RCB002

Voltage Regulator Module (VRM) for Pentium® P55C and K6™ Processors

Features

- Fixed 2.8V, 2.9V or 3.2V output from 5V supply
- Maximum output current 7.5A for RCB002-8
- Maximum output current 10A for RCB002-10
- Typical efficiencies > 80%
- Short circuit protection
- Power Good output
- Excellent transient response
- Meets Intel's Pentium P55C and AMD's K6 power specifications

Applications

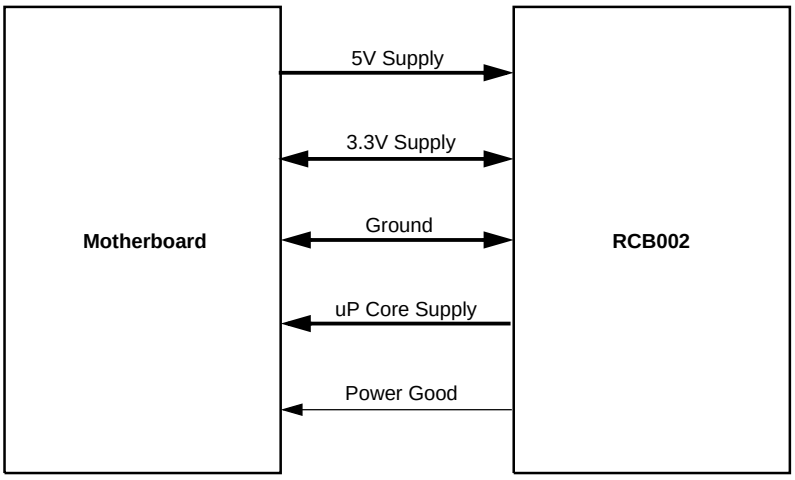
- Pentium and K6 motherboard 30-pin VRM module
- Add-in power supply upgrade for P55C and K6 CPUs
- Flexible motherboard designs

Description

The RCB002 VRM module is a DC-DC voltage regulator module designed to deliver the processor core voltage required by the P55C and K6 microprocessors. It offers board designers the flexibility to support the P55C and K6 processors with a modular add-in power supply. The RCB002 uses a proprietary Fairchild programmable DC-DC controller IC to deliver a precise output voltage to the CPU core without the need for external precision resistors. The result is a voltage regulator module with a minimum number of components to achieve high reliability at a competitive cost.

The RCB002-8 can deliver 2.8V or 2.9V (factory preset) of extremely well regulated voltage at 6A of continuous current. This voltage can be used to address the P55C and the 166/200MHz K6. The RCB002-10 delivers 3.2V at 10A for the 233MHz K6. In addition, the Power Good open collector outputs a logic LOW when an out-of-tolerance voltage is detected at the VRM output. Other features include high efficiency, short circuit protection, and low package weight.

Block Diagram



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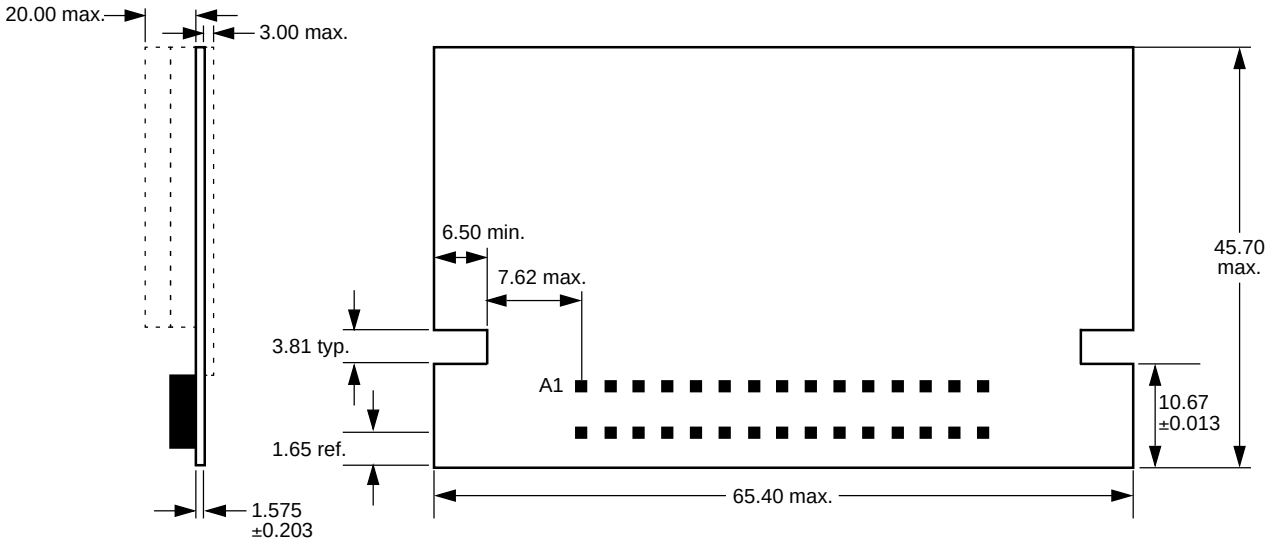
Mechanical Dimensions (mm) – Viewed from connector side



