

AP4438M-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

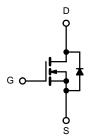
- · Halogen-free
- Trench Power MOSFET



- 100 % R_g Tested
- 100 % UIS Tested

APPLICATIONS

- Notebook CPU Core
 - High-Side Switch



2.5

1.3^{b, c}

- 55 to 150

2.2^{b, c}

		N-Channel MOSFET		
ABSOLUTE MAXIMUM RATING	S T _A = 25 °C, unles	s otherwise noted	1	
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V _{DS}	30	V
Gate-Source Voltage		V _{GS}	± 20	v
	T _C = 25 °C		13	
Continuous Drain Current (T _{.1} = 150 °C)	T _C = 70 °C	I-	10	
Continuous Diain 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 Source-Drain Diode 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 = 0.1 IIII	E _{AS}	21	mJ
	To = 25 °C		<i>A</i> 1	

T_C = 70 °C

 $\overline{T_A} = 25 \, ^{\circ}C$

T_A = 70 °C

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	

 P_D

T_J, T_{stg}

Notes:

a. Base on $T_C = 25$ °C.

Maximum Power Dissipation

- 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

W

°C



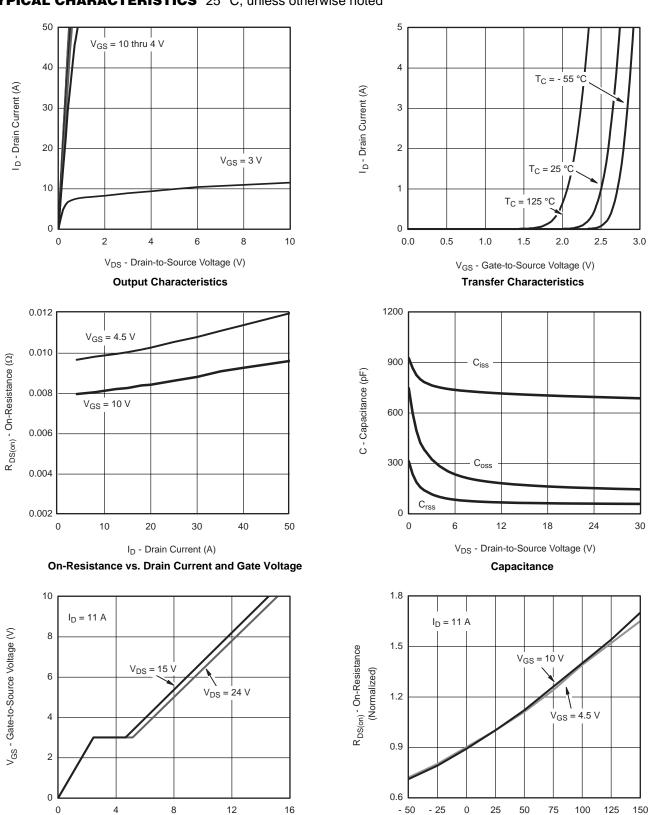
Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit
Static						<u> </u>
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V, } I_{D} = 250 \mu\text{A}$	30			V
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	J 050 A		26		mV/°C
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	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	<u> </u>
Zero Gate Voltage Drain Current	IDSS	V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C			10	μΑ
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	0.000			Ω
Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 10 A		50		S
Dynamic ^b						
Input Capacitance	C _{iss}			800		
Output Capacitance	C _{oss}	V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz		165		pF
Reverse Transfer Capacitance	C _{rss}			73		
	Qg	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 10 A		15	15 23	nC
Total Gate Charge		50 00 5		6.8	10.2	
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	$V_{DD} = 15 \text{ V}, R_{L} = 1.4 \Omega$		12	16	1
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	$V_{DD} = 15 \text{ V}, R_{L} = 1.4 \Omega$		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	1
Drain-Source Body Diode Characterist	tics	<u> </u>		1	'	•
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			10	۸
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
ody Diode Reverse Recovery Charge Q _{rr}		L = 0 A dl/dt = 100 A/vs T = 25 °C		6	12	nC
Reverse Recovery Fall Time	$I_F = 9 \text{ A}, \text{ dI/dt} = 100 \text{ A/µs}, T_J = 25 °C$			8		
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.





