

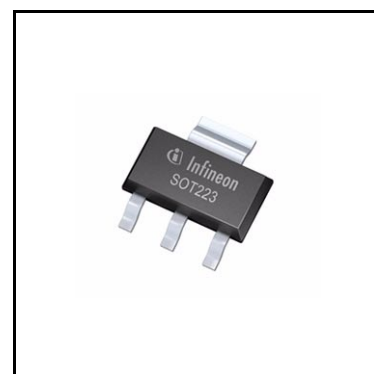
OPTIREG™ Linear TLE4266G

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.

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

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Block diagram

1 Block diagram

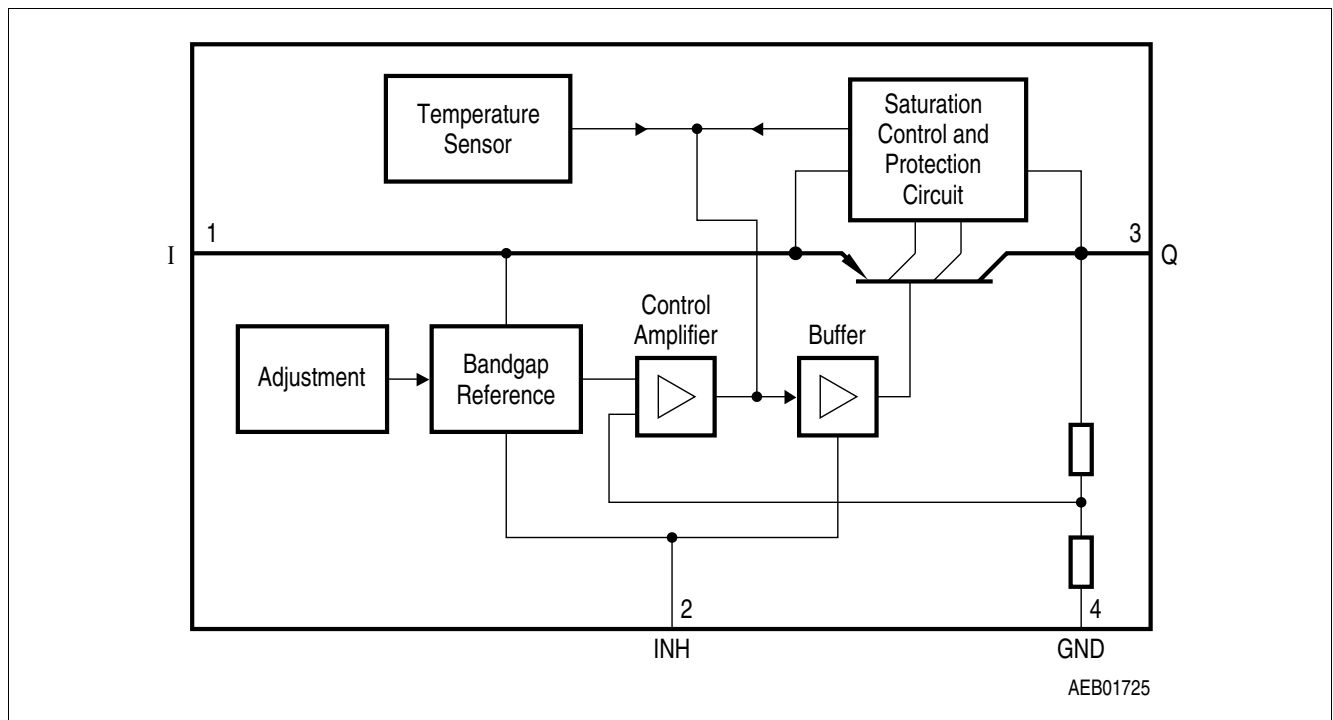


Figure 1 Block diagram

Pin configuration

2 Pin configuration

2.1 Pin assignment

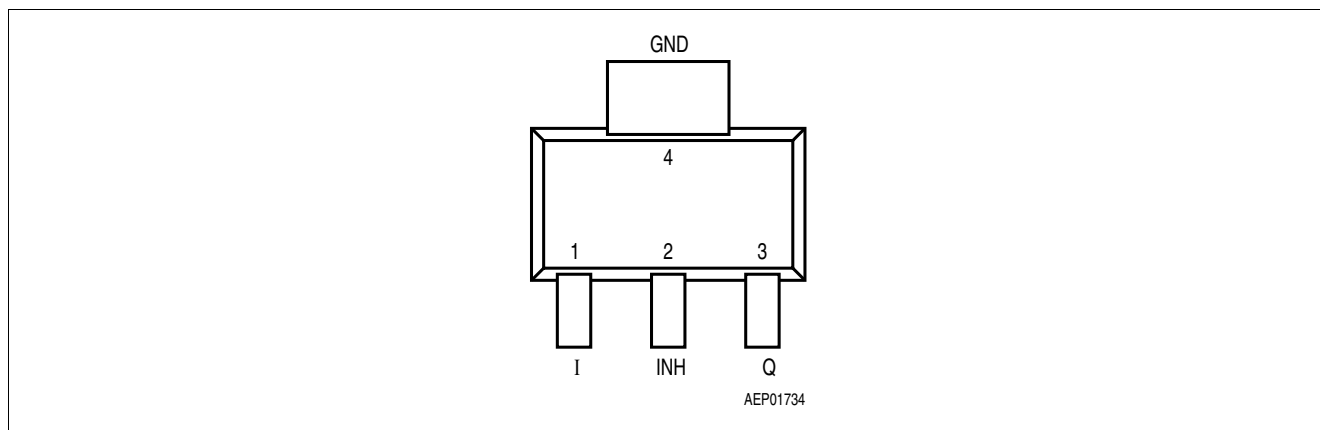


Figure 2 Pin configuration (top view)

2.2 Pin definitions and functions

Table 1 Pin definitions and functions

Pin	Symbol	Function
1	I	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 $C_Q \geq 10 \mu\text{F}$.
4	GND	Ground

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.		
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	-1	–	32	V	–
Current	I_Q	–	–	–	–	Internally limited
GND						
Current	I_{GND}	50	–	–	mA	–
Temperature						
Junction temperature	T_j	–	–	150	$^{\circ}\text{C}$	–
Storage temperature	T_S	-50	–	150	$^{\circ}\text{C}$	–
Operating range (TLE4266G)						
Input voltage	V_I	5.5	–	45	V	–
Junction temperature	T_j	-40	–	150	$^{\circ}\text{C}$	–
Operating range (TLE4266GSV10)						
Input voltage	V_I	10.5	–	45	V	–
Junction temperature	T_j	-40	–	150	$^{\circ}\text{C}$	–
Thermal resistance						
Junction ambient	$R_{\text{thj-a}}$	–	–	165	K/W	¹⁾
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 μm Cu; 5 μm 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	μA	$V_{\text{INH}} = 0\text{ V}$; $T_j \leq 100^\circ\text{C}$
Current consumption $I_q = I_i - I_Q$	I_q	–	–	400	μA	$I_Q = 1\text{ mA}$ 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_{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_{INH}	5	15	25	μA	$V_{\text{INH}} = 5\text{ V}$

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	μA	$V_{INH} = 0 \text{ V};$ $T_j \leq 100^\circ\text{C}$
Current consumption $I_q = I_1 - I_Q$	I_q	–	350	500	μA	$I_Q < 1 \text{ mA}$ 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	μA	$V_{INH} = 5 \text{ V}$

