



ALPHA & OMEGA
SEMICONDUCTOR

AO4292E

100V N-Channel MOSFET

General Description

- Trench Power MV MOSFET technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- Optimized for fast-switching applications
- ESD protected
- RoHS and Halogen-Free Compliant

Applications

- Synchronous Rectification in DC/DC and AC/DC Converters
- Industrial and Motor Drive applications

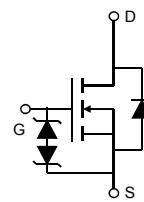
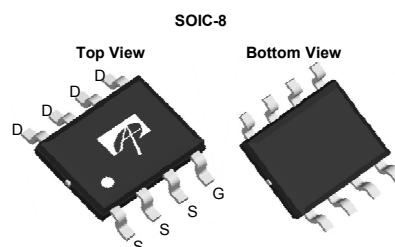
Product Summary

V_{DS}	100V
I_D (at $V_{GS}=10V$)	8A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 23mΩ
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 33mΩ

Typical ESD protection

HBM Class 2

100% UIS Tested
100% R_g Tested



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AO4292E	SO-8	Tape & Reel	3000

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^A	I_D	8	A
$T_A=70^\circ C$		6.2	
Pulsed Drain Current ^C	I_{DM}	32	
Avalanche Current ^C	I_{AS}	14	A
Avalanche energy $L=0.1mH$ ^C	E_{AS}	10	mJ
V_{DS} Spike	V_{SPIKE}	120	V
$T_A=25^\circ C$	P_D	3.1	W
$T_A=70^\circ C$		2.0	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	R_{6JA}	31	40	°C/W
Maximum Junction-to-Ambient ^{A,D} Steady-State		59	75	°C/W
Maximum Junction-to-Lead	R_{6JL}	16	24	°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	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	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	$V_{DS}=0\text{V}, V_{GS}=\pm20\text{V}$			±10	μA
$V_{GS(\text{th})}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.6	2.15	2.7	V
$R_{DS(\text{ON})}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=8\text{A}$ $T_J=125^\circ\text{C}$		18.5	23	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}, I_D=6\text{A}$		33	42	
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}, I_D=8\text{A}$		30		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}, V_{GS}=0\text{V}$		0.72	1	V
I_S	Maximum Body-Diode Continuous Current				4	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=50\text{V}, f=1\text{MHz}$		1200		pF
C_{oss}	Output Capacitance			93		pF
C_{rss}	Reverse Transfer Capacitance			6.3		pF
R_g	Gate resistance	$f=1\text{MHz}$	0.5	1.0	1.5	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}, V_{DS}=50\text{V}, I_D=8\text{A}$		16.5	25	nC
$Q_g(4.5\text{V})$	Total Gate Charge			8	14	nC
Q_{gs}	Gate Source Charge			3.5		nC
Q_{gd}	Gate Drain Charge			2.5		nC
$t_{D(\text{on})}$	Turn-On Delay Time	$V_{GS}=10\text{V}, V_{DS}=50\text{V}, R_L=6.25\Omega, R_{\text{GEN}}=3\Omega$		6		ns
t_r	Turn-On Rise Time			3		ns
$t_{D(\text{off})}$	Turn-Off Delay Time			22		ns
t_f	Turn-Off Fall Time			3		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=8\text{A}, dI/dt=500\text{A}/\mu\text{s}$		20		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=8\text{A}, dI/dt=500\text{A}/\mu\text{s}$		80		nC

A. The value of R_{QA} 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 $T_{J(\text{MAX})}=150^\circ\text{C}$, using $\leq 10\text{s}$ junction-to-ambient thermal resistance.

