

# M62221L/FP

## 3.0V FIXED OUTPUT VOLTAGE DC-DC CONVERTER

### GENERAL DESCRIPTION

The M62221 is a general purpose DC-DC converter which provides a 3.0V 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 5V to 3.0V .

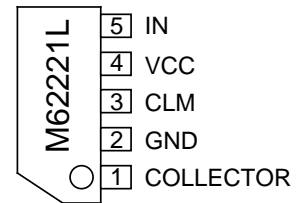
### FEATURES

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

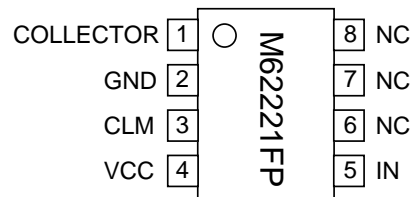
### APPLICATIONS

CD-ROM, PDA, general purpose electric products

### PIN CONFIGURATION (TOP VIEW)



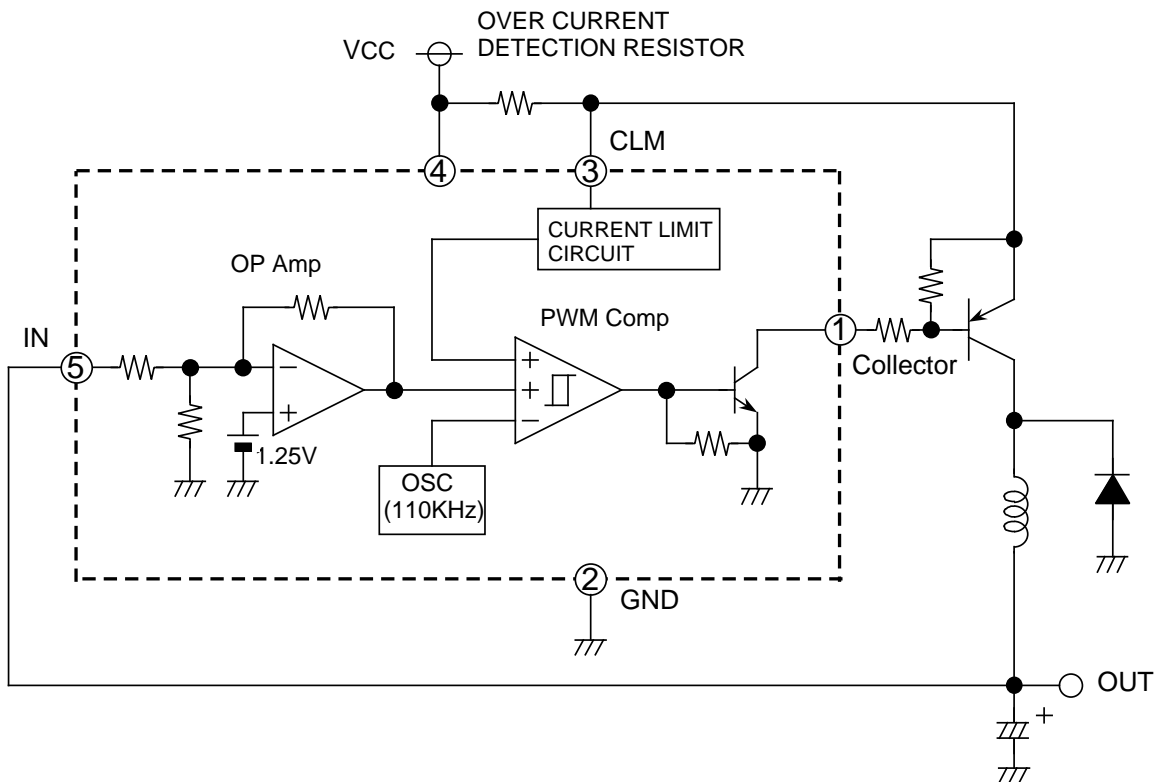
Outline 5P5T



Outline 8P2S-A

NC: NO CONNECTION

### BLOCK DIAGRAM



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**ABSOLUTE MAXIMUM RATINGS** (Ta=25°C, unless otherwise noted)

