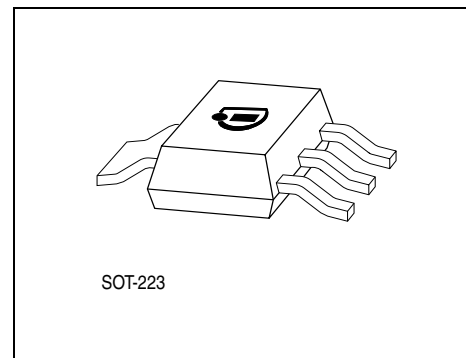


Low-Drop Voltage Regulator

TLE 4266-2

Features

- Fixed output voltage 5.0V or 3.3V
- Output voltage tolerance $\leq \pm 2\%$, $\pm 3\%$
- 150 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



Type	Ordering Code	Package
TLE 4266-2 G	Q67006-A9485	P-SOT223-4-7
TLE 4266-2 GSV33	Q67006-A9636	P-SOT223-4-7

Functional Description

The TLE 4266-2 is a monolithic integrated low-drop fixed voltage regulator which can supply loads up to 150 mA. It can be switched on and off by the $\overline{\text{INH}}$ pin. It is functional compatible to the TLE 4266, but with a reduced quiescent current of $< 1 \mu\text{A}$ in OFF mode and $40 \mu\text{A}$ in ON mode. The TLE 4266-2 is especially designed for all applications that require very low quiescent current in ON and OFF mode. The device is available in the small surface mounted P-SOT223-4-2 package. It is pin compatible to the TLE 4266G. It is designed to supply microprocessor systems under the severe condition of automotive applications and therefore it is equipped with additional protection against over load, short circuit and overtemperature. Of course the TLE 4266-2 can be used in other applications, where a stabilized voltage and the inhibit feature is required.

And input voltage V_i up to 45 V is regulated to $V_O = 5 \text{ V}$ (TLE 4266-2 G) or $V_O = 3.3 \text{ V}$ (TLE 4266-2 GSV33) with an accuracy of $\pm 3\%$. For the 5V device an accuracy of $\pm 2\%$ is kept for a load current range up to 50 mA.

The device operates in the temperature range of $T_j = -40$ to 150°C . A High level at the $\overline{\text{INH}}$ pin switches the regulator on.

