



产品规格手册

PRODUCT SPECIFICATION MANUAL

AO4409

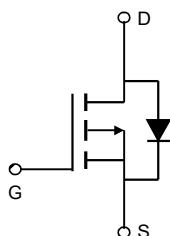
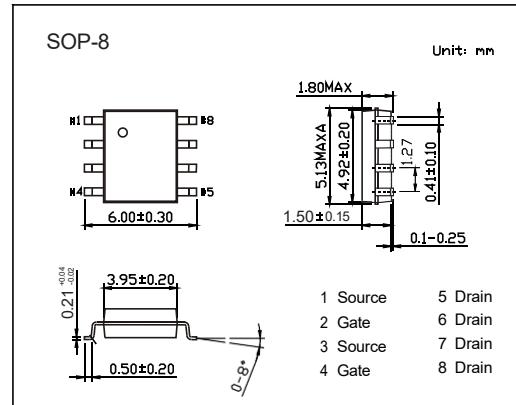
-30V/-15A P-Channel MOSFET
SOP8





■ Features

- $V_{DS}(V) = -30V$
- $ID = -15 A (VGS = -10V)$
- $RDS(ON) < 7.5m\Omega$
($VGS = -10V$)
- $RDS(ON) < 12m\Omega$
($VGS = -4.5V$)



■ Absolute Maximum Ratings $T_a = 25^\circ C$

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current	I_D <small>TA=25°C</small>	-15	A
	I_D <small>TA=70°C</small>	-12,8	
Pulsed Drain Current	I_{DM}	-80	
Avalanche Current	I_{AS}, I_{AR}	30	
Avalanche energy	E_{AS}, E_{AR} <small>L=0.1mH</small>	135	mJ
Power Dissipation	P_D <small>TA=25°C</small>	3.1	W
	P_D <small>TA=70°C</small>	2	
Thermal Resistance.Junction- to-Ambient	R_{thJA} <small>t ≤ 10s</small>	40	°C/W
	R_{thJA} <small>Steady-State</small>	75	
Thermal Resistance.Junction- to-Lead	R_{thJL}	24	
Junction Temperature	T_J	150	°C
Junction Storage Temperature Range	T_{stg}	-55 to 150	

■ Electrical Characteristics $T_a = 25^\circ\text{C}$

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	$I_D=-250 \mu\text{A}, V_{GS}=0\text{V}$	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-30\text{V}, V_{GS}=0\text{V}$			-5	μA
		$V_{DS}=-30\text{V}, V_{GS}=0\text{V}, T_J=55^\circ\text{C}$			-25	
Gate-Body leakage current	I_{GSS}	$V_{DS}=0\text{V}, V_{GS}=\pm 20\text{V}$			± 100	nA
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS}=V_{GS}, I_D=-250 \mu\text{A}$	-1.4		-2.7	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-10\text{V}, I_D=-15\text{A}$			7.5	$\text{m}\Omega$
		$V_{GS}=-10\text{V}, I_D=-15\text{A}, T_J=125^\circ\text{C}$			11.5	
		$V_{GS}=-4.5\text{V}, I_D=-10\text{A}$			12	
On state drain current	$I_D(\text{ON})$	$V_{GS}=-10\text{V}, V_{DS}=-5\text{V}$	-80			A
Forward Transconductance	g_{FS}	$V_{DS}=-5\text{V}, I_D=-15\text{A}$	35	50		S
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}, V_{DS}=-15\text{V}, f=1\text{MHz}$		5270	6400	pF
Output Capacitance	C_{oss}			945		
Reverse Transfer Capacitance	C_{rss}			745		
Gate resistance	R_g	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$		2	3	Ω
Total Gate Charge (10V)	Q_g	$V_{GS}=-10\text{V}, V_{DS}=-15\text{V}, I_D=-15\text{A}$		100	120	nC
Total Gate Charge (4.5V)				51.5		
Gate Source Charge	Q_{gs}			14.5		
Gate Drain Charge	Q_{gd}			23		
Turn-On DelayTime	$t_{d(on)}$	$V_{GS}=-10\text{V}, V_{DS}=-15\text{V}, R_L=1\Omega, R_{GEN}=3\Omega$		14		ns
Turn-On Rise Time	t_r			16.5		
Turn-Off DelayTime	$t_{d(off)}$			76.5		
Turn-Off Fall Time	t_f			37.5		
Body Diode Reverse Recovery Time	t_{rr}	$I_F=-15\text{A}, dI/dt=100\text{A}/\mu\text{s}$		36.7	45	nC
Body Diode Reverse Recovery Charge	Q_{rr}			28		
Maximum Body-Diode Continuous Current	I_S				-5	A
Diode Forward Voltage	V_{SD}	$I_S=-1\text{A}, V_{GS}=0\text{V}$			-1	V

Note : The static characteristics in Figures 1 to 6 are obtained using $<300 \mu\text{s}$ pulses, duty cycle 0.5% max.

