6th Generation Intel® Core™ Processor Series

Application Power Guidelines Addendum

Supporting the 6th Generation Intel® Core™ Processor Series Based on the S-Processor Lines

August 2015

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Revision History

Date	Revision	Description
August 2015	001	Initial release

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1.0   Introduction

This document provides power numbers for the 6th Generation Intel® Core™ Processor Series for desktop processors while running real life applications. This document supplements the specifications published in the product datasheet.

Use these Application Power Guidelines for reference purposes only. The power data elements provided in this document are not design points or technical specifications and should not be used as such.

Table 1 provides definitions for Application Power Guidelines terms and acronyms used in this document.

1.1   Terminology

Table 1.   Terminology

Term	Description
APG	Application Power Guidelines
NDA	Non-Disclosure Agreement
SKU	Stock Keeping Unit
TAT	Thermal Analysis Tool
TDP	Thermal Design Power

1.2 Reference Documents

Refer to the documents in Table 2 for the titles and links to key related technical documents.

Table 2.   Reference Documents

Document	Document Number
Intel® Embedded Application Power Guideline Whitepaper	324759
Intel® Embedded Application Power Guidelines Refresh Whitepaper	554966
6th Generation Intel® Core™ Processor Family External Design Specification (EDS) – Volume 1 of 2	544924
6th Generation Intel® Core™ Processor Family External Design Specification (EDS) – Volume 2 of 2	544925
IOTG Embedded Skylake Processor Desktop and Mobile Platform External Design Specification Addendum (EDS)	557315
Skylake S Platform Design Guide Based on Skylake S Processor	543611
Skylake-S Thermal and Mechanical Design Guide	548536

NOTE: Contact your local Intel representative(s) for the most recent revision of these documents.

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2.0 Application Power Guidelines

The Application Power Guidelines (APG) data listed in this document are intended to reflect typical use conditions. Factors such as temperature, platform configuration, and other variables can influence power usage. Specific information about the platforms and test configurations is provided to enable a repeatable power measurement.

2.1 Intel® Core™ Processor i7-6700TE Application Power Guidelines

Figure 1 indicates the Application Power Guidelines for various embedded applications for the Intel® Core™ Processor i7-6700TE with a 35W TDP specification.

Figure 1. Intel® Core™ Processor i7-6700TE Application Power Guidelines
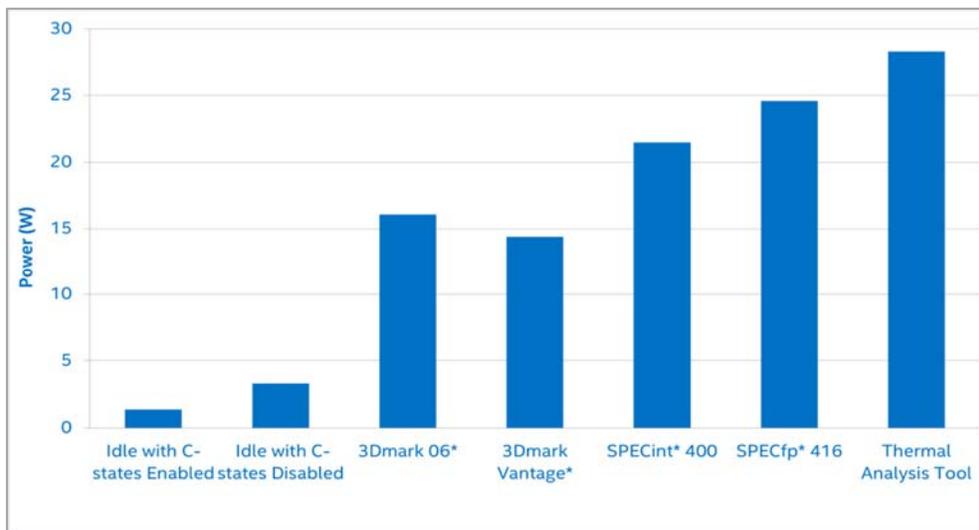
Table 3. Intel® Core™ Processor i7-6700TE Application Power Guidelines

