

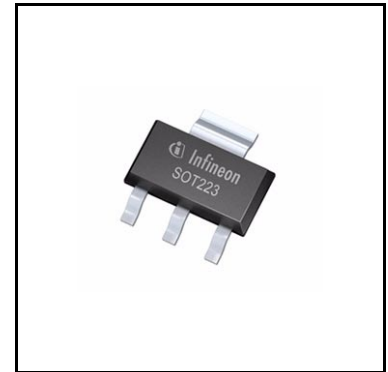
# OPTIREG™ Linear TLE4266G

## 5 V/10 V low drop voltage regulator



### Features

- Output voltage 5 V or 10 V
- Output voltage tolerance  $\leq \pm 2\%$
- 120 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)



### Potential applications

General automotive applications.

### Product validation

Qualified for automotive applications. Product validation according to AEC-Q100/101.

### Description

The OPTIREG™ Linear TLE4266G is a low-drop voltage regulator for 5 V or 10 V supply in a PG-SOT223-4 SMD package. The IC regulates an input voltage  $V_I$  in the range of  $5.5\text{ V}/10.5\text{ V} < V_I < 45\text{ V}$  to  $V_{Q,nom} = 5\text{ V}/10\text{ V}$ . The maximum output current is more than 120 mA. The IC can be switched off via the inhibit input, which causes the current consumption to drop below 10  $\mu\text{A}$ . The IC is shortcircuit-proof and incorporates a temperature protection which turns off the IC at overtemperature.

### Choosing external components

The input capacitor  $C_I$  is necessary for compensating line influences. Using a resistor of approx. 1  $\Omega$  in series with  $C_I$ , the oscillating of input line inductivity and input capacitance can be clamped. The output capacitor  $C_O$  is necessary for the stability of the regulating circuit. Stability is guaranteed at values  $C_O \geq 10\ \mu\text{F}$  and an  $\text{ESR} \leq 10\ \Omega$  within the whole operating temperature range.

**OPTIREG™ Linear TLE4266G**  
**5 V/10 V low drop voltage regulator**

---



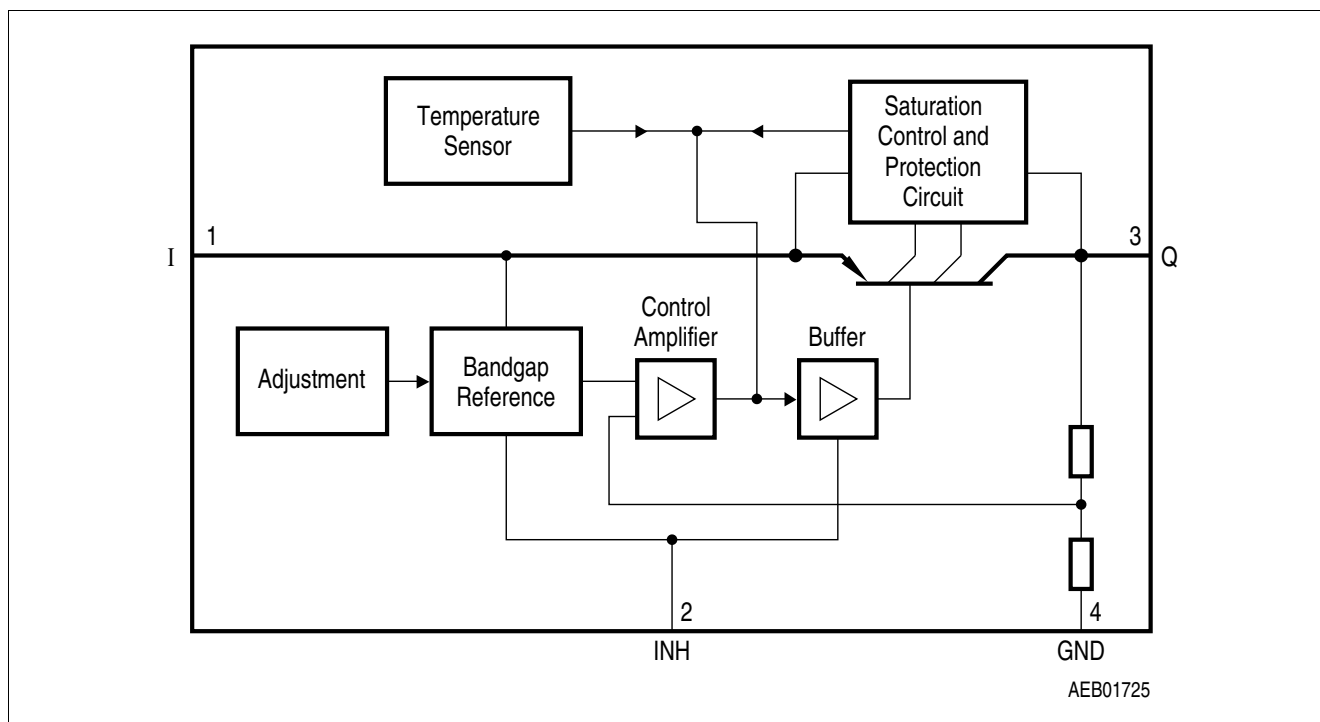
<b>Type</b>	<b>Package</b>	<b>Marking</b>
TLE4266G	PG-SOT223-4	4266 G
TLE4266GSV10	PG-SOT223-4	66GV10

