



AO8802

Common-Drain Dual N-Channel Enhancement Mode Field Effect Transistor

General Description

The AO8802 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V while retaining a 12V $V_{GS(MAX)}$ rating. This device is suitable for use as a uni-directional or bi-directional load switch, facilitated by its common-drain configuration.

Features

- V_{DS} (V) = 20V
- I_D = 7.5A
- $R_{DS(ON)} < 14m\Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 16m\Omega$ ($V_{GS} = 4.5V$)
- $R_{DS(ON)} < 22m\Omega$ ($V_{GS} = 2.5V$)
- $R_{DS(ON)} < 30m\Omega$ ($V_{GS} = 1.8V$)



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ^A	$T_A=25^\circ C$ $T_A=70^\circ C$	I_D	7.5
			6.3
Pulsed Drain Current ^B	I_{DM}	30	A
Power Dissipation ^A	$T_A=25^\circ C$ $T_A=70^\circ C$	P_D	1.5
			1.08
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	$R_{\theta JA}$	64	83	$^\circ C/W$
Maximum Junction-to-Ambient ^A		Steady-State	89	
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	53	70	$^\circ C/W$

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	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	20			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=16\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			10 25	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 12\text{V}$			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	0.5	0.75	1	V
$I_{D(ON)}$	On state drain current	$V_{GS}=4.5\text{V}$, $V_{DS}=5\text{V}$	30			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=7.5\text{A}$ $T_J=125^\circ\text{C}$		11.6	14	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$, $I_D=5\text{A}$		13.3	16	$\text{m}\Omega$
		$V_{GS}=2.5\text{V}$, $I_D=4\text{A}$		17.4	22	$\text{m}\Omega$
		$V_{GS}=1.8\text{V}$, $I_D=3\text{A}$		24.4	30	$\text{m}\Omega$
g_{FS}	Forward Transconductance					S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.73	1	V
I_S	Maximum Body-Diode Continuous Current				2.4	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=10\text{V}$, $f=1\text{MHz}$		1690		pF
C_{oss}	Output Capacitance			230		pF
C_{rss}	Reverse Transfer Capacitance			184		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		1.6		Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	$V_{GS}=4.5\text{V}$, $V_{DS}=10\text{V}$, $I_D=7.5\text{A}$		17.8		nC
Q_{gs}	Gate Source Charge			1.76		nC
Q_{gd}	Gate Drain Charge			5		nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=10\text{V}$, $V_{DS}=10\text{V}$, $R_L=1.3\Omega$, $R_{GEN}=3\Omega$		3.3		ns
t_r	Turn-On Rise Time			5.9		ns
$t_{D(off)}$	Turn-Off Delay Time			44		ns
t_f	Turn-Off Fall Time			7.7		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=7.5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		22		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=7.5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		9.8		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 a given application depends on the user's specific board design. The current rating is based on the $t \leq 10\text{s}$ thermal resistance rating.

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

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

D. The static characteristics in Figures 1 to 6,12,14 are obtained using 80 μs pulses, duty cycle 0.5% max.

E. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The SOA curve provides a single pulse rating.