

General Description

The AO4466 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications. The source leads are separated to allow a Kelvin connection to the source, which may be used to bypass the source inductance.

* RoHS and Halogen-Free Compliant

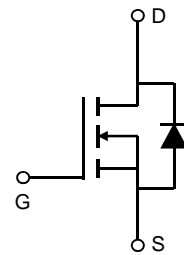
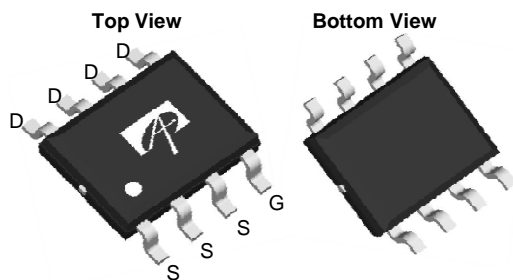
Product Summary

$V_{DS} (V) = 30V$
 $I_D = 10A$ ($V_{GS} = 10V$)
 $R_{DS(ON)} < 23m\Omega$ ($V_{GS} = 10V$)
 $R_{DS(ON)} < 35m\Omega$ ($V_{GS} = 4.5V$)

100% UIS Tested
 100% Rg Tested



SOIC-8



Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^{AF}	I_D	10	A
		$T_A=70^\circ C$	
Pulsed Drain Current ^B	I_{DM}	64	
Power Dissipation	P_D	3.1	W
		$T_A=70^\circ C$	
Avalanche Current ^{B, G}	I_{AR}	12	A
Repetitive avalanche energy 0.1mH ^{B, G}	E_{AR}	7	mJ
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	36	40	$^\circ C/W$
		Steady-State	62	
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	18	24	$^\circ C/W$

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0V	30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30 V _{GS} =0V T _J =55°C			1 5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} = ±20V			100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =250μA	1.5	2.1	2.6	V
I _{D(ON)}	On state drain current	V _{GS} =4.5V, V _{DS} =5V	64			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =10A T _J =125°C		16.7 24.3	23 30	mΩ
		V _{GS} =4.5V, I _D =5A		23.7	35	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =10A		17		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.75	1	V
I _S	Maximum Body-Diode Continuous Current				2.4	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz	298	373	448	pF
C _{oss}	Output Capacitance		46	67	88	pF
C _{rss}	Reverse Transfer Capacitance		24	41	58	pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	0.6	1.8	2.8	Ω
SWITCHING PARAMETERS						
Q _{g(10V)}	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =10A	5.7	7.1	8.6	nC
Q _{g(4.5V)}	Total Gate Charge		2.7	3.5	4.2	nC
Q _{gs}	Gate Source Charge			1.2		nC
Q _{gd}	Gate Drain Charge			1.6		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =1.5Ω, R _{GEN} =3Ω		4.3		ns
t _r	Turn-On Rise Time			2.8		ns
t _{D(off)}	Turn-Off DelayTime			15.8		ns
t _f	Turn-Off Fall Time			3		ns
t _{rr}	Body Diode Reverse Recovery Time		I _F =10A, dI/dt=100A/μs	8.4	10.5	12.6
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =10A, dI/dt=100A/μs	3.6	4.5	5.4	nC
t _{rr}	Body Diode Reverse Recovery Time	I _F =10A, dI/dt=500A/μs	4.7	6.0	7.2	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =10A, dI/dt=500A/μs	5.3	6.6	8	nC

A: The value of R_{θJA} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The SOA curve provides a single pulse rating.

F: The current rating is based on the t ≤ 10s junction to ambient thermal resistance rating.

