

Intel[®] Core[™] i3 Processor Series

Embedded Application Power Guideline Addendum

July 2012



INFORMATION IN THIS DOCUMENT IS PROVIDED IN CONNECTION WITH INTEL PRODUCTS. NO LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT. EXCEPT AS PROVIDED IN INTEL'S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, INTEL ASSUMES NO LIABILITY WHATSOEVER AND INTEL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY, RELATING TO SALE AND/OR USE OF INTEL PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

A "Mission Critical Application" is any application in which failure of the Intel Product could result, directly or indirectly, in personal injury or death. SHOULD YOU PURCHASE OR USE INTEL'S PRODUCTS FOR ANY SUCH MISSION CRITICAL APPLICATION, YOU SHALL INDEMNIFY AND HOLD INTEL AND ITS SUBSIDIARIES, SUBCONTRACTORS AND AFFILIATES, AND THE DIRECTORS, OFFICERS, AND EMPLOYEES OF EACH, HARMLESS AGAINST ALL CLAIMS COSTS, DAMAGES, AND EXPENSES AND REASONABLE ATTORNEYS' FEES ARISING OUT OF, DIRECTLY OR INDIRECTLY, ANY CLAIM OF PRODUCT LIABILITY, PERSONAL INJURY, OR DEATH ARISING IN ANY WAY OUT OF SUCH MISSION CRITICAL APPLICATION, WHETHER OR NOT INTEL OR ITS SUBCONTRACTOR WAS NEGLIGENT IN THE DESIGN, MANUFACTURE, OR WARNING OF THE INTEL PRODUCT OR ANY OF ITS PARTS.

Intel may make changes to specifications and product descriptions at any time, without notice. Designers must not rely on the absence or characteristics of any features or instructions marked "reserved" or "undefined". Intel reserves these for future definition and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to them. The information here is subject to change without notice. Do not finalize a design with this information.

The products described in this document may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.

Contact your local Intel sales office or your distributor to obtain the latest specifications and before placing your product order.

Copies of documents which have an order number and are referenced in this document, or other Intel literature, may be obtained by calling 1-800-548-4725, or go to: <http://www.intel.com/design/literature.htm>

Intel may make changes to specifications and product descriptions at any time, without notice.

Designers must not rely on the absence or characteristics of any features or instructions marked "reserved" or "undefined." Intel reserves these for future definition and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to them.

The Intel® Core™ i3 Processor series may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.

Intel and Intel Core are trademarks of Intel Corporation in the U.S. and/or other countries.

*Other names and brands may be claimed as the property of others.

Copyright © 2012, Intel Corporation. All rights reserved.



Contents

Revision History	5
Background	6
Nomenclature	7
Application Power Guidelines	8
Disclaimer	13



Figures

Figure 1. Application Power Guidelines for the Intel® Core™ i3 Processor -3120ME	9
Figure 2. Application Power Guidelines for the Intel® Core™ i3 Processor -3217UE Nominal	10
Figure 3. Application Power Guidelines for the Intel® Core™ i3 Processor -3217UE cTDP-Down.	11



Revision History

Revision Number	Description	Date
001	Initial release	July 2012

§



Background

This document provides power numbers on the Intel® Core™ i3 Processor while running real life applications. This document is complementary to the specs published in the datasheet. The application power guidelines should be used for reference only. The power numbers provided in this document are not design points and should not be used as such.

The specifications contained in this document complement the document in the Reference Documents table.

Information types defined in the Nomenclature section of this document are consolidated into this update document and are no longer published in other documents. Additional information about Applications Power Guidelines is provided in the Related Documents table.

Related Documents

Document Title	Document Number/Location
Embedded Application Power Guideline	http://edc.intel.com/Link.aspx?id=4025

Reference Documents

Document Title	Document Number/Location
Mobile 3rd Generation Intel® Core™ Processor Family External Design Specification (EDS) – Volume 1 of 2	http://www.intel.com/cd/edesign/library/asm-na/eng/473716.htm
Desktop 3rd Generation Intel® Core™ Processor Family, Mobile 3rd Generation Intel® Core™ Processor Family, and Intel® Xeon® Processor E3-1200 v2 Product Family External Design Specification (EDS) – Volume 2 of 2	http://www.intel.com/cd/edesign/library/asm-na/eng/473770.htm

S



Nomenclature

APG	Application Power Guidelines
TDP	Thermal Design Power
SKU	Stock Keeping Unit
cTDP	Configurable TDP



