OPTIREG™ Linear TLE4266G

5 V/10 V low drop voltage regulator

Features

- Output voltage 5 V or 10 V
- Output voltage tolerance ≤ ±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 V/10.5 V < V_I < 45 V to $V_{Q,nom}$ = 5 V/10 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 µA. 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 Ω in series with C_I, the oscillating of input line inductivity and input capacitance can be clamped. The output capacitor C_Q is necessary for the stability of the regulating circuit. Stability is guaranteed at values C_Q ≥ 10 µF and an ESR ≤ 10 Ω within the whole operating temperature range.

Type	Package	Marking
TLE4266G	PG-SOT223-4	4266 G
TLE4266GSV10	PG-SOT223-4	66GV10

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1 Block diagram

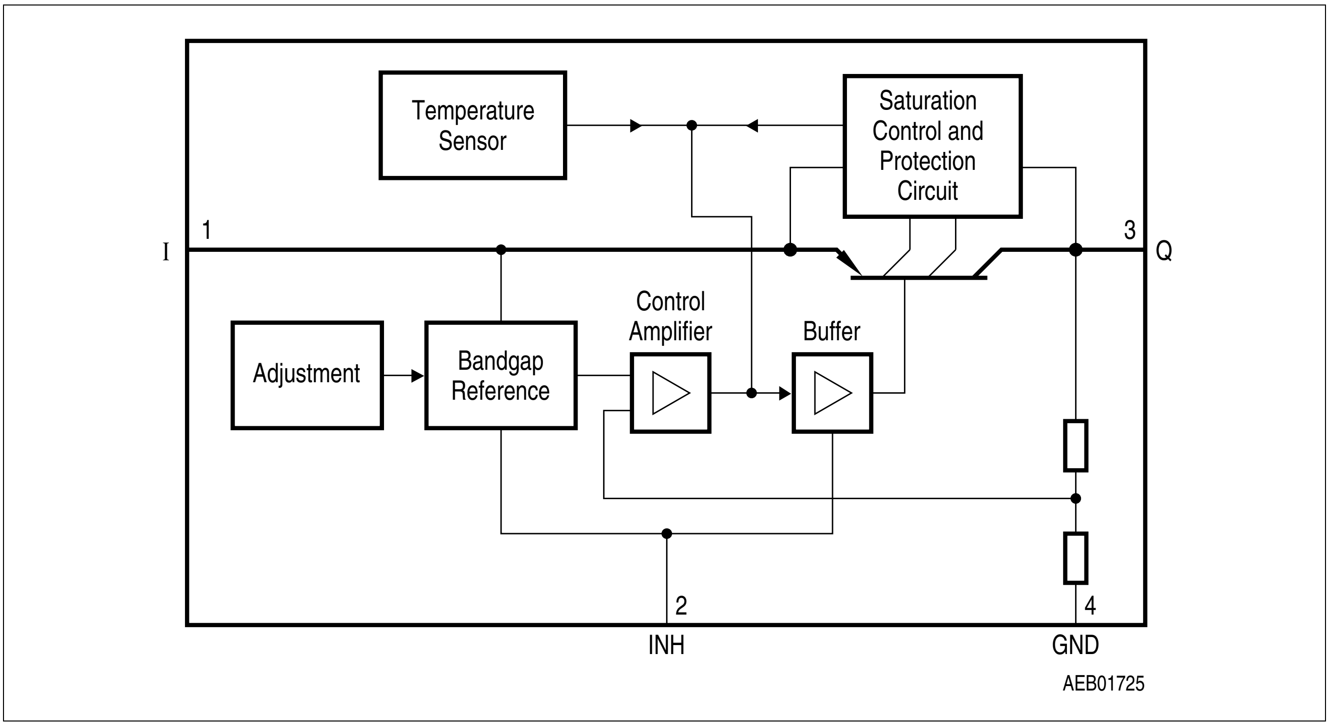


Figure 1 Block diagram

2 Pin configuration

2.1 Pin assignment

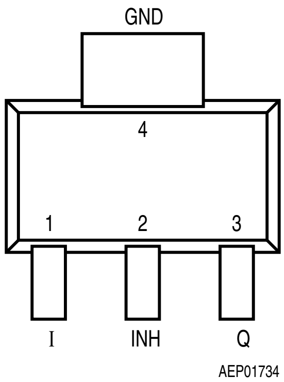


Figure 2 Pin configuration (top view)

