

**SuperMOS – SOP8 -30V  $V_{DSS}$ , 37.5m $\Omega$   $R_{DS(on)}$ , -5.8A  $I_D$  P-channel MOSFET**

**1. Description**

The AO4405 is P-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 AO4405 is Pb-free.

**2. Features**

- -30V,  $R_{DS(ON)}$ =37.5m $\Omega$ (Typ),  $V_{GS}$ =-10V
- $R_{DS(ON)}$ =54m $\Omega$ (Typ),  $V_{GS}$ =-4.5V
- Fast Switching
- High density cell design for low  $R_{DS(on)}$
- Material : Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

**3. Applications**

- PWM applications 100% UIS TESTED
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

**4. Ordering Information**

Part Number	Package	Marking	Material	Quantity per reel	Flammability Rating
AO4405	SOP8	ES4405/lot	Halogen free	3,000 PCS	UL 94V-0

Table-1 Ordering information

**5. Pin Configuration and Functions**


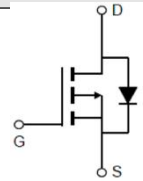
Pin	Function	Outline	Circuit Diagram
4	Gate		
1/2/3	Source		
5/6/7/8	Drain		

Table-2 Pin configuration

## 6. Specification

### Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$BV_{DSS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$T_A=25^\circ\text{C}$	-5.8
		$T_A=75^\circ\text{C}$	-4.5
Maximum Power Dissipation	$P_D$	$T_A=25^\circ\text{C}$	3.1
		$T_A=75^\circ\text{C}$	1.9
Pulsed Drain Current	$I_{DM}$	-23.2	A
Operating Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-55 to +150	$^\circ\text{C}$

#### Thermal resistance ratings

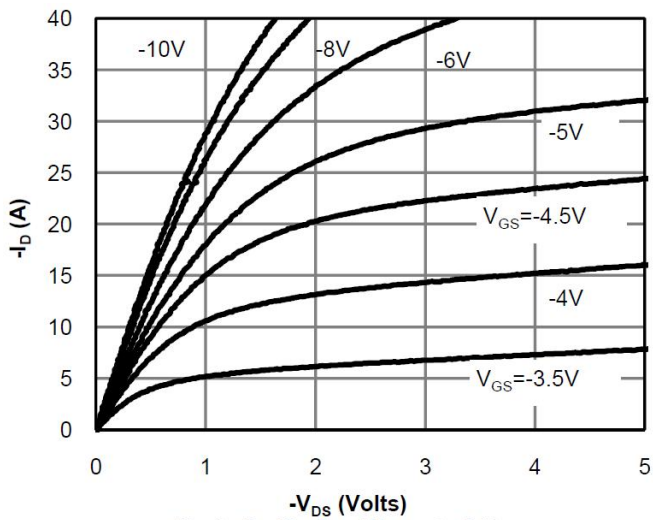
Single Operation				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance <sup>a</sup> ( $t \leq 10\text{s}$ )	$R_{\theta JA}$	32	40	$^\circ\text{C/W}$

