AMD Athlon™ 64 Processor Power and Thermal Data Sheet

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Table 1: Revision History

Date	Revision	Description
March 2006	3.51	Added three AMD Turion™ 64 Mobile Technology OPNS: TMSMT32BQX4LD, TMSMT34BQX5LD, and TMSMT37BQX5LD.
March 2006	3.47	Added OPNs across all processor brands. Added new Section 5 AMD Athlon™ 64 X2 Dual Core Processor. Added new Section 6 MTOPS.
October 2004	3.43	Added OPN for model 4000+ desktop
October 2004	3.41	Added FX-55 OPN. Added desktop OPNs for models 3000+, 3200+, and 3500+. Documented $T_{CONTROL}$ max parameter for all OPNs. Removed chapters 3, 4, and 6.
August 2004	3.37	Added AMD Sempron™ Processor and Mobile AMD Sempron™ Processor chapters. Removed model 3100+ 62W OPN. Added DTR Model 3700+ OPN.
July 2004	3.29	Added model 3400+ 62W mobile OPN.
June 2004	3.25	Added rev CG 89W model 3500+, 3700+, and 3800+ OPNs. Added FX-53 939 pin package OPN. Added one decimal precision to some IDD numbers. Updated document references.
May 2004	3.21	Added rev CG 35W models 2700+ and 2800+.
April 2004	3.19	Removed rev CG 35W OPN.
April 2004	3.17	Corrected model number formatting for DTR OPNs.
March 2004	3.15	Added rev CG 35W model 2700+ OPN.
March 2004	3.13	Added rev CG model 2800+, 3000+, and 3200+ 89W OPNs. Added FX-53 940 pin package OPN. Corrected note for C3 state on all Power/Thermal Specification tables. Added package drawing references for lidless parts in OPN decode section.
January 2004	3.11	Added rev CG entries for existing rev C0 parts. Corrected Max FID code for model 3200+ 62W mobile OPN. Updated FX-51 Halt/Stop Grant power number. Revised IDD Max and TDP for Intermediate P-state #2 for 754 pin lidless package Rev C0 DTR Model 3200+.
January 2004	3.07	Added model 3400+ DT and DTR parts. Added model 2800+, 3000+, and 3200+ 62W Mobile parts.
December 2003	3.06	Added model 3000+ desktop part.
November 2003	3.05	General clean up. Updated S3 I/O power for non-FX parts. Fixed mobile OPN example. Added thermal resistance specifications for all OPNs.
September 2003	3.02	Changed min P-state information to N/A in Table 8, and removed unreleased entries from Table 4 and Table 14.
September 2003	3.00	Initial public release.

1 AMD Athlon™ 64 Processor

The following sections contain thermal/power and related BIOS specifications for AMD Athlon™ 64 processors. Each column in the BIOS and thermal/power tables represents a specific Ordering Part Number (OPN). Section 1.1 provides an example of the OPN structure for this processor family.

For all other electrical specifications for the processor, refer to the *AMD Athlon™ 64 Product Data Sheet*, order #24659. For power management BIOS requirements, refer to the *BIOS and Kernel Developer's Guide for AMD Athlon™ 64 Processors and AMD Opteron™ Processors*, order #26094.

1.1 Ordering Part Number Description

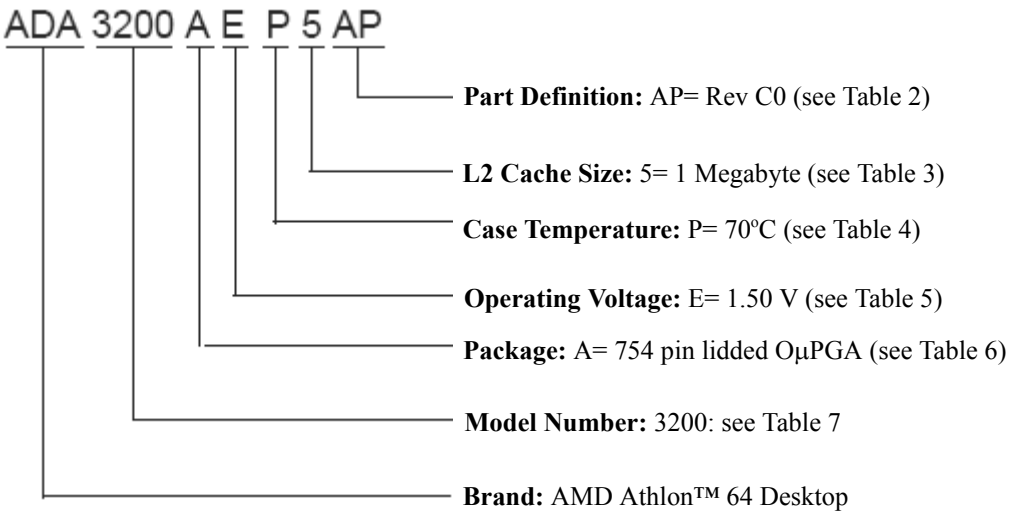

Figure 1. AMD Athlon™ 64 Processor Ordering Part Number Example

Table 2: AMD Athlon™ 64 Processor Part Definition Options

Part Definition	Revision	Package Drawing
AP	Rev C0	Lidded
AR	Rev CG	Lidded
AS	Rev CG	D1
AW	Rev CG	D1
AX	Rev CG	Lidded
BI	Rev D0	D1
BN	Rev E4	D1
BP	Rev E3	D2
BW	Rev E6	D2

Table 2: AMD Athlon™ 64 Processor Part Definition Options (Continued)

Part Definition	Revision	Package Drawing
BX	Rev E6	Lidded
CF	Rev E6	D1
CG	Rev E4	D1

Note: Refer to the *AMD Functional Data Sheet, 754 Pin Package,* order #31410 or *AMD Functional Data Sheet, 939 Pin Package*, order #31411, as appropriate for package drawings.

Table 3: AMD Athlon™ 64 Processor L2 Cache Size Options

OPN Character	Cache Size
3	256 KB
4	512 KB
5	1 MB

Table 4: AMD Athlon™ 64 Processor Temperature Options

OPN Character	Temperature
A	Variable
O	69ºC
P	70ºC
K	65ºC

Table 5: AMD Athlon™ 64 Processor Operating Voltage

OPN Character	Operating Voltage
A	Variable
E	1.50 V
I	1.40 V
K	1.35 V

Table 6: AMD Athlon™ 64 Processor Package Options

OPN Character	Package
A	754 Pin Lidded OµPGA
D	939 Pin Lidded OµPGA

Table 7: AMD Athlon™ 64 Processor Model Number Options

Package	Cache Size	Frequency	Max HyperTransport Frequency	Model Number
754 Pin Lidded OμPGA	512 KB	1800 MHz	800 MHz	2800+
754 Pin Lidded OμPGA	512 KB	2000 MHz	800 MHz	3000+
754 Pin Lidded OμPGA	1 MB	2000 MHz	800 MHz	3200+
754 Pin Lidded OμPGA	512 KB	2200 MHz	800 MHz	3200+
754 Pin Lidded OμPGA	256 KB	2400 MHz	800 MHz	3300+
754 Pin Lidded OμPGA	1 MB	2200 MHz	800 MHz	3400+
754 Pin Lidded OμPGA	512 KB	2400 MHz	800 MHz	3400+
754 Pin Lidded OμPGA	1 MB	2400 MHz	800 MHz	3700+
939 Pin Lidded OμPGA	512 KB	1800 MHz	1000 MHz	3000+
939 Pin Lidded OμPGA	512 KB	2000 MHz	1000 MHz	3200+
939 Pin Lidded OμPGA	512 KB	2200 MHz	800 MHz	3400+
939 Pin Lidded OμPGA	512 KB	2200 MHz	1000 MHz	3500+
939 Pin Lidded OμPGA	1 MB	2200 MHz	1000 MHz	3700+
939 Pin Lidded OμPGA	512 KB	2400 MHz	1000 MHz	3800+
939 Pin Lidded OμPGA	1 MB	2400 MHz	1000 MHz	4000+

Table 8: AMD Athlon™ 64 Processor Thermal Profile

Thermal Profile	A	B
Thermal Resistance (case to ambient)	0.34°C/W	0.34°C/W
Local Ambient Temperature	42°C	42°C
Tcase Max	Power (Thermal Profile A)	Power (Thermal Profile B)
49°C	20.6 W	20.6 W
51°C	26.5 W	26.5 W
53°C	32.4 W	32.4 W
55°C	38.2 W	38.2 W
57°C	44.1 W	44.1 W
59°C	50.0 W	50.0 W
61°C	55.9 W	55.9 W
63°C	61.8 W	61.8 W
65°C	67.6 W	67.0 W
67°C	73.5 W	N/A
69°C	79.4 W	N/A
71°C	85.3 W	N/A

***Note**: The thermal profile is used to define the relationship between Tcase max and device specific Thermal Design Power for* Rev E *processors specified in this document with 'Variable' indicated by the Case Temperature OPN character.*

1.2 AMD Athlon™ 64 Processor BIOS Specifications

Table 9 contains the power and thermal related BIOS specifications for this processor family. Each column in the BIOS specification tables represents a specific Ordering Part Number (OPN). Section 1.1 provides an example of the OPN structure for this processor family.

Table 9: AMD Athlon™ 64 Processor BIOS Specifications

Parameter/OPN	Notes	ADA2800AEP4AP	ADA3000AEP4AP	ADA3200AEP5AP
Model Number		2800+	3000+	3200+
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h	04h	04h
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00000F48h	00000F48h	00000F48h
FID/VID Status MaxVID Field	2	00h	00h	00h
FID/VID Status MaxFID Field	2	0Ah	0Ch	0Ch
FID/VID Status StartVID Field	2	02h	02h	02h
FID/VID Status StartFID Field	2	0Ah	0Ch	0Ch
L2 Cache Size		512 KB	512 KB	1 MB
Max HyperTransport™ Frequency		800 MHz	800 MHz	800 MHz
Max P-State		1800 MHz	2000 MHz	2000 MHz
VID Code		02h	02h	02h
VID_VDD	3	1.500 V	1.500 V	1.500 V
Thermal Design Power	4	89.0 W	89.0 W	89.0 W
Intermediate P-State #1	5	N/A	1800 MHz	1800 MHz
VID Code / VID_VDD	3		06h 1.400 V	06h 1.400 V
Thermal Design Power	4		66.0 W	66.0 W
Intermediate P-State #2	5	N/A	N/A	N/A
VID Code / VID_VDD	3			
Thermal Design Power	4			
Intermediate P-State #3	5	N/A	N/A	N/A
VID Code / VID_VDD	3			
Thermal Design Power	4			
Intermediate P-State #4	5	N/A	N/A	N/A
VID Code / VID_VDD	3			
Thermal Design Power	4			
Intermediate P-State #5	5	N/A	N/A	N/A
VID Code / VID_VDD	3			
Thermal Design Power	4			
Intermediate P-State #6	5	N/A	N/A	N/A
VID Code / VID_VDD	3			
Thermal Design Power	4			
Min P-State		800 MHz	800 MHz	800 MHz
VID Code / VID_VDD	3	0Ah 1.300 V	0Ah 1.300 V	0Ah 1.300 V
Thermal Design Power	4	35.0 W	35.0 W	35.0 W

The notes for this table appear on page 29.

Parameter/OPN	Notes	ADA3400AEP5AP	
Model Number		3400+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00000F48h	
FID/VID Status MaxVID Field	2	00h	
FID/VID Status MaxFID Field	2	0Eh	
FID/VID Status StartVID Field	2	02h	
FID/VID Status StartFID Field	2	0Eh	
L2 Cache Size		1 MB	
Max HyperTransport™ Frequency		800 MHz	
Max P-State		2200 MHz	
VID Code		02h	
VID_VDD	3	1.500 V	
Thermal Design Power	4	89.0 W	
Intermediate P-State #1	5	2000 MHz	
VID Code / VID_VDD	3	06h	1.400 V
Thermal Design Power	4	70.0 W	
Intermediate P-State #2	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #3	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #4	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #5	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #6	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Min P-State		800 MHz	
VID Code / VID_VDD	3	0Ah	1.300 V
Thermal Design Power	4	35.0 W	

The notes for this table appear on page 29.

Parameter/OPN	Notes	ADA2800AEP4AR		ADA3000AEP4AR	
Model Number		2800+		3000+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h		04h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00000F4Ah		00000F4Ah	
FID/VID Status MaxVID Field	2	00h		00h	
FID/VID Status MaxFID Field	2	0Ah		0Ch	
FID/VID Status StartVID Field	2	02h		02h	
FID/VID Status StartFID Field	2	0Ah		0Ch	
L2 Cache Size		512 KB		512 KB	
Max HyperTransport™ Frequency		800 MHz		800 MHz	
Max P-State		1800 MHz		2000 MHz	
VID Code		02h		02h	
VID_VDD	3	1.500 V		1.500 V	
Thermal Design Power	4	89.0 W		89.0 W	
Intermediate P-State #1	5	N/A		1800 MHz	
VID Code / VID_VDD	3			06h	1.400 V
Thermal Design Power	4			66.0 W	
Intermediate P-State #2	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #3	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #4	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #5	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #6	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Min P-State		1000 MHz		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V	12h	1.100 V
Thermal Design Power	4	22.0 W		22.0 W	

The notes for this table appear on page 29.

Parameter/OPN	Notes	ADA3700AEP5AR	
Model Number		3700+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00000F4Ah	
FID/VID Status MaxVID Field	2	00h	
FID/VID Status MaxFID Field	2	10h	
FID/VID Status StartVID Field	2	02h	
FID/VID Status StartFID Field	2	10h	
L2 Cache Size		1 MB	
Max HyperTransport™ Frequency		800 MHz	
Max P-State		2400 MHz	
VID Code		02h	
VID_VDD	3	1.500 V	
Thermal Design Power	4	89.0 W	
Intermediate P-State #1	5	2200 MHz	
VID Code / VID_VDD	3	06h	1.400 V
Thermal Design Power	4	72.0 W	
Intermediate P-State #2	5	2000 MHz	
VID Code / VID_VDD	3	0Ah	1.300 V
Thermal Design Power	4	53.0 W	
Intermediate P-State #3	5	1800 MHz	
VID Code / VID_VDD	3	0Eh	1.200 V
Thermal Design Power	4	39.0 W	
Intermediate P-State #4	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #5	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #6	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Min P-State		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V
Thermal Design Power	4	22.0 W	

The notes for this table appear on page 29.

Parameter/OPN	Notes	ADA2800AEP4AX	ADA3000AEP4AX	ADA3200AEP4AX
Model Number		2800+	3000+	3200+
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h	04h	04h
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00000FC0h	00000FC0h	00000FC0h
FID/VID Status MaxVID Field	2	00h	00h	00h
FID/VID Status MaxFID Field	2	0Ah	0Ch	0Eh
FID/VID Status StartVID Field	2	02h	02h	02h
FID/VID Status StartFID Field	2	0Ah	0Ch	0Eh
L2 Cache Size		512 KB	512 KB	512 KB
Max HyperTransport™ Frequency		800 MHz	800 MHz	800 MHz
Max P-State		1800 MHz	2000 MHz	2200 MHz
VID Code		02h	02h	02h
VID_VDD	3	1.500 V	1.500 V	1.500 V
Thermal Design Power	4	89.0 W	89.0 W	89.0 W
Intermediate P-State #1	5	N/A	1800 MHz	2000 MHz
VID Code / VID_VDD	3		06h 1.400 V	06h 1.400 V
Thermal Design Power	4		67.0 W	69.0 W
Intermediate P-State #2	5	N/A	N/A	1800 MHz
VID Code / VID_VDD	3			0Ah 1.300 V
Thermal Design Power	4			50.0 W
Intermediate P-State #3	5	N/A	N/A	N/A
VID Code / VID_VDD	3			
Thermal Design Power	4			
Intermediate P-State #4	5	N/A	N/A	N/A
VID Code / VID_VDD	3			
Thermal Design Power	4			
Intermediate P-State #5	5	N/A	N/A	N/A
VID Code / VID_VDD	3			
Thermal Design Power	4			
Intermediate P-State #6	5	N/A	N/A	N/A
VID Code / VID_VDD	3			
Thermal Design Power	4			
Min P-State		1000 MHz	1000 MHz	1000 MHz
VID Code / VID_VDD	3	12h 1.100 V	12h 1.100 V	12h 1.100 V
Thermal Design Power	4	22.0 W	22.0 W	22.0 W

The notes for this table appear on page 29.