2.2 Pin definitions and functions

Table 1 Pin definitions and functions

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

3 General product characteristics

3.1 Absolute maximum ratings

Table 2 Absolute maximum ratings (TLE4266G, TLE4266GSV10)

-40°C ≤ T_j ≤ 150°C

Parameter	Symbol	Values			Unit	Note or Test Condition
		Min.	Typ.	Max.		
Input I						
Voltage	V_I	-42	–	45	V	–
Current	I_I	–	–	–	–	Internally limited
Inhibit $\overline{INH}$						
Voltage	$V_{\overline{INH}}$	-42	–	45	V	–
Output Q						
Voltage	V_Q	-1	–	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	–
Operating range (TLE4266G)						
Input voltage	V_I	5.5	–	45	V	–
Junction temperature	T_j	-40	–	150	°C	–
Operating range (TLE4266GSV10)						
Input voltage	V_I	10.5	–	45	V	–
Junction temperature	T_j	-40	–	150	°C	–
Thermal resistance						
Junction ambient	R_{thj-a}	–	–	165	K/W	[1]
Junction case	$R_{thj-pin}$	–	–	17	K/W	Measured to pin 4

1) Package mounted on PCB 80 × 80 × 1.5 mm^3; 35 µm Cu; 5 µm Sn; Footprint only; zero airflow.

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 V; -40°C ≤ T_j ≤ 125°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 mA ≤ I_Q ≤ 100 mA; 6 V ≤ V_i ≤ 28 V
Output-current limitation	I_Q	120	150	–	mA	–
Current consumption $I_q = I_i - I_Q$	I_q	–	–	10	µA	$V_{\overline{INH}}$ = 0 V; T_j ≤ 100°C
Current consumption $I_q = I_i - I_Q$	I_q	–	–	400	µA	I_Q = 1 mA Inhibit ON
Current consumption $I_q = I_i - I_Q$	I_q	–	10	15	mA	I_Q = 100 mA Inhibit ON
Drop voltage	V_{Dr}	–	0.25	0.5	V	I_Q = 100 mA[1)]
Load regulation	$\Delta V_{Q,lo}$	–	–	40	mV	I_Q = 5 to 100 mA; V_i = 6 V
Line regulation	$\Delta V_{Q,li}$	–	15	30	mV	V_I = 6 V to 28 V; I_Q = 5 mA
Power supply ripple rejection	*PSRR*	–	54	–	dB	f_r = 100 Hz; V_r = 0.5 Vpp
Inhibit						
Inhibit on voltage	$V_{\overline{INH}, on}$	3.5	–	–	V	–
Inhibit off voltage	$V_{\overline{INH}, off}$	–	–	0.8	V	–
Inhibit current	$I_{\overline{INH}}$	5	15	25	µA	V_{INH} = 5 V

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

Table 4 Electrical characteristics (TLE4266GSV10)

V_I = 13.5 V; -40°C ≤ T_j ≤ 125°C

Parameter	Symbol	Values			Unit	Note or Test Condition
		Min.	Typ.	Max.		
Output voltage	V_Q	9.8	10	10.2	V	5 mA ≤ I_Q ≤ 100 mA; 11 V ≤ V_I ≤ 21 V
Output voltage	V_Q	9.8	10	10.2	V	1 mA ≤ I_Q ≤ 50 mA; 11 V ≤ V_I ≤ 28 V
Output-current limitation	I_Q	120	150	200	mA	–
Current consumption $I_q = I_I - I_Q$	$I_{q,off}$	–	–	10	µA	$V_{\overline{INH}}$ = 0 V; T_j ≤ 100°C
Current consumption $I_q = I_I - I_Q$	I_q	–	350	500	µA	I_Q < 1 mA Inhibit ON
Current consumption $I_q = I_I - I_Q$	I_q	–	7	15	mA	I_Q < 100 mA Inhibit ON
Drop voltage	V_{Dr}	–	0.28	0.5	V	I_Q = 100 mA[1)]
Load regulation	$\Delta V_{Q,Lo}$	-80	–	80	mV	I_Q = 5 to 100 mA; V_I = 11 V
Line regulation	$\Delta V_{Q,Li}$	-30	5	30	mV	V_I = 11 V to 28 V; I_Q = 5 mA
Power supply ripple rejection	*PSRR*	–	54	–	dB	f_r = 100 Hz; V_r = 0.5 Vpp
Inhibit						
Inhibit on voltage	$V_{\overline{INH}, on}$	3.5	–	–	V	–
Inhibit off voltage	$V_{\overline{INH}, off}$	–	–	0.8	V	–
Inhibit current	$I_{\overline{INH}}$	5	12	25	µA	$V_{\overline{INH}}$ = 5 V

