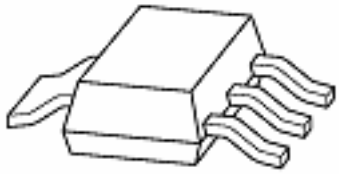
5 V Low-Drop Voltage Regulator ILE 4266-2

Features

- Output voltage tolerance ≤ ± 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



ILE 4266-2 P-SOT223-4-2

TA = -40 °...125 °C

Type	Package
ILE 4266-2 G	P-SOT223-4-2

Functional Description

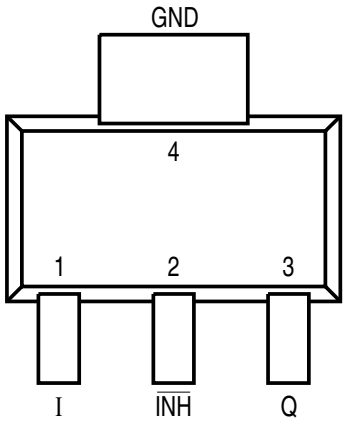
The ILE 4266-2 is a monolithic integrated low-drop fixed voltage regulator which can supply loads up to 150 mA. It can be switched on and off by the $\overline{\text{INH}}$ pin. It is functional compatible to the ILE 4266, but with a reduced quiescent current of < 1 µA in OFF mode and 35 µA in ON mode. The ILE 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. In the P-SOT223-4-2 housing it is pin compatible to the ILE 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 ILE 4266-2 can be used in other applications, where a stabilized voltage and the inhibit feature is required.

And input voltage V_i in the range of 6 V < V_i < 45 V is regulated to V_Q = 5 V with an accuracy of ± 3%.

The device operates in the temperature range of T_j = – 40 to 125 °C. A High level at the $\overline{\text{INH}}$ pin switches the regulator on.

Pin Configuration (top view)

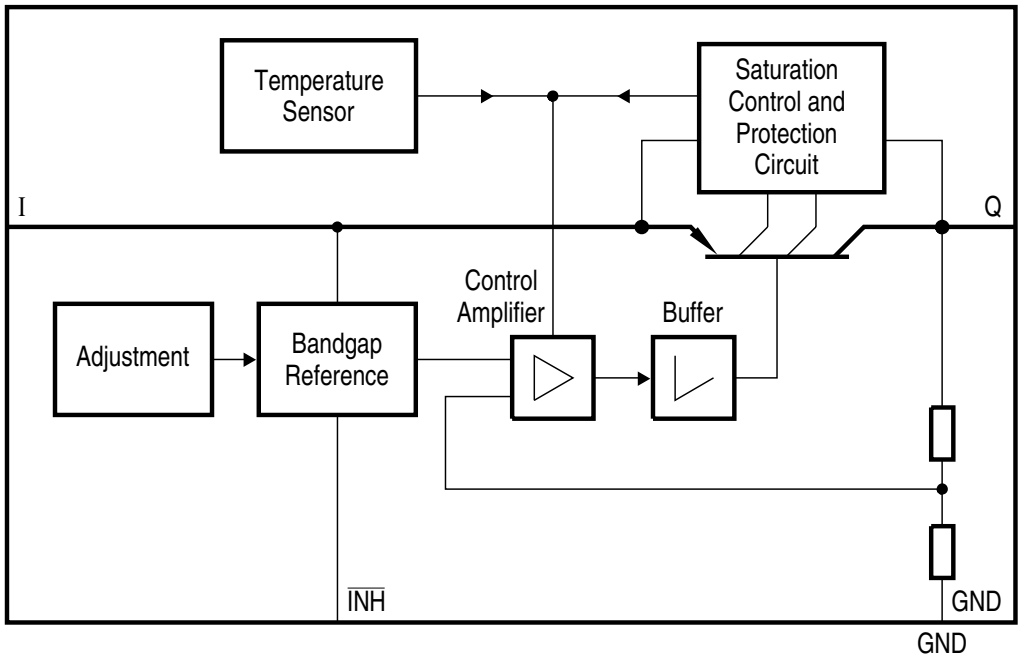
P-SOT223-4-2



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;** high level turns IC on.
3	Q	**Output voltage;** block to ground with a capacitor.
4	GND	**Ground**