## Electrical Characteristics

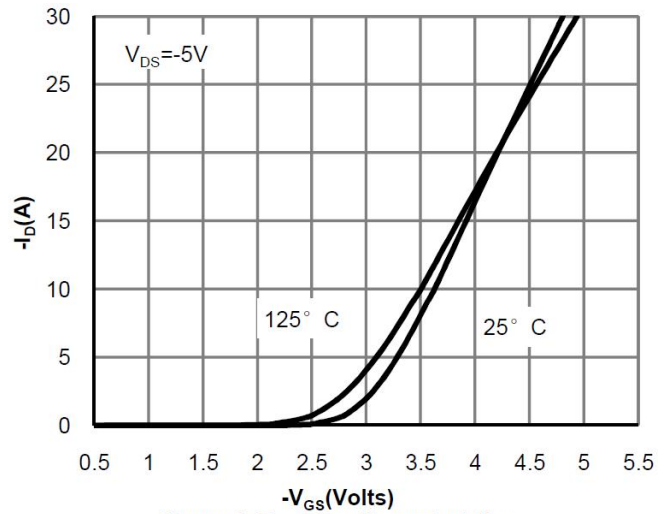
At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-30V, V_{GS}=0V$			-1	$\mu A$
Gate-to-source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.5	-2.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-5A$		37.5	60	m $\Omega$
		$V_{GS}=-4.5V, I_D=-4A$		54	80	
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V$ $V_{DS}=-15V$ $f=1MHz$		550		pF
Output Capacitance	$C_{OSS}$			105		
Reverse Transfer Capacitance	$C_{RSS}$			63		
Gate Resistance	$R_g$	$f=1MHz$		7.5		$\Omega$
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=-10V$ $V_{DS}=-15V$ $I_D=-5A$		9.5	11.2	nC
Gate-to-Source Charge	$Q_{GS}$			4.5	6	
Gate-to-Drain Charge	$Q_{GD}$			1.8		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=-10V$ $V_{DS}=-15V$ $R_L=3.5\Omega$ $R_G=3\Omega$		8		ns
Rise Time	$t_r$			6		
Turn-Off Delay Time	$t_{d(OFF)}$			19		
Fall Time	$t_f$			7		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-1.0A$		-0.7	-1.2	V

