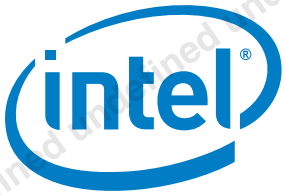

# Desktop 4th Generation Intel® Core™, Intel® Pentium®, and Intel® Celeron® Processor Families and Intel® Xeon® Processor E3-1268L v3

## Application Power Guidelines Addendum

*May 2014*

Document Number: 329174-004US

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# Revision History

| Date | Revision | Description |
|---|---|---|
| May 2014 | 004 | Updated APG addendum with the Intel® Core™ i7-4790S, Intel® Core™ i5-4590S, and Intel® Core™ i5-4590T processors and the Intel® Core™ i3-4340TE. |
| December 2013 | 003 | Updated with the Intel® Celeron® G1820TE Processor. |
| November 2013 | 002 | Updated with the Intel® Core™ i3-4330TE and Intel® Pentium® G3320TE Processors. |
| June 2013 | 001 | Initial release. |

§

# 1 Introduction

This document provides power numbers for the 4th Generation Intel® Core™ processor, Intel® Pentium® processor, and Intel® Celeron® processor series for desktop and the Intel® Xeon® processor while running real life applications. This document is complementary to the specifications published in the product datasheet.

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

Additional information about Application Power Guidelines is provided in the Table 1 Related Documents. Refer to the documents in Table 2 for supplemental information.

## 1.1 Related Documents

**Table 1. Related Documents**

| Document | Document No./Location |
|---|---|
| *Embedded Application Power Guidelines* | http://www.intel.com/content/dam/www/public/us/en/documents/white-papers/embedded-appl-power-guideline-paper.pdf |

## 1.2 Reference Documents

**Table 2. Reference Documents**

| Document | Document No./Location |
|---|---|
| *4th Generation Intel® Core™ Processor Family Desktop and Intel® Xeon® E3-1200 v3 Product Family External Design Specification (EDS) – Volume 1 of 2* | 487245 |
| *4th Generation Intel® Core™ Processor Desktop, 4th Generation Intel® Core™ Processor Mobile, and Intel® Xeon® processor E3-1200 v3 Product Family External Design Specification (EDS) – Volume 2 of 2* | 487247 |
| *Shark Bay and Denlow-WS Platform Design Guide* | 486711 |
| *Shark Bay Platform Thermal Management Design Guide* | 489729 |

***Note:*** Contact your local Intel representative for the most recent revision of these documents.

## 1.3 Terminology

**Table 3. Terminology**

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

§

# 2 Application Power Guidelines

The Application Power Guidelines (APG) data listed in this document are intended to reflect the 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 in this document to enable a repeatable power measurement.

## 2.1 Intel® Xeon® processor E3-1268L v3 Application Power Guidelines

Figure 1 indicates the Application Power Guidelines for various embedded applications for the Intel® Xeon® processor E3-1268L v3 with a 45W TDP specification.

**Figure 1. Intel® Xeon® Processor E3-1268L v3 Application Power Guidelines**

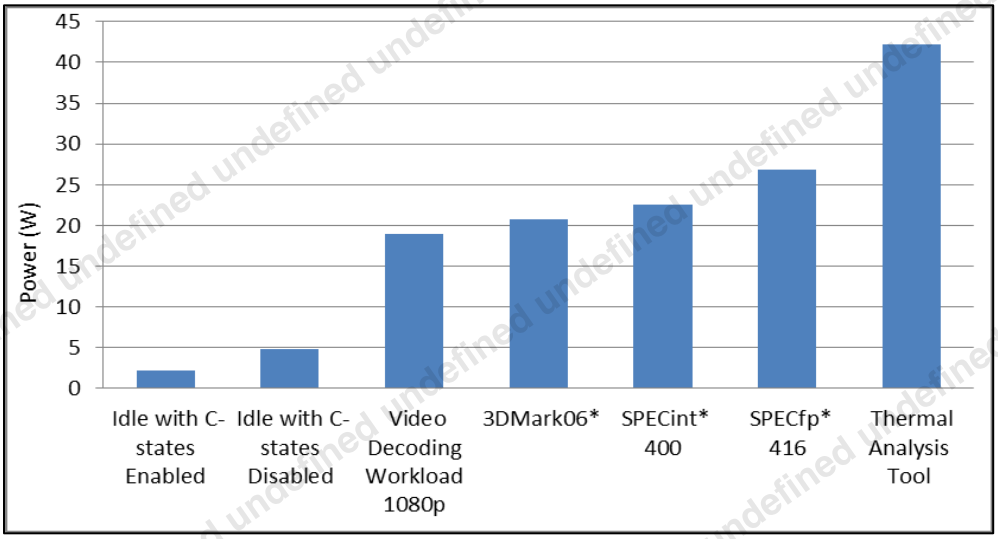


**Table 4. Intel® Xeon® Processor E3-1268L v3 Application Power Guidelines**

| Application / Benchmark | Processor Power (W) | Junction Temperature (°C) |
|---|---|---|
| Idle with C-states Enabled | 2.2 | 38 |
| Idle with C-states Disabled | 4.8 | 41 |
| Video Decoding Workload 1080p | 19.0 | 45 |
| 3DMark06* | 20.7 | 45 |
| SPECint* 400 | 22.6 | 47 |
| SPECfp* 416 | 26.8 | 51 |
| Thermal Analysis Tool | 42.2 | 56 |