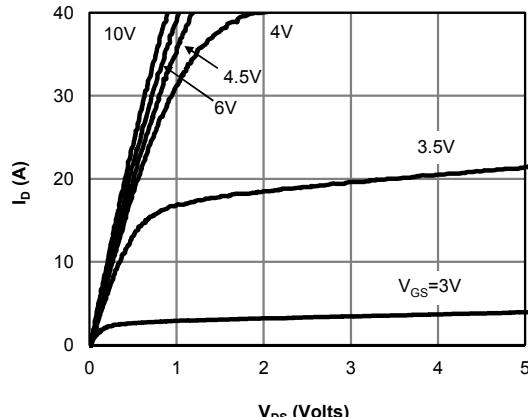
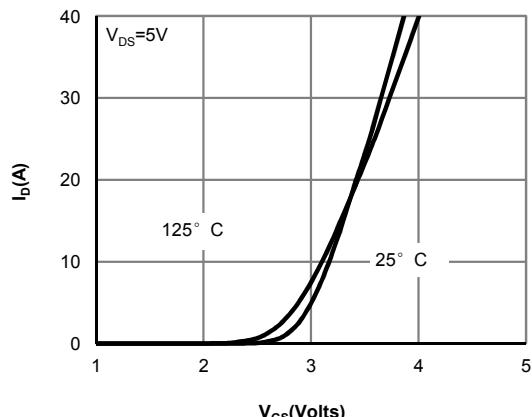
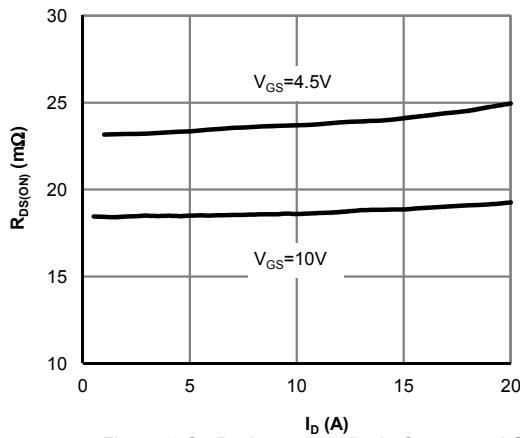
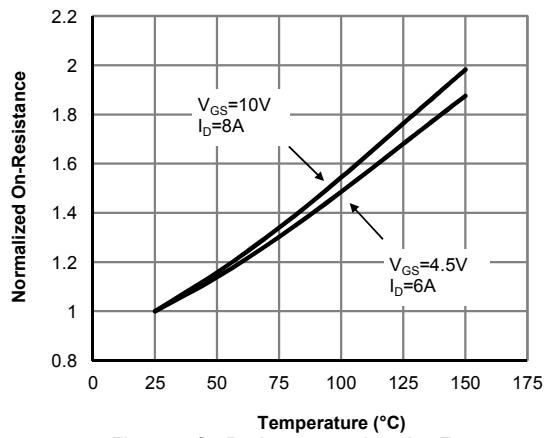
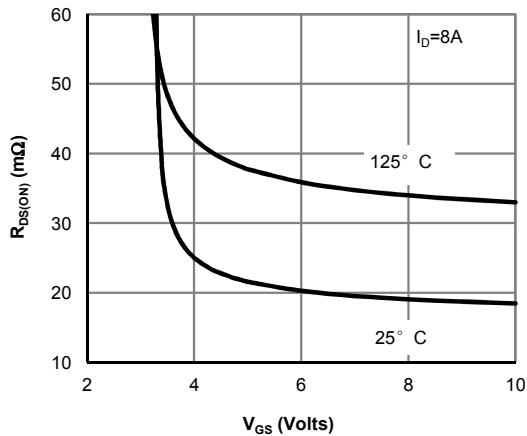
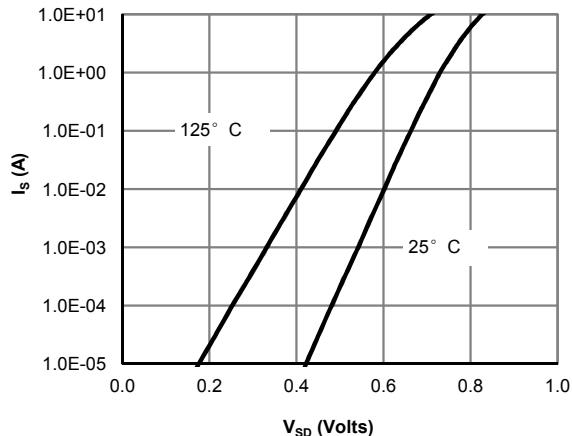
C. Repetitive rating, pulse width limited by junction temperature $T_{J(\text{MAX})}=150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ\text{C}$.