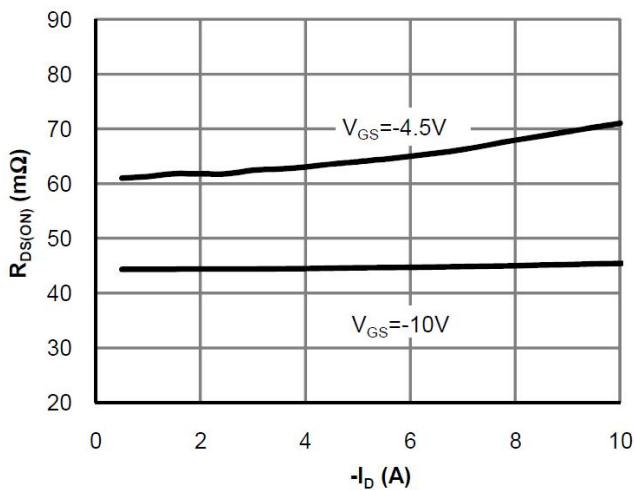
**7. Typical Characteristic**



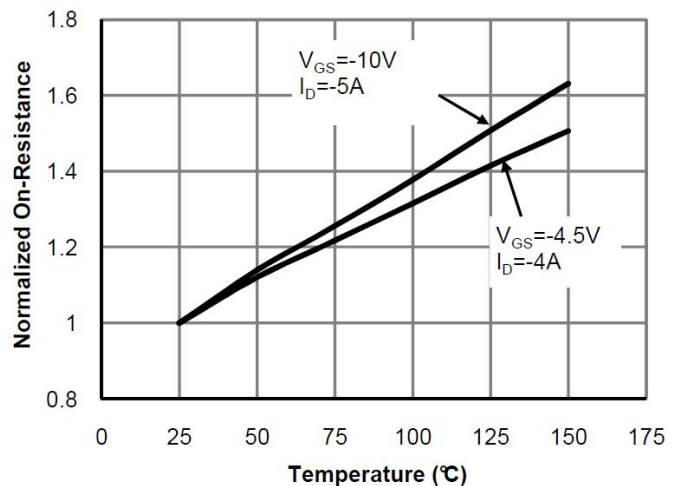
**Fig 1: On-Region Characteristics**



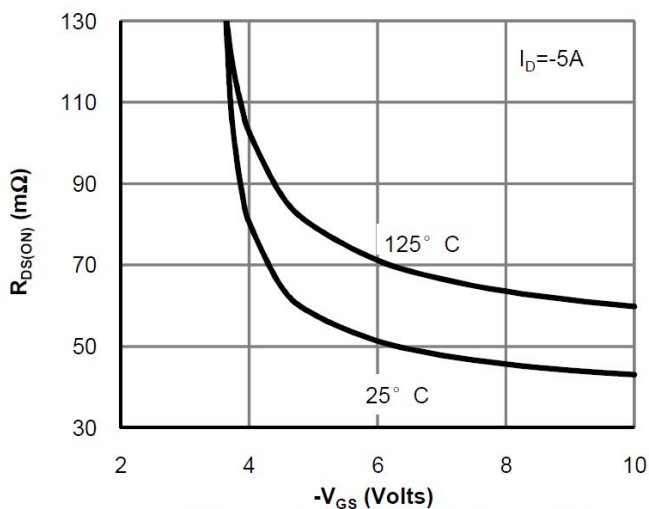
**Figure 2: Transfer Characteristics**



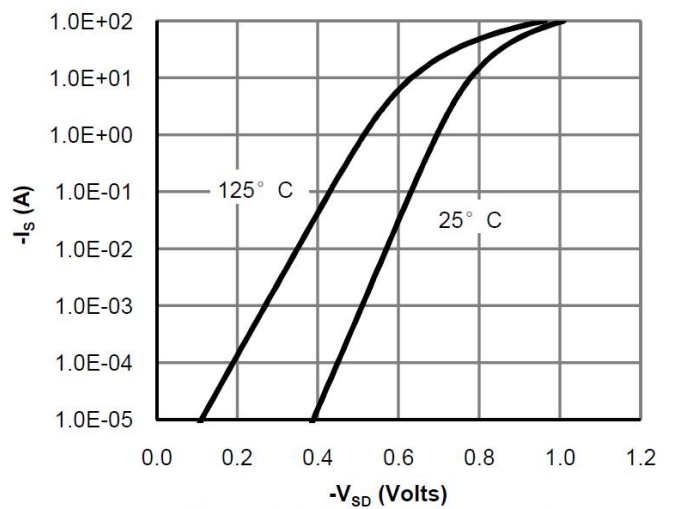
**Figure 3: On-Resistance vs. Drain Current and Gate Voltage**