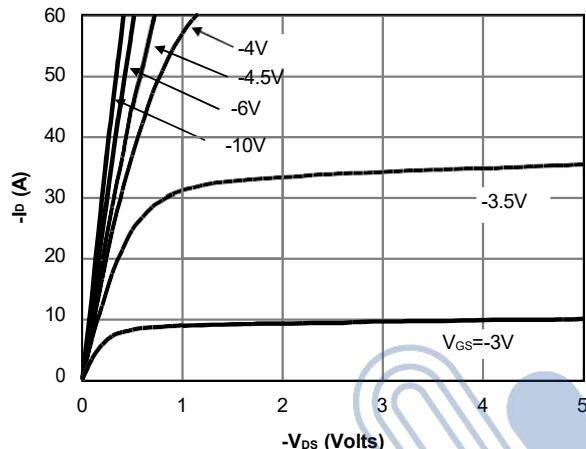


Fig 1: On-Region Characteristics (Note E)

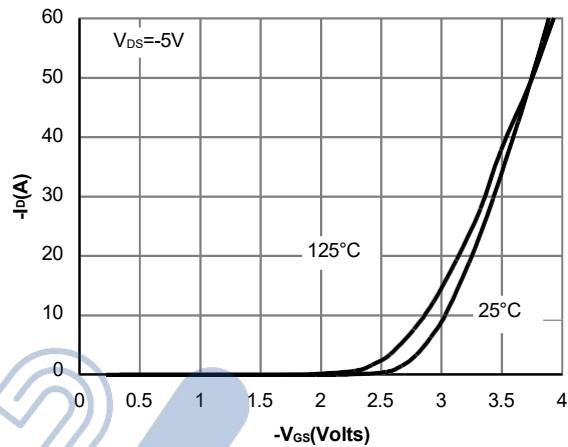


Figure 2: Transfer Characteristics (Note E)

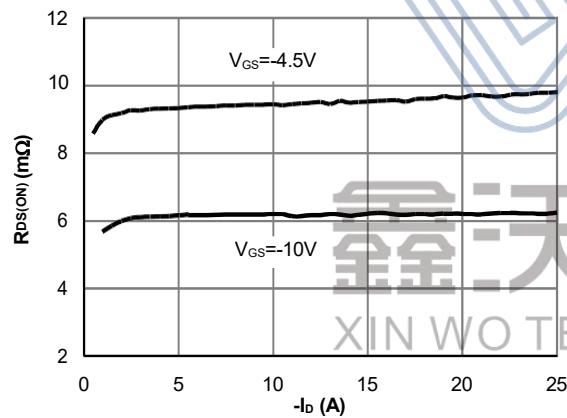


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

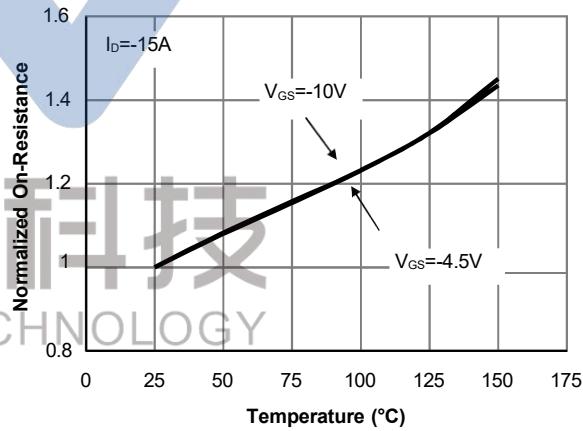


Figure 4: On-Resistance vs. Junction Temperature (Note E)