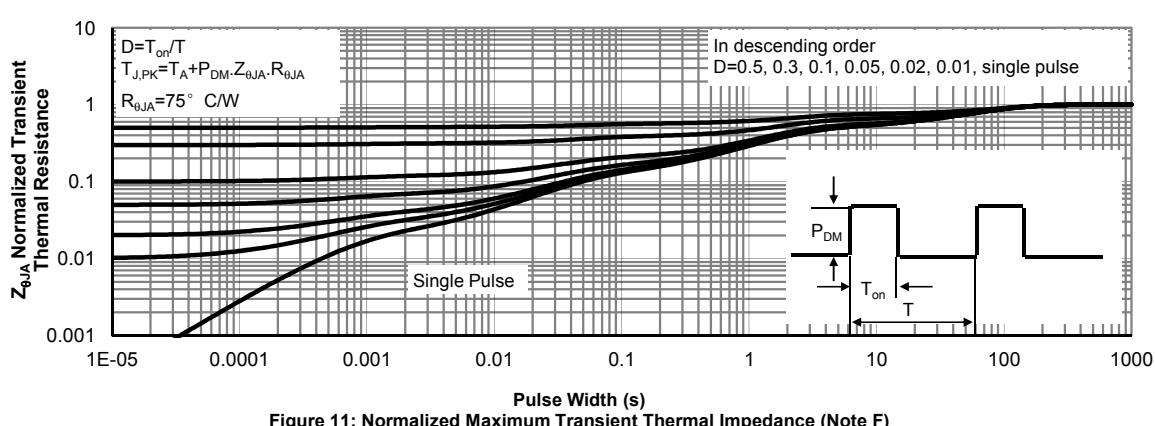
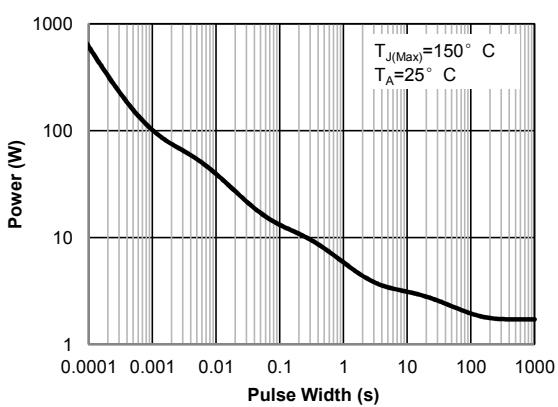
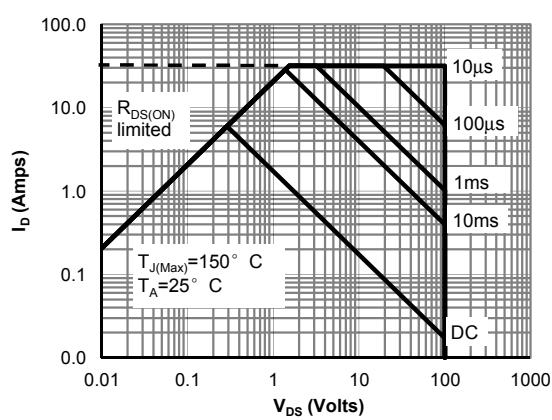
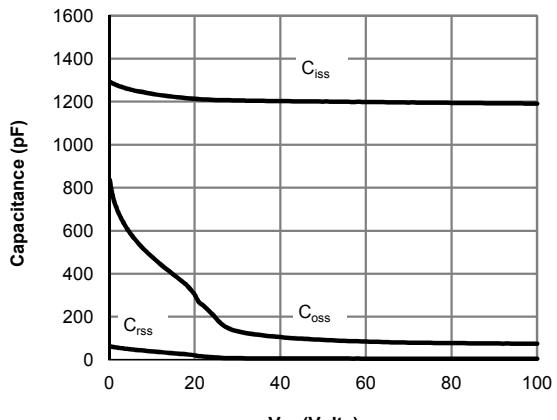
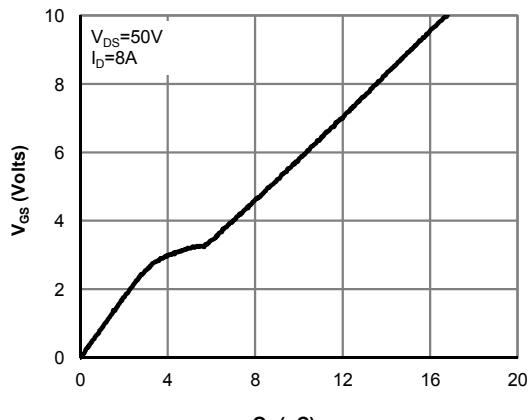
D. The R_{QA} is the sum of the thermal impedance from junction to lead R_{QJL} and lead to ambient.