**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. 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. For more information go to http://www.intel.com/performance.
2. Test Configuration: The results presented are from a single sample. The data was not post-processed to account for part-to-part variation. Intel internal testing as of April 2013.
3. Platform: Intel® Xeon® E3-1268L v3 Processor with Intel® Series 8 Chipset Family.
4. BIOS Revision: HSWLPTU1.86C.0123.R00.1304212017.
5. Memory: 4x 2 GB 1Rx8 PC3-12800U-11-11-A1 DDR3 DIMMS at 1600 MHz.
6. Operating System: Windows 7* x64 Service Pack 1 and Linux* Ubuntu* 11.10 (kernel 3.0.030-generic).
7. Additional Configuration details are listed in Section 3 Configuration and Disclaimer.

## 2.2 Intel® Core™ Processor i7-4790S Application Power Guidelines

Figure 2 indicates the Application Power Guidelines for various embedded applications for the Intel® Core™ Processor i7-4790S with a 65W TDP specification.

**Figure 2. Intel® Core™ Processor i7-4790S Application Power Guidelines**

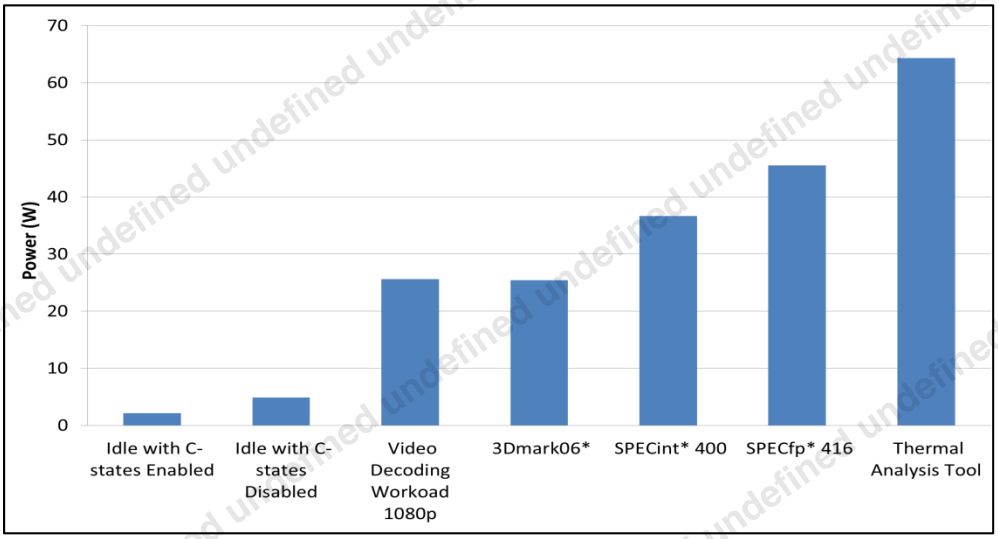


**Table 5. Intel® Core™ Processor i7-4790S Application Power Guidelines**

| Application / Benchmark | Processor Power (W) | Junction Temperature (°C) |
|---|---|---|
| Idle with C-states Enabled | 2.1 | 30 |
| Idle with C-states Disabled | 4.9 | 32 |
| Video Decoding Workload 1080p | 25.6 | 43 |
| 3DMark06* | 25.4 | 43 |
| SPECint* 400 | 36.7 | 42 |
| SPECfp* 416 | 45.5 | 48 |
| Thermal Analysis Tool | 64.3 | 57 |

**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. 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. For more information go to http://www.intel.com/performance.
2. Test Configuration: The results presented are from a single sample. The data was not post-processed to account for part-to-part variation. Intel internal testing as of March 2014.
3. Platform: Intel® Core™ i7-4790S Processor with Intel® Communications Chipset 89xx Series.
4. BIOS Revision: BDW.E1R1.86C.0046.R00.1310070119.
5. Memory: 2GB 1Rx8 PC3-12800U-11-11-A1 DDR3 DIMMS at 1600 MHz.
6. Operating System: Windows 7* x64 Service Pack 1 and Linux* Ubuntu* 11.10 (kernel 3.10.1-generic).
7. Additional Configuration details are listed in Section 3 Configuration and Disclaimer.

## 2.3 Intel® Core™ Processor i7-4770TE Application Power Guidelines

Figure 3 indicates the Application Power Guidelines for various embedded applications for the Intel® Core™ Processor i7-4770TE with a 45W TDP specification.

