

M62292FP

3.3 V, 1.8 V Fixed 2-Output Voltage DC/DC Converter

REJ03D0852-0300

Rev.3.00

Jun 15, 2007

Description

M62292FP is 3.3 V and 1.8 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.

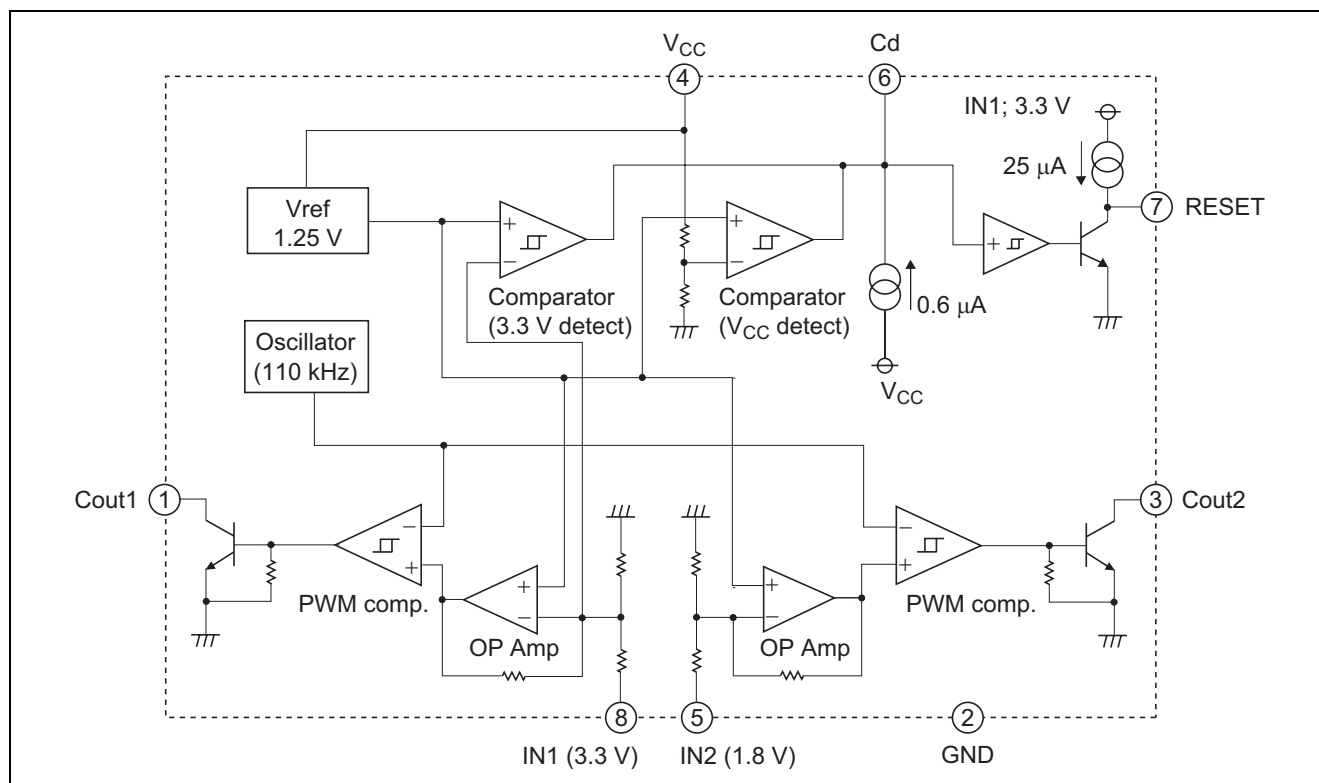
Features

- 3.3 V and 1.8 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

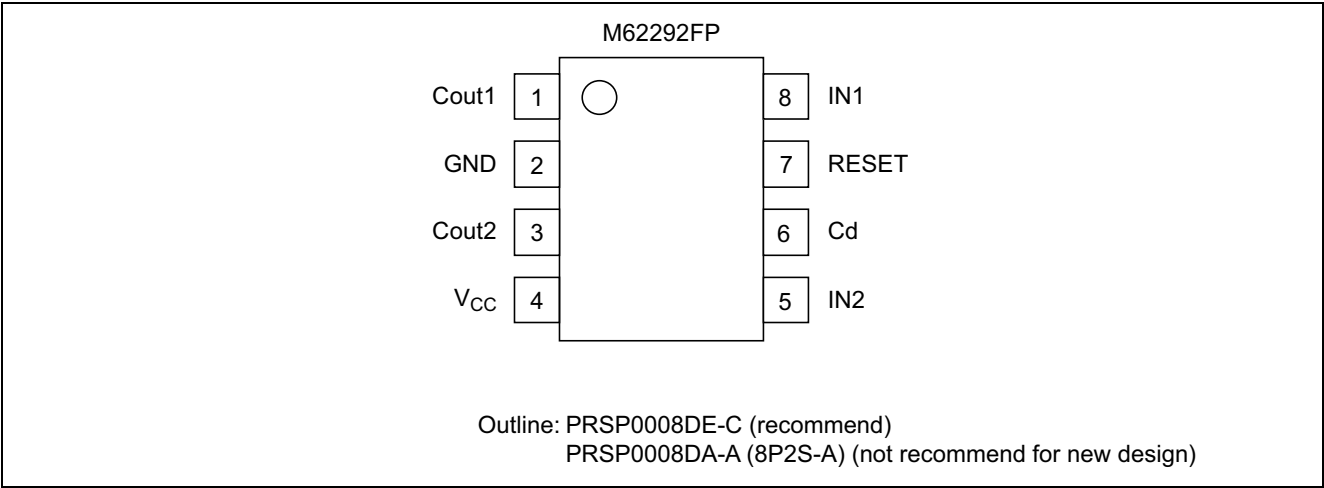
Application

Application system with microprocessor and ASIC

Block Diagram



Pin Arrangement



