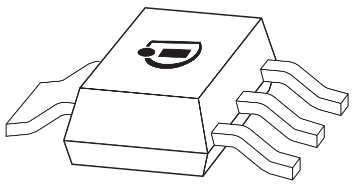
5 V/10 V Low Drop Voltage Regulator

TLE 4266

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)
- AEC Qualified



Functional Description

TLE 4266 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
TLE 4266 G	PG-SOT223-4
TLE 4266 GSV10	PG-SOT223-4

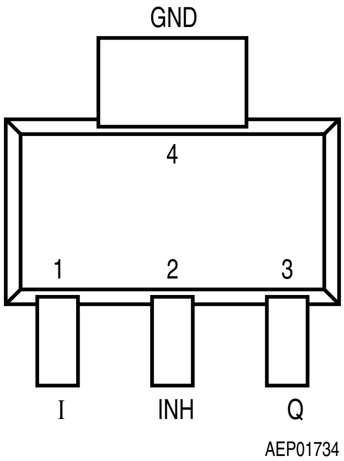


Figure 1 **Pin Configuration** (top view)

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	INH	**Inhibit;** low-active input.
3	Q	**Output voltage;** block to ground with a capacitor $C_Q \geq 10\ \mu F$.
4	GND	**Ground**

Circuit 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

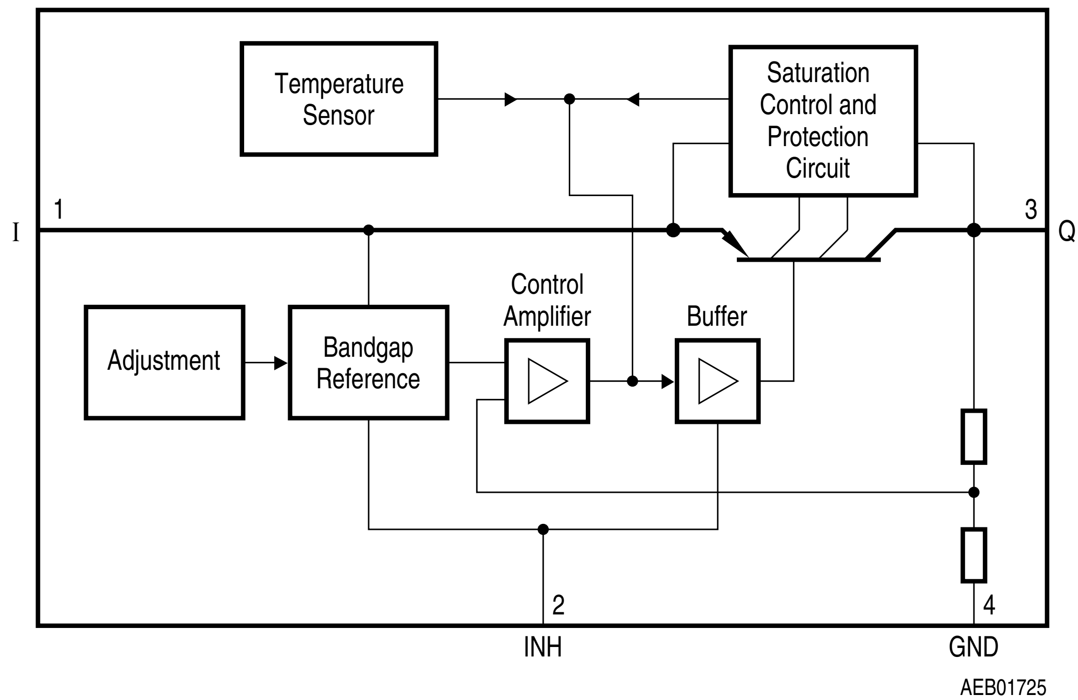


Figure 2 Block Diagram

Table 2 Absolute Maximum Ratings (TLE 4266 G, TLE 4266 GSV10)

T_j = -40 to 150 °C

Parameter	Symbol	Limit Values		Unit	Notes
		Min.	Max.		
Input					
Voltage	V_I	-42	45	V	–
Current	I_I	–	–	–	internally limited
Inhibit					
Voltage	V_{INH}	-42	45	V	–
Output					
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 (TLE 4266 G)					
Input voltage	V_I	5.5	45	V	–
Junction temperature	T_j	-40	150	°C	–
Operating Range (TLE 4266 GSV10)					
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; 35µ Cu; 5µ Sn; Footprint only; zero airflow.

