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April 1st, 2010
Renesas Electronics Corporation

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M6227xGP

5-Pin SOT-23 3 V System Fixed Output Voltage DC/DC Converter

REJ03D0849-0201

Rev.2.01

Nov 14, 2007

Description

M6227xGP is an integrated circuit designed as 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 500 μ A (typ.)

Especially this is most suitable for CD-ROM, and so on as converter from 5 to 3 V system.

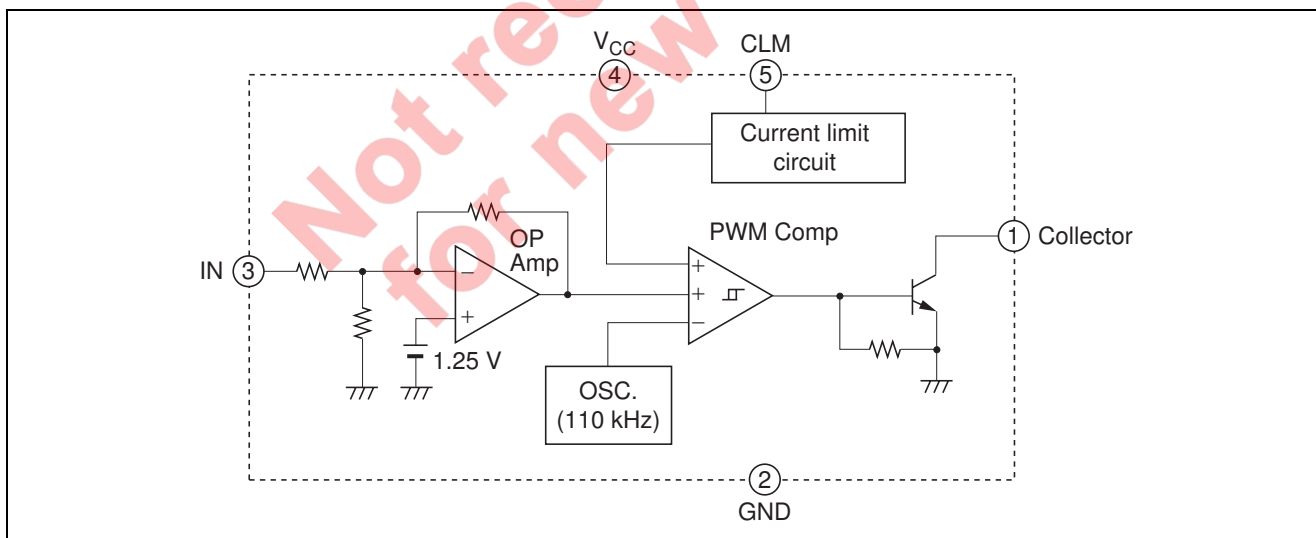
Features

- Wide operation power supply voltage range..... 4 V to 15 V ($V_{CC} = 5$ V typ.)
- Low power consumption..... 500 μ A max. ($V_{CC} = 5$ V typ., at no load)
- Built-in oscillator without peripheral components (110 kHz typ.)
- Built-in over current protection circuit
- Ultra small 5-pin SOT23 package