Parameter/OPN	Notes	ADA3400AEP4AX	
Model Number		3400+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00000FC0h	
FID/VID Status MaxVID Field	2	00h	
FID/VID Status MaxFID Field	2	10h	
FID/VID Status StartVID Field	2	02h	
FID/VID Status StartFID Field	2	10h	
L2 Cache Size		512 KB	
Max HyperTransport™ Frequency		800 MHz	
Max P-State		2400 MHz	
VID Code		02h	
VID_VDD	#VALUE!	1.500 V	
Thermal Design Power	4	89.0 W	
Intermediate P-State #1	5	2200 MHz	
VID Code / VID_VDD	3	06h	1.400 V
Thermal Design Power	4	72.0 W	
Intermediate P-State #2	5	2000 MHz	
VID Code / VID_VDD	3	0Ah	1.300 V
Thermal Design Power	4	53.0 W	
Intermediate P-State #3	5	1800 MHz	
VID Code / VID_VDD	3	0Eh	1.200 V
Thermal Design Power	4	39.0 W	
Intermediate P-State #4	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #5	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #6	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Min P-State		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V
Thermal Design Power	4	22.0 W	

The notes for this table appear on page 29.

Parameter/OPN	Notes	ADA3500DEP4AS	
Model Number		3500+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00000F7Ah	
FID/VID Status MaxVID Field	2	00h	
FID/VID Status MaxFID Field	2	0Eh	
FID/VID Status StartVID Field	2	02h	
FID/VID Status StartFID Field	2	0Eh	
L2 Cache Size		512 KB	
Max HyperTransport™ Frequency		1000 MHz	
Max P-State		2200 MHz	
VID Code		02h	
VID_VDD	3	1.500 V	
Thermal Design Power	4	89.0 W	
Intermediate P-State #1	5	2000 MHz	
VID Code / VID_VDD	3	06h	1.400 V
Thermal Design Power	4	69.0 W	
Intermediate P-State #2	5	1800 MHz	
VID Code / VID_VDD	3	0Ah	1.300 V
Thermal Design Power	4	50.0 W	
Intermediate P-State #3	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #4	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #5	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #6	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Min P-State		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V
Thermal Design Power	4	22.0 W	

The notes for this table appear on page 29.

Parameter/OPN	Notes	ADA3500DEP4AW	
Model Number		3500+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00000FF0h	
FID/VID Status MaxVID Field	2	00h	
FID/VID Status MaxFID Field	2	0Eh	
FID/VID Status StartVID Field	2	02h	
FID/VID Status StartFID Field	2	0Eh	
L2 Cache Size		512 KB	
Max HyperTransport™ Frequency		1000 MHz	
Max P-State		2200 MHz	
VID Code		02h	
VID_VDD	3	1.500 V	
Thermal Design Power	4	89.0 W	
Intermediate P-State #1	5	2000 MHz	
VID Code / VID_VDD	3	06h	1.400 V
Thermal Design Power	4	69.0 W	
Intermediate P-State #2	5	1800 MHz	
VID Code / VID_VDD	3	0Ah	1.300 V
Thermal Design Power	4	50.0 W	
Intermediate P-State #3	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #4	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #5	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #6	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Min P-State		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V
Thermal Design Power	4	22.0 W	

The notes for this table appear on page 29.

Parameter/OPN	Notes	ADA3800DEP4AW		ADA4000DEP5AS	
Model Number		3800+		4000+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h		04h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00000FF0h		00000F7Ah	
FID/VID Status MaxVID Field	2	00h		00h	
FID/VID Status MaxFID Field	2	10h		10h	
FID/VID Status StartVID Field	2	02h		02h	
FID/VID Status StartFID Field	2	10h		10h	
L2 Cache Size		512 KB		1 MB	
Max HyperTransport™ Frequency		1000 MHz		1000 MHz	
Max P-State		2400 MHz		2400 MHz	
VID Code		02h		02h	
VID_VDD	3	1.500 V		1.500 V	
Thermal Design Power	4	89.0 W		89.0 W	
Intermediate P-State #1	5	2200 MHz		2200 MHz	
VID Code / VID_VDD	3	06h	1.400 V	06h	1.400 V
Thermal Design Power	4	72.0 W		72.0 W	
Intermediate P-State #2	5	2000 MHz		2000 MHz	
VID Code / VID_VDD	3	0Ah	1.300 V	0Ah	1.300 V
Thermal Design Power	4	53.0 W		53.0 W	
Intermediate P-State #3	5	1800 MHz		1800 MHz	
VID Code / VID_VDD	3	0Eh	1.200 V	0Eh	1.200 V
Thermal Design Power	4	39.0 W		39.0 W	
Intermediate P-State #4	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #5	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #6	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Min P-State		1000 MHz		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V	12h	1.100 V
Thermal Design Power	4	22.0 W		22.0 W	

The notes for this table appear on page 29.

Parameter/OPN	Notes	ADA3500DAA4BN		ADA3700DAA5BN		ADA4000DAA5BN	
Model Number		3500+		3700+		4000+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h		04h		04h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00020F71h		00020F71h		00020F71h	
FID/VID Status MaxFID Field	2	0Eh		0Eh		10h	
FID/VID Status StartFID Field	2	0Eh		0Eh		10h	
L2 Cache Size		512 KB		1 MB		1 MB	
Max HyperTransport™ Frequency		1000 Mhz		1000 Mhz		1000 Mhz	
Max P-State		2200 MHz		2200 MHz		2400 MHz	
FID/VID Status MaxVID Field	2, 6	06h	04h	06h	04h	06h	04h
FID/VID Status StartVID Field	2, 6	08h	06h	08h	06h	08h	06h
VID Code		08h	06h	08h	06h	08h	06h
VID_VDD	3	1.350 V	1.400 V	1.350 V	1.400 V	1.350 V	1.400 V
Thermal Design Power	4	67.0 W		85.3 W		85.3 W	
Intermediate P-State #1	5	2000 MHz		2000 MHz		2200 MHz	
VID Code / VID_VDD	3	08h	1.350 V	08h	1.350 V	08h	1.350 V
Thermal Design Power	4	64.7 W		83.0 W		83.0 W	
Intermediate P-State #2	5	1800 MHz		1800 MHz		2000 MHz	
VID Code / VID_VDD	3	0Ah	1.300 V	0Ah	1.300 V	0Ah	1.300 V
Thermal Design Power	4	54.8 W		70.4 W		70.6 W	
Intermediate P-State #3	5	N/A		N/A		1800 MHz	
VID Code / VID_VDD	3					0Ch	1.250 V
Thermal Design Power	4					59.6 W	
Intermediate P-State #4	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #5	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #6	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Min P-State		1000 MHz		1000 MHz		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V	12h	1.100 V	12h	1.100 V
Thermal Design Power	4	27.5 W		36.1 W		35.0 W	

The notes for this table appear on page 29

Parameter/OPN	Notes	ADA3700DKA5CF		ADA4000DKA5CF	
Model Number		3700+		4000+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h		04h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00030F72h		00030F72h	
FID/VID Status MaxFID Field	2	0Eh		10h	
FID/VID Status StartFID Field	2	0Eh		10h	
L2 Cache Size		1 MB		1 MB	
Max HyperTransport™ Frequency		1000 Mhz		1000 Mhz	
Max P-State		2200 MHz		2400 MHz	
FID/VID Status MaxVID Field	2, 6	06h		06h	
FID/VID Status StartVID Field	2, 6	08h		08h	
VID Code		08h		08h	
VID_VDD	3	1.350 V		1.350 V	
Thermal Design Power	4	85.3 W		85.3 W	
Intermediate P-State #1	5	2000 MHz		2200 MHz	
VID Code / VID_VDD	3	08h	1.350 V	08h	1.350 V
Thermal Design Power	4	83.0 W		83.0 W	
Intermediate P-State #2	5	1800 MHz		2000 MHz	
VID Code / VID_VDD	3	0Ah	1.300 V	0Ah	1.300 V
Thermal Design Power	4	70.4 W		70.6 W	
Intermediate P-State #3	5	N/A		1800 MHz	
VID Code / VID_VDD	3			0Ch	1.250 V
Thermal Design Power	4			59.6 W	
Intermediate P-State #4	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #5	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #6	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Min P-State		1000 MHz		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V	12h	1.100 V
Thermal Design Power	4	36.1 W		35.0 W	

The notes for this table appear on page 29.

Parameter/OPN	Notes	ADA3800DAA4BP	
Model Number		3800+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00020FF0h	
FID/VID Status MaxFID Field	2	10h	
FID/VID Status StartFID Field	2	10h	
L2 Cache Size		512 KB	
Max HyperTransport™ Frequency		1000 MHz	
Max P-State		2400 MHz	
FID/VID Status MaxVID Field	2, 6	06h	04h
FID/VID Status StartVID Field	2, 6	08h	06h
VID Code		08h	06h
VID_VDD	3	1.350 V	1.400 V
Thermal Design Power	4	85.3 W	
Intermediate P-State #1	5	2200 MHz	
VID Code / VID_VDD	3	08h	1.350 V
Thermal Design Power	4	83.0 W	
Intermediate P-State #2	5	2000 MHz	
VID Code / VID_VDD	3	0Ah	1.300 V
Thermal Design Power	4	70.6 W	
Intermediate P-State #3	5	1800 MHz	
VID Code / VID_VDD	3	0Ch	1.250 V
Thermal Design Power	4	59.6 W	
Intermediate P-State #4	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #5	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #6	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Min P-State		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V
Thermal Design Power	4	35.0 W	

The notes for this table appear on page 29

Parameter/OPN	Notes	ADA3000DIK4BI	ADA3200DIK4BI	ADA3500DIK4BI
Model Number		3000+	3200+	3500+
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h	04h	04h
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00010FF0h	00010FF0h	00010FF0h
FID/VID Status MaxVID Field	2	04h	04h	04h
FID/VID Status MaxFID Field	2	0Ah	0Ch	0Eh
FID/VID Status StartVID Field	2	06h	06h	06h
FID/VID Status StartFID Field	2	0Ah	0Ch	0Eh
L2 Cache Size		512 KB	512 KB	512 KB
Max HyperTransport™ Frequency		1000 MHz	1000 MHz	1000 MHz
Max P-State		1800 MHz	2000 MHz	2200 MHz
VID Code		06h	06h	06h
VID_VDD	3	1.400 V	1.400 V	1.400 V
Thermal Design Power	4	67.0 W	67.0 W	67.0 W
Intermediate P-State #1	5	N/A	1800 MHz	2000 MHz
VID Code / VID_VDD	3		08h / 1.350 V	08h / 1.350 V
Thermal Design Power	4		56.0 W	56.0 W
Intermediate P-State #2	5	N/A	N/A	1800 MHz
VID Code / VID_VDD	3			0Ah / 1.300 V
Thermal Design Power	4			46.0 W
Intermediate P-State #3	5	N/A	N/A	N/A
VID Code / VID_VDD	3			
Thermal Design Power	4			
Intermediate P-State #4	5	N/A	N/A	N/A
VID Code / VID_VDD	3			
Thermal Design Power	4			
Intermediate P-State #5	5	N/A	N/A	N/A
VID Code / VID_VDD	3			
Thermal Design Power	4			
Intermediate P-State #6	5	N/A	N/A	N/A
VID Code / VID_VDD	3			
Thermal Design Power	4			
Min P-State		1000 MHz	1000 MHz	1000 MHz
VID Code / VID_VDD	3	12h / 1.100 V	12h / 1.100 V	12h / 1.100 V
Thermal Design Power	4	21.0 W	21.0 W	20.0 W

The notes for this table appear on page 29.

Parameter/OPN	Notes	ADA3000DAA4BP		ADA3200DAA4BP		ADA3500DAA4BP	
Model Number		3000+		3200+		3500+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h		04h		04h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00020FF0h		00020FF0h		00020FF0h	
FID/VID Status MaxFID Field	2	0Ah		0Ch		0Eh	
FID/VID Status StartFID Field	2	0Ah		0Ch		0Eh	
L2 Cache Size		512 KB		512 KB		512 KB	
Max HyperTransport™ Frequency		1000 MHz		1000 MHz		1000 MHz	
Max P-State		1800 MHz		2000 MHz		2200 MHz	
FID/VID Status MaxVID Field	2, 6	06h	04h	06h	04h	06h	04h
FID/VID Status StartVID Field	2, 6	08h	06h	08h	06h	08h	06h
VID Code		08h	06h	08h	06h	08h	06h
VID_VDD	3	1.350 V	1.400 V	1.350 V	1.400 V	1.350 V	1.400 V
Thermal Design Power	4	67.0 W		67.0 W		67.0 W	
Intermediate P-State #1	5	N/A		1800 MHz		2000 MHz	
VID Code / VID_VDD	3			08h	1.350 V	08h	1.350 V
Thermal Design Power	4			64.7 W		64.7 W	
Intermediate P-State #2	5	N/A		N/A		1800 MHz	
VID Code / VID_VDD	3					0Ah	1.300 V
Thermal Design Power	4					54.8 W	
Intermediate P-State #3	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #4	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #5	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #6	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Min P-State		1000 MHz		1000 MHz		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V	12h	1.100 V	12h	1.100 V
Thermal Design Power	4	29.6 W		28.6 W		27.5 W	

The notes for this table appear on page 29.

Parameter/OPN	Notes	ADA3000DAA4BW		ADA3200DAA4BW		ADA3500DAA4BW	
Model Number		3000+		3200+		3500+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h		04h		04h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00020FF2h		00020FF2h		00020FF2h	
FID/VID Status MaxFID Field	2	0Ah		0Ch		0Eh	
FID/VID Status StartFID Field	2	0Ah		0Ch		0Eh	
L2 Cache Size		512 KB		512 KB		512 KB	
Max HyperTransport™ Frequency		1000 MHz		1000 MHz		1000 MHz	
Max P-State		1800 MHz		2000 MHz		2200 MHz	
FID/VID Status MaxVID Field	2, 6	06h	04h	06h	04h	06h	04h
FID/VID Status StartVID Field	2, 6	08h	06h	08h	06h	08h	06h
VID Code		08h	06h	08h	06h	08h	06h
VID_VDD	3	1.350 V	1.400 V	1.350 V	1.400 V	1.350 V	1.400 V
Thermal Design Power	4	67.0 W		67.0 W		67.0 W	
Intermediate P-State #1	5	N/A		1800 MHz		2000 MHz	
VID Code / VID_VDD	3			08h	1.350 V	08h	1.350 V
Thermal Design Power	4			64.7 W		64.7 W	
Intermediate P-State #2	5	N/A		N/A		1800 MHz	
VID Code / VID_VDD	3					0Ah	1.300 V
Thermal Design Power	4					54.8 W	
Intermediate P-State #3	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #4	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #5	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #6	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Min P-State		1000 MHz		1000 MHz		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V	12h	1.100 V	12h	1.100 V
Thermal Design Power	4	29.6 W		28.6 W		27.5 W	

The notes for this table appear on page 29.

Parameter/OPN	Notes	ADA3200DKA4CG	
Model Number		3200+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00030FF2h	
FID/VID Status MaxFID Field	2	0Ch	
FID/VID Status StartFID Field	2	0Ch	
L2 Cache Size		512 KB	
Max HyperTransport™ Frequency		1000 MHz	
Max P-State		2000 MHz	
FID/VID Status MaxVID Field	2, 6	06h	
FID/VID Status StartVID Field	2, 6	08h	
VID Code		08h	
VID_VDD	3	1.350 V	
Thermal Design Power	4	67.0 W	
Intermediate P-State #1	5	1800 MHz	
VID Code / VID_VDD	3	08h	1.350 V
Thermal Design Power	4	64.7 W	
Intermediate P-State #2	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #3	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #4	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #5	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #6	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Min P-State		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V
Thermal Design Power	4	28.6 W	

The notes for this table appear on page 29.

Parameter/OPN	Notes	ADA3800DAA4BW	
Model Number		3800+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00020FF2h	
FID/VID Status MaxFID Field	2	10h	
FID/VID Status StartFID Field	2	10h	
L2 Cache Size		512 KB	
Max HyperTransport™ Frequency		1000 MHz	
Max P-State		2400 MHz	
FID/VID Status MaxVID Field	2, 6	06h	04h
FID/VID Status StartVID Field	2, 6	08h	06h
VID Code		08h	06h
VID_VDD	3	1.350 V	1.400 V
Thermal Design Power	4	85.3 W	
Intermediate P-State #1	5	2200 MHz	
VID Code / VID_VDD	3	08h	1.350 V
Thermal Design Power	4	83.0 W	
Intermediate P-State #2	5	2000 MHz	
VID Code / VID_VDD	3	0Ah	1.300 V
Thermal Design Power	4	70.6 W	
Intermediate P-State #3	5	1800 MHz	
VID Code / VID_VDD	3	0Ch	1.250 V
Thermal Design Power	4	59.6 W	
Intermediate P-State #4	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #5	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #6	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Min P-State		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V
Thermal Design Power	4	35.0 W	

The notes for this table appear on page 29.

