M62291GP

5-Pin SOT-23 5.0 V System Fixed Output Voltage DC/DC Converter

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Description

M62291GP is an integrated circuit designed as 5 V fixed output voltage general purpose DC/DC converter.

Integrating peripheral components in ultra small 5-pin SOT23 package allows for simplified external circuit and compact low cost design.

This IC is applicable to portable equipments due to low circuit current 570 µA (typ.)

Especially this is most suitable for localized power source such as audio equipments, and so on as converter from 12 to 5 V system.

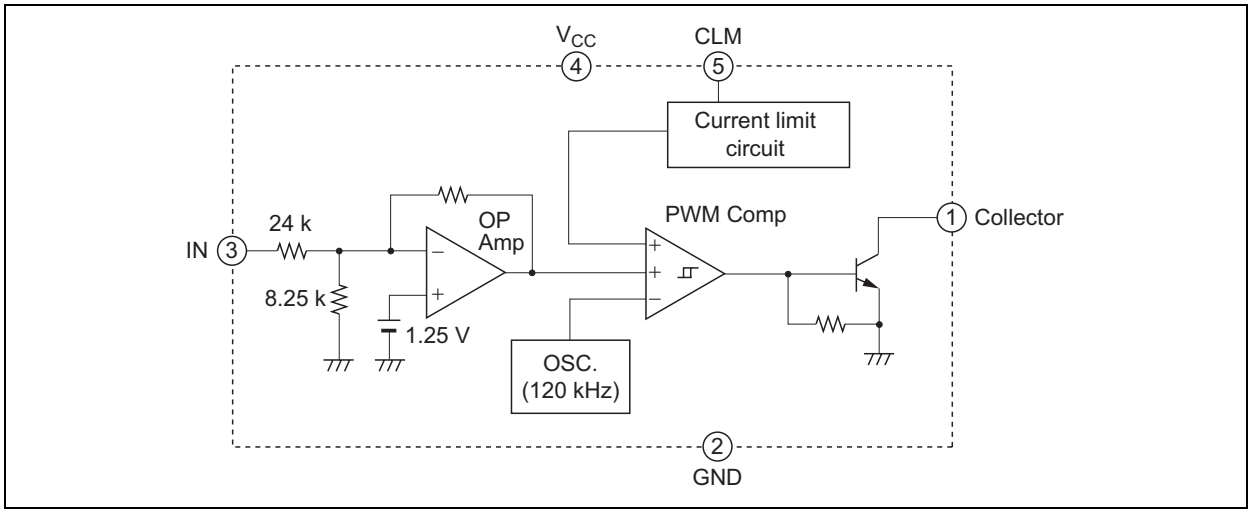
Features

- Wide operation power supply voltage range…….. 6 V to 15 V (V_{CC} = 12 V typ.)
- Low power consumption……..…. 570 µA max. (V_{CC} = 12 V typ., at no load)
- Built-in oscillator without peripheral components (120 kHz typ.)
- Built-in over current protection circuit
- Ultra small 5-pin SOT23 package

Applications

Localized power supply for audio, portable equipments, and general electric products

Block Diagram



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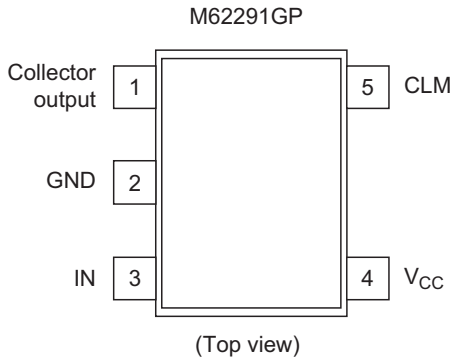
Pin Arrangement



Outline: SOT-23, PLSP0005ZA-A (SOT-25)

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Absolute Maximum Ratings

(Ta = 25°C, unless otherwise noted)

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V_{CC}	16	V	
Output current	I_O	100	mA	
Power dissipation	Pd	200	mW	Ta = 25°C
Thermal derating ratio	Kθ	2.0	mW/°C	Ta > 25°C
Operating ambient temperature	Topr	–20 to +85	°C	
Storage temperature	Tstg	–40 to +125	°C	

Electrical Characteristics

(Ta = 25°C, V_{CC} = 12 V, unless otherwise noted)

Block	Item	Symbol	Limits			Units	Conditions
			Min	Typ	Max		
Error Amp.	Supply voltage	V_{CC}	6.0	—	15	V	
	Supply current	I_{CC}	—	570	800	µA	No load
	Output voltage	V_O	4.75	5.0	5.25	V	
	REF line regulation	Vreg-L	—	5	30	mV	V_{CC} = 4 to 12 V
	In input current	Iin	—	160	300	µA	
Oscillator	Oscillator frequency	f_{OSC}	70	120	175	kHz	
CLM	Current limit voltage	V_{THCLM}	110	140	170	mV	V_{CC} – CLM
Output	Maximum on duty	T_{DUTY}	—	90	—	%	
	Output leakage current	I_{CL}	–1	—	1	µA	V_{CC} = 15 V, V_C = 15 V
	Output saturation voltage	Vsat	—	1.2	2.0	V	I_O = 100 mA

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Application Circuit (5.0 V Output DC/DC Converter; M62291GP)

