

# M62221L/FP

## 3.0 V Fixed Output Voltage DC/DC Converter

REJ03D0847-0200

Rev.2.00

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### General Description

The M62221 is a general purpose DC/DC converter which provides a 3.0 V fixed output voltage.

It is possible to simplify the peripheral circuit and to design compact and low cost sets because this IC, housed in a small 5 or 8-pin package includes necessary peripheral components.

Especially this is most suitable for CD-ROM, Disk Drive sets and PDA as a converter from 5 V to 3.0 V.

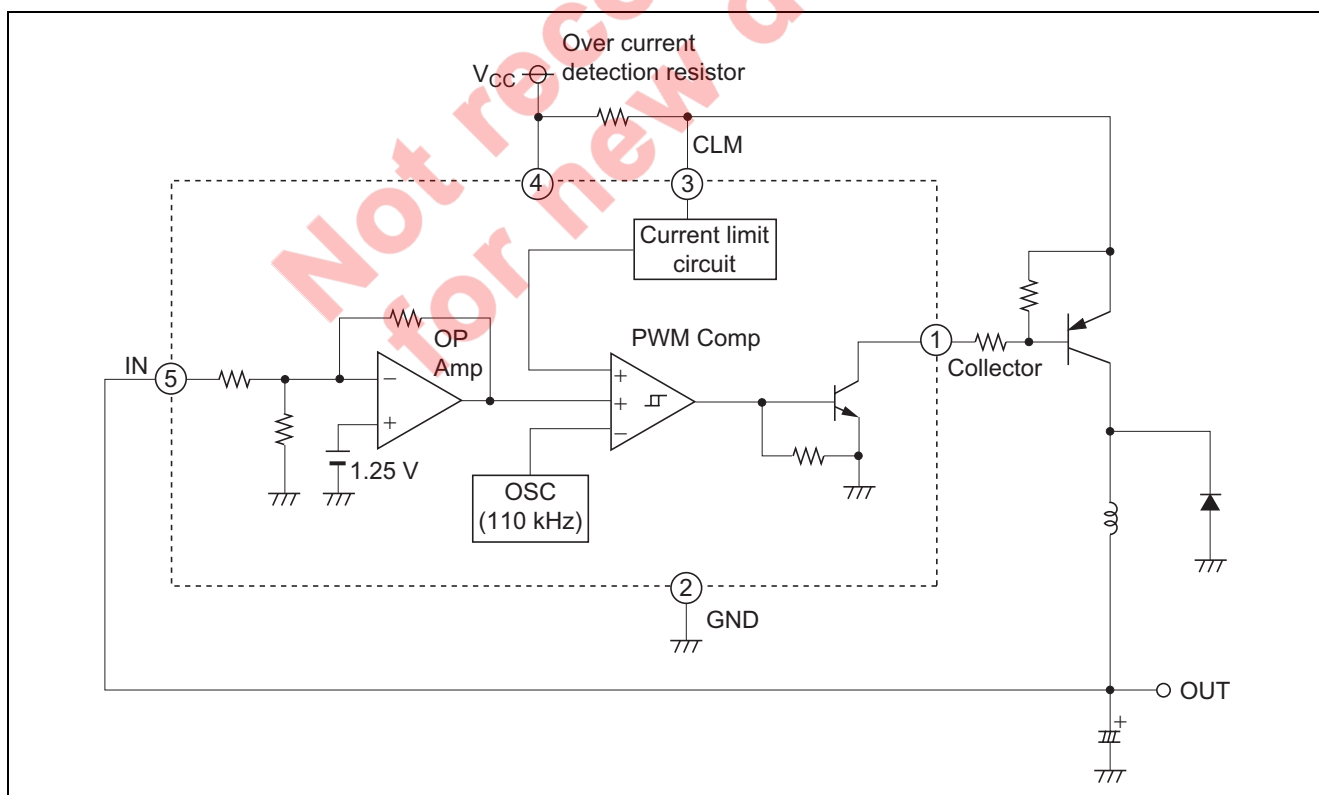
### Features

- Wide operation supply voltage range.....4 to 15 V
- Low power consumption.....900  $\mu$ A (max.)
- Built-in oscillator without external components (110 kHz typ.)
- Built-in over current protection circuit
- Small size 5-pin SIP and 8-pin SOP packages

