

Regulator+Reset IC Monolithic IC MM1481

Outline

This IC was developed for use in CD-ROM drives and other optical disc drives. It combines two 3V system regulator lines and reset (monitors regulator input) with a built-in 4.2V detection delay circuit that responds to market needs.

Features

1. Large output current 300mA max.
2. High ripple rejection rate regulator1: 80dB typ. regulator2: 60dB 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.

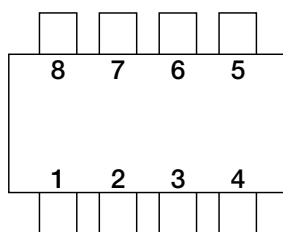
Package

VSOP-8A

Applications

1. CD-ROM drive
2. Optical disc drives

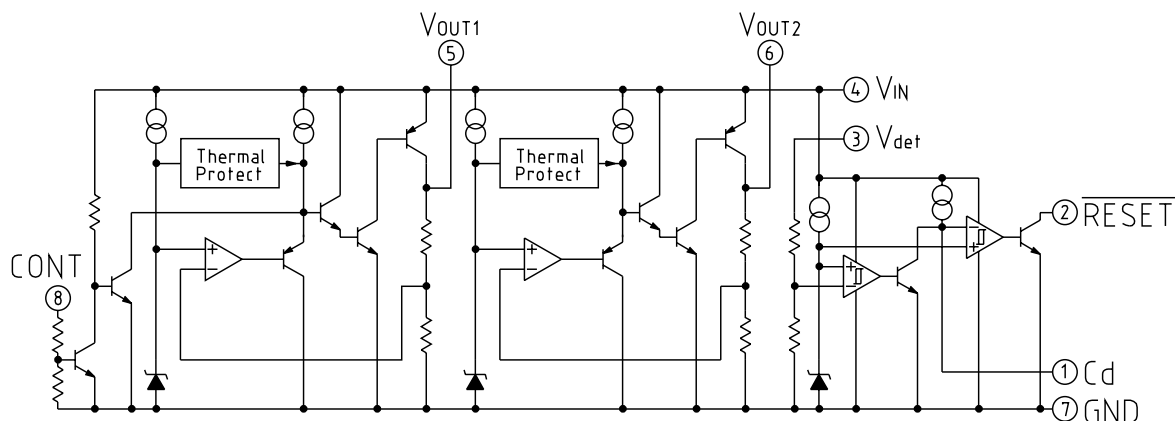
Pin Assignment



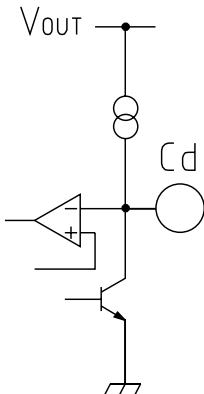
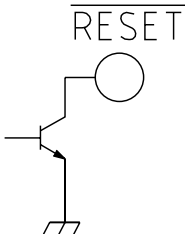
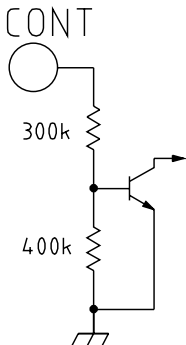
VSOP-8A
(TOP VIEW)

