

M62294FP

3.3 V, 2.0 V Fixed 2-Output Voltage DC/DC Converter

REJ03D0854-0200

Rev.2.00

Jun 14, 2006

Description

M62294FP is 3.3 V and 2.0 V fixed stable 2-output step-down DC/DC converter.

It is possible to simplify peripheral circuit and to design compact and low cost sets because this device includes peripheral devices in small size 8-pin package.

The IC also has Reset circuit with time delay that monitors power supply ($V_{CC} = 5\text{ V}$) and one regulator output ($V_{out1} = 3.3\text{ V}$; IN1 terminal), therefore an application system is protected system errors.

Especially this is most suitable for application system with microprocessor and ASIC.

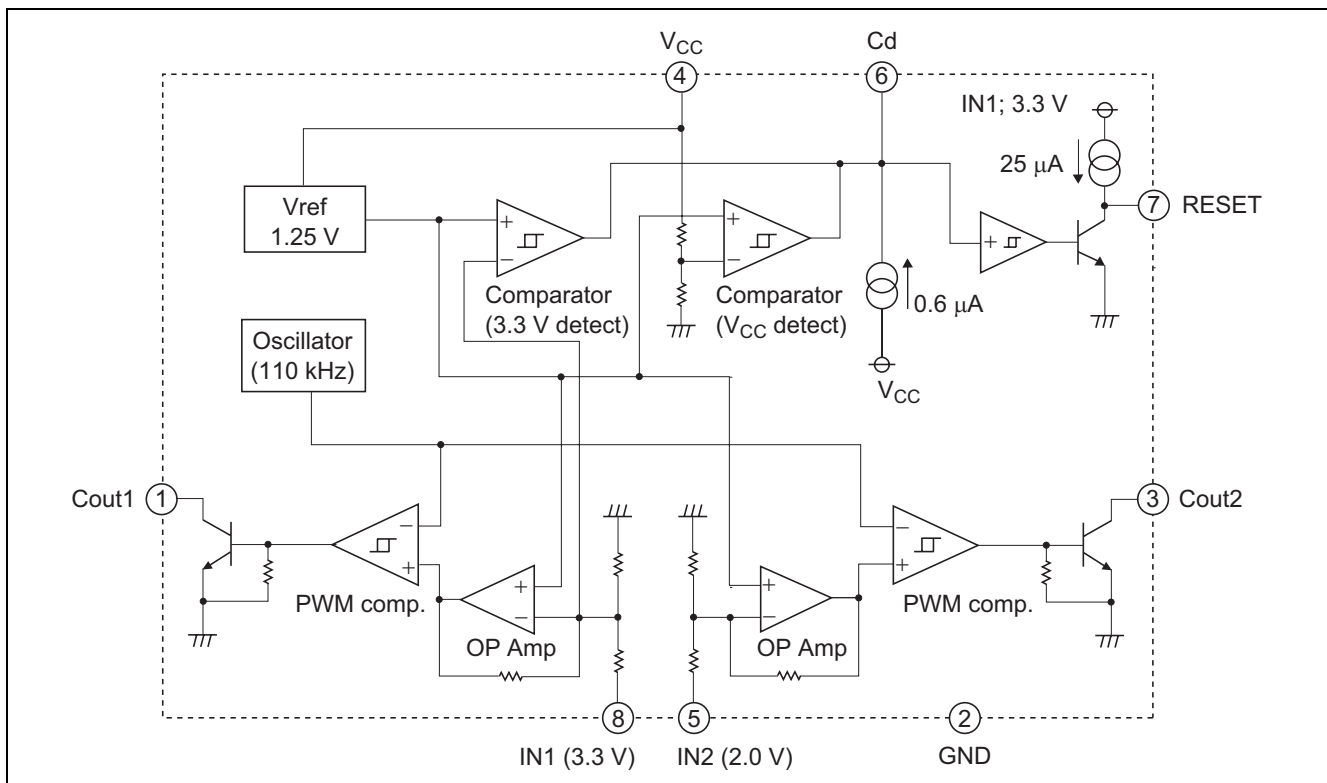
Features

- 3.3 V and 2.0 V step-down converter
- 4 to 15 V wide input supply voltage ($V_{CC} = 5\text{ V typ.}$)
- Reset circuit with time delay monitors
- Supply voltage ($V_{CC} = 5\text{ V}$) and regulator output (3.3 V)
- 110 kHz fixed frequency oscillator without peripheral devices
- 8-pin SOP package

