

# IC for Regulator+Reset Monolithic IC MM1482

June 23, 1999

## 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.
7. Operating temperature range and ripple elimination rate are available separately for 3 ranks.

## Package

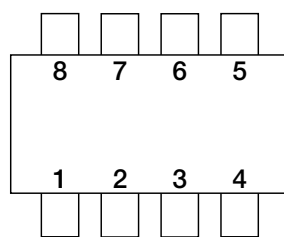
SOP-8D

## Applications

1. CD-ROM drive
2. Optical disc drivers

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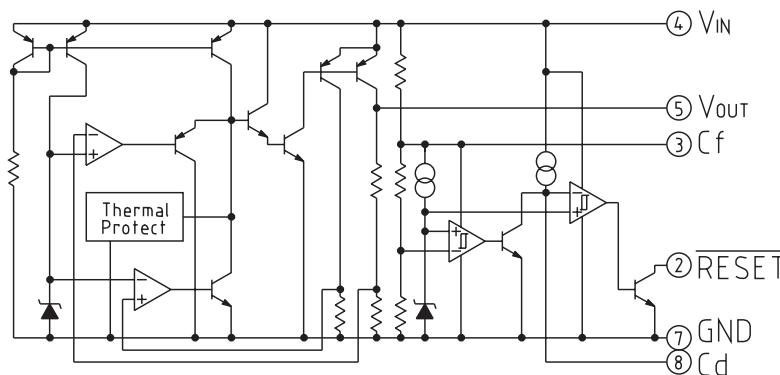
## Pin Assignment



SOP-8D  
(TOP VIEW)

1	N. C
2	RESET
3	Cf
4	V <sub>IN</sub>
5	V <sub>OUT</sub>
6	N. C
7	GND
8	Cd

## Equivalent Circuit Diagram



Pin Description

Pin No.	Pin name	Functions	Equivalent circuit diagram						
1	N. C								
2	RESET	<p>V<sub>IN</sub> pin voltage detection output</p> <p>RESET pin logic</p> <table border="1"> <thead> <tr> <th></th> <th>RESET</th> </tr> </thead> <tbody> <tr> <td>V<sub>IN</sub>&lt;V<sub>S</sub></td> <td>L</td> </tr> <tr> <td>V<sub>IN</sub>&gt;V<sub>S</sub></td> <td>H</td> </tr> </tbody> </table>		RESET	V <sub>IN</sub> <V <sub>S</sub>	L	V <sub>IN</sub> >V <sub>S</sub>	H	
	RESET								
V <sub>IN</sub> <V <sub>S</sub>	L								
V <sub>IN</sub> >V <sub>S</sub>	H								
3	Cf	<p>Ripple-filter pin (RESET)</p> <p>Please connect a capacitor between Cf-GND to reject ripple voltage of V<sub>IN</sub> for RESET. It become C-R low-pass filter. Internal impedance of Cf is typically 14kΩ.</p>							
4	V <sub>IN</sub>	Voltage supply input pin							
5	V <sub>OUT</sub>	Regulator Output pin							
6	N. C								
7	GND	GND pin							
8	Cd	<p>Delay time capacitor pin</p> <p>RESET pin output delay time can be set by the capacitance connected to the Cd pin.</p> <p><math>t_{PLH} = 100000 \cdot C</math></p> <p>t<sub>PLH</sub>: transmission delay time [s]</p> <p>C: capacitor value [F]</p>							

Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Operating temperature *1	T <sub>OPR</sub>	-30~+85	°C
Storage temperature	T <sub>STG</sub>	-40~+125	°C
Supply voltage	V <sub>IN</sub>	-0.3~+10	V
Output current	I <sub>OUT</sub>	400	mA
Power dissipation	P <sub>d</sub>	400(Alone)* 950(With board mounted)*2	mW

Note1: \*1 Rank B: -20 ~+80°C ; Rank A: -30 ~ +85°C

Note2: \*2 When mounted on a (Copper foil area 80% 192×142×1t mm glass epoxy board.