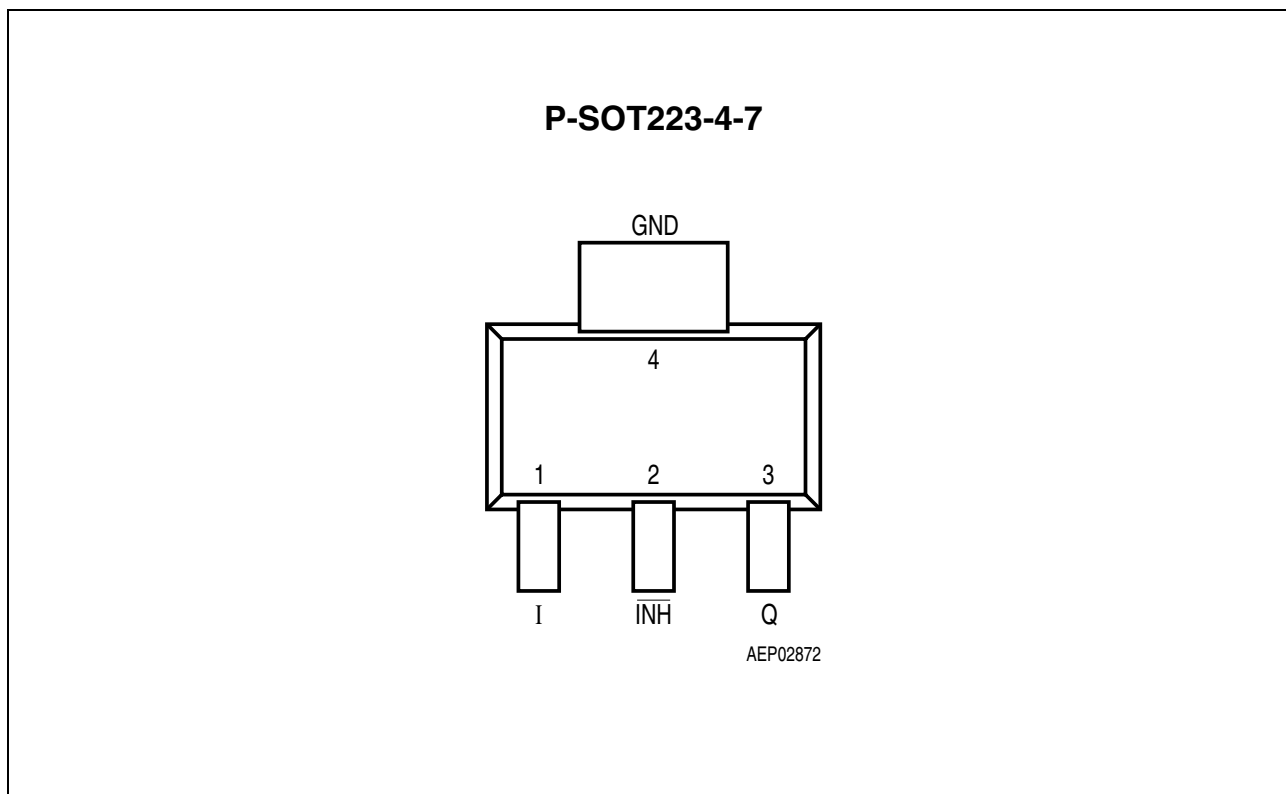


Figure 1 Pin Configuration (top view)

Pin Definitions and Functions TLE 4266-2 G, TLE 4266-2 GSV33

Pin	Symbol	Function
1	I	Input voltage; block to ground directly at the IC with a ceramic capacitor.
2	$\overline{\text{INH}}$	Inhibit input; high level turns IC on, integrated pull down resistor.
3	Q	Output voltage; block to ground with a capacitor $C_Q \geq 10 \mu\text{F}$, $\text{ESR} \leq 4 \Omega$
4	GND	Ground