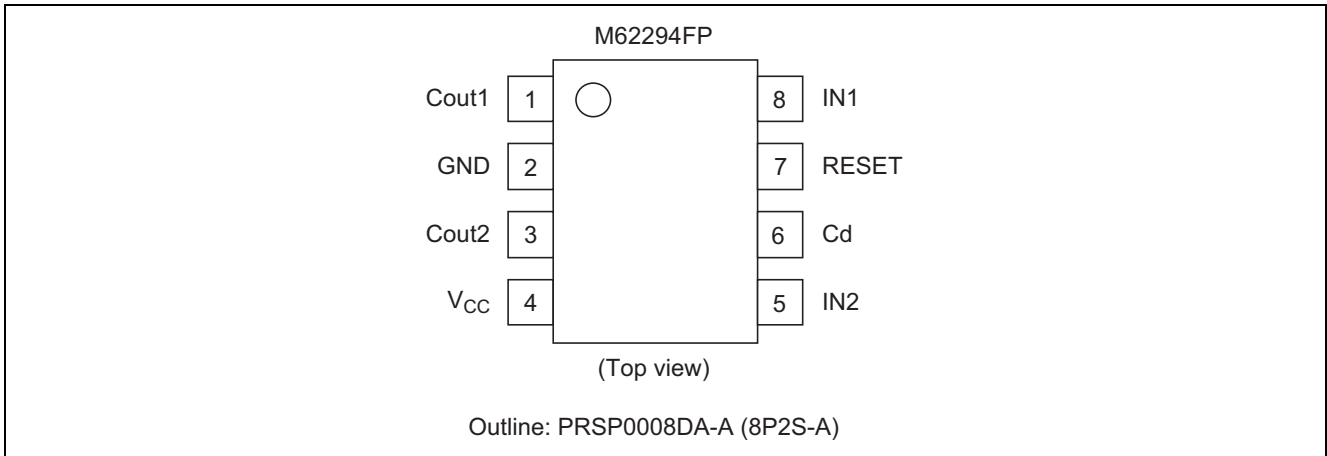
Application

Application system with microprocessor and ASIC

Block Diagram



Pin Arrangement



Absolute Maximum Ratings

(Ta = 25°C, unless otherwise noted)

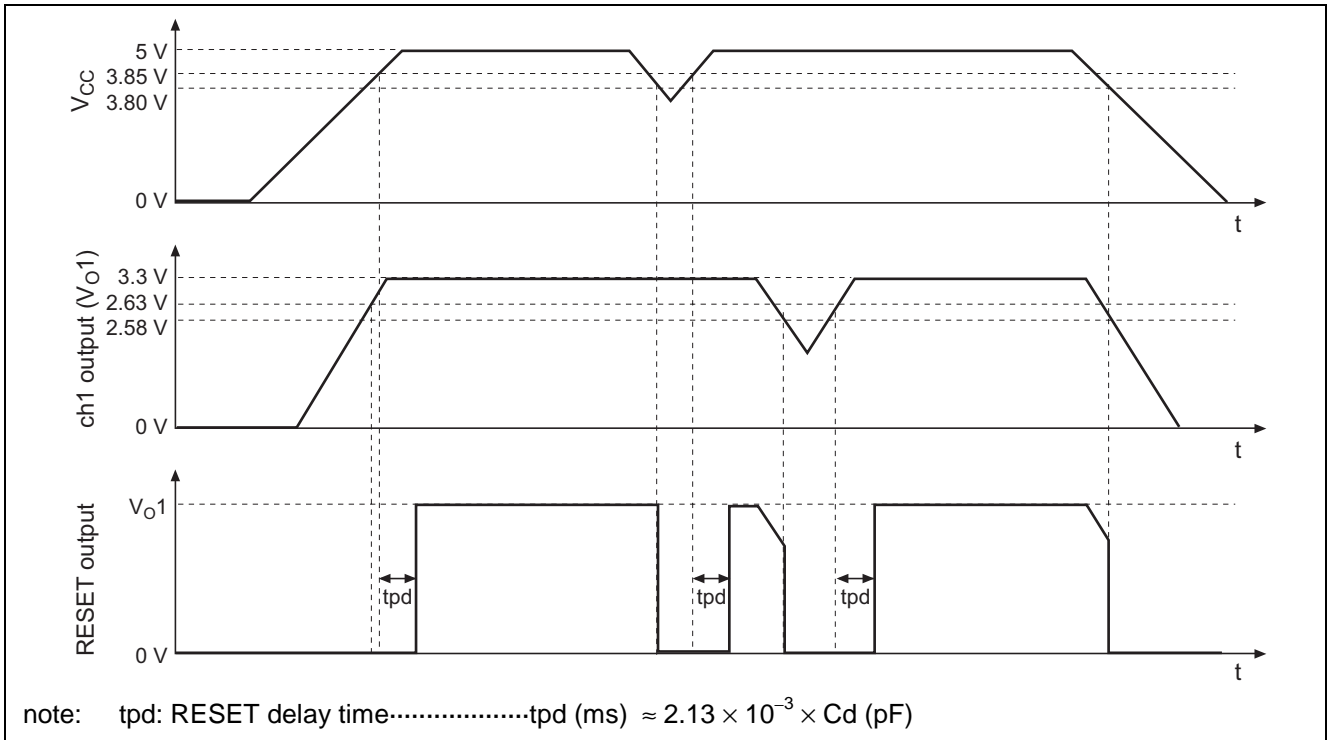
Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V _{CC}	16	V	
Output current (DC/DC converter block)	I _O	30	mA	ch1, ch2
Output current (Reset block)	I _{ORESET}	6	mA	
Power dissipation	P _d	440	mW	Ta = 25°C
Thermal derating	K _θ	4.4	mW/°C	Ta > 25°C
Operating temperature	Topr	-20 to +85	°C	
Storage temperature	Tstg	-40 to +125	°C	