Application Power Guidelines

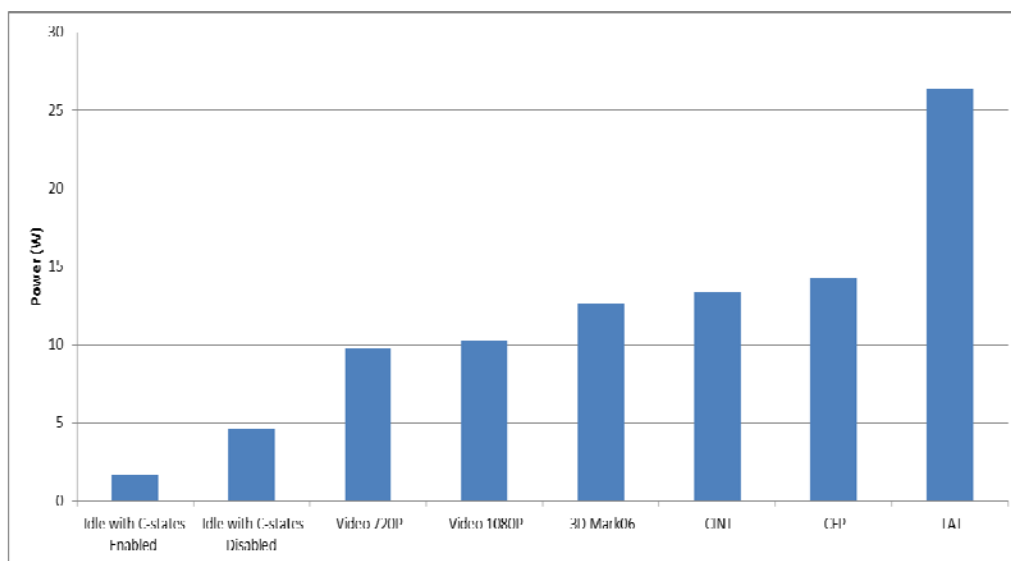
The Application Power Guidelines (APG) numbers listed in this document are intended to reflect the nominal use conditions. Several factors such as temperature, platform configuration and other variables can influence the numbers. Specific information about the platform, benchmarks, temperatures, etc. are provided in this document to enable a repeatable power measurement. Since Application Power Guidelines are provided on limited applications and SKUs, it is expected that users understand these numbers and apply them in their own use cases.



Application Power Guidelines for the Intel® Core™ i3 Processor -3120ME

Figure 1 indicates the Application Power Guidelines for various embedded applications for the Intel® Core™ i3 Processor -3120ME with a 35W TDP specification.

Figure 1. Application Power Guidelines for the Intel® Core™ i3 Processor - 3120ME



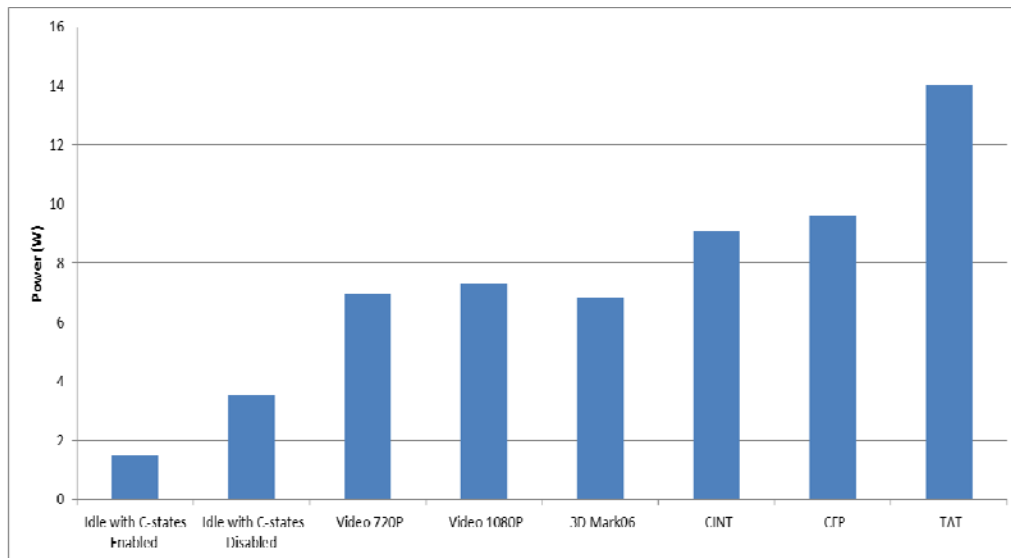
Application/Benchmark	Processor Power (W)	Junction Temperature (°C)
Idle with C-states Enabled	2	30
Idle with C-states Disabled	5	31
Video 720P	10	42
Video 1080P	10	42
3DMark 06	13	41
CINT	13	45
CFP	14	46
TAT	26	53



Application Power Guidelines for the Intel® Core™ i3 Processor -3217UE

Figure 2 indicates the Application Power Guidelines for various embedded applications for the Intel® Core™ i3 Processor -3217UE with a 17W Nominal TDP specification.

