

**ZXTR1005K4**
**100V INPUT, 5V 50mA VOLTAGE REGULATOR**
**Description**

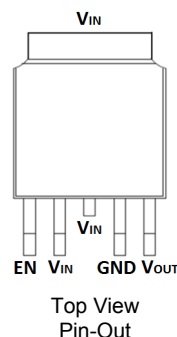
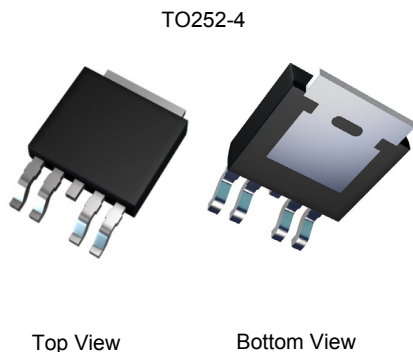
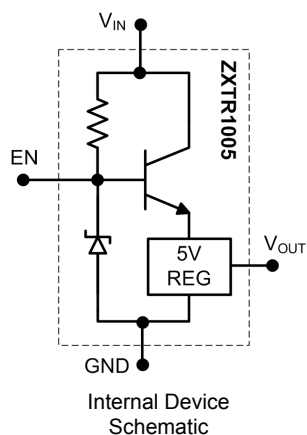
The ZXTR1005K4 is a high voltage regulator with fixed output voltage of  $5V \pm 2\%$  and a 50mA drive capability. It is designed for use in high voltage applications where standard linear regulators cannot be used. This function is fully integrated into a TO252 package, minimizing PCB area and reducing number of components when compared with a multi-chip discrete solution.

The device also features an enable pin which disables the regulator when pulled low.

**Applications**

Supply voltage regulation in:

- Networking
- Telecom
- Power Over Ethernet (PoE)

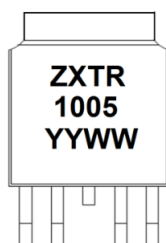


| Pin Name         | Pin Function   |
|------------------|----------------|
| V <sub>IN</sub>  | Input Supply   |
| GND              | Power Ground   |
| V <sub>OUT</sub> | Voltage Output |
| EN               | Enable Output  |

**Ordering Information** (Note 4)

| Product       | Package | Marking   | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|---------------|---------|-----------|--------------------|-----------------|-------------------|
| ZXTR1005K4-13 | TO252-4 | ZXTR 1005 | 13                 | 16              | 2,500             |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**


ZXTR 1005 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 13 = 2013)  
 WW = Week (01-52)

**Absolute Maximum Ratings** (Voltage relative to GND, @T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                              | Symbol                             | Value       | Unit |
|---------------------------------------------|------------------------------------|-------------|------|
| Input Voltage                               | V <sub>IN</sub>                    | -0.3 to 100 | V    |
| Enable Current                              | I <sub>EN</sub>                    | ±1          | mA   |
| Continuous Input & Output Current           | I <sub>IN</sub> , I <sub>OUT</sub> | 100         | mA   |
| Peak Pulsed Input & Output Current          | I <sub>IM</sub> , I <sub>OM</sub>  | 100         | mA   |
| Maximum Voltage applied to V <sub>OUT</sub> | V <sub>OUT(max)</sub>              | 10          | V    |

**Maximum Current** (@ V<sub>IN</sub> = 48V, T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic            | Symbol           | Value | Unit |
|---------------------------|------------------|-------|------|
| Continuous Output Current | I <sub>OUT</sub> | 50    | mA   |
| Pulsed Output Current     | I <sub>OM</sub>  | 100   | mA   |
|                           |                  | 100   | mA   |