**Figure 3. Intel® Core™ Processor i7-4770TE Application Power Guidelines**

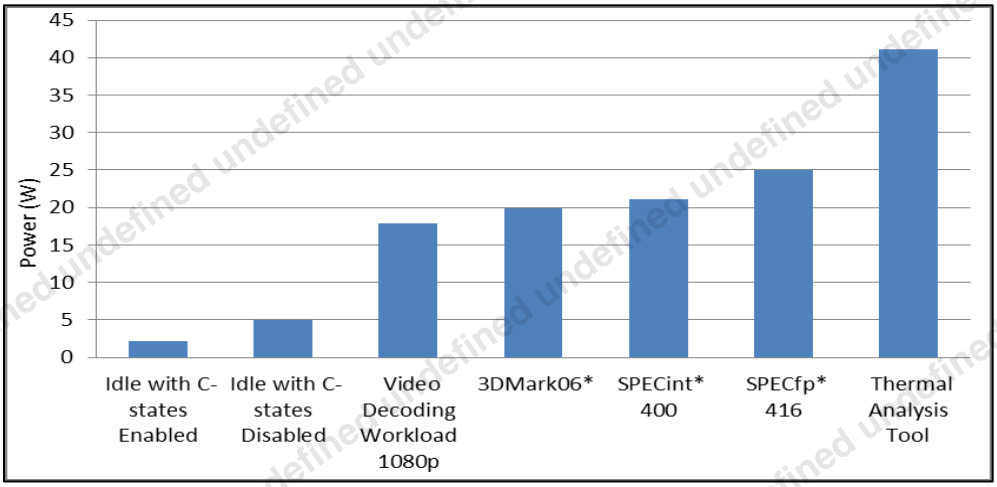


**Table 6. Intel® Core™ Processor i7-4770TE Application Power Guidelines**

| Application / Benchmark | Processor Power (W) | Junction Temperature (°C) |
|---|---|---|
| Idle with C-states Enabled | 2.2 | 38 |
| Idle with C-states Disabled | 4.9 | 41 |
| Video Decoding Workload 1080p | 17.9 | 45 |
| 3DMark06* | 19.9 | 45 |
| SPECint* 400 | 21.1 | 47 |
| SPECfp* 416 | 25.0 | 49 |
| Thermal Analysis Tool | 41.1 | 57 |

**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. 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. For more information go to http://www.intel.com/performance.
2. Test Configuration: The results presented are from a single sample. The data was not post-processed to account for part-to-part variation. Intel internal testing as of April 2013.
3. Platform: Intel® Core™ i7-4770TE Processor with Intel® Communications Chipset 89xx Series.
4. BIOS Revision: HSWLPTU1.86C.0123.R00.1304212017.
5. Memory: 4x 2 GB 1Rx8 PC3-12800U-11-11-A1 DDR3 DIMMS at 1600 MHz.
6. Operating System: Windows 7* x64 Service Pack 1 and Linux* Ubuntu* 11.10 (kernel 3.0.0-30-generic).
7. Additional Configuration details are listed in Section 3. Configuration and Disclaimer.

## 2.4 Intel® Core™ Processor i5-4590S Application Power Guidelines

Figure 4 indicates the Application Power Guidelines for various embedded applications for the Intel® Core™ Processor i5-4590S with a 65W TDP specification.

**Figure 4. Intel® Core™ Processor i5-4590S Application Power Guidelines**

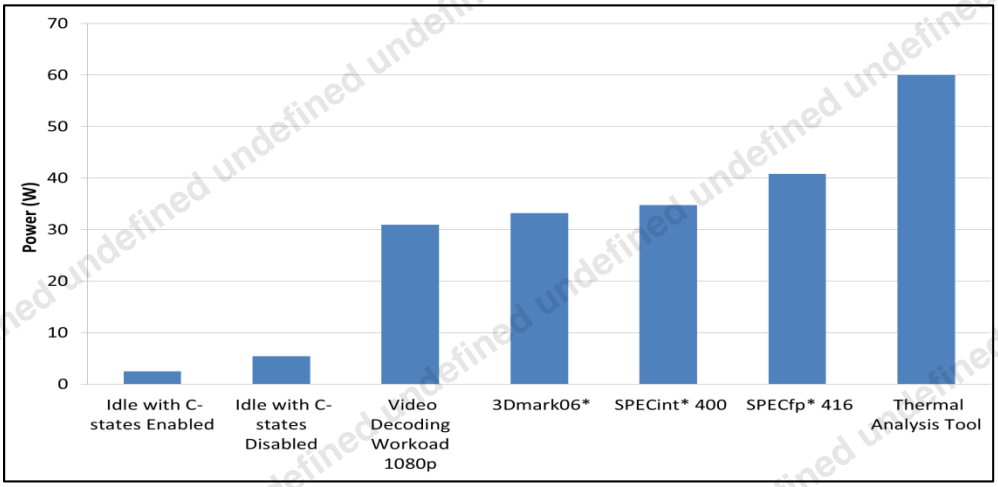


**Table 7. Intel® Core™ Processor i5-4590S Application Power Guidelines**

| Application / Benchmark | Processor Power (W) | Junction Temperature (°C) |
|---|---|---|
| Idle with C-states Enabled | 2.5 | 30 |
| Idle with C-states Disabled | 5.4 | 31 |
| Video Decoding Workload 1080p | 30.9 | 43 |
| 3DMark06* | 33.2 | 40 |
| SPECint* 400 | 34.7 | 49 |
| SPECfp* 416 | 40.8 | 51 |
| Thermal Analysis Tool | 60.1 | 56 |

