

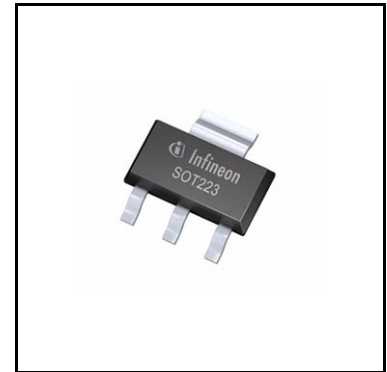
# OPTIREG™ Linear TLE4266G

## 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.

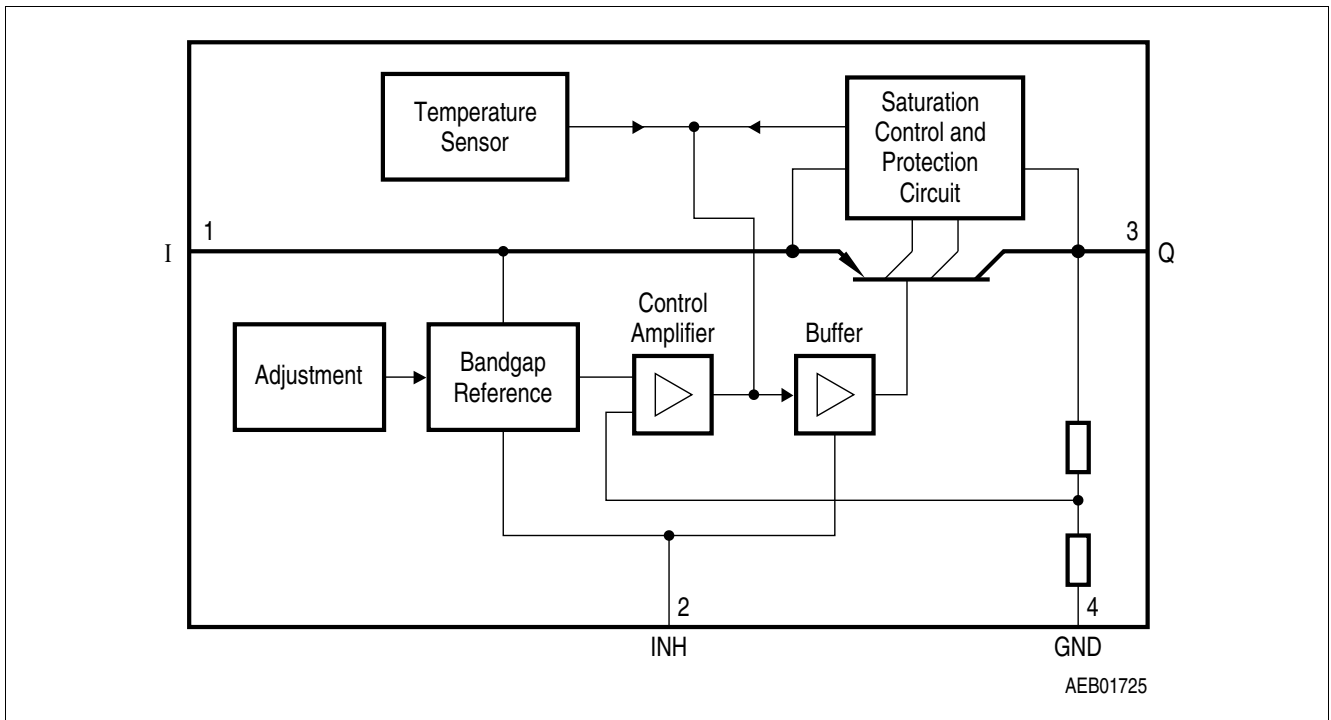
<b>Type</b>	<b>Package</b>	<b>Marking</b>
TLE4266G	PG-SOT223-4	4266 G
TLE4266GSV10	PG-SOT223-4	66GV10