Table 3 Characteristics (TLE 4266 G)

V_I = 13.5 V; -40 °C ≤ T_j ≤ 125 °C

Parameter	Symbol	Limit Values			Unit	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_{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	$V_{INH, on}$	3.5	–	–	V	–
Inhibit off voltage	$V_{INH, off}$	–	–	0.8	V	–
Inhibit current	I_{INH}	5	15	25	µA	V_{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 obtained at V_i = 13.5 V).

Table 4 Characteristics (TLE 4266 GSV10)

V_I = 13.5 V; -40 °C ≤ T_j ≤ 125 °C

Parameter	Symbol	Limit Values			Unit	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_{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	$V_{INH, on}$	3.5	–	–	V	–
Inhibit off voltage	$V_{INH, off}$	–	–	0.8	V	–
Inhibit current	I_{INH}	5	12	25	µA	V_{INH} = 5 V

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

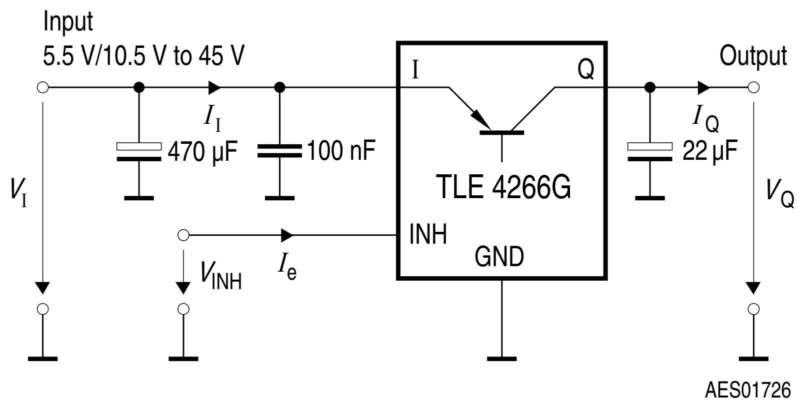


Figure 3 Measuring Circuit (TLE 4266 G, TLE 4266 GSV10)

