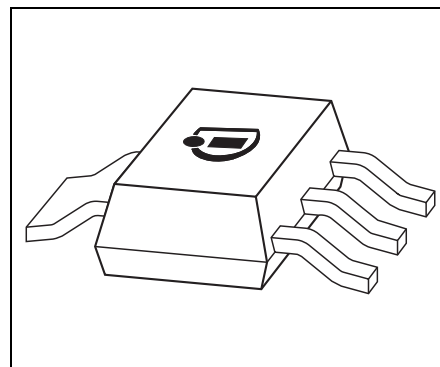




Features

- Fixed output voltage 5.0 V or 3.3 V
- Output voltage tolerance $\leq \pm 2\%$, $\pm 3\%$
- 150 mA current capability
- Very low current consumption
- Low-drop voltage
- Overtemperature protection
- Reverse polarity proof
- Wide temperature range
- Suitable for use in automotive electronics
- Inhibit
- Green Product (RoHS compliant)
- AEC Qualified



Functional Description

The TLE 4266-2 is a monolithic integrated low-drop fixed voltage regulator which can supply loads up to 150 mA. It can be switched on and off by the $\overline{\text{INH}}$ pin. It is functional compatible to the TLE 4266, but with a reduced quiescent current of $\ll 1 \mu\text{A}$ in OFF mode and $40 \mu\text{A}$ in ON mode. The TLE 4266-2 is especially designed for all applications that require very low quiescent current in ON and OFF mode. The device is available in the small surface mounted PG-SOT223-4 package. It is pin compatible to the TLE 4266 G. It is designed to supply microprocessor systems under the severe condition of automotive applications and therefore it is equipped with additional protection against over load, short circuit and overtemperature. Of course the TLE 4266-2 can be used in other applications, where a stabilized voltage and the inhibit feature is required.

And input voltage V_i up to 45 V is regulated to $V_o = 5 \text{ V}$ (TLE 4266-2 G) or $V_o = 3.3 \text{ V}$ (TLE 4266-2 GSV33) with an accuracy of $\pm 3\%$. For the 5 V device an accuracy of $\pm 2\%$ is kept for a load current range up to 50 mA.

The device operates in the temperature range of $T_j = -40$ to 150°C . A High level at the $\overline{\text{INH}}$ pin switches the regulator on.

| Type | Package |
|------------------|-------------|
| TLE 4266-2 G | PG-SOT223-4 |
| TLE 4266-2 GSV33 | PG-SOT223-4 |