Parameter/OPN	Notes	ADA3000AIK4BX	
Model Number		3000+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	04h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00020FC2h	
FID/VID Status MaxFID Field	2	0Ch	
FID/VID Status StartFID Field	2	0Ch	
L2 Cache Size		512 KB	
Max HyperTransport™ Frequency		800 MHz	
Max P-State		2000 MHz	
FID/VID Status MaxVID Field	2, 6	04h	
FID/VID Status StartVID Field	2, 6	06h	
VID Code		06h	
VID_VDD	3	1.400 V	
Thermal Design Power	4	51.0 W	
Intermediate P-State #1	5	1800 MHz	
VID Code / VID_VDD	3	08h	1.350 V
Thermal Design Power	4	42.8 W	
Intermediate P-State #2	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #3	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #4	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #5	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #6	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Min P-State		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V
Thermal Design Power	4	18.9 W	

The notes for this table appear on page 29.

Notes:

1 CPUID extended function 8000_0001h fields are used by BIOS in uniquely associating a given processor to the P-states that are valid for that processor. Refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094.

2 FIDVID Status Register, MSR C001_0042h.

3 The VID_VDD voltage is the VID[4:0] requested VDD supply level. Refer to the appropriate functional data sheet for details.

4 Thermal Design Power (TDP) is measured under the conditions of Tcase Max, IDD Max, and VDD=VID_VDD, and include all power dissipated on-die from VDD, VDDIO, VLDT, VTT, and VDDA.

5 Implementation of this P-state is optional in BIOS.

6 StartVID and MaxVID are programmed during device manufacturing with part-specific values for Rev E and later processors, and can have one or more valid options. All valid options for StartVID, MaxVID, and VID_VDD will be specified for the corresponding OPN. For information on the relationship of StartVID and MaxVID to VID_VDD refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094. Contact your FAE for more info on TDP specifications.

1.3 AMD Athlon™ 64 Processor Thermal/Power Specifications

Table 10 contains the power and thermal specifications for this processor family. Each column in the thermal/power specification tables represents a specific Ordering Part Number (OPN). Section 1.1 provides an example of the OPN structure for this processor family.

Table 10: AMD Athlon™ 64 Processor Thermal/Power Specifications

Parameter/OPN	Notes	ADA2800AEP4AP	ADA3000AEP4AP	ADA3200AEP5AP
Tcase Max	1	70°C	70°C	70°C
Tcontrol Max	2	70°C	70°C	70°C
Tambient		42°C	42°C	42°C
Thermal Resistance (case-amb)		0.31°C/W	0.31°C/W	0.31°C/W
Max P-State		1800 MHz	2000 MHz	2000 MHz
VID_VDD	3	1.500 V	1.500 V	1.500 V
IDD Max		57.8 A	57.8 A	57.8 A
Thermal Design Power	4	89.0 W	89.0 W	89.0 W
Intermediate P-State #1	11	N/A	1800 MHz	1800 MHz
VID_VDD	3		1.400 V	1.400 V
IDD Max			45.6 A	45.6 A
Thermal Design Power	4		66.0 W	66.0 W
Intermediate P-State #2	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #3	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #4	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #5	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #6	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Min P-State		800 MHz	800 MHz	800 MHz
VID_VDD	3	1.300 V	1.300 V	1.300 V
IDD Max		25.2 A	25.2 A	25.2 A
Thermal Design Power	4	35.0 W	35.0 W	35.0 W
Halt/Stop Grant				
IDDC1 Max @ Max P-State	5	32.5 A	32.5 A	32.5 A
IDDC1 Max @ Min P-State	6	10.5 A	10.5 A	10.5 A
I/O Power	8, 12	2.2 W	2.2 W	2.2 W
S3	7			
I/O Power	7, 9, 12	600 mW	600 mW	600 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA3400AEP5AP
Tcase Max	1	70°C
Tcontrol Max	2	70°C
Tambient		42°C
Thermal Resistance (case-amb)		0.31°C/W
Max P-State		2200 MHz
VID_VDD	3	1.500 V
IDD Max		57.8 A
Thermal Design Power	4	89.0 W
Intermediate P-State #1	11	2000 MHz
VID_VDD	3	1.400 V
IDD Max		48.4 A
Thermal Design Power	4	70.0 W
Intermediate P-State #2	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #3	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #4	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #5	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #6	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Min P-State		800 MHz
VID_VDD	3	1.300 V
IDD Max		25.2 A
Thermal Design Power	4	35.0 W
Halt/Stop Grant		
IDDC1 Max @ Max P-State	5	32.5 A
IDDC1 Max @ Min P-State	6	10.5 A
I/O Power	8, 12	2.2 W
S3	7	
I/O Power	7, 9, 12	600 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA2800AEP4AR	ADA3000AEP4AR
Tcase Max	1	70°C	70°C
Tcontrol Max	2	70°C	70°C
Tambient		42°C	42°C
Thermal Resistance (case-amb)		0.31°C/W	0.31°C/W
Max P-State		1800 MHz	2000 MHz
VID_VDD	3	1.500 V	1.500 V
IDD Max		57.8 A	57.8 A
Thermal Design Power	4	89.0 W	89.0 W
Intermediate P-State #1	11	N/A	1800 MHz
VID_VDD	3		1.400 V
IDD Max			45.6 A
Thermal Design Power	4		66.0 W
Intermediate P-State #2	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #3	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #4	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #5	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #6	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Min P-State		1000 MHz	1000 MHz
VID_VDD	3	1.100 V	1.100 V
IDD Max		18.0 A	18.0 A
Thermal Design Power	4	22.0 W	22.0 W
Halt/Stop Grant			
IDDC1 Max @ Max P-State	5	30.0 A	30.0 A
IDDC1 Max @ Min P-State	6	7.0 A	7.0 A
I/O Power	8, 12	2.2 W	2.2 W
S3	7		
I/O Power	7, 9, 12	750 mW	750 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA3700AEP5AR
Tcase Max	1	70°C
Tcontrol Max	2	70°C
Tambient		42°C
Thermal Resistance (case-amb)		0.31°C/W
Max P-State		2400 MHz
VID_VDD	3	1.500 V
IDD Max		57.8 A
Thermal Design Power	4	89.0 W
Intermediate P-State #1	11	2200 MHz
VID_VDD	3	1.400 V
IDD Max		50.0 A
Thermal Design Power	4	72.0 W
Intermediate P-State #2	11	2000 MHz
VID_VDD	3	1.300 V
IDD Max		39.0 A
Thermal Design Power	4	53.0 W
Intermediate P-State #3	11	1800 MHz
VID_VDD	3	1.200 V
IDD Max		31.0 A
Thermal Design Power	4	39.0 W
Intermediate P-State #4	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #5	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #6	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Min P-State		1000 MHz
VID_VDD	3	1.100 V
IDD Max		18.0 A
Thermal Design Power	4	22.0 W
Halt/Stop Grant		
IDDC1 Max @ Max P-State	5	30.0 A
IDDC1 Max @ Min P-State	6	7.0 A
I/O Power	8, 12	2.2 W
S3	7	
I/O Power	7, 9, 12	750 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA2800AEP4AX	ADA3000AEP4AX	ADA3200AEP4AX
Tcase Max	1	70°C	70°C	70°C
Tcontrol Max	2	70°C	70°C	70°C
Tambient		42°C	42°C	42°C
Thermal Resistance (case-amb)		0.31°C/W	0.31°C/W	0.31°C/W
Max P-State		1800 MHz	2000 MHz	2200 MHz
VID_VDD	3	1.500 V	1.500 V	1.500 V
IDD Max		57.8 A	57.8 A	57.8 A
Thermal Design Power	4	89.0 W	89.0 W	89.0 W
Intermediate P-State #1	11	N/A	1800 MHz	2000 MHz
VID_VDD	3		1.400 V	1.400 V
IDD Max			46.0 A	48.0 A
Thermal Design Power	4		67.0 W	69.0 W
Intermediate P-State #2	11	N/A	N/A	1800 MHz
VID_VDD	3			1.300 V
IDD Max				37.0 A
Thermal Design Power	4			50.0 W
Intermediate P-State #3	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #4	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #5	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #6	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Min P-State		1000 MHz	1000 MHz	1000 MHz
VID_VDD	3	1.100 V	1.100 V	1.100 V
IDD Max		18.0 A	18.0 A	18.0 A
Thermal Design Power	4	22.0 W	22.0 W	22.0 W
Halt/Stop Grant				
IDDC1 Max @ Max P-State	5	30.0 A	30.0 A	30.0 A
IDDC1 Max @ Min P-State	6	7.0 A	7.0 A	7.0 A
I/O Power	8, 12	2.2 W	2.2 W	2.2 W
S3	7			
I/O Power	7, 9, 12	750 mW	750 mW	750 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA3400AEP4AX
Tcase Max	1	70°C
Tcontrol Max	2	70°C
Tambient		42°C
Thermal Resistance (case-amb)		0.31°C/W
Max P-State		2400 MHz
VID_VDD	3	1.500 V
IDD Max		57.9 A
Thermal Design Power	4	89.0 W
Intermediate P-State #1	11	2200 MHz
VID_VDD	3	1.400 V
IDD Max		49.9 A
Thermal Design Power	4	72.0 W
Intermediate P-State #2	11	2000 MHz
VID_VDD	3	1.300 V
IDD Max		39.1 A
Thermal Design Power	4	53.0 W
Intermediate P-State #3	11	1800 MHz
VID_VDD	3	1.200 V
IDD Max		30.7 A
Thermal Design Power	4	39.0 W
Intermediate P-State #4	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #5	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #6	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Min P-State		1000 MHz
VID_VDD	3	1.100 V
IDD Max		18.0 A
Thermal Design Power	4	22.0 W
Halt/Stop Grant		
IDDC1 Max @ Max P-State	5	30.0 A
IDDC1 Max @ Min P-State	6	7.0 A
I/O Power	8, 12	2.2 W
S3	7	
I/O Power	7, 9, 12	750 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA3500DEP4AS
Tcase Max	1	70°C
Tcontrol Max	2	70°C
Tambient		42°C
Thermal Resistance (case-amb)		0.31°C/W
Max P-State		2200 MHz
VID_VDD	3	1.500 V
IDD Max		57.4 A
Thermal Design Power	4	89.0 W
Intermediate P-State #1	11	2000 MHz
VID_VDD	3	1.400 V
IDD Max		47.2 A
Thermal Design Power	4	69.0 W
Intermediate P-State #2	11	1800 MHz
VID_VDD	3	1.300 V
IDD Max		36.2 A
Thermal Design Power	4	50.0 W
Intermediate P-State #3	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #4	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #5	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #6	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Min P-State		1000 MHz
VID_VDD	3	1.100 V
IDD Max		17.4 A
Thermal Design Power	4	22.0 W
Halt/Stop Grant		
IDDC1 Max @ Max P-State	5	30.0 A
IDDC1 Max @ Min P-State	6	7.0 A
I/O Power	8, 12	2.9 W
S3	7	
I/O Power	7, 9, 12	750 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA3500DEP4AW
Tcase Max	1	70°C
Tcontrol Max	2	70°C
Tambient		42°C
Thermal Resistance (case-amb)		0.31°C/W
Max P-State		2200 MHz
VID_VDD	3	1.500 V
IDD Max		57.4 A
Thermal Design Power	4	89.0 W
Intermediate P-State #1	11	2000 MHz
VID_VDD	3	1.400 V
IDD Max		47.2 A
Thermal Design Power	4	69.0 W
Intermediate P-State #2	11	1800 MHz
VID_VDD	3	1.300 V
IDD Max		36.2 A
Thermal Design Power	4	50.0 W
Intermediate P-State #3	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #4	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #5	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #6	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Min P-State		1000 MHz
VID_VDD	3	1.100 V
IDD Max		17.4 A
Thermal Design Power	4	22.0 W
Halt/Stop Grant		
IDDC1 Max @ Max P-State	5	30.0 A
IDDC1 Max @ Min P-State	6	7.0 A
I/O Power	8, 12	2.9 W
S3	7	
I/O Power	7, 9, 12	750 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA3800DEP4AW	ADA4000DEP5AS
Tcase Max	1	70°C	70°C
Tcontrol Max	2	70°C	70°C
Tambient		42°C	42°C
Thermal Resistance (case-amb)		0.31°C/W	0.31°C/W
Max P-State		2400 MHz	2400 MHz
VID_VDD	3	1.500 V	1.500 V
IDD Max		57.4 A	57.4 A
Thermal Design Power	4	89.0 W	89.0 W
Intermediate P-State #1	11	2200 MHz	2200 MHz
VID_VDD	3	1.400 V	1.400 V
IDD Max		49.4 A	49.4 A
Thermal Design Power	4	72.0 W	72.0 W
Intermediate P-State #2	11	2000 MHz	2000 MHz
VID_VDD	3	1.300 V	1.300 V
IDD Max		38.5 A	38.5 A
Thermal Design Power	4	53.0 W	53.0 W
Intermediate P-State #3	11	1800 MHz	1800 MHz
VID_VDD	3	1.200 V	1.200 V
IDD Max		30.1 A	30.1 A
Thermal Design Power	4	39.0 W	39.0 W
Intermediate P-State #4	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #5	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #6	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Min P-State		1000 MHz	1000 MHz
VID_VDD	3	1.100 V	1.100 V
IDD Max		17.4 A	17.4 A
Thermal Design Power	4	22.0 W	22.0 W
Halt/Stop Grant			
IDDC1 Max @ Max P-State	5	30.0 A	30.0 A
IDDC1 Max @ Min P-State	6	7.0 A	7.0 A
I/O Power	8, 12	2.9 W	2.9 W
S3	7		
I/O Power	7, 9, 12	750 mW	750 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA3500DAA4BN	ADA3700DAA5BN	ADA4000DAA5BN
Tcase Max	1, 13	49°C to 65°C	49°C to 71°C	49°C to 71°C
Tcontrol Max	2	70°C	70°C	70°C
Tambient		42°C	42°C	42°C
Thermal Resistance (case-amb)		0.34°C/W	0.34°C/W	0.34°C/W
Thermal Profile	14	B	A	A
Max P-State		2200 MHz	2200 MHz	2400 MHz
VID_VDD	3	1.350 V | 1.400 V	1.350 V | 1.400 V	1.350 V | 1.400 V
IDD Max		47.5 A	60.0 A	60.0 A
Thermal Design Power	4	67.0 W	85.3 W	85.3 W
Intermediate P-State #1	11	2000 MHz	2000 MHz	2200 MHz
VID_VDD	3	1.350 V	1.350 V	1.350 V
IDD Max		45.8 A	59.3 A	59.3 A
Thermal Design Power	4	64.7 W	83.0 W	83.0 W
Intermediate P-State #2	11	1800 MHz	1800 MHz	2000 MHz
VID_VDD	3	1.300 V	1.300 V	1.300 V
IDD Max		39.9 A	51.9 A	52.1 A
Thermal Design Power	4	54.8 W	70.4 W	70.6 W
Intermediate P-State #3	11	N/A	N/A	1800 MHz
VID_VDD	3			1.250 V
IDD Max				45.4 A
Thermal Design Power	4			59.6 W
Intermediate P-State #4	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #5	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #6	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Min P-State		1000 MHz	1000 MHz	1000 MHz
VID_VDD	3	1.100 V	1.100 V	1.100 V
IDD Max		22.4 A	30.2 A	29.2 A
Thermal Design Power	4	27.5 W	36.1 W	35.0 W
Halt/Stop Grant				
IDDC1 Max @ Max P-State	5	19.3 A	34.8 A	34.8 A
IDDC1 Max @ Min P-State	6	4.2 A	7.1 A	7.1 A
I/O Power	8, 12	2.9 W	2.9 W	2.9 W
S3	7			
I/O Power	7, 9, 12	500 mW	500 mW	500 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA3700DKA5CF	ADA4000DKA5CF
Tcase Max	1, 13	49°C to 71°C	49°C to 71°C
Tcontrol Max	2	70°C	70°C
Tambient		42°C	42°C
Thermal Resistance (case-amb)		0.34°C/W	0.34°C/W
Thermal Profile	14	A	A
Max P-State		2200 MHz	2400 MHz
VID_VDD	3	1.350 V	1.350 V
IDD Max		60.0 A	60.0 A
Thermal Design Power	4	85.3 W	85.3 W
Intermediate P-State #1	11	2000 MHz	2200 MHz
VID_VDD	3	1.350 V	1.350 V
IDD Max		59.3 A	59.3 A
Thermal Design Power	4	83.0 W	83.0 W
Intermediate P-State #2	11	1800 MHz	2000 MHz
VID_VDD	3	1.300 V	1.300 V
IDD Max		51.9 A	52.1 A
Thermal Design Power	4	70.4 W	70.6 W
Intermediate P-State #3	11	N/A	1800 MHz
VID_VDD	3		1.250 V
IDD Max			45.4 A
Thermal Design Power	4		59.6 W
Intermediate P-State #4	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #5	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #6	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Min P-State		1000 MHz	1000 MHz
VID_VDD	3	1.100 V	1.100 V
IDD Max		30.2 A	29.2 A
Thermal Design Power	4	36.1 W	35.0 W
Halt/Stop Grant			
IDDC1 Max @ Max P-State	5	34.8 A	34.8 A
IDDC1 Max @ Min P-State	6	7.1 A	7.1 A
I/O Power	8, 12	2.9 W	2.9 W
S3	7		
I/O Power	7, 9, 12	500 mW	500 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA3800DAA4BP
Tcase Max	1, 13	49°C to 71°C
Tcontrol Max	2	70°C
Tambient		42°C
Thermal Resistance (case-amb)		0.34°C/W
Thermal Profile	14	A
Max P-State		2400 MHz
VID_VDD	3	1.350 V | 1.400 V
IDD Max		60.0 A
Thermal Design Power	4	85.3 W
Intermediate P-State #1	11	2200 MHz
VID_VDD	3	1.350 V
IDD Max		59.3 A
Thermal Design Power	4	83.0 W
Intermediate P-State #2	11	2000 MHz
VID_VDD	3	1.300 V
IDD Max		52.1 A
Thermal Design Power	4	70.6 W
Intermediate P-State #3	11	1800 MHz
VID_VDD	3	1.250 V
IDD Max		45.4 A
Thermal Design Power	4	59.6 W
Intermediate P-State #4	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #5	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #6	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Min P-State		1000 MHz
VID_VDD	3	1.100 V
IDD Max		29.2 A
Thermal Design Power	4	35.0 W
Halt/Stop Grant		
IDDC1 Max @ Max P-State	5	34.8 A
IDDC1 Max @ Min P-State	6	7.1 A
I/O Power	8, 12	2.9 W
S3	7	
I/O Power	7, 9, 12	500 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA3000DIK4BI	ADA3200DIK4BI	ADA3500DIK4BI
Tcase Max	1	65°C	65°C	65°C
Tcontrol Max	2	70°C	70°C	70°C
Tambient		42°C	42°C	42°C
Thermal Resistance (case-amb)		0.34°C/W	0.34°C/W	0.34°C/W
Max P-State		1800 MHz	2000 MHz	2200 MHz
VID_VDD	3	1.400 V	1.400 V	1.400 V
IDD Max	9	45.8 A	45.8 A	45.8 A
Thermal Design Power	4, 9	67.0 W	67.0 W	67.0 W
Intermediate P-State #1	11	N/A	1800 MHz	2000 MHz
VID_VDD	3		1.350 V	1.350 V
IDD Max			39.3 A	39.3 A
Thermal Design Power	4		56.0 W	56.0 W
Intermediate P-State #2	11	N/A	N/A	1800 MHz
VID_VDD	3			1.300 V
IDD Max				33.2 A
Thermal Design Power	4			46.0 W
Intermediate P-State #3	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #4	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #5	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #6	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Min P-State		1000 MHz	1000 MHz	1000 MHz
VID_VDD	3	1.100 V	1.100 V	1.100 V
IDD Max		16.5 A	16.5 A	15.5 A
Thermal Design Power	4	21.0 W	21.0 W	20.0 W
Halt/Stop Grant				
IDDC1 Max @ Max P-State	5	36.8 A	36.8 A	36.8 A
IDDC1 Max @ Min P-State	6	9.3 A	9.3 A	9.3 A
I/O Power	8, 12	2.9 W	2.9 W	2.9 W
S3	7			
I/O Power	7, 9, 12	750 mW	750 mW	750 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA3000DAA4BP	ADA3200DAA4BP	ADA3500DAA4BP
Tcase Max	1, 13	49°C to 65°C	49°C to 65°C	49°C to 65°C
Tcontrol Max	2	70°C	70°C	70°C
Tambient		42°C	42°C	42°C
Thermal Resistance (case-amb)		0.34°C/W	0.34°C/W	0.34°C/W
Thermal Profile	14	B	B	B
Max P-State		1800 MHz	2000 MHz	2200 MHz
VID_VDD	3	1.350 V | 1.400 V	1.350 V | 1.400 V	1.350 V | 1.400 V
IDD Max		47.5 A	47.5 A	47.5 A
Thermal Design Power	4	67.0 W	67.0 W	67.0 W
Intermediate P-State #1	11	N/A	1800 MHz	2000 MHz
VID_VDD	3		1.350 V	1.350 V
IDD Max			45.8 A	45.8 A
Thermal Design Power	4		64.7 W	64.7 W
Intermediate P-State #2	11	N/A	N/A	1800 MHz
VID_VDD	3			1.300 V
IDD Max				39.9 A
Thermal Design Power	4			54.8 W
Intermediate P-State #3	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #4	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #5	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #6	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Min P-State		1000 MHz	1000 MHz	1000 MHz
VID_VDD	3	1.100 V	1.100 V	1.100 V
IDD Max		24.3 A	23.4 A	22.4 A
Thermal Design Power	4	29.6 W	28.6 W	27.5 W
Halt/Stop Grant				
IDDC1 Max @ Max P-State	5	19.3 A	19.3 A	19.3 A
IDDC1 Max @ Min P-State	6	4.2 A	4.2 A	4.2 A
I/O Power	8, 12	2.9 W	2.9 W	2.9 W
S3	7			
I/O Power	7, 9, 12	500 mW	500 mW	500 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA3000DAA4BW	ADA3200DAA4BW	ADA3500DAA4BW
Tcase Max	1, 13	49°C to 65°C	49°C to 65°C	49°C to 65°C
Tcontrol Max	2	70°C	70°C	70°C
Tambient		42°C	42°C	42°C
Thermal Resistance (case-amb)		0.34°C/W	0.34°C/W	0.34°C/W
Thermal Profile	14	B	B	B
Max P-State		1800 MHz	2000 MHz	2200 MHz
VID_VDD	3	1.350 V | 1.400 V	1.350 V | 1.400 V	1.350 V | 1.400 V
IDD Max		47.5 A	47.5 A	47.5 A
Thermal Design Power	4	67.0 W	67.0 W	67.0 W
Intermediate P-State #1	11	N/A	1800 MHz	2000 MHz
VID_VDD	3		1.350 V	1.350 V
IDD Max			45.8 A	45.8 A
Thermal Design Power	4		64.7 W	64.7 W
Intermediate P-State #2	11	N/A	N/A	1800 MHz
VID_VDD	3			1.300 V
IDD Max				39.9 A
Thermal Design Power	4			54.8 W
Intermediate P-State #3	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #4	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #5	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #6	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Min P-State		1000 MHz	1000 MHz	1000 MHz
VID_VDD	3	1.100 V	1.100 V	1.100 V
IDD Max		24.3 A	23.4 A	22.4 A
Thermal Design Power	4	29.6 W	28.6 W	27.5 W
Halt/Stop Grant				
IDDC1 Max @ Max P-State	5	19.3 A	25.8 A	25.8 A
IDDC1 Max @ Min P-State	6	4.2 A	8.0 A	8.0 A
I/O Power	8, 12	2.9 W	2.9 W	2.9 W
S3	7			
I/O Power	7, 9, 12	500 mW	500 mW	500 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA3200DKA4CG
Tcase Max	1, 13	49°C to 65°C
Tcontrol Max	2	70°C
Tambient		42°C
Thermal Resistance (case-amb)		0.34°C/W
Thermal Profile	14	B
Max P-State		2000 MHz
VID_VDD	3	1.350 V
IDD Max		47.5 A
Thermal Design Power	4	67.0 W
Intermediate P-State #1	11	1800 MHz
VID_VDD	3	1.350 V
IDD Max		45.8 A
Thermal Design Power	4	64.7 W
Intermediate P-State #2	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #3	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #4	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #5	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #6	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Min P-State		1000 MHz
VID_VDD	3	1.100 V
IDD Max		23.4 A
Thermal Design Power	4	28.6 W
Halt/Stop Grant		
IDDC1 Max @ Max P-State	5	25.8 A
IDDC1 Max @ Min P-State	6	8.0 A
I/O Power	8, 12	2.9 W
S3	7	
I/O Power	7, 9, 12	500 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA3800DAA4BW
Tcase Max	1, 13	49°C to 71°C
Tcontrol Max	2	70°C
Tambient		42°C
Thermal Resistance (case-amb)		0.34°C/W
Thermal Profile	14	A
Max P-State		2400 MHz
VID_VDD	3	1.350 V | 1.400 V
IDD Max		60.0 A
Thermal Design Power	4	85.3 W
Intermediate P-State #1	11	2200 MHz
VID_VDD	3	1.350 V
IDD Max		59.3 A
Thermal Design Power	4	83.0 W
Intermediate P-State #2	11	2000 MHz
VID_VDD	3	1.300 V
IDD Max		52.1 A
Thermal Design Power	4	70.6 W
Intermediate P-State #3	11	1800 MHz
VID_VDD	3	1.250 V
IDD Max		45.4 A
Thermal Design Power	4	59.6 W
Intermediate P-State #4	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #5	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #6	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Min P-State		1000 MHz
VID_VDD	3	1.100 V
IDD Max		29.2 A
Thermal Design Power	4	35.0 W
Halt/Stop Grant		
IDDC1 Max @ Max P-State	5	34.8 A
IDDC1 Max @ Min P-State	6	7.1 A
I/O Power	8, 12	2.9 W
S3	7	
I/O Power	7, 9, 12	500 mW

