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LXM1700-xx/1700A-xx

PENTIUM® II VRM MODULE

PRELIMINARY DATA SHEET

DESCRIPTION

The LXM1700/1700A series of DC/DC converters are Voltage Regulator Modules (VRM) which are specifically designed to meet or exceed the Intel VRM8.1 DC/DC Converter electrical specification as well as its mechanical outline. The LXM1700-xx/1700A-xx is guaranteed to deliver a maximum current of at least 14A. These converters maintain a total tolerance of ±5% maximum, which includes load and line regulation, temperature stability, inital accuracy, load transient and ripple and noise. One of the main features of these converters is their ability to program the output voltage from 1.8 to 3.5V using a 5-bit word from the processors, providing automatic voltage adjustment for each individual processor. Other features

include high efficiency, short-circuit protection, over-voltage protection (LXM1700-xx only), under-voltage detection, soft start and logic level output enable functions.

The LXM1700-05/1700A-05 powers the processor using the 5V supply as the input power and 12V for the control bias. The LXM1700-12/1700A-12 powers the processor using only the 12V supply and does not need a separate voltage for the control bias (see Block Diagram below). The +5V or the +12V input configuration is factory set via simple jumper connections. The LXM1700-12/1700A-12 is primarily used for multiple processor applications, such as quad processor servers, where 5V supplies may not have the needed current capability.
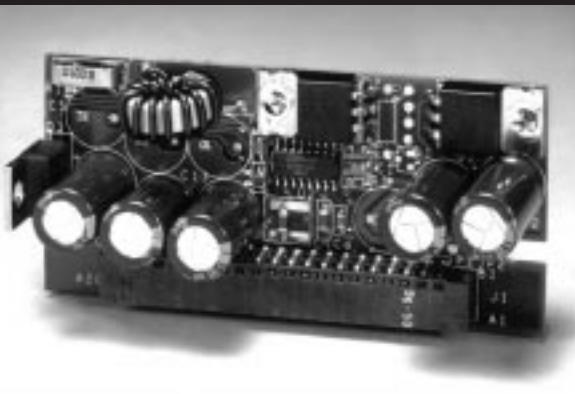
KEY FEATURES

- **GUARANTEED 14.0A OUTPUT**
- ☐ TOTAL OUTPUT TOLERANCE OF LESS THAN ±5% — Includes: Line & load regulation, temperature stability, initial accuracy, load transient and ripple & noise.
- ☐ ADJUSTABLE OUTPUT VOLTAGE USING A FIVE-BIT WORD (See Table 1)
- ☐ OVER-VOLTAGE DETECTION CROWBARS THE OUTPUT VOLTAGE IN THE EVENT OF PASS TRANSISTOR FAILURE - 100% PROCESSOR PROTECTION (LXM1700-xx)
- ☐ HIGH EFFICIENCY — 85% (TYP.)
- ☐ POWER GOOD SIGNAL INDICATES LOW OUTPUT VOLTAGE
- ☐ SOFT-START ELIMINATES TURN-ON OVERSHOOT
- ☐ SHORT-CIRCUIT PROTECTION
- ☐ OUTPUT ENABLE /SHUTDOWN
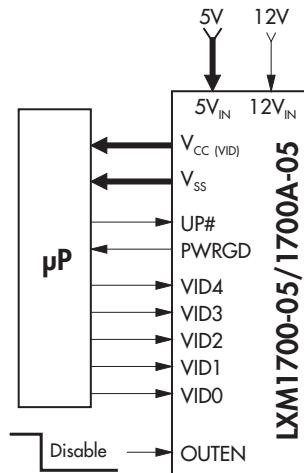
APPLICATIONS

- PENTIUM II PROCESSOR
- PENTIUM PRO PROCESSOR
- ADVANCED MICROPROCESSOR SUPPLIES
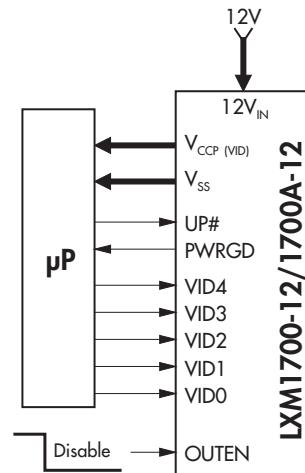
MODULE PHOTO