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

4.2 Circuit description

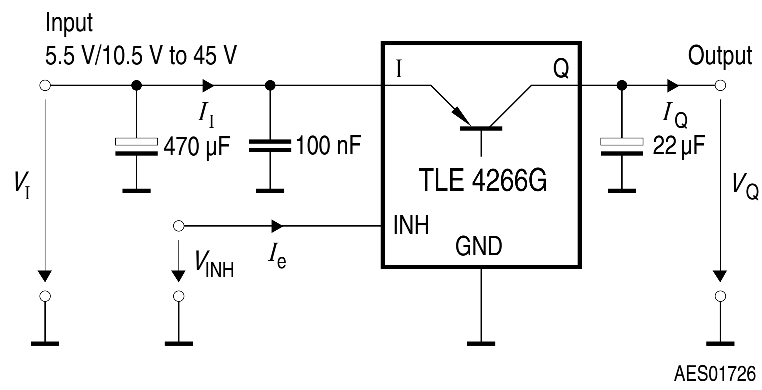


Figure 3 Measuring circuit (TLE4266G, TLE4266GSV10)

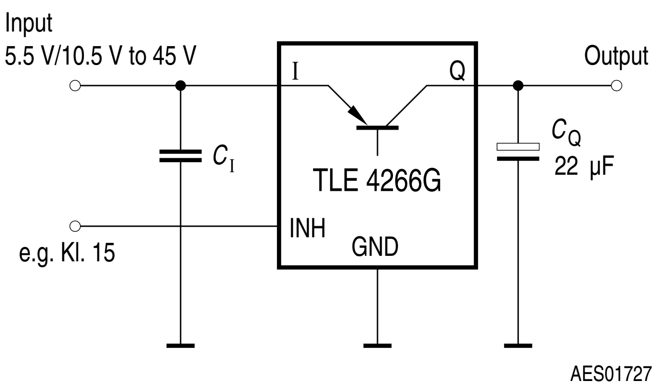
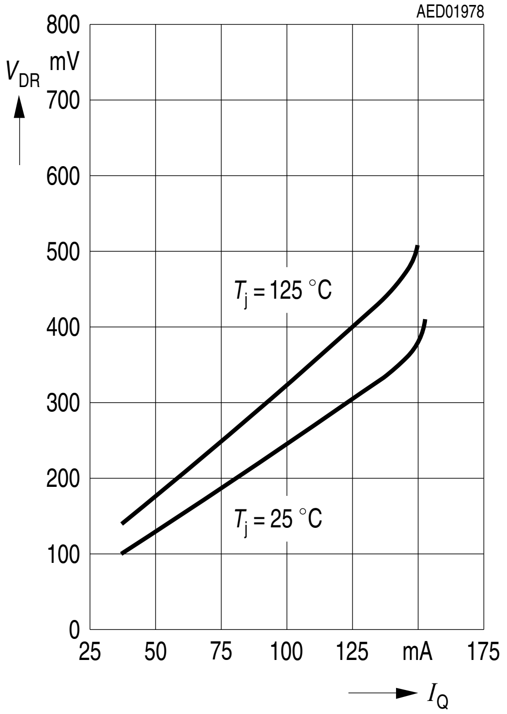


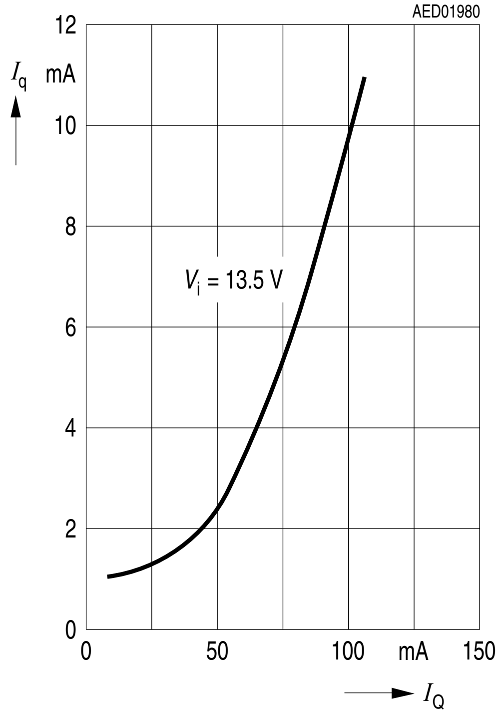
Figure 4 Application circuit (TLE4266G, TLE4266GSV10)

