

# M6227xGP

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

REJ03D0849-0201

Rev.2.01

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### 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  $\mu$ A (typ.)

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

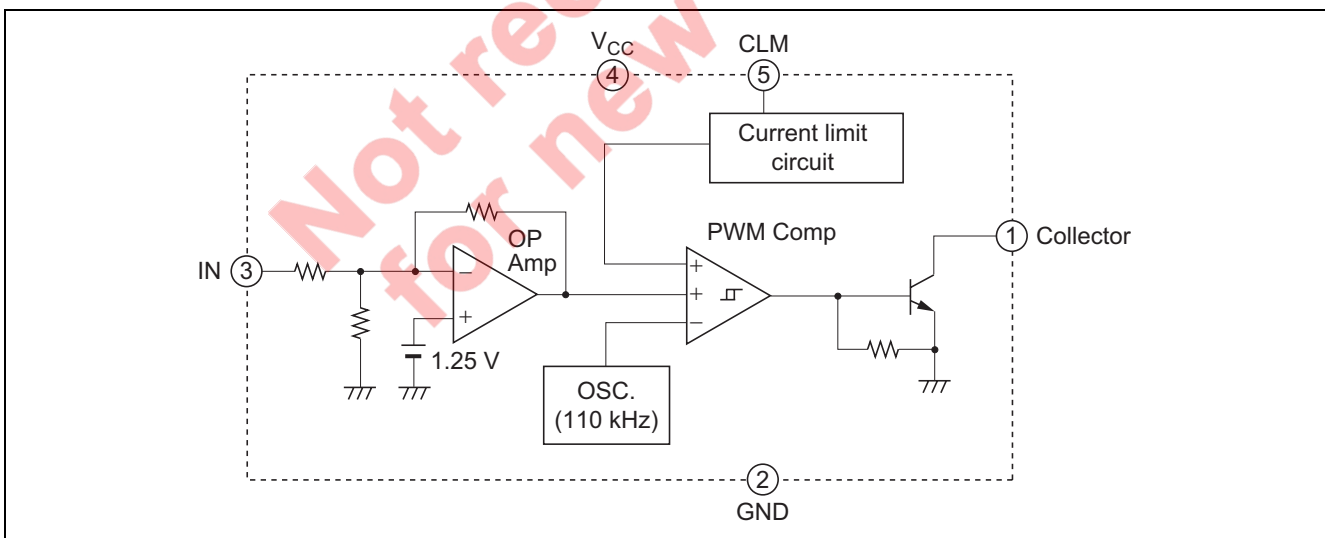
### Features

- Wide operation power supply voltage range..... 4 V to 15 V ( $V_{CC} = 5$  V typ.)
- Low power consumption..... 500  $\mu$ 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

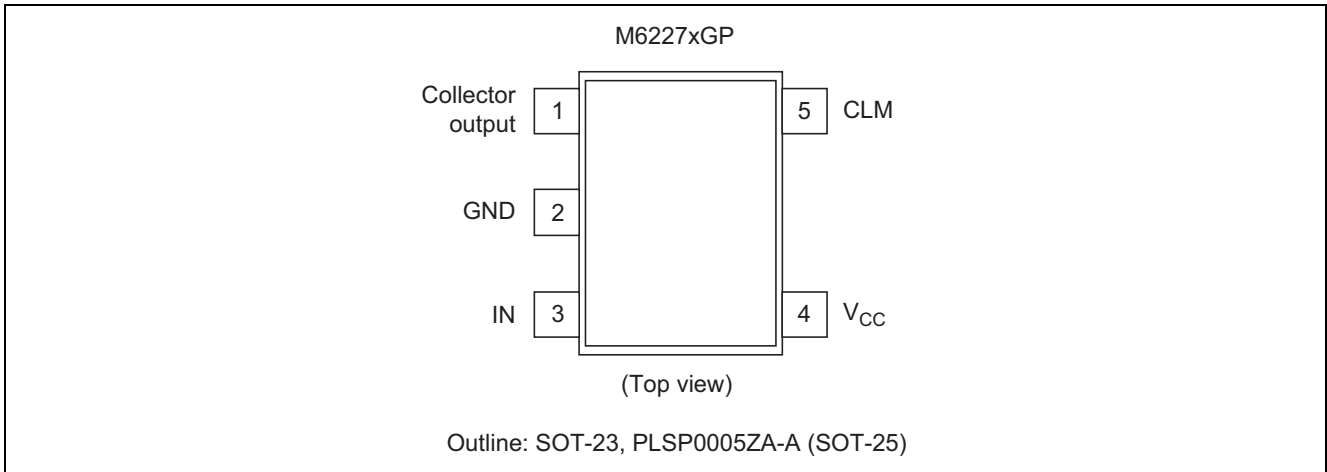
### Applications

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

Not recommended for new design

## Absolute Maximum Ratings

(Ta = 25°C, unless otherwise noted)

