Regulator+Reset IC
Monolithic IC MM1478

Outline

This IC, developed for use in CD-ROM drives, combines a 3V regulator adapted to low power consumption with a much-sought reset function (regulator input monitoring), with internal delay circuit, set to detect 4.2V.

Features

1. Large output current 300mA max.
2. High ripple rejection rate 80dB typ.
3. Internal thermal shutdown circuit.
4. Internal current-limiting circuit.
5. Adjustment-free reset detection voltage 4.2V typ.
6. Easy to set delay time from voltage detection to reset release.

Rank table

Rnak	Regulator output voltage (V)	Detection voltage (V)
A	3.40±0.05	4.20±0.09
D	3.30±0.05	4.20±0.09
F	3.30±0.05	3.90±0.09
M	2.50±0.05	4.20±0.09

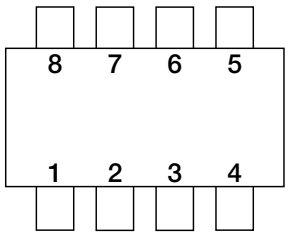
Package

SOP-8D

Applications

CD-ROM drive.

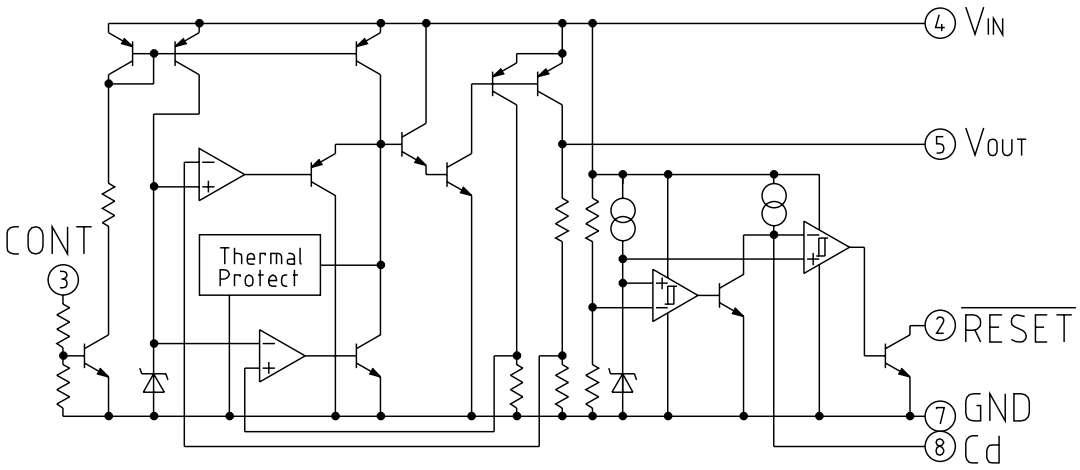
Pin Assignment



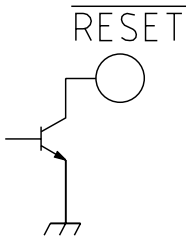
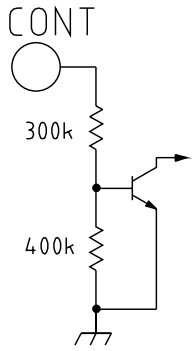
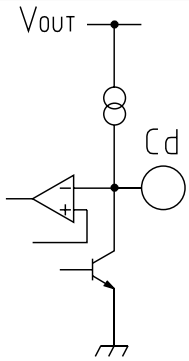
SOP-8D
(TOP VIEW)

1	N. C
2	$\overline{\text{RESET}}$
3	CONT
4	V_{IN}
5	V_{OUT}
6	N. C
7	GND
8	Cd

Equivalent Circuit Diagram



Pin Description

Pin No.	Pin name	Functions	Equivalent circuit diagram
1	N. C		
2	$\overline{\text{RESET}}$	Input voltage detection output Input voltage detection output pin $\overline{\text{RESET}}$ pin logic V_{IN}<VS: L V_{IN}>VS: H	
3	CONT	Output voltage on/off-control pin V_{CONT} L: Output OFF; H: Output ON Connect cont-terminal with V_{IN}, when it is not used.	
4	V_{IN}	Voltage supply input pin	
5	V_{OUT}	Regulator Output pin	
6	N. C		
7	GND	GND pin	
8	Cd	Delay time capacitor pin RESET pin output delay time can be set by the capacitance connected to the Cd pin. t_{PLH}=100000·C t_{PLH}: transmission delay time [s] C: capacitor value [F]	

Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Operating temperature	T_{OPR}	−30~+85	°C
Storage temperature	T_{STG}	−40~+125	°C
Supply voltage	V_{IN}	−0.3~+10	V
Output current	I_{OUT}	400	mA
Power dissipation	Pd	700*	mW

Note: * When mounted on a 25×40×1^t mm glass epoxy board.