4.3 Typical performance characteristics

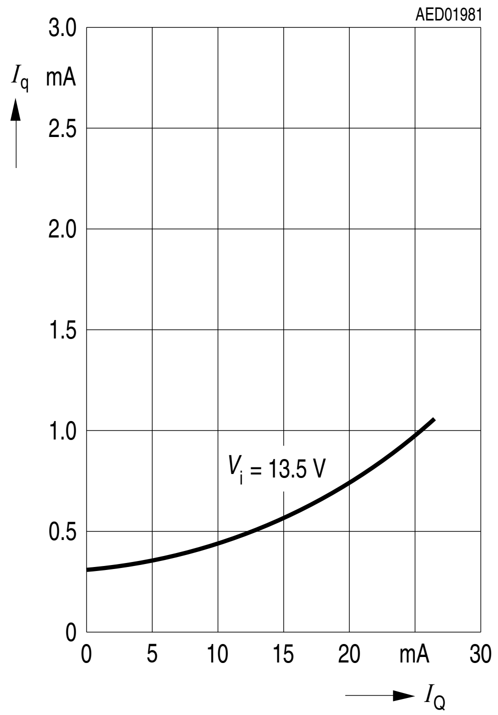
Drop voltage V_{Dr} versus output current I_Q (5 V, 10 V)



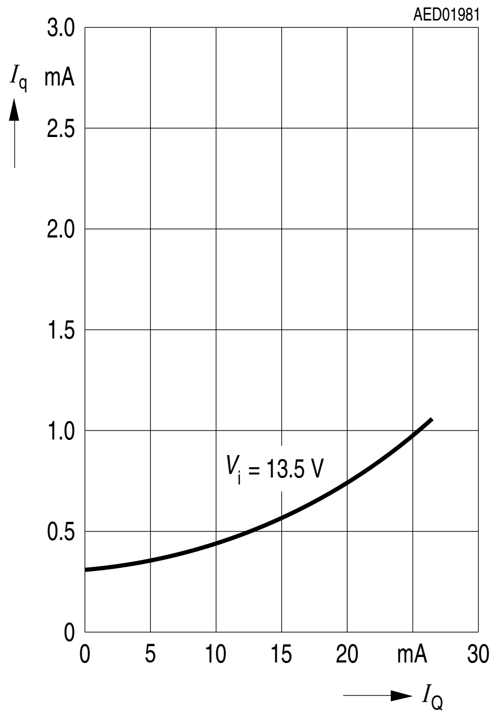
Current consumption I_q versus output current I_Q (5 V)



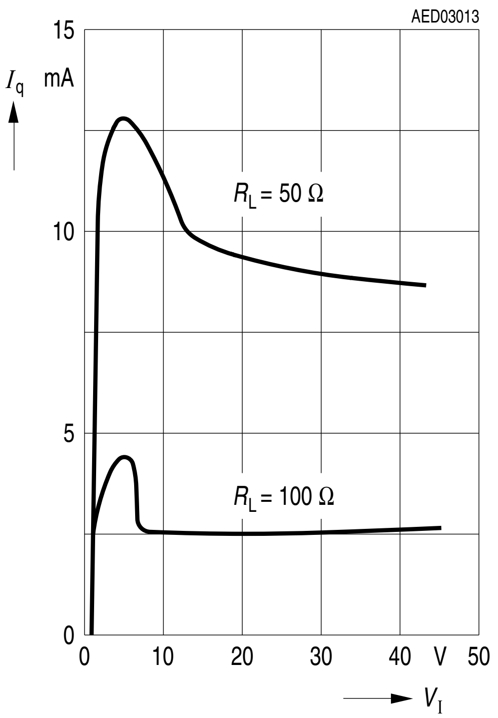
Current consumption I_q versus output current I_Q (5 V version)