The notes for this table appear on page 48.

Parameter/OPN	Notes	ADA3000AIK4BX
Tcase Max	1, 13	65°C
Tcontrol Max	2	70°C
Tambient		42°C
Thermal Resistance (case-amb)		0.45°C/W
Thermal Profile	14	N/A
Max P-State		2000 MHz
VID_VDD	3	1.400 V
IDD Max		34.9 A
Thermal Design Power	4	51.0 W
Intermediate P-State #1	11	1800 MHz
VID_VDD	3	1.350 V
IDD Max		30.1 A
Thermal Design Power	4	42.8 W
Intermediate P-State #2	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #3	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #4	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #5	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #6	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Min P-State		1000 MHz
VID_VDD	3	1.100 V
IDD Max		15.2 A
Thermal Design Power	4	18.9 W
Halt/Stop Grant		
IDDC1 Max @ Max P-State	5	19.3 A
IDDC1 Max @ Min P-State	6	4.2 A
I/O Power	8, 12	2.2 W
S3	7	
I/O Power	7, 9, 12	500 mW

The notes for this table appear on page 48.

Notes:

1. Tcase max is the maximum case temperature specification which is a physical value in degrees Celsius. This value is programmed into Rev D and later processors. Refer to the appropriate functional data sheet, and the THERMTRIP Status Register in the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094.
2. Tcontrol max (maximum control temperature) is a non physical temperature on an arbitrary scale that can be used for system thermal management policies. Tcontrol max represents the value at which the processor has reached Tcase max when measuring the thermal diode with a dual sourcing current temperature sensor. Refer to the appropriate functional data sheet, and the THERMTRIP Status Register in the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094.
3. The VID_VDD voltage is the VID[4:0] requested VDD supply level. Refer to the appropriate functional data sheet for details.
4. Thermal Design Power (TDP) is measured under the conditions of Tcase Max, IDD Max, and VDD=VID_VDD, and include all power dissipated on-die from VDD, VDDIO, VLDT, VTT, and VDDA.
5. Assumes Tcase max, max P-state VID_VDD, clock divider set to 32.
6. Assumes 50°C, min P-state VID_VDD, clock divider set to 32.
7. Assumes 35°C, VDD, VDDA, and VLDT supplies are off, VDDIO and VTT are powered, memory in self-refresh mode and DDR SDRAM interface tri-stated except CKE pins. Refer to the appropriate functional data sheet for complete VDDIO and VTT power supply specifications.
8. Thermal Design Power dissipated by the processor VDDIO, VTT, VLDT, and VDDA power planes only.
9. Thermal Design Power dissipated by the processor VDDIO and VTT power planes only.
10. Refer to the AMD Athlon™ 64 Processor Desktop Power Roadmap, order #26882, for IDD Max and Thermal Design Power requirements for future processor revisions.
11. Implementation of this P-state is optional in BIOS.
12. Assumes VDDIO = 2.6 V and VTT = VDDIO / 2. Refer to the appropriate functional data sheet for complete VDDIO and VTT power supply specifications.
13. Tcase max is programmed during device manufacturing with part-specific values for Rev E and later processors, and can be any valid Tcase max value in the range specified for the corresponding OPN.
14 Thermal Design Power (TDP) and IDD max for Rev E and later processors are the limits at the highest Tcase max in the specified range for the corresponding OPN. Products will conform to the TDP and IDD Max limits at all valid voltages. The relationship of Tcase max and Thermal Profile to TDP for a specific device is defined in Table 8.

2 AMD Athlon™ 64 FX Processor

The following sections contain thermal/power and related BIOS specifications for AMD Athlon™ 64 FX processors. Each column in the BIOS and thermal/power tables represents a specific Ordering Part Number (OPN). Section 2.1 provides an example of the OPN structure for this processor family.

For all other electrical specifications for the processor, refer to the *AMD Athlon™ 64 FX Product Data Sheet*, order #30431. For power management BIOS requirements, refer to the *BIOS and Kernel Developer's Guide for AMD Athlon™ 64 Processors and AMD Opteron™ Processors*, order #26094.

2.1 Ordering Part Number Description

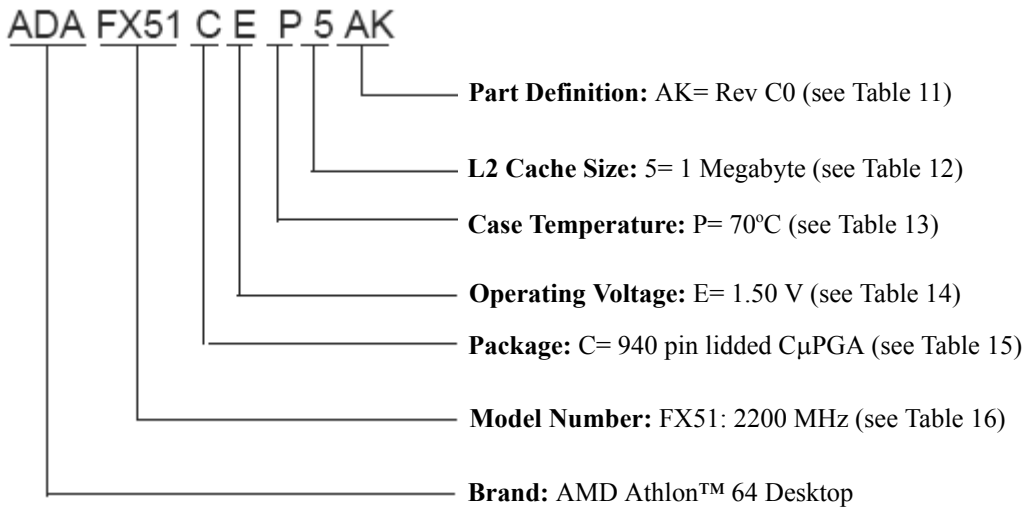

Figure 2. AMD Athlon™ 64 FX Processor Ordering Part Number Example

Table 11: AMD Athlon™ 64 FX Processor Part Definition Options

Part Definition	Revision
AK	Rev C0
AS	Rev CG
AT	Rev CG
BN	Rev E4

Table 12: AMD Athlon™ 64 FX Processor L2 Cache Size Options

OPN Character	Cache Size
5	1 MB

Table 13: AMD Athlon™ 64 FX Processor Temperature Options

OPN Character	Temperature
P	70ºC
I	63ºC
A	Variable

Table 14: AMD Athlon™ 64 FX Processor Operating Voltage

OPN Character	Operating Voltage
E	1.50 V
A	Variable

Table 15: AMD Athlon™ 64 FX Processor Package Options

OPN Character	Package
C	940 Pin Lidded CµPGA
D	939 Pin Lidded OµPGA

Table 16: AMD Athlon™ 64 FX Processor Model Number Options

Model Number	Frequency
FX51	2200 MHz
FX53	2400 MHz
FX55	2600 MHz
FX57	2800 MHz

Table 17: AMD Athlon™ 64 FX Processor Thermal Profile

Thermal Profile	G
Thermal Resistance (case to ambient)	0.22°C/W
Local Ambient Temperature	40°C
Tcase Max	Power (Thermal Profile G)
49°C	40.9 W
51°C	50.0 W
53°C	59.1 W
55°C	68.2 W
57°C	77.3 W
59°C	86.4 W
61°C	95.5 W
63°C	104.0 W
65°C	N/A
67°C	N/A
69°C	N/A
71°C	N/A

2.2 AMD Athlon™ 64 FX Processor BIOS Specifications

Table 18 contains the power and thermal related BIOS specifications for this processor family. Each column in the BIOS specification tables represents a specific Ordering Part Number (OPN). Section 2.1 provides an example of the OPN structure for this processor family.