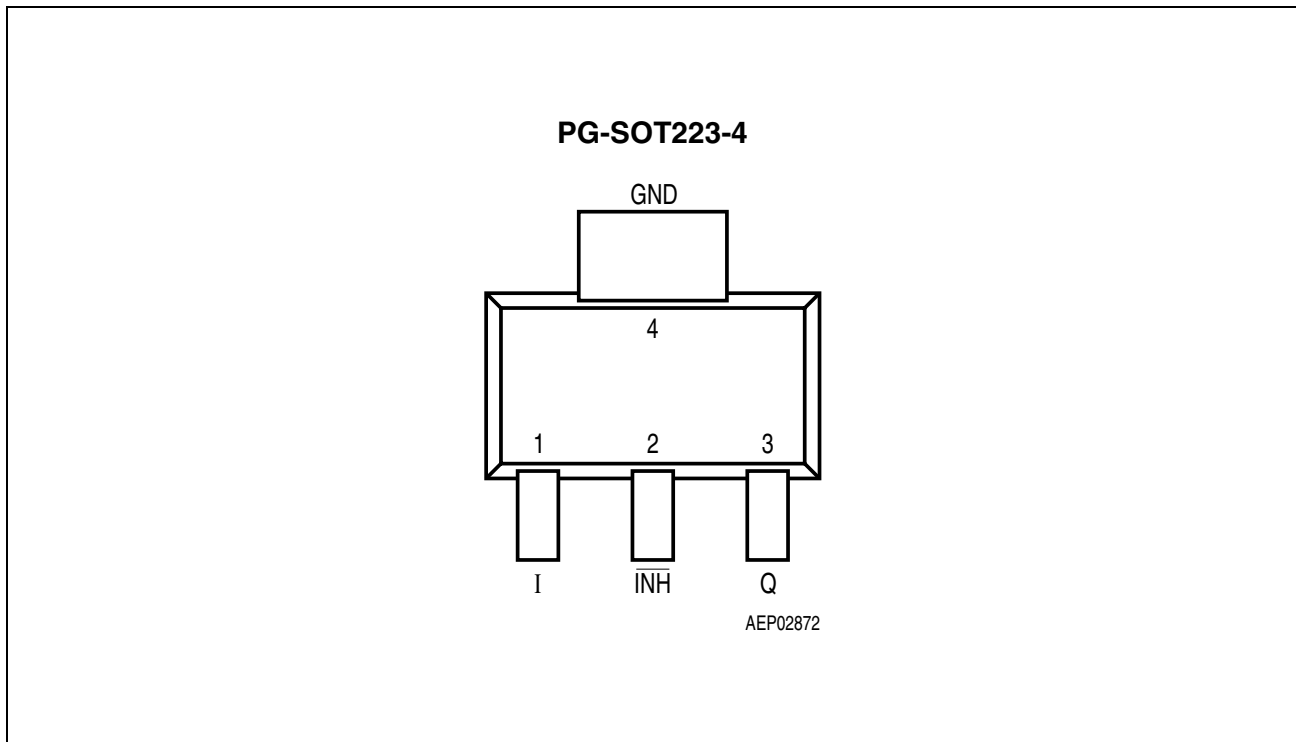


Figure 1 Pin Configuration (top view)

Table 1 Pin Definitions and Functions TLE 4266-2 G, TLE 4266-2 GSV33

| Pin | Symbol | Function |
|-----|-------------------------|---|
| 1 | I | Input voltage ; block to ground directly at the IC with a ceramic capacitor. |
| 2 | $\overline{\text{INH}}$ | Inhibit input ; high level turns IC on, integrated pull-down resistor. |
| 3 | Q | Output voltage ; block to ground with a capacitor $C_Q \geq 10 \mu\text{F}$, $\text{ESR} \leq 4 \Omega$ |
| 4 | GND | Ground |

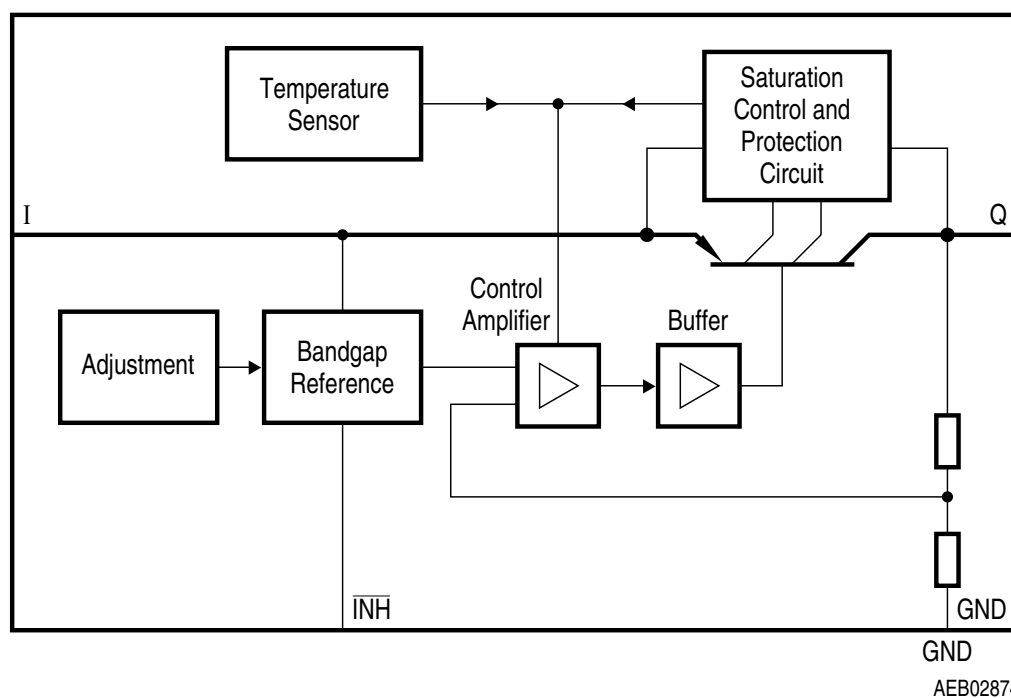


Figure 2 **Block Diagram**

Table 2 Absolute Maximum Ratings
 $T_j = -40 \text{ to } 150 \text{ }^{\circ}\text{C}$