Application/Benchmark	Processor Power (W)	Junction Temperature (°C)
Idle with C-states Enabled	1.4	21
Idle with C-states Disabled	3.3	22
3DMark 06*	16.1	32
3DMark Vantage*	14.4	32
SPECint* 400	21.5	33
SPECfp* 416	24.6	35

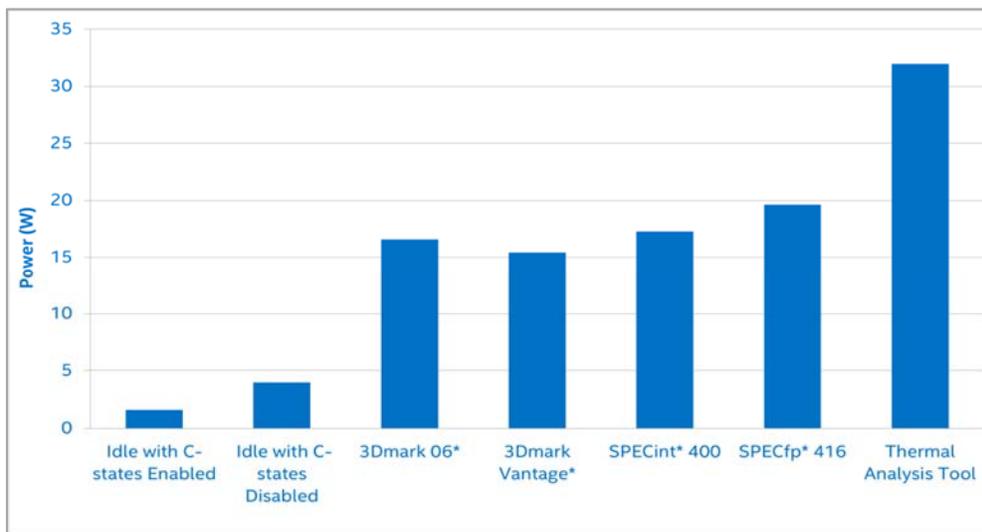| Application/Benchmark	Processor Power (W)	Junction Temperature (°C)
Thermal Analysis Tool	28.3	37

NOTES:

1. 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. A change to any of those factors may cause results to vary. Consult additional information and performance tests to fully evaluate all potential purchases, including the performance of that product when combined with other products. For more information go to http://www.intel.com/performance.
2. Test Configuration: Presented results are from a single sample. The data was not post-processed to account for part-to-part variation. Intel internal testing as of June 2015.
3. Platform: Intel® Core™ Processor i7-6700TE Processor with C236 chipset.
4. BIOS Revision: SKLSE2R1.R00.X085.B01.1505270114
5. Memory: 2x 8GB 1G x 64-Bit DDR3L-1600 CL9 204-Pin SODIMM (1333MHz)
6. Operating System: Windows 8.1* x64 and Linux* Ubuntu* 12.04 64 bit (kernel 3.11.0-26-generic).
7. Additional configuration details are listed in Section 3.0 Configuration and Disclaimer.

2.2 Intel® Core™ Processor i5-6500TE Application Power Guidelines

Figure 2 indicates the Application Power Guidelines for various embedded applications for the Intel® Core™ Processor i5-6500TE with a 35W TDP specification.

