

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

M6227XGP

5-PIN SOT-23 3V SYSTEM FIXED OUTPUT VOLTAGE DC-DC CONVERTER

DESCRIPTION

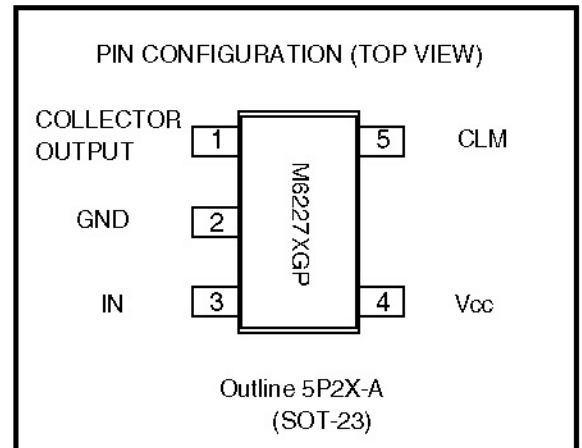
M6227XGP is an integrated circuit designed as fixed output voltage general purpose DC-DC converter.
Integrating peripheral components in ultrasmall 5-pin SOT23 package allows for simplified external circuit and compact low cost design.
This IC is applicable to portable equipments due to low circuit current 500uA(typ.)
Especially this is most suitable for CD-ROM, and so on as converter from 5 to 3V system.

FEATURES

- Wide operation power supply voltage range -- 4V to 15V(V_{cc}=5V typ.)
- Low power consumption -- 500μA max.(V_{cc}=5V typ., at no load)
- Built-in oscillator without peripheral components (110KHz typ.)
- Built-in overcurrent protection circuit
- Ultrasmall 5-pin SOT23 package

APPLICATIONS

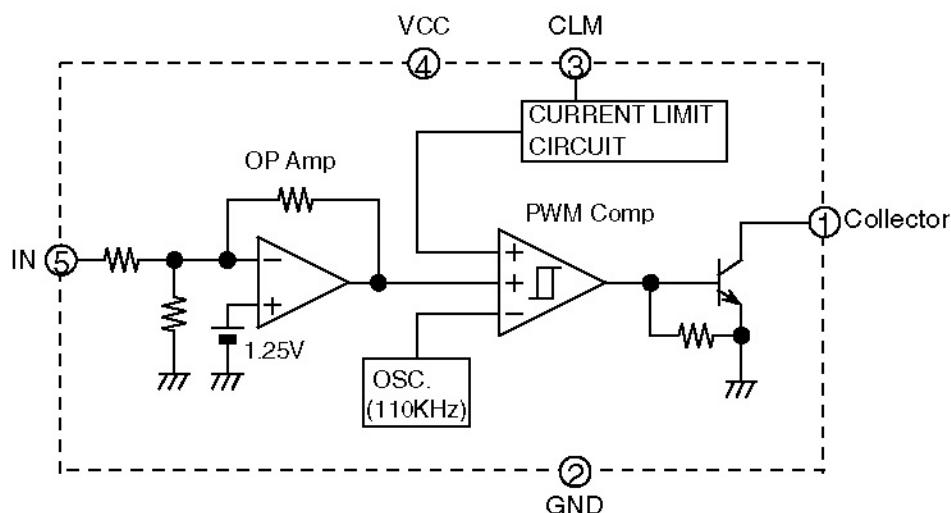
CD-ROM, portable equipments, general electric products



<TYPE NAME & OUTPUT VOLTAGE>

TYPE NAME	OUTPUT VOLTAGE
M62270GP	3.3V
M62271GP	3.0V
M62272GP	2.7V
M62273GP	2.4V
M62274GP	2.1V
M62275GP	1.8V
M62276GP	1.5V

BLOCK DIAGRAM



M6227XGP

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

Symbol	Parameter	Conditions	Ratings	Unit
Vcc	Supply Voltage		16	V
Io	Output Current		100	mA
Pd	Power Dissipation	Ta=25C	200	mW
KTHETA	Thermal Derating Ratio	Ta>25C	2.0	mW/C
Topr	Operating Ambient Temperature		-20 to +85	C
Tstg	Storage Temperature		-40 to +125	C