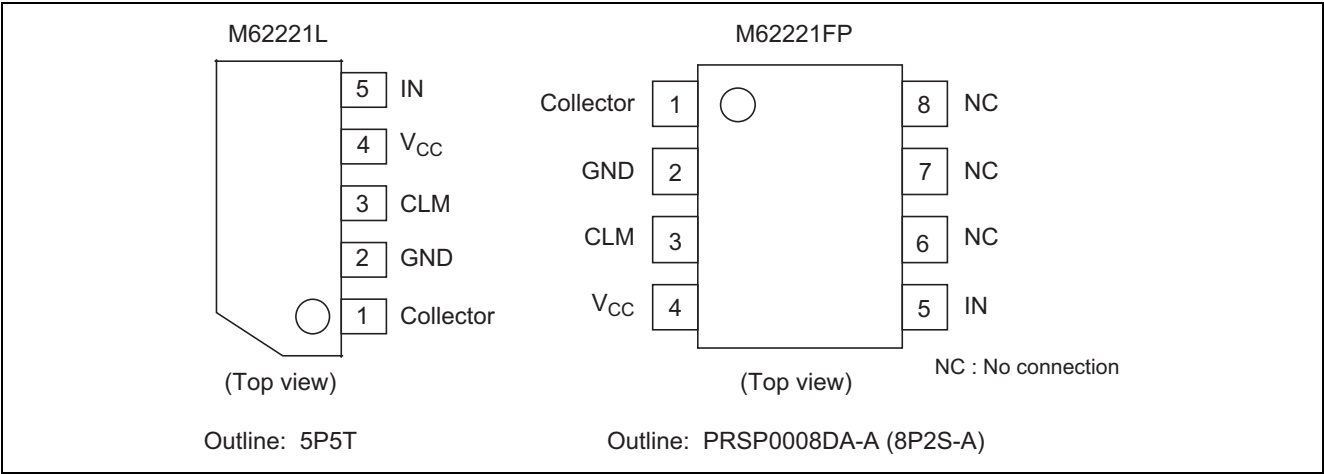
### Applications

CD-ROM, PDA, general purpose electric products

### Block Diagram



Pin Arrangement



Not recommend  
for new design

## Absolute Maximum Ratings

(Ta = 25°C, unless otherwise noted)

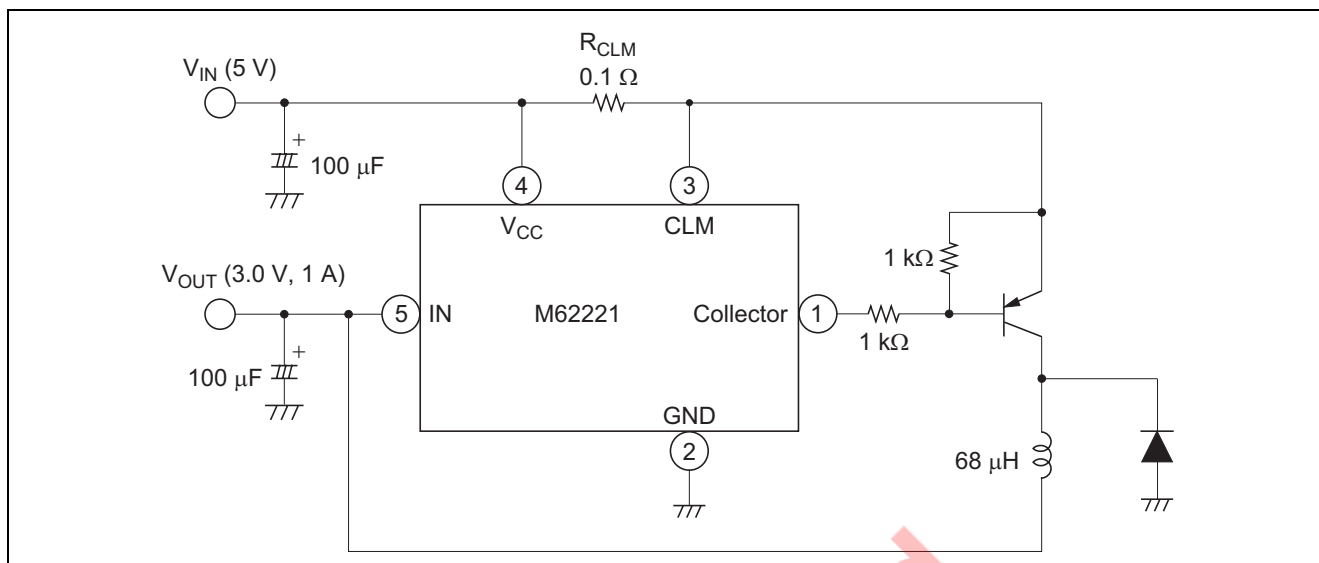
Item	Symbol	Ratings	Unit	Conditions	
Supply voltage	V <sub>CC</sub>	16	V		
Output current	I <sub>o</sub>	100	mA		
Power dissipation	P <sub>d</sub>	450	mW	Ta = 25°C	5-pin SIP
		440	mW		8-pin SOP
Thermal derating	K <sub>θ</sub>	4.5	mW/°C	Ta > 25°C	5-pin SIP
		4.4	mW/°C		8-pin SOP
Operating ambient temperature	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			Unit	Test Conditions
			Min	Typ	Max		
All block	Supply voltage	V <sub>CC</sub>	4.0	—	15	V	
	Supply current	I <sub>CC</sub>	—	660	900	μA	Without load
Error Amp.	Output voltage	V <sub>o</sub>	2.85	3.00	3.15	V	
	REF line regulation	V <sub>reg-L</sub>	—	5	15	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	155	kHz	
	Maximum on duty	T <sub>DUTY</sub>	—	90	—	%	
CLM	Current limit voltage	V <sub>THCLM</sub>	120	150	180	mV	V <sub>CC</sub> – CLM
Output	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>	—	0.4	0.7	V	I <sub>o</sub> = 100 mA

