M62220L/FP

3.3 V Fixed Output Voltage DC/DC Converter

REJ03D0846-0300
Rev.3.00
Jun 15, 2007

General Description

The M62220 is a general purpose DC/DC converter which provides a 3.3 V 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 5 V to 3.3 V.

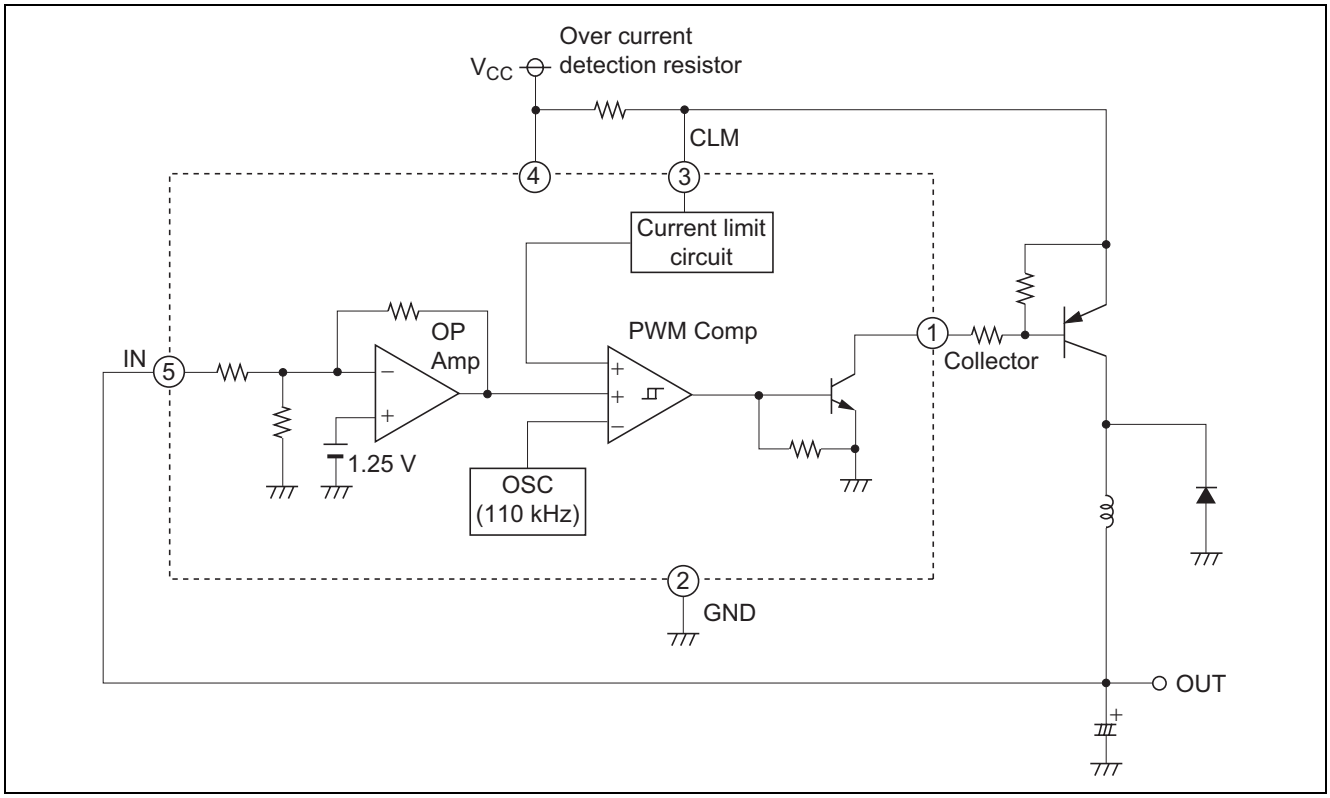
Features

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

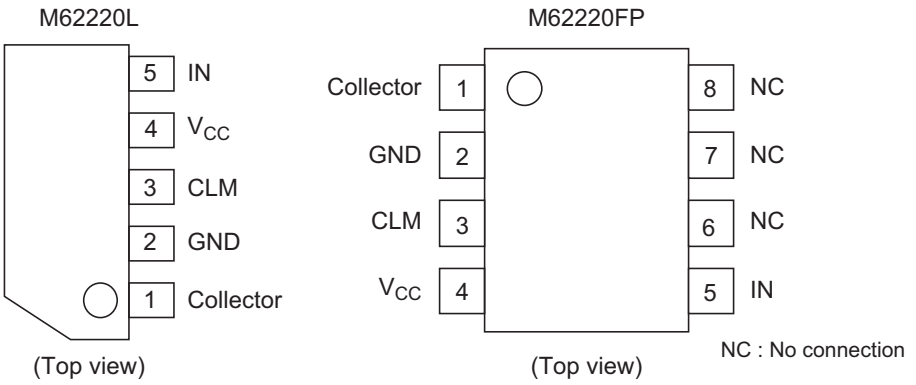
Applications

CD-ROM, PDA, general purpose electric products

Block Diagram



Pin Arrangement



Outline: 5P5T

Outline: PRSP0008DE-C (recommend)
PRSP0008DA-A (8P2S-A) (not recommend for new design)

Absolute Maximum Ratings

(Ta = 25°C, unless otherwise noted)

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

Electrical Characteristics

(Ta = 25°C, V_{CC} = 5 V, unless otherwise noted)

Block	Item	Symbol	Limits			Unit	Test Conditions
			Min	Typ	Max		
All block	Supply voltage	V_{CC}	4.0	—	15	V	