Pin Orientation – Top View
(Socket: AMPMOD2 532956-5 or equivalent)

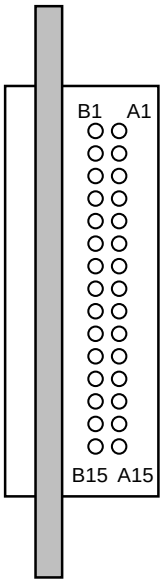


Table 1. VRM Connector Pin Definitions

Pin #	Row A	Row B
1	GND	GND
2	GND	GND
3	V12[1]	$V_{I/O}$[1]
4	$V_{I/O}$[1]	$V_{I/O}$[1]
5	V3[1]	V3[1]
6	V3[1]	V3[1]
7	V_{CORE}	V_{CORE}
8	V_{CORE}	V_{CORE}
9	GND	V_{CORE}
10	V_{CORE}	V_{CORE}
11	PWRGD	UPVRM#[1]
12	SENSE[1]	DISABLE[1]
13	GND	GND
14	V5	V5
15	V5	V5

Note:
1. Not used by VRM module

VRM Connector Pin Reference

Pin Description	Input/ Output	Function
V5	I	+5V supply voltage to support power to the CPU core.
V3	I	+3.3V supply to support power to the CPU I/O. These pins are connected directly to the $V_{I/O}$ pins so the 3.3V supply can be routed through the module header.
PWRGD (Power Good) for Pentium Open collector TTL output	O	If PWRGD = HIGH, the output voltage is within specifications. If PWRGD = LOW, the output voltage not within ±10% of nominal. The PWRGD output will change to the proper state within 5ms of the output coming into or going out of its specified range.
V_{CORE}	O	Processor core VCC.
$V_{I/O}$	O	CPU I/O VCC. These pins are connected to the +3.3V input pins.
GND	I,O	Ground Reference.

Electrical Specifications

(V_{IN} = +5V, T_A = 25°C unless otherwise specified.)

Parameter	Test Conditions	Min.	Typ.	Max.	Units
Input Specifications					
Controller supply voltage, V_{IN}		4.75	5	5.25	V
Output Specifications (RCB002-8)					
Output Voltage, V_{CORE}			2.8 2.9		V V
Output Current, I_{CORE}			6	8.0	A
Load Transient[1]	I_{CORE} = 0.5A to 7.5A, 20A/µs		±40	±100	mV
Load Regulation	I_{CORE} = 0.5A to 7.5A		±0.8		%
Efficiency	I_{CORE} = 6A		83		%
Short Circuit Protection			10		A
Output Specifications (RCB002-10)					
Output Voltage, V_{CORE}			3.2		V
Output Current, I_{CORE}			8.5	10	A
Load Transient	I_{CORE} = 0.5A to 10A, 20A/µs		±50	±100	mV
Load Regulation	I_{CORE} = 0.5A to 10A		±1.0		%
Efficiency	I_{CORE} = 8A		80		%
Short Circuit Protection			13		A
General Specifications					
Set Point Accuracy[2]	I_{CORE} = 3A	‘	±1.0		%
Line Regulation	V_{IN} = 5.0V ± 0.25V		±0.1		%
Output Temperature Drift	T_A = 0 to 60°C		20		ppm/°C
Switching Frequency			300		kHz
Cumulative Accuracy[3]			±50	±100	mV

Notes:

1. Refer to Intel’s AP-580 for bulk capacitance decoupling recommendations. Four 100 µF Tantalum capacitors with 25mΩ ESR are recommended for optimum transient response.
2. Set Point Accurcy is defined as the static accuracy of the output voltage at 3A and T_A = 25°C.
3. Cumulative Accuracy includes Set Point Accuracy, Output Temperature Drift, Line and Load Regulation, and Output Ripple/Noise.

Ordering Information

Part Number	Output Current	Output Voltage	Input
RCB002-8/2.8	8A	2.8V	5V DC
RCB002-8/2.9	8A	2.9V	5V DC
RCB002-10	10A	3.2V	5V DC

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