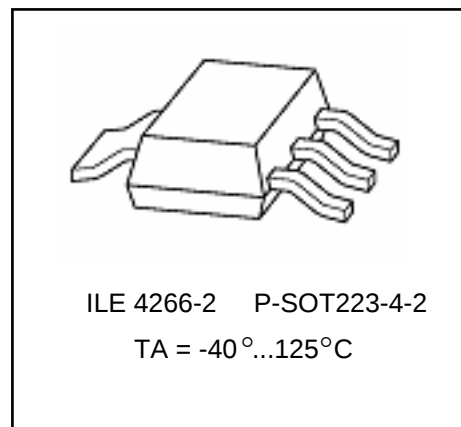


5 V Low-Drop Voltage Regulator

ILE 4266-2

Features

- Output voltage tolerance $\leq \pm 3 \%$
- 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

Package

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

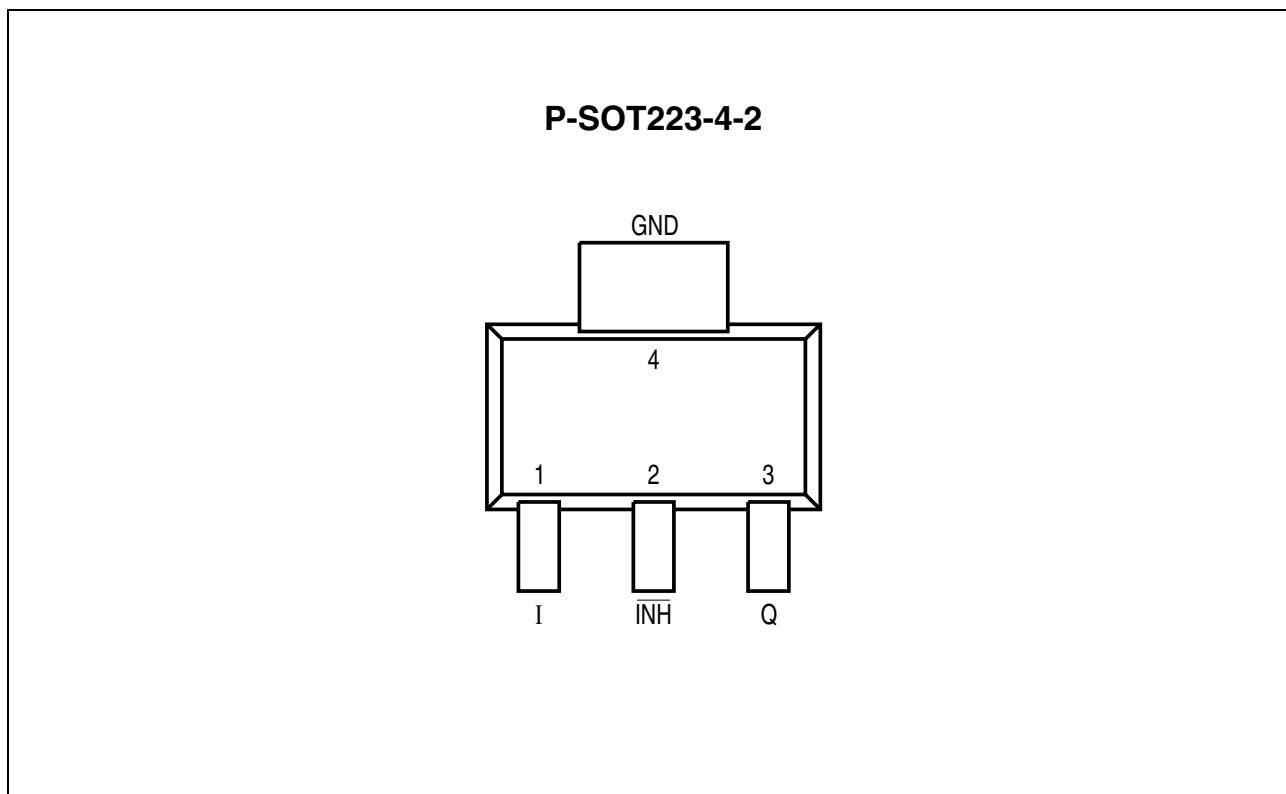
Functional Description

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 $< 1 \mu\text{A}$ in OFF mode and $35 \mu\text{A}$ 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 $6 \text{ V} < V_i < 45 \text{ V}$ is regulated to $V_o = 5 \text{ V}$ with an accuracy of $\pm 3\%$.

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

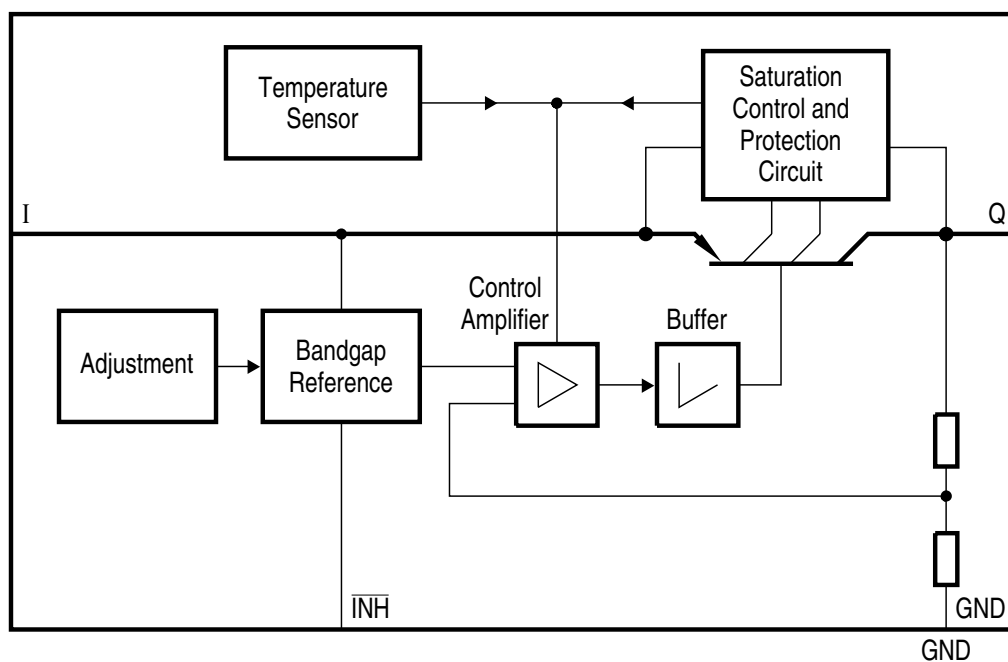
Pin Configuration (top view)