G: L=100uH, V_{DD}=0V, R_G=0Ω, rated V_{DS}=30V and V_{GS}=10V

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

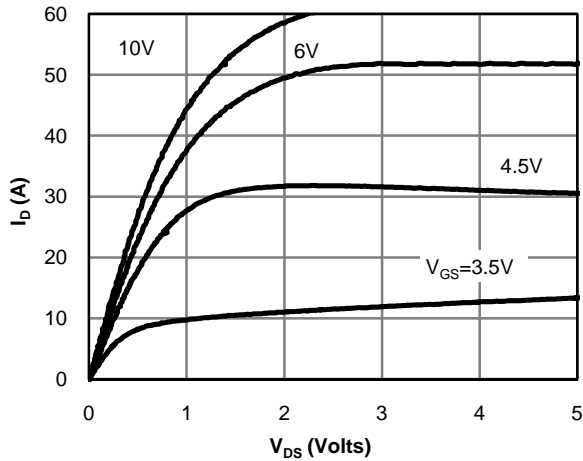


Fig 1: On-Region Characteristics

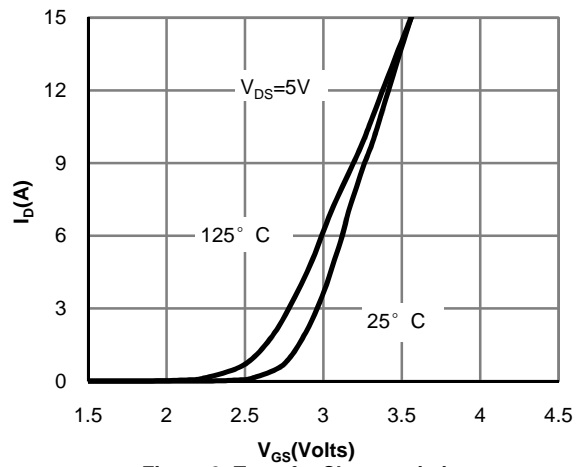


Figure 2: Transfer Characteristics

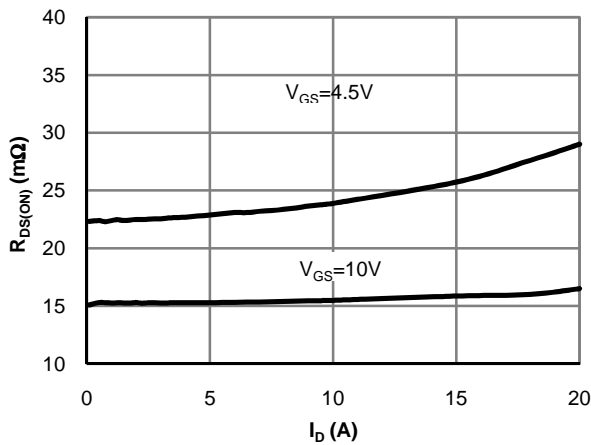


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

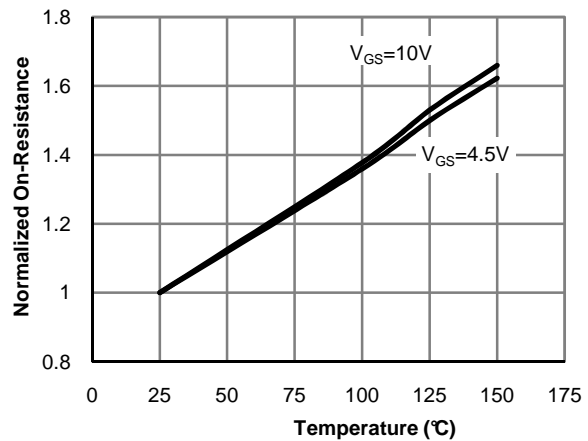


Figure 4: On-Resistance vs. Junction Temperature

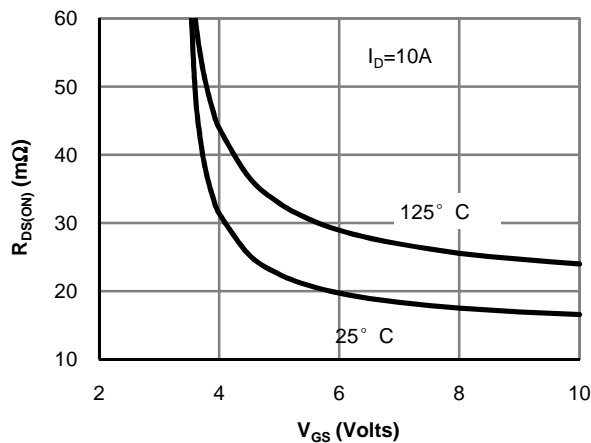


Figure 5: On-Resistance vs. Gate-Source Voltage

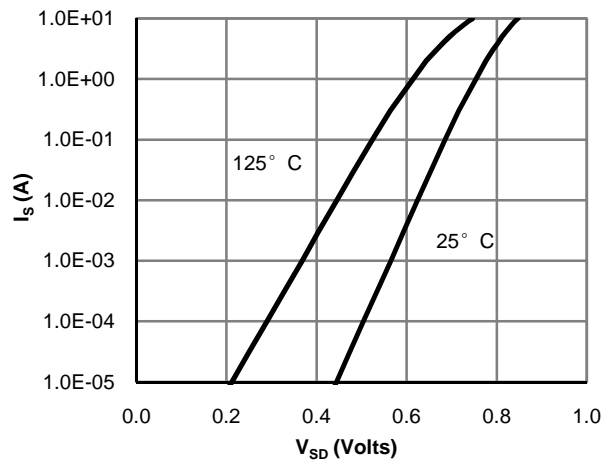


Figure 6: Body-Diode Characteristics

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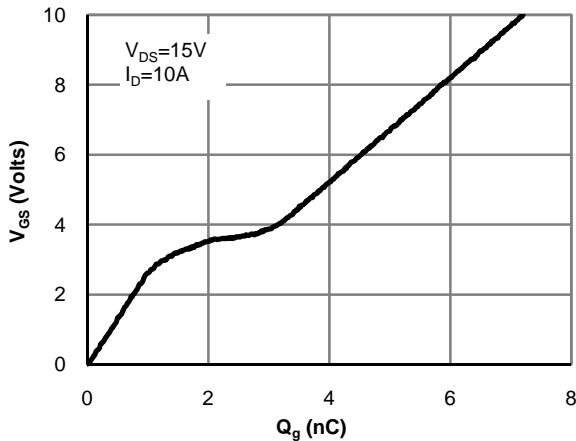