| Parameter | Symbol | Limit Values | | Unit | Notes |
|---------------------------------|-----------------------------|--------------|------|------|---------------------------|
| | | Min. | Max. | | |
| Input I | | | | | |
| Voltage | V_I | -42 | 45 | V | – |
| Current | I_I | – | – | – | internally limited |
| Inhibit $\overline{\text{INH}}$ | | | | | |
| Voltage | $V_{\overline{\text{INH}}}$ | -42 | 45 | V | – |
| Output Q | | | | | |
| Voltage | V_Q | -0.3 | 32 | V | – |
| Current | I_Q | – | – | – | internally limited |
| GND | | | | | |
| Current | I_{GND} | 50 | – | mA | – |
| Temperature | | | | | |
| Junction temperature | T_j | – | 150 | °C | – |
| Storage temperature | T_S | -50 | 150 | °C | – |
| Thermal Resistance | | | | | |
| Junction ambient | $R_{\text{thj-a}}$ | – | 81 | K/W | PG-SOT223-4 ¹⁾ |
| Junction case | $R_{\text{thj-pin4}}$ | – | 18 | K/W | PG-SOT223-4 |
| Operating Range | | | | | |
| Input voltage | V_I | 5.5 | 45 | V | TLE 4266-2 G |
| | | 4.4 | 45 | V | TLE 4266-2 GSV33 |
| Junction temperature | T_j | -40 | 150 | °C | – |

1) Worst case, regarding peak temperature; zero airflow; mounted on a PCB $80 \times 80 \times 1.5 \text{ mm}^3$, heat sink area 300 mm^2 .

Table 3 Characteristics
 $V_I = 13.5 \text{ V}; V_{\text{INH}} = 5 \text{ V}; -40 \text{ }^{\circ}\text{C} \leq T_j \leq 125 \text{ }^{\circ}\text{C}$ unless otherwise specified

| Parameter | Symbol | Limit Values | | | Unit | Test Condition |
|--|-----------------|--------------|------|------|---------------|---|
| | | Min. | Typ. | Max. | | |
| Output voltage | V_Q | 4.85 | 5.0 | 5.15 | V | TLE 4266-2 G; $5 \text{ mA} \leq I_Q \leq 100 \text{ mA};$ $6 \text{ V} \leq V_I \leq 21 \text{ V}$ |
| | | 4.9 | 5.0 | 5.1 | V | TLE 4266-2 G; $5 \text{ mA} \leq I_Q \leq 50 \text{ mA};$ $9 \text{ V} \leq V_I \leq 16 \text{ V}$ |
| Output voltage | V_Q | 3.20 | 3.30 | 3.40 | V | TLE 4266-2 GSV33; $5 \text{ mA} \leq I_Q \leq 100 \text{ mA};$ $6 \text{ V} \leq V_I \leq 21 \text{ V}$ |
| Output-current limitation | I_Q | 150 | 200 | 500 | mA | – |
| Current consumption $I_q = I_I - I_Q$ | I_q | – | 0 | 1 | μA | $V_{\text{INH}} = 0 \text{ V}; T_j \leq 100 \text{ }^{\circ}\text{C}$ |
| Current consumption $I_q = I_I - I_Q$ | I_q | – | 40 | 60 | μA | $I_Q = 100 \text{ } \mu\text{A};$ $T_j \leq 85 \text{ }^{\circ}\text{C}$ |
| | | – | 40 | 70 | μA | $I_Q = 100 \text{ } \mu\text{A}$ |
| Current consumption $I_q = I_I - I_Q$ | I_q | – | 1.7 | 4 | mA | $I_Q = 50 \text{ mA}$ |
| Drop voltage | V_{Dr} | – | 0.25 | 0.5 | V | TLE 4266-2 G; $I_Q = 100 \text{ mA}^{1)}$ |
| Drop voltage | V_{Dr} | – | 1.00 | 1.10 | V | TLE 4266-2 GSV33; $I_Q = 100 \text{ mA}^{2)}$ |
| Load regulation | ΔV_Q | – | 50 | 90 | mV | TLE 4266-2 G; $I_Q = 1 \text{ to } 100 \text{ mA};$ $V_I = 6 \text{ V}$ |
| Load regulation | ΔV_Q | – | 35 | 60 | mV | TLE 4266-2 GSV33; $I_Q = 1 \text{ to } 100 \text{ mA};$ $V_I = 6 \text{ V}$ |
| Line regulation | ΔV_Q | – | 5 | 30 | mV | TLE 4266-2 G; $V_I = 6 \text{ V to } 28 \text{ V};$ $I_Q = 1 \text{ mA}$ |
| Line regulation | ΔV_Q | – | 4 | 20 | mV | TLE 4266-2 GSV33; $V_I = 6 \text{ V to } 28 \text{ V};$ $I_Q = 1 \text{ mA}$ |