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

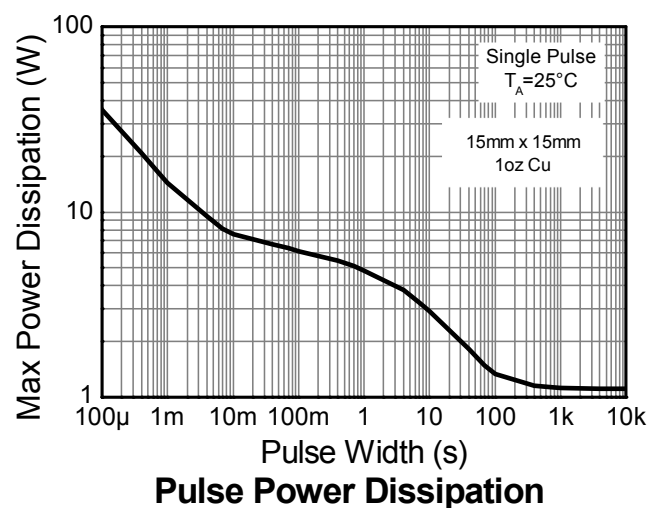
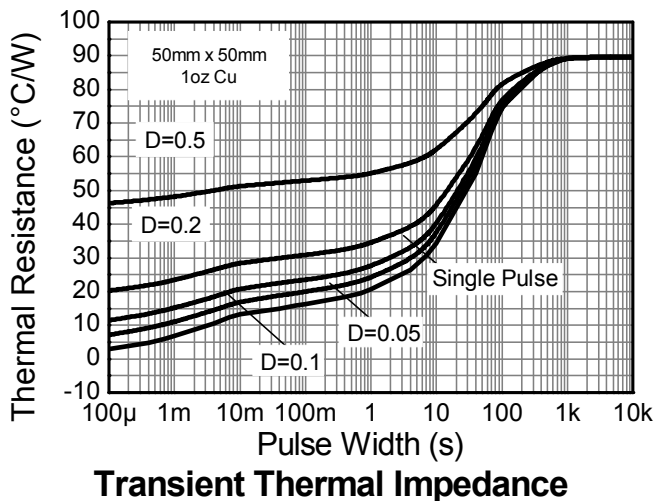
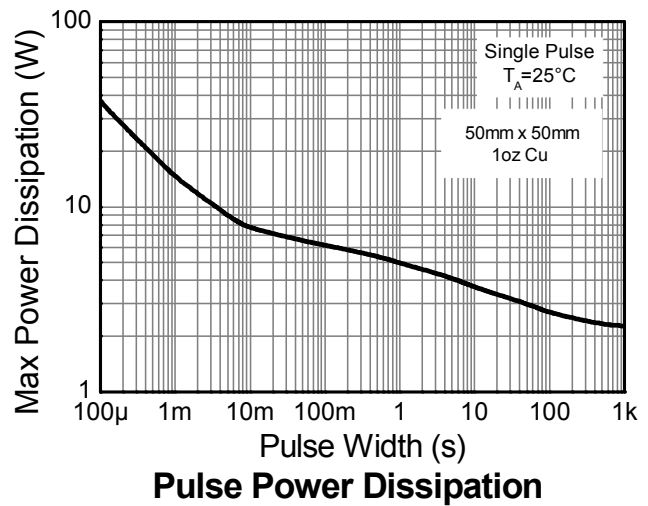
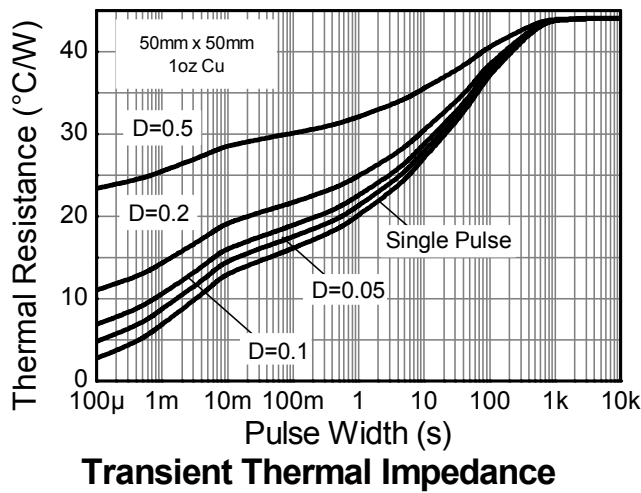
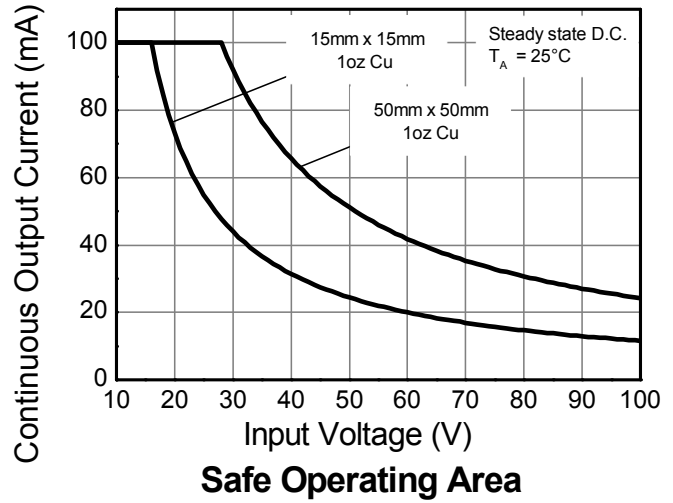
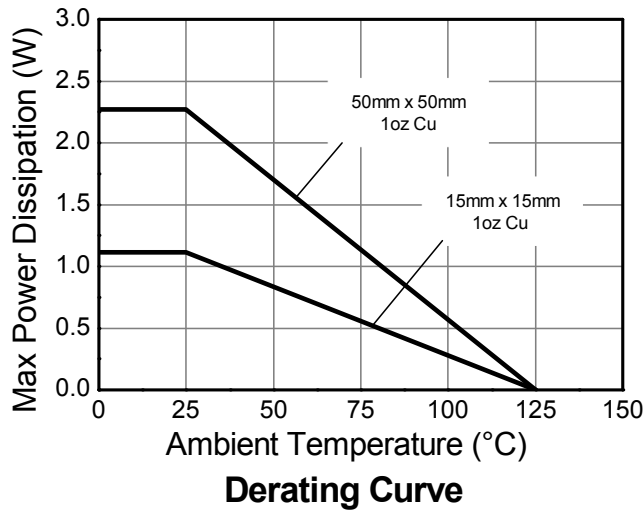
| Characteristic                               | Symbol           | Value       | Unit |
|----------------------------------------------|------------------|-------------|------|
| Power Dissipation                            | P <sub>D</sub>   | 2.3         | W    |
|                                              |                  | 1.1         | W    |
| Thermal Resistance, Junction to Ambient      | R <sub>θJA</sub> | 44          | °C/W |
|                                              |                  | 90          | °C/W |
| Thermal Resistance, Junction to Lead         | R <sub>θJL</sub> | 8.39        | °C/W |
| Thermal Resistance, Junction to Case         | R <sub>θJC</sub> | 8.15        | °C/W |
| Maximum Operating Junction Temperature Range | T <sub>J</sub>   | -55 to +125 | °C   |
| Storage Temperature Range                    | T <sub>STG</sub> | -65 to +150 | °C   |