## 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**

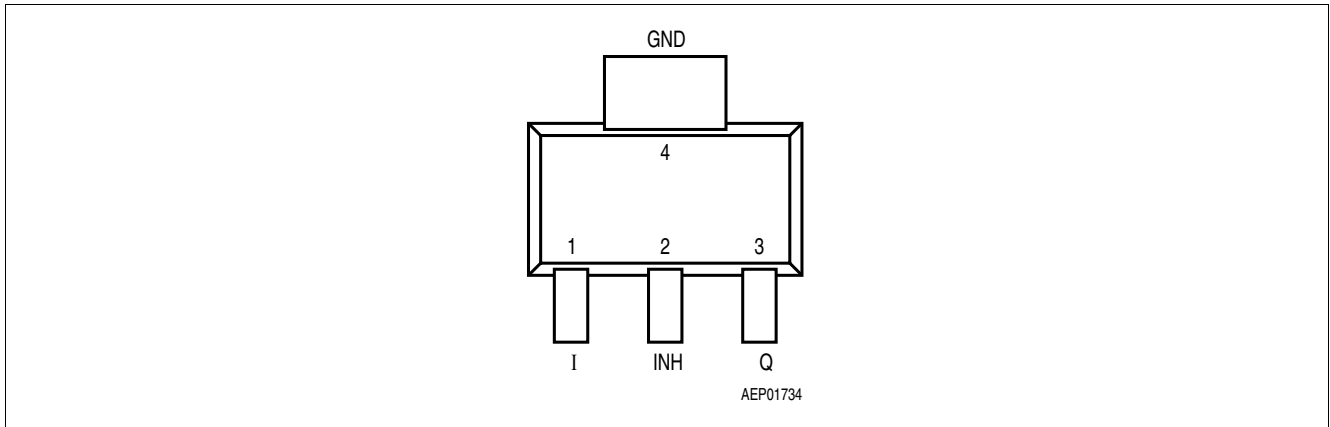


**Figure 1 Block diagram**

**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	$\mu\text{A}$	$V_{\overline{\text{INH}}} = 0 \text{ V};$ $T_j \leq 100^\circ\text{C}$
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**

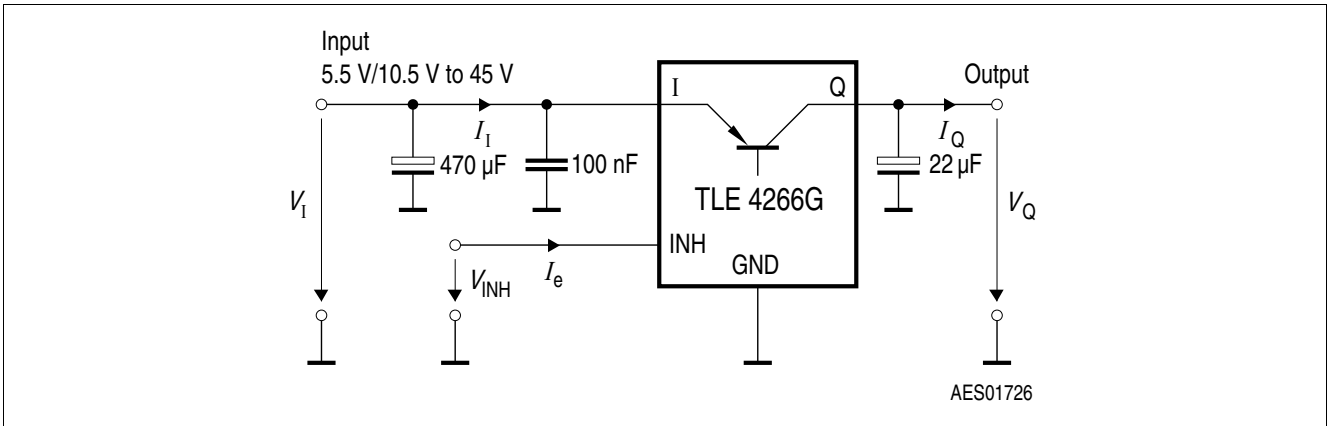
Inhibit on voltage	$V_{\overline{\text{INH}},on}$	3.5	–	–	V	–
Inhibit off voltage	$V_{\overline{\text{INH}},off}$	–	–	0.8	V	–
Inhibit current	$I_{\overline{\text{INH}}}$	5	12	25	$\mu\text{A}$	$V_{\overline{\text{INH}}} = 5 \text{ V}$