Table 3 Characteristics (cont'd)
 $V_I = 13.5 \text{ V}; V_{\text{INH}} = 5 \text{ V}; -40 \text{ }^\circ\text{C} \leq T_j \leq 125 \text{ }^\circ\text{C}$ unless otherwise specified

| Parameter | Symbol | Limit Values | | | Unit | Test Condition |
|-------------------------------|--------|--------------|------|------|---------------|--|
| | | Min. | Typ. | Max. | | |
| Power Supply Ripple Rejection | $PSRR$ | – | 68 | – | dB | $f_r = 100 \text{ Hz};$ $V_r = 0.5 \text{ Vpp}$ |
| Output Capacitor | C_Q | 10 | – | – | μF | $\text{ESR} \leq 4 \text{ } \Omega \text{ at } 10 \text{ kHz}$ |

Inhibit

| | | | | | | |
|---------------------|-----------------------|-----|-----|-----|---------------|--------------------------------|
| Inhibit on voltage | $V_{\text{INH, on}}$ | 3.5 | – | – | V | – |
| Inhibit off voltage | $V_{\text{INH, off}}$ | – | – | 0.8 | V | – |
| Inhibit current | I_{INH} | – | 4 | 8 | μA | $V_{\text{INH}} = 5 \text{ V}$ |
| Pull-down resistor | R_{INH} | – | 1.0 | – | M Ω | see I_{INH} |

- 1) Drop voltage = $V_I - V_Q$ (measured when the output voltage V_Q has dropped 100 mV from the nominal value obtained at $V_I = 13.5 \text{ V}$).
- 2) Drop voltage = $V_I - V_Q$ (measured when the output voltage V_Q has dropped 100 mV from the nominal value obtained at $V_I = 13.5 \text{ V}$).