**ESD Ratings** (Note 11)

| Characteristics                            | Symbols | Value | Unit | JEDEC Class |
|--------------------------------------------|---------|-------|------|-------------|
| Electrostatic Discharge – Human Body Model | ESD HBM | 4,000 | V    | 3A          |
| Electrostatic Discharge – Machine Model    | ESD MM  | 400   | V    | C           |

- Notes:
- For a device mounted with the exposed V<sub>IN</sub> pad on 50mm x 50mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
  - Same as note 5, except mounted on 15mm x 15mm 1oz copper.
  - Same as note 5, whilst operating at V<sub>IN</sub>=48V this is thermally limited. Refer to Safe Operating Area for other Input Voltages.
  - Same as note 5, except measured with a single pulse width = 100µs and V<sub>IN</sub>=48V. This is limited by the absolute maximum I<sub>OM</sub> rating.
  - Same as note 5, except measured with a single pulse width = 10ms and V<sub>IN</sub>=48V. This is limited by the absolute maximum I<sub>OM</sub> rating.
  - R<sub>θJL</sub> = Thermal resistance from junction to solder-point (on the exposed V<sub>IN</sub> pad).
  - R<sub>θJC</sub> = Thermal resistance from junction to the top of case.
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

## Thermal Characteristics and Derating Information



**Electrical Characteristics** (Voltage relative to GND, @T<sub>A</sub> = +25°C, unless otherwise specified.)

Enable Output with EN = OPEN (i.e. -100nA < I<sub>EN</sub> < 100nA)