Figure 2. Application Power Guidelines for the Intel® Core™ i3 Processor - 3217UE Nominal



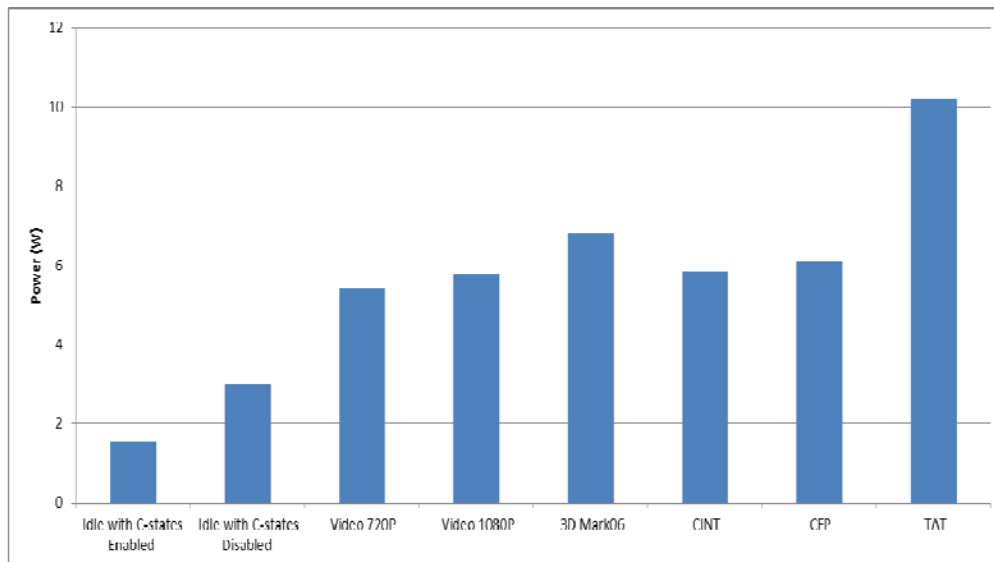
Application/Benchmark	Processor Power (W)	Junction Temperature (°C)
Idle with C-states Enabled	2	29
Idle with C-states Disabled	4	30
Video 720P	7	36
Video 1080P	7	36
3DMark 06	7	35
CINT	9	37
CFP	10	38
TAT	14	42



Application Power Guidelines for the Intel® Core™ i3 Processor -3217UE

Figure 3 indicates the Application Power Guidelines for various embedded applications for the Intel® Core™ i3 Processor -3217UE with a 14W cTDP-Down specification.

Figure 3. Application Power Guidelines for the Intel® Core™ i3 Processor - 3217UE cTDP-Down



Application/Benchmark	Processor Power (W)	Junction Temperature (°C)
Idle with C-states Enabled	2	29
Idle with C-states Disabled	3	31
Video 720P	5	33
Video 1080P	6	34
3DMark 06	7	33
CINT	6	35
CFP	6	35
TAT	10	37

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products.



APG Configuration:

The results presented in this document are collected on a single sample. The data has not been post processed to account for part to part variation.

- Platform: Intel® Core™ i3 Processor -3120ME/3217UE with Intel® Series 7 QM77 Express Chipset
- BIOS Rev: ACRVMBY1.86C.0082.P01 was used for Intel® Core™ i3 Processor 3217UE at Nominal
- BIOS Rev: ACRVMBY1.86C.0089.P01 was used for Intel® Core™ i3 Processor 3120ME/ 3217UE at cTDP-Down
- Memory: 2X 2GB DDR3 1xR8 PC3 1333MHz
- Operating System: Windows* 7 x64, Linux Ubuntu* 11.10 x64
- Windows Benchmarks: TAT (Thermal Analysis Tool rev4.3.1), Video 720P/1080P (VLC Player: Elephants Dream 1280x720 and 1920x1080Divx), Video720P/1080P, and 3Dmark 06
- Ubuntu Benchmarks: SPEC CPU2006 (CINT.400 Perlbench, CFP.416 Games)
- Intel® Turbo Boost Technology graphics frequency was disabled in the Operating System graphics properties when running all benchmarks including the TDP workload
- When setting the Intel® Core™ i3 processor -3217UE at 17W Nominal and 14W TDP-Down, the frequencies respectively are 1.6GHz and 800MHz
- A reference heat sink with fan was used while running these benchmarks
- Application Power Guidelines testing was conducted by Intel Corporation
- For more information go to <http://www.intel.com/performance/>

Additional Information:

- In case of conflict the Datasheet supersedes this document.
- Temperature values are mean temperatures measured through the duration of the test.
- APG configuration is provided for repeatability of the test.
- SPEC CPU2006 is one of the most widely used industry standard benchmark for evaluating IA CPU compute capabilities. The CINT benchmark used in this test is 400.Perlbench. The CFP benchmark used in this test is 416.gamess.
- Power Thermal Utility tool (PTU) or Thermal Analysis tool (TAT) are developed by Intel to generate TDP like workloads on a system.
- 3DMark 06 is a 3D game performance benchmark.
- VLC Player is an open source media player.
- Elephants Dream is an open movie, made entirely with open source graphics software.
- With cTDP, the processor is capable of altering the maximum sustained power with an alternate guaranteed frequency. Configurable TDP allows operation in situations where extra cooling is available or situations where a cooler and quieter mode of operation is desired. Configurable TDP can be enabled via Intel's DPTF driver or through HW/EC firmware.
- The Idle Power reported above is while displaying the Windows Desktop screen.



Disclaimer

Values presented represent a typical or average processor SKU and do not guarantee a customer will achieve these exact values for each silicon sample. These values are not intended to replace TDP, nor to be used for reliability assessments. Individual test results may vary.

§