1	Cd
2	RESET
3	V _{det}
4	V _{IN}
5	V _{OUT1}
6	V _{OUT2}
7	GND
8	CONT

Equivalent Circuit Diagram



Pin Description

Pin No.	Pin Name	Functions	Equivalent circuit diagram						
1	Cd	<p>Delay time capacitor pin</p> <p>The delay time of RESET output can be set according to the capacity value connected with Cd</p> <p>$t_{PLH}=450000 \cdot C$</p> <p>t_{PLH1}: Delay Time [s]</p> <p>C: Cd-capacitance [F]</p>							
2	RESET	<p>$\overline{\text{RESET}}$ -output pin</p> <p>$\overline{\text{RESET}}$ pin logic</p> <table border="1"><thead><tr><th></th><th>$\overline{\text{RESET}}$</th></tr></thead><tbody><tr><td>Vdet<VS</td><td>L</td></tr><tr><td>Vdet>VS</td><td>H</td></tr></tbody></table> <p>When the voltage of V_{IN} decreases to 1.6V or less, it is likely to become "L" regardless of Vdet voltaege.</p>		$\overline{\text{RESET}}$	Vdet<VS	L	Vdet>VS	H	
	$\overline{\text{RESET}}$								
Vdet<VS	L								
Vdet>VS	H								
3	Vdet	Voltage-supply pin (reset)							
4	V_{IN}	Voltage-supply pin							
5	V_{OUT1}	Regulator output pin (150mA)							
6	V_{OUT2}	Regulator output pin (100mA)							
7	GND	GND pin							
8	CONT	<p>V_{OUT1} ON/OFF-control pin</p> <table border="1"><thead><tr><th>V_{CONT}</th><th>V_{OUT1}</th></tr></thead><tbody><tr><td>L</td><td>OFF</td></tr><tr><td>H</td><td>ON</td></tr></tbody></table> <p>Connect cont-terminal with V_{IN}, when it is not used.</p>	V_{CONT}	V_{OUT1}	L	OFF	H	ON	
V_{CONT}	V_{OUT1}								
L	OFF								
H	ON								

Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Storage temperature	T_{STG}	-40~+125	°C
Supply voltage	V_{IN}	-0.3~+10	V
Output current 1	I_{OUT1}	300	mA
Output current 2	I_{OUT2}	200	mA
Power dissipation	P_d	550*	mW

Note: * When mounted on a (Copper foil area 80%, 100×100×1.6^t mm) glass epoxy board.

Recommended Operating Conditions (Except where noted otherwise, Ta=25°C)

Item	Symbol	Ratings	Unit
Operating temperature	T _{OP}	-20~+85	°C
Output current 1	I _{OP1}	0~150	mA
Output current 2	I _{OP2}	0~100	mA
Operating voltage	V _{OP}	0~10	V

Electrical Characteristics (Except where noted otherwise, Ta=25°C, V_{CONT}=1.6V)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Unit
V _{IN} Input Current 1	I _{CCQ1}	V _{IN} =5V I _{OUT1} =10mA I _{OUT2} =0mA		2.1	4.2	mA
V _{IN} Input Current 2 (V _{OUT1} —OFF)	I _{CCQ2}	V _{IN} =5V V _{cont} =0.4V I _{OUT2} =0mA		300	500	μA
V _{det} Input Current 1	I _{CCQ3}	V _{det} =5V		20	40	μA
Regulator 1 (150mA output)						
Output Voltage	V _{OUT1}	V _{IN} =5V I _{OUT1} =30mA	3.52	3.60	3.68	V
Input-Output differential Voltage	V _{IO}	V _{IN} =3.4V I _{OUT1} =70mA		0.13	0.26	V
Line Regulation	ΔV ₁	V _{IN} =4.4V~5.5V I _{OUT1} =30mA		1	20	mV
Load Regulation	ΔV ₂	V _{IN} =5V I _{OUT1} =0mA~150mA		20	120	mV
V _{OUT} Temperature Coefficient *1	ΔV _{OUT} /ΔT	T _j =-20~+80°C V _{IN} =5V I _{OUT1} =30mA		100		ppm/°C
Ripple Rejection *1	RR	V _{IN} =5V f=120Hz V _{RIPPLE} =1V _{P-P} , I _{OUT1} =30mA	50	80		dB
Output Noise Voltage *1	V _n	V _{IN} =5V, f=20~80kHz I _{OUT1} =30mA		100		μV _{rms}
CONT Terminal Current when ON	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
Regulator 2 (100mA output)						
Output Voltage	V _{OUT2}	V _{IN} =5V I _{OUT2} =20mA	3.52	3.60	3.68	V
Input-Output differential Voltage	V _{IO}	V _{IN} =3.4V I _{OUT2} =20mA		0.07	0.14	V
Line Regulation	ΔV ₁	V _{IN} =4.4V~5.5V I _{OUT2} =20mA		10	20	mV
Load Regulation	ΔV ₂	V _{IN} =5V I _{OUT2} =0mA~100mA		20	120	mV
V _{OUT} Temperature Coefficient *1	ΔV _{OUT} /ΔT	T _j =-20~+80°C V _{IN} =5V I _{OUT2} =20mA		100		ppm/°C
Ripple Rejection *1	RR	V _{IN} =5V f=120Hz V _{RIPPLE} =1V _{P-P} , I _{OUT2} =20mA	50	60		dB
Output Noise Voltage *1	V _n	V _{IN} =5V, f=20~80kHz I _{OUT2} =20mA		150		μV _{rms}