## Table of contents

	<b>Features</b> .....	<b>1</b>
	<b>Potential applications</b> .....	<b>1</b>
	<b>Product validation</b> .....	<b>1</b>
	<b>Description</b> .....	<b>1</b>
	<b>Table of contents</b> .....	<b>3</b>
<b>1</b>	<b>Block diagram</b> .....	<b>4</b>
<b>2</b>	<b>Pin configuration</b> .....	<b>5</b>
2.1	Pin assignment .....	5
2.2	Pin definitions and functions .....	5
<b>3</b>	<b>General product characteristics</b> .....	<b>6</b>
3.1	Absolute maximum ratings .....	6
<b>4</b>	<b>Functional description</b> .....	<b>7</b>
4.1	Electrical characteristics .....	7
4.2	Circuit description .....	9
4.3	Typical performance characteristics .....	10
<b>5</b>	<b>Package information</b> .....	<b>14</b>
<b>6</b>	<b>Revision history</b> .....	<b>15</b>

**Block diagram**

**1 Block diagram**



**Figure 1 Block diagram**

Pin configuration

## 2 Pin configuration

### 2.1 Pin assignment

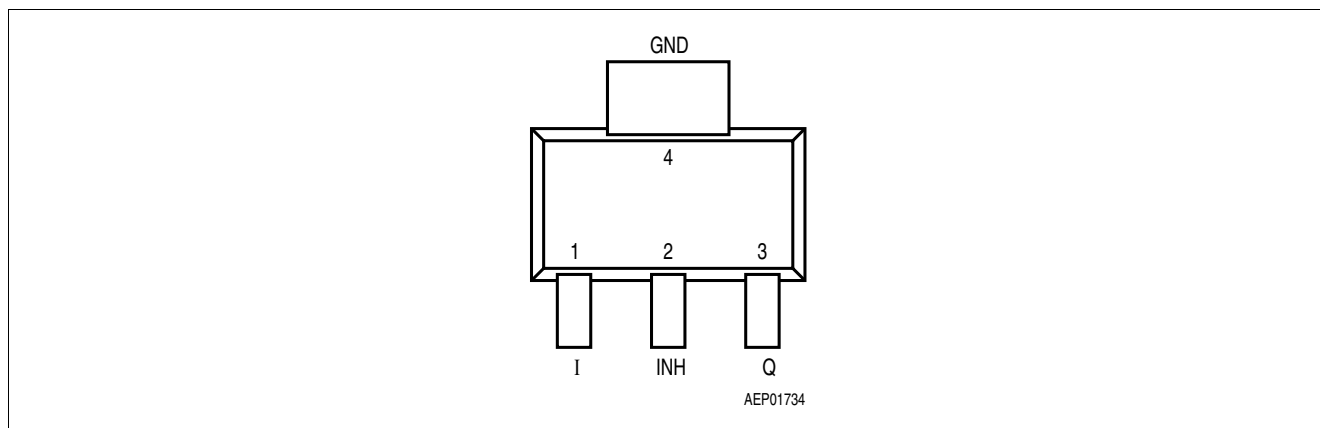


Figure 2 Pin configuration (top view)

### 2.2 Pin definitions and functions

Table 1 Pin definitions and functions

Pin	Symbol	Function
1	I	<b>Input voltage</b> Block to ground directly at the IC with a ceramic capacitor.
2	$\overline{\text{INH}}$	<b>Inhibit input</b> Low-active input.
3	Q	<b>Output voltage</b> Block to ground with a capacitor $C_Q \geq 10 \mu\text{F}$ .
4	GND	<b>Ground</b>

**General product characteristics**

### 3 General product characteristics

#### 3.1 Absolute maximum ratings

**Table 2 Absolute maximum ratings (TLE4266G, TLE4266GSV10)**

$-40^{\circ}\text{C} \leq T_j \leq 150^{\circ}\text{C}$

Parameter	Symbol	Values			Unit	Note or Test Condition
		Min.	Typ.	Max.		
<b>Input I</b>						
Voltage	$V_I$	-42	–	45	V	–
Current	$I_I$	–	–	–	–	Internally limited
<b>Inhibit <math>\overline{\text{INH}}</math></b>						
Voltage	$V_{\overline{\text{INH}}}$	-42	–	45	V	–
<b>Output Q</b>						
Voltage	$V_Q$	-1	–	32	V	–
Current	$I_Q$	–	–	–	–	Internally limited
<b>GND</b>						
Current	$I_{\text{GND}}$	50	–	–	mA	–
<b>Temperature</b>						
Junction temperature	$T_j$	–	–	150	$^{\circ}\text{C}$	–
Storage temperature	$T_S$	-50	–	150	$^{\circ}\text{C}$	–
<b>Operating range (TLE4266G)</b>						
Input voltage	$V_I$	5.5	–	45	V	–
Junction temperature	$T_j$	-40	–	150	$^{\circ}\text{C}$	–
<b>Operating range (TLE4266GSV10)</b>						
Input voltage	$V_I$	10.5	–	45	V	–
Junction temperature	$T_j$	-40	–	150	$^{\circ}\text{C}$	–
<b>Thermal resistance</b>						
Junction ambient	$R_{\text{thj-a}}$	–	–	165	K/W	<sup>1)</sup>
Junction case	$R_{\text{thj-pin}}$	–	–	17	K/W	Measured to pin 4

1) Package mounted on PCB  $80 \times 80 \times 1.5 \text{ mm}^3$ ; 35  $\mu\text{m}$  Cu; 5  $\mu\text{m}$  Sn; Footprint only; zero airflow.