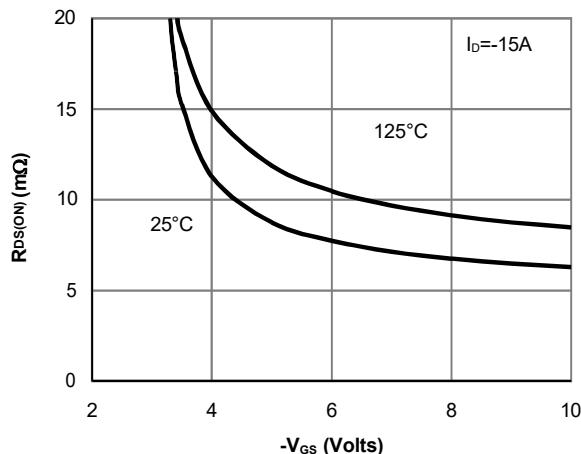


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

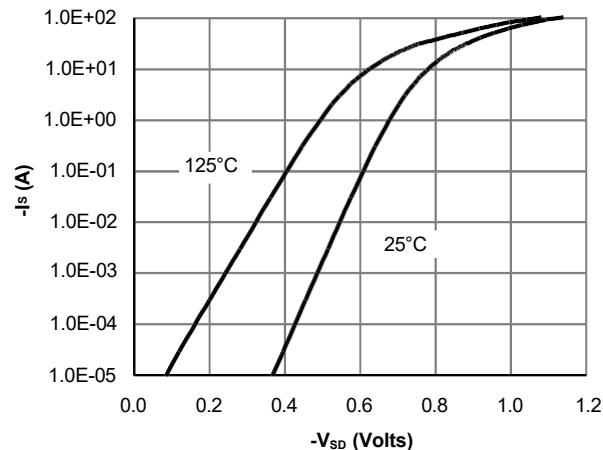


Figure 6: Body-Diode Characteristics (Note E)