Electrical Characteristics

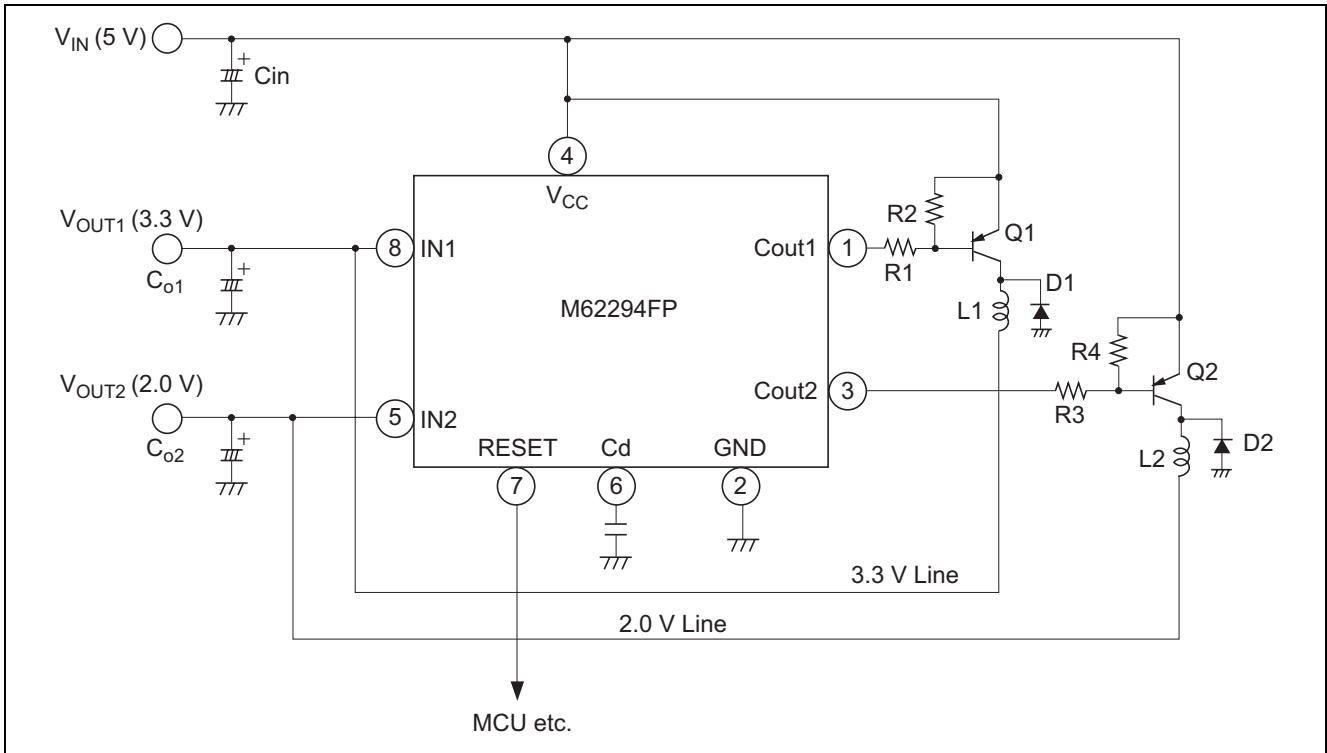
(Ta = 25°C, V_{CC} = 5 V, unless otherwise noted)