**Functional description**

## 4 Functional description

The device includes a precise reference voltage, which is very accurate due to resistor adjustment. A control amplifier compares the divided output voltage to this reference voltage and drives the base of the PNP series transistor through a buffer.

Saturation control as a function of the load current prevents any oversaturation of the power element. The IC also incorporates a number of protection circuitry for:

- Overload
- Overtemperature
- Reverse polarity

### 4.1 Electrical characteristics

**Table 3 Electrical characteristics (TLE4266G)**

$V_i = 13.5\text{ V}$ ;  $-40^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$  (unless otherwise specified)

Parameter	Symbol	Values			Unit	Note or Test Condition
		Min.	Typ.	Max.		
Output voltage	$V_Q$	4.9	5	5.1	V	$5\text{ mA} \leq I_Q \leq 100\text{ mA}$ ; $6\text{ V} \leq V_i \leq 28\text{ V}$
Output-current limitation	$I_Q$	120	150	–	mA	–
Current consumption $I_q = I_i - I_Q$	$I_q$	–	–	10	$\mu\text{A}$	$V_{\text{INH}} = 0\text{ V}$ ; $T_j \leq 100^\circ\text{C}$
Current consumption $I_q = I_i - I_Q$	$I_q$	–	–	400	$\mu\text{A}$	$I_Q = 1\text{ mA}$ Inhibit ON
Current consumption $I_q = I_i - I_Q$	$I_q$	–	10	15	mA	$I_Q = 100\text{ mA}$ Inhibit ON
Drop voltage	$V_{\text{Dr}}$	–	0.25	0.5	V	$I_Q = 100\text{ mA}^{1)}$
Load regulation	$\Delta V_{Q,\text{lo}}$	–	–	40	mV	$I_Q = 5\text{ to }100\text{ mA}$ ; $V_i = 6\text{ V}$
Line regulation	$\Delta V_{Q,\text{li}}$	–	15	30	mV	$V_i = 6\text{ V to }28\text{ V}$ ; $I_Q = 5\text{ mA}$
Power supply ripple rejection	$PSRR$	–	54	–	dB	$f_r = 100\text{ Hz}$ ; $V_r = 0.5\text{ Vpp}$

#### Inhibit

Inhibit on voltage	$V_{\text{INH, on}}$	3.5	–	–	V	–
Inhibit off voltage	$V_{\text{INH, off}}$	–	–	0.8	V	–
Inhibit current	$I_{\text{INH}}$	5	15	25	$\mu\text{A}$	$V_{\text{INH}} = 5\text{ V}$

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

**Functional description**

**Table 4 Electrical characteristics (TLE4266GSV10)**

$V_I = 13.5 \text{ V}; -40^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$

Parameter	Symbol	Values			Unit	Note or Test Condition
		Min.	Typ.	Max.		
Output voltage	$V_Q$	9.8	10	10.2	V	$5 \text{ mA} \leq I_Q \leq 100 \text{ mA};$ $11 \text{ V} \leq V_I \leq 21 \text{ V}$
Output voltage	$V_Q$	9.8	10	10.2	V	$1 \text{ mA} \leq I_Q \leq 50 \text{ mA};$ $11 \text{ V} \leq V_I \leq 28 \text{ V}$
Output-current limitation	$I_Q$	120	150	200	mA	–
Current consumption $I_q = I_1 - I_Q$	$I_{q,off}$	–	–	10	$\mu\text{A}$	$V_{INH} = 0 \text{ V};$ $T_j \leq 100^\circ\text{C}$
Current consumption $I_q = I_1 - I_Q$	$I_q$	–	350	500	$\mu\text{A}$	$I_Q < 1 \text{ mA}$ Inhibit ON
Current consumption $I_q = I_1 - I_Q$	$I_q$	–	7	15	mA	$I_Q < 100 \text{ mA}$ Inhibit ON
Drop voltage	$V_{Dr}$	–	0.28	0.5	V	$I_Q = 100 \text{ mA}^{1)}$
Load regulation	$\Delta V_{Q,Lo}$	-80	–	80	mV	$I_Q = 5 \text{ to } 100 \text{ mA};$ $V_I = 11 \text{ V}$
Line regulation	$\Delta V_{Q,Li}$	-30	5	30	mV	$V_I = 11 \text{ V to } 28 \text{ V};$ $I_Q = 5 \text{ mA}$
Power supply ripple rejection	$PSRR$	–	54	–	dB	$f_r = 100 \text{ Hz};$ $V_r = 0.5 \text{ Vpp}$

