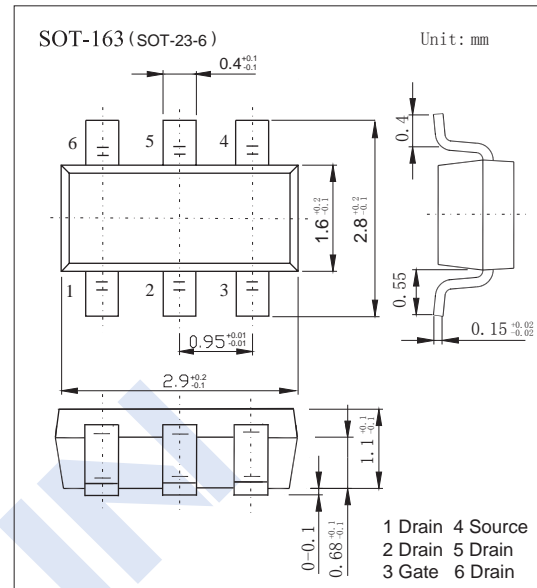
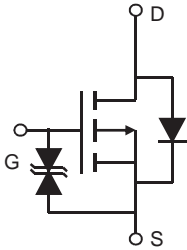


## P-Channel MOSFET

### AO6409 (KO6409)

#### ■ Features

- $V_{DS} (V) = -20V$
- $I_D = -5.5A$  ( $V_{GS} = -4.5V$ )
- $R_{DS(ON)} < 41m\Omega$  ( $V_{GS} = -4.5V$ )
- $R_{DS(ON)} < 53m\Omega$  ( $V_{GS} = -2.5V$ )
- $R_{DS(ON)} < 65m\Omega$  ( $V_{GS} = -1.8V$ )
- ESD Rating: 2000V HBM



#### ■ Absolute Maximum Ratings $T_A = 25^\circ C$

| Parameter                               |                    | Symbol     | Rating     | Unit         |
|---|--------------------|------------|------------|--------------|
| Drain-Source Voltage                    |                    | $V_{DS}$   | -20        | V            |
| Gate-Source Voltage                     |                    | $V_{GS}$   | $\pm 8$    |              |
| Continuous Drain Current                | $T_A = 25^\circ C$ | $I_D$      | -5.5       | A            |
|   | $T_A = 70^\circ C$ |            | -4.2       |              |
| Pulsed Drain Current                    |                    | $I_{DM}$   | -30        |              |
| Power Dissipation                       | $T_A = 25^\circ C$ | $P_D$      | 2.1        | W            |
|   | $T_A = 70^\circ C$ |            | 1.3        |              |
| Thermal Resistance.Junction- to-Ambient | $t \leq 10s$       | $R_{thJA}$ | 60         | $^\circ C/W$ |
|   | Steady-State       |            | 90         |              |
| Thermal Resistance.Junction- to-Lead    |                    | $R_{thJL}$ | 45         |              |
| Junction Temperature                    |                    | $T_J$      | 150        | $^\circ C$   |
| Junction Storage Temperature Range      |                    | $T_{stg}$  | -55 to 150 |              |