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 $125\text{ }^{\circ}\text{C}$

Parameter	Sym bol	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	$^{\circ}\text{C}$	–
Storage temperature	T_S	- 50	150	$^{\circ}\text{C}$	–

Operating Range

Input voltage	V_i	5.5	45	V	–
Junction temperature	T_j	- 40	150	$^{\circ}\text{C}$	–

Absolute Maximum Ratings

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

Parameter	Symbol	Limit Values		Unit	Notes
		min.	max.		

Thermal Resistance

Junction ambient	R_{thj-a}	—	85	K/W	P-SOT223-4-2 ¹⁾
Junction ambient	R_{thj-a}	—	115	K/W	P-TSOP-8-1 ¹⁾
Junction case	$R_{thj-pin4}$	—	20	K/W	P-SOT223-4-2
Junction case	$R_{thj-pin5-8}$	—	29	K/W	P-TSOP-8-1

Operating Range

Input voltage	V_i	5.5	45	V	—
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

$V_i = 13.5 \text{ V}; -40 \text{ }^{\circ}\text{C} \leq T_j \leq 125 \text{ }^{\circ}\text{C}$

Parameter	Symbol	Limit Values			Unit	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	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	–	35	–	μA	$I_Q = 1 \text{ mA}$ Inhibit ON
Current consumption $I_q = I_i - I_Q$	I_q	–	2	8	mA	$I_Q = 50 \text{ mA}$ Inhibit ON
Drop voltage	V_{Dr}	–	0.25	0.5	V	$I_Q = 100 \text{ mA}^{1)}$
Load regulation	ΔV_Q	–	10	30	mV	$I_Q = 1 \text{ to } 100 \text{ mA}$ $V_i = 6 \text{ V}$
Line regulation	ΔV_Q	–	10	40	mV	$V_i = 6 \text{ V to } 28 \text{ V}$ $I_Q = 1 \text{ mA}$
Supply-voltage rejection	SVR	–	68	–	dB	$f_r = 100 \text{ Hz}, V_r = 0.5 V_{\text{PP}}$
Output Capacitor	C_Q	10	–	–	μF	Low ESR tantalum or ceramic capacitor recommended
Output Series Resistance	$R_Q + ESR$	1.5	–	5.5	Ω	$C_Q = 10 \mu\text{F}$
	$R_Q + ESR$	1.0	–	5.5	Ω	$C_Q = 22 \mu\text{F}$

Characteristics

$V_i = 13.5 \text{ V}; -40 \text{ }^{\circ}\text{C} \leq T_j \leq 125 \text{ }^{\circ}\text{C}$

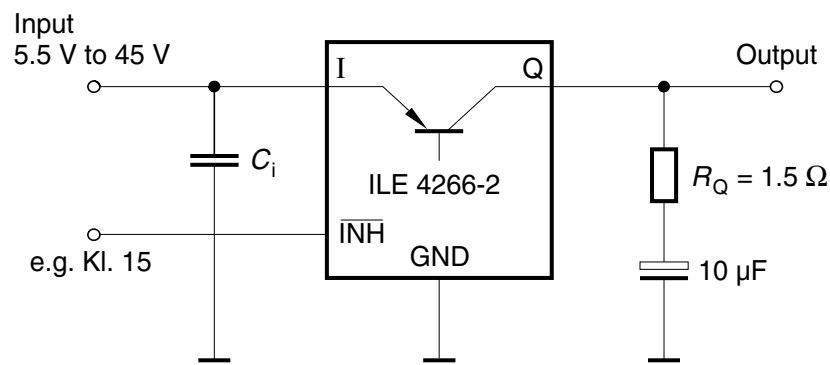
Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		

Inhibit

Inhibit on voltage	$V_{\overline{\text{INH}}, \text{on}}$	–	–	3.5	V	–
Inhibit off voltage	$V_{\overline{\text{INH}}, \text{off}}$	0.8	–	–	V	–
Inhibit current	$I_{\overline{\text{INH}}}$	–	4	8	μA	$V_{\overline{\text{INH}}} = 5 \text{ V}$

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

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 $\pm 2\%$ at an input voltage range of $5.5 \text{ V} < V_i < 45 \text{ V}$.

For stability of the control loop the ILE 4266-2 output requires an output capacitor C_o of at least $10 \mu\text{F}$ and an additional output resistor R_o . The resistor should be 1.5Ω when a $10 \mu\text{F}$ capacitor is used and 1.0Ω for $C_o \geq 22 \mu\text{F}$. The sum of R_o and the ESR of the capacitor must be kept below 5.5Ω . 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. 1Ω in series with C_i , can damp any oscillation occurring 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

