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

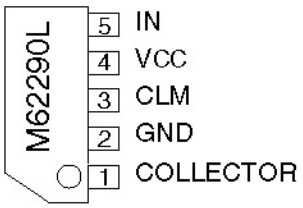
M62290L/FP

5.0V FIXED OUTPUT VOLTAGE DC-DC CONVERTER

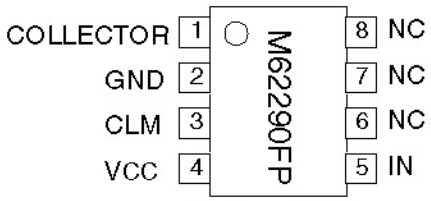
GENERAL DESCRIPTION

The M62290L/FP is a general purpose DC-DC converter which provides 5.0V fixed output.
It is possible to simplify peripheral circuits and to design compact and low cost sets because this IC includes a lot of functions in small 5- or 8-pin packages.
Especially this is most suitable for a local voltage regulator of audio sets as a converter from 12V to 5V.

PIN CONFIGURATION (TOP VIEW)



Outline 5P5T



Outline 8P2S-A

NC : NO CONNECTION

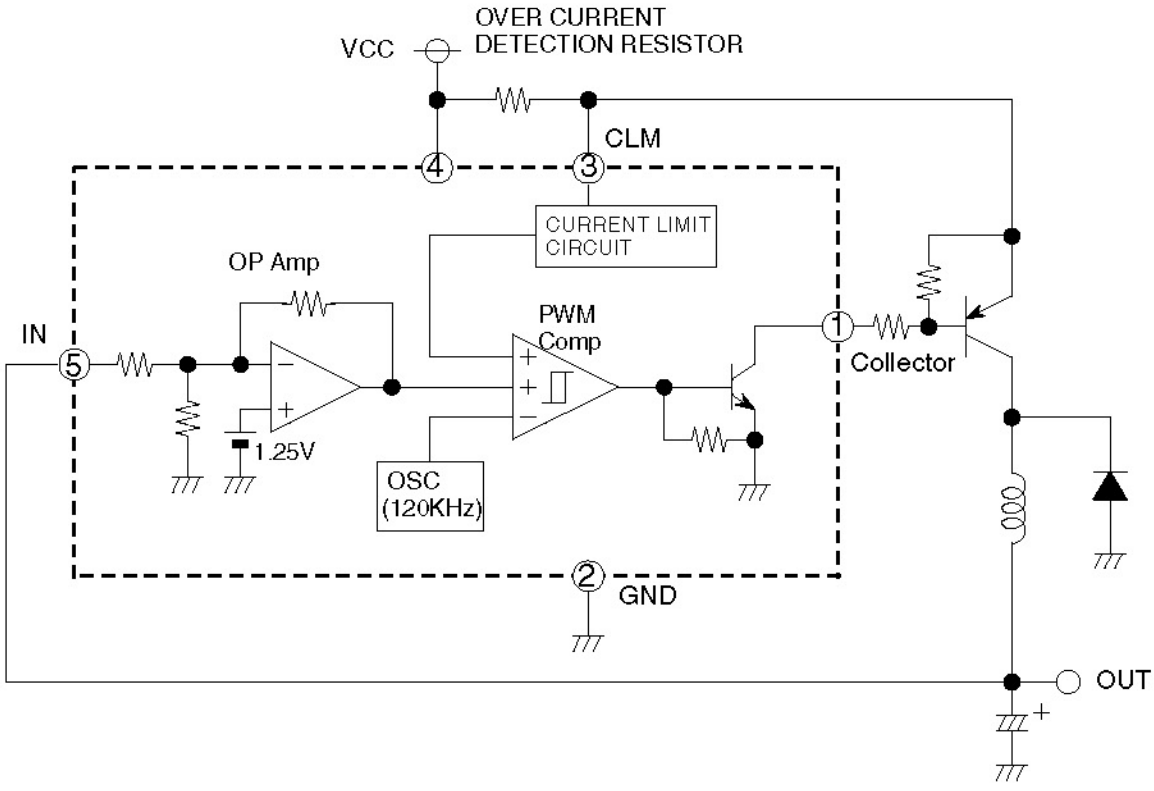
FEATURES

- Wide operation voltage range ····· 6 to 15 V (typ.Vcc=12V)
- Low power dissipation ·····1.1mA (max.,Vcc=12V)
- Built-in oscillator without peripheral devices (120KHz typ.)
- Built-in over current protection circuit
- Small 5-pin SIP and 8-pin SOP packages