**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. 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. For more information go to http://www.intel.com/performance.
2. Test Configuration: The results presented are from a single sample. The data was not post-processed to account for part-to-part variation. Intel internal testing as of February 2014.
3. Platform: Intel® Core™ i5-4590S Processor with Intel® Communications Chipset 89xx Series.
4. BIOS Revision: BDW.E1R1.86C.0046.R00.1310070119.
5. Memory: 4x 2GB 1Rx8 PC3-12800U-11-11-A1 DDR3 DIMMS at 1600 MHz.
6. Operating System: Windows 7* x64 Service Pack 1 and Linux* Ubuntu* 11.10 (kernel 3.10.1-generic).
7. Additional Configuration details are listed in Section 3. Configuration and Disclaimer.

## 2.5 Intel® Core™ Processor i5-4590T Application Power Guidelines

Figure 5 indicates the Application Power Guidelines for various embedded applications for the Intel® Core™ Processor i5-4590T with a 35W TDP specification.

**Figure 5. Intel® Core™ Processor i5-4590T Application Power Guidelines**

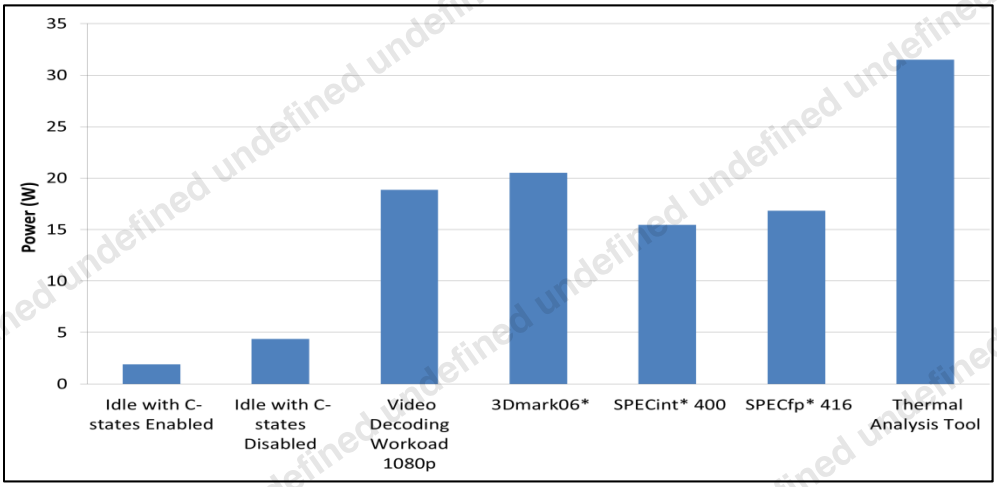


**Table 8. Intel® Core™ Processor i5-4590T Application Power Guidelines**

| Application / Benchmark | Processor Power (W) | Junction Temperature (°C) |
|---|---|---|
| Idle with C-states Enabled | 1.9 | 30 |
| Idle with C-states Disabled | 4.4 | 31 |
| Video Decoding Workload 1080p | 18.9 | 37 |
| 3DMark06* | 20.5 | 36 |
| SPECint* 400 | 15.5 | 35 |
| SPECfp* 416 | 16.8 | 36 |
| Thermal Analysis Tool | 31.5 | 47 |

**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. 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. For more information go to http://www.intel.com/performance.
2. Test Configuration: The results presented are from a single sample. The data was not post-processed to account for part-to-part variation. Intel internal testing as of March 2014.
3. Platform: Intel® Core™ i5-4590T Processor with Intel® Communications Chipset 89xx Series.
4. BIOS Revision: BDW.E1R1.86C.0046.R00.1310070119.
5. Memory: 4x 2GB 1Rx8 PC3-12800U-11-11-A1 DDR3 DIMMS at 1600 MHz.
6. Operating System: Windows 7* x64 Service Pack 1 and Linux* Ubuntu* 11.10 (kernel 3.10.1-generic).
7. Additional Configuration details are listed in Section 3. Configuration and Disclaimer.

## 2.6 Intel® Core™ Processor i5-4570TE Application Power Guidelines

Figure 6 indicates the Application Power Guidelines for various embedded applications for the Intel® Core™ Processor i5-4570TE with a 35W TDP specification.