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

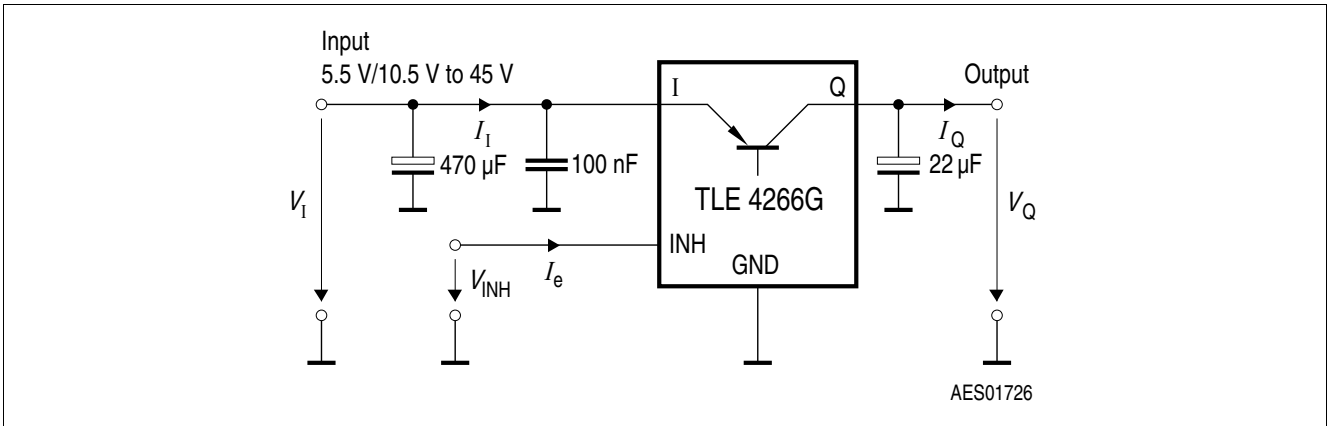


Figure 3 Measuring circuit (TLE4266G, TLE4266GSV10)

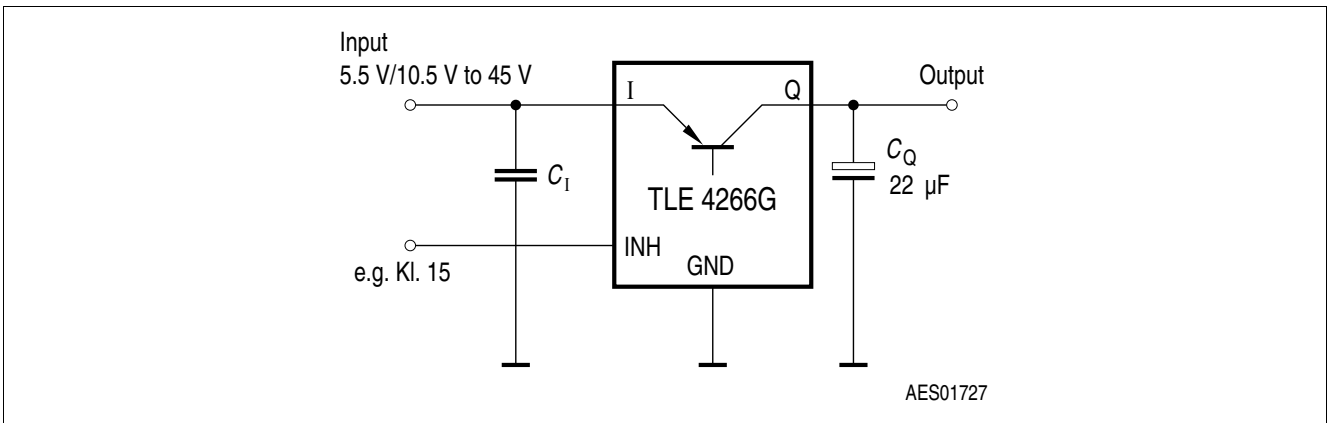
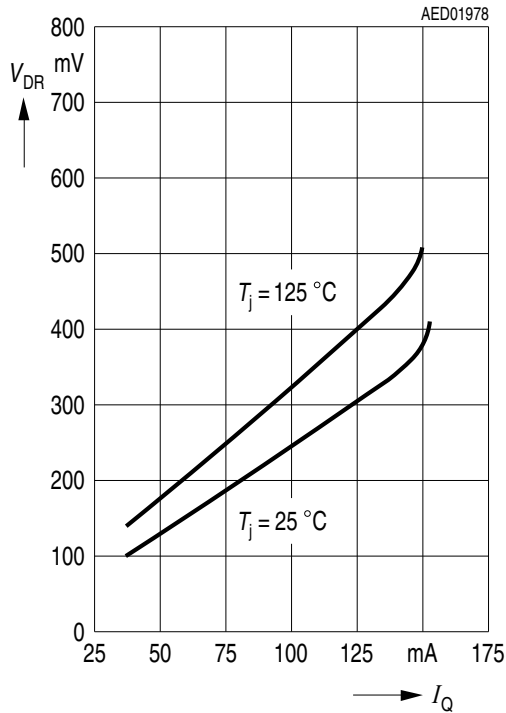