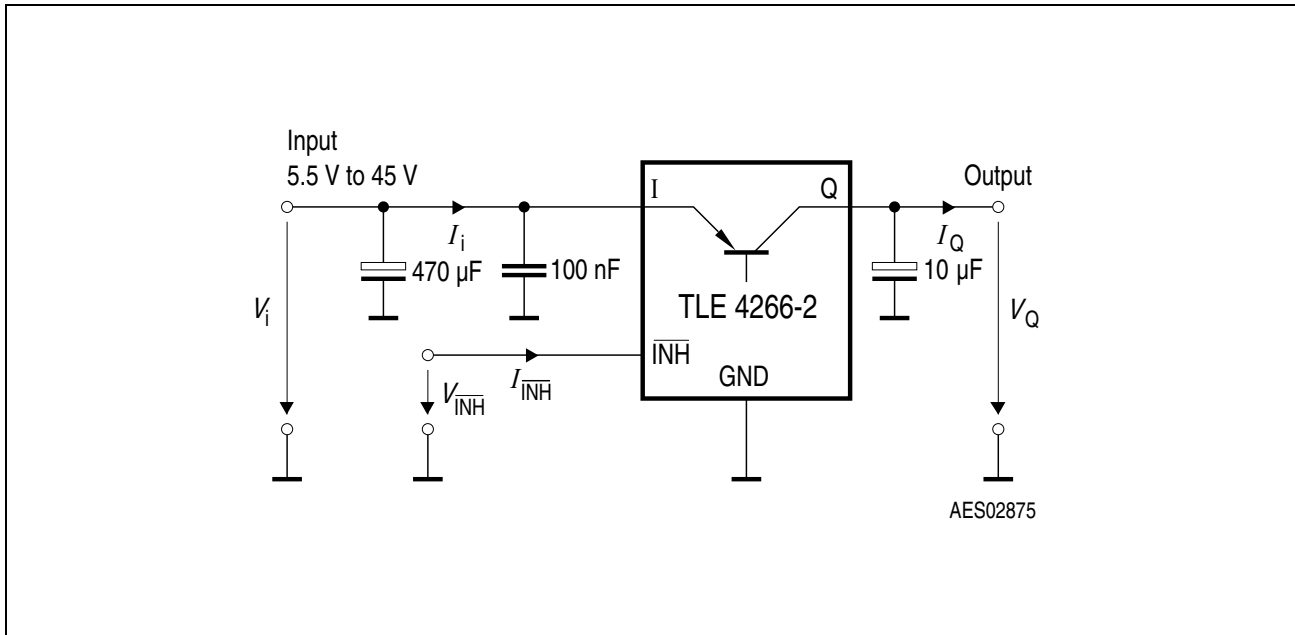


Figure 3 Measuring Circuit

Circuit Description and Application Information

In the TLE 4266-2 the output voltage is divided and compared to an internal reference of 2.5 V typical. The regulation loop controls the output to achieve an output voltage of 5 V with an accuracy of $\pm 2\%$ at an input voltage up to 45 V. The minimum required input voltage is $V_Q + V_{dr}$ with a drop voltage V_{dr} of max. 0.5 V (see [“Typical Performance Characteristics” on Page 8](#)) in case of the TLE 4266-2 G. The TLE 4266-2 GSV33 requires a minimum input voltage of 4.4 V.

The TLE 4266-2 can supply up to 150 mA. However for protection reasons at high input voltage above 25 V, the maximum output current is reduced (SOA protection).

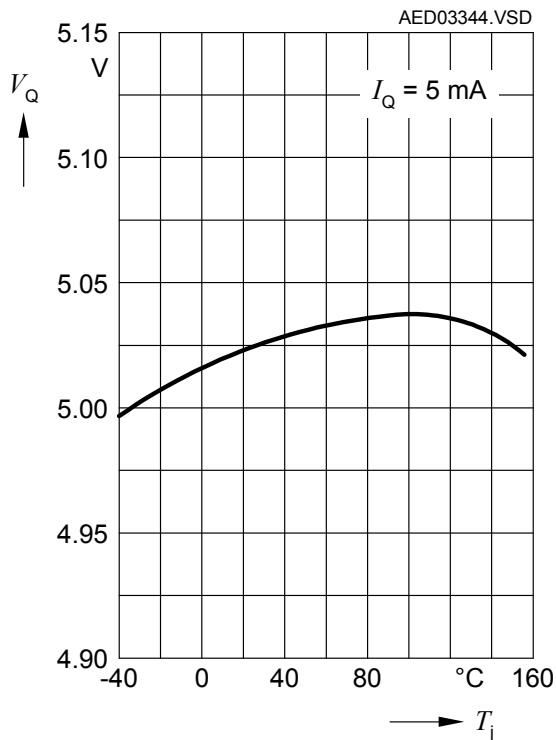
Figure 3 shows a typical measuring circuit. For stability of the control loop the TLE 4266-2 output requires an output capacitor C_Q of at least 10 µF with a maximum permissible ESR of 4 Ω. Tantalum as well as multi layer ceramic capacitors are suitable.

At the input of the regulator an input capacitor is necessary for compensating line influences (100 nF ceramic capacitor recommended). A resistor of approx. 1 Ω in series with C_i , can damp any oscillation occurring due the input inductivity and the input capacitor. In the measuring circuit shown in **Figure 3** an additional electrolytic input capacitor of 470 µF is added in order to buffer supply line influences. This capacitor is recommended, if the device is sourced via long supply lines of several meters.