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

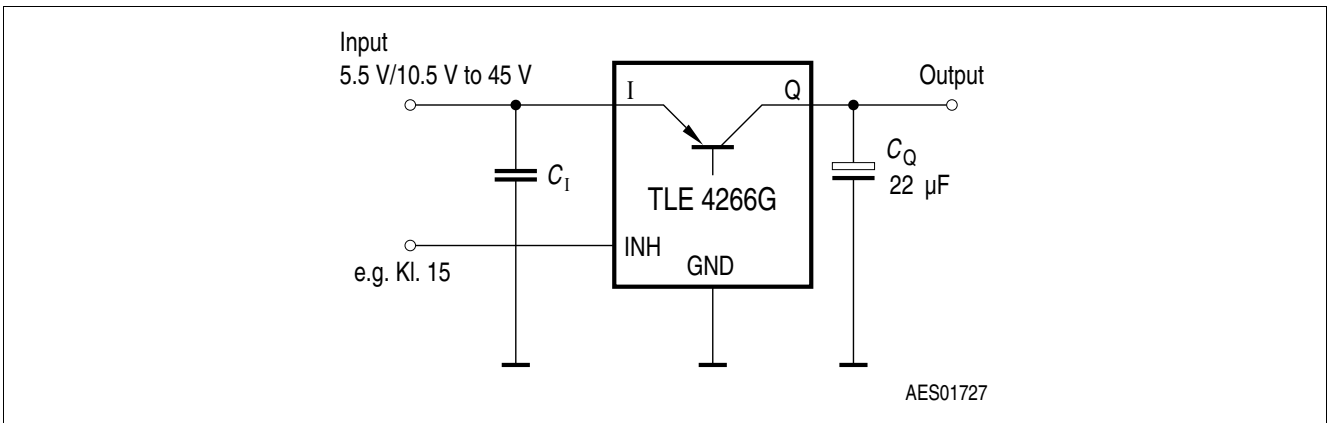


**Functional description**

**4.2 Circuit description**



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

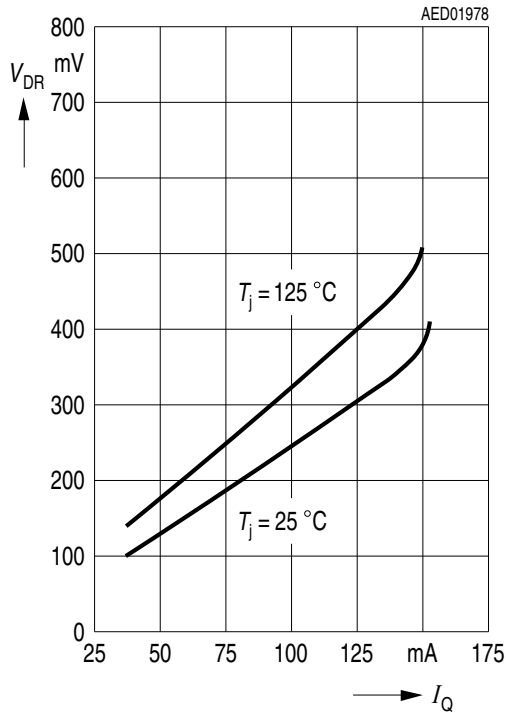


**Figure 4 Application circuit (TLE4266G, TLE4266GSV10)**

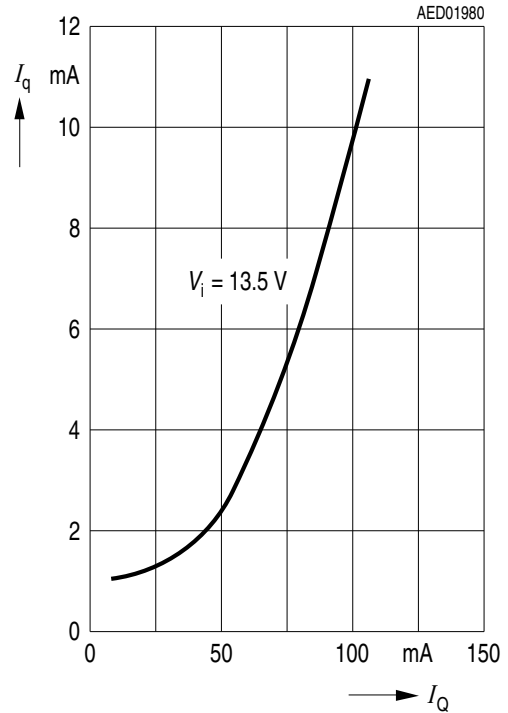