Figure 7: Gate-Charge Characteristics

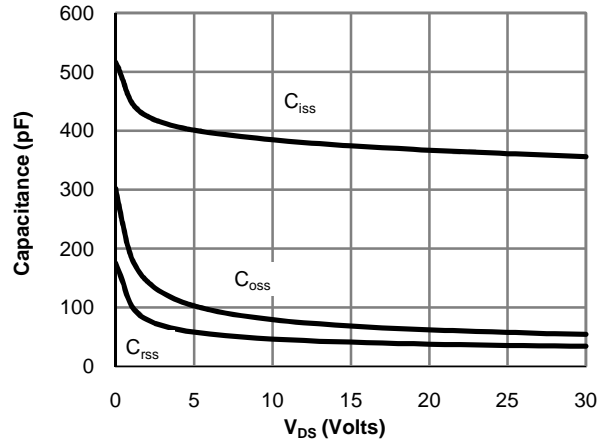


Figure 8: Capacitance Characteristics

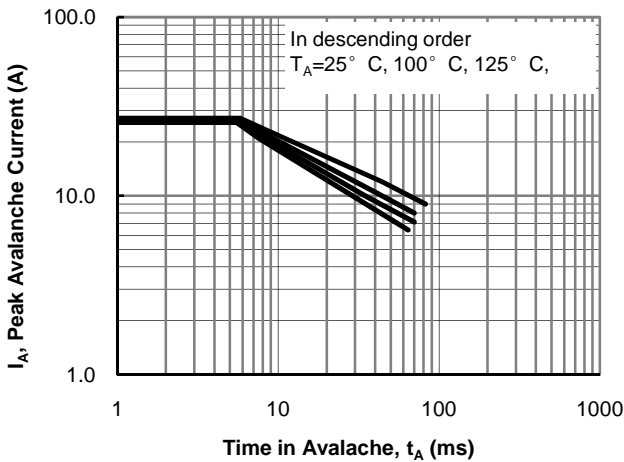


Figure 9: Single Pulse Avalanche Capability

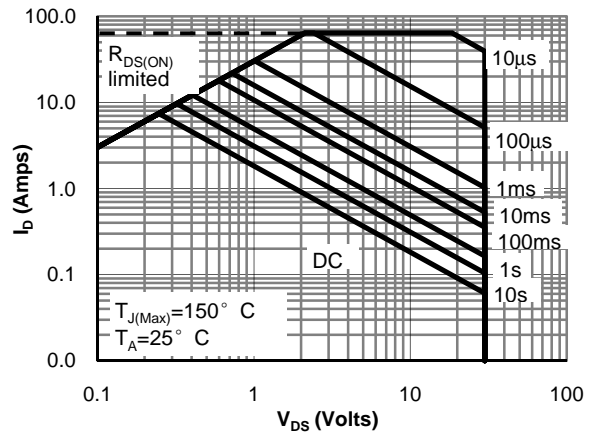