Block	Item	Symbol	Limits			Unit	Test Condition
			Min	Typ	Max		
All Blocks	Supply voltage	V _{CC}	4.0	5.0	15	V	
	Supply current	I _{CC}	—	1.5	2.8	mA	Without load
DC/DC converter block							
Error Amp.	Output voltage	V _{O1}	3.15	3.30	3.45	V	ch1 output
		V _{O2}	1.90	2.00	2.10		ch2 output
	Line regulation	V _{reg-L}	—	5	15	mV	V _{CC} = 4 to 12 V
	Input current 1	I _{in}	—	150	450	μA	ch1
	Input current 2	I _{in}	—	100	300	μA	ch2
Oscillator	Oscillator frequency	f _{OSC}	65	110	160	kHz	
Output	Maximum on duty	T _{DUTY}	—	90	—	%	
	Output leakage current	I _{CL}	-1	—	1	V	V _{CC} = 12 V, V _C = 12 V
	Output saturation voltage	V _{sat}	—	1.2	2.0	V	I _O = 10 mA, Darlington connection
Reset circuit block							
Reset circuit	Detecting voltage 1	V _{S1}	3.6	3.8	4.0	V	V _{CC} = 5 V detection
	Hysteresis voltage 1	ΔV _{S1}	30	50	80	mV	
	Detecting voltage 2	V _{S2}	2.46	2.58	2.70	V	ch1 output (3.3 V) detection
	Hysteresis voltage 2	ΔV _{S2}	30	50	80	mV	
	Cd output current	I _{PD}	-1.1	-0.6	-0.3	μA	
	Delay time	t _{pd}	5	10	20	ms	Cd = 4700 pF
	RESET output current	I _{OC}	-40	-25	-17	μA	V _{CC} = 5 V, V _O = 1/2 × V _{CC}
	RESET low voltage	V _{OL}	—	—	0.2 V _{O1}	V	I _{ORESET} = 4 mA
	RESET high voltage	V _{OH}	0.8 V _{O1}	—	—	V	

Reset Block Timing Chart



Application Circuit (3.3 V and 2.0 V 2-output Voltage DC/DC Converter)



The Expression of Circuit Constants

Constants	Expressions
$\frac{T_{ON}}{T_{OFF}}$	$\frac{V_O + V_F}{V_{IN} - V_{CE(sat)} - V_O}$
$(T_{ON} + T_{OFF})_{MAX}$	$\frac{1}{f_{OSC}} f_{OSC}: 110 \text{ kHz } (V_{CC} = 5 \text{ V})$
$T_{OFF(MIN)}$	$(T_{ON} + T_{OFF}) / (1 + \frac{T_{ON}}{T_{OFF}})$
$T_{ON(MAX)}$	$\frac{1}{f_{OSC}} - T_{OFF}$
$L(MIN)$	$\frac{(V_{IN} - V_{CE(sat)} - V_O) \times T_{ON(MAX)}}{\Delta I_O}$
I_{pk}	$I_O + \frac{1}{2} \Delta I_O$

Note: V_F : Forward voltage drop of an external diode.

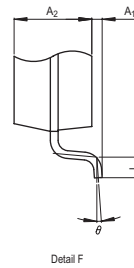
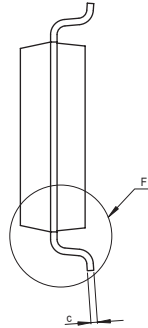
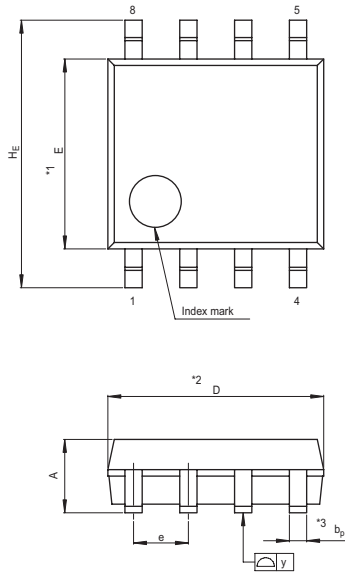
V_{sat} : Output saturation voltage of an external switching transistor.

ΔI_O : Set to 1/3 to 1/5 of maximum output current.

Choose an external transistor, diode and inductor with peak current rating approximately greater than " I_{pk} ".

Package Dimensions

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

Keep safety first in your circuit designs!

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