**Functional description**

**4.3 Typical performance characteristics**

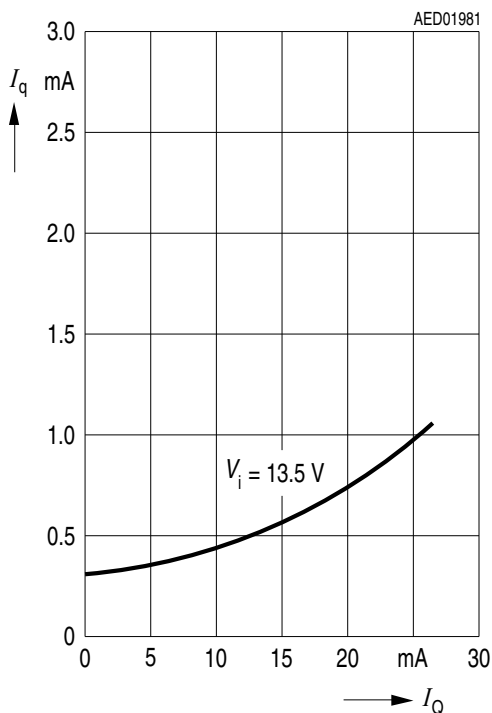
**Drop voltage  $V_{Dr}$  versus output current  $I_Q$  (5 V, 10 V)**



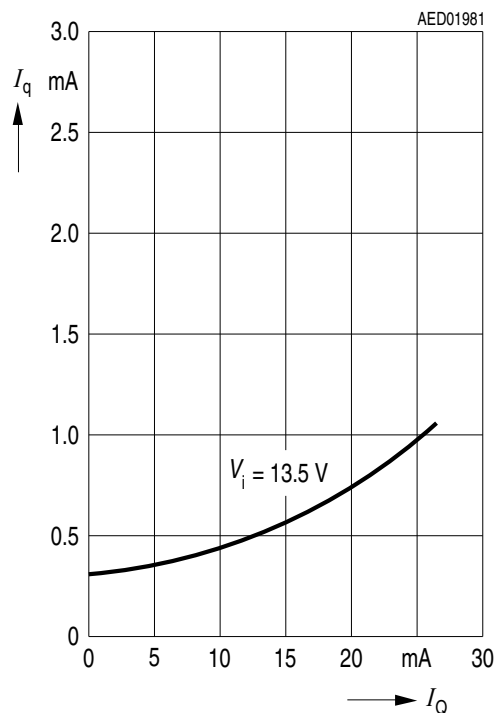
**Current consumption  $I_q$  versus output current  $I_Q$  (5 V)**