**Figure 4: On-Resistance vs. Junction Temperature**



**Figure 5: On-Resistance vs. Gate-Source Voltage**



**Figure 6: Body-Diode Characteristics**

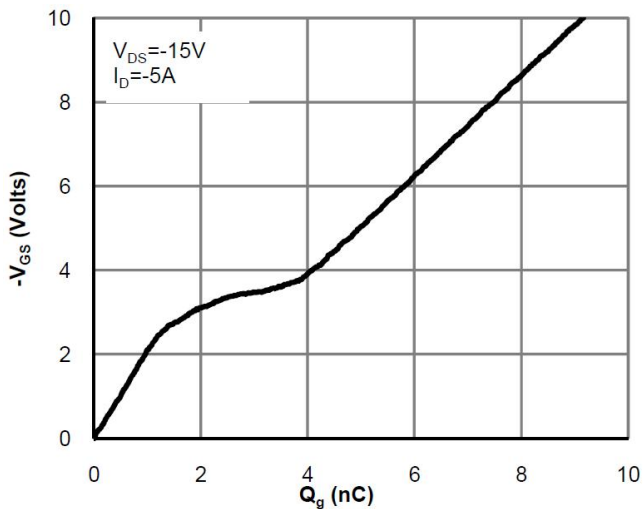


Figure 7: Gate-Charge Characteristics

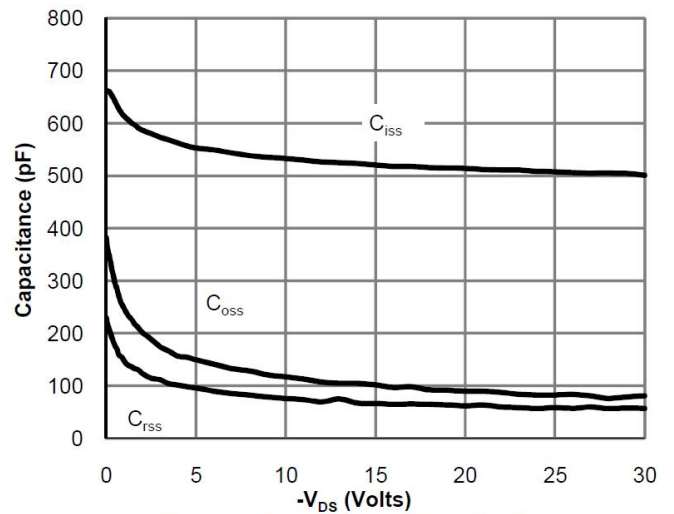


Figure 8: Capacitance Characteristics

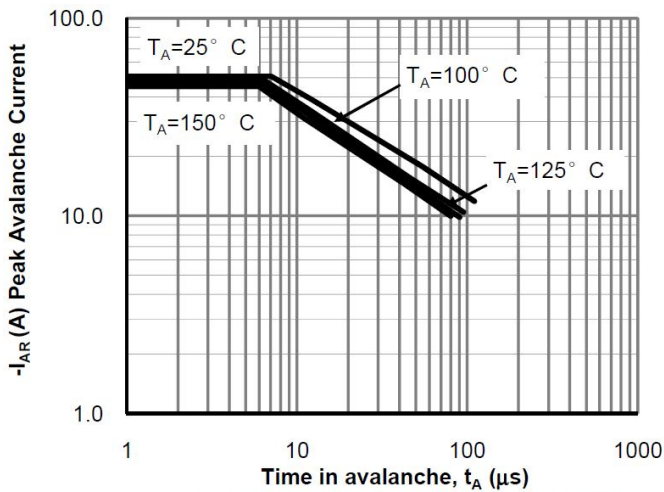


Figure 9: Single Pulse Avalanche capability

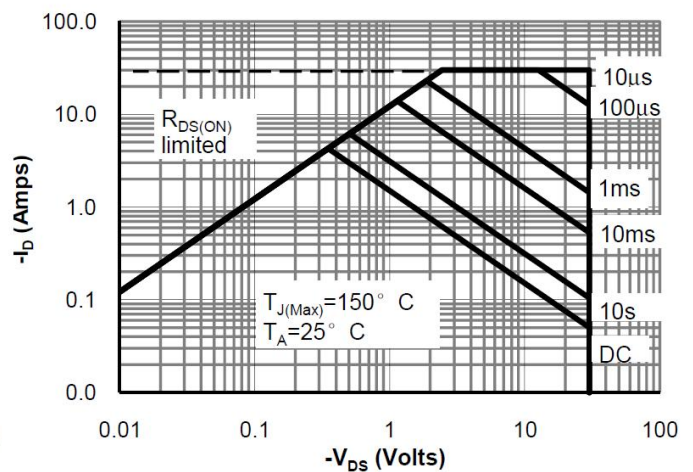


Figure 10: Maximum Forward Biased Safe Operating Area