服务热线:400-655-8788

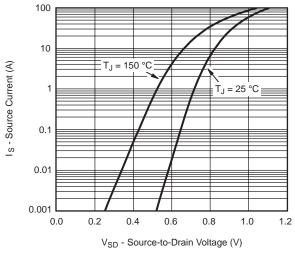
Q_q - Total Gate Charge (nC)

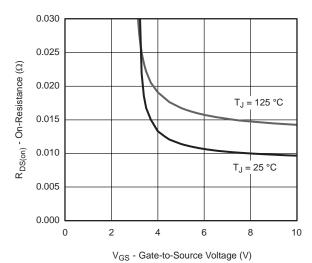
Gate Charge

T_J - Junction Temperature (°C)

On-Resistance vs. Junction Temperature

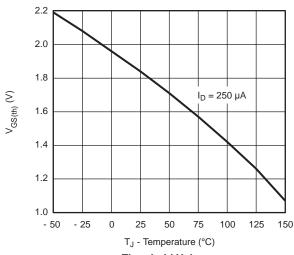


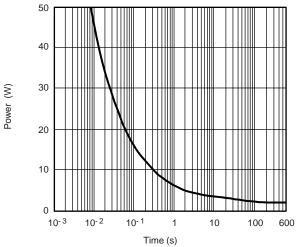




Source-Drain Diode Forward Voltage

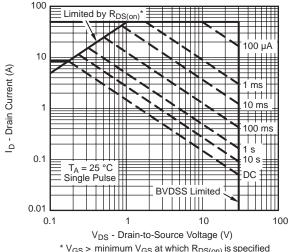






Threshold Voltage

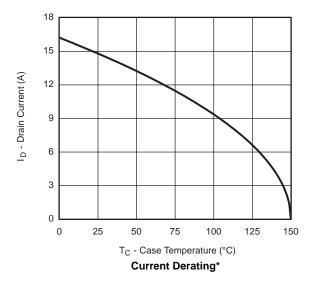
Single Pulse Power, Junction-to-Ambient

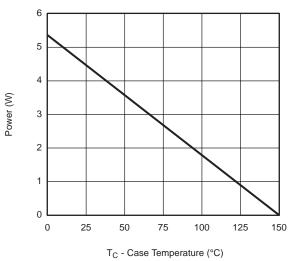


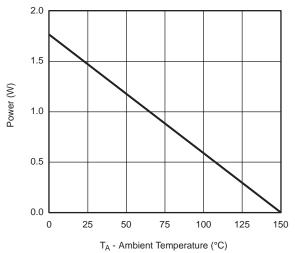
* $V_{GS} > \mbox{minimum } V_{GS}$ at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient









Power Derating, Junction-to-Foot

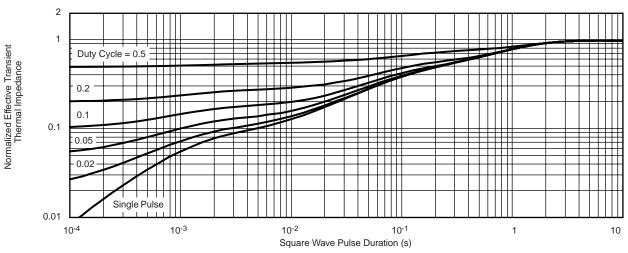
Power Derating, Junction-to-Ambient

^{*} 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.





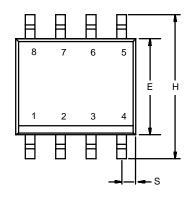
Normalized Thermal Transient Impedance, Junction-to-Ambient

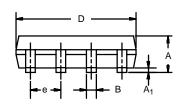


Normalized Thermal Transient Impedance, Junction-to-Foot



SOIC (NARROW): 8-LEAD







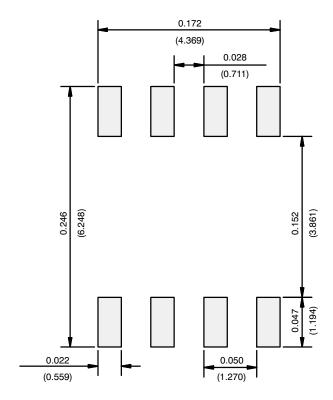
	MILLIMETERS		INC	HES	
DIM	Min	Max	Min	Max	
Α	1.35	1.75	0.053	0.069	
A ₁	0.10	0.20	0.004	0.008	
В	0.35	0.51	0.014	0.020	
С	0.19	0.25	0.0075	0.010	
D	4.80	5.00	0.189	0.196	
Е	3.80	4.00	0.150	0.157	
е	1.27 BSC		0.050 BSC		
Н	5.80	6.20	0.228	0.244	
h	0.25	0.50	0.010	0.020	
L	0.50	0.93	0.020	0.037	
q	0°	8°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