APPLICATIONS

Local voltage regulator of audio sets and general electric products

BLOCK DIAGRAM



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

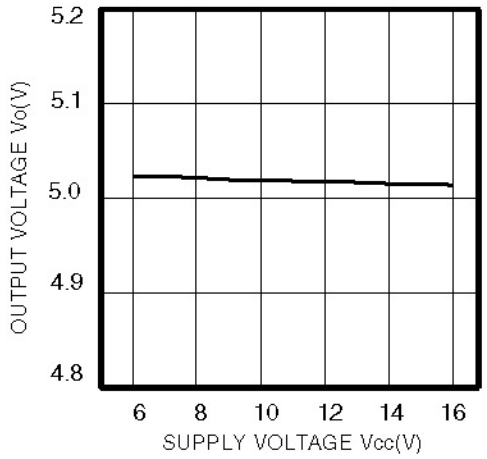
Symbol	Parameter	Conditions		Ratings	Unit
Vcc	Supply voltage			16	V
Io	Output current			100	mA
Pd	Power dissipation	Ta = 25°C	5-pin SIP	450	mW
			8-pin SOP	440	mW
Kθ	Thermal derating	Ta > 25°C	5-pin SIP	4.5	mW/ °C
			8-pin SOP	4.4	mW/ °C
Topr	Operating temperature			-20 to +85	°C
Tstg	Storage temperature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

ELECTRICAL CHARACTERISTICS (Ta=25°C, Vcc=12V, unless otherwise noted)

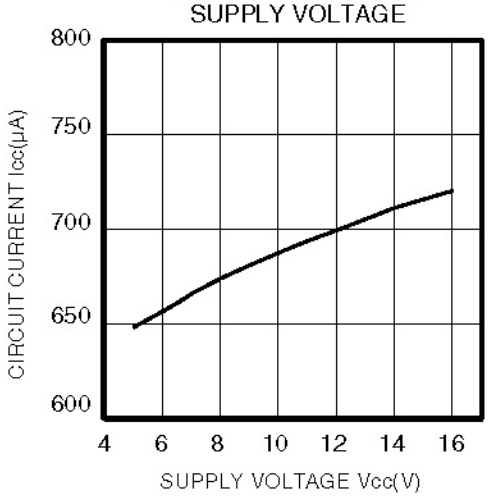
Block	Symbol	Parameter	Test conditions	Limits			Unit
				Min.	Typ.	Max.	
All block	Vcc	Supply voltage		6.0		15	V
	Icc	Supply current	Without load	—	780	1100	µA
Error Amp.	Vo	Output voltage		4.75	5.00	5.25	V
	Vreg-L	REF line regulation	Vcc= 6 to 15V		5	30	mV
	Iin	IN input current		—	160	300	µA
Oscillator	fosc	Oscillator frequency		70	120	170	kHz
	TDUTY	Maximum on duty			90		%
CLM	VTHCLM	Current limit voltage	Vcc - CLM	110	140	170	mV
Output	ICL	Output leakage current	Vcc = 15V, Vc = 15V	-1	—	1	µA
	Vsat	Output saturation voltage	Io = 100mA	—	0.1	0.3	V

