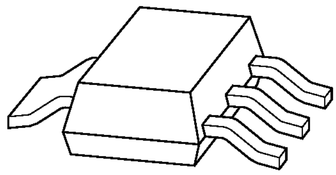
5V/10 V Low-Drop Voltage Regulator

ILE4266-2

Functional Description

ILE 4266-2 is a low-drop voltage regulator for 5 V or 10 V supply in a P-SOT223-4-2 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_{Qrated} = 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 uA. The IC is shortcircuit-proof and incorporates temperature protection that disables the IC an overheating.



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

T_A = -40° ÷ 125°C

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

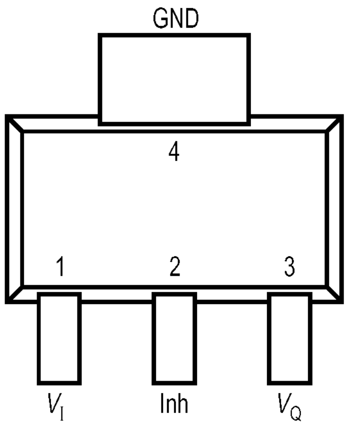
Dimensioning Information on External Components

The input capacitor C_I is necessary for compensating line influences. Using a resistor of approx. 1 Ohm in series with C_I, the oscillating of input 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 uF and an ESR ≤10 Ohm within the operating temperature range.

Pin Definitions and Functions

Pin	Symbol	Function
1	V_I	**Input voltage;** block to ground directly at the IC with a ceramic capacitor.
2	Inh	**Inhibit;** low-active input.
3	V_Q	**Output voltage;** block to ground with a capacitor. *C* ≥10 uF.
4	GND	**Ground**

PIN CONFIGURATION



Circuit Description

The device produces a precise reference voltage, that 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

Maximum & Absolute Maximum Ratings

Parameter Symbol	Unit	Maximum Ratings		Absolute Maximum Ratings	
		min.	max.	min.	max.
Junction temperature, T_J	^oC	-40	125	-40	150
Storage temperature, T_S	^oC	-	-	-50	150
Input voltage, V_I	V	6	28	-42	45
Input current, I_I	A	-	internally limited	-	internally limited
Current on common pin ,I_{GND}	mA	-	15	50	-
Output voltage, U_Q	V	4,9	5,1	-1	16
Output current (pin 3)	A	-	internally limited	-	internally limited
Inhibit voltage, U_{INH}	V	-	-	-42	45
Thermal resistance junction case, $R_{th\ jc}$	^oC /W	-	25*	-	25*
Thermal resistance junction ambient, $R_{th\ ja}$, - on PCB, - without heat dissipater	°C/Bт	 - -	 100* 220*	 - -	 100* 220*

* Thermal resistance junction ambient for IC with heat dissipater is calculated by formula:

$R_{th\ ja} = R_{th\ jc} + R_{th\ ca}$, (1)

$R_{th\ jc}$ - thermal resistance junction case, ^oC /W.

Application circuit and heat dissipater have to provide $T_J \le 125\ ^oC$.

Maximum power P_{tot},Bт, dissipated by IC for T_A , is calculated by formula:

$P_{tot} = (125 - T_A) / R_{th\ ja}$, (2)

125 – maximum permitable operating junction temperature, ^oC.

* Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied.
Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