## Application Circuit (3.0 V Output DC/DC Converter)



**Figure 1 Example of the M62221L/FP Application Circuit**

- Current limit detection:  
When the voltage drop between pin 3 and pin 4 becomes more than 150 mV, the current limit detection circuit begins operating. The peak switch current "I<sub>pk</sub>" is limited to 150 mV/R<sub>CLM</sub>. In the example of application (Figure 1), the current is limited to 1.5 A.

## The Expression of Circuit Constants

Constants	Expressions
$\frac{T_{ON}}{T_{OFF}}$	$\frac{V_O + V_F}{V_{IN} - V_{CE(sat)} - V_O}$
$(T_{ON} + T_{OFF})_{MAX}$	$\frac{1}{f_{OSC}} f_{OSC}: 110 \text{ kHz } (V_{CC} = 5 \text{ V})$
$T_{OFF(MIN)}$	$(T_{ON} + T_{OFF}) / (1 + \frac{T_{ON}}{T_{OFF}})$
$T_{ON(MAX)}$	$\frac{1}{f_{OSC}} - T_{OFF}$
$L_{(MIN)}$	$\frac{(V_{IN} - V_{CE(sat)} - V_O) \times T_{ON(MAX)}}{\Delta I_O}$
$I_{pk}$	$I_O + \frac{1}{2} \Delta I_O$
$R_{CLM}$	$\frac{0.15}{I_{pk}} \Delta V_{CLM}: 150 \text{ mV } (V_{CC} = 5 \text{ V})$