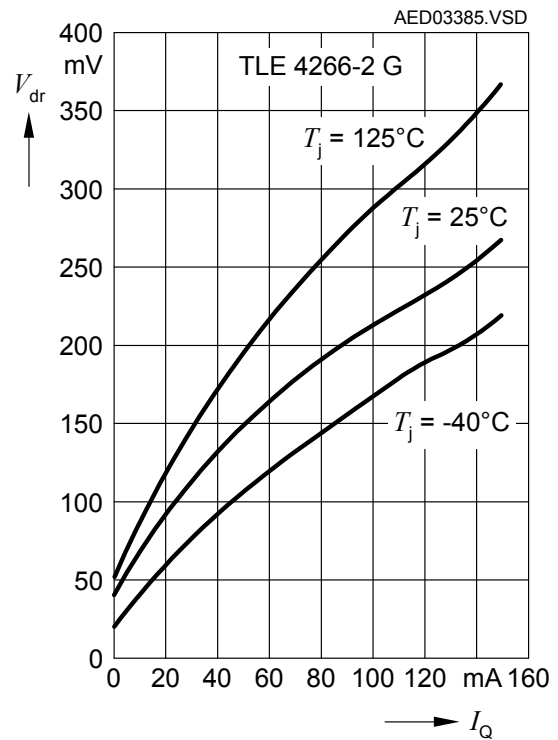
The TLE 4266-2 includes the Inhibit function. For a voltage above 3.5 V at the $\overline{\text{INH}}$ pin the regulator is switched on.

Typical Performance Characteristics

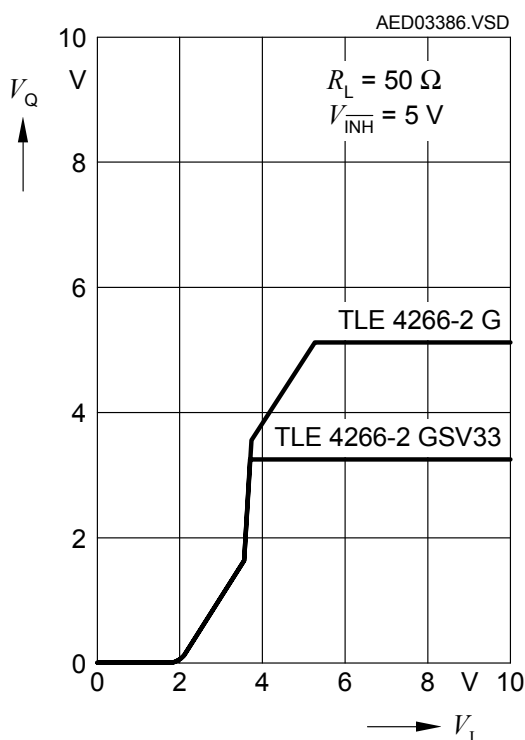
Output Voltage V_Q versus
Junction Temperature T_j



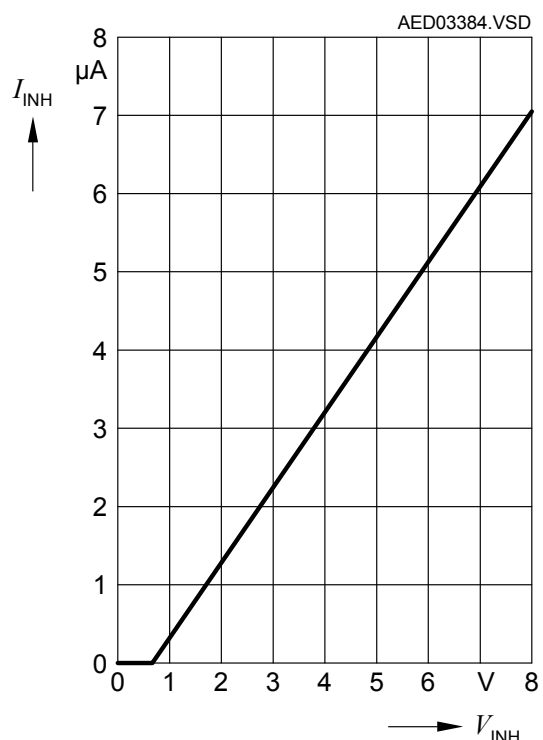
Drop Voltage V_{dr} versus
Output Current I_Q (TLE 4266-2 G)