## P-Channel MOSFET

### AO6409 (KO6409)

#### ■ Electrical Characteristics Ta = 25°C

| Parameter                             | Symbol              | Test Conditions  | Min  | Typ | Max  | Unit |
|---------------------------------------|---------------------|--|------|-----|------|------|
| Drain-Source Breakdown Voltage        | V <sub>DSS</sub>    | I <sub>D</sub> =-250 μA, V <sub>GS</sub> =0V   | -20  |     |      | V    |
| Gate-Source breakdown voltage         | BV <sub>GSO</sub>   | V <sub>DS</sub> = 0 V, I <sub>G</sub> =±250μA  | ±8   |     |      |      |
| Zero Gate Voltage Drain Current       | I <sub>DSS</sub>    | V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V   |      |     | -1   | μA   |
|                                       |                     | V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C                             |      |     | -5   |      |
| Gate-Body leakage current             | I <sub>GSS</sub>    | V <sub>DS</sub> =0V, V <sub>GS</sub> =±8V  |      |     | ±10  | μA   |
| Gate Threshold Voltage                | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250 μA                                   | -0.3 |     | -0.9 | V    |
| Static Drain-Source On-Resistance     | R <sub>DS(on)</sub> | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5.5A  |      |     | 41   | mΩ   |
|                                       |                     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5.5A T <sub>J</sub> =125°C                          |      |     | 59   |      |
|                                       |                     | V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-4A  |      |     | 53   |      |
|                                       |                     | V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-2A  |      |     | 65   |      |
| On state drain current                | I <sub>D(ON)</sub>  | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-5V   | -30  |     |      | A    |
| Forward Transconductance              | g <sub>FS</sub>     | V <sub>DS</sub> =-5V, I <sub>D</sub> =-5.5A  |      | 20  |      | S    |
| Input Capacitance                     | C <sub>iss</sub>    | V <sub>GS</sub> =0V, V <sub>DS</sub> =-10V, f=1MHz   | 600  |     | 905  | pF   |
| Output Capacitance                    | C <sub>oss</sub>    |  | 80   |     | 150  |      |
| Reverse Transfer Capacitance          | C <sub>rss</sub>    |  | 48   |     | 115  |      |
| Gate resistance                       | R <sub>g</sub>      | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz   | 6    |     | 20   | Ω    |
| Total Gate Charge                     | Q <sub>g</sub>      | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-10V, I <sub>D</sub> =-5.5A                         | 7.4  |     | 11   | nC   |
| Gate Source Charge                    | Q <sub>gs</sub>     |  | 0.8  |     | 1.2  |      |
| Gate Drain Charge                     | Q <sub>gd</sub>     |  | 1.3  |     | 3.1  |      |
| Turn-On DelayTime                     | t <sub>d(on)</sub>  | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-10V, R <sub>L</sub> =1.8Ω,<br>R <sub>GEN</sub> =3Ω |      | 13  |      | ns   |
| Turn-On Rise Time                     | t <sub>r</sub>      |  |      | 9   |      |      |
| Turn-Off DelayTime                    | t <sub>d(off)</sub> |  |      | 19  |      |      |
| Turn-Off Fall Time                    | t <sub>f</sub>      |  |      | 29  |      |      |
| Body Diode Reverse Recovery Time      | t <sub>rr</sub>     | I <sub>F</sub> =-5.5A, di/dt=500A/μs   | 20   |     | 32   | nC   |
| Body Diode Reverse Recovery Charge    | Q <sub>rr</sub>     |  | 40   |     | 62   |      |
| Maximum Body-Diode Continuous Current | I <sub>S</sub>      |  |      |     | -2   | A    |
| Diode Forward Voltage                 | V <sub>SD</sub>     | I <sub>S</sub> =-1A, V <sub>GS</sub> =0V   |      |     | -1   | V    |

\* The static characteristics in Figures 1 to 6 are obtained using <300us pulses, duty cycle 0.5% max.

#### ■ Marking

|         |      |
|---------|------|
| Marking | D9** |
|---------|------|

## P-Channel MOSFET AO6409 (KO6409)

### Typical Characteristics

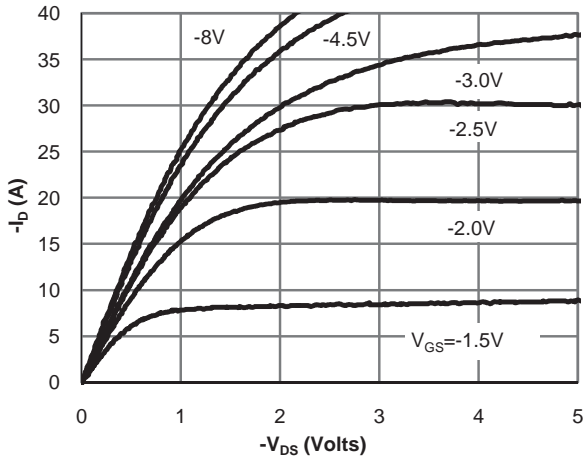


Fig 1: On-Region Characteristics (Note E)

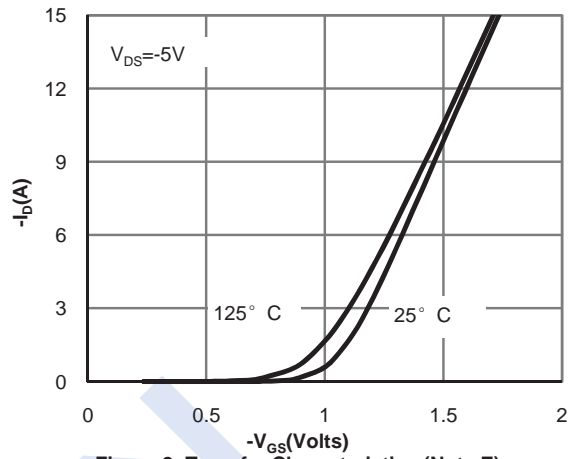


Figure 2: Transfer Characteristics (Note E)