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V <sub>CC</sub>	16	V	
Output current	I <sub>o</sub>	100	mA	
Power dissipation	P <sub>d</sub>	200	mW	Ta = 25°C
Thermal derating ratio	K <sub>θ</sub>	2.0	mW/°C	Ta > 25°C
Operating ambient temperature	T <sub>opr</sub>	-20 to +85	°C	
Storage temperature	T <sub>stg</sub>	-40 to +125	°C	

## Electrical Characteristics

(Ta = 25°C, V<sub>CC</sub> = 5 V, unless otherwise noted)

Block	Item	Symbol	Limits			Units	Conditions
			Min	Typ	Max		
	Supply voltage	V <sub>CC</sub>	4.0	—	15	V	
	Supply current	I <sub>CC</sub>	—	500	700	μA	No load
Error Amp.	Output voltage	V <sub>o</sub>	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 <sub>reg-L</sub>	—	5	30	mV	V <sub>CC</sub> = 4 to 12 V
	IN input current	I <sub>in</sub>	—	100	300	μA	
Oscillator	Oscillator frequency	f <sub>osc</sub>	65	110	160	kHz	
CLM	Current limit voltage	V <sub>THCLM</sub>	120	150	180	mV	V <sub>CC</sub> – CLM
Output	Maximum on duty	T <sub>DUTY</sub>	—	90	—	%	
	Output leakage current	I <sub>CL</sub>	-1	—	1	μA	V <sub>CC</sub> = 12 V, V <sub>C</sub> = 12 V
	Output saturation voltage	V <sub>sat</sub>	—	1.2	2.0	V	I <sub>o</sub> = 100 mA

