

AO4446-VB Datasheet

N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY					
V _{DS} (V)	$R_{DS(on)}(\Omega)$	I _D (A) ^a	Q _g (Typ.)		
30	0.008 at V _{GS} = 10 V	13	6.1 nC		
	0.011 at V _{GS} = 4.5 V	11	0.1110		

SO-8

Top View

D D

FEATURES

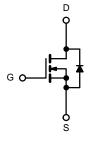
- · Halogen-free
- Trench Power MOSFET



- 100 % R_g Tested
- 100 % UIS Tested

APPLICATIONS

- Notebook CPU Core
 - High-Side Switch



N-Channel MOSFET

- 55 to 150

Parameter	Symbol	Limit	Unit		
Drain-Source Voltage	V _{DS}	30	V		
Gate-Source Voltage		V_{GS}		± 20	
	T _C = 25 °C		13		
Continuous Drain Current (T _{.1} = 150 °C)	T _C = 70 °C	la 🗀	10		
Softifficulty Drain Current (1) = 130 C)	T _A = 25 °C	I _D	9 ^{b, c}		
	T _A = 70 °C		7 ^{b, c}	A	
Pulsed Drain Current	I _{DM}	45			
Continuous Course Prois Diada Current	T _C = 25 °C	I_	3.7		
Continuous Source-Drain Diode Current	T _A = 25 °C	I _S	2.0 ^{b, c}		
Single Pulse Avalanche Current	L = 0.1 mH	I _{AS}	20		
Avalanche Energy	L = 0.111111	E _{AS}	21	mJ	
	T _C = 25 °C		4.1		
Maximum Power Dissination	T _C = 70 °C	P _D	2.5	w	
Maximum Power Dissipation	T _A = 25 °C	' D	2.2 ^{b, c}		
	T 70 °C		h a		

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^{b, d}	t ≤ 10 s	R _{thJA}	39	55	°C/W	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	25	29	C/VV	

Notes:

- a. Base on T_C = 25 °C.
- b. Surface Mounted on 1" x 1" FR4 board.
- c. t = 10 s.
- d. Maximum under Steady State conditions is 85 °C/W.