**Figure 6. Intel® Core™ Processor i5-4570TE Application Power Guidelines**

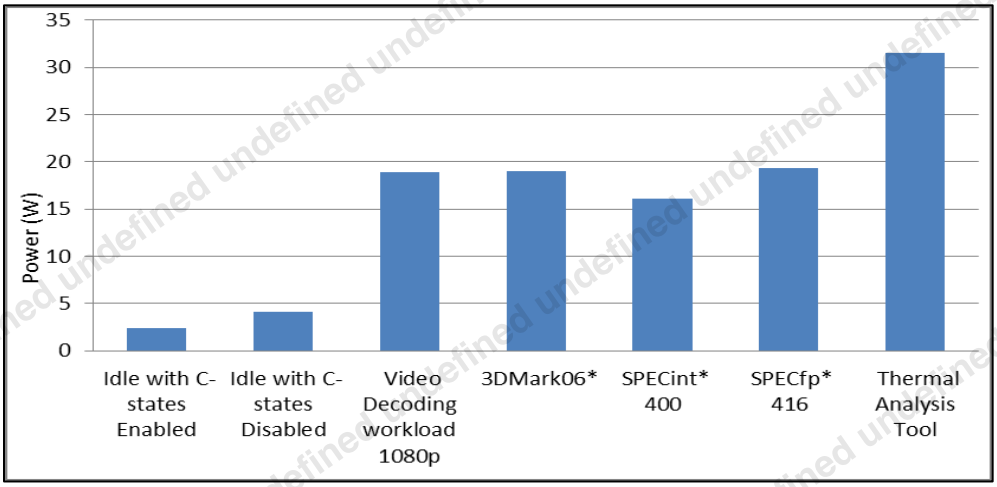


**Table 9. Intel® Core™ Processor i5-4570TE Application Power Guidelines**

| Application / Benchmark | Processor Power (W) | Junction Temperature (°C) |
|---|---|---|
| Idle with C-states Enabled | 2.4 | 37 |
| Idle with C-states Disabled | 4.1 | 38 |
| Video Decoding Workload 1080p | 18.9 | 45 |
| 3DMark06* | 19.0 | 46 |
| SPECint* 400 | 16.1 | 43 |
| SPECfp* 416 | 19.4 | 49 |
| Thermal Analysis Tool | 31.5 | 55 |

**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. 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. For more information go to http://www.intel.com/performance.
2. Test Configuration: The results presented are from a single sample. The data was not post-processed to account for part-to-part variation. Intel internal testing as of May 2013.
3. Platform: Intel® Core™ i5-4570TE Processor with Intel® Communications Chipset 89xx Series.
4. BIOS Revision: HSWLPTU1.86C.0123.R00.1304212017.
5. Memory: 4x 2 GB 1Rx8 PC3-12800U-11-11-A1 DDR3 DIMMS at 1600 MHz.
6. Operating System: Windows 7* x64 Service Pack 1 and Linux* Ubuntu* 11.10 (kernel 3.0.0-30-generic).
7. Additional Configuration details are listed in Section 3. Configuration and Disclaimer.

## 2.7 Intel® Core™ Processor i3-4340TE Application Power Guidelines

Figure 7 indicates the Application Power Guidelines for various embedded applications for the Intel® Core™ Processor i3-4340TE with a 35W TDP specification.

**Figure 7. Intel® Core™ Processor i3-4340TE Application Power Guidelines**

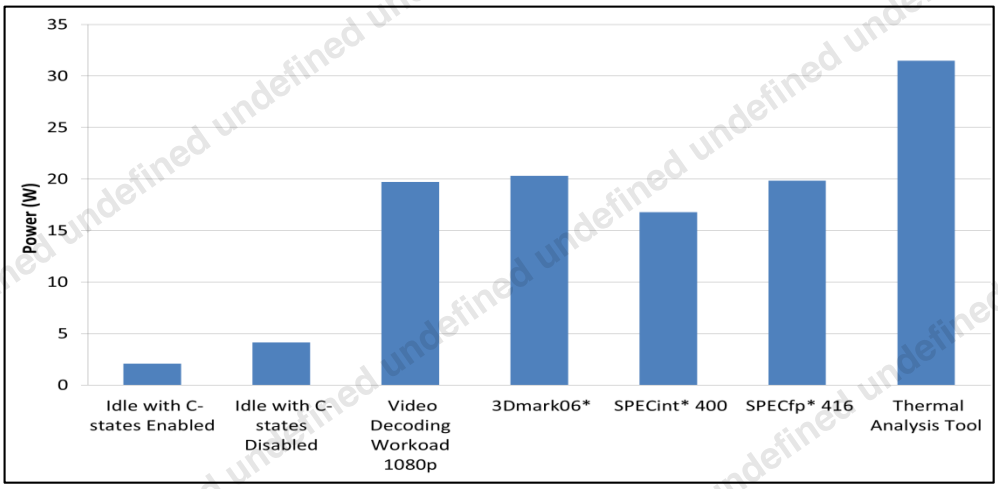


**Table 10. Intel® Core™ Processor i3-4340TE Application Power Guidelines**

| Application / Benchmark | Processor Power (W) | Junction Temperature (°C) |
|---|---|---|
| Idle with C-states Enabled | 2.1 | 30 |
| Idle with C-states Disabled | 4.1 | 31 |
| Video Decoding Workload 1080p | 19.7 | 38 |
| 3DMark06* | 20.3 | 40 |
| SPECint* 400 | 16.8 | 42 |
| SPECfp* 416 | 19.8 | 44 |
| Thermal Analysis Tool | 31.5 | 51 |