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

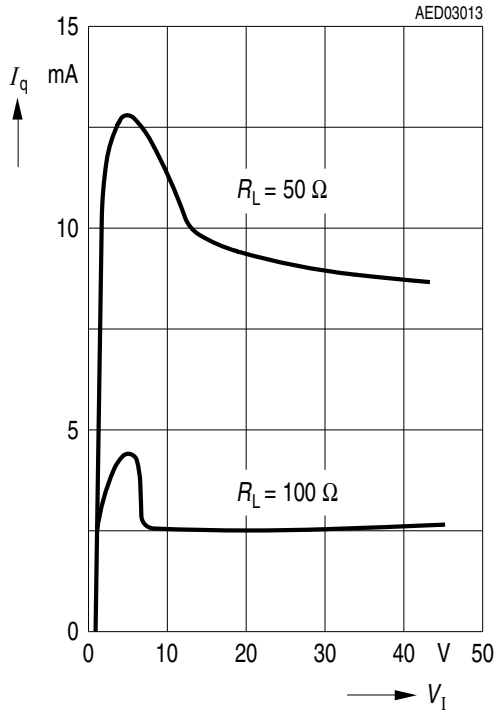


**Current consumption  $I_q$  versus output current  $I_Q$  (10 V version)**

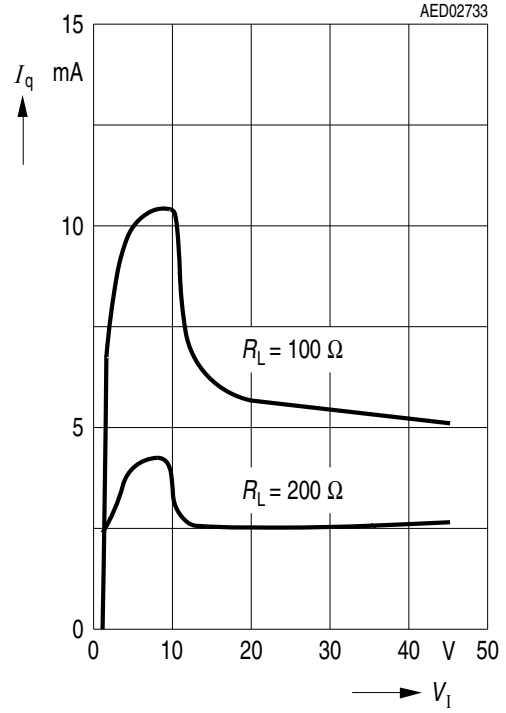


**Functional description**

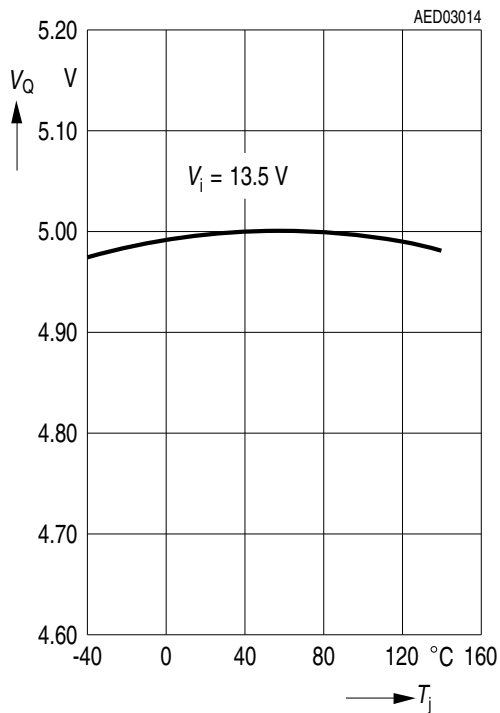
**Current consumption  $I_q$  versus input voltage  $V_i$  (5 V version)**