TYPICAL CHARACTERISTICS

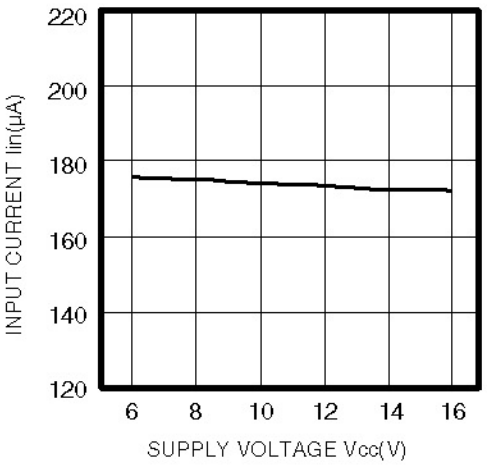
OUTPUT VOLTAGE vs. SUPPLY VOLTAGE



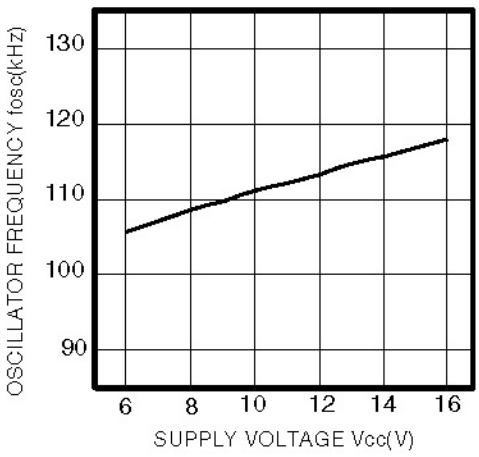
CIRCUIT CURRENT vs. SUPPLY VOLTAGE



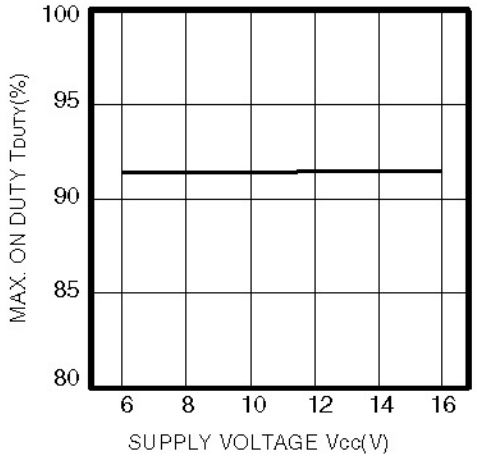
INPUT CURRENT vs. SUPPLY VOLTAGE



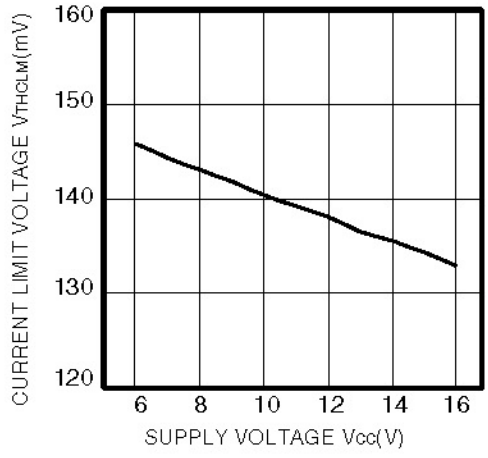
OSCILLATOR FREQUENCY vs. SUPPLY VOLTAGE



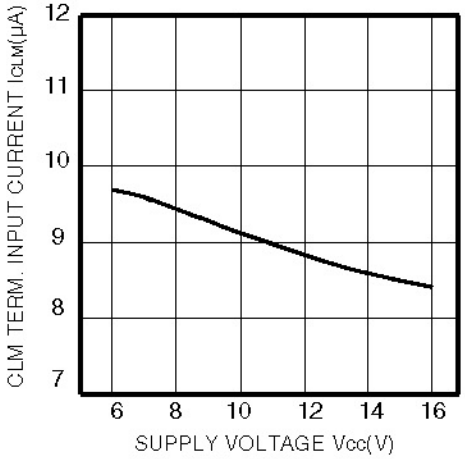
MAX. ON DUTY vs. SUPPLY VOLTAGE



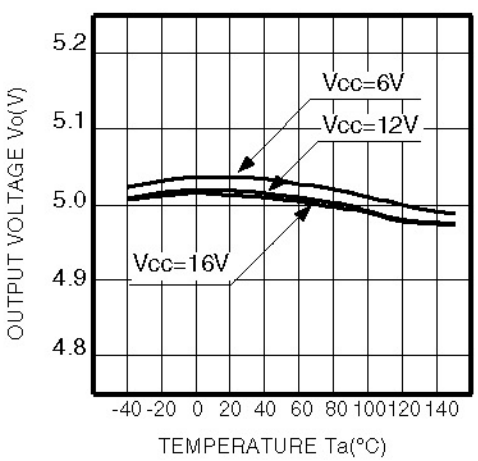
CURRENT LIMIT VOLTAGE vs. SUPPLY VOLTAGE



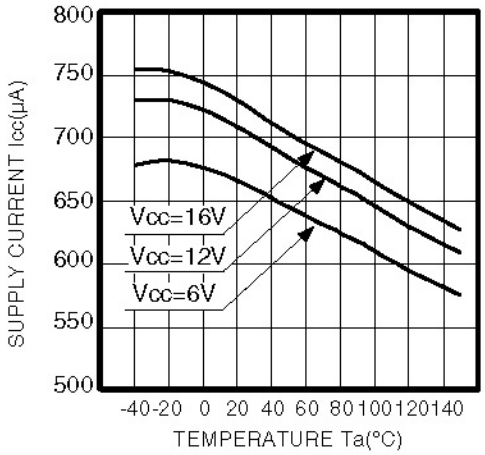
CLM TERM. INPUT CURRENT vs. SUPPLY VOLTAGE