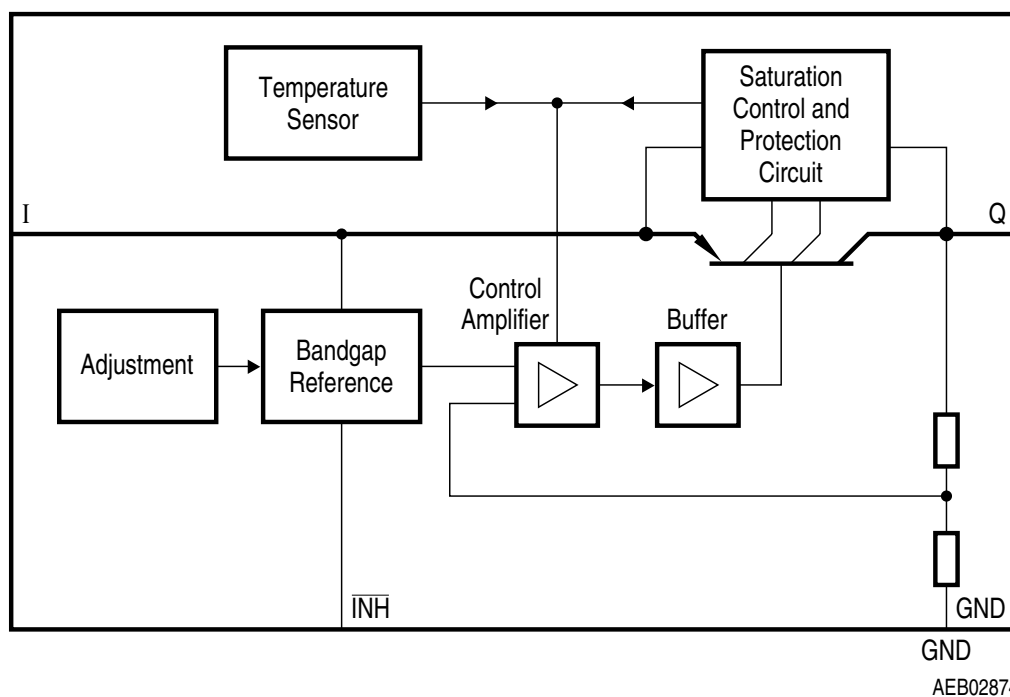


Figure 2 **Block Diagram**

Absolute Maximum Ratings

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

Parameter	Symbol	Limit Values		Unit	Notes
		min.	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	–
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Output Q

Voltage	V_Q	- 0.3	32	V	–
Current	I_Q	–	–	–	internally limited

GND

Current	I_{GND}	50	–	mA	–
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Absolute Maximum Ratings
 $T_j = -40 \text{ to } 150 \text{ }^{\circ}\text{C}$

Parameter	Symbol	Limit Values		Unit	Notes
		min.	max.		

Temperature

Junction temperature	T_j	–	150	$^{\circ}\text{C}$	–
Storage temperature	T_s	– 50	150	$^{\circ}\text{C}$	–

Thermal Resistance

Junction ambient	R_{thj-a}	–	81	K/W	P-SOT223-4-7 ¹⁾
Junction case	$R_{thj-pin4}$	–	18	K/W	P-SOT223-4-7

Operating Range

Input voltage	V_I	5.5	45	V	TLE 4266-2 G
		4.4	45	V	TLE 4266-2 GSV33
Junction temperature	T_j	– 40	150	$^{\circ}\text{C}$	–

¹⁾ Worst case, regarding peak temperature; zero airflow; mounted on a PCB $80 \times 80 \times 1.5 \text{ mm}^3$, heat sink area 300 mm^2 .

Characteristics
 $V_i = 13.5 \text{ V}; V_{\text{INH}} = 5 \text{ V}; -40 \text{ }^{\circ}\text{C} \leq T_j \leq 125 \text{ }^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Output voltage	V_Q	4.85	5.0	5.15	V	TLE 4266-2 G $5 \text{ mA} \leq I_Q \leq 100 \text{ mA}$ $6 \text{ V} \leq V_i \leq 21 \text{ V}$
		4.9	5.0	5.1	V	TLE 4266-2 G $5 \text{ mA} \leq I_Q \leq 50 \text{ mA}$ $9 \text{ V} \leq V_i \leq 16 \text{ V}$
Output voltage	V_Q	3.20	3.30	3.40	V	TLE 4266-2 GSV33 $5 \text{ mA} \leq I_Q \leq 100 \text{ mA}$ $6 \text{ V} \leq V_i \leq 21 \text{ V}$
Output-current limitation	I_Q	150	200	500	mA	–
Current consumption $I_q = I_i - I_Q$	I_q	–	0	1	μA	$V_{\text{INH}} = 0 \text{ V}; T_j \leq 100 \text{ }^{\circ}\text{C}$
Current consumption $I_q = I_i - I_Q$	I_q	–	40	60	μA	$I_Q = 100 \text{ } \mu\text{A},$ $T_j \leq 85 \text{ }^{\circ}\text{C}$
		–	40	70	μA	$I_Q = 100 \text{ } \mu\text{A},$
Current consumption $I_q = I_i - I_Q$	I_q	–	1.7	4	mA	$I_Q = 50 \text{ mA}$
Drop voltage	V_{Dr}	–	0.25	0.5	V	TLE 4266-2 G; $I_Q = 100 \text{ mA}^{1)}$
Drop voltage	V_{Dr}	–	1.00	1.10	V	TLE 4266-2 GSV33; $I_Q = 100 \text{ mA}^{2)}$
Load regulation	ΔV_Q	–	50	90	mV	TLE 4266-2 G $I_Q = 1 \text{ to } 100 \text{ mA}$ $V_i = 6 \text{ V}$
Load regulation	ΔV_Q	–	35	60	mV	TLE 4266-2 GSV33 $I_Q = 1 \text{ to } 100 \text{ mA}$ $V_i = 6 \text{ V}$