Absolute Maximum Ratings

(Ta = 25°C, unless otherwise noted)

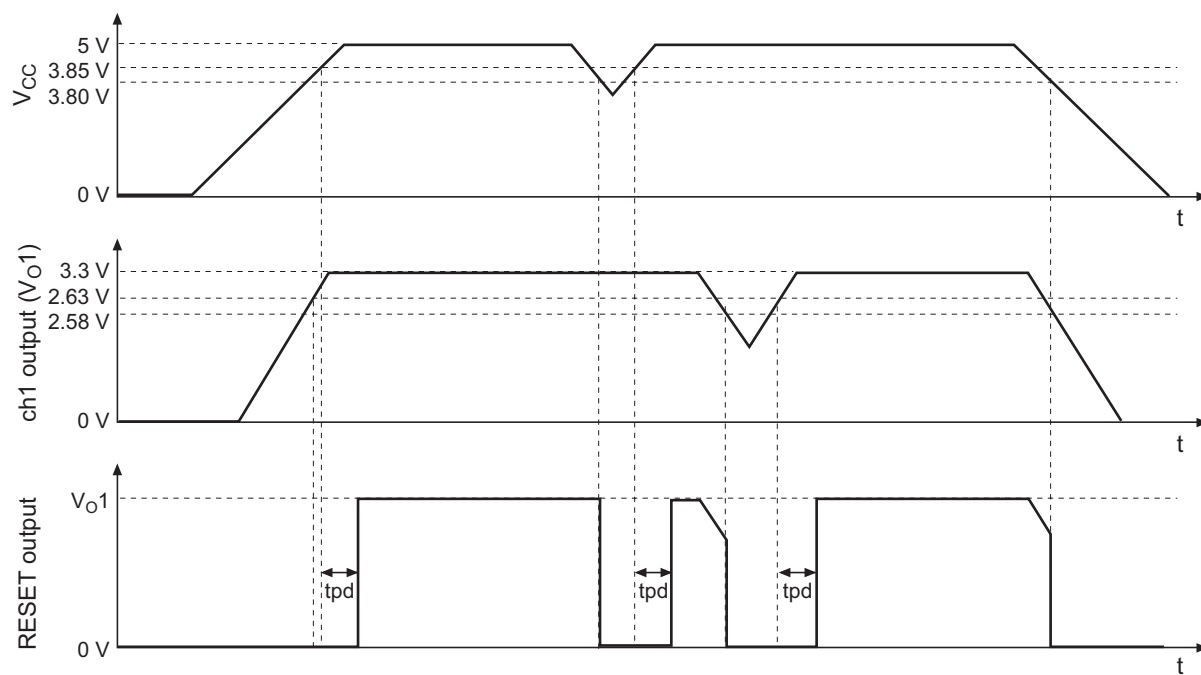
Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V _{CC}	16	V	
Output current (DC/DC converter block)	I _O	30	mA	ch1, ch2
Output current (Reset block)	I _O RESET	6	mA	
Power dissipation	P _d	440	mW	Ta = 25°C
Thermal derating	K _θ	4.4	mW/°C	Ta > 25°C
Operating temperature	Topr	−20 to +85	°C	
Storage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

