

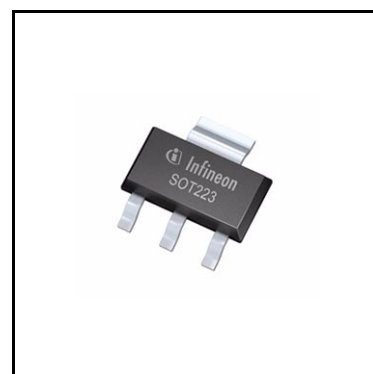
OPTIREG™ Linear TLE4264

5-V low drop fixed voltage regulator



Features

- Output voltage tolerance $\leq \pm 2\%$
- Low-drop voltage
- Very low current consumption
- Overtemperature protection
- Short-circuit proof
- Suitable for use in automotive electronics
- Reverse polarity
- 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 TLE4264 is a 5-V low-drop fixed-voltage regulator in an PG-SOT223-4 package. The IC regulates an input voltage V_I in the range $5.5\text{ V} < V_I < 45\text{ V}$ to $V_{Qrated} = 5.0\text{ V}$. The maximum output current is more than 120 mA. This IC is shortcircuit-proof and features temperature protection that disables the circuit at overtemperature.

Dimensioning information on 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 inductivity and input capacitance can be damped. The output capacitor C_Q is necessary for the stability of the regulating circuit. Stability is guaranteed at values $C_Q \geq 10\ \mu\text{F}$ and an $\text{ESR} \leq 10\ \Omega$ within the operating temperature range.

Type	Package	Marking
TLE4264G	PG-SOT223-4	4264 G

Table of contents

	Features	1
	Potential applications	1
	Product validation	1
	Description	1
	Table of contents	2
1	Block diagram	3
2	Pin configuration	4
3	General product characteristics	5
3.1	Absolute maximum ratings	5
3.2	Electrical characteristics	5
4	Functional description	7
4.1	Application circuit	7
5	Typical performance characteristics	8
6	Package information	10
7	Revision history	11