| Characteristic                                                      | Symbol                              | Min | Typ        | Max        | Unit  | Test Condition                                                                                                       |
|---------------------------------------------------------------------|-------------------------------------|-----|------------|------------|-------|----------------------------------------------------------------------------------------------------------------------|
| Output Voltage (Note 12)                                            | V <sub>OUT</sub>                    | 4.9 | 5.0        | 5.1        | V     | V <sub>IN</sub> = 48V, I <sub>OUT</sub> = 15mA                                                                       |
| Line Regulation (Note 12 & 13)                                      | ΔV <sub>OUT</sub>                   | -10 | 2          | 10         | mV    | V <sub>IN</sub> = 10 to 100V, I <sub>OUT</sub> = 15mA                                                                |
| Average Temperature Coefficient                                     | ΔV <sub>OUT</sub> /ΔT               | —   | 0.44       | 0.7        | mV/°C | T <sub>J</sub> = -55°C to +125°C<br>V <sub>IN</sub> = 48V, I <sub>OUT</sub> = 15mA                                   |
| Load Regulation (Note 12 & 14)                                      | ΔV <sub>OUT</sub>                   | —   | 20         | 50         | mV    | I <sub>OUT</sub> = 0.1 to 50mA, V <sub>IN</sub> = 48V                                                                |
| Minimum Value of Input Voltage Required to Maintain Line Regulation | V <sub>IN(MIN)</sub>                | 10  | —          | —          | V     | —                                                                                                                    |
| Power Supply Rejection Ratio                                        | ΔV <sub>IN</sub> /ΔV <sub>OUT</sub> | —   | 57         | —          | dB    | C <sub>OUT</sub> = 100nF, I <sub>OUT</sub> = 15mA,<br>V <sub>OUT</sub> = 5V, V <sub>IN</sub> = 10 to 100V, f = 100Hz |
| <b>Toggle Output On/Off</b>                                         |                                     |     |            |            |       |                                                                                                                      |
| Enable Output                                                       | V <sub>OUT</sub>                    | 4.9 | 5.0        | 5.1        | V     | EN = OPEN, -100nA < I <sub>EN</sub> < 100nA,<br>V <sub>IN</sub> = 48V, I <sub>OUT</sub> = 15mA                       |
| Disable Output                                                      | V <sub>OUT</sub>                    | —   | 0          | 1          | V     | EN = GND, -0.3V < V <sub>EN</sub> < 1V,<br>V <sub>IN</sub> = 48V, I <sub>OUT</sub> = 100nA                           |
| Quiescent Current (Note 12) with Enable Output                      | I <sub>Q</sub>                      | —   | 300<br>650 | 500<br>900 | μA    | EN = OPEN, V <sub>IN</sub> = 48V<br>EN = OPEN, V <sub>IN</sub> = 100V                                                |
| Quiescent Current (Note 12) with Disable Output                     | I <sub>Q</sub>                      | —   | 300<br>650 | 500<br>900 | μA    | EN = GND, V <sub>IN</sub> = 48V<br>EN = GND, V <sub>IN</sub> = 100V                                                  |

Notes: 12. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

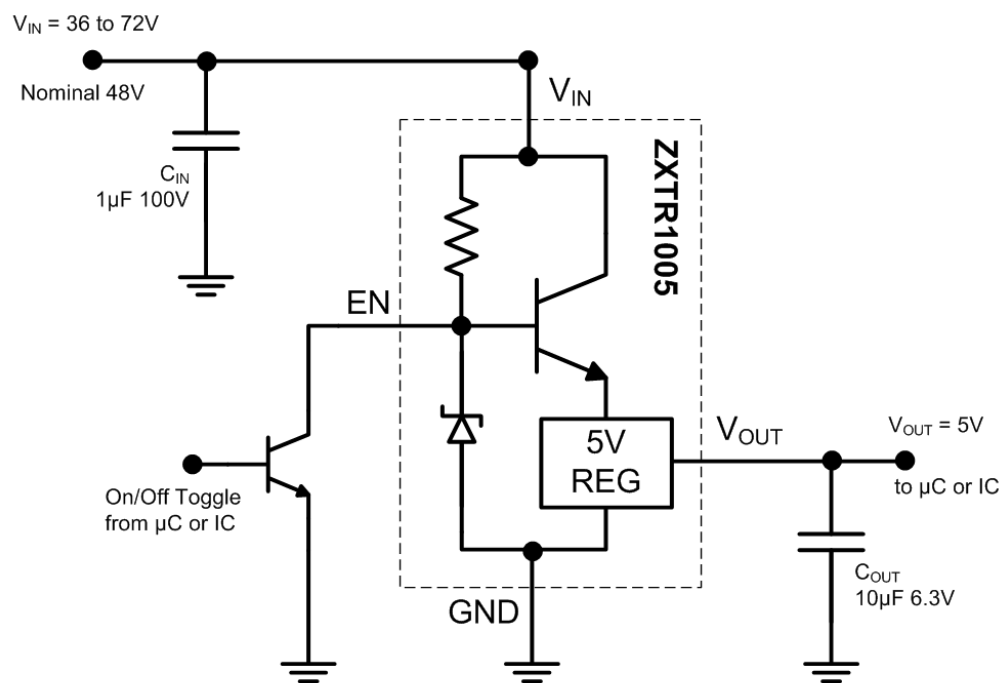
13. Line regulation ΔV<sub>OUT</sub> = V<sub>OUT</sub>(@ V<sub>IN</sub> = 100V) – V<sub>OUT</sub>(@ V<sub>IN</sub> = 10V)