Note 1: design guaranteed

Electrical Characteristics

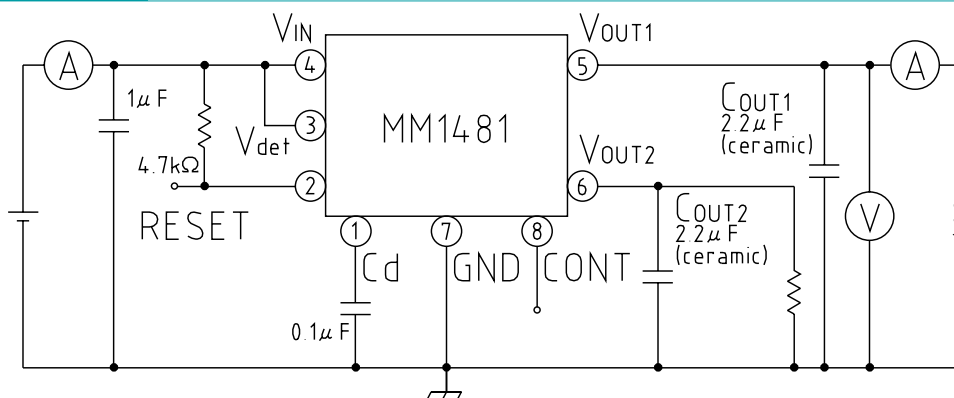
(Typical model MM1481C) (Except where noted otherwise, $T_a=25^\circ\text{C}$, $V_{\text{CONT}}=1.6\text{V}$)
(Except where noted otherwise, resistance unit is Ω)

Part of RESET

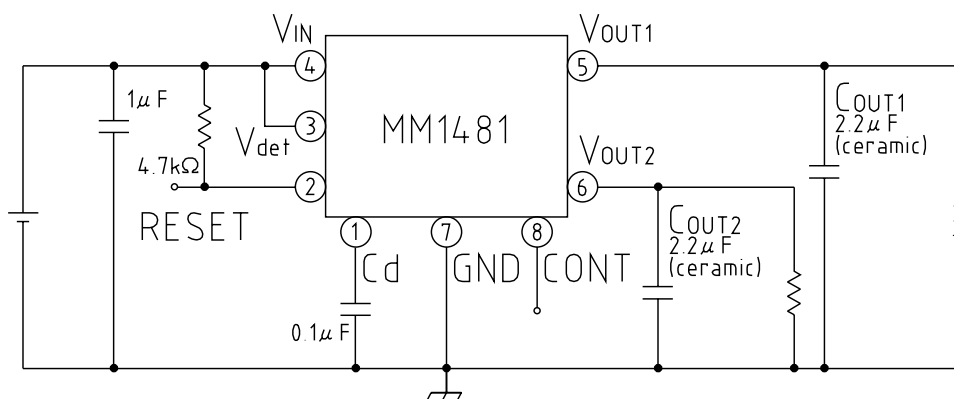
Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Unit
Detecting Voltage	VS	$V_{\text{det}}=\text{H}\rightarrow\text{L}$	4.11	4.20	4.29	V
Vs temperature Coefficient *	$\Delta\text{VS}/\Delta\text{T}$	$T_a=-20\sim+80^\circ\text{C}$		100		ppm/ $^\circ\text{C}$
Hysteresis Voltage	ΔVS	$V_{\text{det}}=\text{H}\rightarrow\text{L}\rightarrow\text{H}$	100		200	mV
Low-Level Output Voltage	V_{OL}	$V_{\text{det}}=3.9\text{V}$ $R_{\text{L}}=4.7\text{k}$		100	200	mV
Output Leakage Current	I_{OH}	$V_{\text{det}}=5\text{V}$			± 0.1	μA
Output Current when ON 1	I_{OL}	$V_{\text{det}}=3.9\text{V}$, $R_{\text{L}}=0$	5			mA
Output Current when ON 2 *	I_{OL}	$V_{\text{det}}=3.9\text{V}$, $R_{\text{L}}=0$ $T_a=-20\sim+80^\circ\text{C}$	3			mA
"H" Transmission Delay Time *	t_{PLH}	C_{d} Pin open		30	90	μs
Reset Delay Time *	t_{PLH1}	$V_{\text{det}}=4\text{V}\rightarrow 5\text{V}$, $C_{\text{d}}=0.22\mu\text{F}$	5	10	15	ms
"L" Transmission Delay Time *	t_{PHL}	C_{d} Pin open		30	90	μs
Threshold Operating Voltage	V_{OPL}	$V_{\text{OL}}=0.4\text{V}$		0.65	0.85	V