Characteristics
 $V_i = 13.5 \text{ V}; V_{\text{INH}} = 5 \text{ V}; -40 \text{ }^{\circ}\text{C} \leq T_j \leq 125 \text{ }^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Line regulation	ΔV_Q	–	5	30	mV	TLE 4266-2 G $V_i = 6 \text{ V to } 28 \text{ V}$ $I_Q = 1 \text{ mA}$
Line regulation	ΔV_Q	–	4	20	mV	TLE 4266-2 GSV33 $V_i = 6 \text{ V to } 28 \text{ V}$ $I_Q = 1 \text{ mA}$
Power Supply Ripple Rejection	$PSRR$	–	68	–	dB	$f_r = 100 \text{ Hz}, V_r = 0.5 V_{pp}$
Output Capacitor	C_Q	10	–	–	μF	$\text{ESR} \leq 4 \text{ } \Omega \text{ at } 10 \text{ kHz}$

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}	–	4	8	μA	$V_{\text{INH}} = 5 \text{ V}$
Pull down resistor	R_{INH}	–	1.0	–	M Ω	see I_{INH}

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

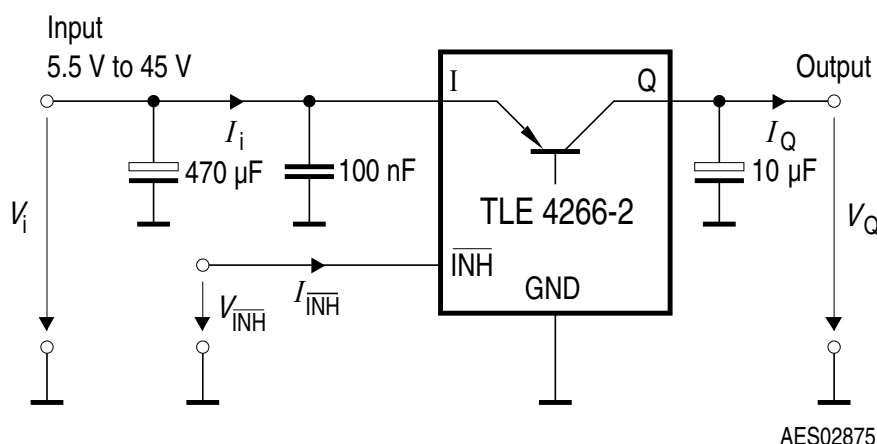


Figure 3 Measuring Circuit

Circuit Description and Application Information

In the TLE 4266-2 the output voltage is divided and compared to an internal reference of 2.5 V typical. The regulation loop controls the output to achieve an output voltage of 5 V with an accuracy of $\pm 2\%$ at an input voltage up to 45 V. The minimum required input voltage is $V_Q + V_{dr}$ with a drop voltage V_{dr} of max. 0.5V(see Fig. page 9) in case of the TLE 4266-2 G. The TLE 4266-2 GSV33 requires a minimum input voltage of 4.4V.

The TLE 4266-2 can supply up to 150 mA. However for protection reasons at high input voltage above 25 V, the maximum output current is reduced (SOA protection).