**Inhibit**

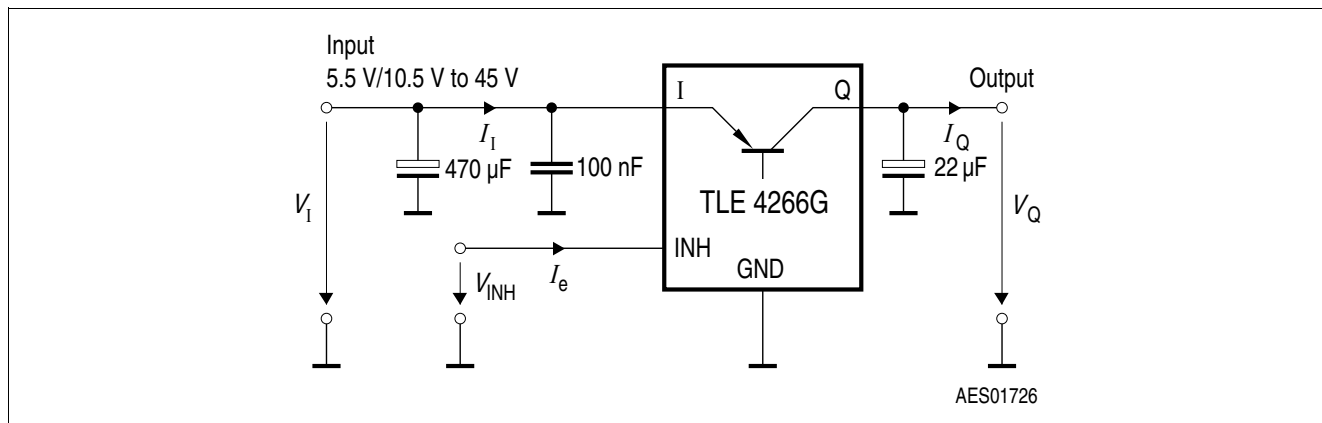
Inhibit on voltage	$V_{INH,on}$	3.5	–	–	V	–
Inhibit off voltage	$V_{INH,off}$	–	–	0.8	V	–
Inhibit current	$I_{INH}$	5	12	25	$\mu\text{A}$	$V_{INH} = 5 \text{ V}$

1) Drop voltage =  $V_I - V_Q$  measured when the output voltage  $V_Q$  has dropped 100 mV from the nominal value.