Note 1: design guaranteed

Measuring Circuit



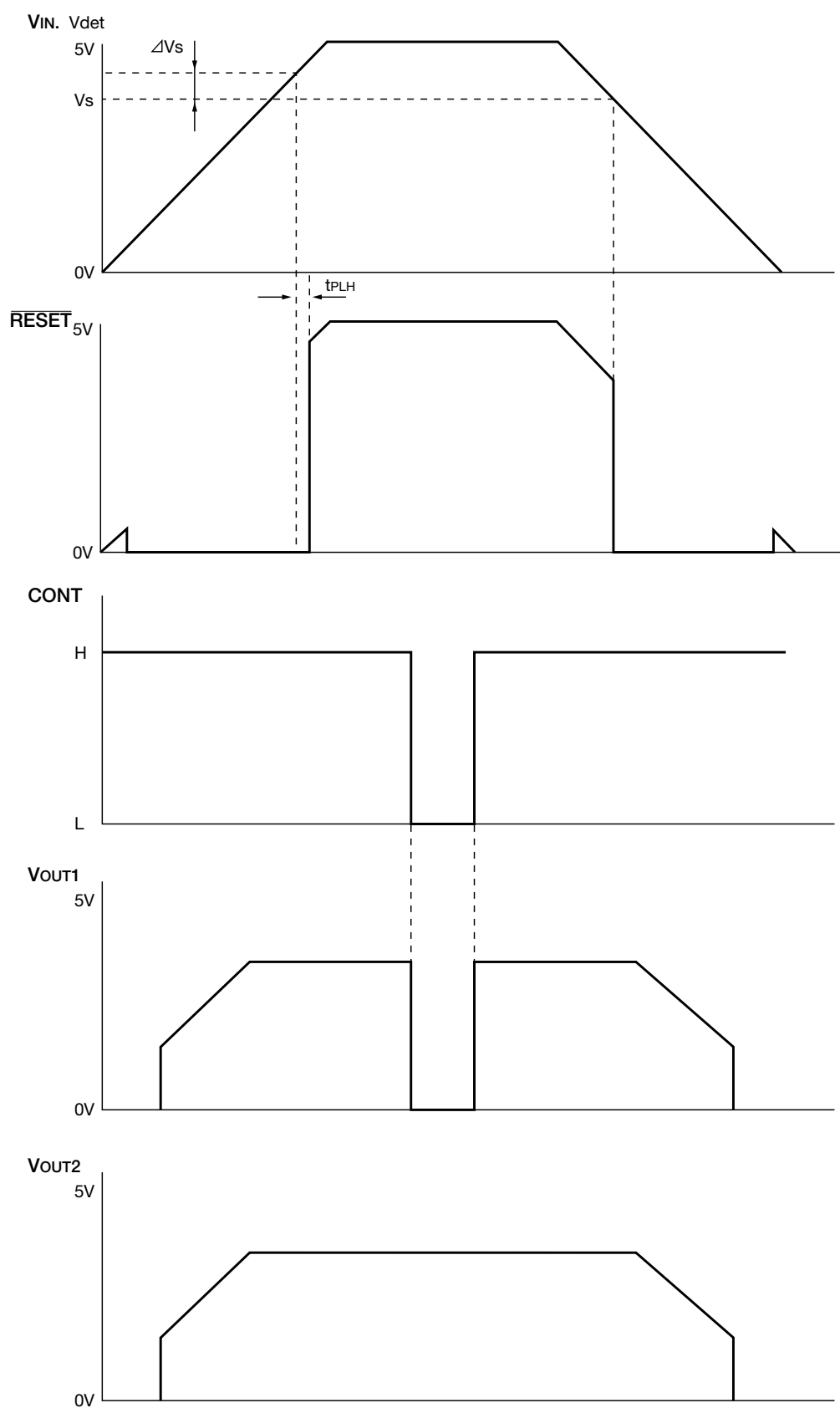
Application Circuit



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

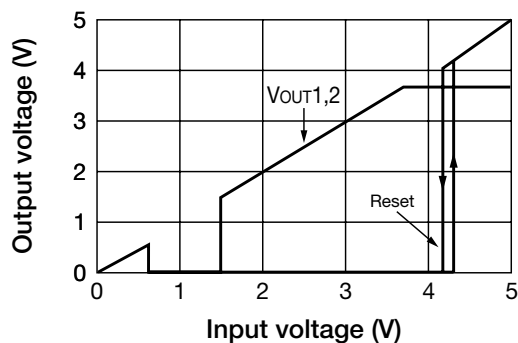
Note 2 : Please be careful with regard to set wiring and temperature-related capacitor changes that may cause oscillation.

Timing Chart

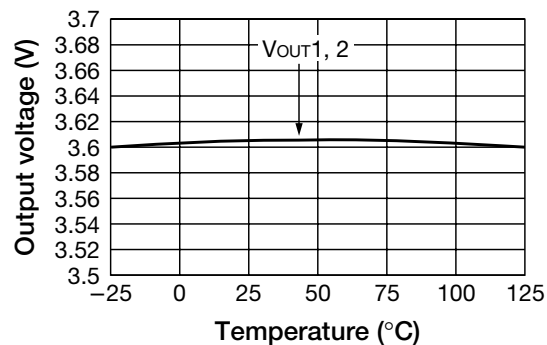