	Supply current	I_{CC}	—	660	900	μA	Without load
Error Amp.	Output voltage	V_O	3.15	3.30	3.45	V	
	REF line regulation	Vreg-L	—	5	15	mV	V_{CC} = 4 to 12 V
	IN input current	Iin	—	100	300	μA	
Oscillator	Oscillator frequency	f_{OSC}	65	110	155	kHz	
	Maximum on duty	T_{DUTY}	—	90	—	%	
CLM	Current limit voltage	V_{THCLM}	120	150	180	mV	V_{CC} – CLM
Output	Output leakage current	I_{CL}	–1	—	1	μA	V_{CC} = 12 V, V_C = 12 V
	Output saturation voltage	Vsat	—	0.4	0.7	V	I_O = 100 mA

Application Circuit (3.3 V Output DC/DC Converter)

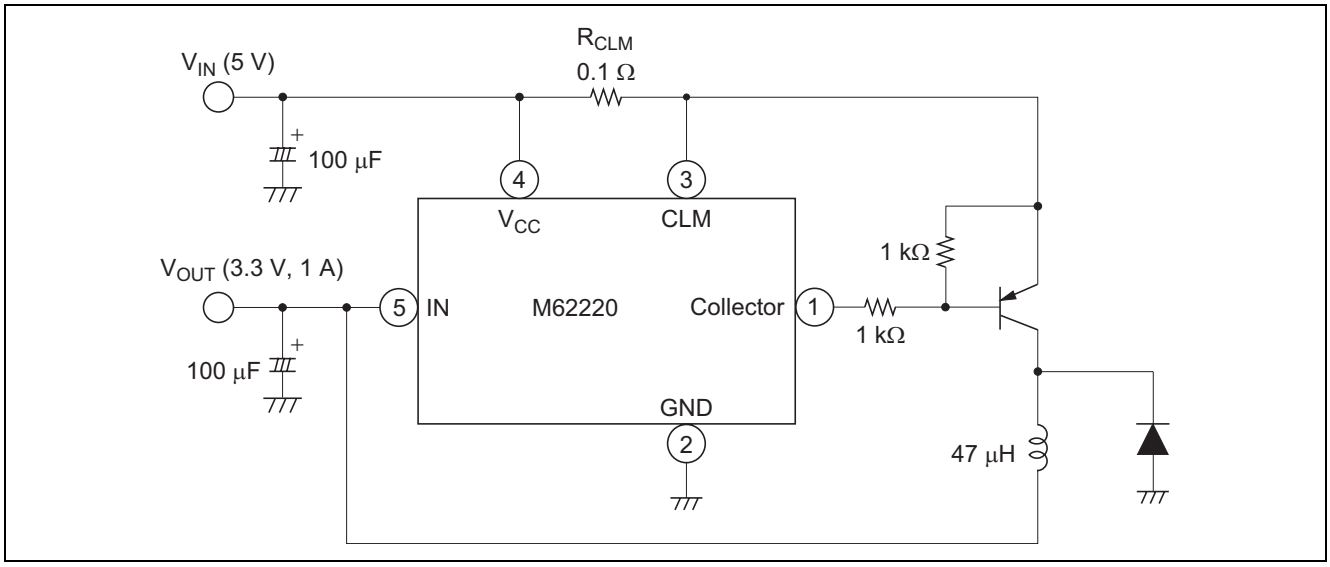


Figure 1 Example of the M62220L/FP Application Circuit

- Current limit detection:
  When the voltage drop between pin 3 and pin 4 becomes more than 150 mV, the current limit detection circuit begins operating. The peak switch current "Ipk" is limited to 150 mV/R_{CLM}. In the example of application (Figure 1), the current is limited to 1.5 A.