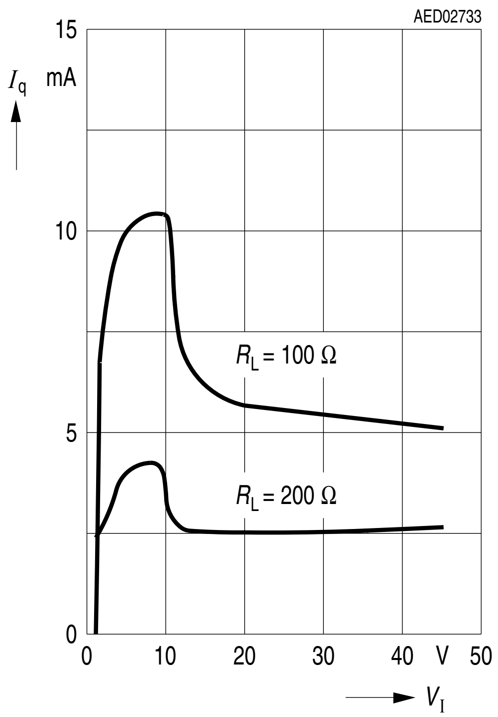
Current consumption I_q versus output current I_Q (10 V version)



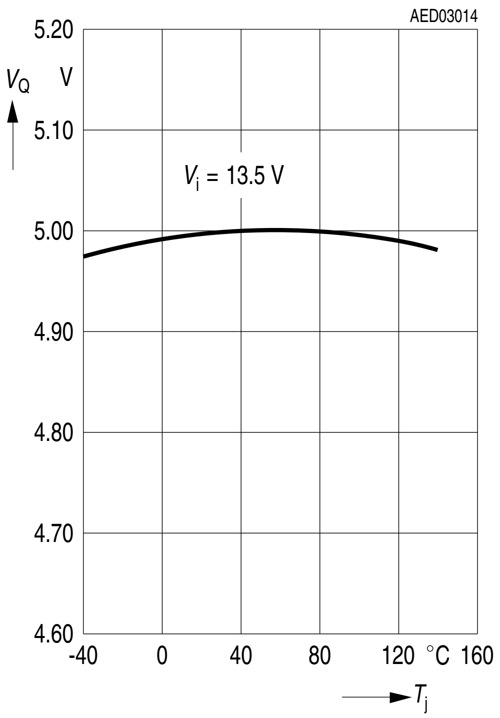
Current consumption I_q versus input voltage V_I (5 V version)



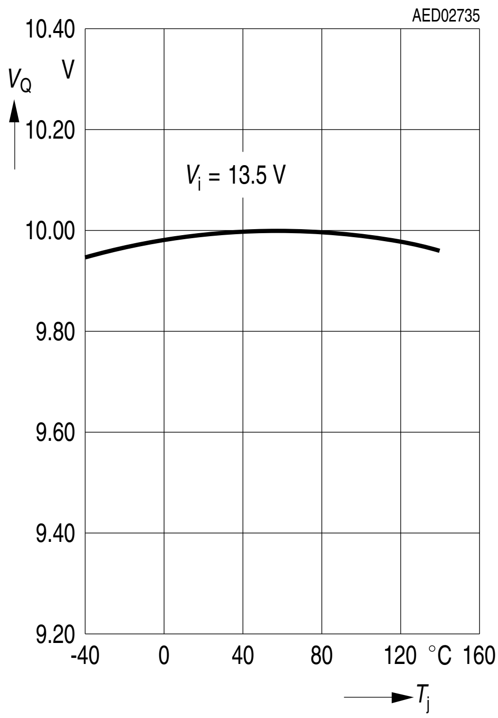
Current consumption I_q versus input voltage V_I (10 V version)