Recommended Operating Conditions

Item	Symbol	Ratings	Unit
Operating temperature	T_{OP}	−20~+85	°C
Output current	I_{OP}	0~300	mA
Operating voltage	V_{OP}	0~10	V

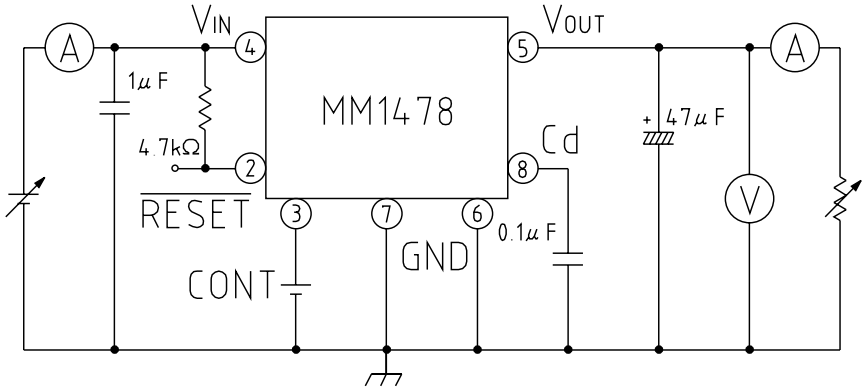
Electrical Characteristics

(Typical model MM1478A) (Except where noted otherwise, Ta=25°C, V_{CONT}=1.6V)
(Except where noted otherwise, resistance unit is Ω)

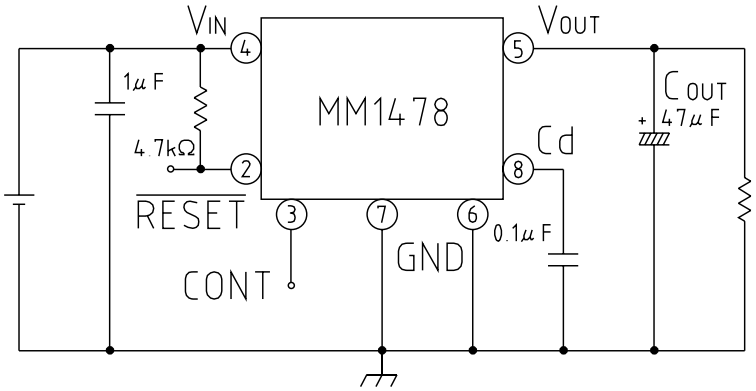
Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Unit
No-load input current 1	Iccq1	V_{IN}=5V, I_{OUT}=0mA		3	8	mA
No-load input current 2	Iccq2	V_{IN}=4V, I_{OUT}=0mA		4		mA
Input current (OFF)	Iccq3	V_{IN}=5V, V_{CONT}=0.4V		250		μA
Regulator						
Output Voltage	V_{OUT}	V_{IN}=5V, I_{OUT}=30mA	3.33	3.40	3.47	V
Input-Output differential Voltage	Vi0	V_{IN}=3.2V, I_{OUT}=150mA		0.15	0.3	V
Line regulation	⊿V1	V_{IN}=4.4~5.5V, I_{OUT}=30mA		10	20	mV
Load regulation	⊿V2	V_{IN}=5V, I_{OUT}=0~300mA		20	120	mV
V_{OUT} temperature coefficient *	⊿V_{OUT} /⊿T	Tj=−20~+80°C, V_{IN}=5V I_{OUT}=30mA		100		ppm/°C
Ripple rejection *	RR	V_{IN}=5V, f=120Hz V_{RIPPLE}=1V_{P-P}, I_{OUT}=30mA	50	80		dB
Output noise voltage *	Vn	V_{IN}=5V, f=20~80kHz I_{OUT}=30mA		40	120	μVrms
CONT terminal current	I_{ON}	V_{CONT}=1.6V		5	10	μA
High threshold voltage	H		1.6		V_{IN}+0.3	V
Low threshold voltage	L		−0.3		0.4	V
Reset						
Detection voltage	VS	V_{IN}=H→L	4.11	4.20	4.29	V
Vs temperature coefficient *	⊿VS/⊿T	Tj=−20~+80°C		100		ppm/°C
Hysteresis voltage	⊿VS	V_{IN}=H→L→H	100		200	mV
Low-level output voltage	V_{OL}	V_{IN}=3.9V, R_L=4.7k		100	200	mV
Output leakage current	I_{OH}	V_{IN}=5V			±0.1	μA
Output current 1	I_{OL}1	V_{IN}=3.9V, R_L=0	5			mA
Output current 2 *	I_{OL}2	V_{IN}=3.9V, R_L=0, Ta=−20~+80°C	3			mA
"H" transmission delay time *	t_{PLH}	Cd=0.0μF		30	90	μs
Reset delay time	t_{PLH1}	V_{IN}=4V→5V, Cd=0.1μF	5	10	20	ms
"L" transmission delay time *	t_{PHL}			30	90	μs
Threshold operating voltage	V_{OPL}	V_{OL}=0.4V		0.65	0.85	V