Block diagram

1 Block diagram

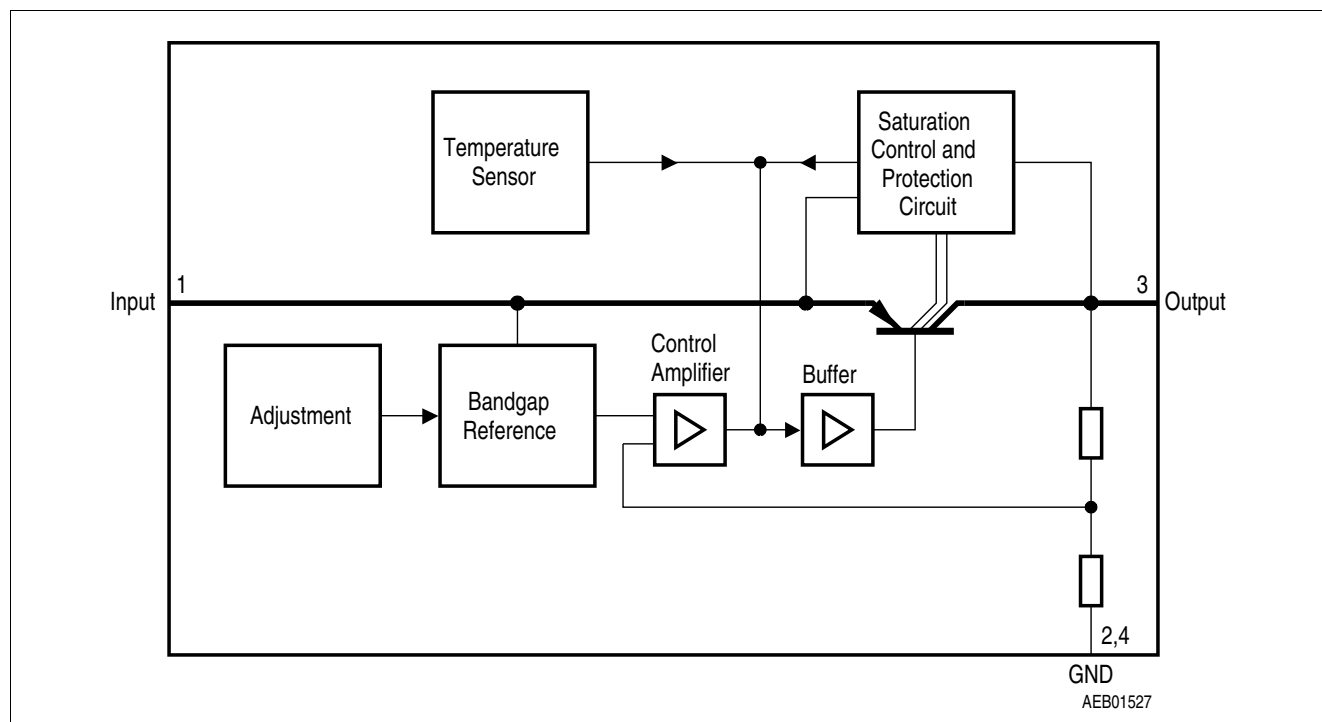


Figure 1 Block diagram

Pin configuration

2 Pin configuration

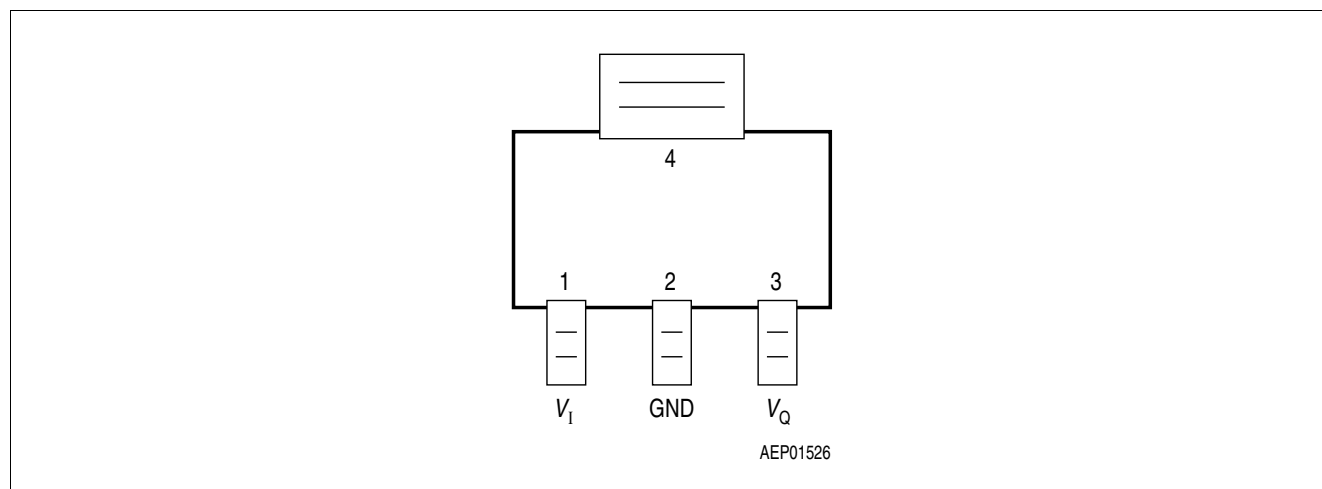


Figure 2 Pin configuration (top view)

Table 1 Pin definitions and functions

Pin	Symbol	Function
1	V_I	Input voltage Block to ground directly on IC with ceramic capacitor.
2, 4	GND	Ground
3	V_O	5-V output voltage Block to ground with $\geq 10 \mu\text{F}$ capacitor, $\text{ESR} \leq 10 \Omega$.

General product characteristics

3 General product characteristics

3.1 Absolute maximum ratings

Table 2 Absolute maximum ratings

$T_j = -40^{\circ}\text{C}$ to 150°C

Parameter	Symbol	Values			Unit	Note or Test Condition
		Min.	Typ.	Max.		
Input						
Input voltage	V_I	-42	–	45	V	–
Input current	I_I	–	–	–	–	Limited internally
Output						
Output voltage	V_Q	-1	–	32	V	–
Output current	I_Q	–	–	–	–	Limited internally
Ground						
Current	I_{GND}	50	–	–	mA	–
Temperatures						
Junction temperature	T_j	–	–	150	°C	–
Storage temperature	T_{stg}	-50	–	150	°C	–
Operating range						
Input voltage	V_I	5.5	–	45	V	–
Junction temperature	T_j	-40	–	150	°C	–
Thermal resistances						
Junction-ambient	$R_{\text{thj-a}}$	–	–	85	K/W	¹⁾
Junction-pin4	$R_{\text{thi-pin4}}$	–	–	20	K/W	–

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 .