**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. 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. For more information go to http://www.intel.com/performance.
2. Test Configuration: The results presented are from a single sample. The data was not post-processed to account for part-to-part variation. Intel internal testing as of March 2014.
3. Platform: Intel® Core™ i3-4340TE Processor with Intel® Communications Chipset 89xx Series.
4. BIOS Revision: HSWLPTU1.86C.0123.R00.1304212017.
5. Memory: 4x 2 GB 1Rx8 PC3-12800U-11-11-A1 DDR3 DIMMS at 1600 MHz.
6. Operating System: Windows 7* x64 Service Pack 1 and Linux* Ubuntu* 11.10 (kernel 3.10.1-generic).
7. Additional Configuration details are listed in Section 3. Configuration and Disclaimer.

## 2.8 Intel® Core™ Processor i3-4330TE Application Power Guidelines

Figure 8 indicates the Application Power Guidelines for various embedded applications for the Intel® Core™ Processor i3-4330TE with a 35W TDP specification.

**Figure 8. Intel® Core™ Processor i3-4330TE Application Power Guidelines**

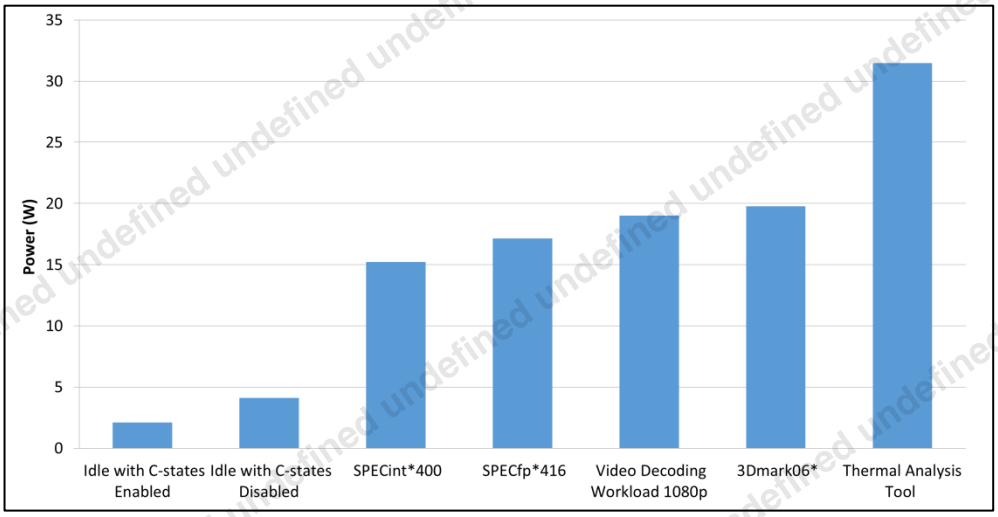


**Table 11. Intel® Core™ Processor i3-4330TE Application Power Guidelines**

| Application / Benchmark | Processor Power (W) | Junction Temperature (°C) |
|---|---|---|
| Idle with C-states Enabled | 2.1 | 37 |
| Idle with C-states Disabled | 4.1 | 38 |
| Video Decoding Workload 1080p | 19.0 | 44 |
| 3DMark06* | 19.8 | 45 |
| SPECint* 400 | 15.2 | 44 |
| SPECfp* 416 | 17.1 | 46 |
| Thermal Analysis Tool | 31.5 | 51 |

**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. 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. For more information go to http://www.intel.com/performance.
2. Test Configuration: The results presented are from a single sample. The data was not post-processed to account for part-to-part variation. Intel internal testing as of October 2013.
3. Platform: Intel® Core™ i3-4330TE Processor with Intel® Communications Chipset 89xx Series.
4. BIOS Revision: HSWLPTU1.86C.0123.R00.1304212017.
5. Memory: 4x 2 GB 1Rx8 PC3-12800U-11-11-A1 DDR3 DIMMS at 1600 MHz.
6. Operating System: Windows 7* x64 Service Pack 1 and Linux* Ubuntu* 11.10 (kernel 3.10.1-generic).
7. Additional Configuration details are listed in Section 3, Configuration and Disclaimer.

## 2.9 Intel® Pentium® Processor G3320TE Application Power Guidelines

Figure 9 indicates the Application Power Guidelines for various embedded applications for the Intel® Pentium® Processor G3320TE with a 35W TDP specification.