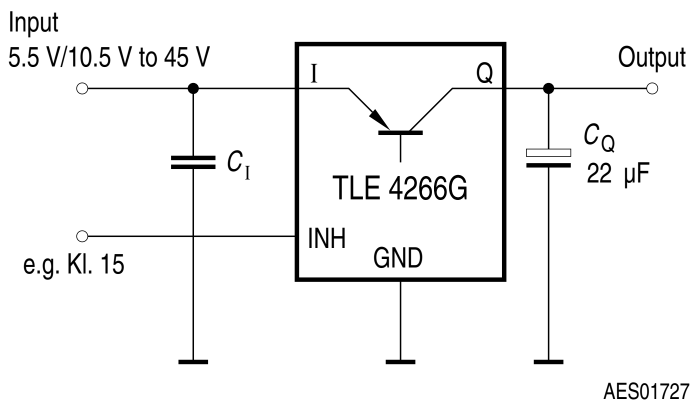
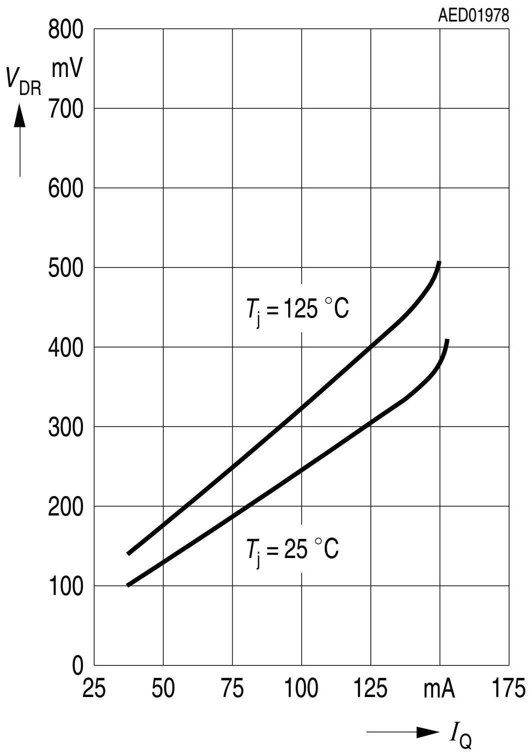
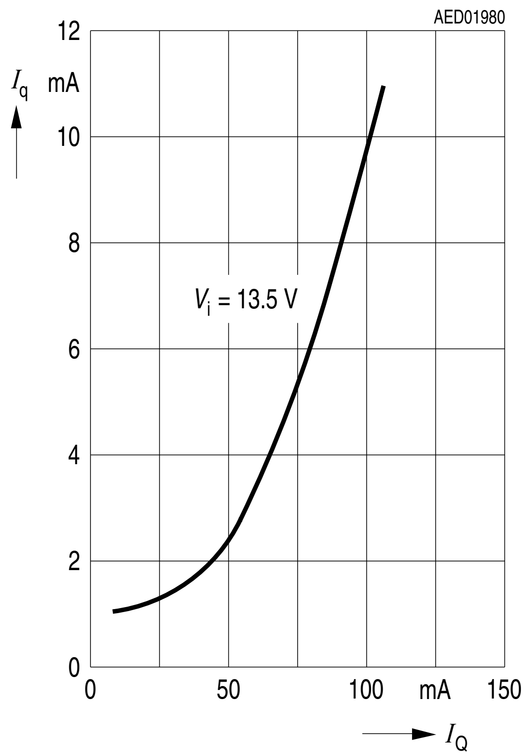


Figure 4 Application Circuit (TLE 4266 G, TLE 4266 GSV10)

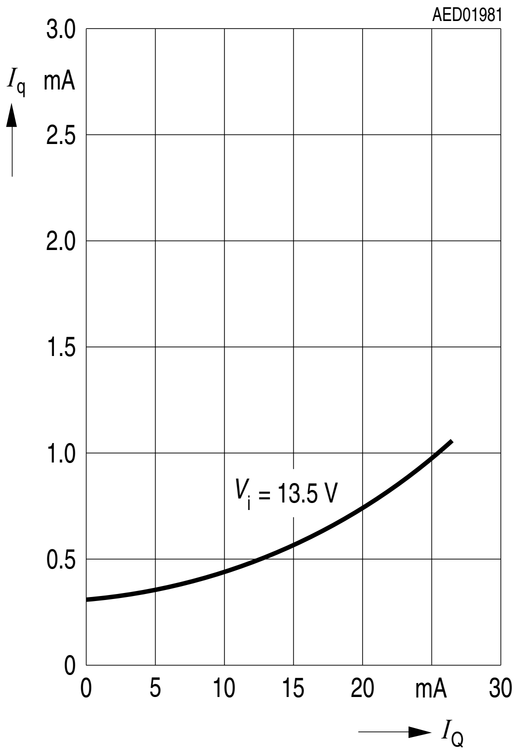
Drop Voltage V_{DR} versus Output Current I_Q (5 V, 10 V)



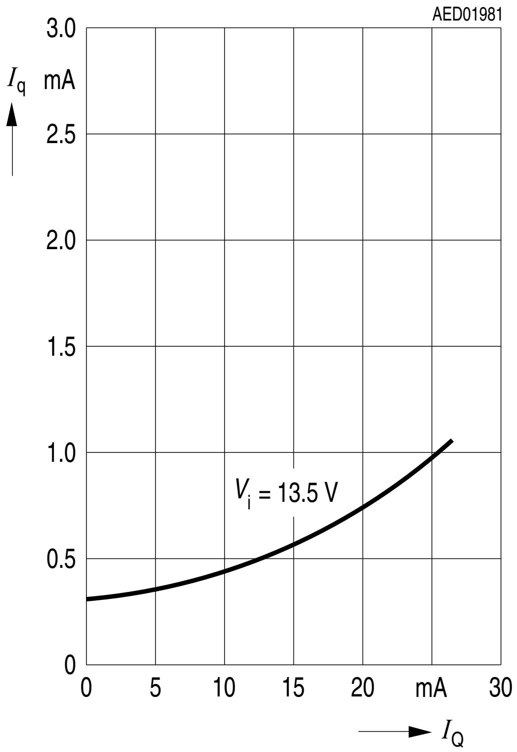
Current Consumption I_q versus Output Current I_Q (5 V)