Symbol	Parameter	Conditions		Ratings	Unit
Vcc	Supply voltage			16	V
Io	Output current			100	mA
Pd	Power dissipation	Ta=25°C	5-pin SIP	450	mW
			8-pin SOP	440	mW
K <sub>THETA</sub>	Thermal derating	Ta>25°C	5-pin SIP	4.5	mW/ °C
			8-pin SOP	4.4	mW/ °C
Topr	Operating ambient temperature			-20 to +85	°C
Tstg	Storage temperature			-40 to +125	°C

**ELECTRICAL CHARACTERISTICS** (Ta=25°C, Vcc=5V, unless otherwise noted)

Block	Symbol	Parameter	Test conditions	Limits			Unit
				Min.	Typ.	Max.	
All block	Vcc	Supply voltage		4.0		15	V
	Icc	Supply current	Without load	—	660	900	µA
Error Amp.	Vo	Output voltage		2.85	3.00	3.15	V
	Vreg-L	REF line regulation	Vcc= 4 to 12V		5	15	mV
	Iin	IN input current		—	100	300	µA
Oscillator	fosc	Oscillator frequency		65	110	155	kHz
	TDUTY	Maximum on duty			90		%
CLM	VTHCLM	Current limit voltage	Vcc - CLM	120	150	180	mV
Output	ICL	Output leakage current	Vcc = 12V, Vc = 12V	-1	—	1	µA
	Vsat	Output saturation voltage	Io = 100mA	—	0.4	0.7	V

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

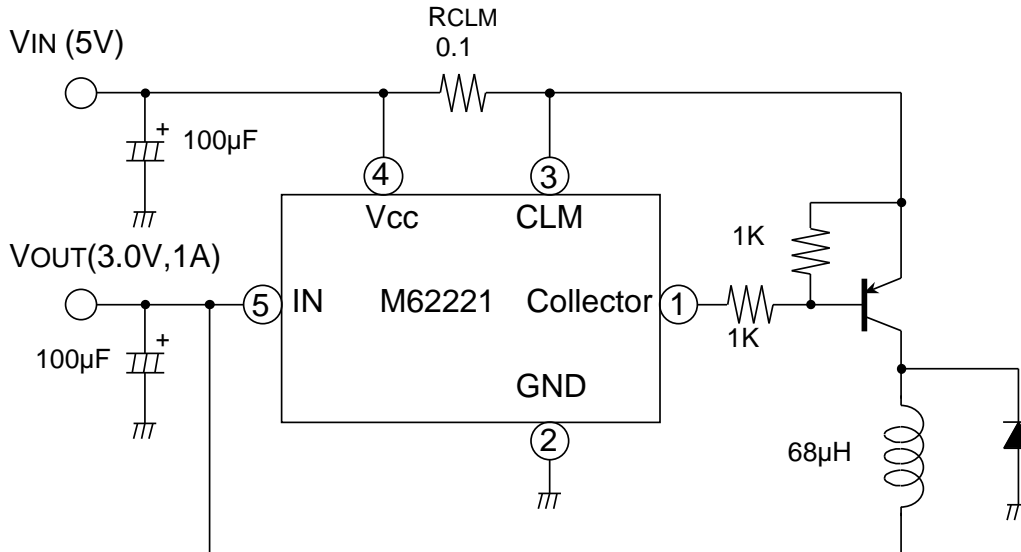


Fig.1 Example of the M62221L/FP application circuit

- Current Limit Detection:  
When the voltage drop between pin 3 and pin 4 becomes more than 150mV, the Current Limit Detection circuit begins operating. The peak switch current "Ipk" is limited to 150mV / RCLM. In the example of application (fig.1), the current is limited to 1.5A.

### THE EXPRESSION OF CIRCUIT CONSTANTS

CONSTANTS	EXPRESSIONS
$\frac{TON}{TOFF}$	$\frac{VO+VF}{VIN - VCE(sat) - VO}$
(TON+TOFF)MAX	$\frac{1}{fosc}$ fosc:110KHz(Vcc=5V)
TOFF(MIN)	$(TON + TOFF) / (1 + \frac{TON}{TOFF})$
TON(MAX)	$\frac{1}{fosc} - TOFF$
L(MIN)	$\frac{(VIN - VCE(sat) - VO) \times TON(MAX)}{Io}$
Ipk	$Io + \frac{1}{2} Io$
RCLM	$\frac{0.15}{Ipk}$ VCLM:150mV(Vcc=5V)

- VF :Forward voltage drop of an external diode.
- Vsat :Output saturation voltage of an external switching transistor.
- Io :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 "Ipk".