BLOCK DIAGRAM

LXM1700-05/1700A-05
IN A +5V SUPPLY APPLICATION

LXM1700-12/1700A-12
IN A +12V SUPPLY APPLICATION

MODULE ORDER INFORMATION

Part #	Input	I_{MAX}	O.V. Protection Crowbar
LXM1700-05	+5V, +12V	14.0A	Yes
LXM1700-12	+12V	14.0A	Yes
LXM1700A-05	+5V, +12V	14.0A	No
LXM1700A-12	+12V	14.0A	No

FOR FURTHER INFORMATION CALL (714) 898-8121

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ELECTRICAL CHARACTERISTICS

Parameter		Symbol	Test Conditions	LXM1700-xx/1700A-xx			Units
				Min.	Typ.	Max.	
Input Voltage Range	+5V	V_{IN}		4.75	5	5.25	V
	+12V			11.4	12	12.6	V
Total Output Voltage Tolerance		V_O	3.1V Set Point	2.945	3.1	3.255	V
Includes: Initial Accuracy			$I_O = 0.5A$, $T_A = 25°C$		±0.6		%
Load Regulation			$I_O = 0.5A$ to 14.0A		15		mV
Line Regulation			$0.95V_{IN}$ to $1.05V_{IN}$		1		mV
Temp. Stability			10 to 60°C		16		mV
Load Transient			$I_O = 0.5A$ to 14.0A, $V_{IN} = 5V$		95		mV
Output Ripple & Noise			$I_O = 5A$		12		mV
Output Current	Maximum	I_O	$V_O = 3.1V$	14.0			A
	Minimum					0	A
Power Good Threshold		V_{THPG}			$0.93V_{SET}$		V
Power Good Output LO Voltage		R_{LOPG}	$I_{SINK} = 5mA$			0.4	V
Output Enable		OUTEN					
LO Level Input Voltage		V_{OL}	$I_{OL} = 1mA$			0.8	V
HI Level Input Voltage		V_{OH}	$I_{OH} = 1mA$	2			V
Turn-on Response		T_R	0 to 99% of V_O after V_{IN} reaches 90%			10	ms
Efficiency	LXM1700-05/1700A-05	Eff	$I_O = 14.0A$	80	85		%
	LXM1700-12/1700A-12		$I_O = 14.0A$	80	85		%
Over-Voltage Threshold	LXM1700-xx	V_{OV}	$V_O = 3.1V$	3.41	3.57	3.72	V
Average Short-Circuit Current		I_{SC}	$V_O = 0V$		2		A
Ambient Temperature		T_A		0		60	°C
Required Air Flow			$I_O = 14.0A$	100			LFM

Table 1 - Voltage Identification Code

Processor Pins 0 = Connected to V_{SS}, 1 = Open or pull-up to V_{IN}					$V_{CC (VID)}$	Processor Pins 0 = Connected to V_{SS}, 1 = Open or pull-up to V_{IN}					$V_{CC (VID)}$
VID4	VID3	VID2	VID1	VID0	(VDC)	VID4	VID3	VID2	VID1	VID0	(VDC)
0	1	1	1	1	*	1	1	1	1	1	No CPU
0	1	1	1	0	*	1	1	1	1	0	2.1
0	1	1	0	1	*	1	1	1	0	1	2.2
0	1	1	0	0	*	1	1	1	0	0	2.3
0	1	0	1	1	*	1	1	0	1	1	2.4
0	1	0	1	0	*	1	1	0	1	0	2.5
0	1	0	0	1	*	1	1	0	0	1	2.6
0	1	0	0	0	*	1	1	0	0	0	2.7
0	0	1	1	1	*	1	0	1	1	1	2.8
0	0	1	1	0	*	1	0	1	1	0	2.9
0	0	1	0	1	1.80	1	0	1	0	1	3.0
0	0	1	0	0	1.85	1	0	1	0	0	3.1
0	0	0	1	1	1.90	1	0	0	1	1	3.2
0	0	0	1	0	1.95	1	0	0	1	0	3.3
0	0	0	0	1	2.00	1	0	0	0	1	3.4
0	0	0	0	0	2.05	1	0	0	0	0	3.5

* Level reserved for future requirements; VRM8.1 output shall be disabled for these VID codes.

