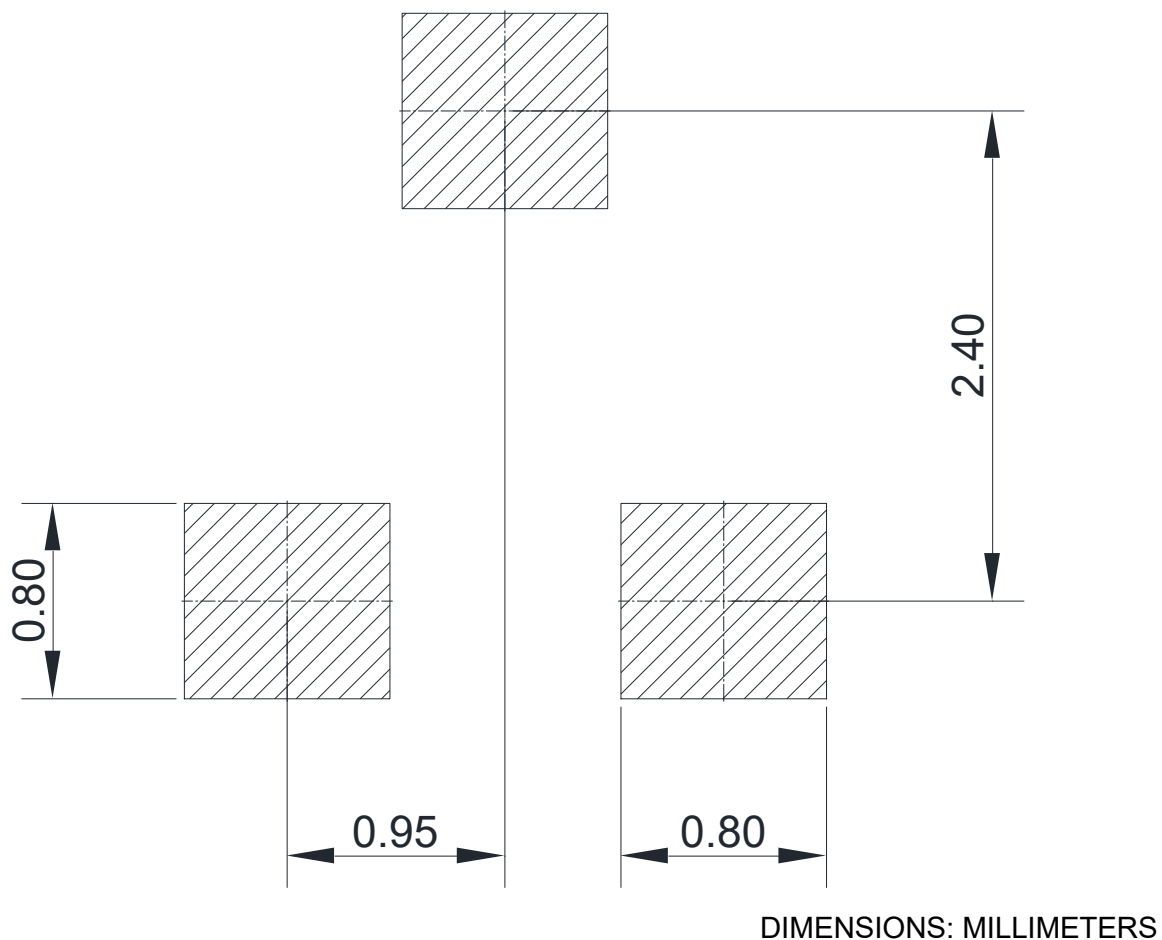
## 8. Dimension (SOT-23)

POD(Z)



| COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER |      |      |        |       |       |
|---------------------------------------------|------|------|--------|-------|-------|
| SYMBOL                                      | MIN  | MAX  | SYMBOL | MIN   | MAX   |
| A                                           | 0.90 | 1.20 | E      | 2.25  | 2.55  |
| A1                                          | 0.00 | 0.10 | E1     | 1.20  | 1.40  |
| A2                                          | 0.90 | 1.10 | e      | 1.80  | 2.00  |
| b                                           | 0.30 | 0.50 | L      | 0.30  | 0.50  |
| c                                           | 0.07 | 0.18 | L1     | 0.475 | 0.625 |
| D                                           | 2.80 | 3.04 | θ      | 0°    | 8°    |

## 9. Recommended Soldering Footprint



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