Table 18: AMD Athlon™ 64 FX Processor BIOS Specifications

Parameter/OPN	Notes	ADAFX51CEP5AK		ADAFX53CEP5AT	
Model Number		FX51		FX53	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	24h		24h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00000F58h		00000F5Ah	
FID/VID Status MaxVID Field	2	00h		00h	
FID/VID Status MaxFID Field	2	2Ah		2Ah	
FID/VID Status StartVID Field	2	02h		02h	
FID/VID Status StartFID Field	2	0Eh		10h	
L2 Cache Size		1 MB		1 MB	
Max P-State		2200 MHz		2400 MHz	
VID Code / VID_VDD	3	02h	1.500 V	02h	1.500 V
Thermal Design Power	4	89.0 W		89.0 W	
Intermediate P-State #1	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #2	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #3	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #4	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #5	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #6	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Min P-State		N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				

The notes for this table appear on page 55.

Parameter/OPN	Notes	ADAFX53DEP5AS		ADAFX55DEI5AS	
Model Number		FX53		FX55	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	24h		24h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00000F7Ah		00000F7Ah	
FID/VID Status MaxVID Field	2	00h		00h	
FID/VID Status MaxFID Field	2	2Ah		2Ah	
FID/VID Status StartVID Field	2	02h		02h	
FID/VID Status StartFID Field	2	10h		12h	
L2 Cache Size		1 MB		1 MB	
Max P-State		2400 MHz		2600 MHz	
VID Code / VID_VDD	3	02h	1.500 V	02h	1.500 V
Thermal Design Power	4	89.0 W		104.0 W	
Intermediate P-State #1	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #2	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #3	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #4	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #5	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #6	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Min P-State		1200 MHz		1200 MHz	
VID Code / VID_VDD	3	12h	1.100 V	12h	1.100 V
Thermal Design Power	4	25.0 W		25.0 W	

The notes for this table appear on page 55.

Parameter/OPN	Notes	ADAFX55DAA5BN		ADAFX57DAA5BN	
Model Number		FX55		FX57	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	24h		24h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00020F71h		00020F71h	
FID/VID Status MaxFID Field	2	2Ah		2Ah	
FID/VID Status StartFID Field	2	12h		14h	
L2 Cache Size		1 MB		1 MB	
Max HyperTransport Frequency		1000 Mhz		1000 Mhz	
Max P-State		2600 MHz		2800 MHz	
FID/VID Status MaxVID Field	2, 6	06h	04h	06h	04h
FID/VID Status StartVID Field	2, 6	08h	06h	08h	06h
VID Code		08h	06h	08h	06h
VID_VDD	3	1.350 V	1.400 V	1.350 V	1.400 V
Thermal Design Power	4	104.0 W		104.0 W	
Intermediate P-State #1	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #2	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #3	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #4	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #5	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #6	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Min P-State		1200 MHz		1200 MHz	
VID Code / VID_VDD	3	12h	1.100 V	12h	1.100 V
Thermal Design Power	4	42.2 W		43.4 W	

The notes for this table appear on page 55.

Notes:

1 CPUID extended function 8000_0001h fields are used by BIOS in uniquely associating a given processor to the P-states that are valid for that processor. Refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094.

2 FIDVID Status Register, MSR C001_0042h.

3 The VID_VDD voltage is the VID[4:0] requested VDD supply level. Refer to the appropriate functional data sheet for details.

4 Thermal Design Power (TDP) is measured under the conditions of Tcase Max, IDD Max, and VDD=VID_VDD, and include all power dissipated on-die from VDD, VDDIO, VLDT, VTT, and VDDA.

5 Implementation of this P-state is optional in BIOS.

6 StartVID and MaxVID are programmed during device manufacturing with part-specific values for Rev E and later processors, and can have one or more valid options. All valid options for StartVID, MaxVID, and VID_VDD will be specified for the corresponding OPN. For information on the relationship of StartVID and MaxVID to VID_VDD refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094. Contact your FAE for more info on TDP specifications.

7 Thermal Design Power (TDP) specifications for dual core processors assume equivalent P-states (Voltage and frequency) and equivalent Tcase conditions for both cores. Refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094, for details on P-state operation for dual core processors.

2.3 AMD Athlon™ 64 FX Processor Thermal/Power Specifications

Table 19 contains the power and thermal specifications for this processor family. Each column in the thermal/power specification tables represents a specific Ordering Part Number (OPN). Section 2.1 on page 49 provides an example of the OPN structure for this processor family.

Table 19: AMD Athlon™ 64 FX Processor Thermal/Power Specifications

Parameter/OPN	Notes	ADAFX51CEP5AK	ADAFX53CEP5AT
Tcase Max	1	70°C	70°C
Tcontrol Max	2	70°C	70°C
Tambient		42°C	42°C
Thermal Resistance (case-amb)		0.31°C/W	0.31°C/W
Max P-State		2200 MHz	2400 MHz
VID_VDD	3	1.500 V	1.500 V
IDD Max		57.4 A	57.4 A
Thermal Design Power	4	89.0 W	89.0 W
Intermediate P-State #1	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #2	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #3	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #4	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #5	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #6	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Min P-State		N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Halt/Stop Grant			
IDDC1 Max @ Max P-State	5	30.0 A	30.0 A
IDDC1 Max @ Min P-State	6	N/A	N/A
I/O Power	8, 12	2.9 W	2.9 W
S3	7		
I/O Power	7, 9, 12	1.4 W	750 mW

The notes for this table appear on page 59.

Parameter/OPN	Notes	ADAFX53DEP5AS	ADAFX55DEI5AS
Tcase Max	1	70°C	63°C
Tcontrol Max	2	70°C	63°C
Tambient		42°C	40°C
Thermal Resistance (case-amb)		0.31°C/W	0.22°C/W
Max P-State		2400 MHz	2600 MHz
VID_VDD	3	1.500 V	1.500 V
IDD Max		57.4 A	67.4 A
Thermal Design Power	4	89.0 W	104.0 W
Intermediate P-State #1	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #2	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #3	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #4	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #5	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #6	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Min P-State		1200 MHz	1200 MHz
VID_VDD	3	1.100 V	1.100 V
IDD Max		20.1 A	20.1 A
Thermal Design Power	4	25.0 W	25.0 W
Halt/Stop Grant			
IDDC1 Max @ Max P-State	5	30.0 A	32.1 A
IDDC1 Max @ Min P-State	6	N/A	N/A
I/O Power	8, 12	2.9 W	2.9 W
S3	7		
I/O Power	7, 9, 12	750 mW	750 mW

The notes for this table appear on page 59.

Parameter/OPN	Notes	ADAFX55DAA5BN	ADAFX57DAA5BN
Tcase Max	1, 13	49°C to 63°C	49°C to 63°C
Tcontrol Max	2	70°C	70°C
Tambient		40°C	40°C
Thermal Resistance (case-amb)		0.22°C/W	0.22°C/W
Thermal Profile	14	G	G
Max P-State		2600 MHz	2800 MHz
VID_VDD	3	1.350 V | 1.400 V	1.350 V | 1.400 V
IDD Max		74.9 A	74.9 A
Thermal Design Power	4	104.0 W	104.0 W
Intermediate P-State #1	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #2	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #3	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #4	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #5	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #6	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Min P-State		1200 MHz	1200 MHz
VID_VDD	3	1.100 V	1.100 V
IDD Max		35.7 A	36.8 A
Thermal Design Power	4	42.2 W	43.4 W
Halt/Stop Grant			
IDDC1 Max @ Max P-State	5	34.8 A	34.8 A
IDDC1 Max @ Min P-State	6	7.1 A	7.1 A
I/O Power	8, 12	2.9 W	2.9 W
S3	7		
I/O Power	7, 9, 12	500 mW	500 mW

The notes for this table appear on page 59.

Notes:

1. Tcase max is the maximum case temperature specification which is a physical value in degrees Celsius. This value is programmed into Rev D and later processors. Refer to the appropriate functional data sheet, and the THERMTRIP Status Register in the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094.
2. Tcontrol max (maximum control temperature) is a non physical temperature on an arbitrary scale that can be used for system thermal management policies. Tcontrol max represents the value at which the processor has reached Tcase max when measuring the thermal diode with a dual sourcing current temperature sensor. Refer to the appropriate functional data sheet, and the THERMTRIP Status Register in the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094.
3. The VID_VDD voltage is the VID[4:0] requested VDD supply level. Refer to the appropriate functional data sheet for details.
4. Thermal Design Power (TDP) is measured under the conditions of Tcase Max, IDD Max, and VDD=VID_VDD, and include all power dissipated on-die from VDD, VDDIO, VLDT, VTT, and VDDA.
5. Assumes Tcase max, max P-state VID_VDD, clock divider set to 32.
6. Assumes 50°C, min P-state VID_VDD, clock divider set to 32.
7. Assumes 35°C, VDD, VDDA, and VLDT supplies are off, VDDIO and VTT are powered, memory in self-refresh mode and DDR SDRAM interface tri-stated except CKE pins. Refer to the appropriate functional data sheet for complete VDDIO and VTT power supply specifications.
8. Thermal Design Power dissipated by the processor VDDIO, VTT, VLDT, and VDDA power planes only.
9. Thermal Design Power dissipated by the processor VDDIO and VTT power planes only.
10. Refer to the AMD Athlon™ 64 Processor Desktop Power Roadmap, order #26882, for IDD Max and Thermal Design Power requirements for future processor revisions.
11. Implementation of this P-state is optional in BIOS.
12. Assumes VDDIO = 2.6 V and VTT = VDDIO / 2. Refer to the appropriate functional data sheet for complete VDDIO and VTT power supply specifications.
13. Tcase max is programmed during device manufacturing with part-specific values for Rev E and later processors, and can be any valid Tcase max value in the range specified for the corresponding OPN.
14 Thermal Design Power (TDP) and IDD max for Rev E and later processors are the limits at the highest Tcase max in the specified range for the corresponding OPN. Products will conform to the TDP and IDD Max limits at all valid voltages. The relationship of Tcase max and Thermal Profile to TDP for a specific device is defined in Table 17.

3 AMD Sempron™ Processor

The following sections contain thermal/power and related BIOS specifications for AMD Sempron™ processors. Each column in the BIOS and thermal/power tables represents a specific Ordering Part Number (OPN). Section 3.1 provides an example of the OPN structure for this processor family.

For all other electrical specifications for the processor, refer to the *AMD Sempron™ Product Data Sheet*, order #31804. For power management BIOS requirements, refer to the *BIOS and Kernel Developer's Guide for AMD Athlon™ 64 Processors and AMD Opteron™ Processors*, order #26094.

3.1 Ordering Part Number Description

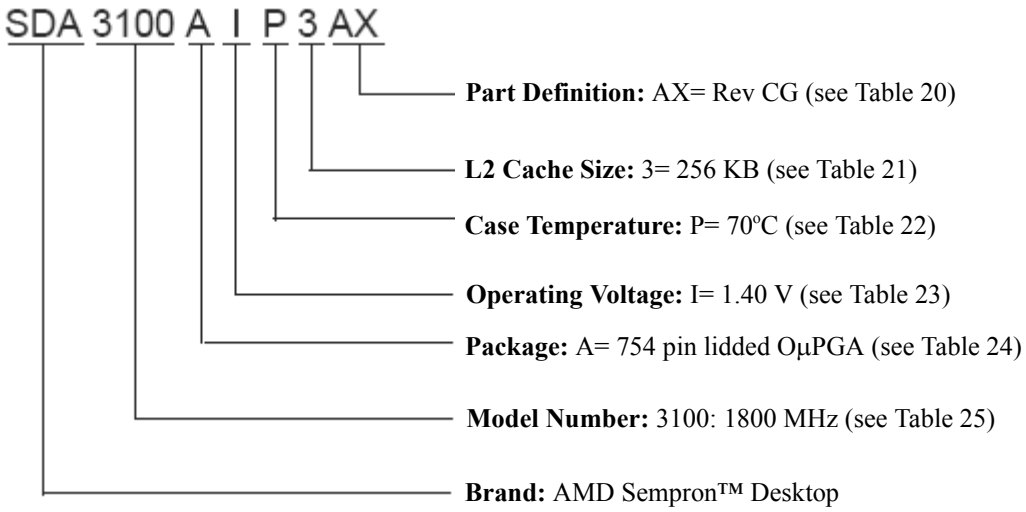

Figure 3. AMD Sempron™ Processor Ordering Part Number Example

Table 20: AMD Sempron™ Processor Part Definition Options

Part Definition	Revision	Package Drawing
AX	Rev CG	Lidded
BA	Rev D0	Lidded
BX	Rev E6	Lidded

Table 21: AMD Sempron™ Processor L2 Cache Size Options

OPN Character	Cache Size
3	256 KB
2	128 KB

Table 22: AMD Sempron™ Processor Temperature Options

OPN Character	Temperature
P	70ºC
O	69ºC

Table 23: AMD Sempron™ Processor Operating Voltage

OPN Character	Operating Voltage
I	1.40 V

Table 24: AMD Sempron™ Processor Package Options

OPN Character	Package
A	754 Pin Lidded OµPGA

Table 25: AMD Sempron™ Processor Model Number Options

Package	Cache Size	Frequency	Model Number
754 Pin Lidded OµPGA	128 KB	1600 MHz	2600+
754 Pin Lidded OµPGA	256 KB	1600 MHz	2800+
754 Pin Lidded OµPGA	128 KB	1800 MHz	3000+
754 Pin Lidded OµPGA	256 KB	1800 MHz	3100+
754 Pin Lidded OµPGA	128 KB	2000 MHz	3300+
754 Pin Lidded OµPGA	256 KB	1400 MHz	2500+
754 Pin Lidded OµPGA	256 KB	2000 MHz	3400+

3.2 AMD Sempron™ Processor BIOS Specifications

Table 26 contains the power and thermal related BIOS specifications for this processor family. Each column in the BIOS specification tables represents a specific Ordering Part Number (OPN). Section 3.1 on page 60 provides an example of the OPN structure for this processor family.

Table 26: AMD Sempron™ Processor BIOS Specifications

Parameter/OPN	Notes	SDA3100AIP3AX	
Model Number		3100+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	22h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00000FC0h	
FID/VID Status MaxVID Field	2	04h	
FID/VID Status MaxFID Field	2	0Ah	
FID/VID Status StartVID Field	2	06h	
FID/VID Status StartFID Field	2	0Ah	
L2 Cache Size		256 KB	
Max P-State		1800 MHz	
VID Code / VID_VDD	3	06h	1.400 V
Thermal Design Power	4	62.0 W	
Intermediate P-State #1	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #2	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #3	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #4	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #5	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #6	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Min P-State		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V
Thermal Design Power	4	20.0 W	

The notes for this table appear on page 67.

Parameter/OPN	Notes	SDA2600AIO2BA		SDA2800AIO3BA		SDA3000AIO2BA	
Model Number		2600+		2800+		3000+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	22h		22h		22h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00010FC0h		00010FC0h		00010FC0h	
FID/VID Status MaxVID Field	2	04h		04h		04h	
FID/VID Status MaxFID Field	2	08h		08h		0Ah	
FID/VID Status StartVID Field	2	06h		06h		06h	
FID/VID Status StartFID Field	2	08h		08h		0Ah	
L2 Cache Size		128 KB		256 KB		128 KB	
Max P-State		1600 MHz		1600 MHz		1800 MHz	
VID Code / VID_VDD	3	06h	1.400 V	06h	1.400 V	06h	1.400 V
Thermal Design Power	4	59.0 W		59.0 W		59.0 W	
Intermediate P-State #1	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #2	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #3	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #4	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #5	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #6	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Min P-State		N/A		N/A		1000 MHz	
VID Code / VID_VDD	3					12h	1.100 V
Thermal Design Power	4					19.0 W	

The notes for this table appear on page 67.

Parameter/OPN	Notes	SDA3100AIO3BA		SDA3300AIO2BA	
Model Number		3100+		3300+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	22h		22h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00010FC0h		00010FC0h	
FID/VID Status MaxVID Field	2	04h		04h	
FID/VID Status MaxFID Field	2	0Ah		0Ch	
FID/VID Status StartVID Field	2	06h		06h	
FID/VID Status StartFID Field	2	0Ah		0Ch	
L2 Cache Size		256 KB		128 KB	
Max P-State		1800 MHz		2000 MHz	
VID Code / VID_VDD	3	06h	1.400 V	06h	1.400 V
Thermal Design Power	4	59.0 W		59.0 W	
Intermediate P-State #1	5	N/A		1800 MHz	
VID Code / VID_VDD	3			08h	1.350 V
Thermal Design Power	4			48.8 W	
Intermediate P-State #2	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #3	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #4	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #5	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Intermediate P-State #6	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4				
Min P-State		1000 MHz		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V	12h	1.100 V
Thermal Design Power	4	19.0 W		18.0 W	

The notes for this table appear on page 67.