Characteristics

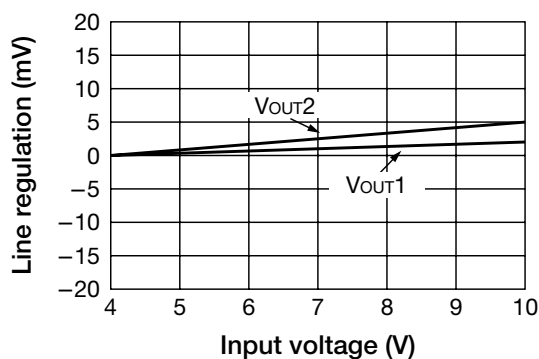
Detection voltage ($I_{OUT}=0mA$)



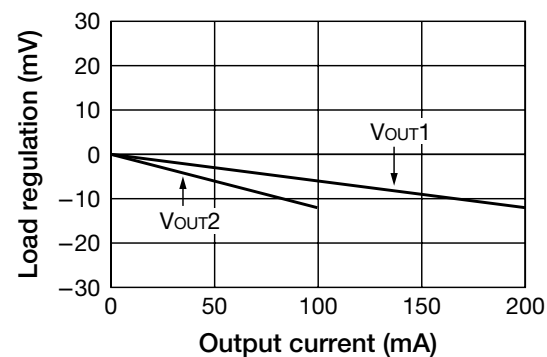
Output voltage vs temperature



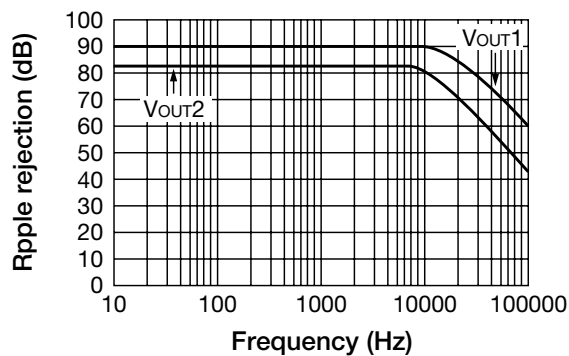
Line regulation



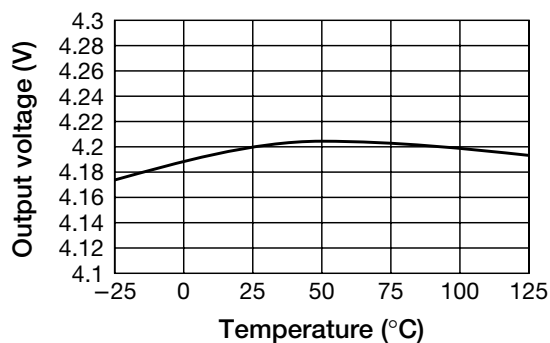
Load regulation



Ripple rejection



Detecting voltage vs temperature



Allowable loss