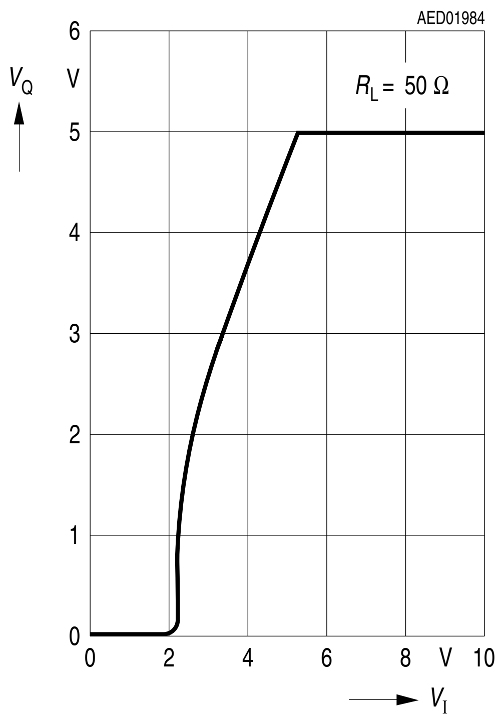
Output voltage V_Q versus temperature T_j (5 V version)



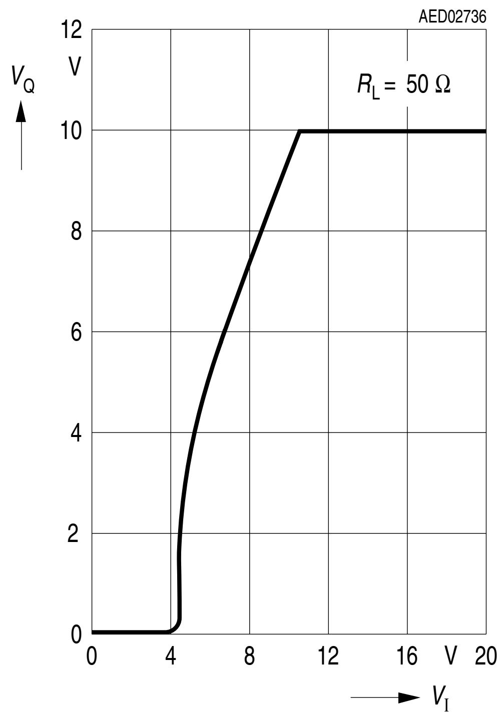
Output voltage V_Q versus temperature T_j (10 V version)



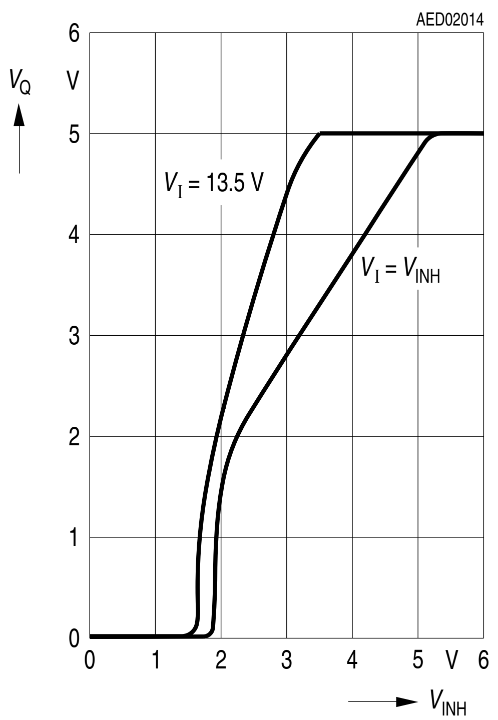
Output voltage V_Q versus input voltage V_I (5 V version)



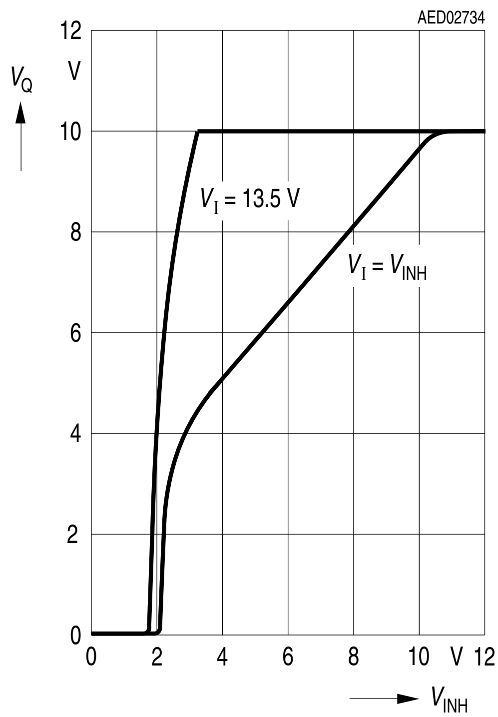
Output voltage V_Q versus input voltage V_I (10 V version)