Figure 10: Maximum Forward Biased Safe Operating Area (Note E)

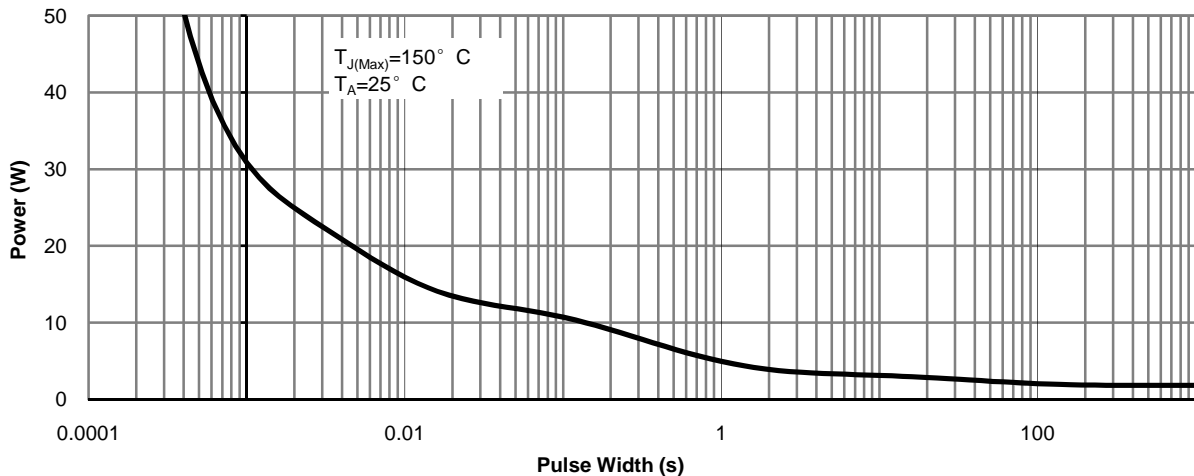
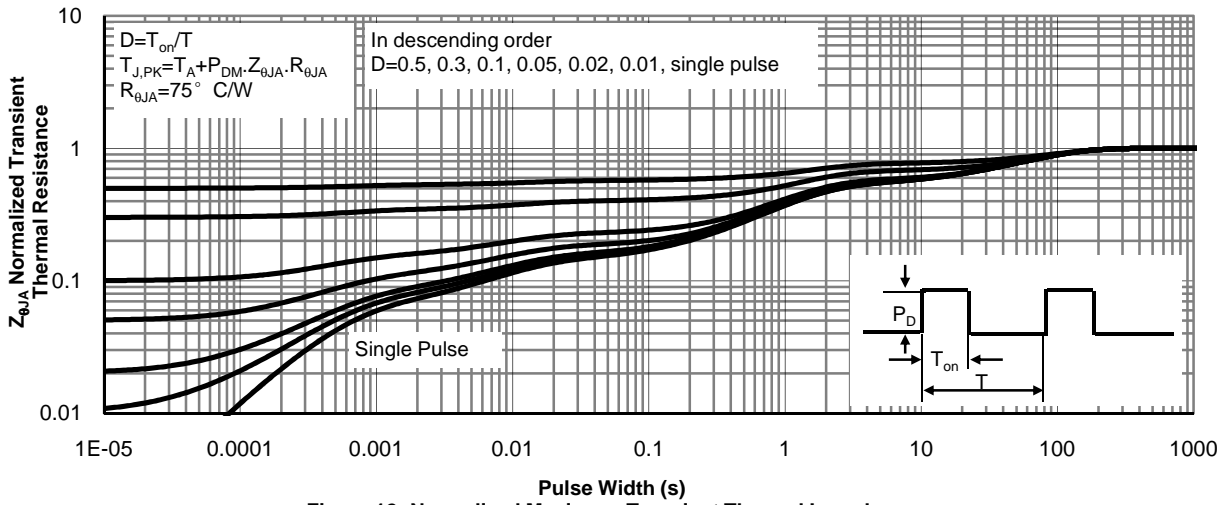
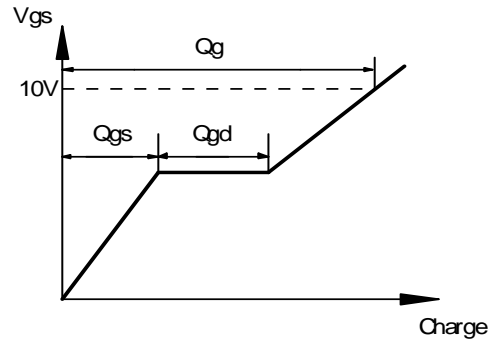
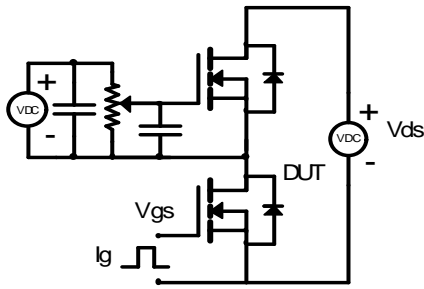