Block Diagram



Absolute Maximum Ratings

T_j = – 40 to 125 °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	–
Output Q					
Voltage	V_Q	– 1	32	V	–
Current	I_Q	–	–	–	internally limited
Output Voltage Sense S					
Voltage	V_S	– 1	32	V	–
Current	I_S	–	–	–	internally limited
GND					
Current	I_{GND}	50	–	mA	–
Temperature					
Junction temperature	T_j	–	150	°C	–
Storage temperature	T_S	– 50	150	°C	–
Operating Range					
Input voltage	V_i	5.5	45	V	–
Junction temperature	T_j	– 40	150	°C	–

Absolute Maximum Ratings

T_j = – 40 to 150 °C

Parameter	Symbol	Limit Values		Unit	Notes
		min.	max.		
Thermal Resistance					
Junction ambient	$R_{thj\text{-}a}$	–	85	K/W	P-SOT223-4-2[1)]
Junction ambient	$R_{thj\text{-}a}$	–	115	K/W	P-TSOP-8-1[1)]
Junction case	$R_{thj\text{-}pin4}$	–	20	K/W	P-SOT223-4-2
Junction case	$R_{thj\text{-}pin5\text{-}8}$	–	29	K/W	P-TSOP-8-1
Operating Range					
Input voltage	V_i	5.5	45	V	–
Junction temperature	T_j	– 40	150	°C	–

1) Worst case, regarding peak temperature; zero airflow; mounted an a PCB 80 × 80 × 1.5 mm³, heat sink area 300 mm².

Characteristics

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	150	200	500	mA	–
Current consumption $I_q = I_i - I_Q$	I_q	–	0	1	µA	$V_{\overline{INH}}$ = 0 V; T_j ≤ 100 °C
Current consumption $I_q = I_i - I_Q$	I_q	–	35	–	µA	I_Q = 1 mA Inhibit ON
Current consumption $I_q = I_i - I_Q$	I_q	–	2	8	mA	I_Q = 50 mA Inhibit ON
Drop voltage	V_{Dr}	–	0.25	0.5	V	I_Q = 100 mA[1)]
Load regulation	ΔV_Q	–	10	30	mV	I_Q = 1 to 100 mA V_i = 6 V
Line regulation	ΔV_Q	–	10	40	mV	V_i = 6 V to 28 V I_Q = 1 mA
Supply-voltage rejection	SVR	–	68	–	dB	f_r = 100 Hz, V_r = 0.5 V_{PP}
Output Capacitor	C_Q	10	–	–	µF	Low ESR tantalum or ceramic capacitor recommended
Output Series Resistance	$R_Q + ESR$	1.5	–	5.5	Ω	C_Q= 10 µF
	$R_Q + ESR$	1.0	–	5.5	Ω	C_Q= 22 µF