Figure 2. Intel® Core™ Processor i5-6500TE Application Power Guidelines

Table 4. Intel® Core™ Processor i5-6500TE Application Power Guidelines

Application/Benchmark	Processor Power (W)	Junction Temperature (°C)
Idle with C-states Enabled	1.6	22

Application/Benchmark	Processor Power (W)	Junction Temperature (°C)
Idle with C-states Disabled	4.0	22
3DMark 06*	16.6	30
3DMark Vantage*	15.4	30
SPECint* 400	17.3	29
SPECfp* 416	19.6	30
Thermal Analysis Tool	32.0	42

NOTES:
1. 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. A change to any of those factors may cause results to vary. Consult additional information and performance tests to fully evaluate all potential purchases, including the performance of that product when combined with other products. For more information go to http://www.intel.com/performance.
2. Test Configuration: Presented results are from a single sample. The data was not post-processed to account for part-to-part variation. Intel internal testing as of June 2015.
3. Platform: Intel® Core™ Processor i5-6500TE Processor with C236 chipset.
4. BIOS Revision: SKLSE2R1.R00.X085.B01.1505270114
5. Memory: 2x 8GB 1G x 64-Bit DDR3L-1600 CL9 204-Pin SODIMM (1333MHz)
6. Operating System: Windows 8.1* x64 and Linux* Ubuntu* 12.04 64 bit (kernel 3.11.0-26-generic).
7. Additional configuration details are listed in Section 3.0 Configuration and Disclaimer.

2.3 Intel® Core™ Processor i3-6100TE Application Power Guidelines

Figure 3 indicates the Application Power Guidelines for various embedded applications for the Intel® Core™ Processor i3-6100TE with a 35W TDP specification.

Figure 3. Intel® Core™ Processor i3-6100TE Application Power Guidelines
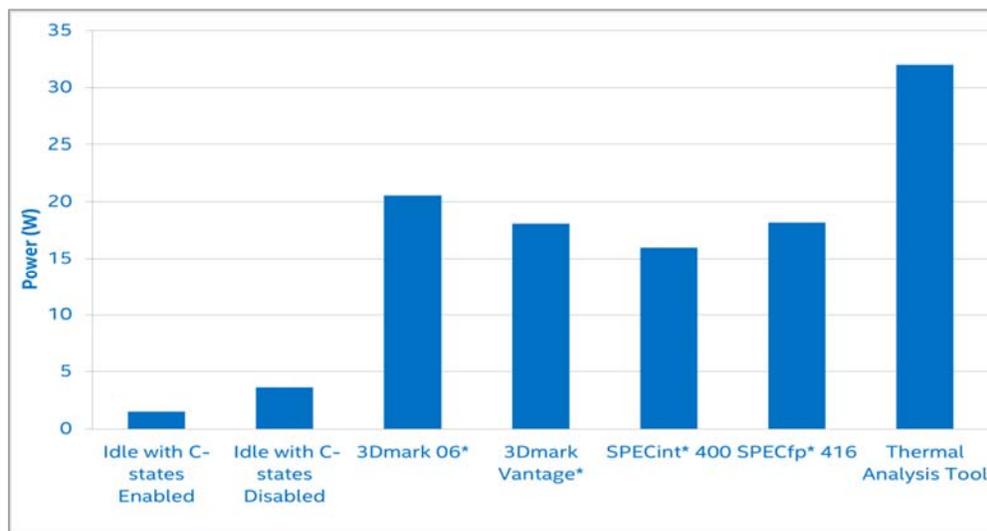
Table 5. Intel® Core™ Processor i3-6100TE Application Power Guidelines

Application/Benchmark	Processor Power (W)	Junction Temperature (°C)
Idle with C-states Enabled	1.5	21
Idle with C-states Disabled	3.6	21
3DMark 06*	20.6	32
3DMark Vantage*	18.1	31
SPECint* 400	16.0	32
SPECfp* 416	18.2	32
Thermal Analysis Tool	32.0	35

NOTES:
1. 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. A change to any of those factors may cause results to vary. Consult additional information and performance tests to fully evaluate all potential purchases, including the performance of that product when combined with other products. For more information go to http://www.intel.com/performance.
2. Test Configuration: Presented results are from a single sample. The data was not post-processed to account for part-to-part variation. Intel internal testing as of June 2015.
3. Platform: Intel® Core™ Processor i3-6100TE Processor with C236 chipset.
4. BIOS Revision: SKLSE2R1.R00.X085.B01.1505270114
5. Memory: 2x 8GB 1G x 64-Bit DDR3L-1600 CL9 204-Pin SODIMM (1333MHz)
6. Operating System: Windows 8.1* x64 and Linux* Ubuntu* 12.04 64 bit (kernel 3.11.0-26-generic).
7. Additional configuration details are listed in Section 3.0 Configuration and Disclaimer.