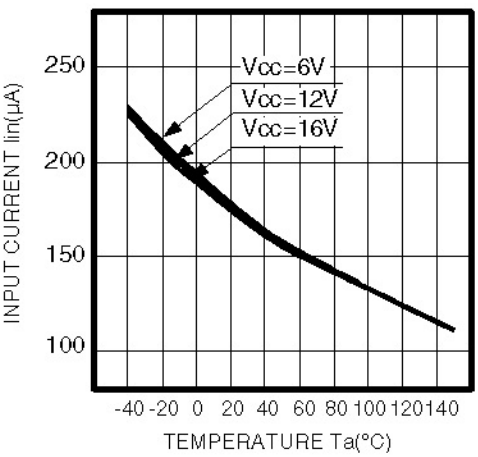
OUTPUT VOLTAGE vs. TEMPERATURE



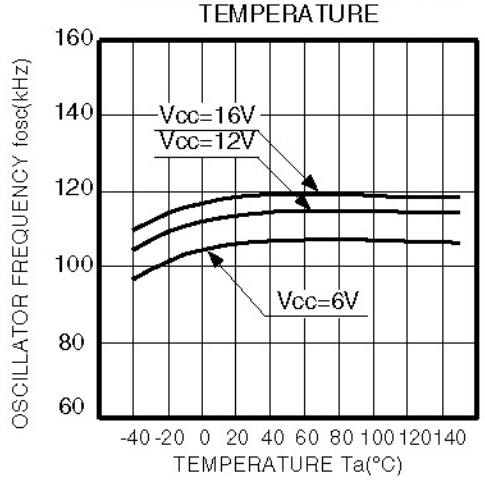
SUPPLY CURRENT vs. TEMPERATURE



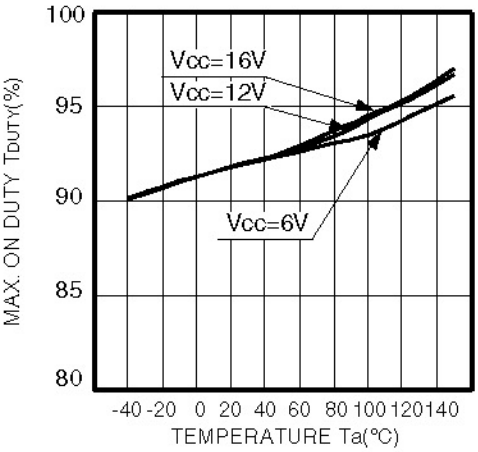
INPUT CURRENT vs. TEMPERATURE



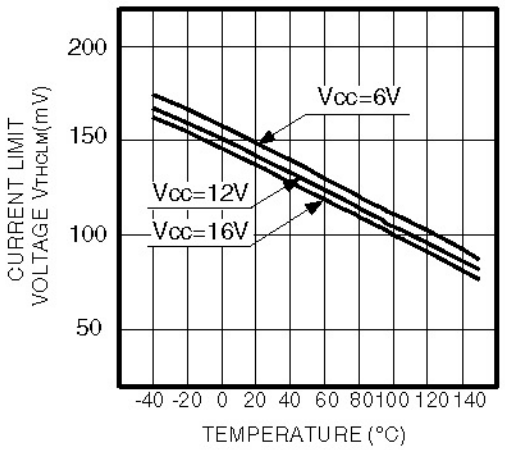
OSCILLATOR FREQUENCY vs. TEMPERATURE



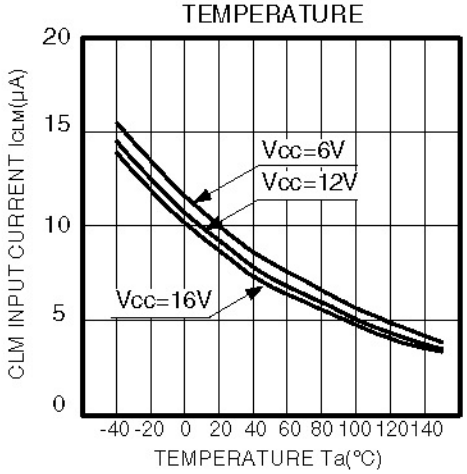
MAX. ON DUTY vs. TEMPERATURE



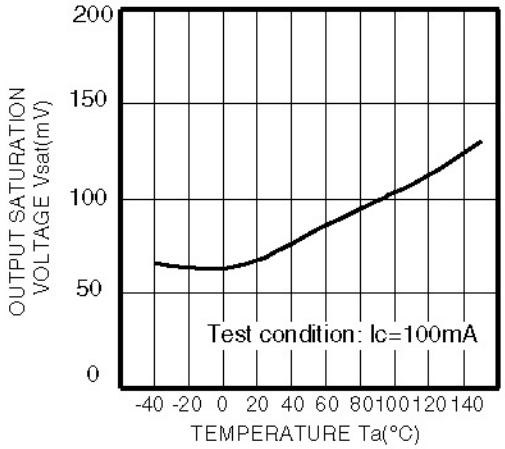
CURRENT LIMIT VOLTAGE vs. TEMPERATURE



CLM INPUT CURRENT vs. TEMPERATURE



OUTPUT SATURATION VOLTAGE vs. TEMPERATURE



Application Circuit (5V Output DC-DC converter)

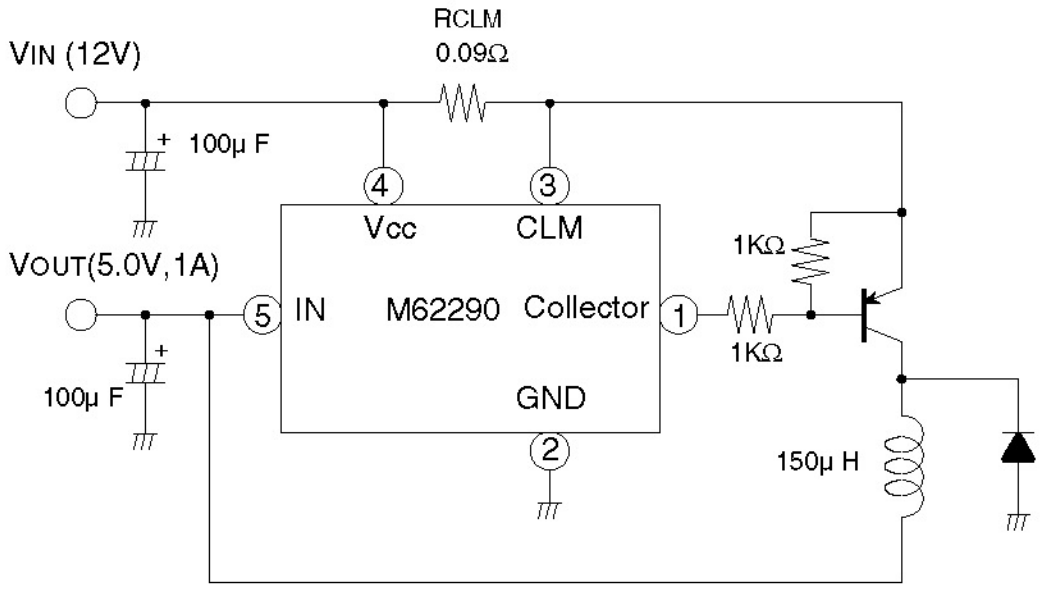


Fig.1 Example of application circuit of the M62290L/FP

•Current Limit Detection:
When the voltage drop between pin 3 and 4 becomes more than 140mV, the Current Limit Detection circuit begins operating. The peak switch current "Ipk" is limited to 140mV / 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:120KHz(Vcc=12V)
TOFF(MIN)	$(TON + TOFF) / (1 + \frac{TON}{TOFF})$
TON(MAX)	$\frac{1}{fosc} - TOFF$
L(MIN)	$\frac{(VIN - VCE(sat) - VO) X TON(MAX)}{\Delta Io}$
Ipk	$Io + \frac{1}{2} \Delta Io$
RCLM	$\frac{0.14}{Ipk}$ ΔVCLM:140mV(Vcc=12V)

- VF : Forward voltage drop of an external diode.
- Vsat : Output saturation voltage of an external switching transistor.
- ΔIO : Set between 1/3 and 1/5 of the maximum output current.
- An external transistor, diode and inductor must be have a peak current capability of approximately greater than "Ipk".

Application circuit characteristics