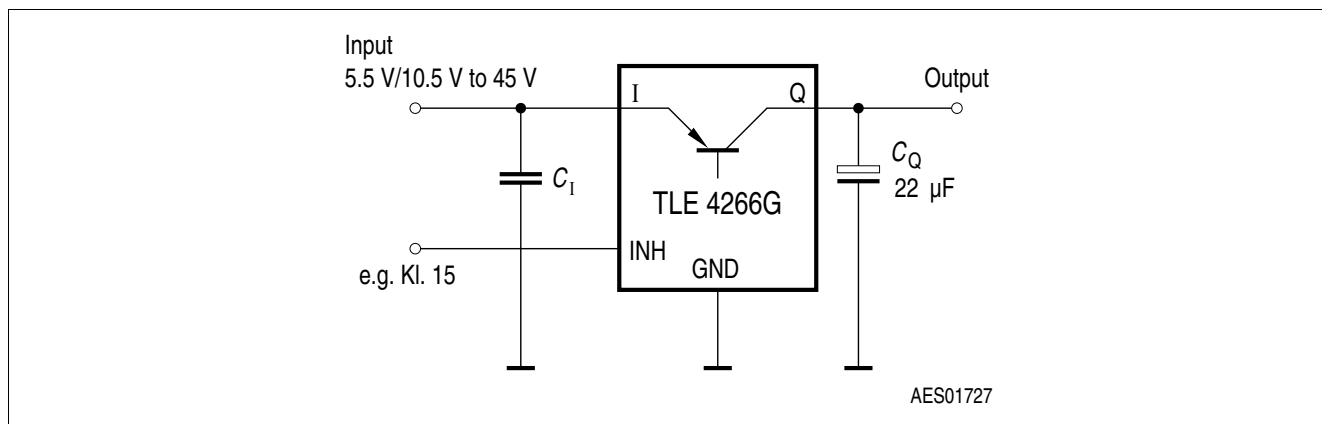


**Functional description**

**4.2 Circuit description**



**Figure 3 Measuring circuit (TLE4266G, TLE4266GSV10)**

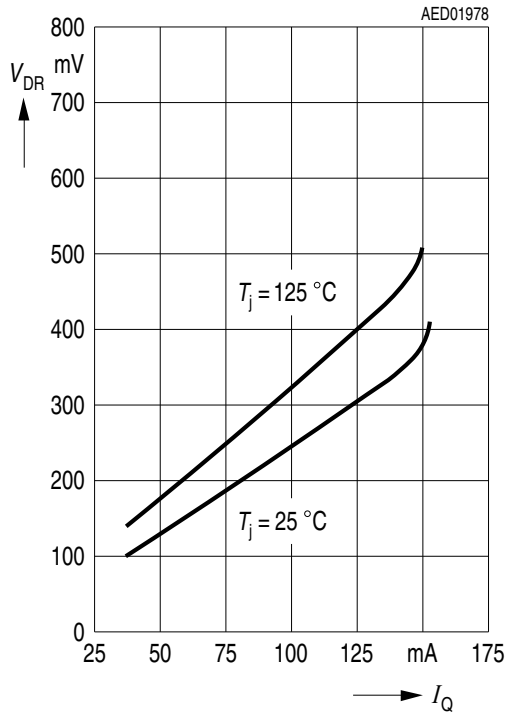


**Figure 4 Application circuit (TLE4266G, TLE4266GSV10)**

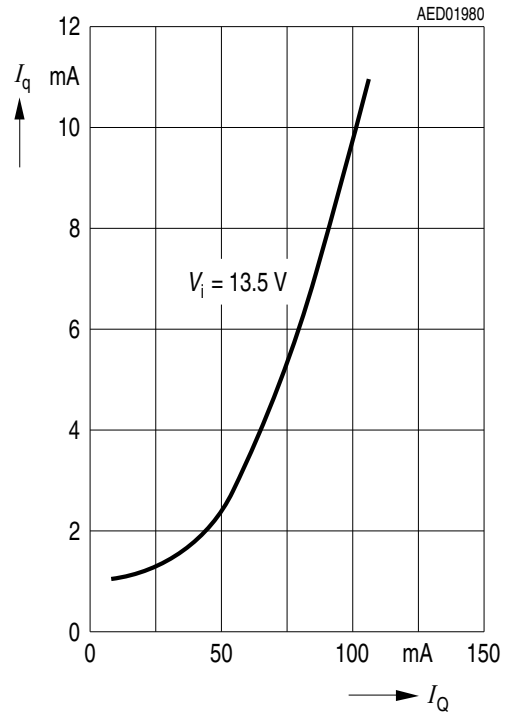
**Functional description**

**4.3 Typical performance characteristics**

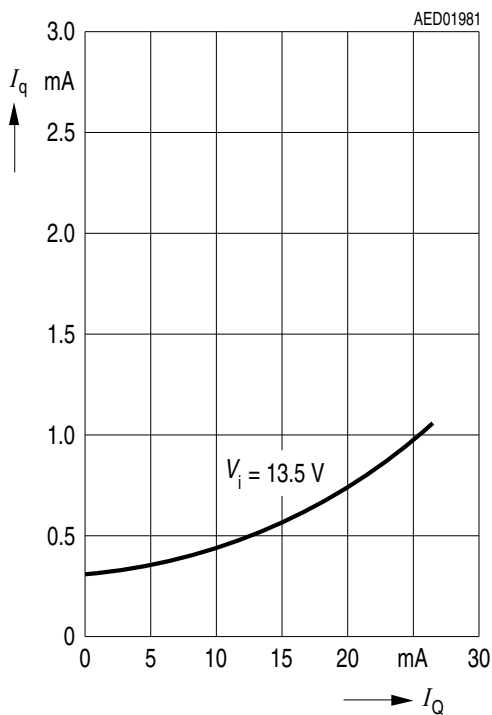
**Drop voltage  $V_{Dr}$  versus output current  $I_Q$  (5 V, 10 V)**



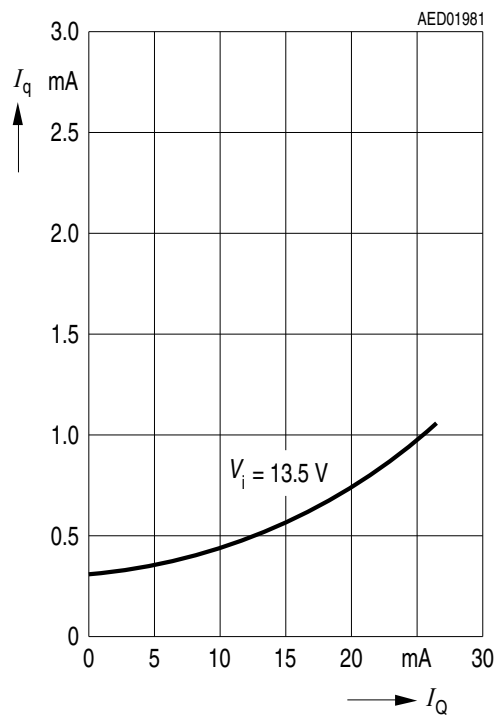
**Current consumption  $I_q$  versus output current  $I_Q$  (5 V)**