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note E)

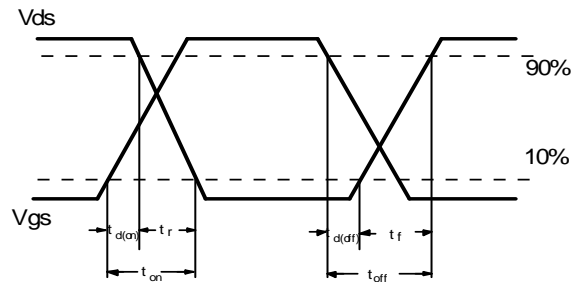
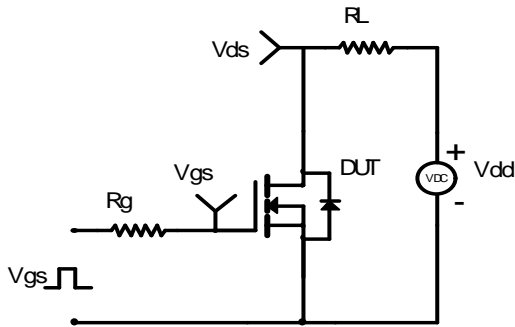
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



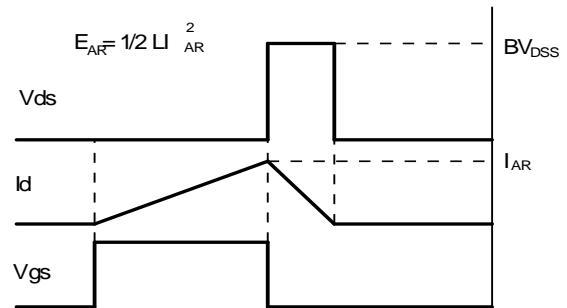
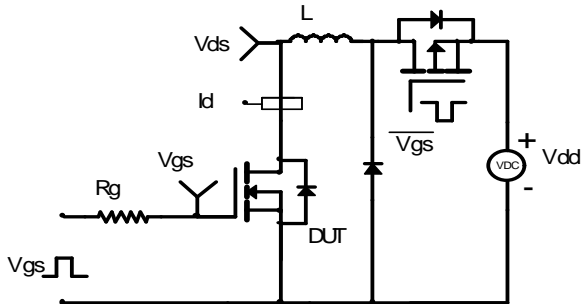
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