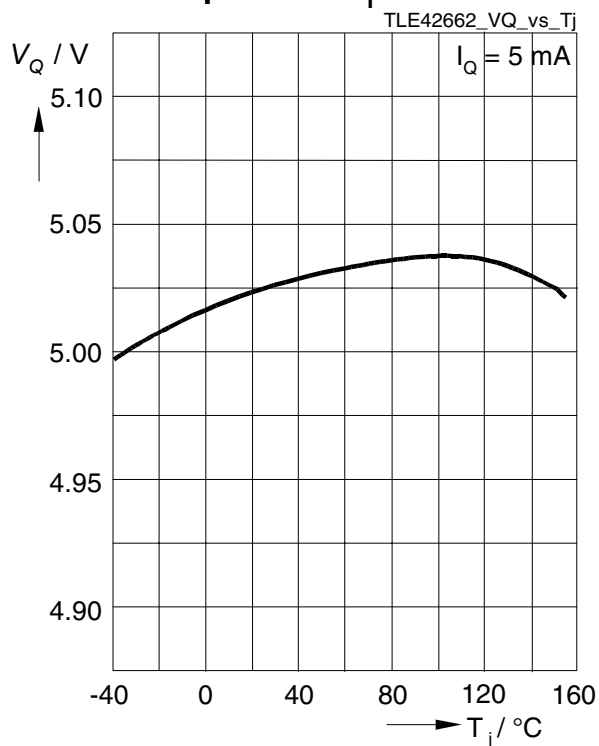
Fig. 3 shows a typical application circuit. For stability of the control loop the TLE 4266-2 output requires an output capacitor C_Q of at least 10 μF with a maximum permissible ESR of 4 Ω . Tantalum as well as multi layer ceramic capacitors are suitable.

At the input of the regulator an input capacitor is necessary for compensating line influences (100 nF ceramic capacitor recommended). A resistor of approx. 1 Ω in series with C_i , can damp any oscillation occurring due the input inductivity and the input capacitor. In the application circuit shown in Fig. 4 an additional electrolytic input capacitor of 470 μF is added in order to buffer supply line influences. This capacitor is recommended, if the device is sourced via long supply lines of several meters.

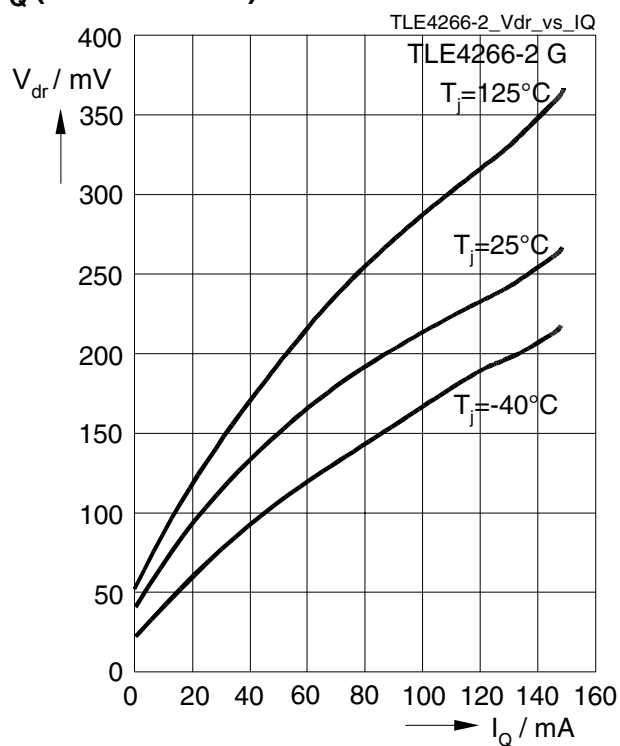
The TLE 4266-2 includes the Inhibit function. For a voltage above 3.5 V at the $\overline{\text{INH}}$ pin the regulator is switched on.