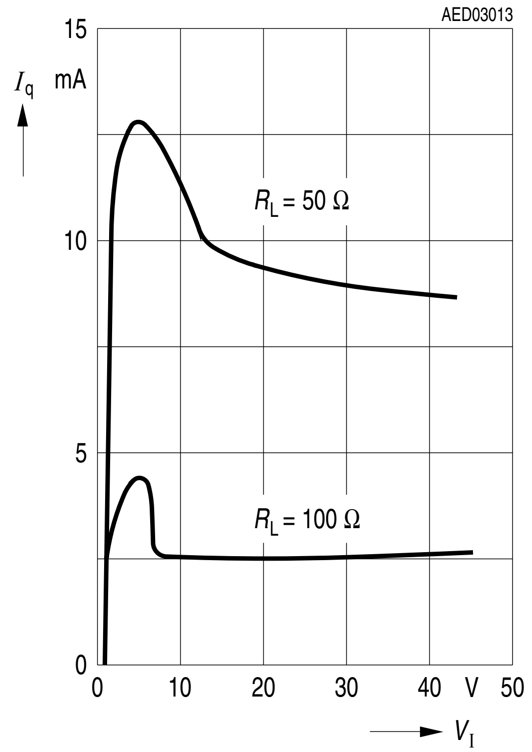
Current Consumption I_q versus Output Current I_Q (5 V version)



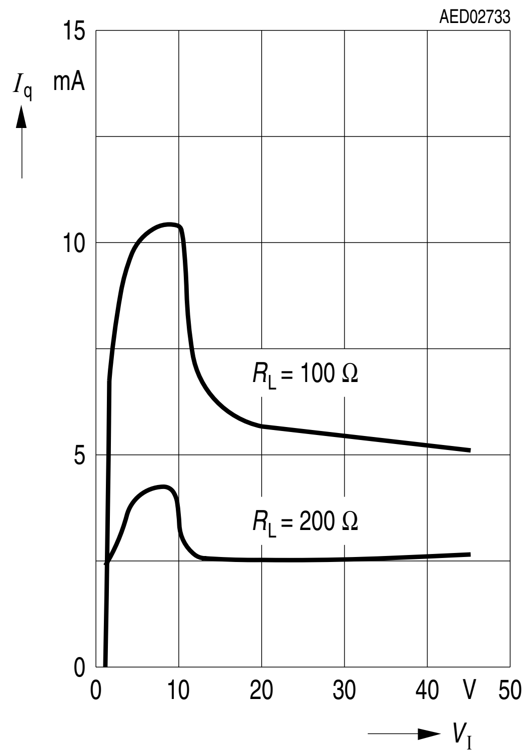
Current Consumption I_q versus Output Current I_Q (10 V version)



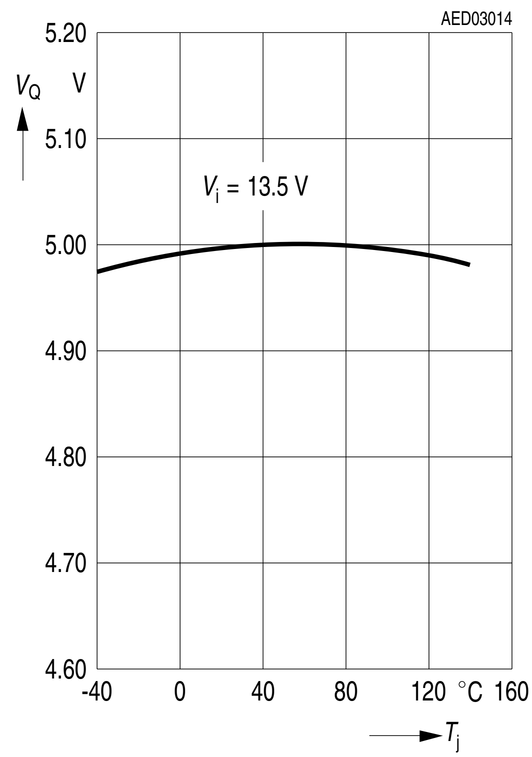
Current Consumption I_q versus Input Voltage V_I (5 V version)