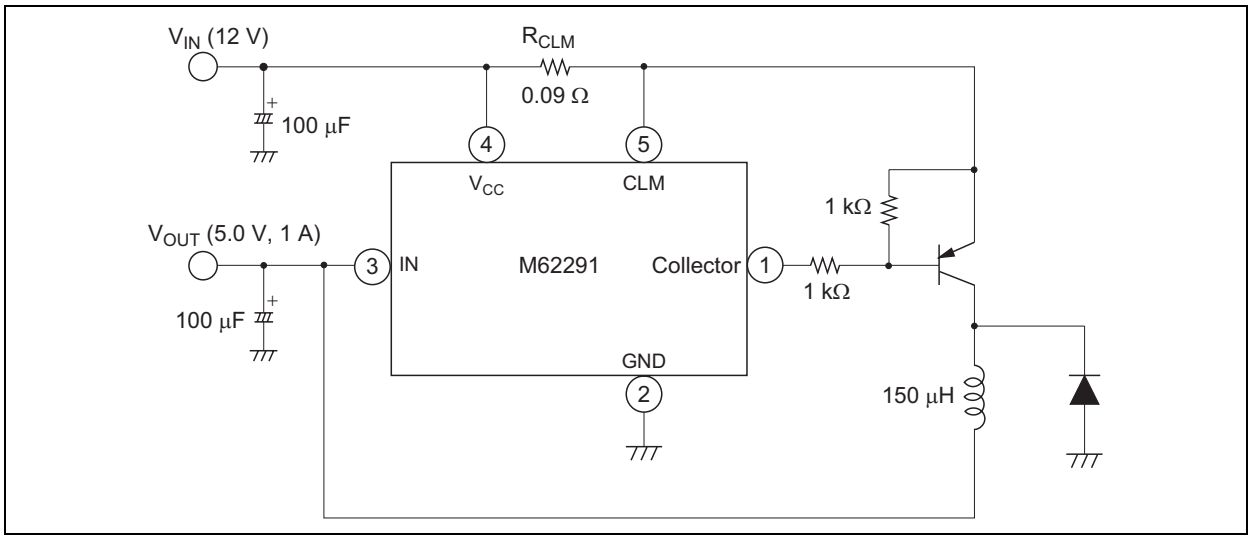

Figure 1 Example of Application Circuit of M62291GP

- Current limit detection:
  When the voltage drop between 4-pin and 5-pin becomes 140 mV or more, current limit detection circuit starts to operate. In the example of application (Figure 1), the current is limited to 1.5 A.

The Expression of Circuit Constants

Constants	Expressions
$\frac{T_{ON}}{T_{OFF}}$	$\frac{V_O + V_F}{V_{IN} - V_{CE\ (sat)} - V_O}$
$(T_{ON} + T_{OFF})$ MAX	$\frac{1}{f_{OSC}}$ f_{OSC}: 120kHz (V_{CC} = 12V)
$T_{OFF\ (MIN)}$	$(T_{ON} + T_{OFF}) / (1 + \frac{T_{ON}}{T_{OFF}})$
$T_{ON\ (MAX)}$	$\frac{1}{f_{OSC}} - T_{OFF}$
L (MIN)	$\frac{(V_{IN} - V_{CE\ (sat)} - V_O) \times T_{ON\ (MAX)}}{\Delta I_O}$
Ipk	$I_O + \frac{1}{2} \Delta I_O$
R_{CLM}	$\frac{0.14}{Ipk}$ ΔV_{CLM}: 140mV (V_{CC} = 12V)

Note: V_F: Forward voltage drop of an external diode.
Vsat: Output saturation voltage of an external switching transistor.
ΔI_O: Set to 1/3 to 1/5 of maximum output current.
Choose an external transistor, diode and inductor with peak current rating greater than "Ipk".

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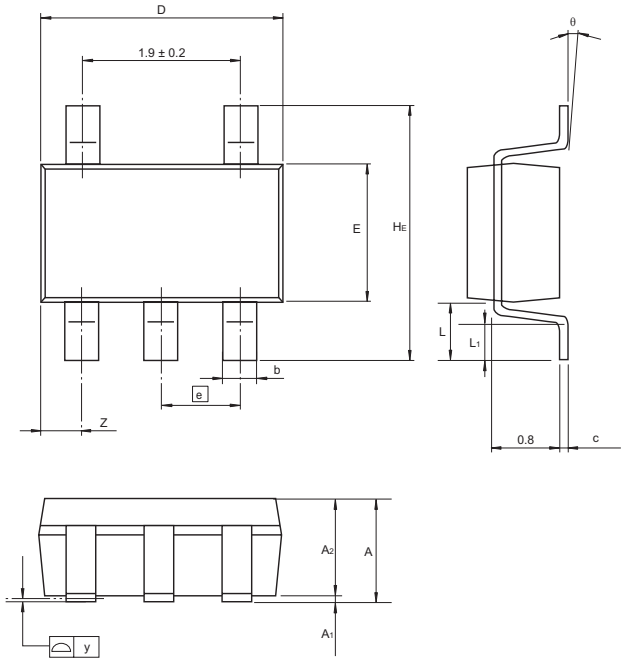
Package Dimensions

JEITA Package Code	RENESAS Code	Package Name	MASS[Typ.]
SC-74A	PLSP0005ZA-A	SOT-25	0.015 g

Unit: mm



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
A	—	—	1.3
A_1	0	—	0.1
A_2	1.0	1.1	1.2
b	0.3	0.4	0.5
c	0.07	0.1	0.2
D	2.7	2.9	3.1
E	1.5	1.6	1.8
e	—	0.95	—
H_E	2.6	2.8	3.0
L	—	0.6	—
L_1	0.2	—	—
y	—	—	0.1
Z	—	—	0.6
θ	0°	—	15°

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