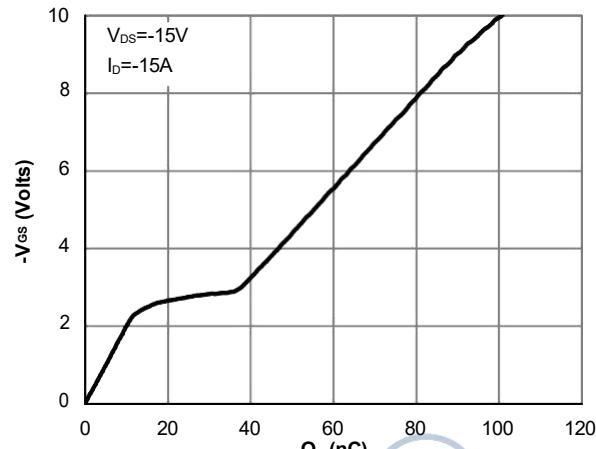


Figure 7: Gate-Charge Characteristics

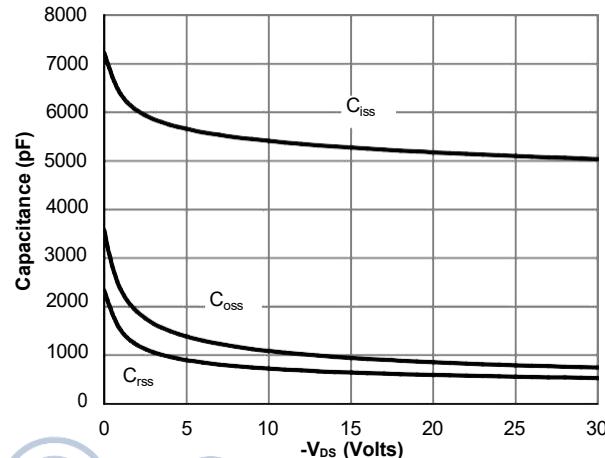


Figure 8: Capacitance Characteristics

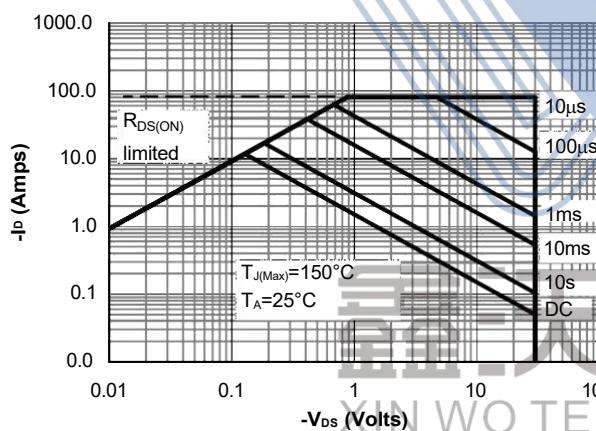


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

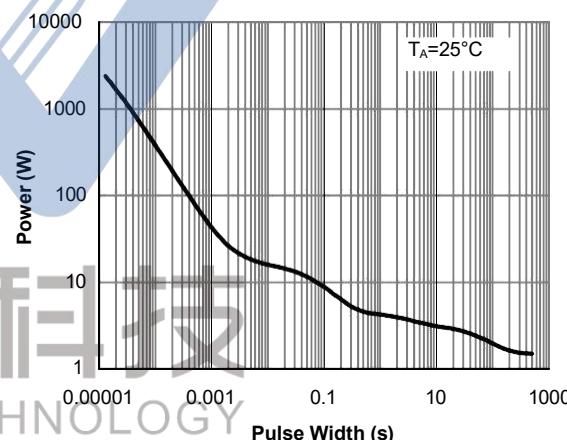


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

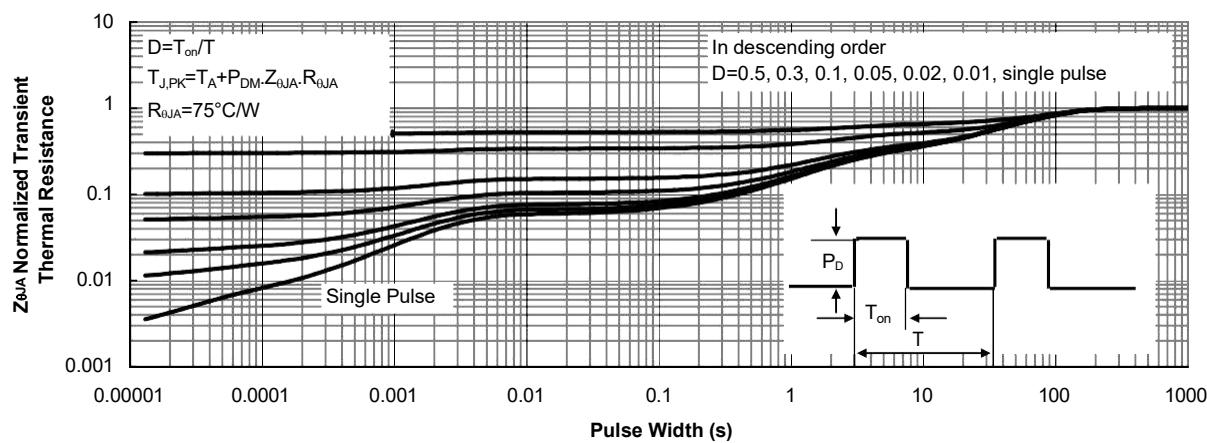
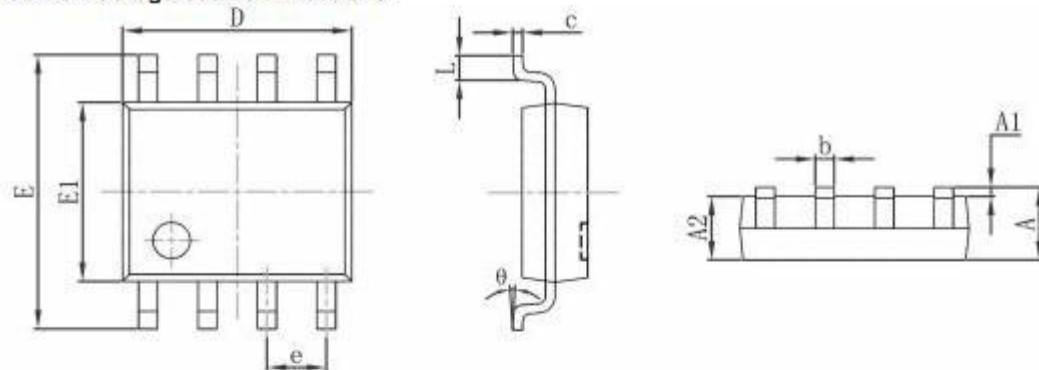
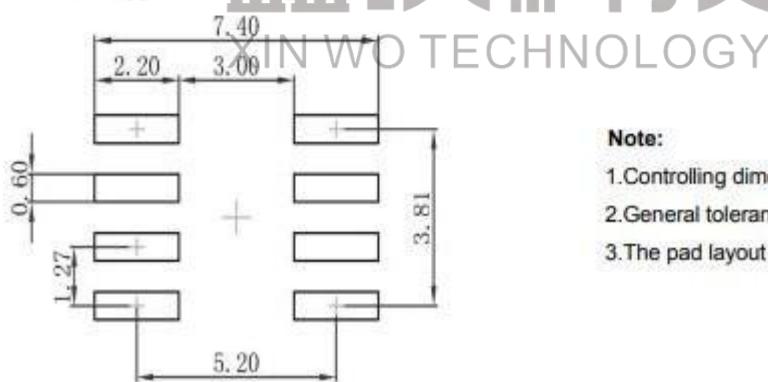


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

**SOP-8 Package Outline Dimensions**

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270(BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

SOP-8 Suggested Pad Layout**Note:**

1. Controlling dimension: in millimeters
2. General tolerance: $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only