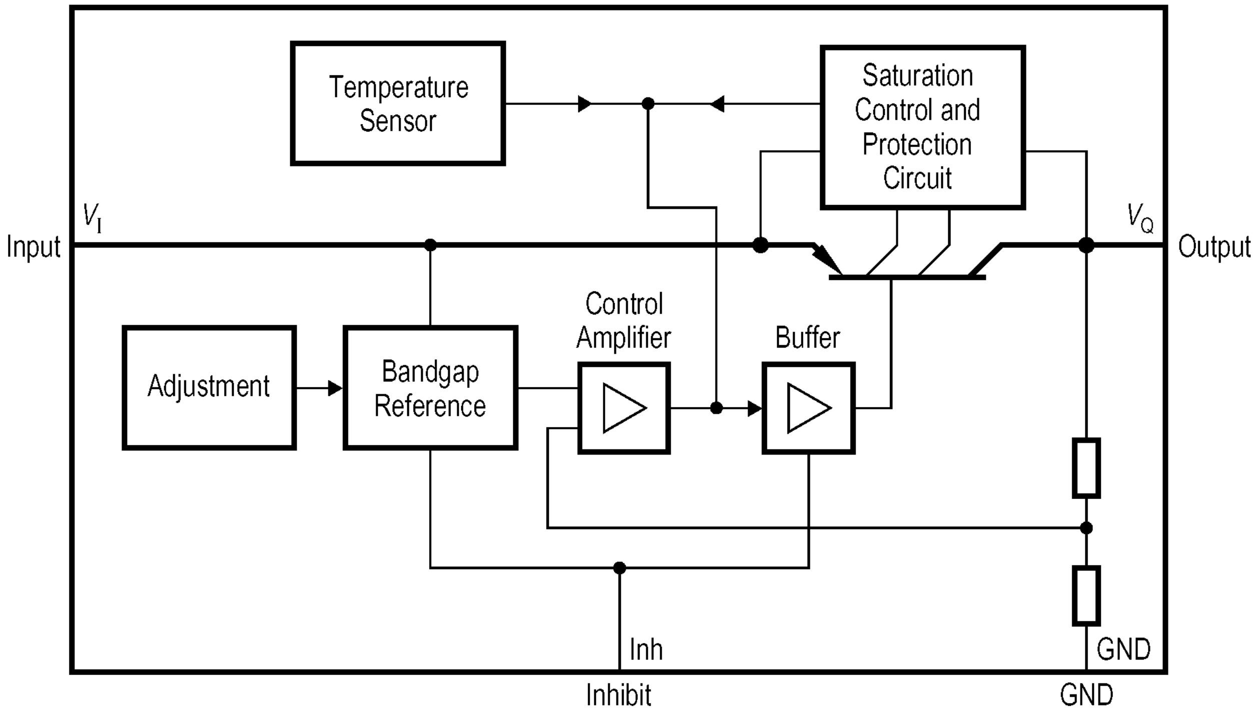
Electrical Characteristics

VI = 13.5 V; $-40\ ^oC \le Tj \le 125\ ^oC$

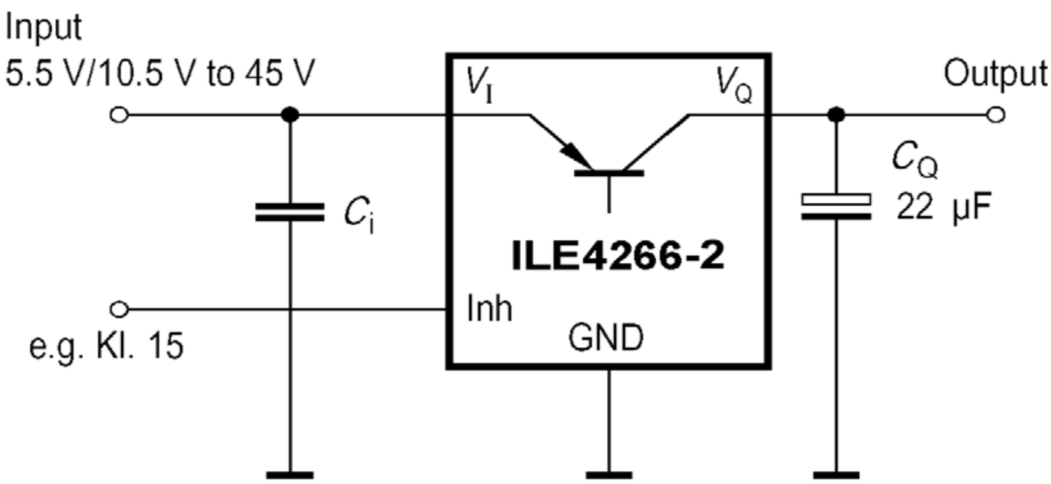
Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Output voltage	V_Q	4.9	5	5.1	V	$5\ mA \le I_Q \le 100\ mA$ $6\ V \le Vi \le 28\ V$
Output-current limitation	I_Q	120	150	–	mA	–
Current consumption $I_q = I_I - I_Q$	I_q	–	0	10	uA	$V_{INH} = 0$ V; $Tj \le 100\ ^oC$
		–	–	400	uA	$I_Q = 1$ mA Inhibit ON
		–	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	ΔV_Q	–	–	40	mV	$I_Q = 5$ to 100 mA $V_I = 6$ V
Supply-voltage regulation	ΔV_Q	–	15	30	mV	$V_I = 6$ V to 28 V $I_Q = 5$ mA
Supply-voltage rejection	SVR	–	54	–	dB	fr = 100 Hz, Vr = 0.5 V_{SS}
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	uA	Ve = 5 V

1) Drop voltage = $V_I - V_Q$ (measured when the output voltage VQ has dropped 100 mV from the nominal value obtained at $V_I = 13.5$ V).

Block Diagram



Application Circuit



Package Dimension

P-SOT 223-4-2