Figure 4 Application circuit (TLE4266G, TLE4266GSV10)

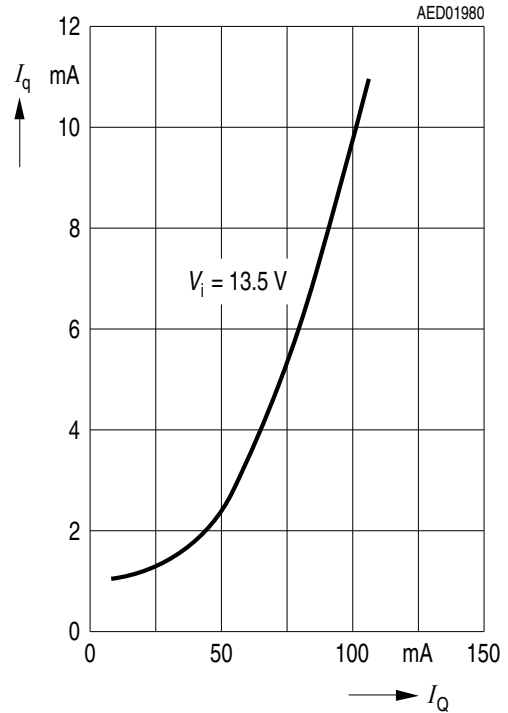
Functional description

4.3 Typical performance characteristics

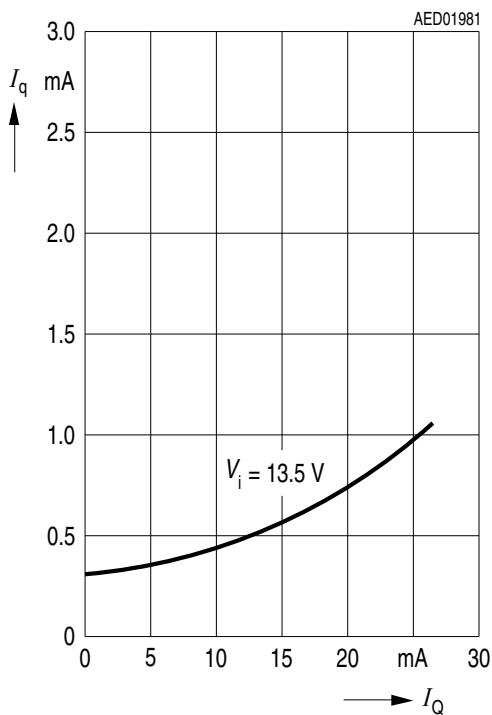
Drop voltage V_{Dr} versus output current I_Q (5 V, 10 V)



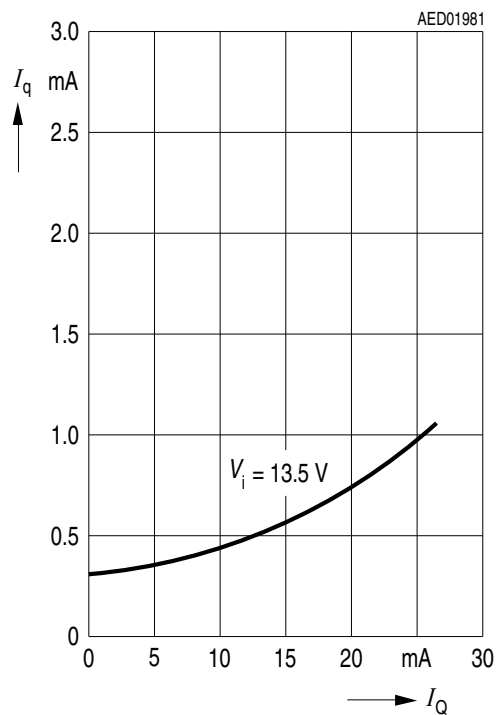
Current consumption I_q versus output current I_Q (5 V)