Typical Performance Characteristics

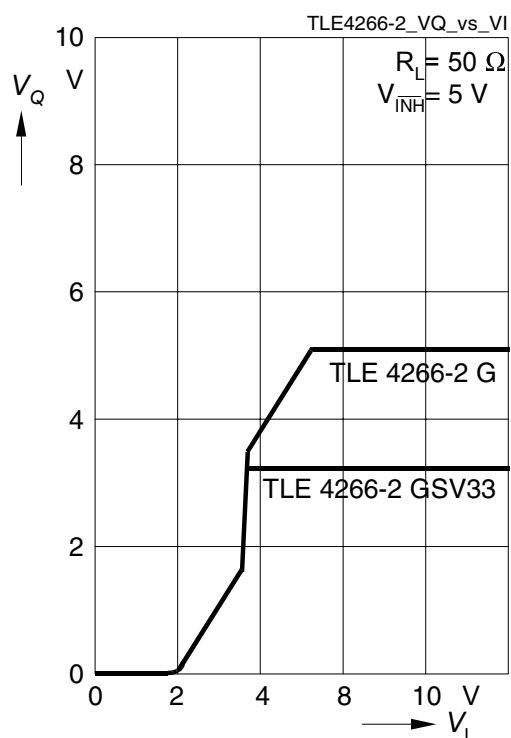
Output Voltage versus V_Q versus Junction Temperature T_j



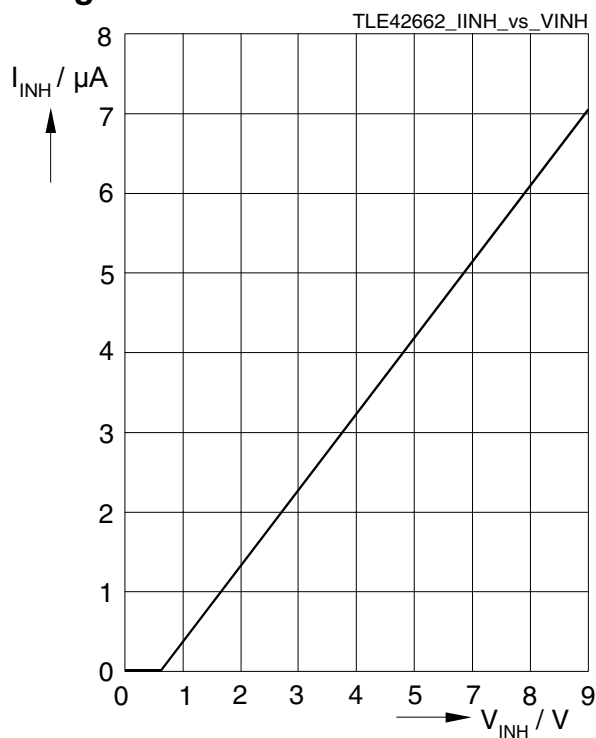
Drop Voltage V_{dr} versus Output Current I_Q (TLE4266-2 G)



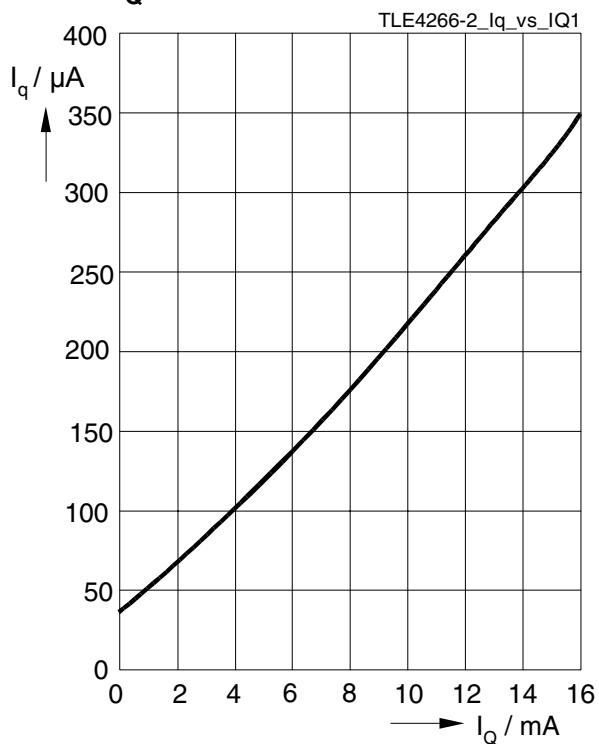
Output Voltage V_Q versus Input Voltage V_I



