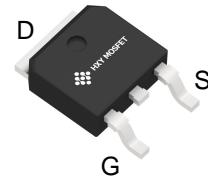




Description

The AOD4146 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



TO-252-2L
(TO-252(DPAK))

General Features

$V_{DS} = 30V$ $I_D = 80A$

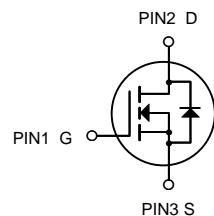
$R_{DS(ON)} < 6.8m\Omega$ @ $V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
AOD4146	TO-252-2L(TO-252(DPAK))	HXY MOSFET	2500

Absolute Maximum Ratings ($T_c=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_c=25^\circ C$)	80	A
	Drain Current – Continuous ($T_c=100^\circ C$)	51	A
I_{DM}	Drain Current – Pulsed ¹	320	A
EAS	Single Pulse Avalanche Energy ²	88	mJ
I_{AS}	Single Pulse Avalanche Current ²	42	A
P_D	Power Dissipation ($T_c=25^\circ C$)	54	W
	Power Dissipation – Derate above $25^\circ C$	0.43	W/ $^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction to ambient	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	2.3	$^\circ C/W$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}$, $I_D=250\text{uA}$	30	---	---	V
$\Delta BVDSS/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	---	0.04	---	$\text{V}/^\circ\text{C}$
IDSS	Drain-Source Leakage Current	$V_{DS}=30\text{V}$, $V_{GS}=0\text{V}$, $T_J=25^\circ\text{C}$	---	---	1	uA
		$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^\circ\text{C}$	---	---	10	uA
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$	---	---	± 100	nA
RDS(ON)	Static Drain-Source On-Resistance ³	$V_{GS}=10\text{V}$, $I_D=20\text{A}$	---	5	6.8	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$, $I_D=10\text{A}$	---	6.5	9	$\text{m}\Omega$
VGS(th)	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\text{uA}$	1	1.6	2.5	V
$\Delta V_{GS(\text{th})}$	$V_{GS(\text{th})}$ Temperature Coefficient		---	-4	---	$\text{mV}/^\circ\text{C}$
gfs	Forward Transconductance	$V_{DS}=10\text{V}$, $I_D=10\text{A}$	---	18	---	S
Q _g	Total Gate Charge ^{3,4}	$V_{DS}=15\text{V}$, $V_{GS}=4.5\text{V}$, $I_D=20\text{A}$	---	11.1	---	nC
Qgs	Gate-Source Charge ^{3,4}		---	1.85	---	
Qgd	Gate-Drain Charge ^{3,4}		---	6.8	---	
Td(on)	Turn-On Delay Time ^{3,4}	$V_{DD}=15\text{V}$, $V_{GS}=10\text{V}$, $R_G=3.3\Omega$ $I_D=15\text{A}$	---	7.5	---	ns
T _r	Rise Time ^{3,4}		---	14.5	---	
Td(off)	Turn-Off Delay Time ^{3,4}		---	35.2	---	
T _f	Fall Time ^{3,4}		---	9.6	---	
Ciss	Input Capacitance	$V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $F=1\text{MHz}$	---	1160	---	pF
Coss	Output Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $F=1\text{MHz}$	---	200	---	Ω
Crss	Reverse Transfer Capacitance		---	180	---	
R _g	Gate resistance		---	2.5	---	
EAS	Single Pulse Avalanche Energy	$V_{DD}=25\text{V}$, $L=0.1\text{mH}$, $IAS=20\text{A}$	20	---	---	mJ
IS	Continuous Source Current	$V_G=V_D=0\text{V}$, Force Current	---	---	80	A
ISM	Pulsed Source Current ³		---	---	320	A
VSD	Diode Forward Voltage ³	$V_{GS}=0\text{V}$, $I_S=1\text{A}$, $T_J=25^\circ\text{C}$	---	---	1	V
trr	Reverse Recovery Time	$V_{GS}=0\text{V}$, $I_S=1\text{A}$, $di/dt=100\text{A}/\mu\text{s}$ $T_J=25^\circ\text{C}$	---	---	---	ns
Q _{rr}	Reverse Recovery Charge		---	---	---	nC