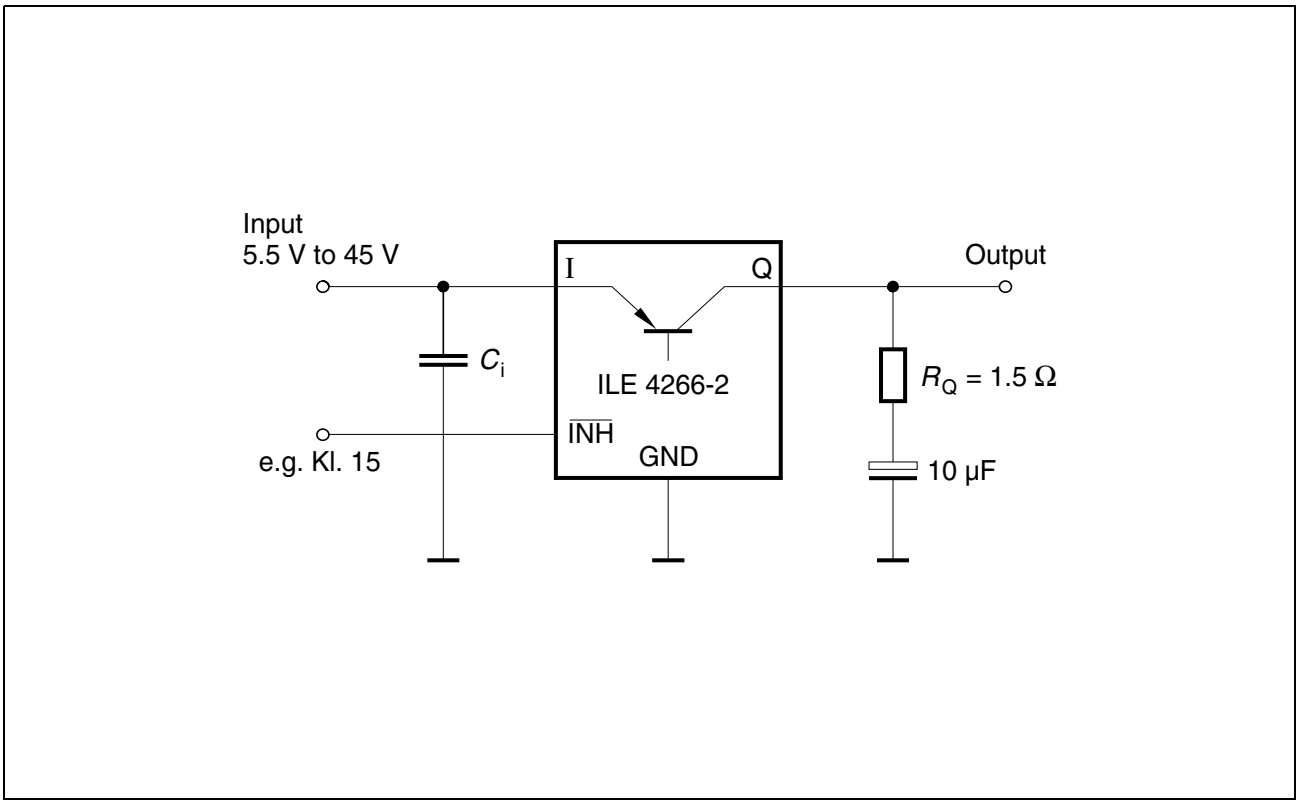
Characteristics

V_I = 13.5 V; – 40 °C ≤ T_j ≤ 125 °C

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Inhibit						
Inhibit on voltage	$V_{\overline{INH},\ on}$	–	–	3.5	V	–
Inhibit off voltage	$V_{\overline{INH},\ off}$	0.8	–	–	V	–
Inhibit current	$I_{\overline{INH}}$	–	4	8	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 obtained at V_i = 13.5 V).

Measuring Circuit



Circuit Description and Application Information

In the ILE 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 ± 2% at an input voltage range of 5.5 V < V_I < 45 V.

For stability of the control loop the ILE 4266-2 output requires an output capacitor C_Q of at least 10 µF and an additional output resistor R_Q. The resistor should be 1.5 Ω when a 10 µF capacitor is used and 1.0 Ω for $C_Q \geq 22$µF. The sum of R_Q and the ESR of the capacitor must be kept below 5.5 Ω. In order to achieve this the use of low-ESR tantalum or ceramic capacitors is recommended.

The ILE 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).

At the input of the regulator an input capacitor is necessary for compensating line influences. A resistor of approx. 1 Ω in series with C_I, can damp any oscillation occuring due the input inductivity and the input capacitor.

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

Package Dimension

P-SOT223-4-2