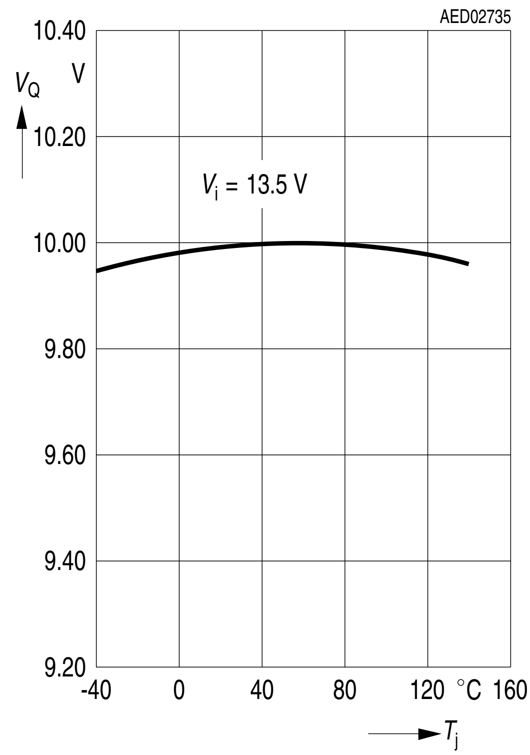
Current Consumption I_q versus Input Voltage V_I (10 V version)



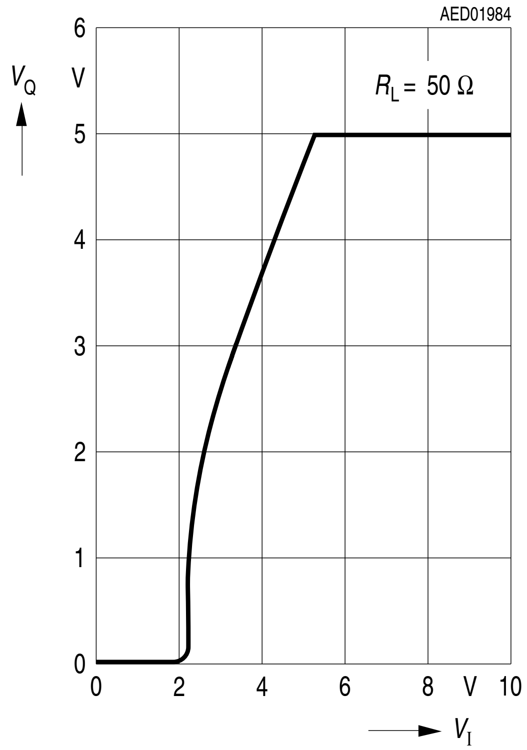
Output Voltage V_Q versus Temperature T_j (5 V version)



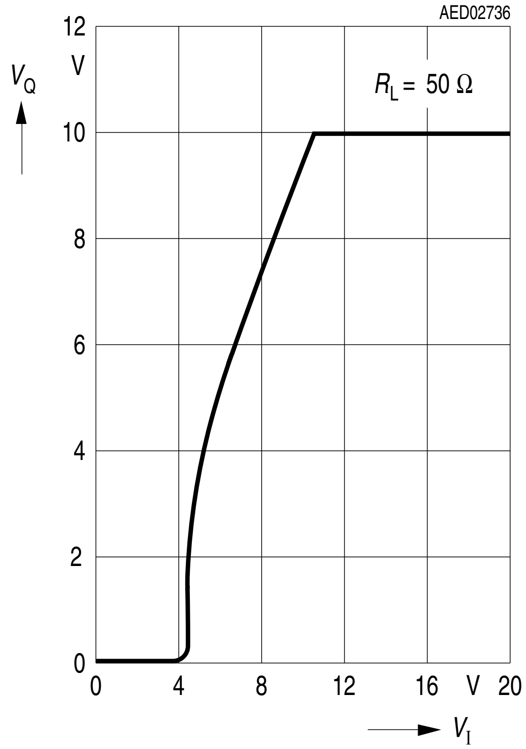
Output Voltage V_Q versus Temperature T_j (10 V version)