Note 1: design guaranteed

Measuring Circuit

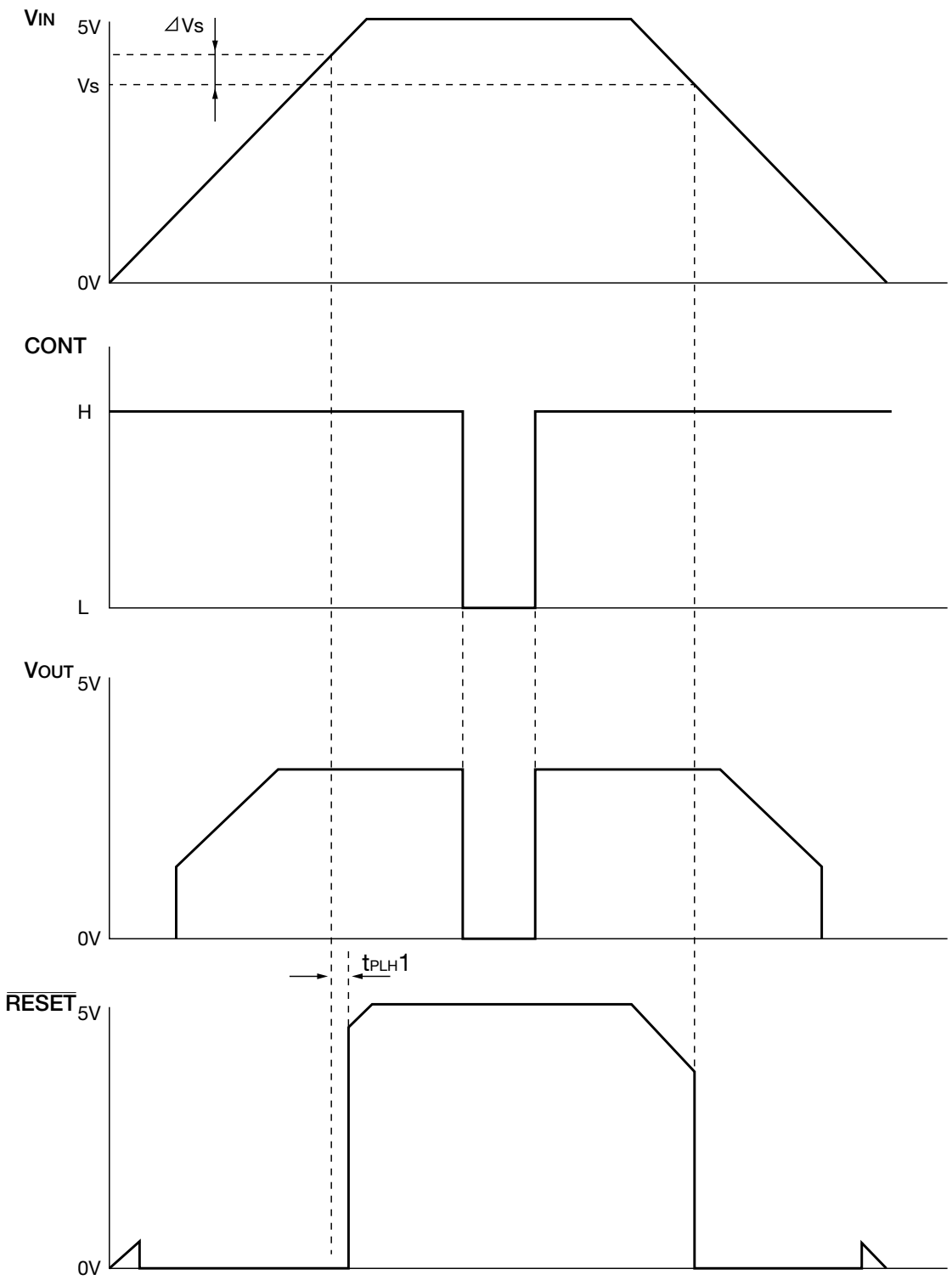


Application Circuit



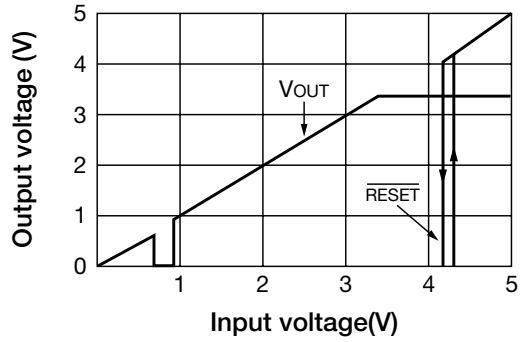
Note 1 : This regulator is not internally compensated and thus requires an external output-capacitor (C_{OUT}) for stability.

Timing Chart

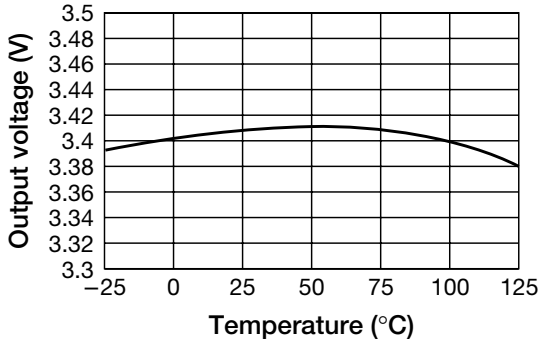


Characteristics (Typical model MM1478A)