**Figure 9. Intel® Pentium® Processor G3320TE Application Power Guidelines**

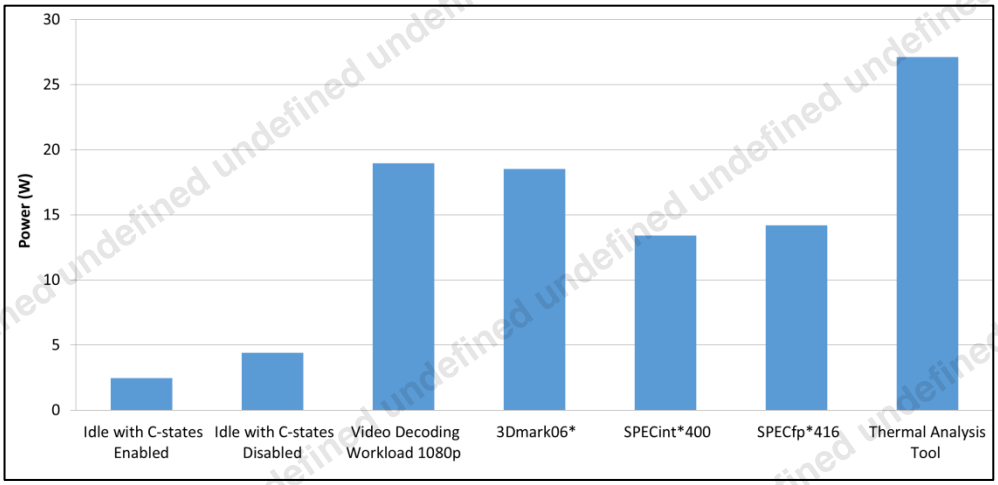


**Table 12. Intel® Pentium® Processor G3320TE Application Power Guidelines**

| Application / Benchmark | Processor Power (W) | Junction Temperature (°C) |
|---|---|---|
| Idle with C-states Enabled | 2.4 | 37 |
| Idle with C-states Disabled | 4.4 | 38 |
| Video Decoding Workload 1080p | 19.0 | 44 |
| 3DMark06* | 18.5 | 45 |
| SPECint* 400 | 13.4 | 44 |
| SPECfp* 416 | 14.2 | 46 |
| Thermal Analysis Tool | 27.1 | 51 |

**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. 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. For more information go to http://www.intel.com/performance.
2. Test Configuration: The results presented are from a single sample. The data was not post-processed to account for part-to-part variation. Intel internal testing as of October 2013.
3. Platform: Intel® Pentium® G3320TE Processor with Intel® Communications Chipset 89xx Series.
4. BIOS Revision: HSWLPTU1.86C.0123.R00.1304212017.
5. Memory: 4x 2 GB 1Rx8 PC3-12800U-11-11-A1 DDR3 DIMMS at 1333 MHz.
6. Operating System: Windows 7* x64 Service Pack 1 and Linux* Ubuntu* 11.10 (kernel 3.10.1-generic).
7. Additional Configuration details are listed in Section 3. Configuration and Disclaimer.

## 2.10 Intel® Celeron® Processor G1820TE Application Power Guidelines

Figure 10 indicates the Application Power Guidelines for various embedded applications for the Intel® Celeron® Processor G1820TE with a 35W TDP specification.

**Figure 10. Intel® Celeron® Processor G1820TE Application Power Guidelines**

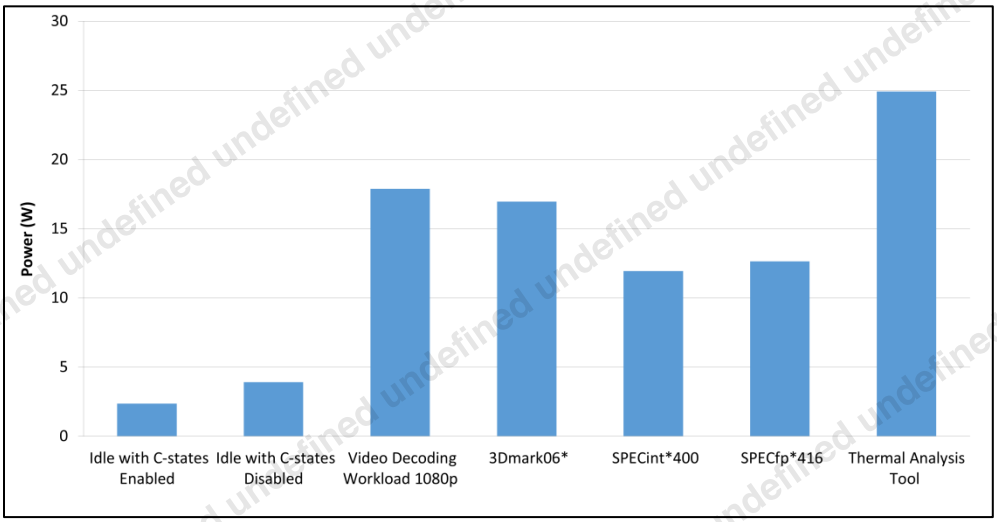


**Table 13. Intel® Celeron® Processor G1820TE Application Power Guidelines**

| Application / Benchmark | Processor Power (W) | Junction Temperature (°C) |
|---|---|---|
| Idle with C-states Enabled | 2.4 | 38 |
| Idle with C-states Disabled | 3.9 | 39 |
| Video Decoding Workload 1080p | 17.9 | 48 |
| 3DMark06* | 17.0 | 45 |
| SPECint* 400 | 11.9 | 41 |
| SPECfp* 416 | 12.6 | 41 |
| Thermal Analysis Tool | 24.9 | 53 |