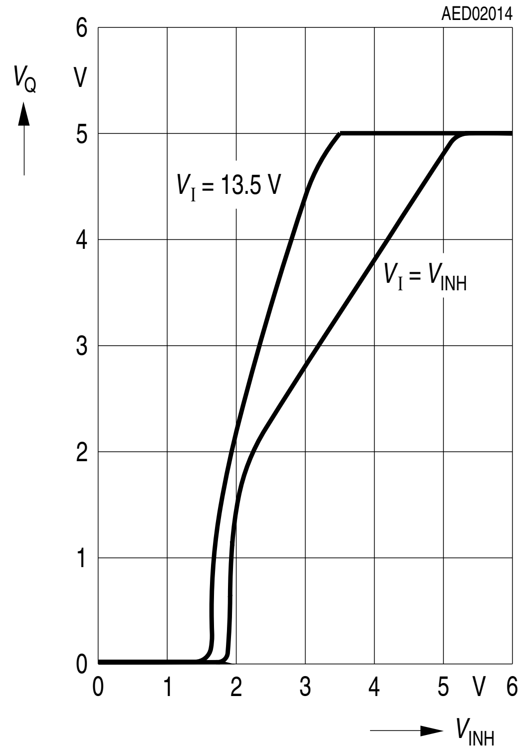
Output Voltage V_Q versus Input Voltage V_I (5 V version)



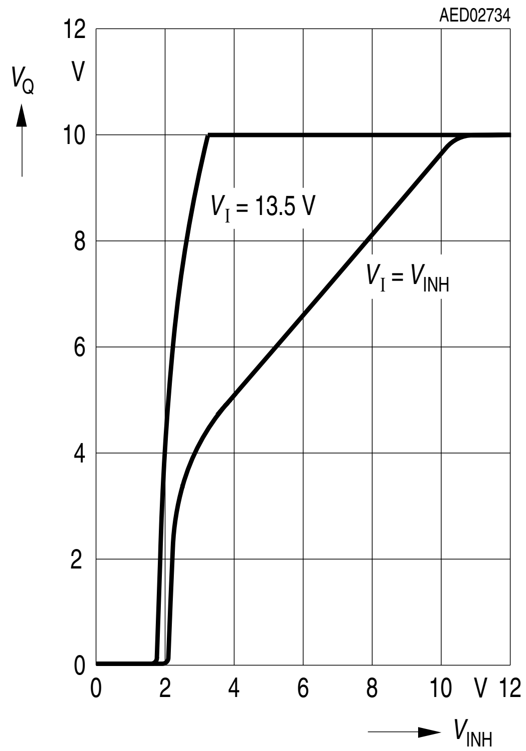
Output Voltage V_Q versus Input Voltage V_I (10 V version)



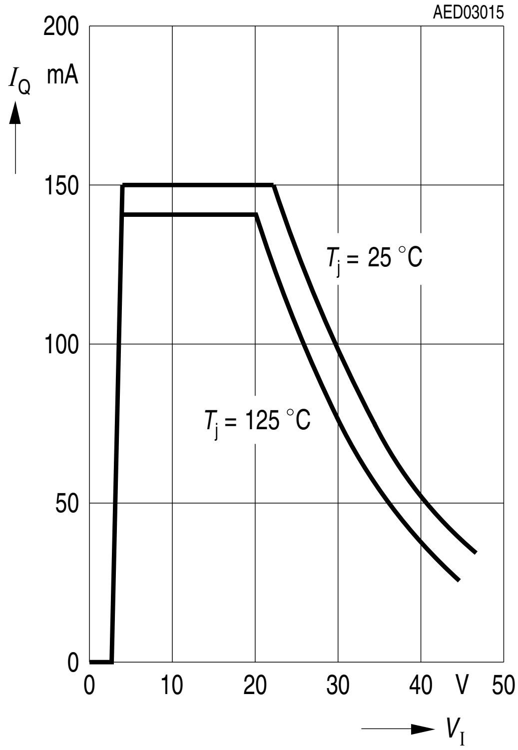
Output Voltage V_Q versus Inhibit Voltage V_{INH} (5 V version)