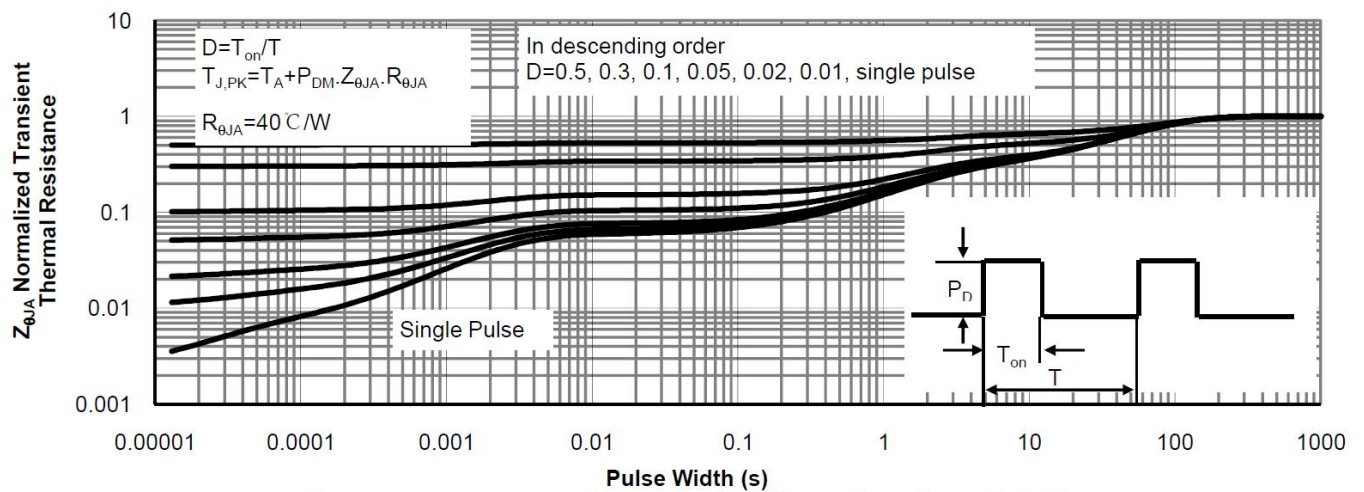
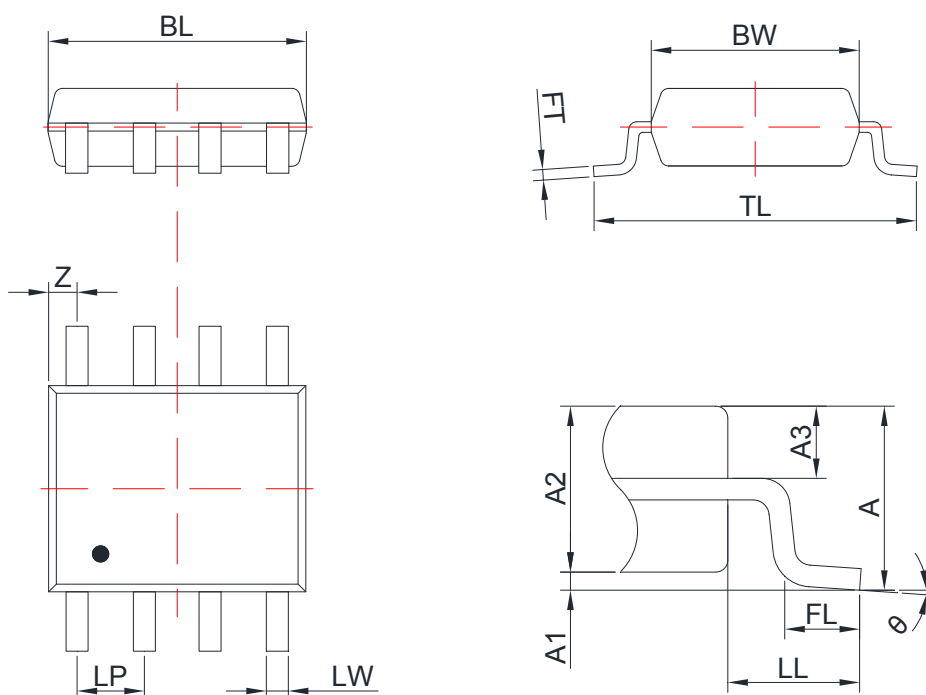


Figure 12: Normalized Maximum Transient Thermal Impedance (Note F)

**8. Dimension (SOP8)**



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
A	1.75		FL	0.50	0.80
A1	0.05	0.15	LP	1.25	1.30
A2	1.40	1.50	LL	1.1 BSC	
A3	0.623 BSC		LW	0.38	0.43
BL	4.92	5.80	TL	5.90	6.10
BW	3.70	4.10	Z	0.54	
FT	0.20	0.21	θ	0°	8°

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