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

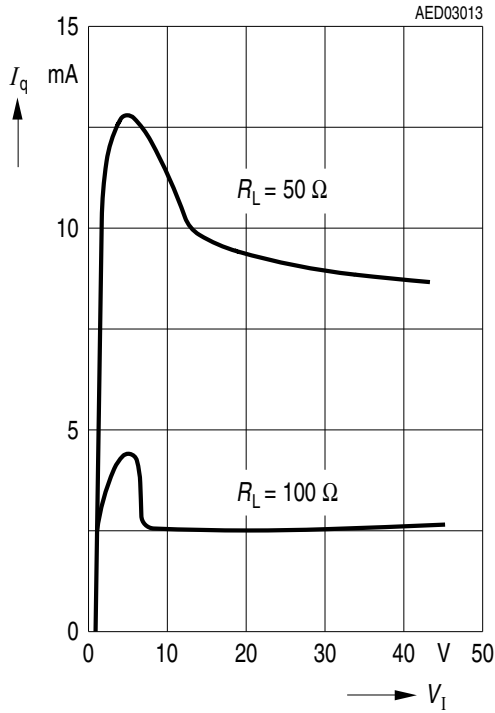


Current consumption I_q versus output current I_Q (10 V version)

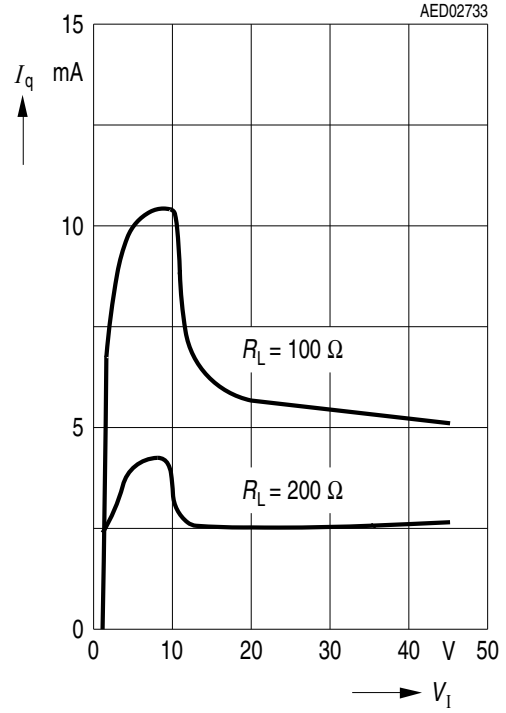


Functional description

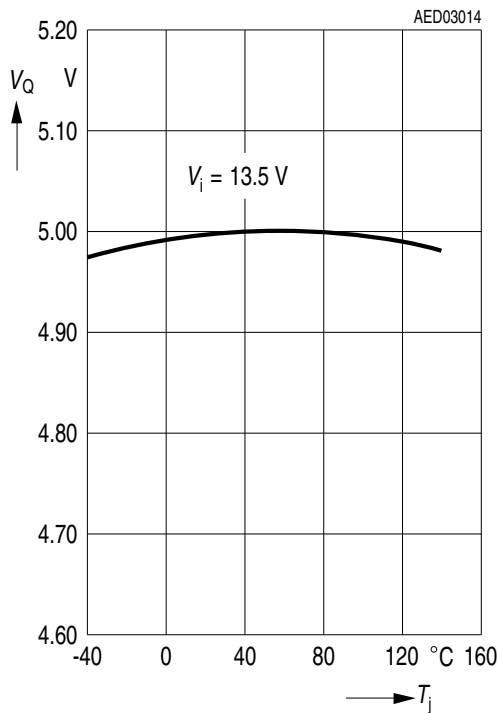
Current consumption I_q versus input voltage V_i (5 V version)