**Recommended Operating Conditions** (Typical model MM1482C) (Except where noted otherwise, Ta=25°C)

Item	Symbol	Ratings	Unit
Operating temperature	T <sub>OP</sub>	-20~+85	°C
Output current	I <sub>OP</sub>	0~300	mA
Operating voltage	V <sub>OP</sub>	0~10	V

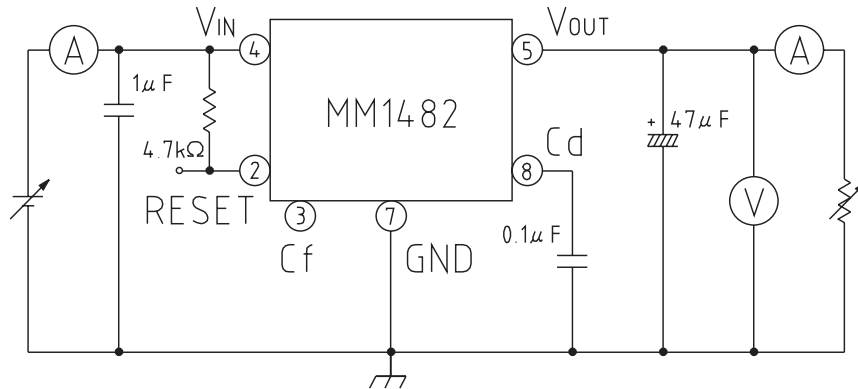
Note1: \*1 Rank B: -20 ~+80°C ; Rank A: -30 ~ +85°C

**Electrical Characteristics** (Typical model 1482C) (Except where noted otherwise, Ta=25°C, V<sub>CONT</sub>=1.6V)  
(Except where noted otherwise, resistance unit is Ω)

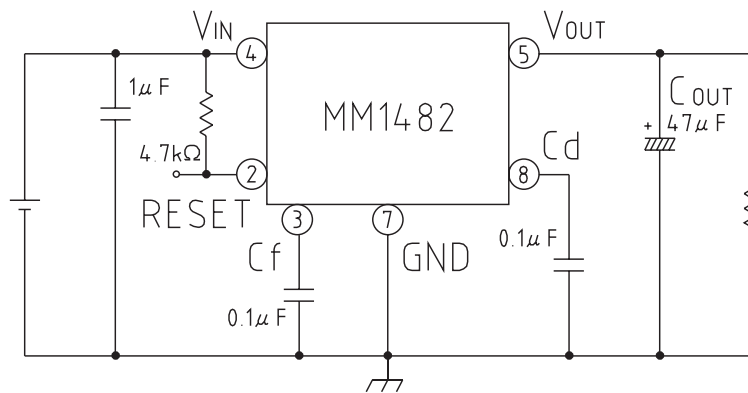
Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Unit
No-Load Input Current	I <sub>ccgl</sub>	V <sub>IN</sub> =5V I <sub>OUT</sub> =0mA C rank		2.2	4	mA
		A, B rank		3.0	6.0	mA
<b>Regulator</b>						
Output Voltage	V <sub>OUT</sub>	V <sub>IN</sub> =5V I <sub>OUT</sub> =30mA	3.23	3.30	3.37	V
Input-Output differential Voltage	V <sub>iO</sub>	V <sub>IN</sub> =3.2V I <sub>OUT</sub> =150mA		0.15	0.3	V
Line Regulation	ΔV <sub>1</sub>	V <sub>IN</sub> =4.4V~5.5V I <sub>OUT</sub> =30mA		0.05	5	mV
Load Regulation	ΔV <sub>2</sub>	V <sub>IN</sub> =5V I <sub>OUT</sub> =0mA~300mA		20	120	mV
V <sub>OUT</sub> Temperature Coefficient *1	ΔV <sub>OUT</sub> /ΔT	T <sub>j</sub> =-20~+80°C V <sub>IN</sub> =5V I <sub>OUT</sub> =30mA		100		ppm/°C
Ripple Rejection *1	RR	V <sub>IN</sub> =5V f=120Hz V <sub>RIPPLE</sub> =1V <sub>P-P</sub> I <sub>OUT</sub> =30mA C rank	50	80		dB
		A, B rank	50	90		dB
Output Noise Voltage *1	V <sub>n</sub>	V <sub>IN</sub> =5V, f=20~80kHz I <sub>OUT</sub> =30mA C rank		60	120	μV <sub>rms</sub>
		A, B rank		40	120	μV <sub>rms</sub>
<b>Reset</b>						
Detecting Voltage	V <sub>s</sub>	V <sub>IN</sub> =H→L	4.11	4.20	4.29	V
V <sub>s</sub> temperature Coefficient *1	ΔV <sub>s</sub> /ΔT	T <sub>j</sub> =20~80°C		100		ppm/°C
Hysteresis Voltage	ΔV <sub>s</sub>	V <sub>IN</sub> =H→L→H	100		200	mV
Low-Level Output Voltage	V <sub>OL</sub>	V <sub>IN</sub> =3.9V R <sub>L</sub> =4.7k		100	200	mV
Output Leakage Current	I <sub>OH</sub>	V <sub>IN</sub> =5V			±0.1	μA
Output Current when ON 1	I <sub>OL</sub>	V <sub>IN</sub> =3.9V, R <sub>L</sub> =0	5			mA
Output Current when ON 2 *1	I <sub>OL</sub>	V <sub>IN</sub> =3.9V, R <sub>L</sub> =0 Ta=-20~+80°C	3			mA
"H"Transmission Delay Time *1	t <sub>PLH</sub>	Cd Pin=open		30	90	μs
Reset Delay Time *1	t <sub>PLH1</sub>	V <sub>IN</sub> =4V→5V, Cd=0.1μF	5	10	20	ms
"L"Transmission Delay Time *1	t <sub>PHL</sub>	Cd pin=open		30	90	μs
Threshold Operating Voltage	V <sub>OPL</sub>	V <sub>OL</sub> =0.4V		0.65	0.85	V
Cf terminal impedance	R <sub>CF</sub>	V <sub>IN</sub> =5V		14		kΩ

