



General Description

The AO4286 uses trench MOSFET technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$, C_{iss} and C_{oss} . This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

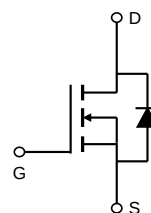
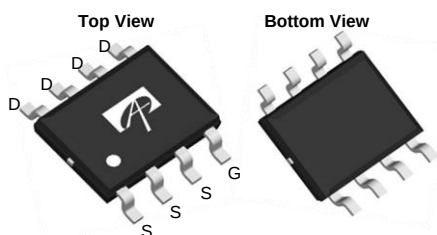
Product Summary

V_{DS}	100V
I_D (at $V_{GS}=10V$)	4A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 68m Ω
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 92m Ω

100% UIS Tested



SOIC-8



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	4	A
$T_C=25^\circ\text{C}$			
$T_C=70^\circ\text{C}$		3	
Pulsed Drain Current ^C	I_{DM}	25	
Avalanche Current ^C	I_{AS}	4	A
Avalanche energy $L=0.1\text{mH}$ ^C	E_{AS}	0.8	mJ
Power Dissipation ^B	P_D	2.5	W
$T_A=25^\circ\text{C}$			
$T_A=70^\circ\text{C}$		1.6	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	42	50	$^\circ\text{C/W}$
$t \leq 10\text{s}$				
Maximum Junction-to-Ambient ^{A,D}		70	85	$^\circ\text{C/W}$
Steady-State				
Maximum Junction-to-Lead	$R_{\theta JL}$	20	30	$^\circ\text{C/W}$
Steady-State				

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	100			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=100\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1.7	2.25	2.9	V
$I_{D(ON)}$	On state drain current	$V_{GS}=10\text{V}$, $V_{DS}=5\text{V}$	25			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=4\text{A}$ $T_J=125^\circ\text{C}$		55.5 104	68 127	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$, $I_D=3\text{A}$		72.5	92	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=4\text{A}$		13		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.76	1	V
I_S	Maximum Body-Diode Continuous Current				3	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=50\text{V}$, $f=1\text{MHz}$		390		pF
C_{oss}	Output Capacitance			30		pF
C_{rss}	Reverse Transfer Capacitance			3		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		7		Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$, $V_{DS}=50\text{V}$, $I_D=4\text{A}$		5.8	10	nC
$Q_g(4.5\text{V})$	Total Gate Charge			2.8	5	nC
Q_{gs}	Gate Source Charge			1.1		nC
Q_{gd}	Gate Drain Charge			1.2		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=10\text{V}$, $V_{DS}=50\text{V}$, $R_L=12.5\Omega$, $R_{GEN}=3\Omega$		6		ns
t_r	Turn-On Rise Time			2.5		ns
$t_{D(off)}$	Turn-Off DelayTime			18		ns
t_f	Turn-Off Fall Time			2.5		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=4\text{A}$, $dI/dt=500\text{A}/\mu\text{s}$		15		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=4\text{A}$, $dI/dt=500\text{A}/\mu\text{s}$		53		nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_{J(MAX)}=150^\circ\text{C}$, using $\leq 10\text{s}$ junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ\text{C}$.