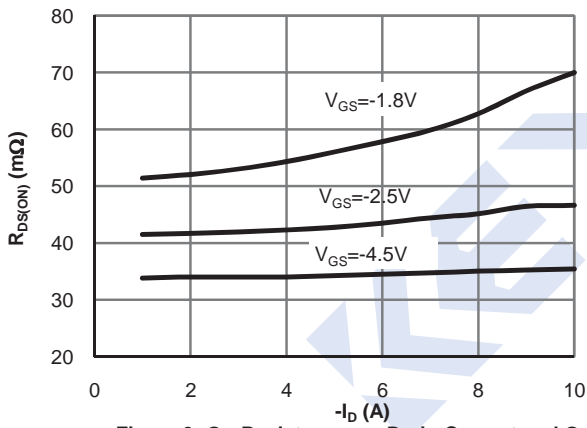


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

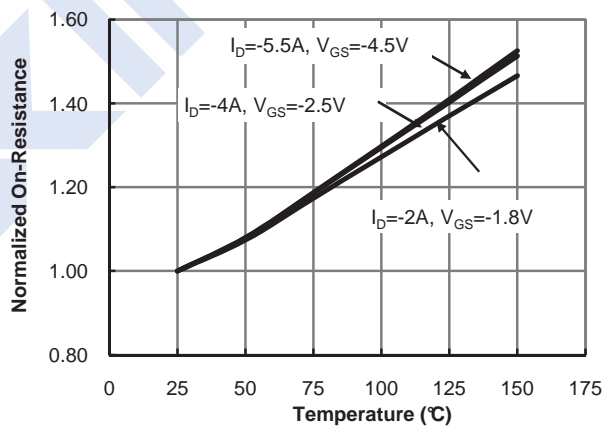


Figure 4: On-Resistance vs. Junction Temperature (Note E)

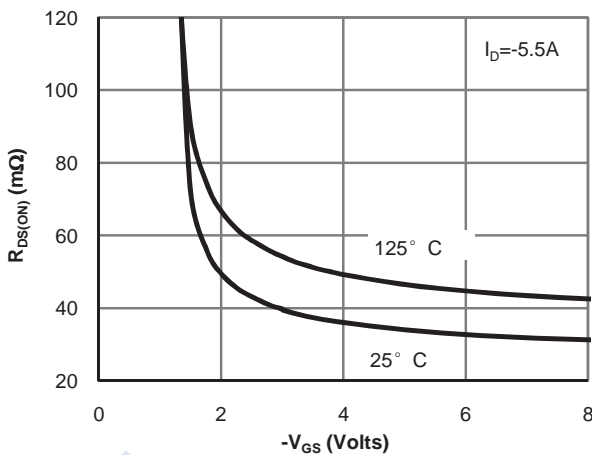


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

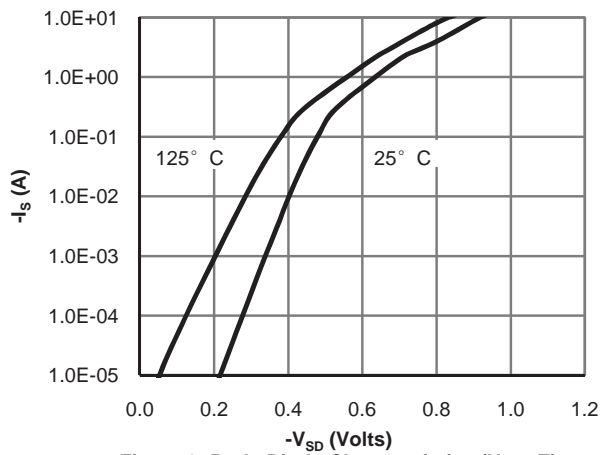


Figure 6: Body-Diode Characteristics (Note E)