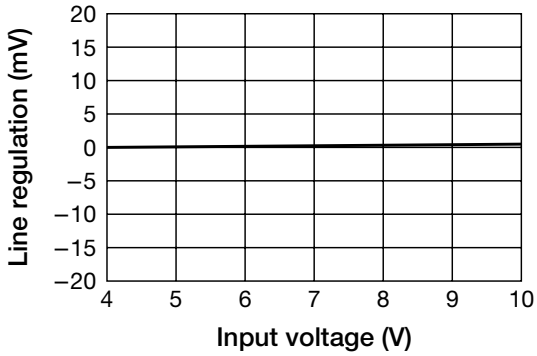
Detection voltage (I_{OUT}=0mA)



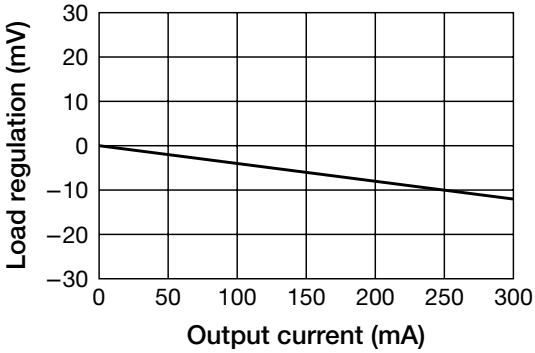
Output voltage vs temperature



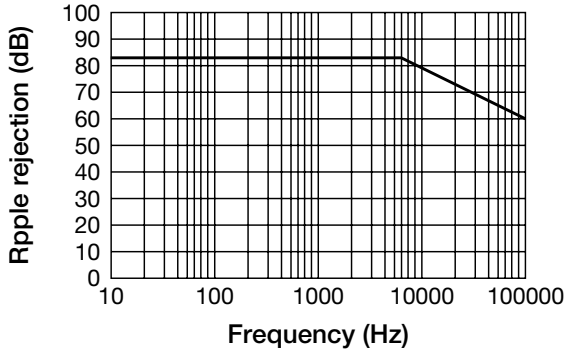
Line regulation



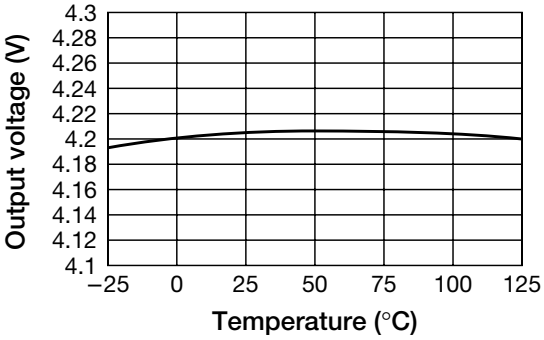
Load regulation



Ripple rejection



Detecting voltage vs temperature



Allowable loss