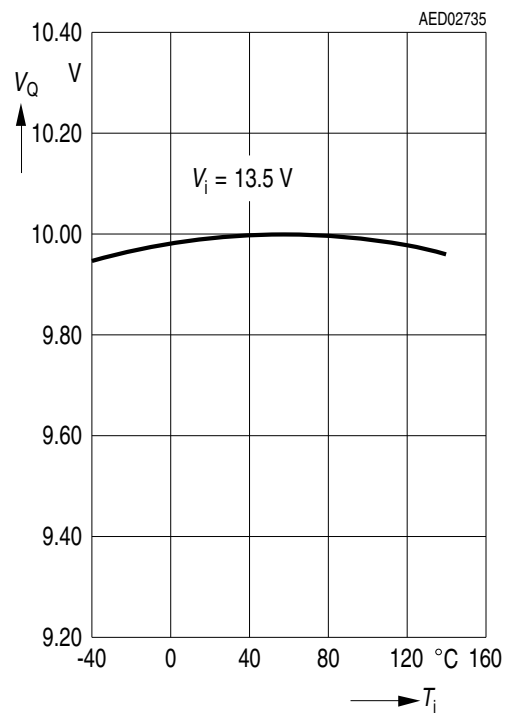
**Current consumption  $I_q$  versus input voltage  $V_i$  (10 V version)**