Typical Characteristics

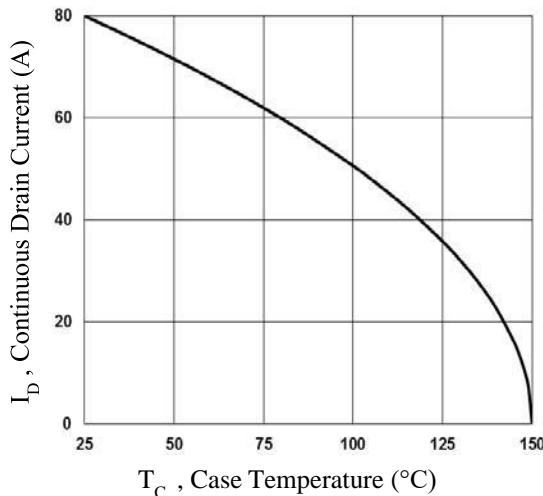


Fig.1 Continuous Drain Current vs. T_C

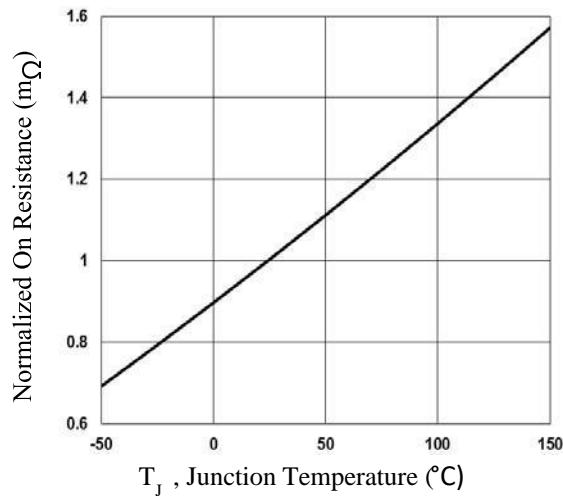


Fig.2 Normalized RDS(on) vs. T_J

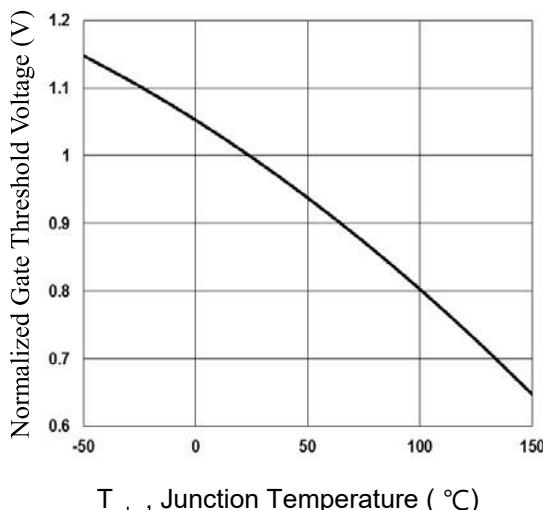


Fig. 3 Normalized V_{th} vs. T_J

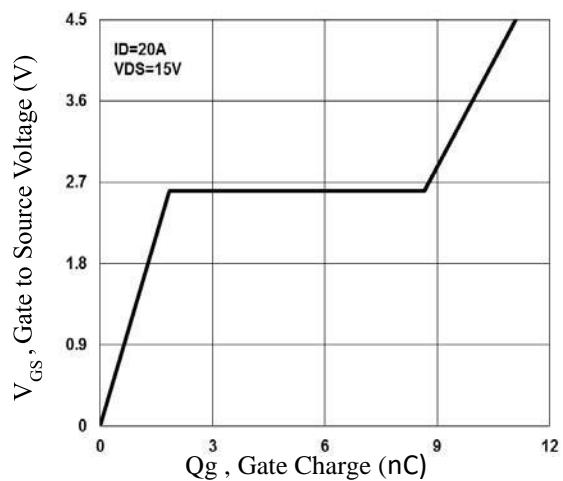


Fig. 4 Gate Charge Waveform

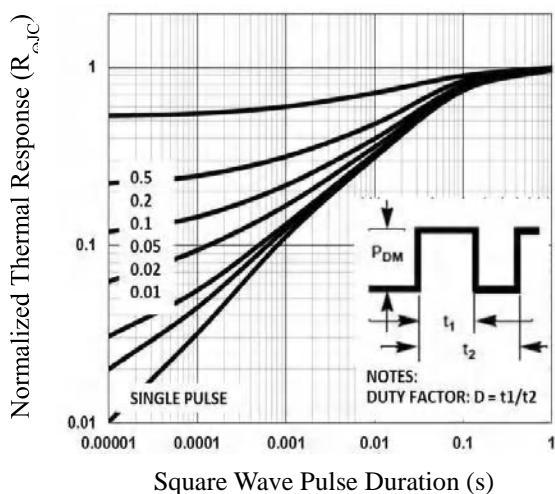


Fig.5 Normalized Transient Impedance