Parameter/OPN	Notes	SDA2500AIO3BX	
Model Number		2500+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	26h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00020FC2h	
FID/VID Status MaxVID Field	2	04h	
FID/VID Status MaxFID Field	2	06h	
FID/VID Status StartVID Field	2	06h	
FID/VID Status StartFID Field	2	06h	
L2 Cache Size		256 KB	
Max P-State		1400 MHz	
VID Code / VID_VDD	3	06h	1.400 V
Thermal Design Power	4	59.0 W	
Intermediate P-State #1	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #2	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #3	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #4	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #5	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Intermediate P-State #6	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		
Min P-State		N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4		

The notes for this table appear on page 67.

Parameter/OPN	Notes	SDA2600AIO2BX		SDA2800AIO3BX		SDA3000AIO2BX	
Model Number		2600+		2800+		3000+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	26h		26h		26h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00020FC2h		00020FC2h		00020FC2h	
FID/VID Status MaxVID Field	2	04h		04h		04h	
FID/VID Status MaxFID Field	2	08h		08h		0Ah	
FID/VID Status StartVID Field	2	06h		06h		06h	
FID/VID Status StartFID Field	2	08h		08h		0Ah	
L2 Cache Size		128 KB		256 KB		128 KB	
Max P-State		1600 MHz		1600 MHz		1800 MHz	
VID Code / VID_VDD	3	06h	1.400 V	06h	1.400 V	06h	1.400 V
Thermal Design Power	4	59.0 W		59.0 W		59.0 W	
Intermediate P-State #1	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #2	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #3	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #4	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #5	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #6	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Min P-State		N/A		N/A		1000 MHz	
VID Code / VID_VDD	3					12h	1.100 V
Thermal Design Power	4					21.7 W	

The notes for this table appear on page 67.

Parameter/OPN	Notes	SDA3100AIO3BX		SDA3300AIO2BX		SDA3400AIO3BX	
Model Number		3100+		3300+		3400+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	26h		26h		26h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00020FC2h		00020FC2h		00020FC2h	
FID/VID Status MaxVID Field	2	04h		04h		04h	
FID/VID Status MaxFID Field	2	0Ah		0Ch		0Ch	
FID/VID Status StartVID Field	2	06h		06h		06h	
FID/VID Status StartFID Field	2	0Ah		0Ch		0Ch	
L2 Cache Size		256 KB		128 KB		256 KB	
Max P-State		1800 MHz		2000 MHz		2000 MHz	
VID Code / VID_VDD	3	06h	1.400 V	06h	1.400 V	06h	1.400 V
Thermal Design Power	4	59.0 W		59.0 W		59.0 W	
Intermediate P-State #1	5	N/A		1800 MHz		1800 MHz	
VID Code / VID_VDD	3			08h	1.350 V	08h	1.350 V
Thermal Design Power	4			49.6 W		49.6 W	
Intermediate P-State #2	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #3	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #4	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #5	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Intermediate P-State #6	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4						
Min P-State		1000 MHz		1000 MHz		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V	12h	1.100 V	12h	1.100 V
Thermal Design Power	4	21.7 W		20.7 W		20.7 W	

The notes for this table appear on page 67.

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Notes:

1 CPUID extended function 8000_0001h fields are used by BIOS in uniquely associating a given processor to the P-states that are valid for that processor. Refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094.

2 FIDVID Status Register, MSR C001_0042h.

3 The VID_VDD voltage is the VID[4:0] requested VDD supply level. Refer to the appropriate functional data sheet for details.

4 Thermal Design Power (TDP) is measured under the conditions of Tcase Max, IDD Max, and VDD=VID_VDD, and include all power dissipated on-die from VDD, VDDIO, VLDT, VTT, and VDDA.

5 Implementation of this P-state is optional in BIOS.

3.3 AMD Sempron™ Processor Thermal/Power Specifications

Table 27 contains the power and thermal specifications for this processor family. Each column in the thermal/power specification tables represents a specific Ordering Part Number (OPN). Section 3.1 on page 60 provides an example of the OPN structure for this processor family.

Table 27: AMD Sempron™ Processor Thermal/Power Specifications

Parameter/OPN	Notes	SDA3100AIP3AX
Tcase Max	1	70°C
Tcontrol Max	2	70°C
Tambient		42°C
Thermal Resistance (case-amb)		0.45°C/W
Max P-State		1800 MHz
VID_VDD	3	1.400 V
IDD Max		42.7 A
Thermal Design Power	4	62.0 W
Intermediate P-State #1	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #2	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #3	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #4	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #5	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #6	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Min P-State		1000 MHz
VID_VDD	3	1.100 V
IDD Max		16.2 A
Thermal Design Power	4	20.0 W
Halt/Stop Grant		
IDDC1 Max @ Max P-State	5	30.0 A
IDDC1 Max @ Min P-State	6	7.0 A
I/O Power	8, 12	2.2 W
S3	7	
I/O Power	7, 9, 12	750 mW

The notes for this table appear on page 74.

Parameter/OPN	Notes	SDA2600AIO2BA	SDA2800AIO3BA	SDA3000AIO2BA
Tcase Max	1	69°C	69°C	69°C
Tcontrol Max	2	70°C	70°C	70°C
Tambient		42°C	42°C	42°C
Thermal Resistance (case-amb)		0.45°C/W	0.45°C/W	0.45°C/W
Max P-State		1600 MHz	1600 MHz	1800 MHz
VID_VDD	3	1.400 V	1.400 V	1.400 V
IDD Max		40.6 A	40.6 A	40.6 A
Thermal Design Power	4	59.0 W	59.0 W	59.0 W
Intermediate P-State #1	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #2	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #3	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #4	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #5	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #6	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Min P-State		N/A	N/A	1000 MHz
VID_VDD	3			1.100 V
IDD Max				15.2 A
Thermal Design Power	4			19.0 W
Halt/Stop Grant				
IDDC1 Max @ Max P-State	5	29.2 A	29.2 A	29.2 A
IDDC1 Max @ Min P-State	6	N/A	N/A	5.8 A
I/O Power	8, 12	2.2 W	2.2 W	2.2 W
S3	7			
I/O Power	7, 9, 12	750 mW	750 mW	750 mW

The notes for this table appear on page 74.

Parameter/OPN	Notes	SDA3100AIO3BA	SDA3300AIO2BA
Tcase Max	1	69°C	69°C
Tcontrol Max	2	70°C	70°C
Tambient		42°C	42°C
Thermal Resistance (case-amb)		0.45°C/W	0.45°C/W
Max P-State		1800 MHz	2000 MHz
VID_VDD	3	1.400 V	1.400 V
IDD Max		40.6 A	40.6 A
Thermal Design Power	4	59.0 W	59.0 W
Intermediate P-State #1	11	N/A	1800 MHz
VID_VDD	3		1.350 V
IDD Max			34.5 A
Thermal Design Power	4		48.8 W
Intermediate P-State #2	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #3	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #4	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #5	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Intermediate P-State #6	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4		
Min P-State		1000 MHz	1000 MHz
VID_VDD	3	1.100 V	1.100 V
IDD Max		15.2 A	14.4 A
Thermal Design Power	4	19.0 W	18.0 W
Halt/Stop Grant			
IDDC1 Max @ Max P-State	5	29.2 A	28.7 A
IDDC1 Max @ Min P-State	6	5.8 A	5.6 A
I/O Power	8, 12	2.2 W	2.2 W
S3	7		
I/O Power	7, 9, 12	750 mW	750 mW

The notes for this table appear on page 74.

Parameter/OPN	Notes	SDA2500AIO3BX
Tcase Max	1	69°C
Tcontrol Max	2	70°C
Tambient		42°C
Thermal Resistance (case-amb)		0.45°C/W
Max P-State		1400 MHz
VID_VDD	3	1.400 V
IDD Max		40.6 A
Thermal Design Power	4	59.0 W
Intermediate P-State #1	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #2	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #3	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #4	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #5	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Intermediate P-State #6	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Min P-State		N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4	
Halt/Stop Grant		
IDDC1 Max @ Max P-State	5	21.6 A
IDDC1 Max @ Min P-State	6	N/A
I/O Power	8, 12	2.2 W
S3	7	
I/O Power	7, 9, 12	500 mW

The notes for this table appear on page 74.

Parameter/OPN	Notes	SDA2600AIO2BX	SDA2800AIO3BX	SDA3000AIO2BX
Tcase Max	1	69°C	69°C	69°C
Tcontrol Max	2	70°C	70°C	70°C
Tambient		42°C	42°C	42°C
Thermal Resistance (case-amb)		0.45°C/W	0.45°C/W	0.45°C/W
Max P-State		1600 MHz	1600 MHz	1800 MHz
VID_VDD	3	1.400 V	1.400 V	1.400 V
IDD Max		40.6 A	40.6 A	40.6 A
Thermal Design Power	4	59.0 W	59.0 W	59.0 W
Intermediate P-State #1	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #2	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #3	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #4	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #5	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #6	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Min P-State		N/A	N/A	1000 MHz
VID_VDD	3			1.100 V
IDD Max				17.7 A
Thermal Design Power	4			21.7 W
Halt/Stop Grant				
IDDC1 Max @ Max P-State	5	21.6 A	21.6 A	21.6 A
IDDC1 Max @ Min P-State	6	N/A	N/A	4.6 A
I/O Power	8, 12	2.2 W	2.2 W	2.2 W
S3	7			
I/O Power	7, 9, 12	500 mW	500 mW	500 mW

The notes for this table appear on page 74.

Parameter/OPN	Notes	SDA3100AIO3BX	SDA3300AIO2BX	SDA3400AIO3BX
Tcase Max	1	69°C	69°C	69°C
Tcontrol Max	2	70°C	70°C	70°C
Tambient		42°C	42°C	42°C
Thermal Resistance (case-amb)		0.45°C/W	0.45°C/W	0.45°C/W
Max P-State		1800 MHz	2000 MHz	2000 MHz
VID_VDD	3	1.400 V	1.400 V	1.400 V
IDD Max		40.6 A	40.6 A	40.6 A
Thermal Design Power	4	59.0 W	59.0 W	59.0 W
Intermediate P-State #1	11	N/A	1800 MHz	1800 MHz
VID_VDD	3		1.350 V	1.350 V
IDD Max			35.1 A	35.1 A
Thermal Design Power	4		49.6 W	49.6 W
Intermediate P-State #2	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #3	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #4	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #5	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Intermediate P-State #6	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4			
Min P-State		1000 MHz	1000 MHz	1000 MHz
VID_VDD	3	1.100 V	1.100 V	1.100 V
IDD Max		17.7 A	16.8 A	16.8 A
Thermal Design Power	4	21.7 W	20.7 W	20.7 W
Halt/Stop Grant				
IDDC1 Max @ Max P-State	5	21.6 A	21.6 A	21.6 A
IDDC1 Max @ Min P-State	6	4.6 A	4.6 A	4.6 A
I/O Power	8, 12	2.2 W	2.2 W	2.2 W
S3	7			
I/O Power	7, 9, 12	500 mW	500 mW	500 mW

The notes for this table appear on page 74.

Notes:

1. Tcase max is the maximum case temperature specification which is a physical value in degrees Celsius. This value is programmed into Rev D and later processors. Refer to the appropriate functional data sheet, and the THERMTRIP Status Register in the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094.
2. Tcontrol max (maximum control temperature) is a non physical temperature on an arbitrary scale that can be used for system thermal management policies. Tcontrol max represents the value at which the processor has reached Tcase max when measuring the thermal diode with a dual sourcing current temperature sensor. Refer to the appropriate functional data sheet, and the THERMTRIP Status Register in the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094.
3. The VID_VDD voltage is the VID[4:0] requested VDD supply level. Refer to the appropriate functional data sheet for details.
4. Thermal Design Power (TDP) is measured under the conditions of Tcase Max, IDD Max, and VDD=VID_VDD, and include all power dissipated on-die from VDD, VDDIO, VLDT, VTT, and VDDA.
5. Assumes Tcase max, max P-state VID_VDD, clock divider set to 32.
6. Assumes 50°C, min P-state VID_VDD, clock divider set to 32.
7. Assumes 35°C, VDD, VDDA, and VLDT supplies are off, VDDIO and VTT are powered, memory in self-refresh mode and DDR SDRAM interface tri-stated except CKE pins. Refer to the appropriate functional data sheet for complete VDDIO and VTT power supply specifications.
8. Thermal Design Power dissipated by the processor VDDIO, VTT, VLDT, and VDDA power planes only.
9. Thermal Design Power dissipated by the processor VDDIO and VTT power planes only.
10. Refer to the AMD Athlon™ 64 Processor Desktop Power Roadmap, order #26882, for IDD Max and Thermal Design Power requirements for future processor revisions.
11. Implementation of this P-state is optional in BIOS.
12. Assumes VDDIO = 2.6 V and VTT = VDDIO / 2. Refer to the appropriate functional data sheet for complete VDDIO and VTT power supply specifications.

4 AMD Turion™ 64 Mobile Technology

The following sections contain AMD Turion™ 64 Mobile Technology thermal/power and related BIOS specifications for processors. Each column in the BIOS and thermal/power tables represents a specific Ordering Part Number (OPN). Section 4.1 provides an example of the OPN structure for this processor family.

For all other electrical specifications for the processor, refer to the *AMD Turion™ 64 Mobile Technology Product Data Sheet*, order #32816. For power management BIOS requirements, refer to the *BIOS and Kernel Developer's Guide for AMD Athlon™ 64 Processors and AMD Opteron™ Processors*, order #26094.

4.1 Ordering Part Number Description

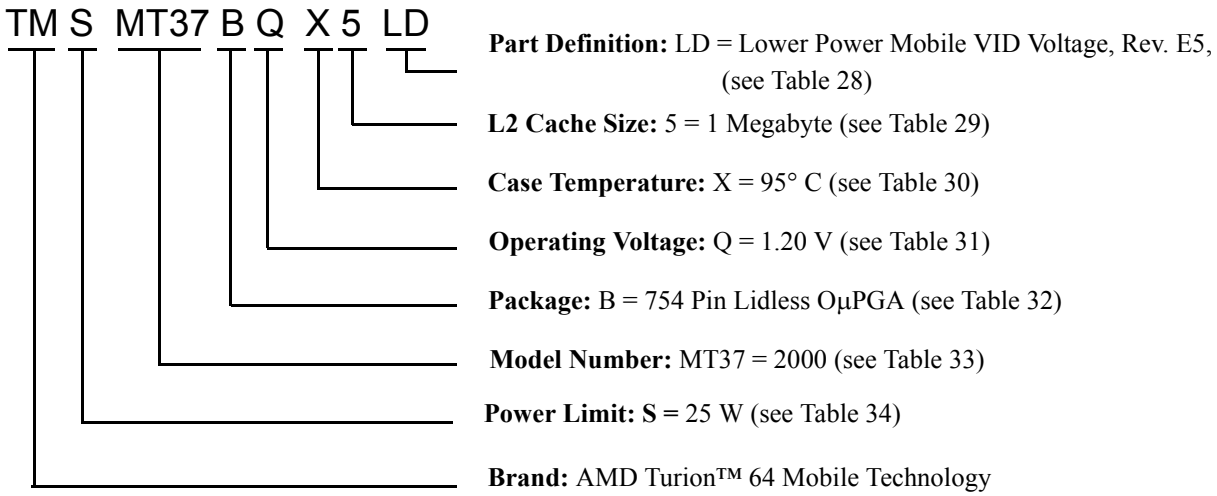

Figure 4. AMD Turion™ 64 Mobile Technology Ordering Part Number Example

Table 28: AMD Turion™ 64 Mobile Technology Part Definition Options

Part Definition	VID Voltage	Revision	Package Drawing
LD	Low Power Mobile	Rev E5	B4

***Note**: Refer to the AMD Functional Data Sheet, 754 Pin Package, order #31410, for package drawings. Refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 Processors and AMD Opteron™ Processors, order #26094, for information on translating VID Codes to Standard or Low Power Mobile Voltages.*

Table 29: AMD Turion™ 64 Mobile Technology L2 Cache Size Options

OPN Character	Cache Size
5	1 MB
4	512 KB

Table 30: AMD Turion™ 64 Mobile Technology Temperature Options

OPN Character	Temperature
X	95ºC

Table 31: AMD Turion™ 64 Mobile Technology Operating Voltage

OPN Character	Operating Voltage
Q	1.20 V

Table 32: AMD Turion™ 64 Mobile Technology Package Options

OPN Character	Package
B	754 Pin Lidless OμPGA

Table 33: AMD Turion™ 64 Mobile Technology Model Number Options

Cache Size	Frequency	Model Number	Power Limit
512 KB	1800 MHz	MT32	25W
1 MB	1800 MHz	MT34	25W
1 MB	2000 MHz	MT37	25W

Table 34: AMD Turion™ 64 Mobile Technology Power Limit

OPN Character	Power Limit
S	25 W

4.2 AMD Turion™ 64 Mobile Technology BIOS Specifications

Table 35 contains the power and thermal related BIOS specifications for this processor family. Each column in the BIOS specification tables represents a specific Ordering Part Number (OPN). Section Section 4.1 on page 75 provides an example of the OPN structure for this processor family.