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

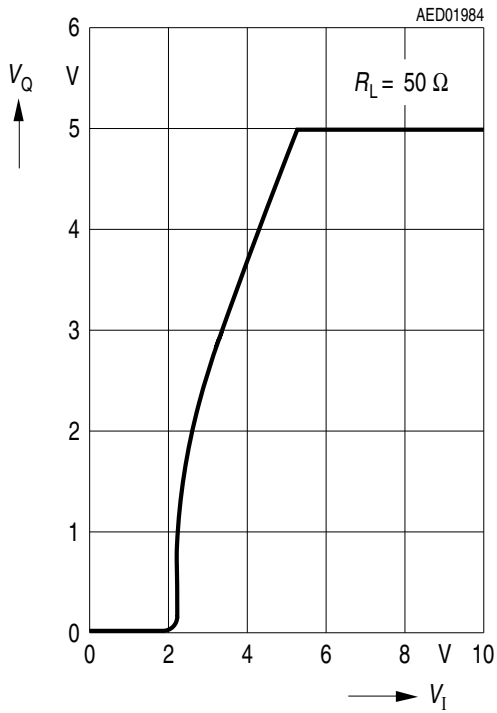


**Output voltage  $V_Q$  versus temperature  $T_j$  (10 V version)**

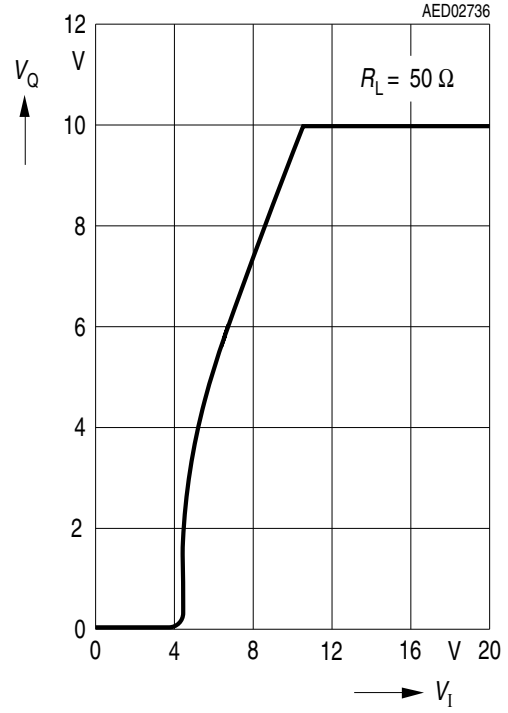


**Functional description**

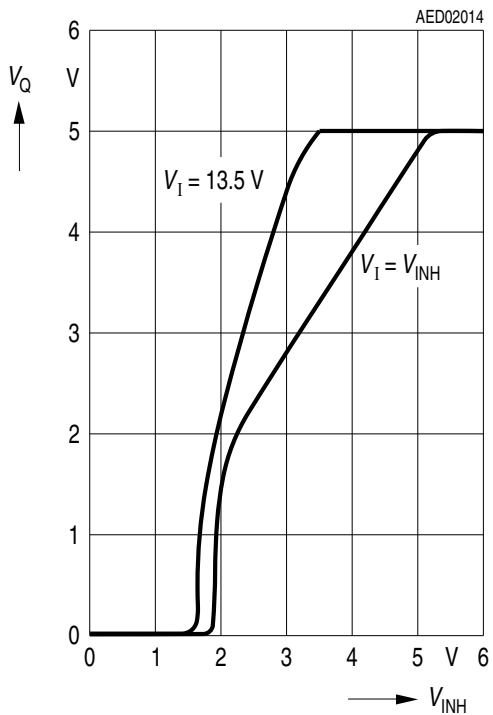
**Output voltage  $V_Q$  versus input voltage  $V_I$  (5 V version)**



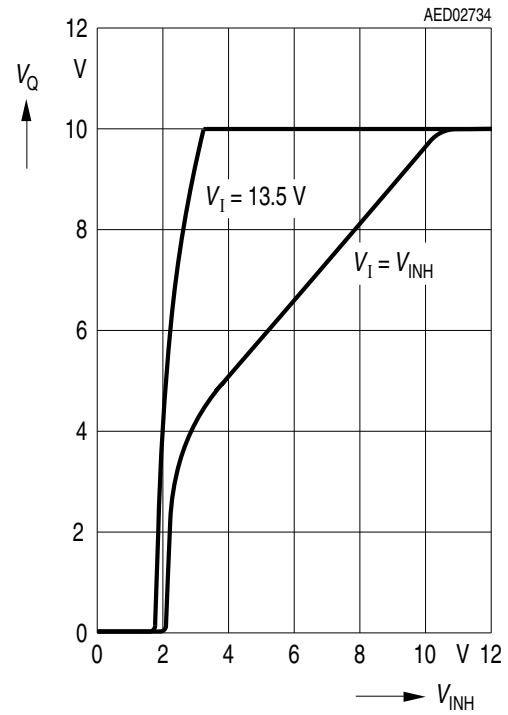
**Output voltage  $V_Q$  versus input voltage  $V_I$  (10 V version)**