The Expression of Circuit Constants

Constants	Expressions
$\frac{T_{ON}}{T_{OFF}}$	$\frac{V_O + V_F}{V_{IN} - V_{CE\ (sat)} - V_O}$
$(T_{ON} + T_{OFF})_{MAX}$	$\frac{1}{f_{OSC}}$ f_{OSC}: 110 kHz (V_{CC} = 5 V)
$T_{OFF\ (MIN)}$	$(T_{ON} + T_{OFF}) / (1 + \frac{T_{ON}}{T_{OFF}})$
$T_{ON\ (MAX)}$	$\frac{1}{f_{OSC}} - T_{OFF}$
L (MIN)	$\frac{(V_{IN} - V_{CE\ (sat)} - V_O) \times T_{ON\ (MAX)}}{\Delta I_O}$
Ipk	$I_O + \frac{1}{2} \Delta I_O$
R_{CLM}	$\frac{0.15}{Ipk}$ ΔV_{CLM}: 150 mV (V_{CC} = 5 V)

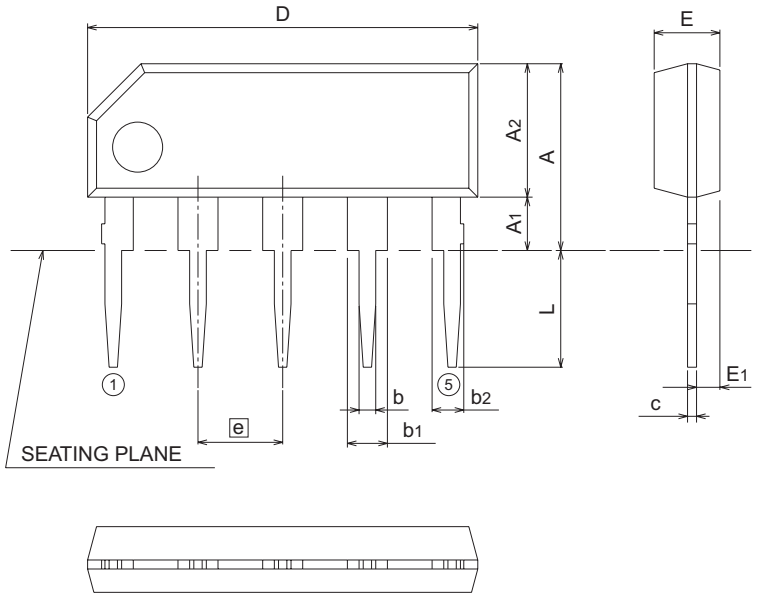
Note: V_F: Forward voltage drop of an external diode.
Vsat: Output saturation voltage of an external switching transistor.
ΔI_O: It should be set between 1/3 and 1/5 of maximum output current.
An external transistor, diode and inductor should have a peak current capability of greater than "Ipk".

Package Dimensions

5P5T

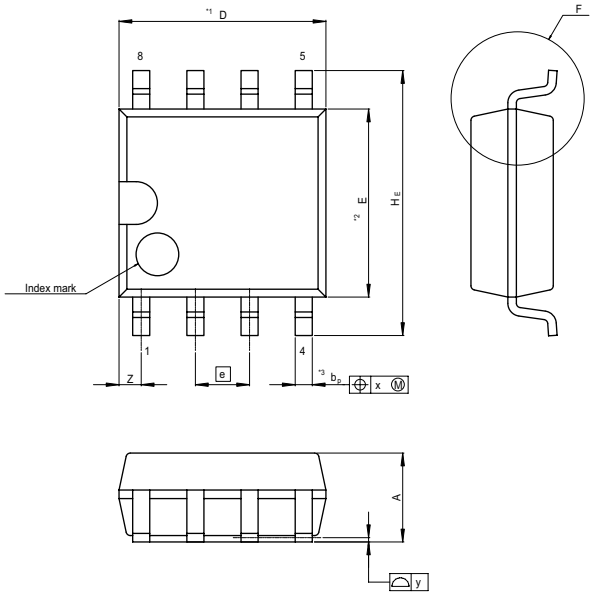
Plastic 5pin 240mil SIP

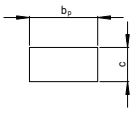
EIAJ Package Code	JEDEC Code	Weight(g)	Lead Material
SIP5-P-240-2.54	–	0.22	Cu Alloy