Electrical Characteristics

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

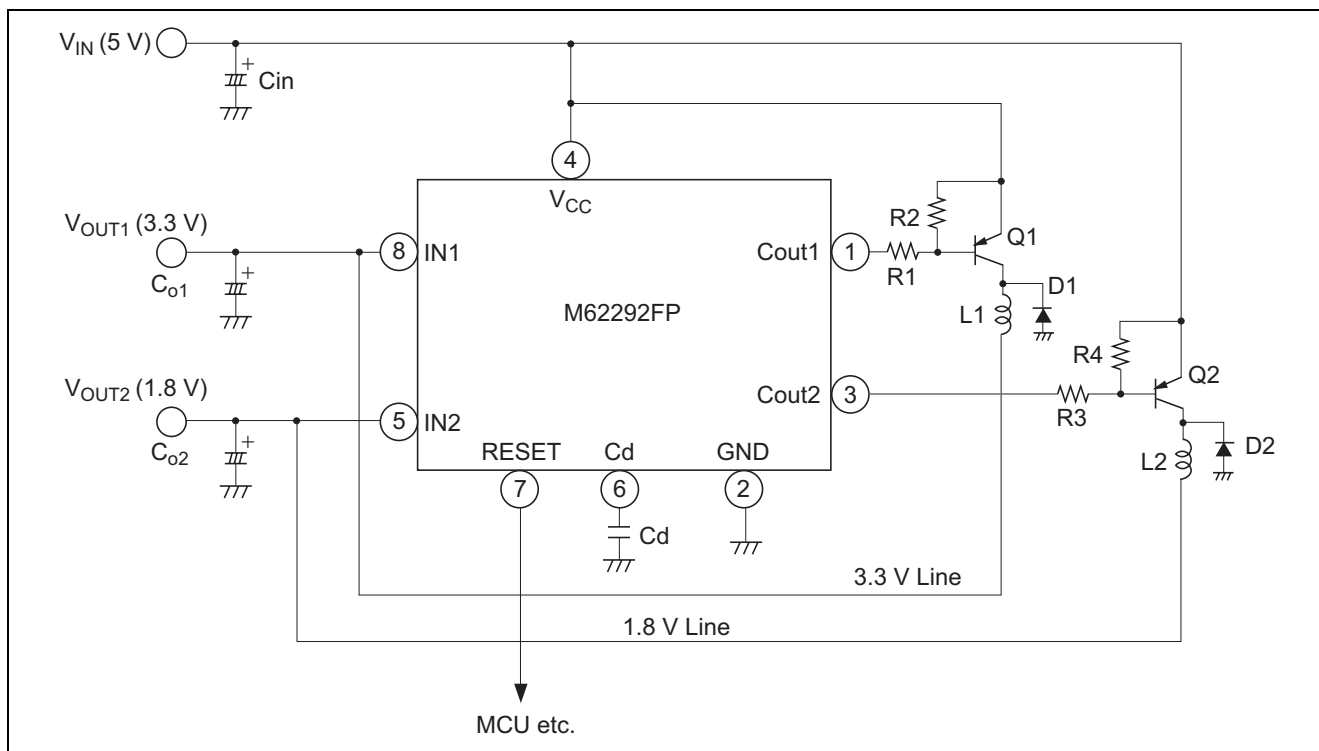
Block	Item	Symbol	Limits			Unit	Test Condition
			Min	Typ	Max		
All blocks	Supply voltage	V _{CC}	4.0	5.0	15	V	
	Supply current	I _{CC}	—	1.5	2.8	mA	Without load
DC/DC converter block							
Error Amp.	Output voltage	V _{O1}	3.15	3.30	3.45	V	ch1 output
		V _{O2}	1.71	1.80	1.89		ch2 output
	Line regulation	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 _O RESET = 4 mA
	RESET high voltage	V _{OH}	0.8 V _{O1}	—	—	V	