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

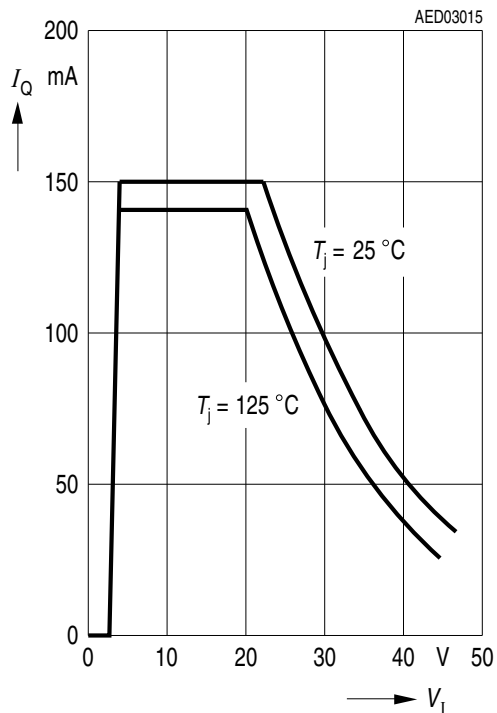


**Output voltage  $V_Q$  versus inhibit voltage  $V_{INH}$  (10 V version)**

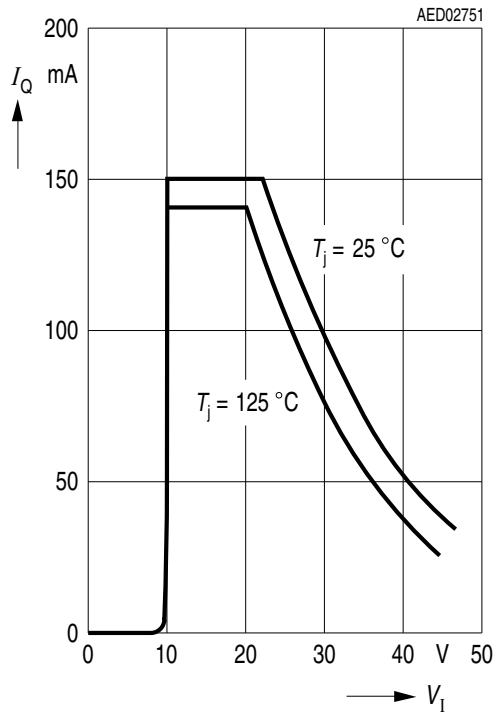


**Functional description**

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

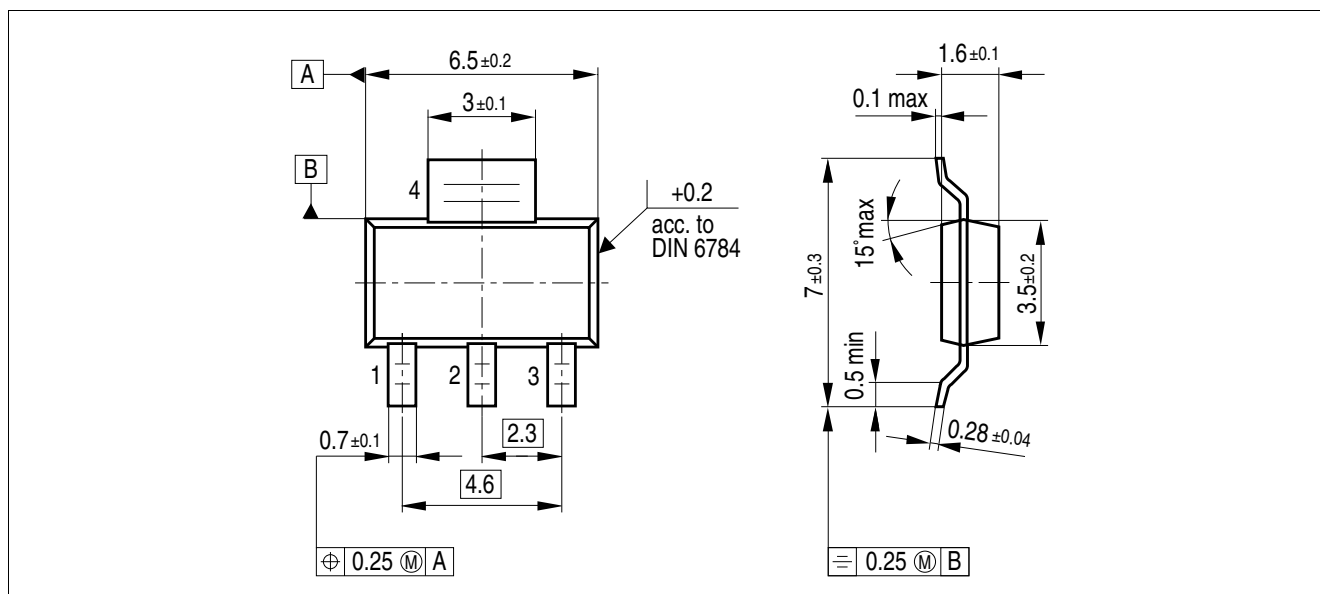


**Output current  $I_Q$  versus input voltage  $V_I$  (10 V version)**



**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.

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**Document reference**

**Z8F55276374**

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