D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

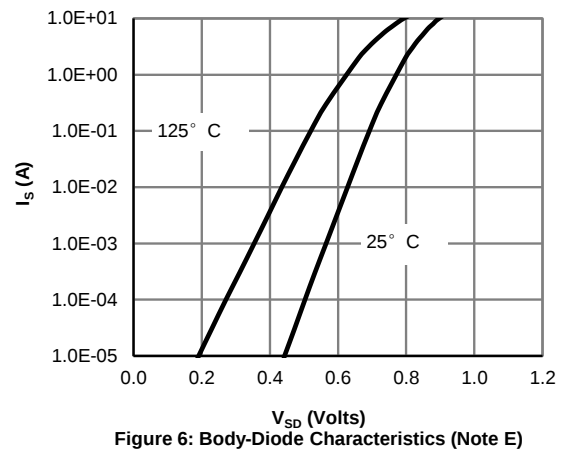
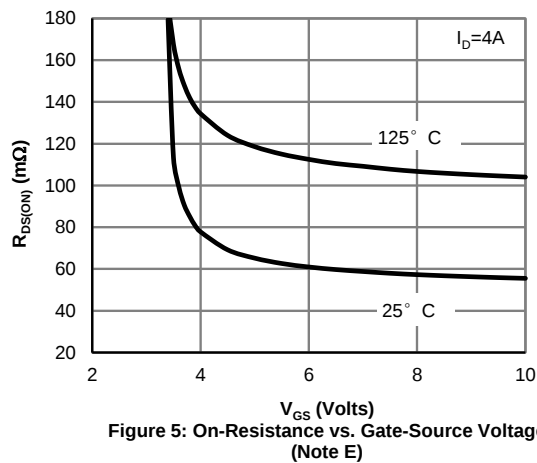
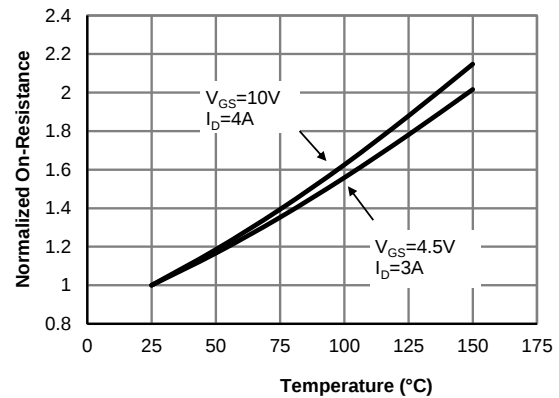
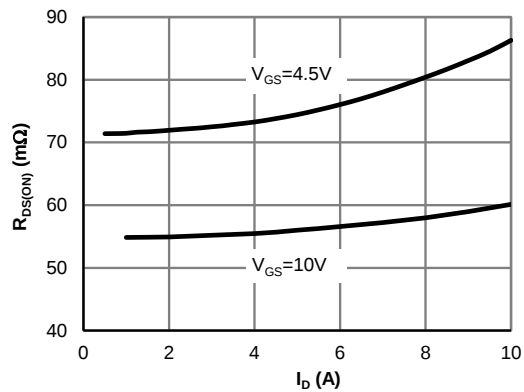
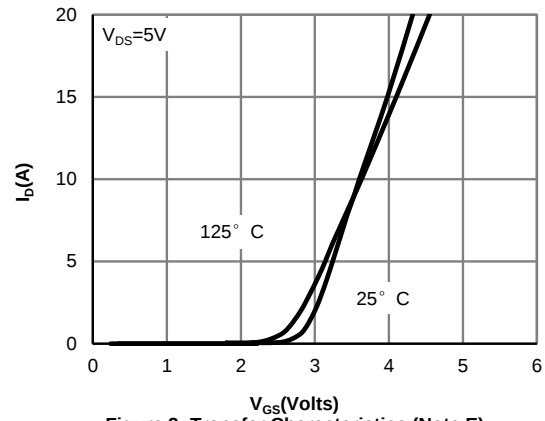
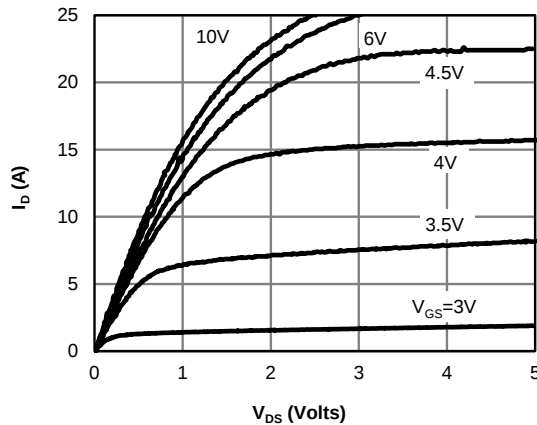
E. The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}=150^\circ\text{C}$. The SOA curve provides a single pulse rating.