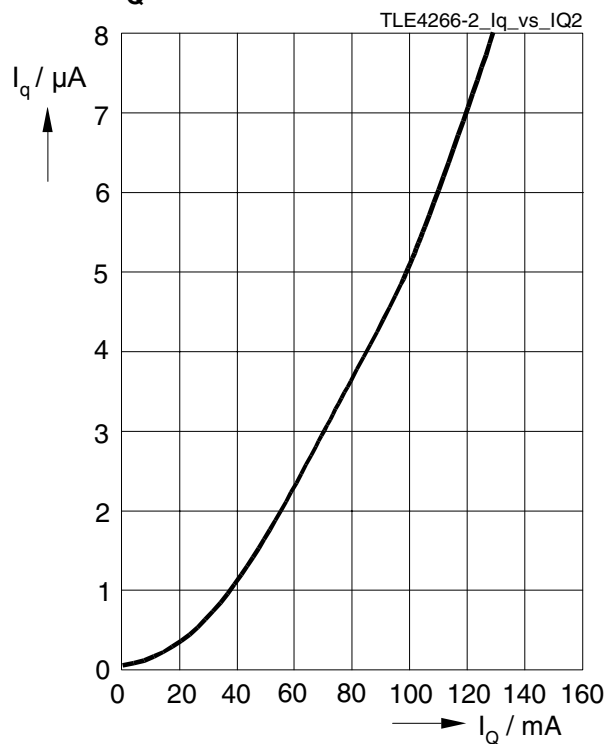
Inhibit Current I_{INH} versus Inhibit Voltage



Current Consumption I_q versus Output Current I_Q



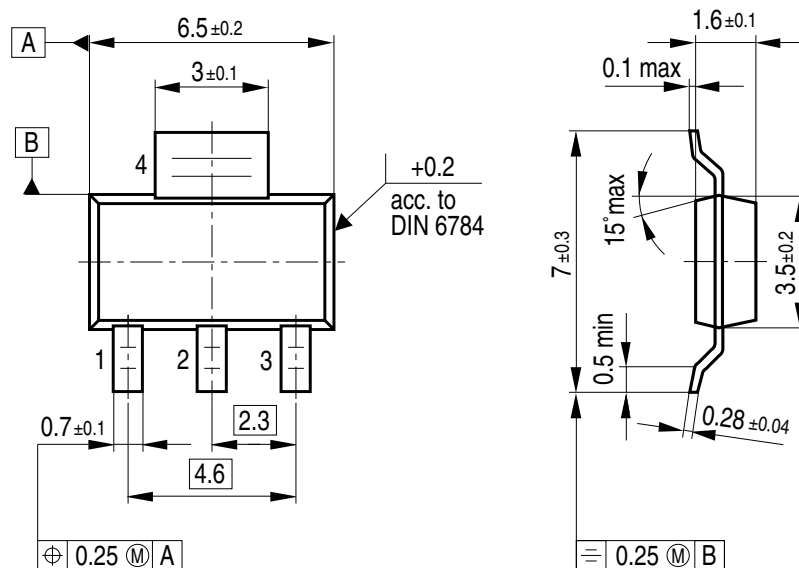
Current Consumption I_q versus Output Current I_Q



Package Outlines

P-SOT223-4-7

(Plastic Small Outline Transistor)



Weight approx. 0.15 g

GPS05560

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