**Current consumption  $I_q$  versus output current  $I_Q$  (5 V version)**

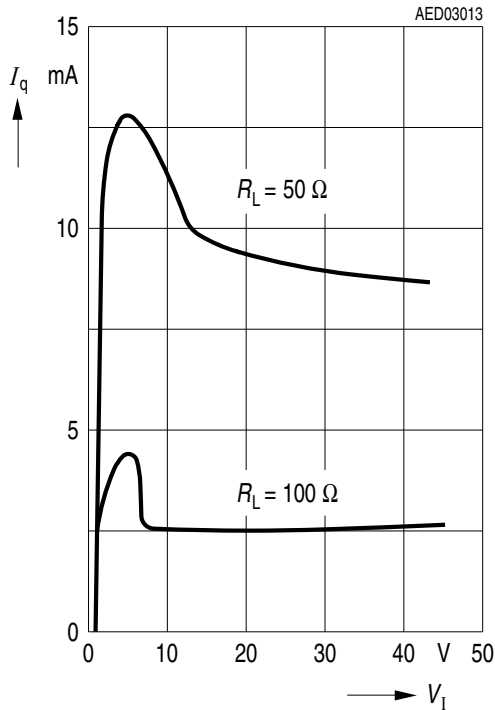


**Current consumption  $I_q$  versus output current  $I_Q$  (10 V version)**

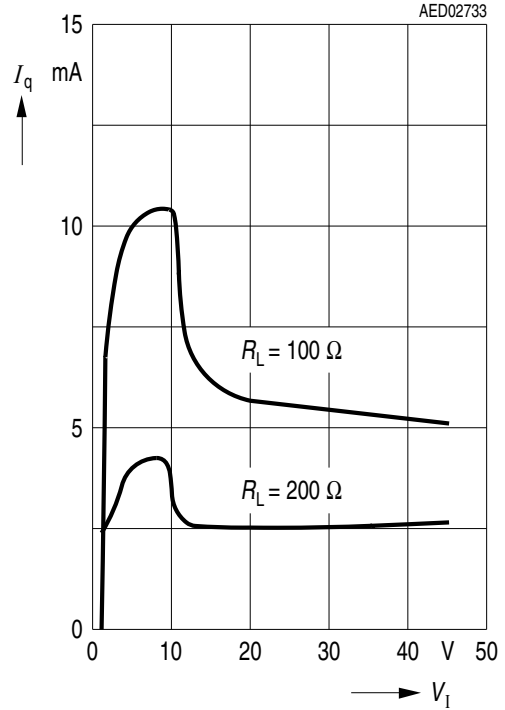


**Functional description**

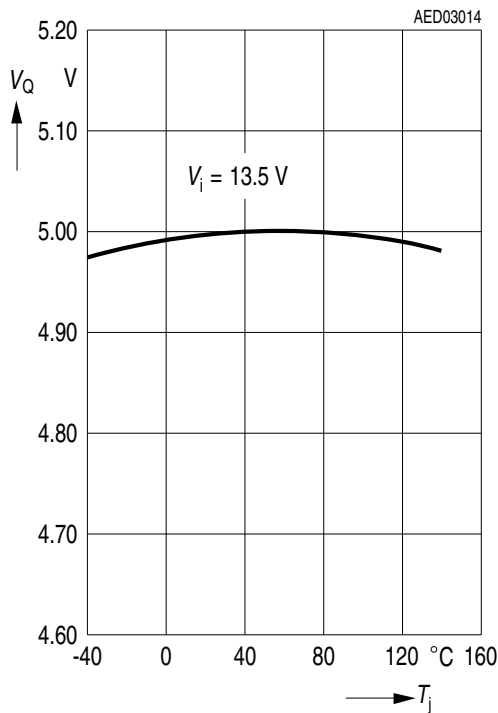
**Current consumption  $I_q$  versus input voltage  $V_i$  (5 V version)**



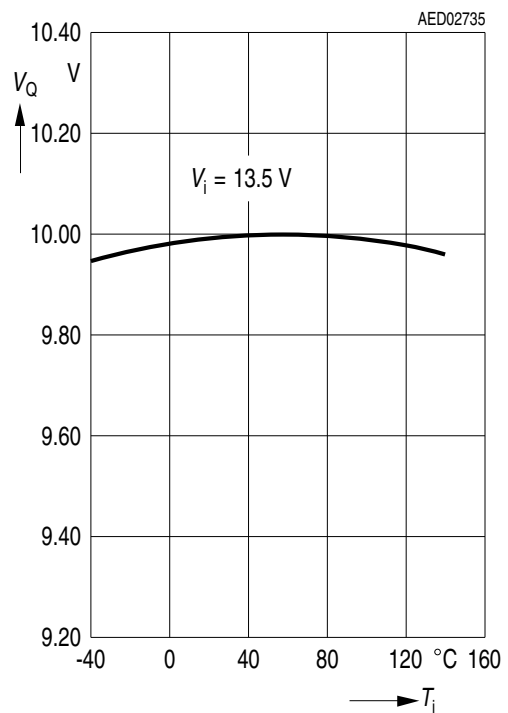
**Current consumption  $I_q$  versus input voltage  $V_i$  (10 V version)**