Note 1: design guaranteed

Measuring Circuit



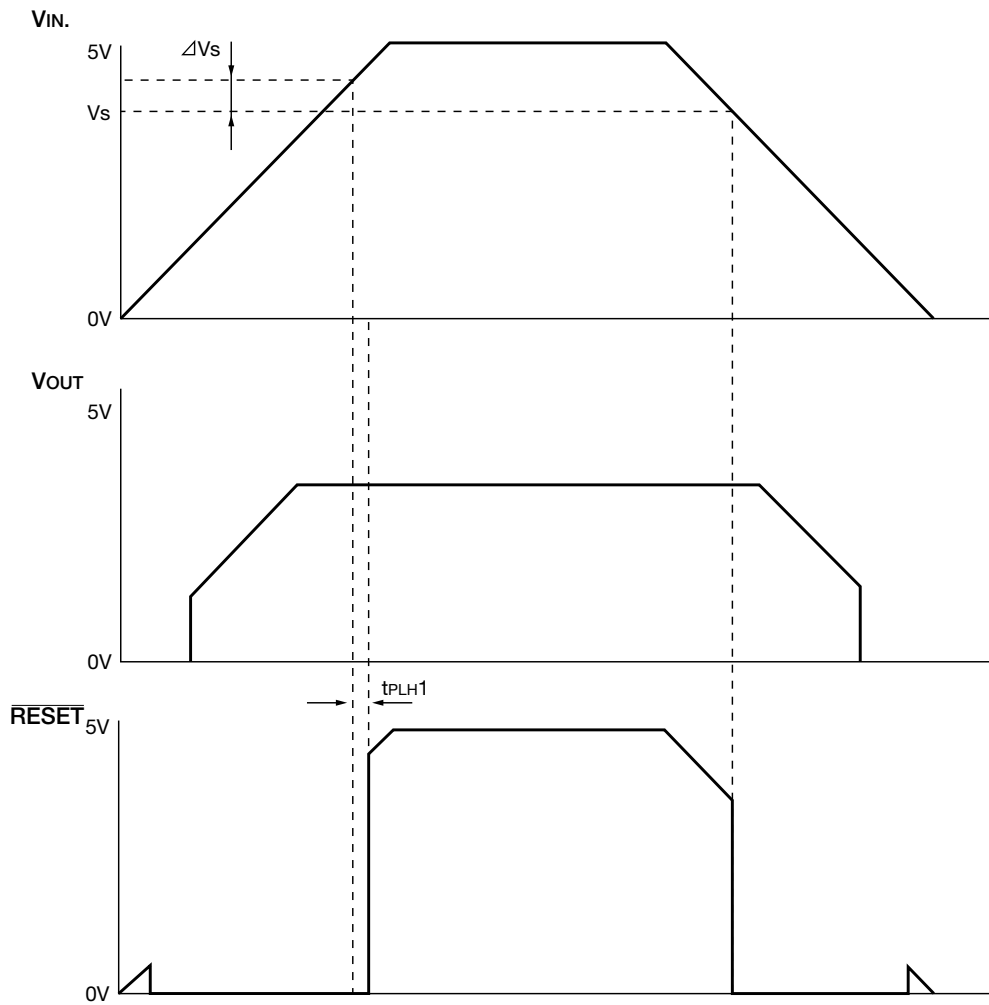
Application Circuit



Note 1 : This regulator is not internally compensated and thus requires an external output-capacitor (C<sub>OUT</sub>) for stability.

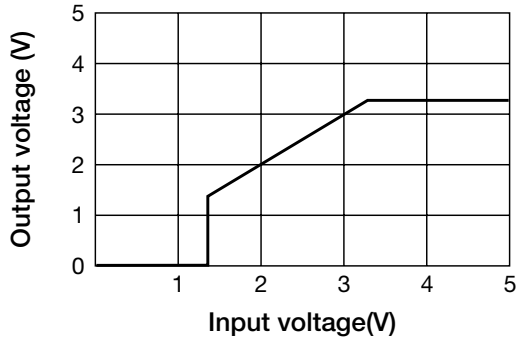
Note 2 : Please be careful with regard to set wiring and temperature-related capacitor changes that may cause oscillation.