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

Block	Symbol	Parameter	Conditions	Limits			Units
				Min	Typ	Max	
	Vcc	Supply Voltage		4.0		15	V
	Icc	Supply Current	No load	-	500	700	μA
Error Amp.	Vo	Output Voltage	M62270GP	3.15	3.30	3.45	V
			M62271GP	2.85	3.00	3.15	V
			M62272GP	2.57	2.70	2.83	V
			M62273GP	2.28	2.40	2.52	V
			M62274GP	2.00	2.10	2.20	V
			M62275GP	1.71	1.80	1.89	V
			M62276GP	1.42	1.50	1.58	V
	Vreg-L	REF Line Regulation	Vcc= 4 to 12V		5	30	mV
	Iin	IN Input Current		-	100	300	μA
Oscillator	fosc	Oscillator Frequency		65	110	160	KHz
CLM	VTHCLM	Current Limit Voltage	Vcc - CLM	120	150	180	mV
Output	TDUTY	Maximum ON Duty			90		%
	ICL	Output Leakage Current	Vcc = 12V, Vc = 12V	-1	-	1	μA
	Vsat	Output Saturation Voltage	Io = 100mA	-	1.2	2.0	V

M6227XGP

5-PIN SOT-23 3V SYSTEM FIXED OUTPUT VOLTAGE DC-DC CONVERTER

1. Application Circuit (3.3V Output DC-DC Converter; M62270GP)

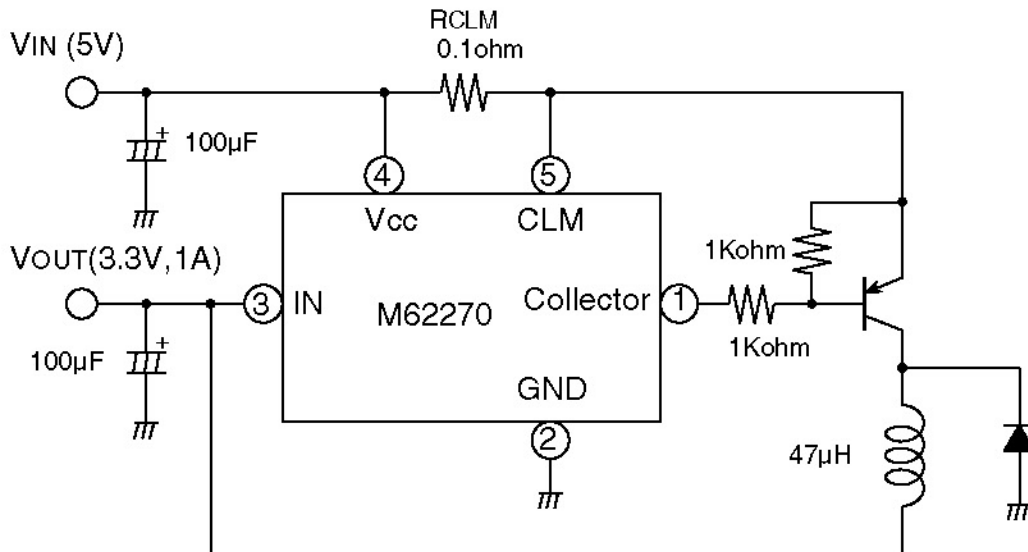


Fig.1 Example of application circuit of M62270GP

Current Limit Detction:

When the voltage drop between 4pin and 5pin becomes 150mV or more, Current Limit Detection circuit starts to operate. In the example of application (fig.1), the current is limited to 1.5A.

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

- VF : Forward voltage drop of an external diode.
- Vsat : Output saturation voltage of an external switching transistor.
- ΔIo : Set to 1/3 to 1/5 of maximum output current
- Choose an external transistor, diode and inductor with peak current rating greater than "Ipk".