**Output voltage  $V_Q$  versus temperature  $T_j$  (5 V version)**

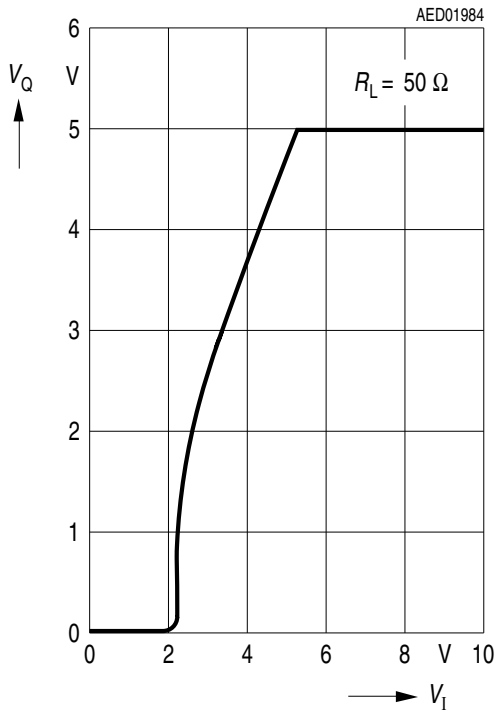


**Output voltage  $V_Q$  versus temperature  $T_j$  (10 V version)**

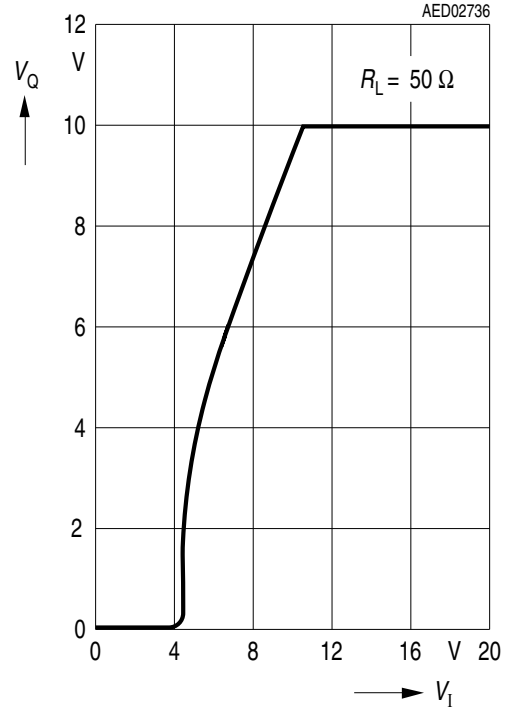


**Functional description**

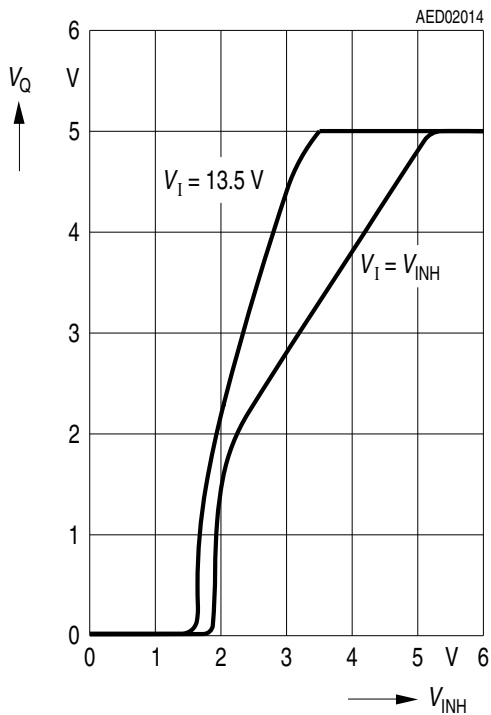
**Output voltage  $V_Q$  versus input voltage  $V_I$  (5 V version)**



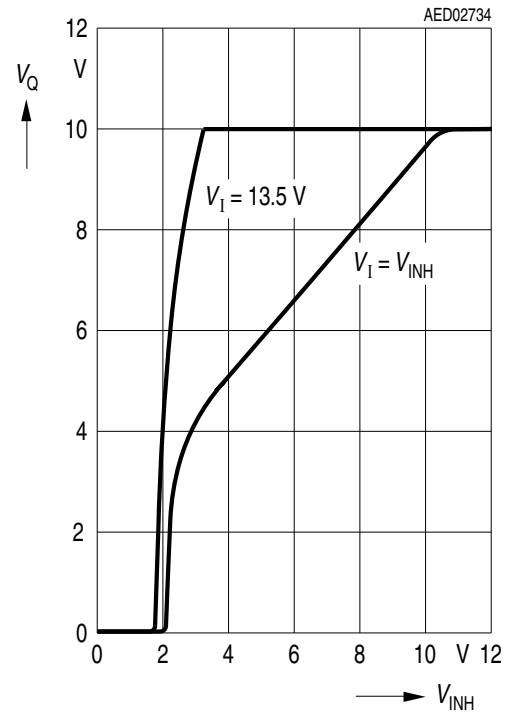
**Output voltage  $V_Q$  versus input voltage  $V_I$  (10 V version)**