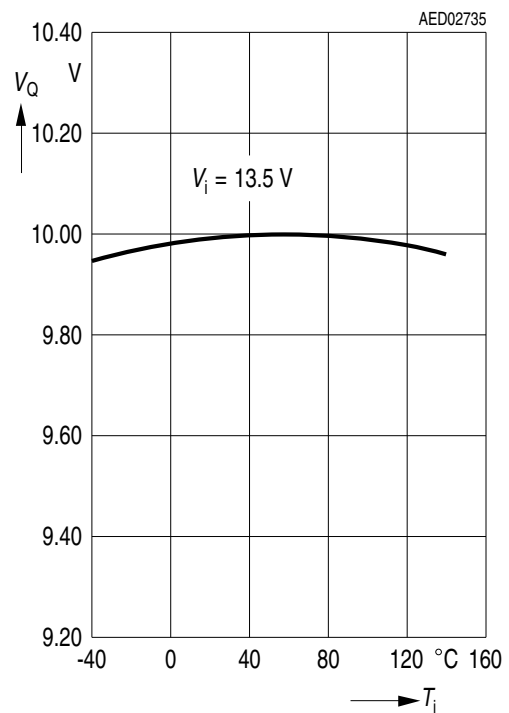
Current consumption I_q versus input voltage V_i (10 V version)



Output voltage V_Q versus temperature T_j (5 V version)

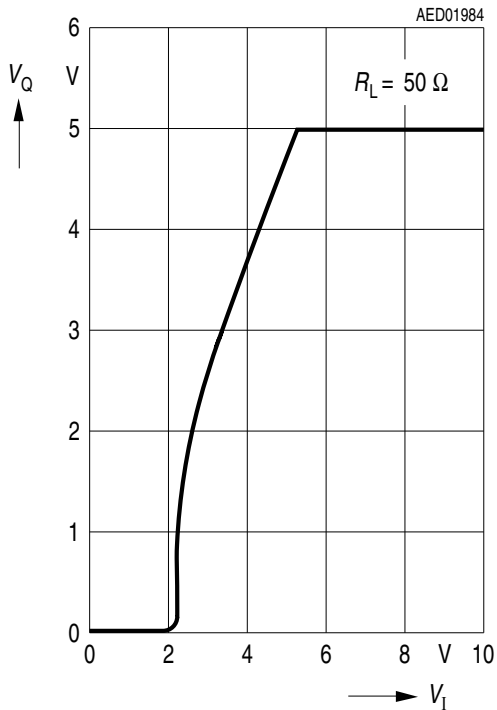


Output voltage V_Q versus temperature T_j (10 V version)

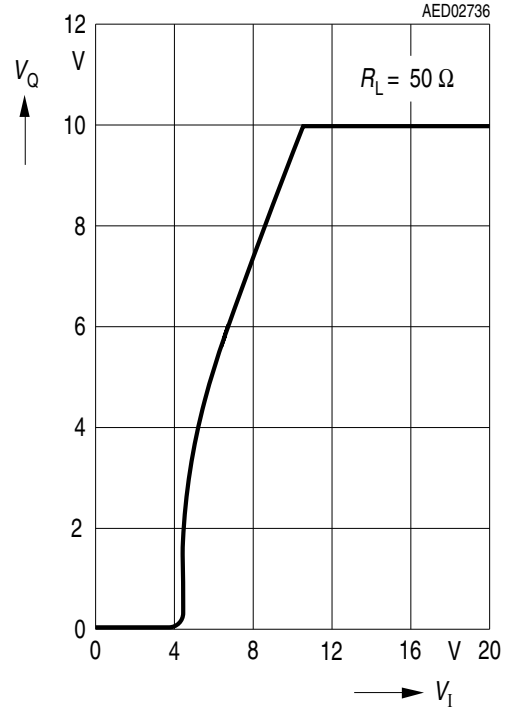


Functional description

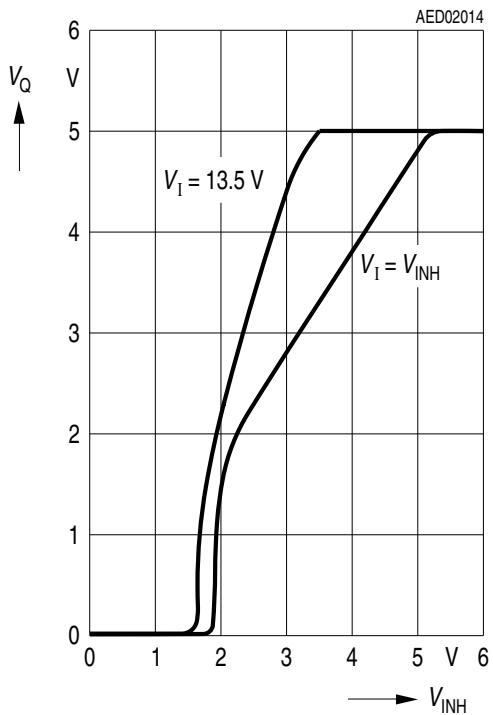
Output voltage V_Q versus input voltage V_I (5 V version)