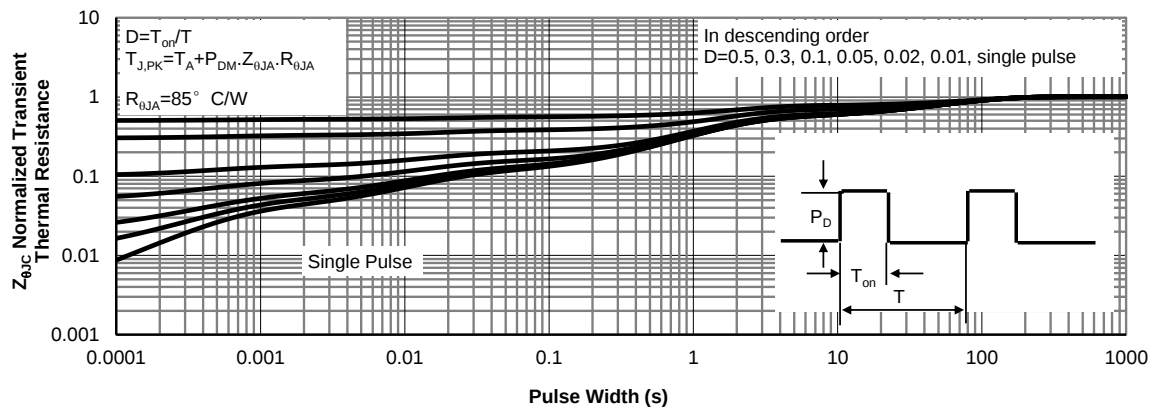
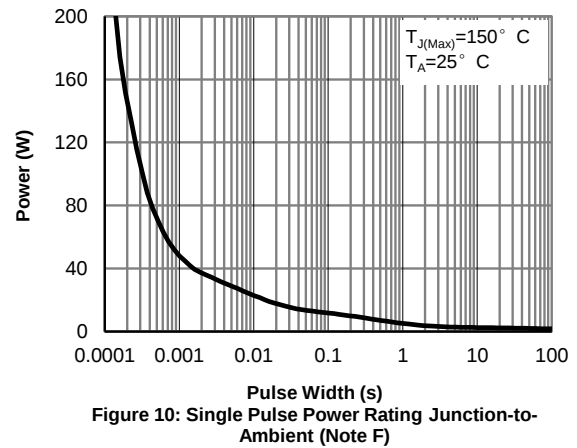
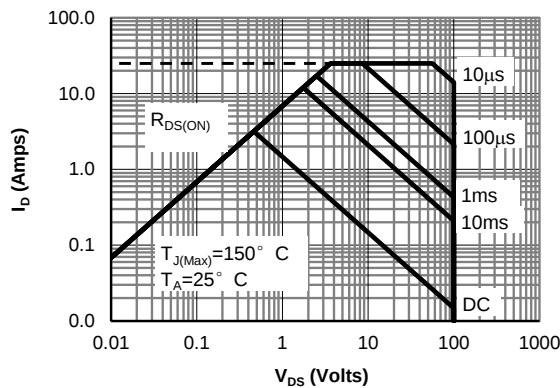
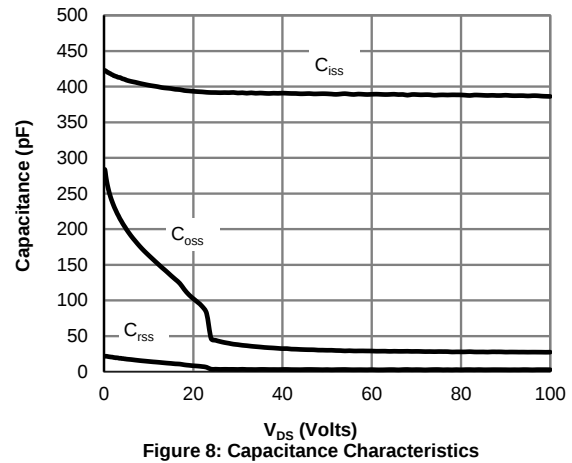
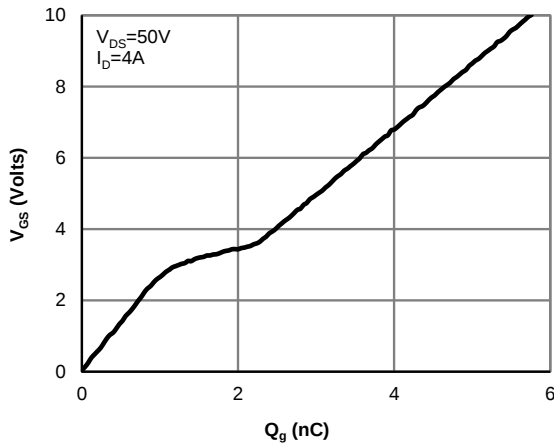
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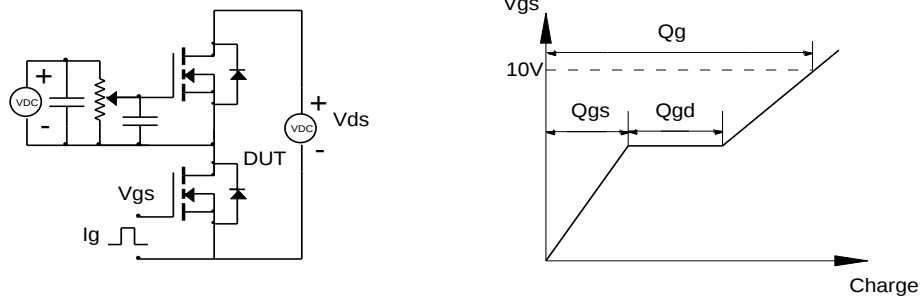
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