## P-Channel MOSFET AO6409 (KO6409)

■ Typical Characteristics

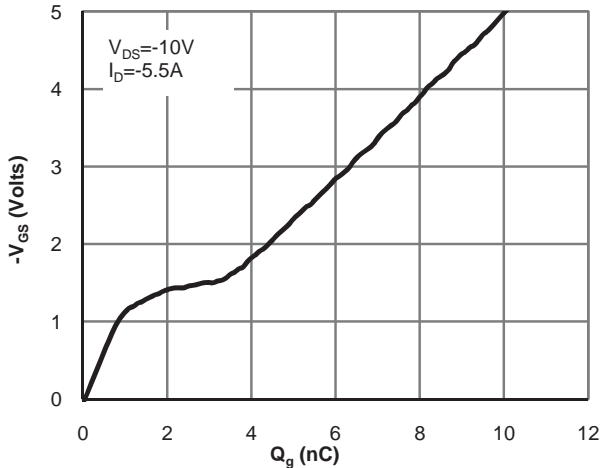


Figure 7: Gate-Charge Characteristics

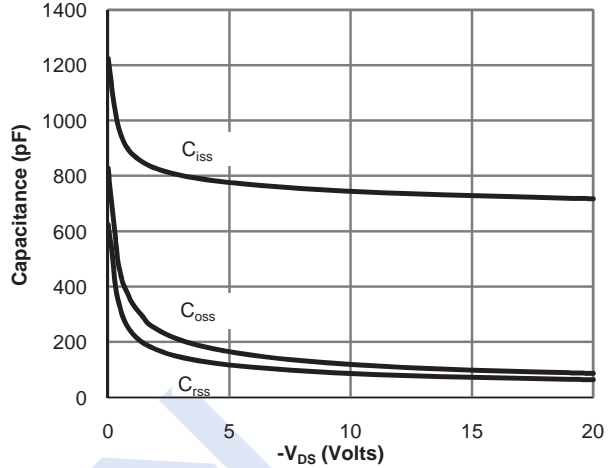


Figure 8: Capacitance Characteristics

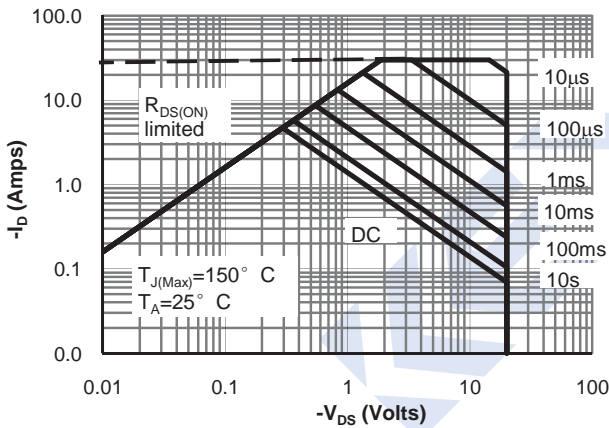


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

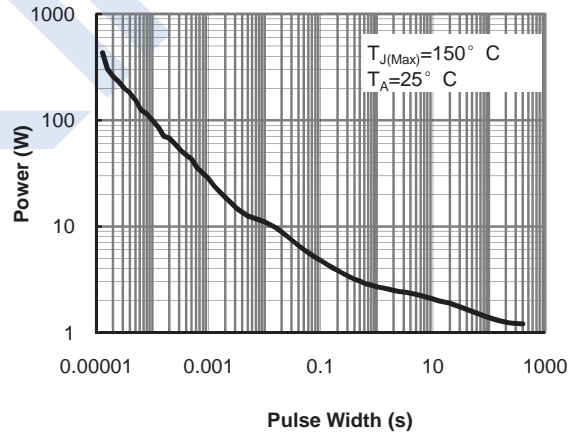


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

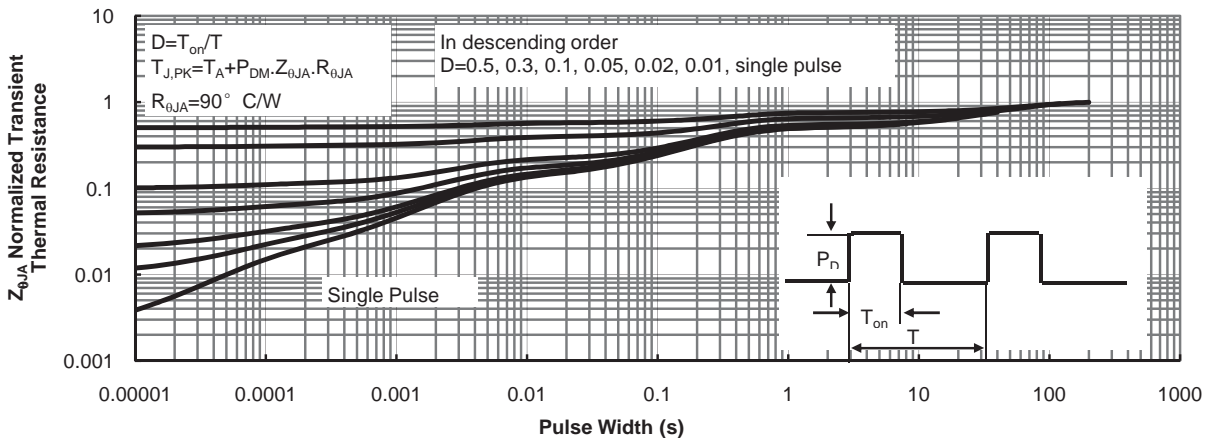


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)