ALPHA & OMEGA SEMICONDUCTOR, INC.

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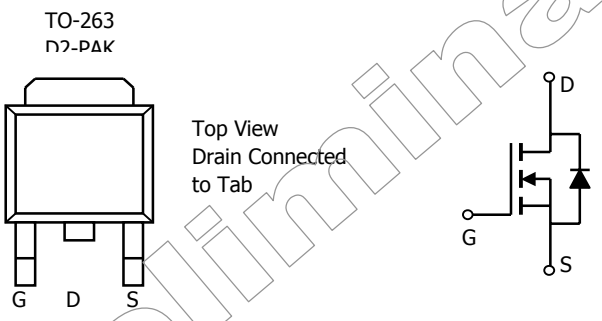
AOB412
N-Channel Enhancement Mode Field Effect Transistor

General Description

The AOB412 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in CPU core DC-DC conversion applications in desktop PCs.

Features

V_{DS} (V) = 30V
I_D = 50 A
$R_{DS(ON)}$ < 13 mΩ (V_{GS} = 10V)
$R_{DS(ON)}$ < 15 mΩ (V_{GS} = 4.5V)



Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±13.5	V
Continuous Drain Current [A]	T_C=25°C	I_D	50	A
	T_C=100°C			
Pulsed Drain Current [B]		I_{DM}	100	
Avalanche Current		I_{AR}	40	A
Repetitive avalanche energy L=0.1mH [D]		E_{AR}	150	mJ
Power Dissipation [A]	T_C=25°C	P_D	90	W
	T_A=100°C			
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$		TBD	°C/W
Maximum Junction-to-Ambient [A]	Steady-State			62	°C/W
Maximum Junction-to-Case [C]	Steady-State	$R_{\theta JC}$		1.6	°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}=24V, V_{GS}=0V			1	µA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±13.5V			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250µA	0.7	1	1.4	V
$I_{D(ON)}$	On state drain current	V_{GS}=4.5V, V_{DS}=5V	50			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=25A		10	13	mΩ
		T_J=125°C		15	19	
		V_{GS}=4.5V, I_D=20A		12	15	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=30A				S
V_{SD}	Diode Forward Voltage	I_S=25A, V_{GS}=0V		0.85	1.2	V
I_S	Maximum Body-Diode Continuous Current				100	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=10V, f=1MHz		1700		pF
C_{oss}	Output Capacitance			220		pF
C_{rss}	Reverse Transfer Capacitance			160		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		0.6		Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=4.5V, V_{DS}=10V, I_D=30A		19		nC
Q_{gs}	Gate Source Charge			3.3		nC
Q_{gd}	Gate Drain Charge			6		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=10V, I_D=75A, R_L=0.13Ω, R_{GEN}=2.5Ω				ns
t_r	Turn-On Rise Time					ns
$t_{D(off)}$	Turn-Off DelayTime					ns
t_f	Turn-Off Fall Time					ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=25A, dI/dt=100A/µs				ns

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The value in any a given application depends on the user's specific board design. The current rating is based on the steady state junction-to-case thermal resistance.

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

C. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to case $R_{\theta JC}$ and case to ambient.

D. Duty cycle < 0.5%

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

F. 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.