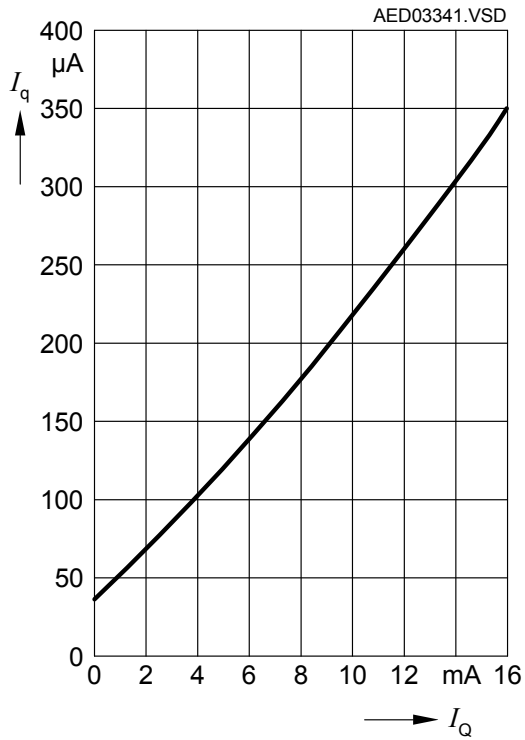
Output Voltage V_Q versus
Input Voltage V_I



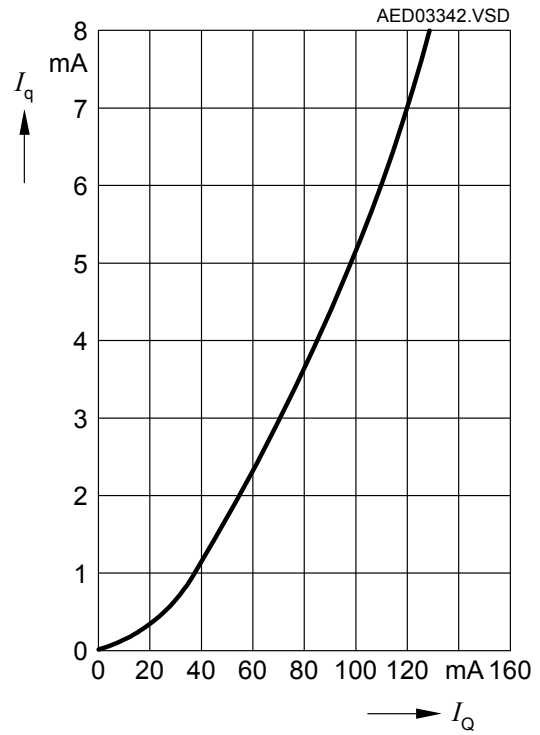
Inhibit Current I_{INH} versus
Inhibit Voltage V_{INH}