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3.0   Configuration and Disclaimer

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

Software and workloads used in performance tests may have been optimized for performance only on Intel® processors. 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. 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.

3.1   Application Power Guidelines Configuration

The following list defines the Application Power Guidelines 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.

- Platforms:
    - Platform 2: Intel® Core™ i7-6700TE with C236 chipset
    - Platform 3: Intel® Core™ i5-6500TE with C236 chipset
    - Platform 4: Intel® Core™ i3-6100TE with C236 chipset

- BIOS Revision: SKLSE2R1.R00.X085.B01.1505270114

- Memory: 2x 8GB 1G x 64-Bit DDR3L-1600 CL9 204-Pin SODIMM (1333MHz)

- Windows* Benchmarks: 3DMark* 06, 3DMark* Vantage, Thermal Analysis Tool (TAT) (rev 5.0.1017, TDP workload option).

- Linux* Ubuntu* Benchmarks: SPEC* CPU2006v1.2 (SPECint* 400.Perlbench, SPECfp* 416.Gamess) with supporting SSE42, AVX, and AVX 2.0 binaries.

- The Intel® Turbo Boost Technology for the Intel® Architecture (IA) was disabled in the BIOS for all Platforms. In the Operating System, "Power Saver" was selected in the Power options under the control panel options. The "Power Saver" option was also selected for idle measurement with C-states disabled.

- The Application Power Guideline testing was conducted by Intel.

- For more information, go to http://www.intel.com/performance.
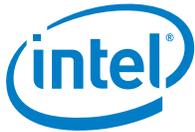
3.2 Additional Considerations

The following list details additional key, relevant considerations.

- In the case of any conflicting information, the datasheet supersedes this document.

- The temperature values are mean temperatures measured through the duration of the test.

- Application Power Guidelines Configuration data are provided for repeatability of the test.

- SPEC CPU2006* is an industrial standard benchmark designed to provide performance measurements that can be used to compare compute-intensive workloads on different computer systems. The SPEC CPU2006* test on Intel® microprocessors is measured using particular, well-configured systems. These results may or may not reflect the relative performance of Intel® microprocessors in systems with different hardware or software designs or configurations (including compilers). Buyers should consult other sources of information, including system benchmarks, to evaluate the performance of systems they are considering to purchase. For more information about SPEC CPU2006* visit http://www.spec.org/cpu2006/.

- 3DMark06* is a 3D graphics benchmark, designed for DirectX* 9.0. It includes four graphics tests, two CPU tests, and several feature tests. The CPU tests measure the contribution of the processor on a 3D graphical, while the graphics test measures game simulation performance. Power was measured while running Graphic Test 1: Return to Proxycon. For more information about 3DMark06* visit http://www.futuremark.com/benchmarks/3dmark/all.

- 3DMarkVantage* is a 3D graphics benchmark, designed for DirectX*10. It includes two graphics tests, two CPU tests, and six feature tests. The CPU test covers physics simulation and artificial intelligence while the graphics test measures various visual techniques. Power was measured while running Graphic Test 1- Jane Nash in the performance preset. For more information about 3Dmark06 please visit www.futuremark.com/benchmarks/3dmark-vantage.

- Thermal Analysis Tool (TAT) is developed by Intel to generate TDP-like workloads on a system. A Non-Disclosure Agreement (NDA) is required for usage.

- The idle power reported above is while displaying the Windows* desktop screen.

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