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 .
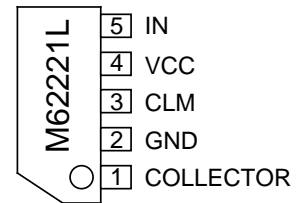
FEATURES

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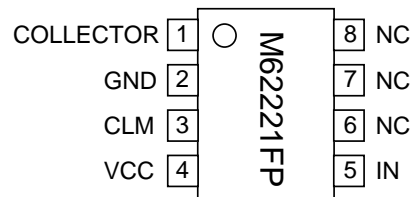• Small size 5-pin SIP and 8-pin SOP packages

APPLICATIONS

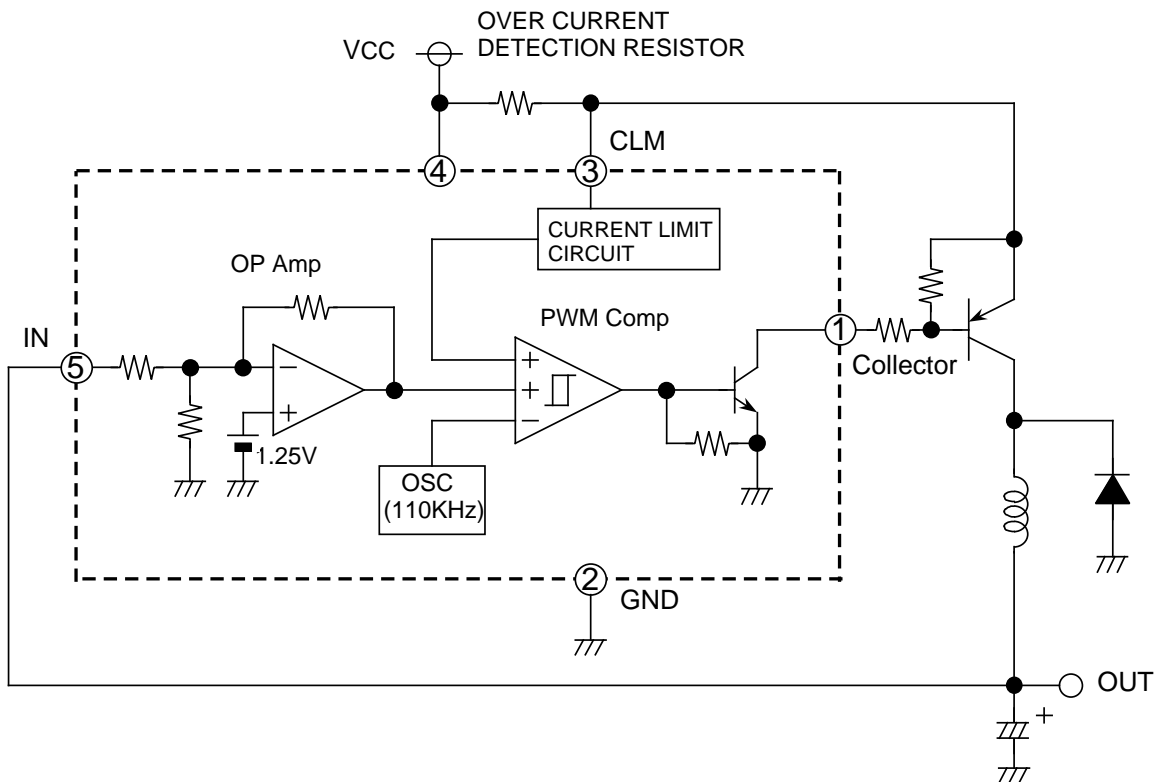CD-ROM, PDA, general purpose electric products

PIN CONFIGURATION (TOP VIEW)

M62221L

5	IN
4	VCC
3	CLM
2	GND
1	COLLECTOR

Outline 5P5T

M62221FP

COLLECTOR	1		8	NC
GND	2		7	NC
CLM	3		6	NC
VCC	4		5	IN

Outline 8P2S-A

NC: NO CONNECTION

BLOCK DIAGRAM

April. 1997

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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$_{THETA}$	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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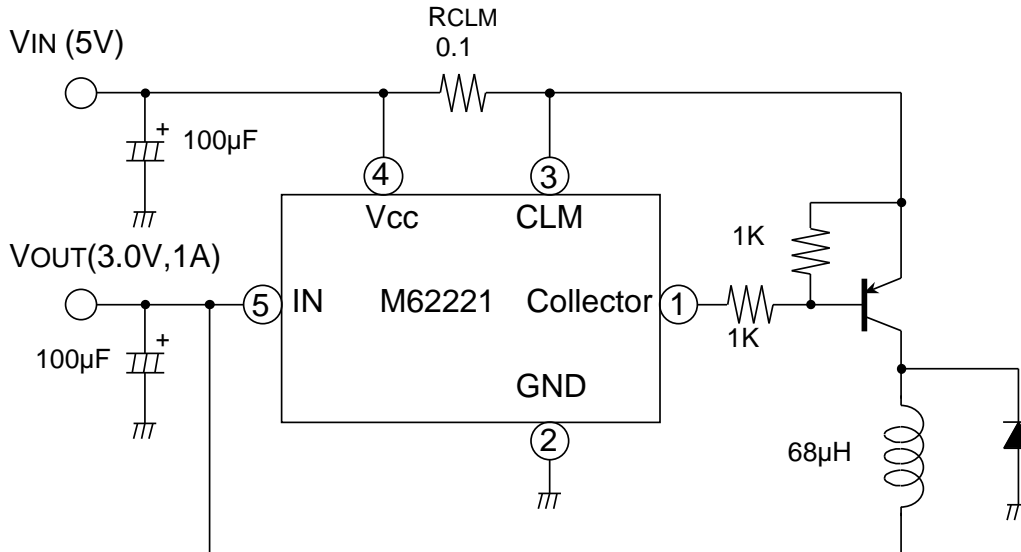## Application Circuit (3.0V Output DC-DC Converter)

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
$\dfrac{TON}{TOFF}$	$\dfrac{VO+VF}{VIN - VCE(sat) - VO}$
(TON+TOFF)MAX	$\dfrac{1}{fosc}$ fosc:110KHz(Vcc=5V)
TOFF(MIN)	$(TON + TOFF) / (1 + \dfrac{TON}{TOFF})$
TON(MAX)	$\dfrac{1}{fosc}$ - TOFF
L(MIN)	$\dfrac{(VIN - VCE(sat) - VO) \times TON(MAX)}{Io}$
Ipk	$Io + \dfrac{1}{2}$ Io
RCLM	$\dfrac{0.15}{Ipk}$ 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".