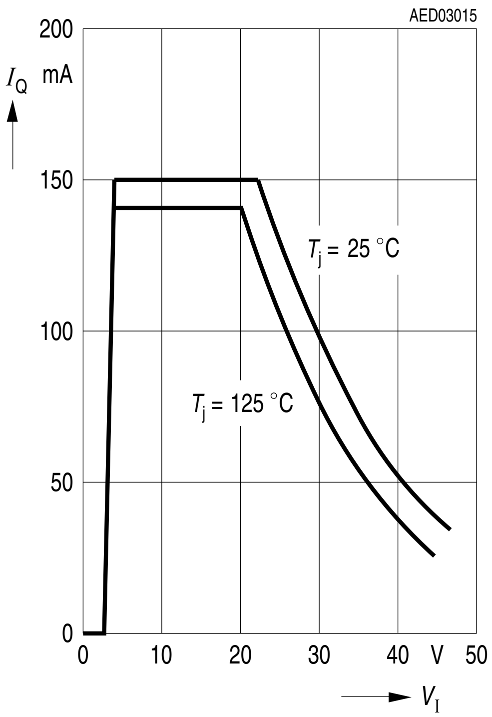
Output voltage V_Q versus inhibit voltage $V_{\overline{INH}}$ (5 V version)



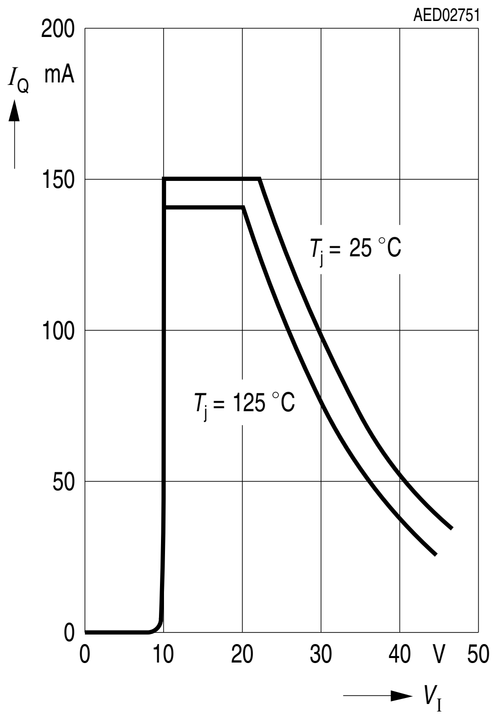
Output voltage V_Q versus inhibit voltage $V_{\overline{INH}}$ (10 V version)



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



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



5 Package information

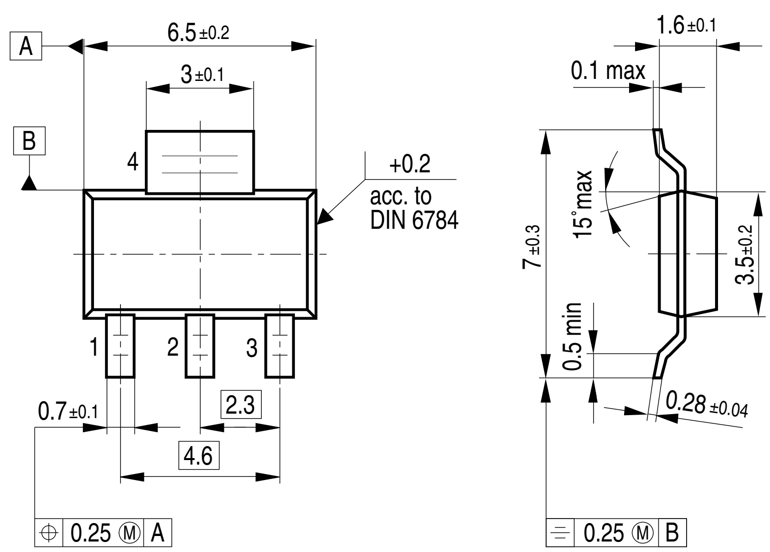


Figure 5 **PG-SOT223-4** (plastic small outline transistor)[1)]

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

6 Revision history

Revision	Date	Changes
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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