Timing Chart

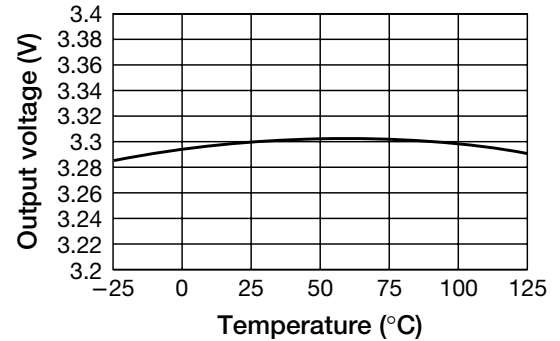


**Characteristics** (Typical model MM1482C)

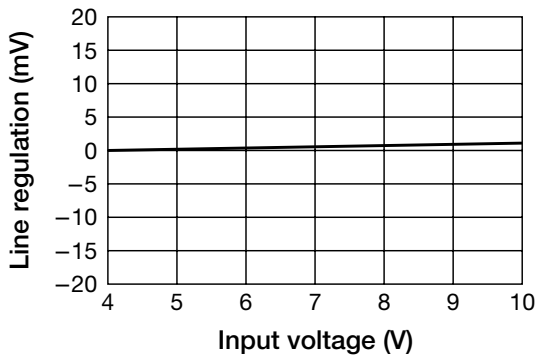
**Regulator Output**



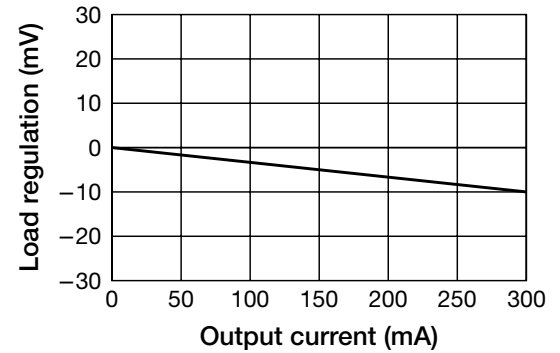
**Output voltage vs temperature**



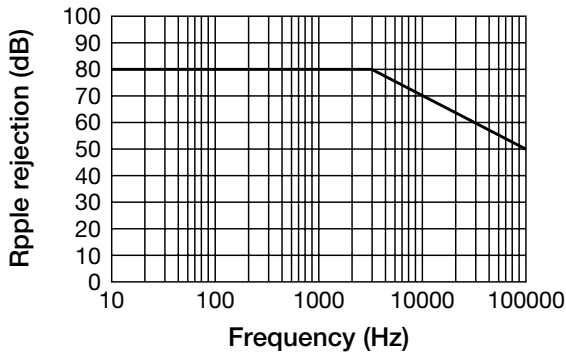
**Line regulation**



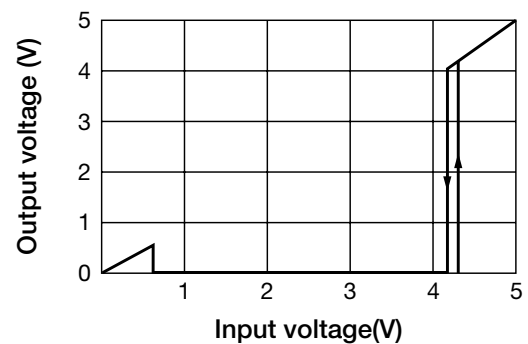
**Load regulation**



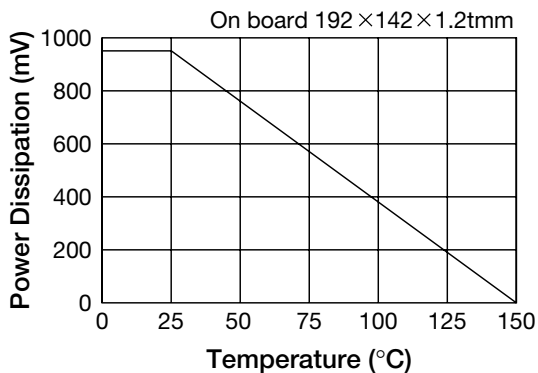
**Ripple rejection**



**Reset Output**



**Power Dissipation**



**Detecting voltage vs temperature**