Table 35: AMD Turion™ 64 Mobile Technology BIOS Specifications

Parameter/OPN	Notes	TMSMT32BQX4LD	
Model Number		MT32	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	0Bh	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00020F42h	
FID/VID Status MaxVID Field	2	08h	
FID/VID Status MaxFID Field	2	0Ah	
FID/VID Status StartVID Field	2	16h	
FID/VID Status StartFID Field	2	00h	
AltVID Code / VID_VDD	3, 4, 5	18h	0.850 V
L2 Cache Size		512 KB	
Max P-State		1800 MHz	
VID Code / VID_VDD	4, 5	0Ah	1.200 V
Thermal Design Power	6	24.0 W	
Intermediate P-State #1	7	1600 MHz	
VID Code / VID_VDD	4, 5	0Ch	1.150 V
Thermal Design Power	6	19.9 W	
Intermediate P-State #2	7	N/A	
VID Code / VID_VDD	4, 5		
Thermal Design Power	6		
Intermediate P-State #3	7	N/A	
VID Code / VID_VDD	4, 5		
Thermal Design Power	6		
Intermediate P-State #4	7	N/A	
VID Code / VID_VDD	4, 5		
Thermal Design Power	6		
Intermediate P-State #5	7	N/A	
VID Code / VID_VDD	4, 5		
Thermal Design Power	6		
Intermediate P-State #6	7	N/A	
VID Code / VID_VDD	4, 5		
Thermal Design Power	6		
Min P-State		800 MHz	
VID Code / VID_VDD	4, 5	16h	0.900 V
Thermal Design Power	6	7.7 W	

The notes for this table appear on page 79.

Parameter/OPN	Notes	TMSMT34BQX5LD		TMSMT37BQX5LD	
Model Number		MT34		MT37	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	0Bh		0Bh	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00020F42h		00020F42h	
FID/VID Status MaxVID Field	2	08h		08h	
FID/VID Status MaxFID Field	2	0Ah		0Ch	
FID/VID Status StartVID Field	2	16h		16h	
FID/VID Status StartFID Field	2	00h		00h	
AltVID Code / VID_VDD	3, 4, 5	18h	0.850 V	18h	0.850 V
L2 Cache Size		1 MB		1 MB	
Max P-State		1800 MHz		2000 MHz	
VID Code / VID_VDD	4, 5	0Ah	1.200 V	0Ah	1.200 V
Thermal Design Power	6	24.0 W		25.0 W	
Intermediate P-State #1	7	1600 MHz		1800 MHz	
VID Code / VID_VDD	4, 5	0Ch	1.150 V	0Ch	1.150 V
Thermal Design Power	6	19.9 W		20.9 W	
Intermediate P-State #2	7	N/A		1600 MHz	
VID Code / VID_VDD	4, 5			0Eh	1.100 V
Thermal Design Power	6			17.5 W	
Intermediate P-State #3	7	N/A		N/A	
VID Code / VID_VDD	4, 5				
Thermal Design Power	6				
Intermediate P-State #4	7	N/A		N/A	
VID Code / VID_VDD	4, 5				
Thermal Design Power	6				
Intermediate P-State #5	7	N/A		N/A	
VID Code / VID_VDD	4, 5				
Thermal Design Power	6				
Intermediate P-State #6	7	N/A		N/A	
VID Code / VID_VDD	4, 5				
Thermal Design Power	6				
Min P-State		800 MHz		800 MHz	
VID Code / VID_VDD	4, 5	16h	0.900 V	16h	0.900 V
Thermal Design Power	6	7.9 W		7.9 W	

The notes for this table appear on page 79.

Notes:

1. CPUID extended function 8000_0001h fields are used by BIOS in uniquely associating a given processor to the P-states that are valid for that processor. Refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094.
2. FIDVID Status Register, MSR C001_0042h.
3. BIOS programs the AltVID setting into Function 3: Offset D8h. Not all systems are AltVID capable. Refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094 for further details.
4. The VID_VDD voltage for Low Power Mobile parts corresponds to 0 load (0 Amp IDD) conditions for the VID[4:0] requested VDD supply level. Refer to the AMD Functional Data Sheet, 754 Pin Package, order #31410, for details.
5. Refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order #26094, for information on translating VID Codes to Standard or Low Power Mobile Voltages.
6. Thermal Design Power (TDP) for Low Power Mobile parts is measured under the conditions of Tdie Max, IDD Max, and VDD=VDD_dc Typ, and include all power dissipated on-die from VDD, VDDIO, VLDT, VTT, and VDDA. Contact your Field Application Engineer for more information on TDP specifications.
7. Implementation of this P-state is optional in BIOS.

4.3 AMD Turion™ 64 Mobile Technology Thermal/Power Specifications

Table 36 on page 81 contains the power and thermal specifications for this processor family. Each column in the thermal/power specification tables represents a specific Ordering Part Number (OPN). Section 4.1 on page 75 provides an example of the OPN structure for this processor family.

Table 36: AMD Turion™ 64 Mobile Technology Thermal/Power Specifications

Parameter/OPN	Notes	TMSMT32BQX4LD	
Tdie Max		95°C	
Tambient / Trise		35°C	10°C
Thermal Resistance (die-amb)		2.08°C/W	
Max P-State		1800 MHz	
VID_VDD / VDD_dc Typ	1, 2	1.200 V	1.166 V
IDD Max		18.70 A	
Thermal Design Power	3	24.0 W	
Intermediate P-State #1	12	1600 MHz	
VID_VDD / VDD_dc Typ	1, 2	1.150 V	1.121 V
IDD Max		15.79 A	
Thermal Design Power	3	19.9 W	
Intermediate P-State #2	12	N/A	
VID_VDD / VDD_dc Typ	1, 2		
IDD Max			
Thermal Design Power	3		
Intermediate P-State #3	12	N/A	
VID_VDD / VDD_dc Typ	1, 2		
IDD Max			
Thermal Design Power	3		
Intermediate P-State #4	12	N/A	
VID_VDD / VDD_dc Typ	1, 2		
IDD Max			
Thermal Design Power	3		
Intermediate P-State #5	12	N/A	
VID_VDD / VDD_dc Typ	1, 2		
IDD Max			
Thermal Design Power	3		
Intermediate P-State #6	12	N/A	
VID_VDD / VDD_dc Typ	1, 2		
IDD Max			
Thermal Design Power	3		
Min P-State		800 MHz	
VID_VDD / VDD_dc Typ	1, 2	0.900 V	0.889 V
IDD Max		6.19 A	
Thermal Design Power	3	7.9 W	
Halt/Stop Grant			
IDDC1 Max @ Max P-State	4	6.10 A	
IDDC1 Max @ Min P-State	5	1.46 A	
I/O Power	10, 13	2.2 W	
C3/S1 Min P-State VID_VDD	6		
IDDC3 Max		0.83 A	
I/O Power	10, 13	360 mW	
C3/S1 AltVID	7		
VID_VDD	8	0.850 V	
IDDC3 Max		0.64 A	
I/O Power	10, 13	360 mW	
S3	9		
I/O Power	9, 11, 13	250 mW	

The notes for this table appear on page 83.

Parameter/OPN	Notes	TMSMT34BQX5LD		TMSMT37BQX5LD	
Tdie Max		95°C		95°C	
Tambient / Trise		35°C	10°C	35°C	10°C
Thermal Resistance (die-amb)		2.08°C/W		2.00°C/W	
Max P-State		1800 MHz		2000 MHz	
VID_VDD / VDD_dc Typ	1, 2	1.200 V	1.166 V	1.200 V	1.164 V
IDD Max		18.70 A		19.58 A	
Thermal Design Power	3	24.0 W		25.0 W	
Intermediate P-State #1	12	1600 MHz		1800 MHz	
VID_VDD / VDD_dc Typ	1, 2	1.150 V	1.121 V	1.150 V	1.119 V
IDD Max		15.79 A		16.70 A	
Thermal Design Power	3	19.9 W		20.9 W	
Intermediate P-State #2	12	N/A		1600 MHz	
VID_VDD / VDD_dc Typ	1, 2			1.100 V	1.074 V
IDD Max				14.25 A	
Thermal Design Power	3			17.5 W	
Intermediate P-State #3	12	N/A		N/A	
VID_VDD / VDD_dc Typ	1, 2				
IDD Max					
Thermal Design Power	3				
Intermediate P-State #4	12	N/A		N/A	
VID_VDD / VDD_dc Typ	1, 2				
IDD Max					
Thermal Design Power	3				
Intermediate P-State #5	12	N/A		N/A	
VID_VDD / VDD_dc Typ	1, 2				
IDD Max					
Thermal Design Power	3				
Intermediate P-State #6	12	N/A		N/A	
VID_VDD / VDD_dc Typ	1, 2				
IDD Max					
Thermal Design Power	3				
Min P-State		800 MHz		800 MHz	
VID_VDD / VDD_dc Typ	1, 2	0.900 V	0.888 V	0.900 V	0.888 V
IDD Max		6.42 A		6.42 A	
Thermal Design Power	3	7.9 W		7.9 W	
Halt/Stop Grant					
IDDC1 Max @ Max P-State	4	6.10 A		6.10 A	
IDDC1 Max @ Min P-State	5	1.46 A		1.46 A	
I/O Power	10, 13	2.2 W		2.2 W	
C3/S1 Min P-State VID_VDD	6				
IDDC3 Max		0.83 A		0.83 A	
I/O Power	10, 13	360 mW		360 mW	
C3/S1 AltVID	7				
VID_VDD	8	0.850 V		0.850 V	
IDDC3 Max		0.64 A		0.64 A	
I/O Power	10, 13	360 mW		360 mW	
S3	9				
I/O Power	9, 11, 13	250 mW		250 mW	

The notes for this table appear on page 83.

Notes:

1. The VID_VDD voltage for Low Power Mobile parts corresponds to 0 load (0 Amp IDD) conditions for the VID[4:0] requested VDD supply level. Refer to the AMD Functional Data Sheet, 754 Pin Package, order #31410, for details.
2. The VDD_dc Typical Voltage is calculated using the following formula: VDD_dc Typ = VID_VDD – 1.83 mV/A * IDD Max. Refer to the AMD Functional Data Sheet, 754 Pin Package, order# 31410, for complete VDD specifications.
3. Thermal Design Power (TDP) for Low Power Mobile parts is measured under the conditions of Tdie Max, IDD Max, and VDD=VDD_dc Typ, and include all power dissipated on-die from VDD, VDDIO, VLDT, VTT, and VDDA. Contact your Field Application Engineer for more information on TDP specifications.
4. Assumes Tdie max, max P-state VDD_dc Typ +25 mV, clock divider set to 512.
5. Assumes 50°C, min P-state VID_VDD, clock divider set to 512.
6. Assumes 35°C, min P-state VID_VDD, clock divider set to 512, HyperTransport™ links disconnected, memory in self-refresh mode, DDR SDRAM interface tri-stated except clocks and CKE pins.
7. Assumes 35°C, AltVID, clock divider set to 512, HyperTransport™ links disconnected, memory in self-refresh mode, DDR SDRAM interface tri-stated except CKE pins. Not all systems are AltVID capable. Refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094 for further details.
8. BIOS programs the AltVID setting into Function 3: Offset D8h. Not all systems are AltVID capable. Refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094 for further details.
9. Assumes 35°C, VDD, VDDA, and VLDT supplies are off, VDDIO and VTT are powered, memory in self-refresh mode and DDR SDRAM interface tri-stated except CKE pins.
10. Thermal Design Power dissipated by the processor VDDIO, VTT, VLDT, and VDDA power planes only.
11. Thermal Design Power dissipated by the processor VDDIO and VTT power planes only.
12. Implementation of this P-state is optional in BIOS.
13. Assumes VDDIO = 2.5 V and VTT = VDDIO / 2. Refer to the AMD Functional Data Sheet, 754 Pin Package, order# 31410 for complete VDDIO and VTT power supply specifications.

5 AMD Athlon™ 64 X2 Dual Core Processor

The following sections contain thermal/power and related BIOS specifications for AMD Athlon™ 64 X2 Dual Core processors. Each column in the BIOS and thermal/power tables represents a specific Ordering Part Number (OPN). Section 5.1 provides an example of the OPN structure for this processor family.

For power management BIOS requirements, refer to the *BIOS and Kernel Developer's Guide for AMD Athlon™ 64 Processors and AMD Opteron™ Processors*, order #26094.

5.1 Ordering Part Number Description

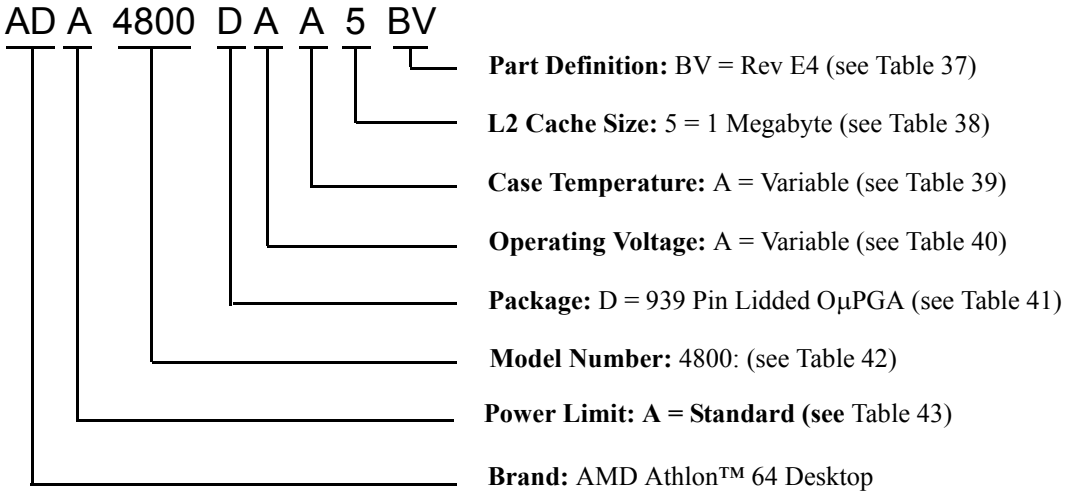

Figure 5. AMD Athlon™ 64 X2 Dual Core Processor Ordering Part Number Example

Table 37: AMD Athlon™ 64 X2 Dual Core Processor Part Definition Options

Part Definition	Revision	Package Drawing
BV	Rev E4	Lidded
CD	Rev E6	Lidded

Note: Refer to AMD Functional Data Sheet, 939 Pin Package*, order #31411 for package drawings.*

Table 38: AMD Athlon™ 64 X2 Dual Core Processor L2 Cache Size Options

OPN Character	Cache Size
5	1 MB
6	2 MB

Table 39: AMD Athlon™ 64 X2 Dual Core Processor Temperature Options

OPN Character	Temperature
A	Variable

Table 40: AMD Athlon™ 64 X2 Dual Core Processor Operating Voltage

OPN Character	Operating Voltage
A	Variable

Table 41: AMD Athlon™ 64 X2 Dual Core Processor Package Options

OPN Character	Package
D	939 Pin Lidded OμPGA

Table 42: AMD Athlon™ 64 X2 Dual Core Processor Model Number Options

Package	Cache Size	Frequency	Model Number
939 Pin Lidded OμPGA	2 MB	2200 MHz	4400+
939 Pin Lidded OμPGA	2 MB	2400 MHz	4800+
939 Pin Lidded OμPGA	1 MB	2000 MHz	3800+
939 Pin Lidded OμPGA	1 MB	2200 MHz	4200+
939 Pin Lidded OμPGA	1 MB	2400 MHz	4600+

Table 43: AMD Athlon™ 64 X2 Dual Core Processor Power Limit

OPN Character	Power Limit
A	Standard

Table 44: AMD Athlon™ 64 X2 Dual Core Processor Thermal Profile

Thermal Profile	O	P
Thermal Resistance (case to ambient)	0.20°C/W	0.32°C/W
Local Ambient Temperature	42°C	42°C
Tcase Max	**Power (Thermal Profile O)**	**Power (Thermal Profile P)**
49°C	35.0 W	21.9 W
51°C	45.0 W	28.1 W
53°C	55.0 W	34.4 W
55°C	65.0 W	40.6 W
57°C	75.0 W	46.9 W
59°C	85.0 W	53.1 W
61°C	95.0 W	59.4 W
63°C	105.0 W	65.6 W
65°C	110.0 W	71.9 W
67°C	N/A	78.1 W
69°C	N/A	84.4 W
71°C	N/A	89.0 W

Note: The thermal profile is used to define the relationship between Tcase max and device specific Thermal Design Power for Rev E processors specified in this document with 'Variable' indicated by the Case Temperature OPN character.