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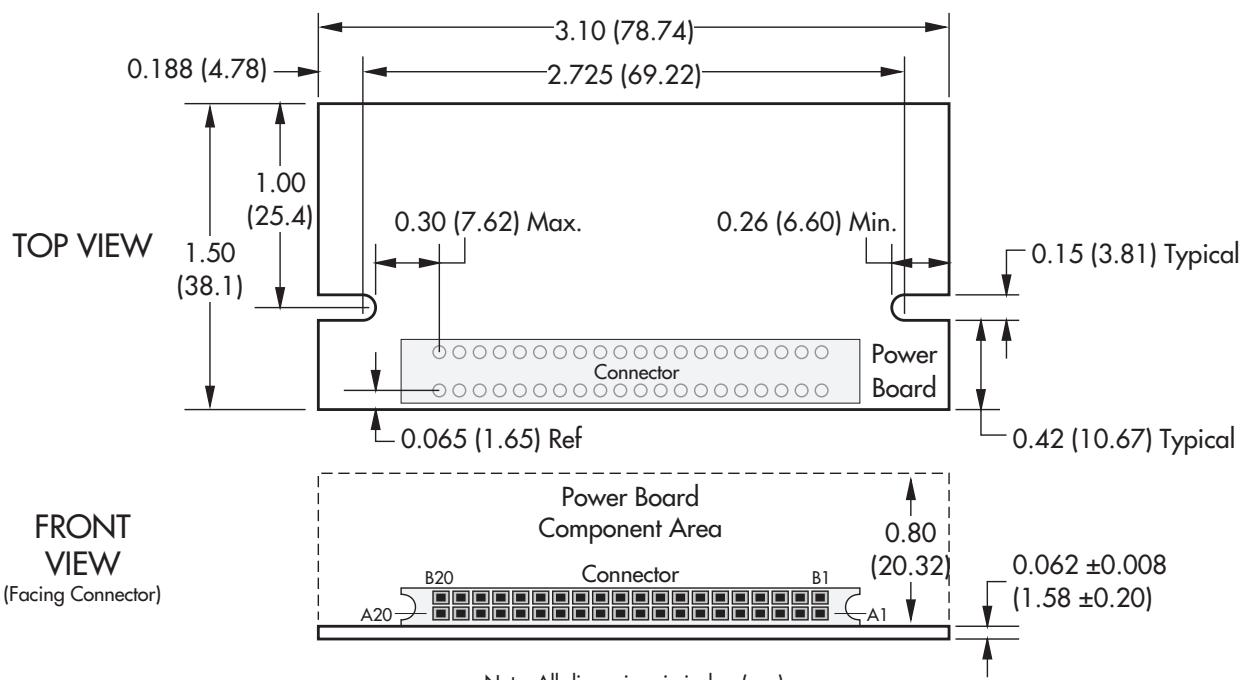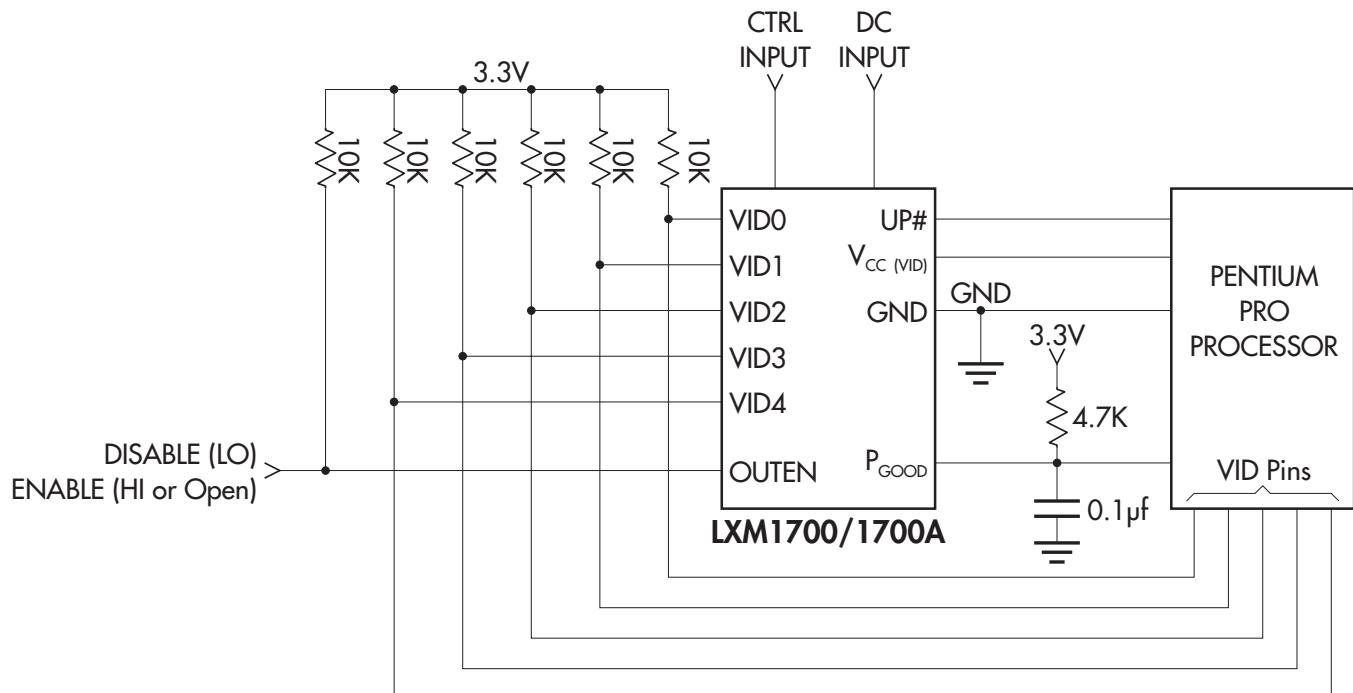
CONNECTOR PIN-OUTS AND DESCRIPTIONS

