To all our customers

Regarding the change of names mentioned in the document, such as Mitsubishi Electric and Mitsubishi XX, to Renesas Technology Corp.

The semiconductor operations of Hitachi and Mitsubishi Electric were transferred to Renesas Technology Corporation on April 1st 2003. These operations include microcomputer, logic, analog and discrete devices, and memory chips other than DRAMs (flash memory, SRAMs etc.) Accordingly, although Mitsubishi Electric, Mitsubishi Electric Corporation, Mitsubishi Semiconductors, and other Mitsubishi brand names are mentioned in the document, these names have in fact all been changed to Renesas Technology Corp. Thank you for your understanding. Except for our corporate trademark, logo and corporate statement, no changes whatsoever have been made to the contents of the document, and these changes do not constitute any alteration to the contents of the document itself.

Note : Mitsubishi Electric will continue the business operations of high frequency & optical devices and power devices.

Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

M62221L/FP

3.0V FIXED OUTPUT VOLTAGE DC-DC CONVERTER

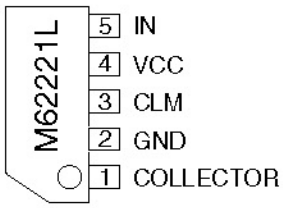
GENERAL DESCRIPTION

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

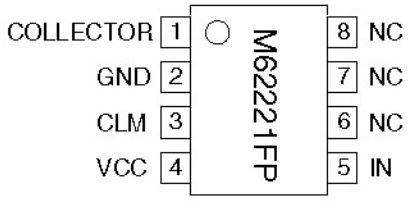
It is possible to simplify the peripheral circuit and to design compact and low cost sets because this IC, housed in a small 5- or 8-pin package includes necessary peripheral components.

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

PIN CONFIGURATION (TOP VIEW)



Outline 5P5T



Outline 8P2S-A

NC: NO CONNECTION

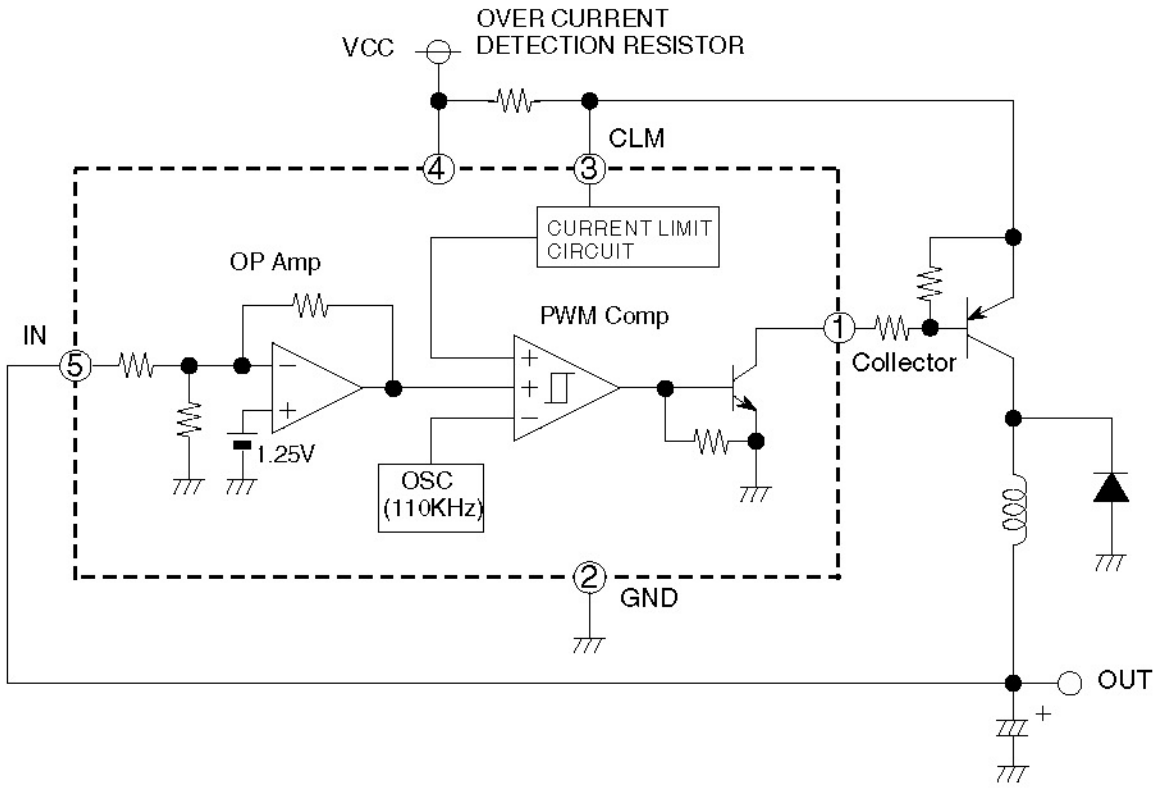
FEATURES

- 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

BLOCK DIAGRAM



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
KTHETA	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

Application Circuit (3.0V Output DC-DC Converter)

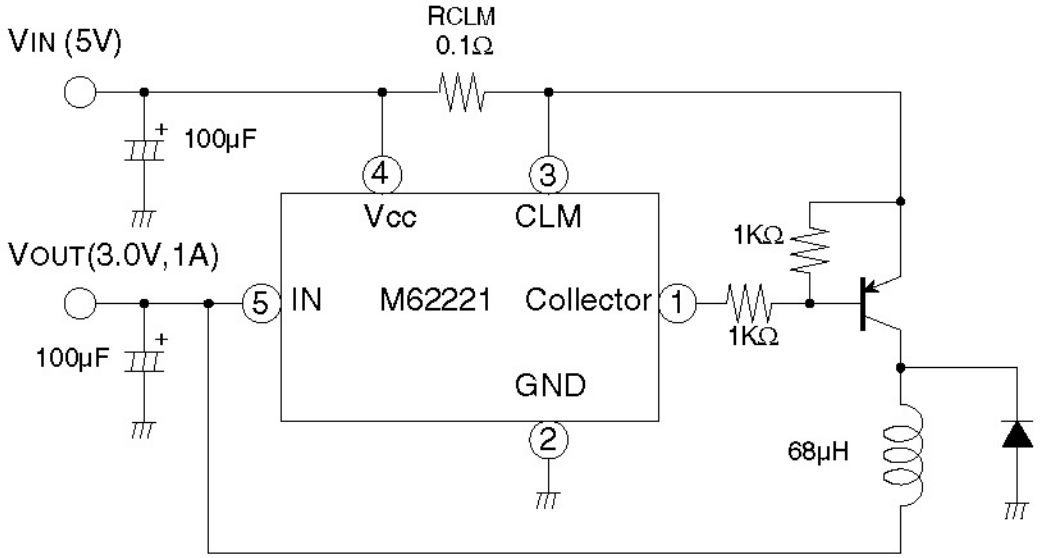


Fig.1 Example of the M62221L/FP application circuit

• 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)	$\frac{(VIN - VCE(sat) - VO) \times TON(MAX)}{\Delta Io}$
Ipk	$Io + \frac{1}{2}\Delta Io$
RCLM	$\frac{0.15}{Ipk}$ ΔVCLM:150mV(Vcc=5V)

•VF :Forward voltage drop of an external diode.
•Vsat :Output saturation voltage of an external switching transistor.
•ΔIO :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".