3.2 Electrical characteristics

Table 3 Electrical characteristics

$V_I = 13.5 \text{ V}$; $T_j = -40^{\circ}\text{C}$ to 125°C , unless specified otherwise

Parameter	Symbol	Values			Unit	Note or Test Condition
		Min.	Typ.	Max.		
Output voltage	V_Q	4.9	5.0	5.1	V	$I_Q = 5 \text{ mA}$ to 100 mA $V_I = 6 \text{ V}$ to 28 V
Output-current limiting	I_Q	120	160	–	mA	–
Current consumption $I_q = I_I - I_Q$	I_q	–	–	400	μA	$I_Q = 1 \text{ mA}$
Current consumption $I_q = I_I - I_Q$	I_q	–	9	15	mA	$I_Q = 100 \text{ mA}$

General product characteristics

Table 3 Electrical characteristics (cont'd)

$V_I = 13.5\text{ V}$; $T_j = -40^\circ\text{C}$ to 125°C , unless specified otherwise

Parameter	Symbol	Values			Unit	Note or Test Condition
		Min.	Typ.	Max.		
Drop voltage	V_{dr}	–	0.25	0.5	V	$I_Q = 100\text{ mA}^{1)}$
Load regulation	ΔV_Q	–	–	40	mV	$I_Q = 5\text{ to }100\text{ mA}$ $V_I = 6\text{ V}$
Supply-voltage regulation	ΔV_Q	–	15	30	mV	$V_I = 6\text{ to }28\text{ V}$ $I_Q = 5\text{ mA}$
Power supply ripple rejection	$PSRR$	–	54	–	dB	$f_r = 100\text{ Hz}$ $V_r = 0.5\text{ Vpp}$

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

Functional description

4 Functional description

4.1 Application circuit

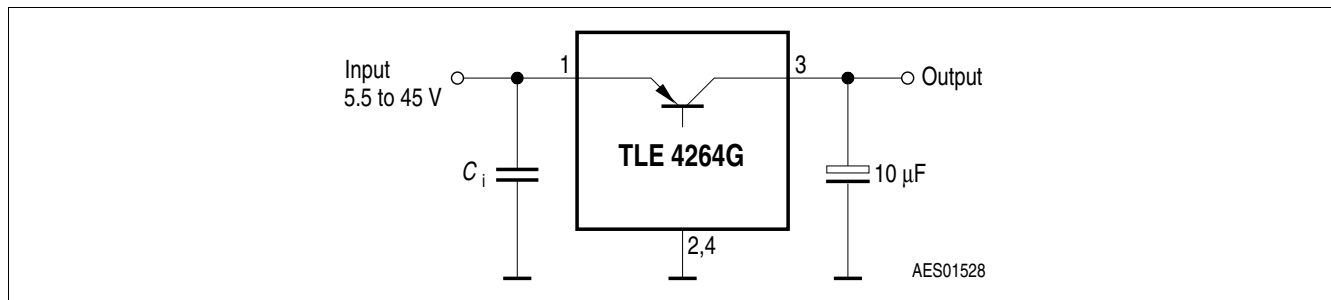


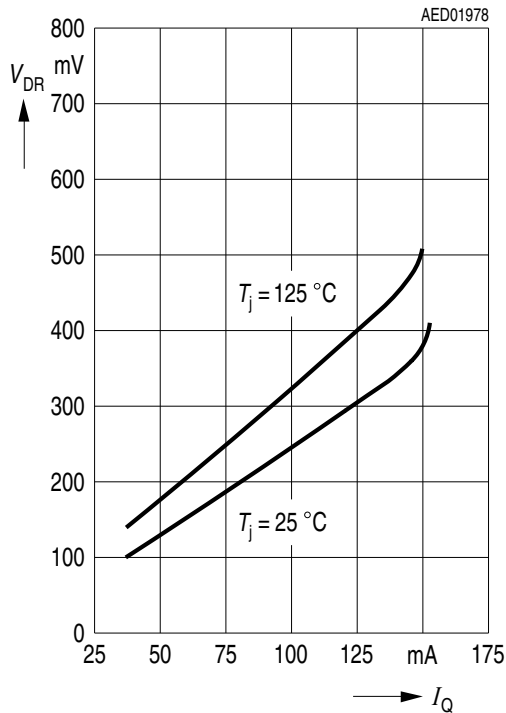
Figure 3 Application circuit

The control amplifier compares a reference voltage, which is kept highly precise by resistance adjustment, to a voltage that is proportional to the output voltage and drives the base of the series transistor via a buffer. Saturation control, working as a function of load current, prevents any over-saturation of the power element. The IC is protected against overload, overtemperature and reverse polarity.