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

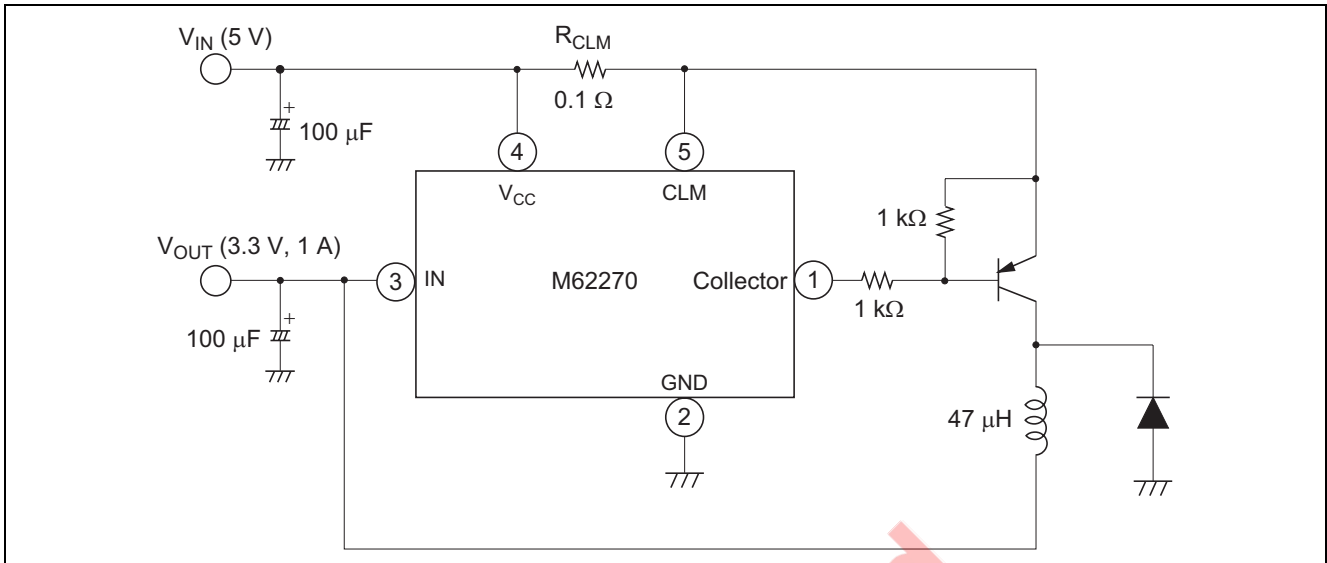


Figure 1 Example of Application Circuit of M62270GP

- 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)
$T_{OFF(MIN)}$	$(T_{ON} + T_{OFF}) / (1 + \frac{T_{ON}}{T_{OFF}})$
$T_{ON(MAX)}$	$\frac{1}{f_{OSC}} - T_{OFF}$
$L(MIN)$	$\frac{(V_{IN} - V_{CE(sat)} - V_O) \times T_{ON(MAX)}}{\Delta I_O}$
$I_{pk}$	$I_O + \frac{1}{2} \Delta I_O$
$R_{CLM}$	$\frac{0.15}{I_{pk}}$ $\Delta V_{CLM}$ : 150 mV ( $V_{CC} = 5$ V)

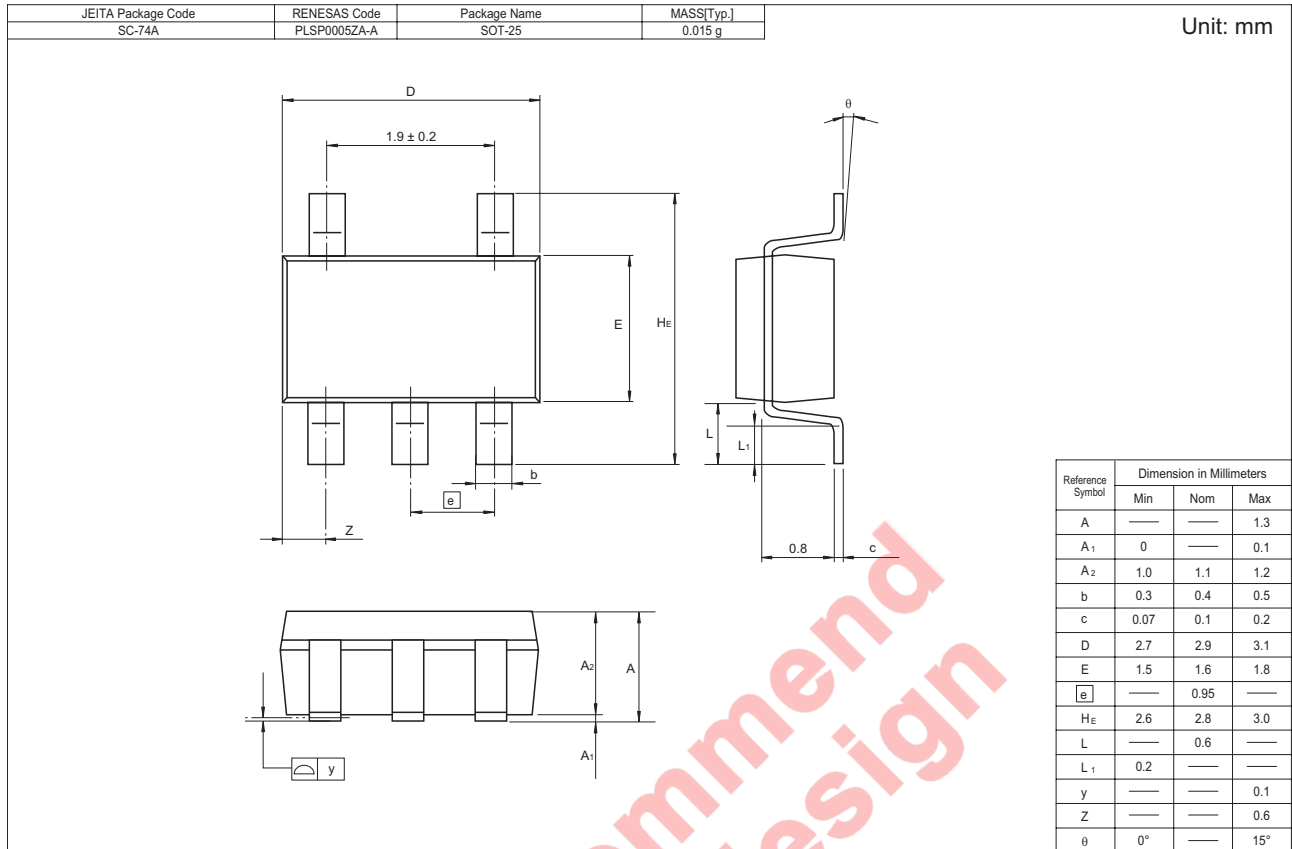
Note:  $V_F$ : Forward voltage drop of an external diode.

$V_{sat}$ : Output saturation voltage of an external switching transistor.

$\Delta I_O$ : 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  
for new design

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