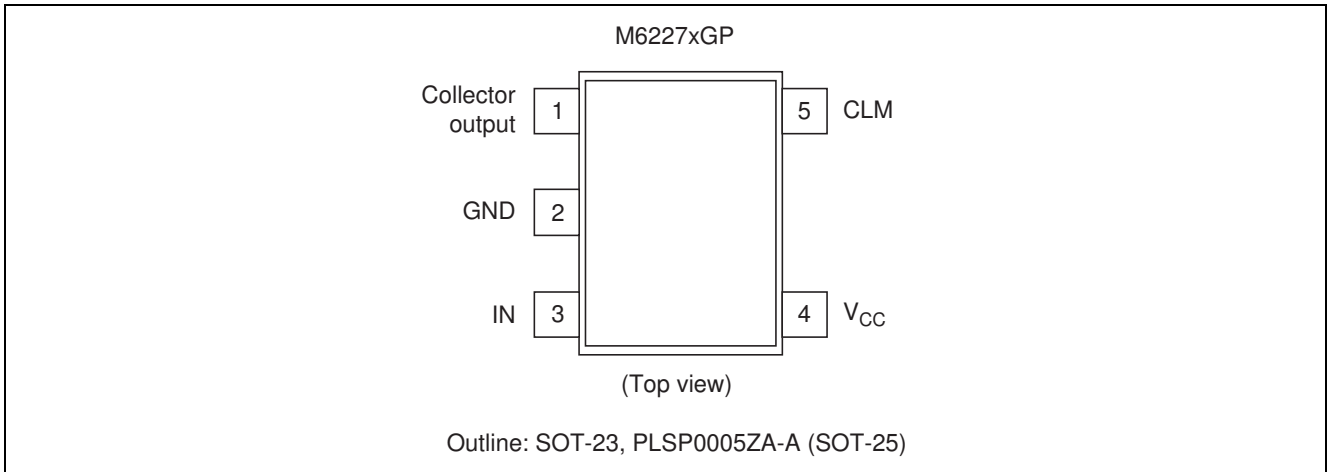
Applications

CD-ROM, portable equipments, general electric products

Block Diagram



Pin Arrangement



Type Name & Output Voltage

Type Name	Output Voltage
M62270GP	3.3 V
M62271GP	3.0 V
M62272GP	2.7 V
M62273GP	2.4 V
M62274GP	2.1 V
M62275GP	1.8 V
M62276GP	1.5 V

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	P _d	200	mW	Ta = 25°C
Thermal derating ratio	K _θ	2.0	mW/°C	Ta > 25°C
Operating ambient temperature	T _{opr}	-20 to +85	°C	
Storage temperature	T _{stg}	-40 to +125	°C	

Electrical Characteristics

(Ta = 25°C, V_{CC} = 5 V, unless otherwise noted)

Block	Item	Symbol	Limits			Units	Conditions
			Min	Typ	Max		
	Supply voltage	V _{CC}	4.0	—	15	V	
	Supply current	I _{CC}	—	500	700	μA	No load
Error Amp.	Output voltage	V _o	3.15	3.30	3.45	V	M62270GP
			2.85	3.00	3.15	V	M62271GP
			2.57	2.70	2.83	V	M62272GP
			2.28	2.40	2.52	V	M62273GP
			2.00	2.10	2.20	V	M62274GP
			1.71	1.80	1.89	V	M62275GP
			1.42	1.50	1.58	V	M62276GP
	REF line regulation	V _{reg-L}	—	5	30	mV	V _{CC} = 4 to 12 V
	IN input current	I _{in}	—	100	300	μA	
Oscillator	Oscillator frequency	f _{osc}	65	110	160	kHz	
CLM	Current limit voltage	V _{THCLM}	120	150	180	mV	V _{CC} – CLM
Output	Maximum on duty	T _{DUTY}	—	90	—	%	
	Output leakage current	I _{CL}	-1	—	1	μA	V _{CC} = 12 V, V _C = 12 V
	Output saturation voltage	V _{sat}	—	1.2	2.0	V	I _o = 100 mA

Application Circuit (3.3 V Output DC/DC Converter; M62270GP)