Current Consumption I_q versus Output Current I_Q



Current Consumption I_q versus Output Current I_Q



Package Outlines

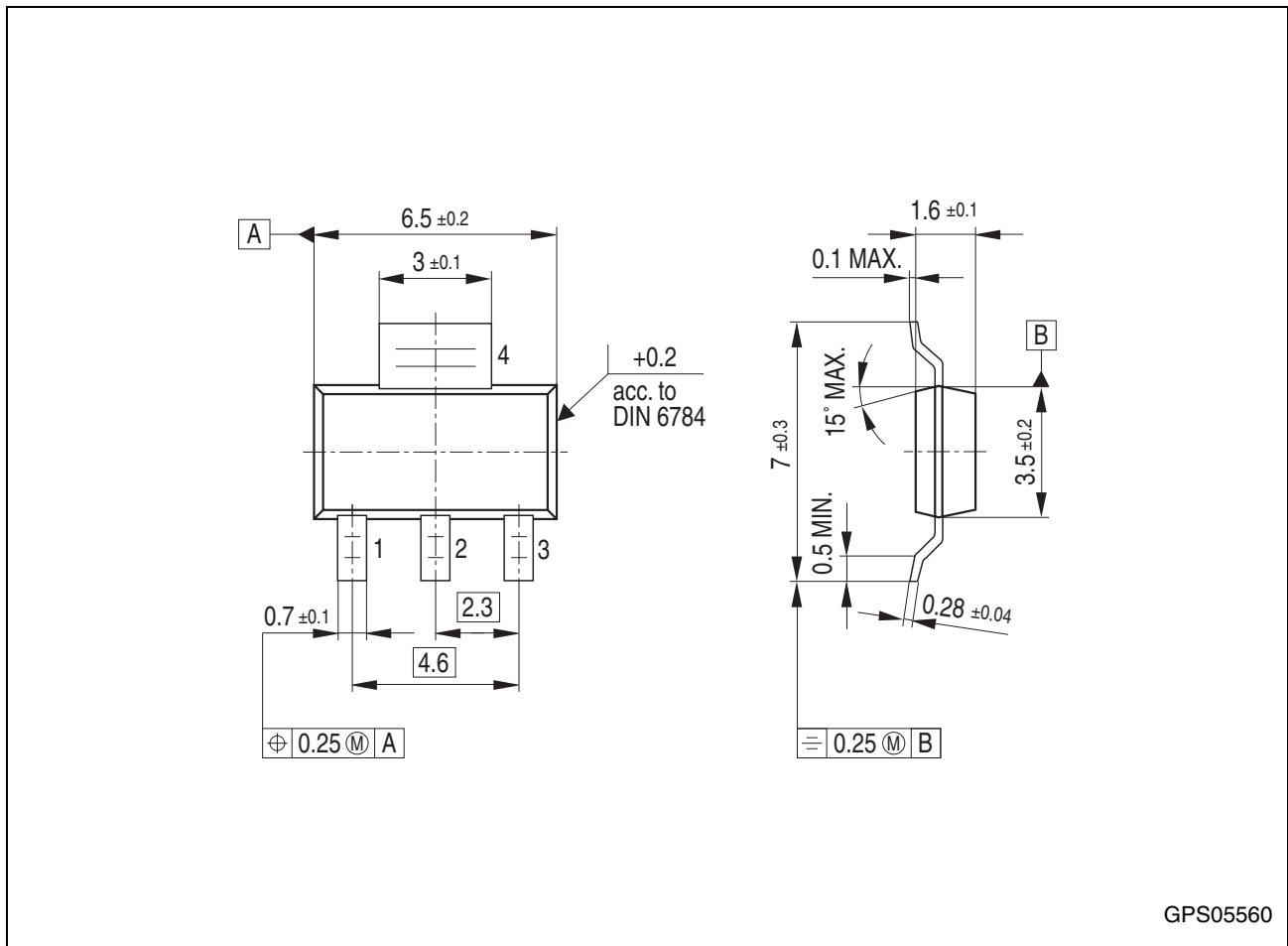


Figure 4 PG-SOT223-4 (Plastic Small Outline Transistor)

Green Product (RoHS compliant)

To meet the world-wide customer requirements for environmentally friendly products and to be compliant with government regulations the device is available as a green product. Green products are RoHS-Compliant (i.e Pb-free finish on leads and suitable for Pb-free soldering according to IPC/JEDEC J-STD-020).

You can find all of our packages, sorts of packing and others in our Infineon Internet Page "Products": <http://www.infineon.com/products>.

SMD = Surface Mounted Device

Dimensions in mm

Revision History

| Version | Date | Changes |
|----------|------------|---|
| Rev. 1.4 | 2008-03-10 | Simplified package name to PG-SOT223-4. No modification of released product. |
| Rev. 1.3 | 2007-03-20 | Initial version of RoHS-compliant derivate of TLE 4266-2 Page 1 : AEC certified statement added Page 1 and Page 10 : RoHS compliance statement and Green product feature added Page 1 and Page 10 : Package changed to RoHS compliant version Legal Disclaimer updated |

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