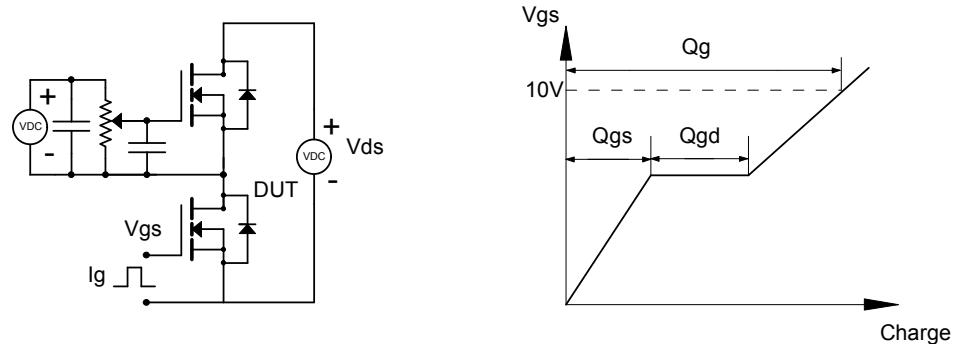
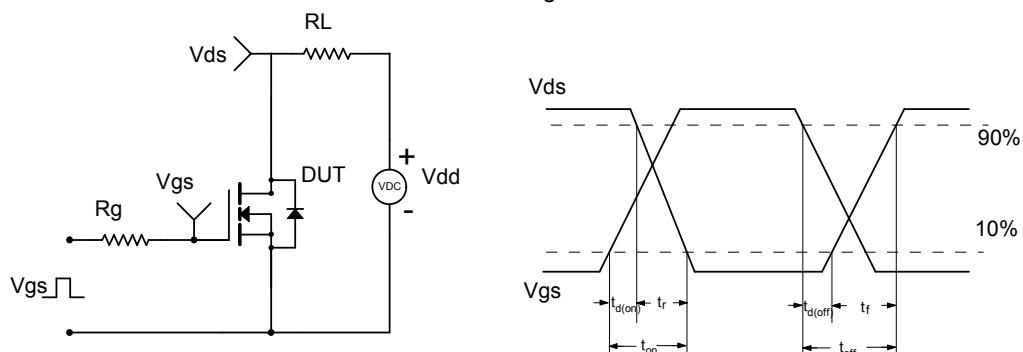
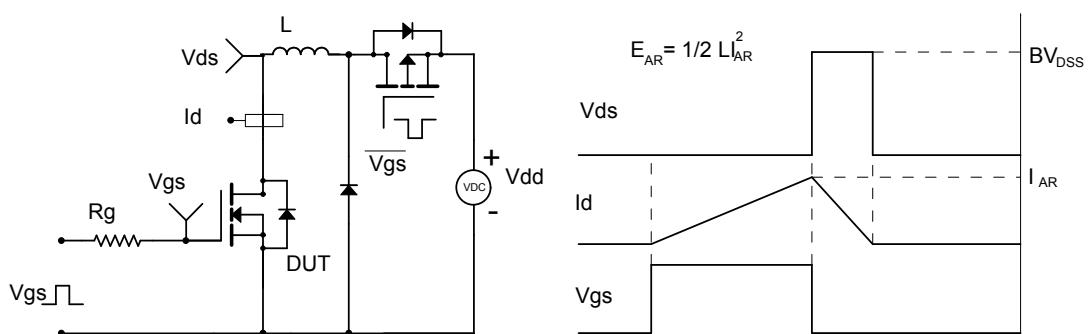
E. The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ pulses, duty cycle 0.5% max.

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 $T_{J(\text{MAX})}=150^\circ\text{C}$. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 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)

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