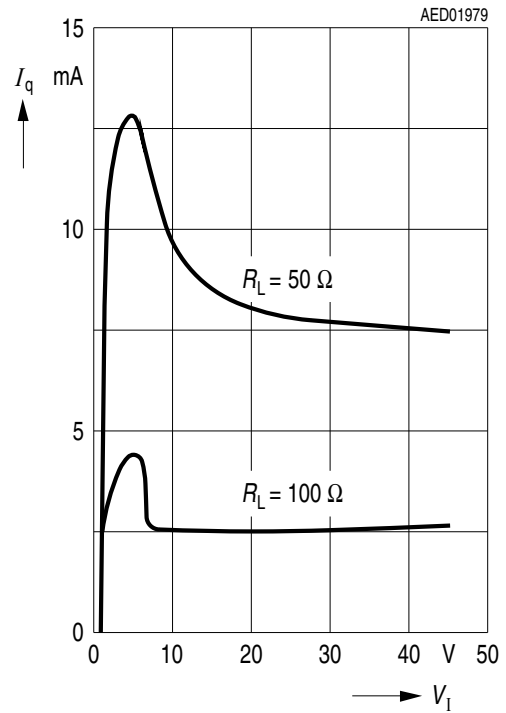
Typical performance characteristics

5 Typical performance characteristics

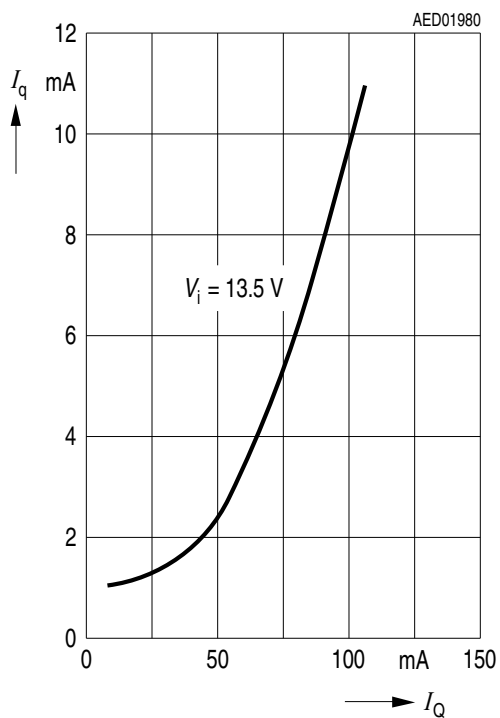
**Drop voltage V_{DR} versus
output current I_Q**



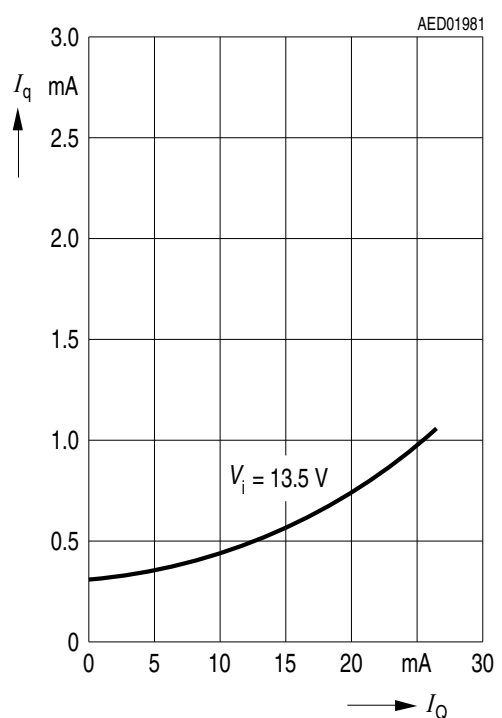
**Current consumption I_q versus
input voltage V_i**