**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. 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. For more information go to http://www.intel.com/performance.
2. Test Configuration: The results presented are from a single sample. The data was not post-processed to account for part-to-part variation. Intel internal testing as of October 2013.
3. Platform: Intel® Celeron® G1820TE processor with Intel® Communications Chipset 89xx Series.
4. BIOS Revision: HSWLPTU1.86C.0123.R00.1304212017.
5. Memory: 4x 2 GB 1Rx8 PC3-12800U-11-11-A1 DDR3 DIMMS at 1333 MHz.
6. Operating System: Windows 7* x64 Service Pack 1 and Linux* Ubuntu* 11.10 (kernel 3.10.1-generic).
7. Additional Configuration details are listed in Section 3. Configuration and Disclaimer.

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# 3 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. 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.

## 3.1 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:
  - Platform 1: Intel® Xeon® processor E3-1268L v3 with Intel® Communications Chipset 89xx Series
  - Platform 2: Intel® Core™ processor i7-4790S with Intel® Communications Chipset 89xx Series
  - Platform 3: Intel® Core™ processor i7-4770TE with Intel® Communications Chipset 89xx Series
  - Platform 4: Intel® Core™ processor i5-4590S with Intel® Communications Chipset 89xx Series
  - Platform 5: Intel® Core™ processor i5-4590T with Intel® Communications Chipset 89xx Series
  - Platform 6: Intel® Core™ processor i5-4570TE with Intel® Communications Chipset 89xx Series
  - Platform 7: Intel® Core™ processor i3-4340TE with Intel® Communications Chipset 89xx Series
  - Platform 8: Intel® Core™ processor i3-4330TE with Intel® Communications Chipset 89xx Series
  - Platform 9: Intel® Pentium® processor G3320TE with Intel® Communications Chipset 89xx Series
  - Platform 10: Intel® Celeron® processor G1820TE with Intel® Communications Chipset 89xx Series
- Platform 1, 3, 6, 8, 9,10: BIOS Revision HSWLPTU1.86C.0123.R00.1304212017.
- Platform 2, 4, 5, 7: BIOS Revision BDW.E1R1.86C.0046.R00.1310070119.
- Memory for Platform 1, 2, 3, 4, 5, 6, 7, 8: 4x 2 GB 1Rx8 PC3-12800U-11-11-A1 DDR3 DIMMS at 1600 MHz.
- Memory Platform 9, 10: 4x 2 GB 1Rx8 PC3-12800U-11-11-A1 DDR3 DIMMS at 1333 MHz.

- Windows Benchmarks: Video Decode Workload 1080P, 3DMark06*, Thermal Analysis Tool (TAT) (rev. 4.3.2.1262 for Platforms 1, 3 and 6), Thermal Analysis Tool (TAT) (rev. 4.3.2.1293 for Platforms 8, 9 and 10) and Thermal Analysis Tool (TAT) (rev. 4.3.4.1299 for Platforms 2, 4, 5, 7).
- Linux* Ubuntu* Benchmarks: SPEC* CPU2006v1.2 (SPECint* 400.Perlbench, SPECfp* 416.Gamess) with supporting SSE42, AVX, and AVX 2.0 binaries.
- Video Decoding Workload 1080P: Digital Signage CityScape1Min_1080pMP4.mp4 (H264, High@L4, 30 fps, 20 mbps, no CABAC) was used to create a workload where multiple concurrent streams were decoded and displayed to the screen (VC+VO) with the GPU running at or near max dynamic frequency. Platforms 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 ran 24, 29, 23, 29, 29, 25, 26, 26, 25, 25 concurrent streams, respectively.
- The Intel® Turbo Boost Technology for the IA was disabled in the BIOS, and in the Operating System “Balanced” was selected in the Power options under the control panel options. For idle measurement with C-states disabled, the “Power saver” option was selected.
- A mainstream heat sink (DHA-B) with fan was used while running these benchmarks.
- Measurement Tool: Power Profiler 2.0 (National Instrument* USB-6255 DAQ with signal conditioning breakout board).
- The application power guidelines testing was conducted by Intel Corporation.
- For more information, go to http://www.intel.com/performance.

## 3.2 Additional Information

- In case of conflict, the datasheet supersedes this document.
- The temperature values are mean temperatures measured through the duration of the test.
- The APG configuration is 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 microprocessor 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 for purchase. For more information about SPEC CPU2006*, visit www.spec.org/cpu2006/.
- 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.

- 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 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 . Player* is an open source media player.
- The idle power reported above is while displaying the Windows desktop screen.

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