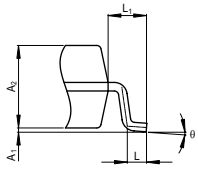
Symbol	Dimension in Millimeters		
	Min	Nom	Max
A	–	–	6.1
A_1	1.4	–	–
A_2	–	4.0	–
b	0.4	0.5	0.6
b_1	1.1	1.2	1.5
b_2	0.75	0.85	1.15
c	0.22	0.27	0.34
D	11.5	11.7	11.9
E	1.77	1.97	2.17
E_1	0.6	0.7	0.8
e	–	2.54	–
L	3.0	–	–

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP8-4.4x4.85-1.27	PRSP0008DE-C	—	0.1g





Terminal cross section
(Ni/Pd/Au plating)

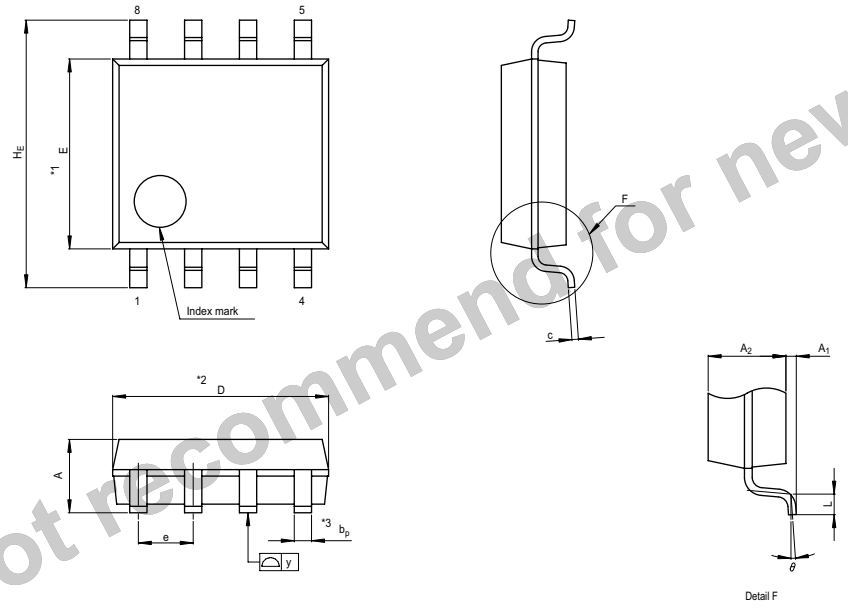


Detail F

NOTE)
1. DIMENSIONS"*1 (Nom)"AND"*2"
DO NOT INCLUDE MOLD FLASH.
2. DIMENSION"*3"DOES NOT
INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	4.65	4.85	5.05
E	4.2	4.4	4.6
A_2	—	1.85	—
A_1	0.00	0.1	0.20
A	—	—	2.03
b_p	0.34	0.4	0.46
b_1	—	—	—
c	0.15	0.20	0.25
c_1	—	—	—
θ	0°	—	8°
H_E	5.7	6.2	6.5
e	1.12	1.27	1.42
x	—	—	0.12
y	—	—	0.10
Z	—	—	0.75
L	0.25	0.45	0.65
L_1	—	0.90	—

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP8-4.4x5-1.27	PRSP0008DA-A	8P2S-A	0.07g



NOTE)
1. DIMENSIONS "*1" AND "*2" DO NOT INCLUDE MOLD FLASH.
2. DIMENSION "*3" DOES NOT INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	4.8	5.0	5.2
E	4.2	4.4	4.6
A_2	—	1.5	—
A_1	0.05	—	—
A	—	—	1.9
b_p	0.35	0.4	0.5
c	0.13	0.15	0.2
θ	0°	—	10°
H_E	5.9	6.2	6.5
e	1.12	1.27	1.42
y	—	—	0.1
L	0.2	0.4	0.6

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