Pin #	Ref. Desig.	Description
A1	5V$_{IN}$	5V Input Power (not needed for LXM1700-12)
A2	5V$_{IN}$	5V Input Power (not needed for LXM1700-12)
A3	5V$_{IN}$	5V Input Power (not needed for LXM1700-12)
A4	12V$_{IN}$	12V Input Power
A5	Reserved	This pin is reserved for future applications
A6	I$_{SHARE}$	Consult Factory
A7	VID0	Bit 0 of the 5-bit input (see Table 1)
A8	VID2	Bit 2 of the 5-bit input (see Table 1)
A9	VID4	Bit 4 of the 5-bit input (see Table 1)
A10	V$_{CC (VID)}$	Output voltage to microprocessor
A11	V$_{SS}$	Output voltage return
A12	V$_{CC (VID)}$	Output voltage to microprocessor
A13	V$_{SS}$	Output voltage return
A14	V$_{CC (VID)}$	Output voltage to microprocessor
A15	V$_{SS}$	Output voltage return
A16	V$_{CC (VID)}$	Output voltage to microprocessor
A17	V$_{SS}$	Output voltage return
A18	V$_{CC (VID)}$	Output voltage to microprocessor
A19	V$_{SS}$	Output voltage return
A20	V$_{CC (VID)}$	Output voltage to microprocessor

Pin #	Ref. Desig.	Description
B1	5V$_{IN}$	5V Input Power (not needed for LXM1700-12)
B2	5V$_{IN}$	5V Input Power (not needed for LXM1700-12)
B3	Reserved	This pin is reserved for future applications
B4	12V$_{IN}$	12V Input Power
B5	UP #	A TTL input indicates the presence of an upgrade processor. LOW = Upgrade processor
B6	OUTEN	A TTL input that disables output when it switches to LO state
B7	VID1	Bit 1 of the 5-bit input (see Table 1)
B8	VID3	Bit 3 of the 5-bit input (see Table 1)
B9	PWRGD	An open collector output that switches LO when output is below the specified range
B10	V$_{SS}$	Output voltage return
B11	V$_{CC (VID)}$	Output voltage to microprocessor
B12	V$_{SS}$	Output voltage return
B13	V$_{CC (VID)}$	Output voltage to microprocessor
B14	V$_{SS}$	Output voltage return
B15	V$_{CC (VID)}$	Output voltage to microprocessor
B16	V$_{SS}$	Output voltage return
B17	V$_{CC (VID)}$	Output voltage to microprocessor
B18	V$_{SS}$	Output voltage return
B19	V$_{CC (VID)}$	Output voltage to microprocessor
B20	V$_{SS}$	Output voltage return

MODULE DIMENSIONS

3.10 (78.74)

0.188 (4.78)

2.725 (69.22)

1.00 (25.4)

TOP VIEW

1.50 (38.1)

0.30 (7.62) Max.

0.26 (6.60) Min.

0.15 (3.81) Typical

Connector

Power Board

0.065 (1.65) Ref

0.42 (10.67) Typical

FRONT VIEW
(Facing Connector)

Power Board Component Area

0.80 (20.32)

B20   Connector   B1

A20   A1

0.062 ±0.008 (1.58 ±0.20)

Note: All dimensions in inches (mm).

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APPLICATION INFORMATION

PART #	DC INPUT	CTRL INPUT
LXM1700-05/1700A-05	+5V	+12V
LXM1700-12/1700A-12	+12V	N.C.

FIGURE 1. — TYPICAL APPLICATION OF THE LXM1700-xx/1700A-xx

Note: 10k pull-up resistors are optional and needed only in cases of noise suppression or long leads.

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