5.2 AMD Athlon™ 64 X2 Dual Core Processor BIOS Specifications

Table 45 contains the power and thermal related BIOS specifications for this processor family. Each column in the BIOS specification tables represents a specific Ordering Part Number (OPN). Section 5.1 provides an example of the OPN structure for this processor family.

Table 45: AMD Athlon™ 64 X2 Dual Core Processor BIOS Specifications

Parameter/OPN	Notes	ADA4400DAA6CD		ADA4800DAA6CD	
Model Number		4400+		4800+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	05h		05h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00020F32h		00020F32h	
FID/VID Status MaxFID Field	2	0Eh		10h	
FID/VID Status StartFID Field	2	0Eh		10h	
L2 Cache Size		2 MB		2 MB	
Max HyperTransport Frequency		1000 MHz		1000 MHz	
Max P-State		2200 MHz		2400 MHz	
FID/VID Status MaxVID Field	2, 6	08h	06h	08h	06h
FID/VID Status StartVID Field	2, 6	0Ah	08h	0Ah	08h
VID Code		0Ah	08h	0Ah	08h
VID_VDD	3	1.300 V	1.350 V	1.300 V	1.350 V
Thermal Design Power	4, 7	110.0 W		110.0 W	
Intermediate P-State #1	5	2000 MHz		2200 MHz	
VID Code / VID_VDD	3	0Ah	1.300 V	0Ah	1.300 V
Thermal Design Power	4, 7	105.6 W		105.6 W	
Intermediate P-State #2	5	1800 MHz		2000 MHz	
VID Code / VID_VDD	3	0Ch	1.250 V	0Ch	1.250 V
Thermal Design Power	4, 7	89.1 W		89.1 W	
Intermediate P-State #3	5	N/A		1800 MHz	
VID Code / VID_VDD	3			0Eh	1.200 V
Thermal Design Power	4, 7			74.8 W	
Intermediate P-State #4	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4, 7				
Intermediate P-State #5	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4, 7				
Intermediate P-State #6	5	N/A		N/A	
VID Code / VID_VDD	3				
Thermal Design Power	4, 7				
Min P-State		1000 MHz		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V	12h	1.100 V
Thermal Design Power	4, 7	49.0 W		46.6 W	

The notes for this table appear on page 90.

Parameter/OPN	Notes	ADA3800DAA5BV		ADA4200DAA5BV		ADA4600DAA5BV	
Model Number		3800+		4200+		4600+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	05h		05h		05h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00020FB1h		00020FB1h		00020FB1h	
FID/VID Status MaxFID Field	2	0Ch		0Eh		10h	
FID/VID Status StartFID Field	2	0Ch		0Eh		10h	
L2 Cache Size		1 MB		1 MB		1 MB	
Max HyperTransport™ Frequency		1000 MHz		1000 MHz		1000 MHz	
Max P-State		2000 MHz		2200 MHz		2400 MHz	
FID/VID Status MaxVID Field	2, 6	08h	06h	08h	06h	08h	06h
FID/VID Status StartVID Field	2, 6	0Ah	08h	0Ah	08h	0Ah	08h
VID Code		0Ah	08h	0Ah	08h	0Ah	08h
VID_VDD	3	1.300 V	1.350 V	1.300 V	1.350 V	1.300 V	1.350 V
Thermal Design Power	4, 7	89.0 W		89.0 W		110.0 W	
Intermediate P-State #1	5	1800 MHz		2000 MHz		2200 MHz	
VID Code / VID_VDD	3	0Ah	1.300 V	0Ah	1.300 V	0Ah	1.300 V
Thermal Design Power	4, 7	84.6 W		84.6 W		105.6 W	
Intermediate P-State #2	5	N/A		1800 MHz		2000 MHz	
VID Code / VID_VDD	3			0Ch	1.250 V	0Ch	1.250 V
Thermal Design Power	4, 7			70.9 W		89.1 W	
Intermediate P-State #3	5	N/A		N/A		1800 MHz	
VID Code / VID_VDD	3					0Eh	1.200 V
Thermal Design Power	4, 7					74.8 W	
Intermediate P-State #4	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4, 7						
Intermediate P-State #5	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4, 7						
Intermediate P-State #6	5	N/A		N/A		N/A	
VID Code / VID_VDD	3						
Thermal Design Power	4, 7						
Min P-State		1000 MHz		1000 MHz		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V	12h	1.100 V	12h	1.100 V
Thermal Design Power	4, 7	40.1 W		37.6 W		46.6 W	

The notes for this table appear on page 90.

Parameter/OPN	Notes	ADA3800DAA5CD	
Model Number		3800+	
CPUID 8000_0001h EBX [11:6] (BrandID)	1	05h	
CPUID 8000_0001h EAX [31:0] (CPUID)	1	00020F32h	
FID/VID Status MaxFID Field	2	0Ch	
FID/VID Status StartFID Field	2	0Ch	
L2 Cache Size		1 MB	
Max HyperTransport Frequency		1000 MHz	
Max P-State		2000 MHz	
FID/VID Status MaxVID Field	2, 6	08h	06h
FID/VID Status StartVID Field	2, 6	0Ah	08h
VID Code		0Ah	08h
VID_VDD	3	1.300 V	1.350 V
Thermal Design Power	4, 7	89.0 W	
Intermediate P-State #1	5	1800 MHz	
VID Code / VID_VDD	3	0Ah	1.300 V
Thermal Design Power	4, 7	84.6 W	
Intermediate P-State #2	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4, 7		
Intermediate P-State #3	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4, 7		
Intermediate P-State #4	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4, 7		
Intermediate P-State #5	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4, 7		
Intermediate P-State #6	5	N/A	
VID Code / VID_VDD	3		
Thermal Design Power	4, 7		
Min P-State		1000 MHz	
VID Code / VID_VDD	3	12h	1.100 V
Thermal Design Power	4, 7	40.1 W	

The notes for this table appear on page 90.

Notes:

1 CPUID extended function 8000_0001h fields are used by BIOS in uniquely associating a given processor to the P-states that are valid for that processor. Refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094.

2 FIDVID Status Register, MSR C001_0042h.

3 The VID_VDD voltage is the VID[4:0] requested VDD supply level. Refer to the appropriate functional data sheet for details.

4 Thermal Design Power (TDP) is measured under the conditions of Tcase Max, IDD Max, and VDD=VID_VDD, and include all power dissipated on-die from VDD, VDDIO, VLDT, VTT, and VDDA.

5 Implementation of this P-state is optional in BIOS.

6 StartVID and MaxVID are programmed during device manufacturing with part-specific values for Rev E and later processors, and can have one or more valid options. All valid options for StartVID, MaxVID, and VID_VDD will be specified for the corresponding OPN. For information on the relationship of StartVID and MaxVID to VID_VDD refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094. Contact your FAE for more info on TDP specifications.

7 Thermal Design Power (TDP) specifications for dual core processors assume equivalent P-states (Voltage and frequency) and equivalent Tcase conditions for both cores. Refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094, for details on P-state operation for dual core processors.

5.3 AMD Athlon™ 64 X2 Dual Core Processor Thermal/Power Specifications

Table 46 on page 91 contains the power and thermal specifications for this processor family. Each column in the thermal/power specification tables represents a specific Ordering Part Number (OPN). Section 5.1 provides an example of the OPN structure for this processor family.

Table 46: AMD Athlon™ 64 X2 Dual Core Processor Thermal/Power Specifications

Parameter/OPN	Notes	ADA4400DAA6CD	ADA4800DAA6CD
Tcase Max	1, 13	49°C to 65°C	49°C to 65°C
Tcontrol Max	2	70°C	70°C
Tambient		42°C	42°C
Thermal Resistance (case-amb)		0.20°C/W	0.20°C/W
Thermal Profile	14	O	O
Max P-State		2200 MHz	2400 MHz
VID_VDD	3	1.300 V | 1.350 V	1.300 V | 1.350 V
IDD Max		80.0 A	80.0 A
Thermal Design Power	4, 15	110.0 W	110.0 W
Intermediate P-State #1	11	2000 MHz	2200 MHz
VID_VDD	3	1.300 V	1.300 V
IDD Max		79.0 A	79.0 A
Thermal Design Power	4, 15	105.6 W	105.6 W
Intermediate P-State #2	11	1800 MHz	2000 MHz
VID_VDD	3	1.250 V	1.250 V
IDD Max		69.0 A	69.0 A
Thermal Design Power	4, 15	89.1 W	89.1 W
Intermediate P-State #3	11	N/A	1800 MHz
VID_VDD	3		1.200 V
IDD Max			59.9 A
Thermal Design Power	4, 15		74.8 W
Intermediate P-State #4	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4, 15		
Intermediate P-State #5	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4, 15		
Intermediate P-State #6	11	N/A	N/A
VID_VDD	3		
IDD Max			
Thermal Design Power	4, 15		
Min P-State		1000 MHz	1000 MHz
VID_VDD	3	1.100 V	1.100 V
IDD Max		41.9 A	39.7 A
Thermal Design Power	4, 15	49.0 W	46.6 W
Halt/Stop Grant			
IDDC1 Max @ Max P-State	5, 16	44.5 A	44.5 A
IDDC1 Max @ Min P-State	6, 16	10.9 A	10.9 A
I/O Power	8, 12	2.9 W	2.9 W
S3	7		
I/O Power	7, 9, 12	500 mW	500 mW

The notes for this table appear on page 94.

Parameter/OPN	Notes	ADA3800DAA5BV	ADA4200DAA5BV	ADA4600DAA5BV
Tcase Max	1, 13	49°C to 71°C	49°C to 71°C	49°C to 65°C
Tcontrol Max	2	70°C	70°C	70°C
Tambient		42°C	42°C	42°C
Thermal Resistance (case-amb)		0.32°C/W	0.32°C/W	0.20°C/W
Thermal Profile	14	P	P	O
Max P-State		2000 MHz	2200 MHz	2400 MHz
VID_VDD	3	1.300 V | 1.350 V	1.300 V | 1.350 V	1.300 V | 1.350 V
IDD Max		66.2 A	66.2 A	80.0 A
Thermal Design Power	4, 15	89.0 W	89.0 W	110.0 W
Intermediate P-State #1	11	1800 MHz	2000 MHz	2200 MHz
VID_VDD	3	1.300 V	1.300 V	1.300 V
IDD Max		62.8 A	62.8 A	79.0 A
Thermal Design Power	4, 15	84.6 W	84.6 W	105.6 W
Intermediate P-State #2	11	N/A	1800 MHz	2000 MHz
VID_VDD	3		1.250 V	1.250 V
IDD Max			54.4 A	69.0 A
Thermal Design Power	4, 15		70.9 W	89.1 W
Intermediate P-State #3	11	N/A	N/A	1800 MHz
VID_VDD	3			1.200 V
IDD Max				59.9 A
Thermal Design Power	4, 15			74.8 W
Intermediate P-State #4	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4, 15			
Intermediate P-State #5	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4, 15			
Intermediate P-State #6	11	N/A	N/A	N/A
VID_VDD	3			
IDD Max				
Thermal Design Power	4, 15			
Min P-State		1000 MHz	1000 MHz	1000 MHz
VID_VDD	3	1.100 V	1.100 V	1.100 V
IDD Max		33.8 A	31.5 A	39.7 A
Thermal Design Power	4, 15	40.1 W	37.6 W	46.6 W
Halt/Stop Grant				
IDDC1 Max @ Max P-State	5, 16	28.7 A	27.9 A	44.5 A
IDDC1 Max @ Min P-State	6, 16	7.1 A	7.0 A	10.9 A
I/O Power	8, 12	2.9 W	2.9 W	2.9 W
S3	7			
I/O Power	7, 9, 12	500 mW	500 mW	500 mW

The notes for this table appear on page 94.

Parameter/OPN	Notes	ADA3800DAA5CD
Tcase Max	1, 13	49°C to 71°C
Tcontrol Max	2	70°C
Tambient		42°C
Thermal Resistance (case-amb)		0.34°C/W
Thermal Profile	14	P
Max P-State		2000 MHz
VID_VDD	3	1.300 V | 1.350 V
IDD Max		66.2 A
Thermal Design Power	4, 15	89.0 W
Intermediate P-State #1	11	1800 MHz
VID_VDD	3	1.300 V
IDD Max		62.8 A
Thermal Design Power	4, 15	84.6 W
Intermediate P-State #2	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4, 15	
Intermediate P-State #3	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4, 15	
Intermediate P-State #4	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4, 15	
Intermediate P-State #5	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4, 15	
Intermediate P-State #6	11	N/A
VID_VDD	3	
IDD Max		
Thermal Design Power	4, 15	
Min P-State		1000 MHz
VID_VDD	3	1.100 V
IDD Max		33.8 A
Thermal Design Power	4, 15	40.1 W
Halt/Stop Grant		
IDDC1 Max @ Max P-State	5, 16	28.7 A
IDDC1 Max @ Min P-State	6, 16	7.1 A
I/O Power	8, 12	2.9 W
S3	7	
I/O Power	7, 9, 12	500 mW

The notes for this table appear on page 94.

Notes:

1. Tcase max is the maximum case temperature specification which is a physical value in degrees Celsius. This value is programmed into Rev D and later processors. Refer to the appropriate functional data sheet, and the THERMTRIP Status Register in the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094.
2. Tcontrol max (maximum control temperature) is a non physical temperature on an arbitrary scale that can be used for system thermal management policies. Tcontrol max represents the value at which the processor has reached Tcase max when measuring the thermal diode with a dual sourcing current temperature sensor. Refer to the appropriate functional data sheet, and the THERMTRIP Status Register in the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094.
3. The VID_VDD voltage is the VID[4:0] requested VDD supply level. Refer to the appropriate functional data sheet for details.
4. Thermal Design Power (TDP) is measured under the conditions of Tcase Max, IDD Max, and VDD=VID_VDD, and include all power dissipated on-die from VDD, VDDIO, VLDT, VTT, and VDDA.
5. Assumes Tcase max, max P-state VID_VDD, clock divider set to 32.
6. Assumes 50°C, min P-state VID_VDD, clock divider set to 32.
7. Assumes 35°C, VDD, VDDA, and VLDT supplies are off, VDDIO and VTT are powered, memory in self-refresh mode and DDR SDRAM interface tri-stated except CKE pins. Refer to the appropriate functional data sheet for complete VDDIO and VTT power supply specifications.
8. Thermal Design Power dissipated by the processor VDDIO, VTT, VLDT, and VDDA power planes only.
9. Thermal Design Power dissipated by the processor VDDIO and VTT power planes only.
10. Refer to the AMD Athlon™ 64 Processor Desktop Power Roadmap, order #26882, for IDD Max and Thermal Design Power requirements for future processor revisions.
11. Implementation of this P-state is optional in BIOS.
12. Assumes VDDIO = 2.6 V and VTT = VDDIO / 2. Refer to the appropriate functional data sheet for complete VDDIO and VTT power supply specifications.
13. Tcase max is programmed during device manufacturing with part-specific values for Rev E and later processors, and can be any valid Tcase max value in the range specified for the corresponding OPN.
14. Thermal Design Power (TDP) and IDD max for Rev E and later processors are the limits at the highest Tcase max in the specified range for the corresponding OPN. Products will conform to the TDP and IDD Max limits at all valid voltages. The relationship of Tcase max and Thermal Profile to TDP for a specific device is defined in Table 44.
15. Thermal Design Power (TDP) specifications for dual core processors assume equivalent P-states (Voltage and frequency) and equivalent Tcase conditions for both cores. Refer to the BIOS and Kernel Developer's Guide for AMD Athlon™ 64 and AMD Opteron™ Processors, order# 26094, for details on P-state operation for dual core processors.
16. IDDC1 specifications for dual core processors assume equivalent Voltage, clock divisor, and Tcase conditions for both cores.

6 MTOPS

Table 47 shows the Composite Theoretical Performance (CTP) calculations ("Calculations") for AMD Athlon™ 64, AMD Athlon™ 64 FX, AMD Athlon™ 64 X2 Dual Core and AMD Sempron™ microprocessors. The Calculations are stated in Millions of Theoretical Operations Per Second (MTOPS) and are based upon a formula in the United States Department of Commerce Export Administration Regulations 15 CFR 774 (Advisory Note 4 for Category 4).

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Table 47: Composite Theoretical Performance (CTP) Calculations

Frequency	MTOPS Single-Core	MTOPS Dual-Core
800	2,467	4,667
1000	3,084	5,834
1200	3,700	7,000
1400	4,317	8,167
1600	4,934	9,334
1800	5,550	10,500
2000	6,167	11,667
2200	6,784	12,834
2400	7,400	14,000
2600	8,017	15,167
2800	8,634	16,334
3000	9,250	17,500