Operating Junction and Storage Temperature Range

服务热线:400-655-8788

°C



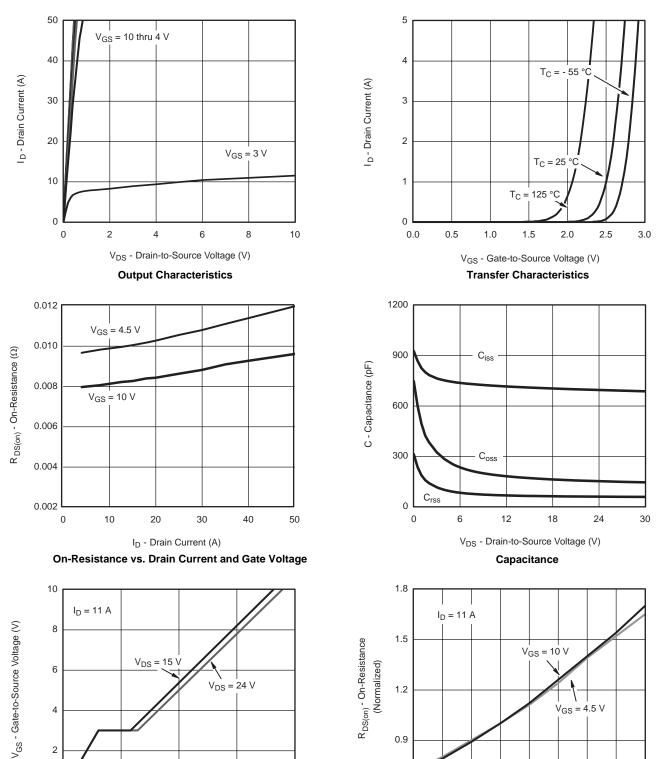
SPECIFICATIONS $T_J = 25 ^{\circ}\text{C}$ Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static				.,,,,			
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_{D} = 250 \mu\text{A}$	30			V	
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$			26		mV/°C	
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I _D = 250 μA		- 6			
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_{D} = 250 \mu\text{A}$	1.0		3.0	V	
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA	
		V _{DS} = 30 V, V _{GS} = 0 V			1	_	
Zero Gate Voltage Drain Current	IDSS	V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C			10	μA	
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$	20			Α	
		V _{GS} = 10 V, I _D = 10 A	0.008			+	
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 9 A		0.011		Ω	
Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 10 A		50		S	
Dynamic ^b				L		ı	
Input Capacitance	C _{iss}			800		pF	
Output Capacitance	C _{oss}	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		165			
Reverse Transfer Capacitance	C _{rss}			73			
Total Cata Charma	Qg	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 10 A		15	23		
Total Gate Charge				6.8	10.2	nC	
Gate-Source Charge	Q _{gs}	$V_{DS} = 15 \text{ V}, V_{GS} = 5 \text{ V}, I_{D} = 10 \text{ A}$		2.5			
Gate-Drain Charge	Q_{gd}			2.3			
Gate Resistance	R_g	f = 1 MHz	0.36	1.8	3.6	Ω	
Turn-On Delay Time	t _{d(on)}			16	23		
Rise Time	t _r	V_{DD} = 15 V, R_L = 1.4 Ω		12	16		
Turn-Off Delay Time	t _{d(off)}	$I_D \cong 9 \text{ A}, V_{GEN} = 4.5 \text{ V}, R_g = 1 \Omega$		16	22		
Fall Time	t _f			10	18]	
Turn-On Delay Time	t _{d(on)}			8	16	ns	
Rise Time	t _r	V_{DD} = 15 V, R_L = 1.4 Ω		10	20		
Turn-Off Delay Time	t _{d(off)}	$I_D \cong 9 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 1 \Omega$		16	22		
Fall Time	t _f			8	15		
Drain-Source Body Diode Characterist	ics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			10		
Pulse Diode Forward Current ^a	I _{SM}				50	A	
Body Diode Voltage	V_{SD}	I _S = 9 A		0.8	1.2	V	
Body Diode Reverse Recovery Time	t _{rr}			15	30	ns	
Body Diode Reverse Recovery Charge	Q _{rr}	I _F = 9 A, dI/dt = 100 A/μs, T _{.I} = 25 °C		6	12	nC	
Reverse Recovery Fall Time	t _a	i _F = θ A, αί/αι = 100 A/μs, 1 _J = 25 °C		8		20	
Reverse Recovery Rise Time	t _b					ns	

Notes:

- a. Pulse test; pulse width $\leq 300~\mu s,$ duty cycle $\leq 2~\%.$
- b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.





0.9

0.6

- 50

- 25

0

25

50

T_J - Junction Temperature (°C)

On-Resistance vs. Junction Temperature

75

16

服务热线:400-655-8788

2

0

0

4

8

Q_q - Total Gate Charge (nC)