**Current consumption I_q versus
output current I_Q**

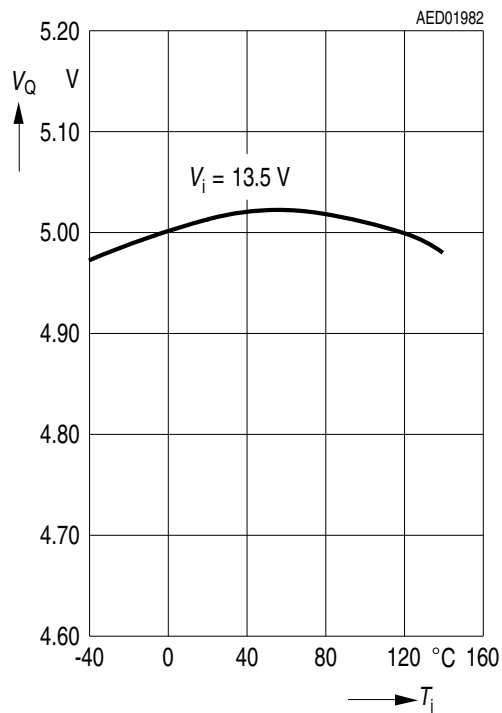


**Current consumption I_q versus
output current I_Q**

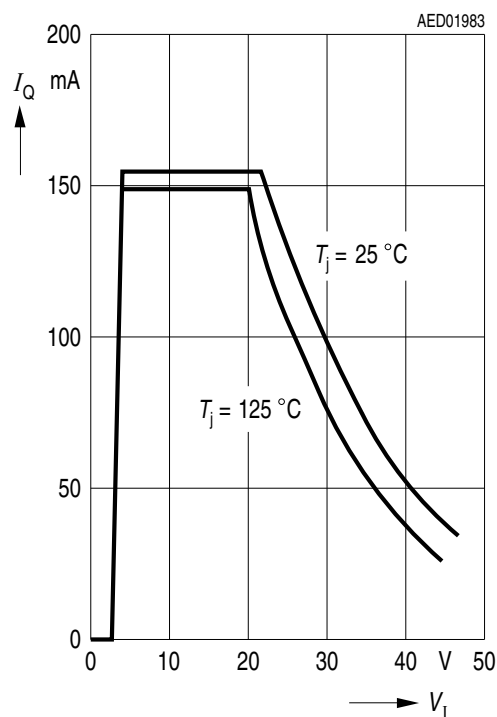


Typical performance characteristics

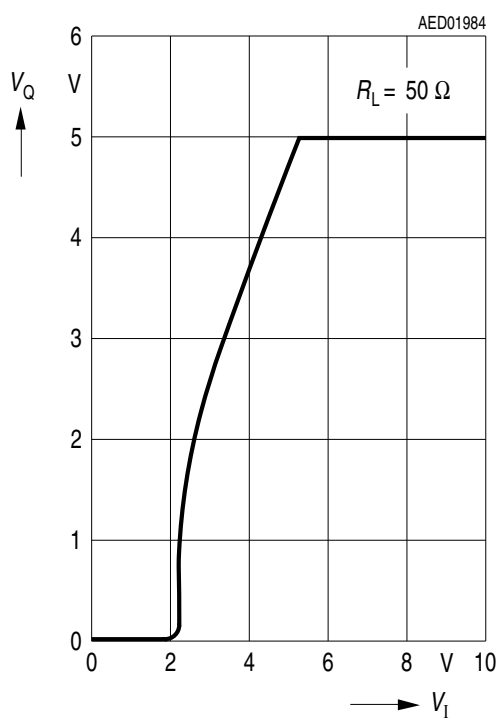
**Output voltage V_Q versus
junction temperature T_j**



**Output current I_Q versus
input voltage V_i**



**Output voltage V_Q versus
input voltage V_i**



Revision history

7 Revision history

Revision	Date	Changes
2.5	2021-07-12	Editorial change page 6: typo in column “Note or Test conditions” 6mA to 5mA
2.4	2019-05-22	Updated layout and structure Updated packaged drawing “PG-SOT223” Editorial changes
2.3	2008-03-07	Simplified package name to PG-SOT223-4 No modification of released product
2.2	2007-03-20	Initial version of RoHS-compliant derivate of TLE4264 Page 1: AEC certified statement added Page 1 and Page 10: RoHS compliance statement and Green product feature added Page 1 and Page 10: Package changed to RoHS compliant version Legal Disclaimer updated

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