14. Load regulation ΔV<sub>OUT</sub> = V<sub>OUT</sub>(@ I<sub>OUT</sub> = 50mA) – V<sub>OUT</sub>(@ I<sub>OUT</sub> = 0mA)

**Pin Functions**

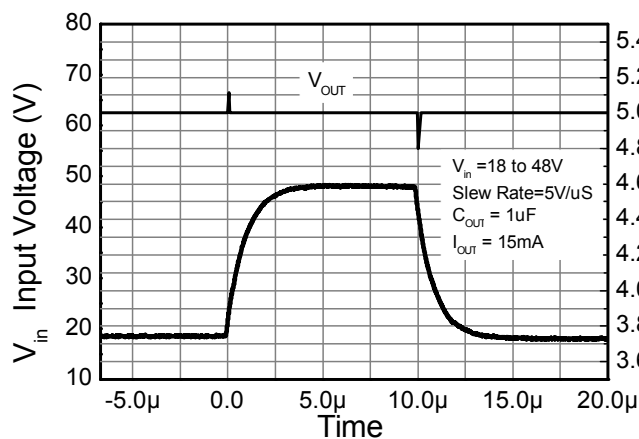
| Pin Name         | Pin Function   | Notes                                                                                                                                                                                                                                         |                                                                   |
|------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| V <sub>IN</sub>  | Input Supply   | To maintain output regulation the input voltage can vary from 10 to 100V with respect to the GND pin. It is recommended to connect a 1μF capacitor to GND.                                                                                    |                                                                   |
| GND              | Power Ground   | This pin should be tied to the system ground.                                                                                                                                                                                                 |                                                                   |
| V <sub>OUT</sub> | Voltage Output | Outputs a regulated 5V when drawing between 0.1 to 50mA current. It is recommended to connect a ≥100nF capacitor to GND to minimize the noise on the regulated output. The pin can be pulled high to a maximum of 10V with respect to ground. |                                                                   |
| EN               | Enable Output  | <b>Output Always On</b><br><br>When the output state is required to be permanently on, then the EN pin should be left floating in an OPEN state.                                                                                              | EN pin = Do not connect                                           |
|                  |                | <b>Toggle Output On/Off</b><br><br>Toggle the regulator's output state between on (5V) and off (0V).                                                                                                                                          |                                                                   |
|                  |                | <b>Enable Output</b><br>Leave the EN pin floating in an OPEN state.                                                                                                                                                                           | <b>Enable Output</b><br>EN pin = -100nA < I <sub>EN</sub> < 100nA |
|                  |                | <b>Disable Output</b><br>Pull the EN pin to GND in a SHORT state.<br><br>For example, see the Typical Application Circuit showing a transistor toggling the EN pin.                                                                           | <b>Disable Output</b><br>EN pin = -0.3V < V <sub>EN</sub> < 1V    |

## Typical Application Circuit

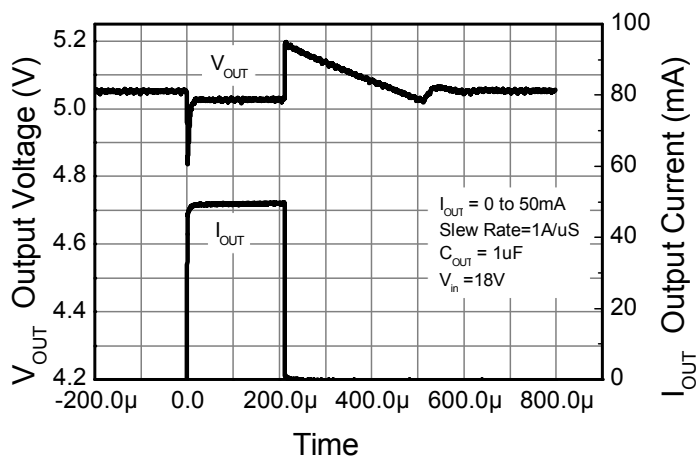


Example of a 5V regulated supply from a nominal 48V for powering a Controller IC.