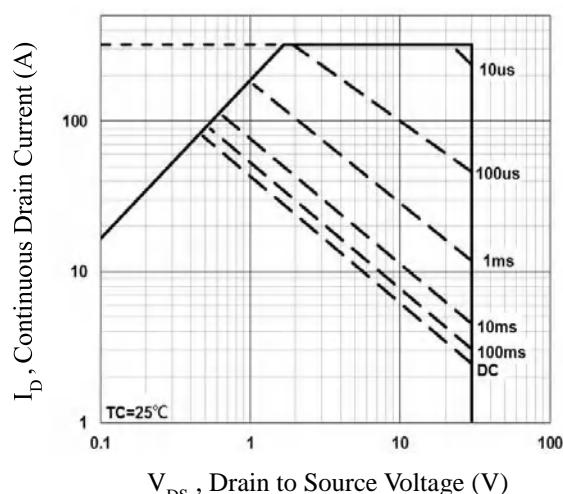


Fig.6 Maximum Safe Operation Area

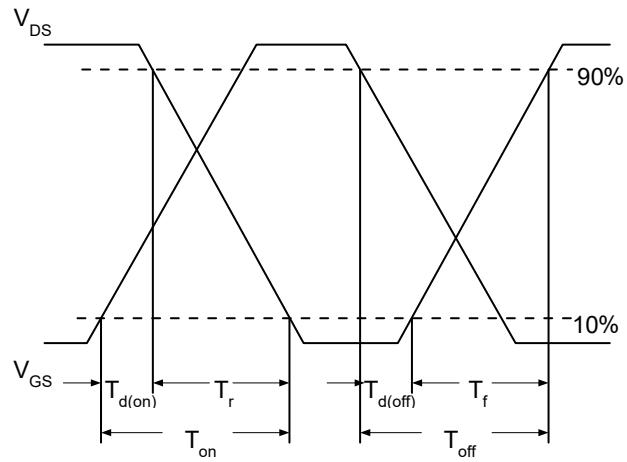


Fig. 7 Switching Time Waveform

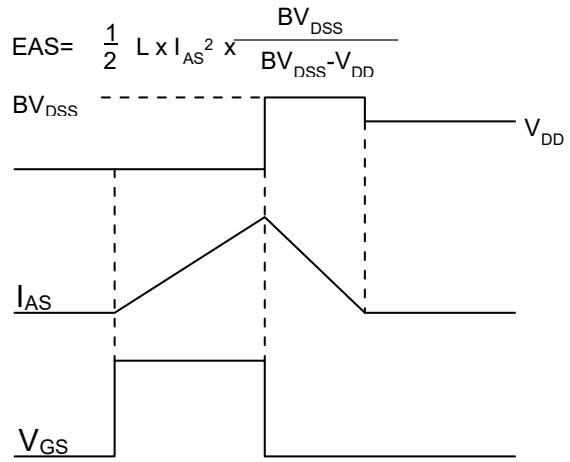
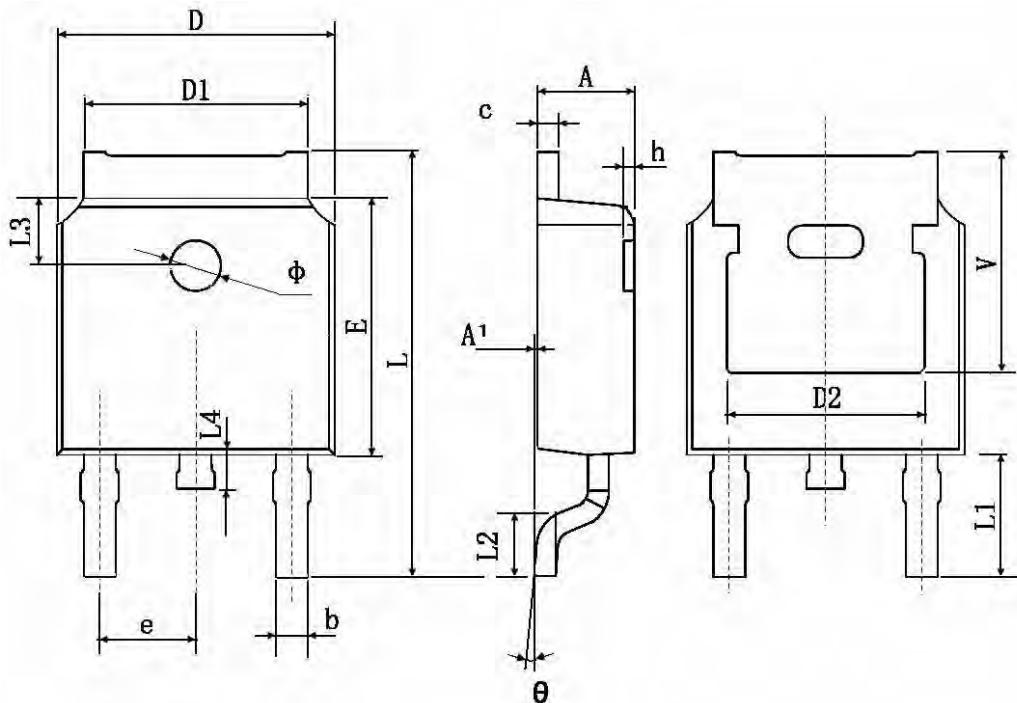


Fig. 8 EAS Waveform



TO252-2L(TO-252(DPAK)) Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	0.483 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	



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