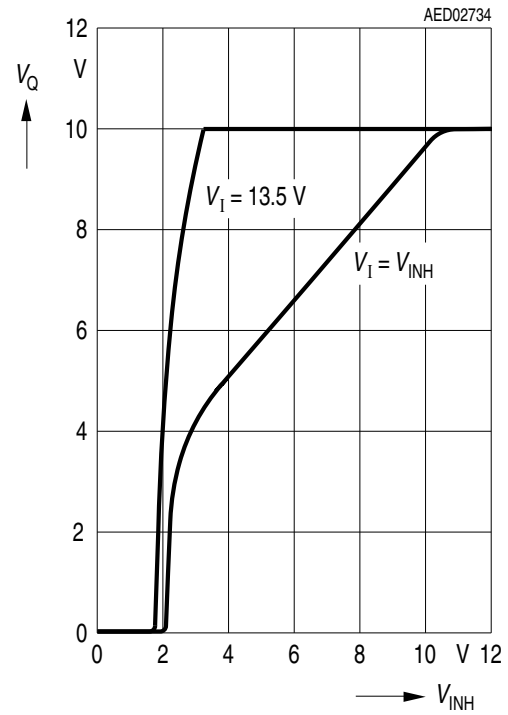
Output voltage V_Q versus input voltage V_I (10 V version)



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

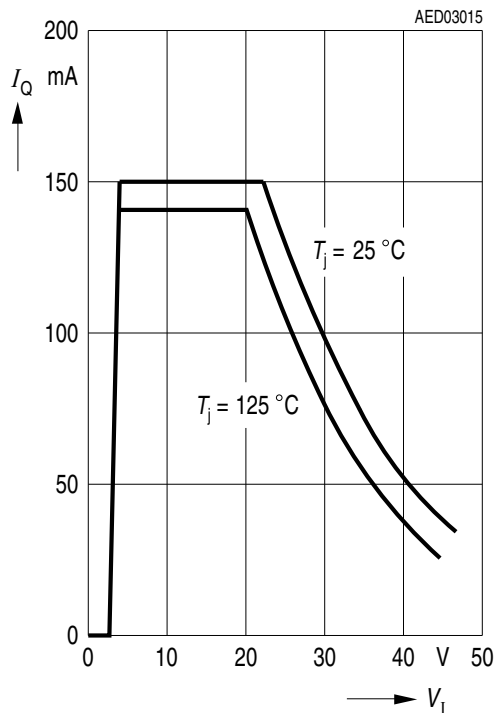


Output voltage V_Q versus inhibit voltage V_{INH} (10 V version)

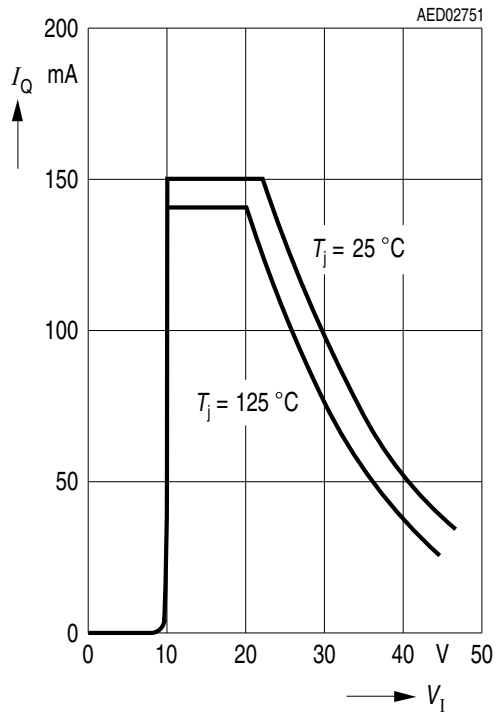


Functional description

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



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



Revision history

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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