Gate Charge

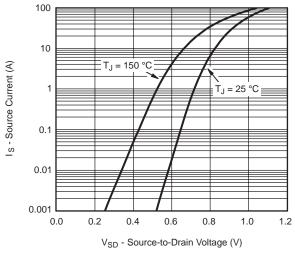
V_{GS} = 4.5 V

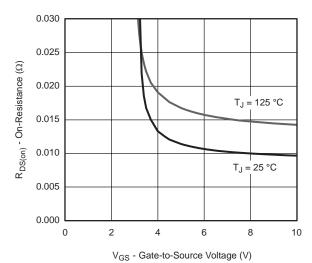
100

125

150

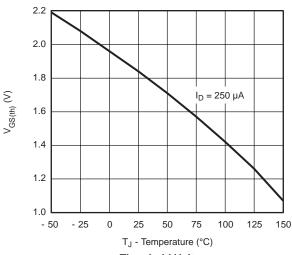


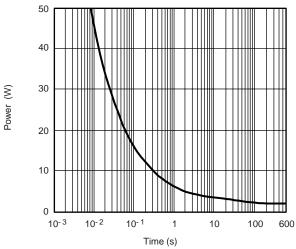




Source-Drain Diode Forward Voltage

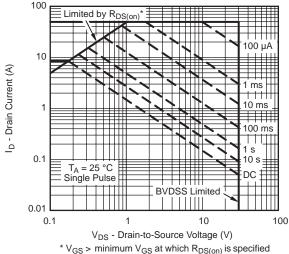






Threshold Voltage

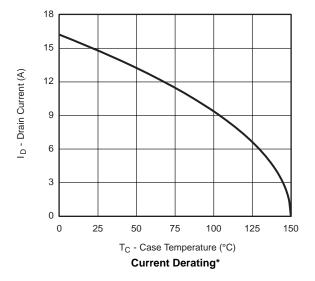
Single Pulse Power, Junction-to-Ambient

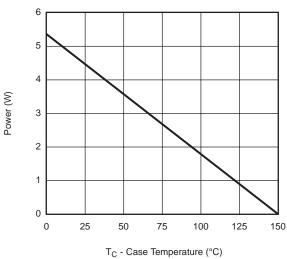


* $V_{GS} > \mbox{minimum } V_{GS}$ at which $R_{DS(on)}$ is specified

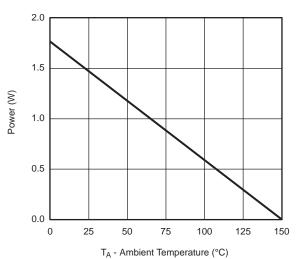
Safe Operating Area, Junction-to-Ambient







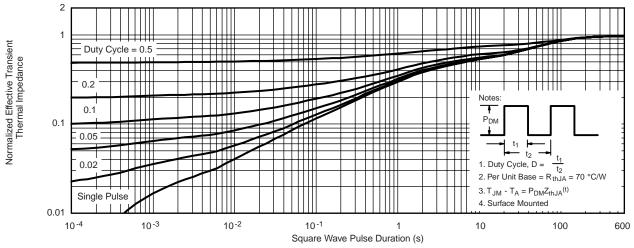
Power Derating, Junction-to-Foot



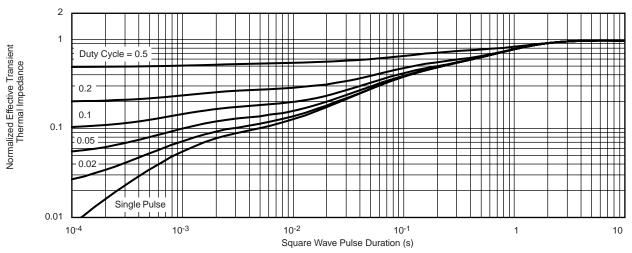
Power Derating, Junction-to-Ambient

^{*} The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.





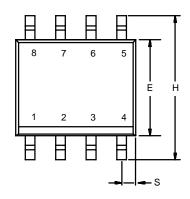
Normalized Thermal Transient Impedance, Junction-to-Ambient



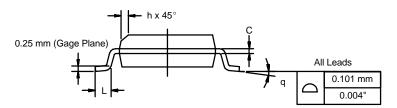
Normalized Thermal Transient Impedance, Junction-to-Foot



SOIC (NARROW): 8-LEAD







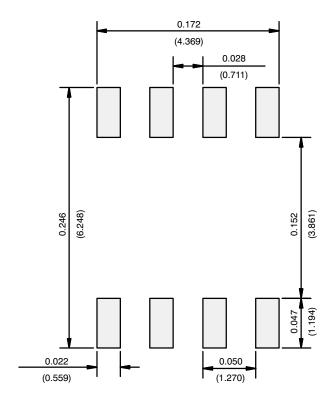
	MILLIM	IETERS	INCHES		
DIM	Min	Max	Min	Max	
Α	1.35	1.75	0.053	0.069	
A ₁	0.10	0.20	0.004	0.008	
В	0.35	0.51	0.014	0.020	
С	0.19	0.25	0.0075	0.010	
D	4.80	5.00	0.189	0.196	
E	3.80	4.00	0.150	0.157	
е	1.27 BSC		0.050 BSC		
Н	5.80	6.20	0.228	0.244	
h	0.25	0.50	0.010	0.020	
L	0.50	0.93	0.020	0.037	
q	0°	8°	0°	8°	
S	0.44	0.64	0.018	0.026	
FCN: C-06527-Rev I 11-Sen-06					

ECN: C-06527-Rev. I, 11-Sep-06

DWG: 5498



RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads Dimensions in Inches/(mm)



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