Reset Block Timing Chart



Note: t_{pd} : RESET delay time..... $t_{pd} \text{ (ms)} \approx 2.13 \times 10^{-3} \times C_d \text{ (pF)}$

Application Circuit (3.3 V and 1.8 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.

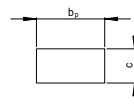
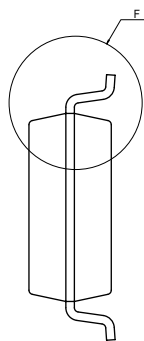
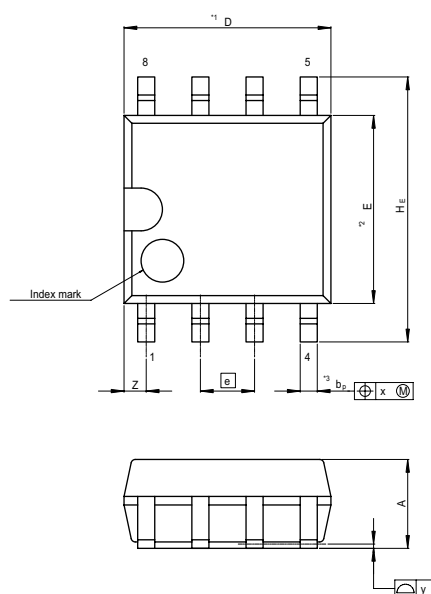
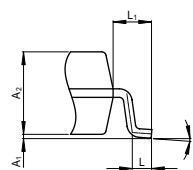
V_{sat} : Output saturation voltage of an external switching transistor.

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-SOP8-4.4x4.85-1.27	PRSP0008DE-C	—	0.1g

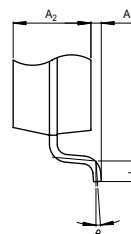
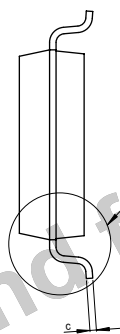
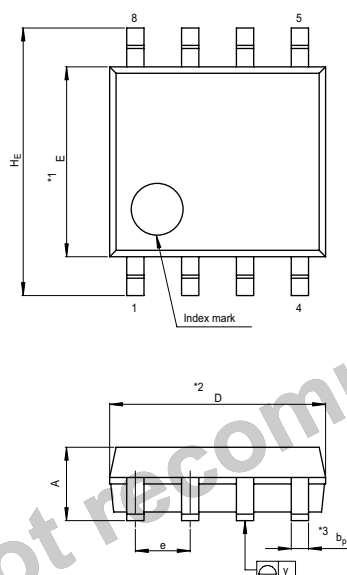
Terminal cross section
(Ni/Pd/Au plating)

Detail F

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

Reference Symbol	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



Detail F

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

Reference Symbol	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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