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

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

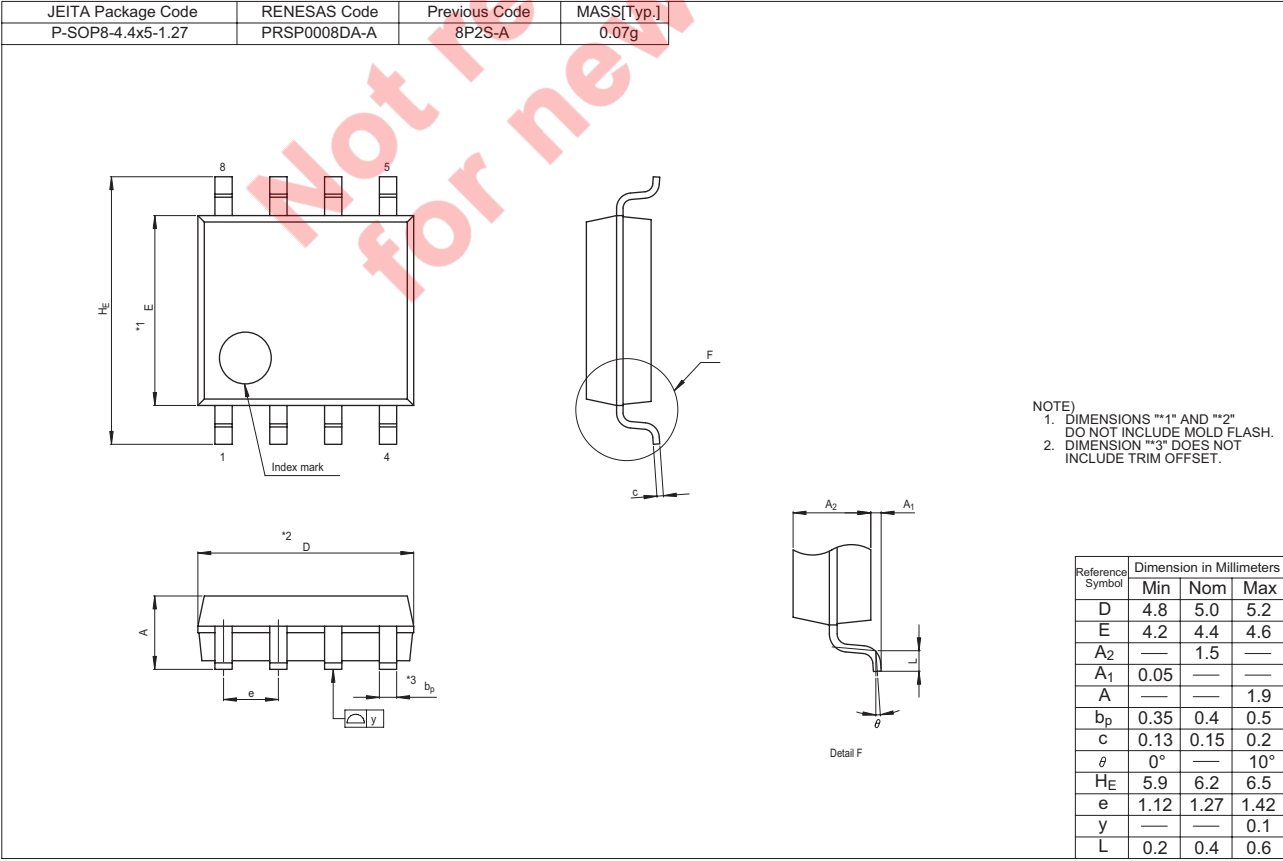
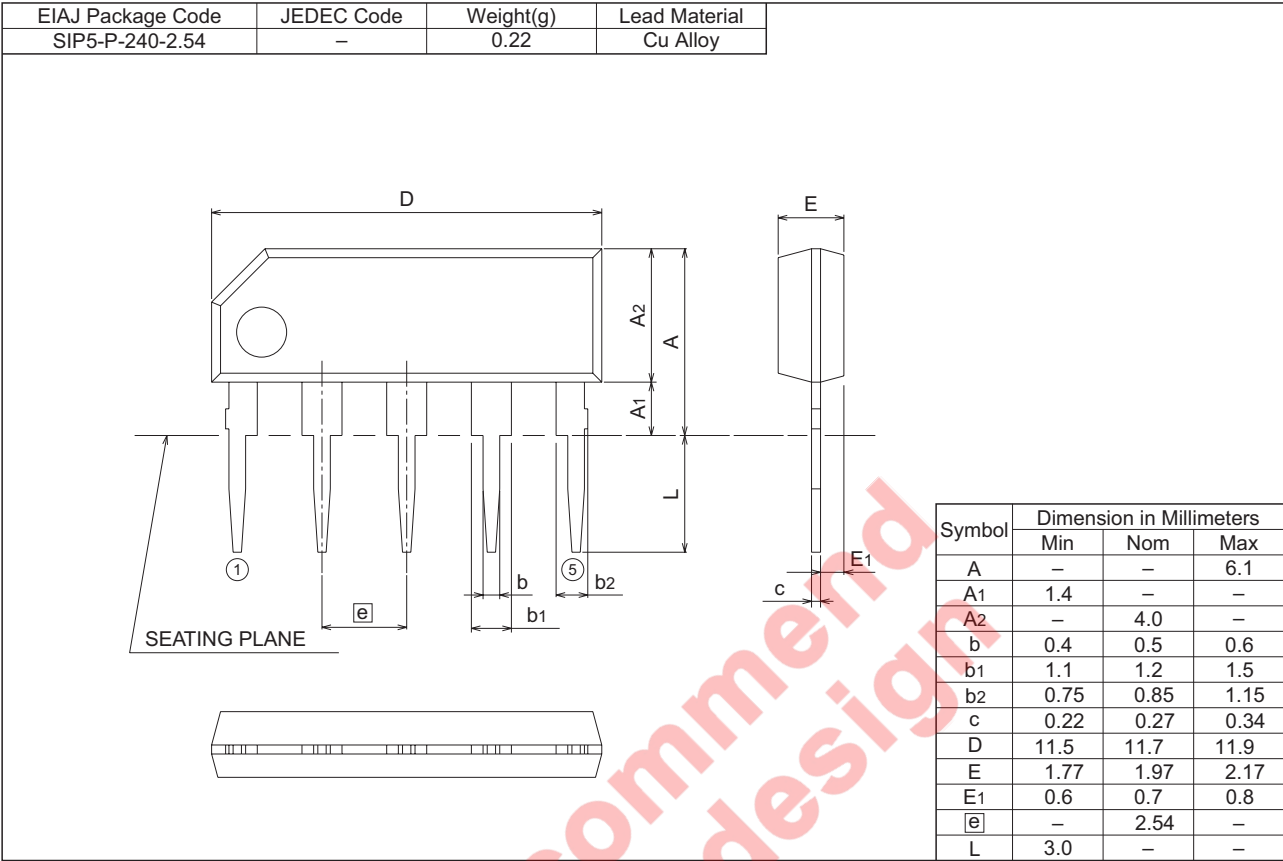
$\Delta I_O$ : It should be set between 1/3 and 1/5 of maximum output current.

An external transistor, diode and inductor should have a peak current capability of greater than "I<sub>pk</sub>".

Package Dimensions

5P5T

Plastic 5pin 240mil SIP



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