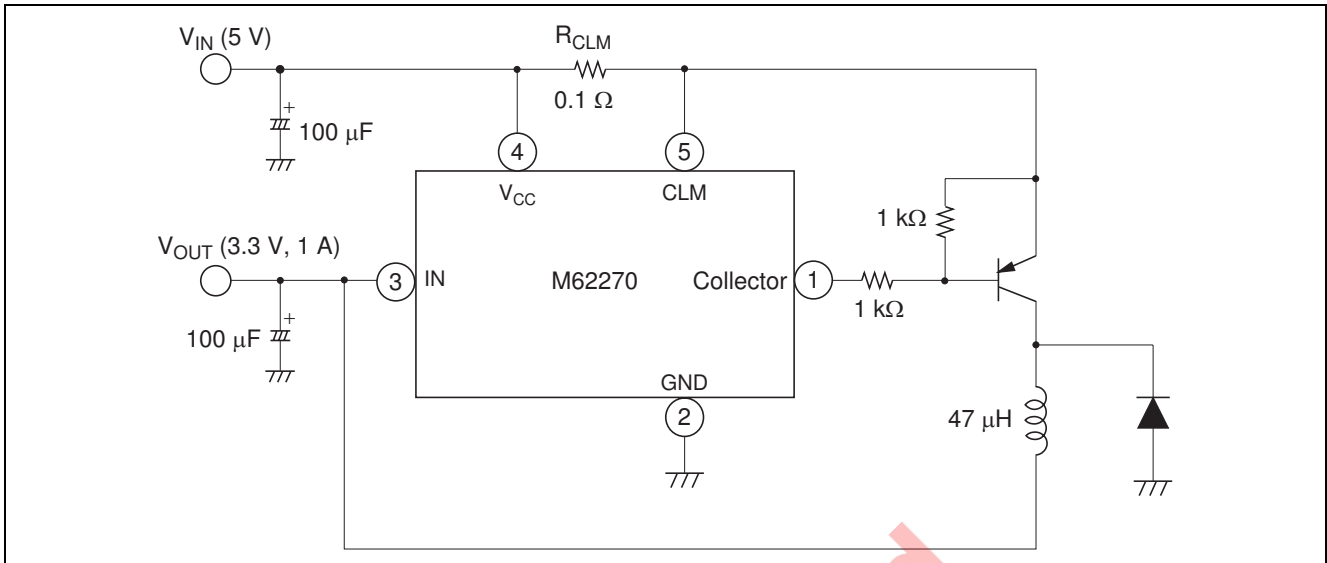


Figure 1 Example of Application Circuit of M62270GP

- Current limit detection:
When the voltage drop between 4-pin and 5-pin becomes 150 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} : 110 kHz ($V_{CC} = 5$ V)
$T_{OFF(MIN)}$	$(T_{ON} + T_{OFF}) / (1 + \frac{T_{ON}}{T_{OFF}})$
$T_{ON(MAX)}$	$\frac{1}{f_{OSC}} - T_{OFF}$
$L(MIN)$	$\frac{(V_{IN} - V_{CE(sat)} - V_O) \times T_{ON(MAX)}}{\Delta I_O}$
I_{pk}	$I_O + \frac{1}{2} \Delta I_O$
R_{CLM}	$\frac{0.15}{I_{pk}}$ ΔV_{CLM} : 150 mV ($V_{CC} = 5$ V)

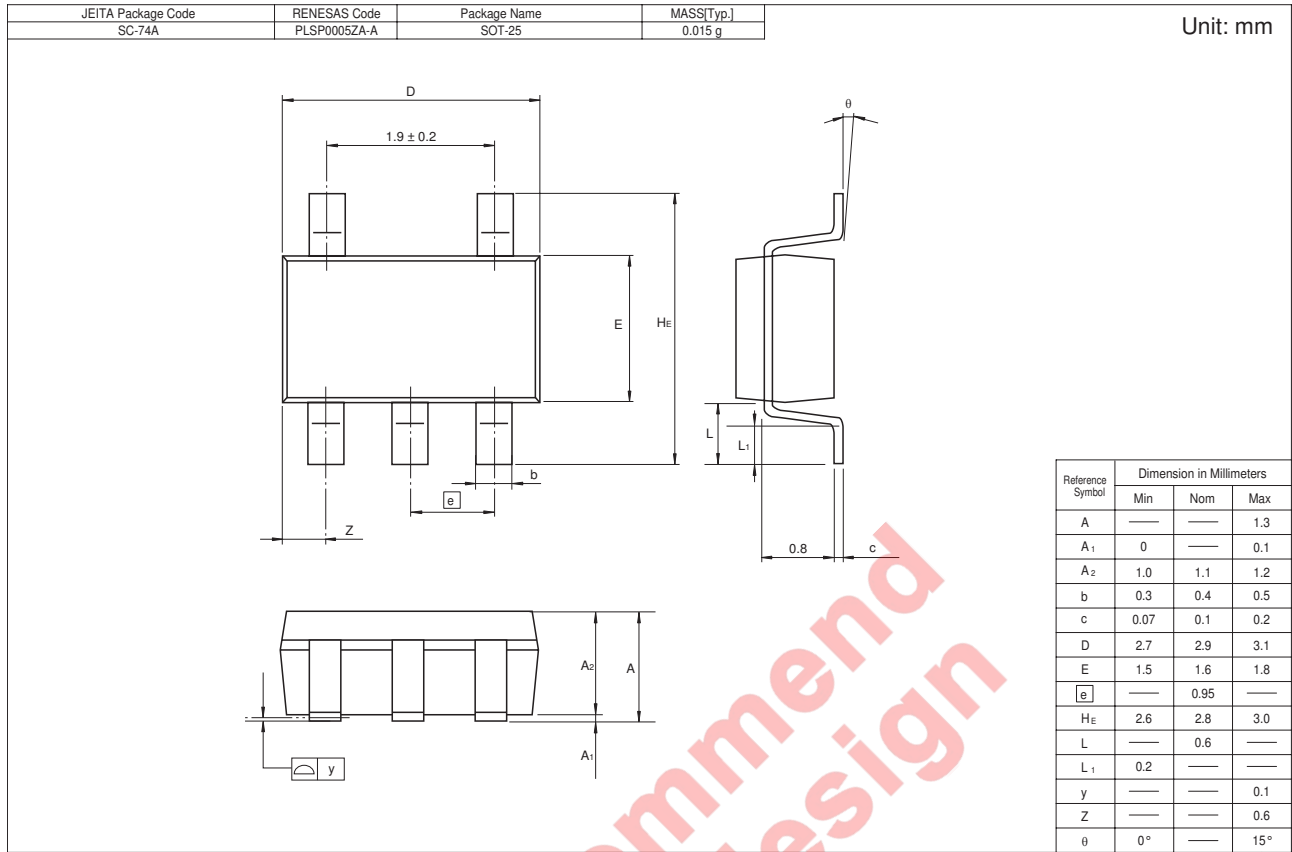
Note: V_F : Forward voltage drop of an external diode.

V_{sat} : 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 " I_{pk} ".

Package Dimensions



Not recommend
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