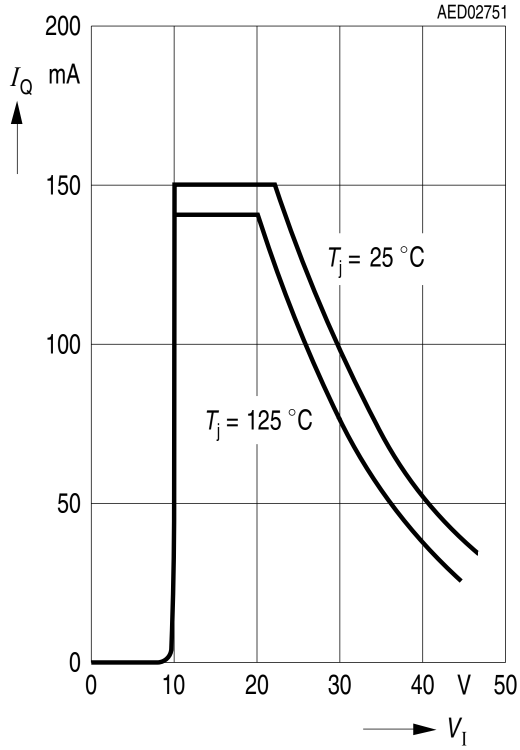
Output Voltage V_Q versus Inhibit Voltage V_{INH} (10 V version)



Output Current I_Q versus Input Voltage V_I (5 V-version)



Output Current I_Q versus Input Voltage V_I (10 V version)



Package Outlines

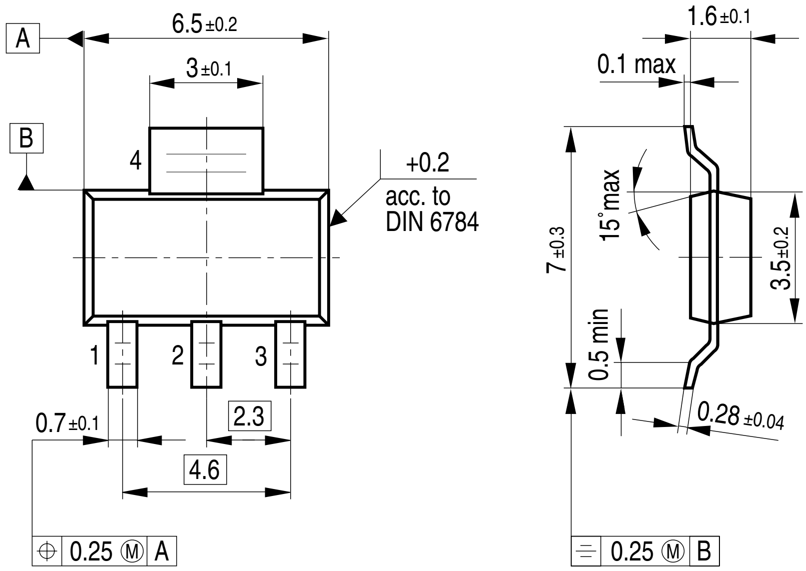


Figure 5 **PG-SOT223-4** (Plastic Small Outline Transistor)

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

Version	Date	Changes
Rev. 2.5	2008-03-10	Simplified package name to PG-SOT223-4. No modification of released product.
Rev. 2.4	2007-03-20	Initial version of RoHS-compliant derivate of TLE 4266 **Page 1**: AEC certified statement added **Page 1** and **Page 12**: RoHS compliance statement and Green product feature added **Page 1** and **Page 12**: Package changed to RoHS compliant version Legal Disclaimer updated

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