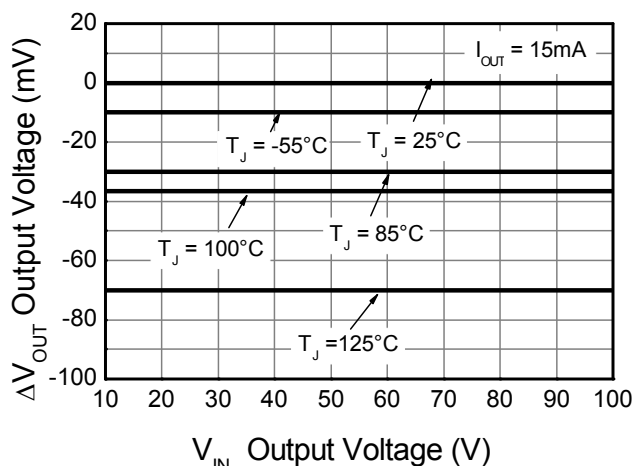
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



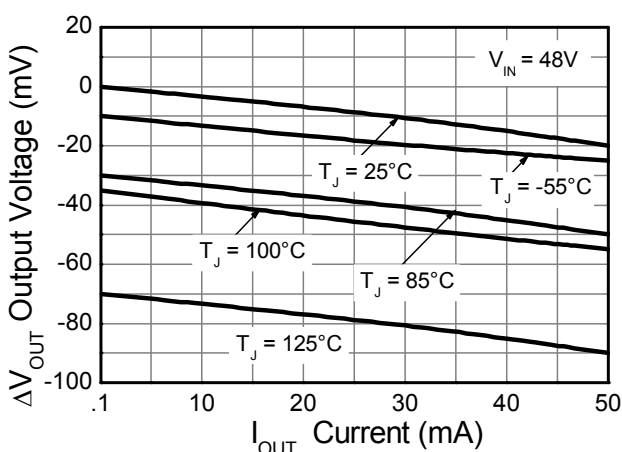
**Line transient response**



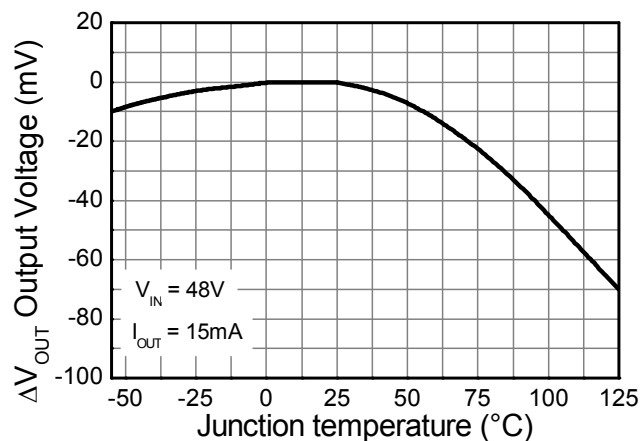
**Load transient response**



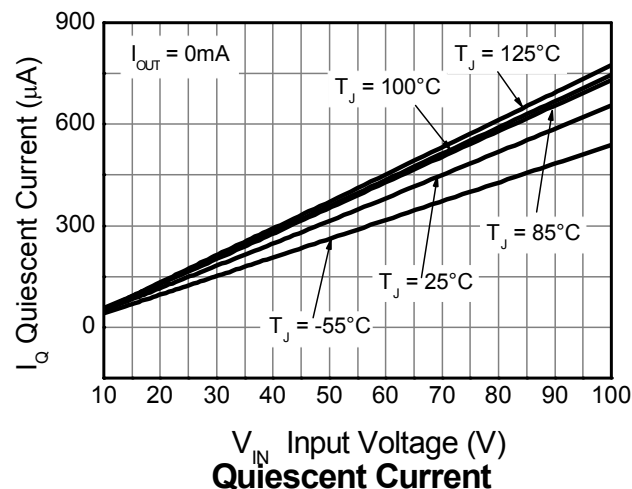
**Line Regulation (Note 15)**



**Load Regulation (Note 16)**



**Temperature Coefficient (Note 17)**

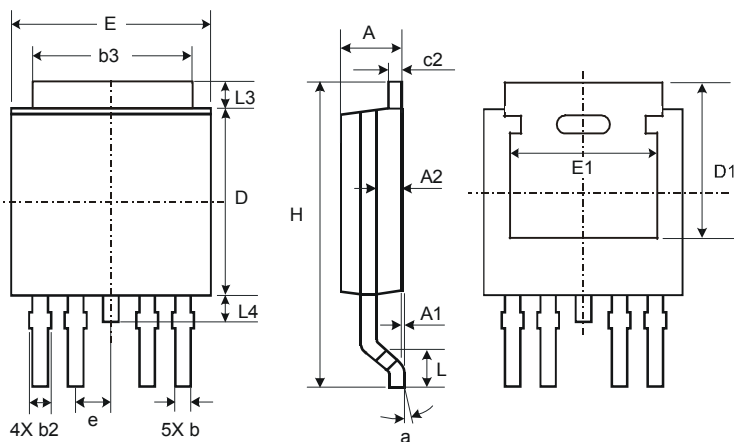


**Quiescent Current**

- Notes:
- 15. Line regulation  $\Delta V_{OUT} = V_{OUT} - V_{OUT}(@ V_{IN} = 10\text{V}, I_{OUT} = 15\text{mA}, T_J = +25^\circ\text{C})$
  - 16. Load regulation  $\Delta V_{OUT} = V_{OUT} - V_{OUT}(@ V_{IN} = 48\text{V}, I_{OUT} = 0\text{A}, T_J = +25^\circ\text{C})$
  - 17. Temperature Coefficient  $\Delta V_{OUT} = V_{OUT} - V_{OUT}(@ V_{IN} = 48\text{V}, I_{OUT} = 30\text{mA}, T_J = +25^\circ\text{C})$

## Package Outline Dimensions

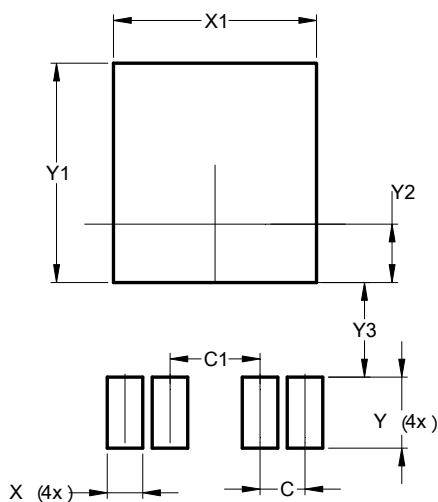
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| TO252-4              |      |       |       |
|----------------------|------|-------|-------|
| Dim                  | Min  | Max   | Typ   |
| A                    | 2.19 | 2.39  | 2.29  |
| A1                   | 0.00 | 0.13  | 0.08  |
| A2                   | 0.97 | 1.17  | 1.07  |
| b                    | 0.51 | 0.71  | 0.583 |
| b2                   | 0.61 | 0.79  | 0.70  |
| b3                   | 5.21 | 5.46  | 5.33  |
| c2                   | 0.45 | 0.58  | 0.531 |
| D                    | 6.00 | 6.20  | 6.10  |
| D1                   | 5.21 | -     | -     |
| e                    | -    | -     | 1.27  |
| E                    | 6.45 | 6.70  | 6.58  |
| E1                   | 4.32 | -     | -     |
| H                    | 9.40 | 10.41 | 9.91  |
| L                    | 1.40 | 1.78  | 1.59  |
| L3                   | 0.88 | 1.27  | 1.08  |
| L4                   | 0.64 | 1.02  | 0.83  |
| a                    | 0°   | 10°   | -     |
| All Dimensions in mm |      |       |       |

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| c          | 1.27          |
| c1         | 2.54          |
| X          | 1.00          |
| X1         | 5.73          |
| Y          | 2.00          |
| Y1         | 6.17          |
| Y2         | 1.64          |
| Y3         | 2.66          |

**IMPORTANT NOTICE**

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

**LIFE SUPPORT**

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2014, Diodes Incorporated

[www.diodes.com](http://www.diodes.com)



## Данный компонент на территории Российской Федерации

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

moschip.ru\_9