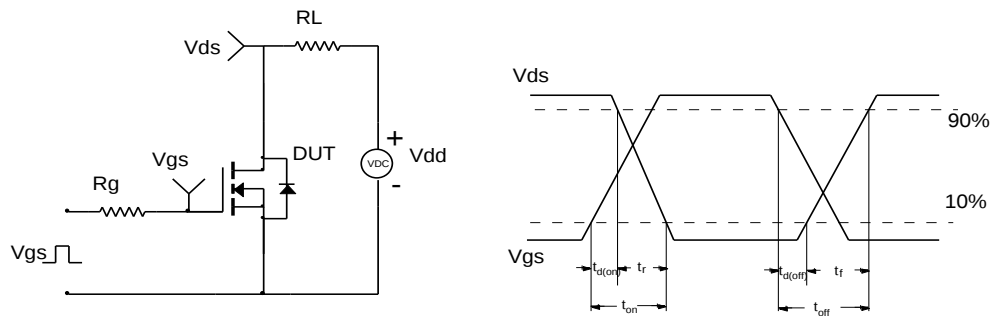
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



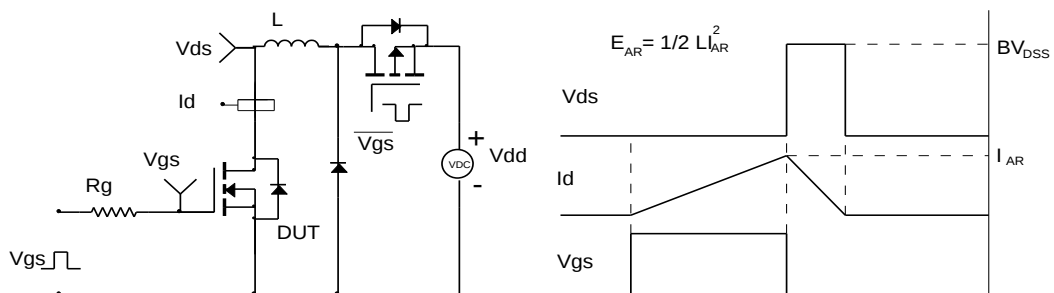
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