**Output voltage  $V_Q$  versus inhibit voltage  $V_{INH}$  (5 V version)**

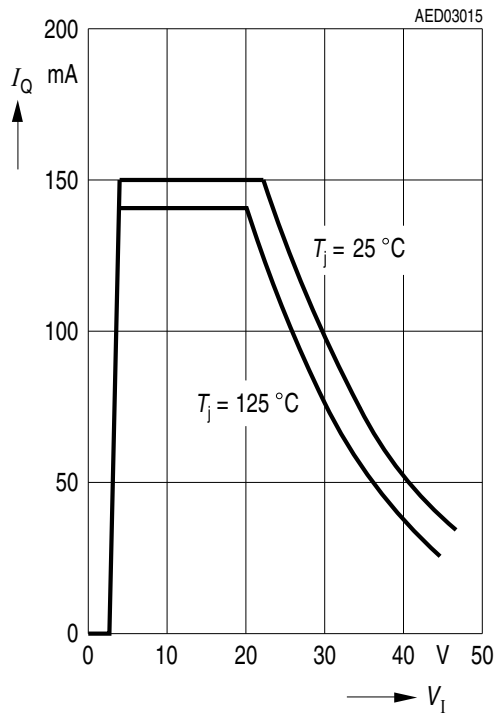


**Output voltage  $V_Q$  versus inhibit voltage  $V_{INH}$  (10 V version)**

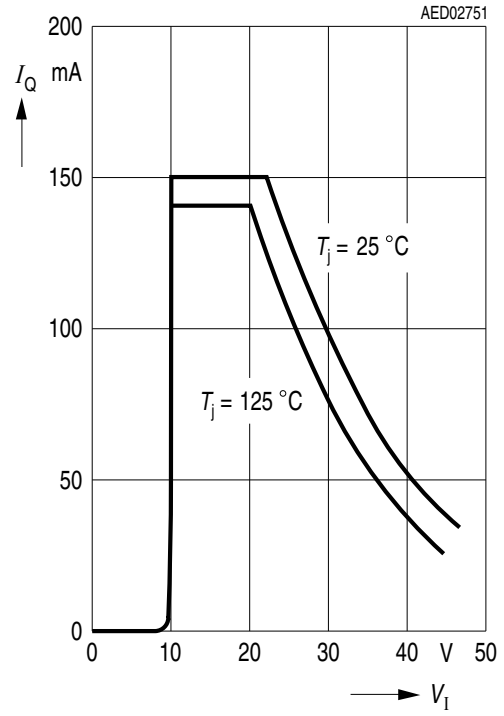


**Functional description**

**Output current  $I_Q$  versus input voltage  $V_I$  (5 V version)**

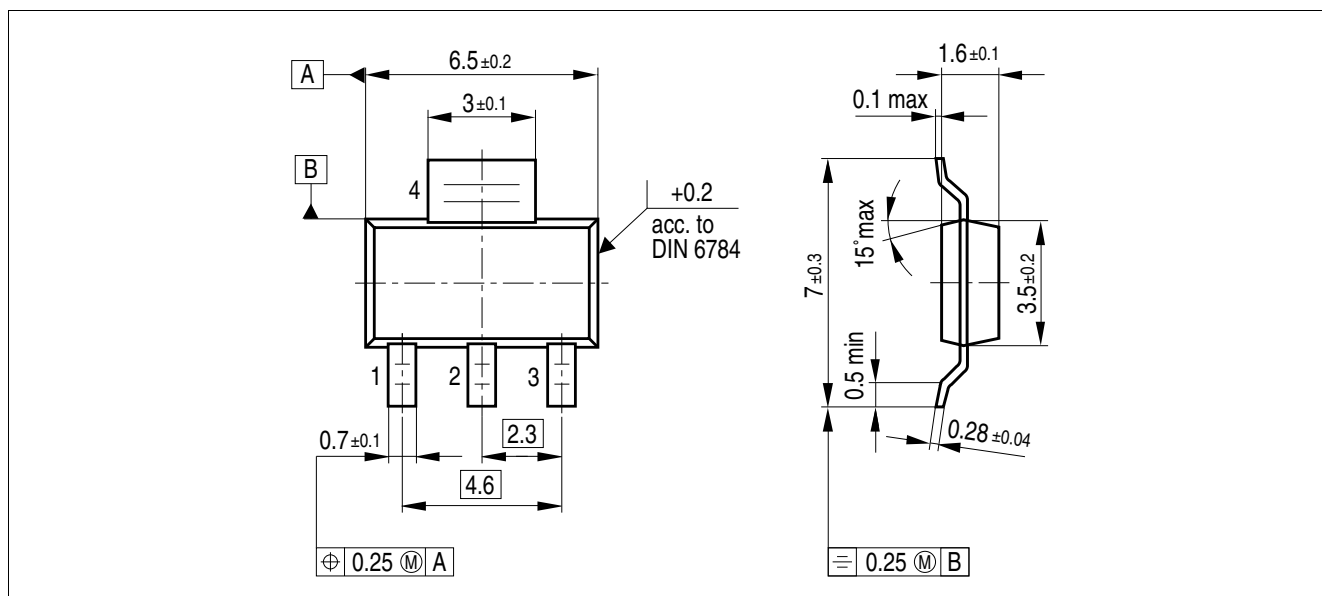


**Output current  $I_Q$  versus input voltage  $V_I$  (10 V version)**



**Package information**

**5 Package information**



**Figure 5** PG-SOT223-4 (plastic small outline transistor)<sup>1)</sup>

**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).

**Further information on packages**

<https://www.infineon.com/packages>

1) Dimensions in mm

**Revision history**

## **6 Revision history**

<b>Revision</b>	<b>Date</b>	<b>Changes</b>
2.61	2019-06-03	Editorial change, added marking
2.6	2019-02-15	Updated layout and structure. Editorial changes.
2.5	2008-03-10	Simplified package name to PG-SOT223-4. No modification of released product.
2.4	2007-03-20	Initial version of RoHS-compliant derivate of TLE4266. AEC certified statement added. RoHS compliance statement and Green product feature added. Package changed to RoHS compliant version. Legal Disclaimer updated.

#### Trademarks

All referenced product or service names and trademarks are the property of their respective owners.

**Edition 2019-06-03**

**Published by**

**Infineon Technologies AG**

**81726 Munich, Germany**

**© 2019 Infineon Technologies AG.**

**All Rights Reserved.**

**Do you have a question about any aspect of this document?**

**Email: [erratum@infineon.com](mailto:erratum@infineon.com)**

**Document reference**

**Z8F55276374**

#### IMPORTANT NOTICE

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffheitsgarantie").

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office ([www.infineon.com](http://www.infineon.com)).

#### WARNINGS

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.