

CMOS Regulator

Monolithic IC MM303X Series

Outline

This IC is a voltage regulator IC developed using the CMOS process. Super low consumption current of 1.5 μA typ. (MM303X) (when not loaded) has been achieved through the use of the CMOS process. Also, the output voltage has a high accuracy of $\pm 2\%$.

Features

- | | |
|---|---|
| 1. Super low consumption current | 1.5 μA typ. (when not loaded, excluding the CE terminal current) |
| 2. Super low consumption current (when off) | 0.1 μA typ. |
| 3. High precision output voltage | $\pm 2\%$ |
| 4. Input/output voltage difference | 40mV typ. ($I_o = 1\text{mA}$ MM3033A) |
| 5. Good input stability | 0.05%/V typ. |
| 6. Built-in short-circuit restriction circuit | 60mA typ. |
| 7. Wide operating temperature range | $-30 \sim +85^\circ\text{C}$ |
| 8. Output voltage | 1.7~5.5V (0.1V step) |

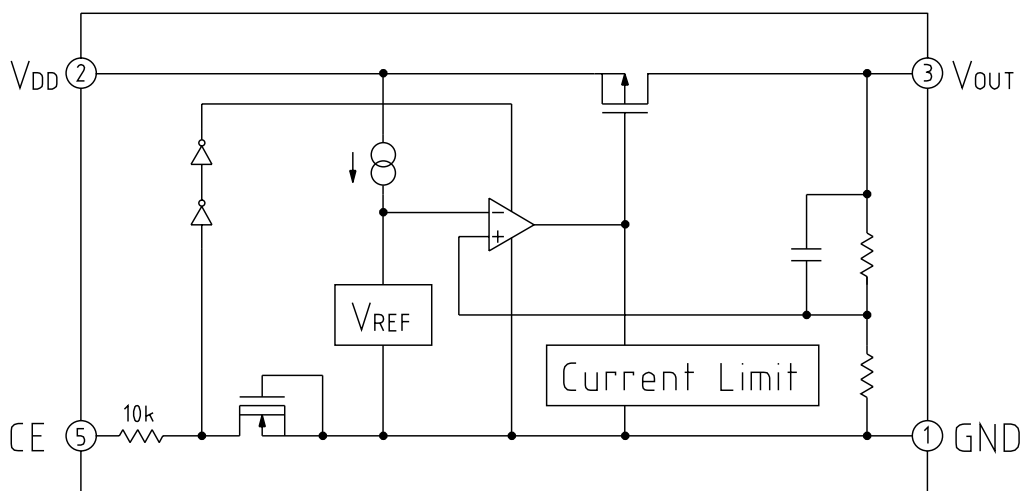
Package

SC-82AB

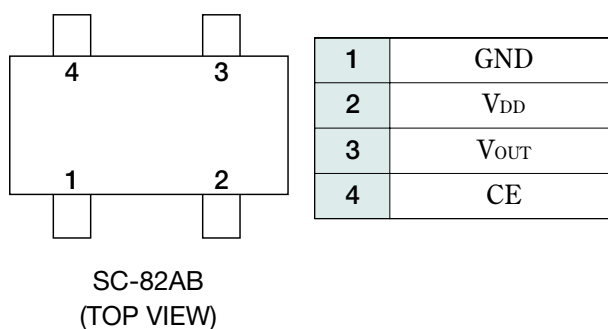
Applications

1. Devices that use batteries
2. Portable communications devices
3. Household electronics products

Block Diagram



Pin Assignment



Pin Description

Pin No.	Pin name	Functions						
1	GND	GND Pin						
2	V _{DD}	Voltage-Supply pin						
3	V _{OUT}	Regulator output pin						
4	CE	No connection pin						
		<table><tr><td>CE</td><td>OUTPUT</td></tr><tr><td>L</td><td>OFF</td></tr><tr><td>H</td><td>ON</td></tr></table>	CE	OUTPUT	L	OFF	H	ON
		CE	OUTPUT					
		L	OFF					
		H	ON					
ON/OFF-Control pin								
Connect CE-pin with VDD-pin,when it is not used.								

Absolute Maximum Ratings (Ambient Temperature, Ta=25°C)

Item	Symbol	Ratings	Unit
Storage Temperature	T _{STG}	-40~+125	°C
Operating Temperature	T _{OPR}	-30~+85	°C
Supply Voltage	V _{DD}	-0.3~+9	V
Output Current	I _{OUT}	150	mA
Allowable loss	P _d	150 (Alone)	mW

Recommended Operating Conditions (Ambient Temperature, Ta=25°C)

Item	Symbol	Ratings	Unit
Operating Temperature	T _{OP}	-30~+85	°C
Supply Voltage	V _{OP}	V _{OUT} +0.3~8	V

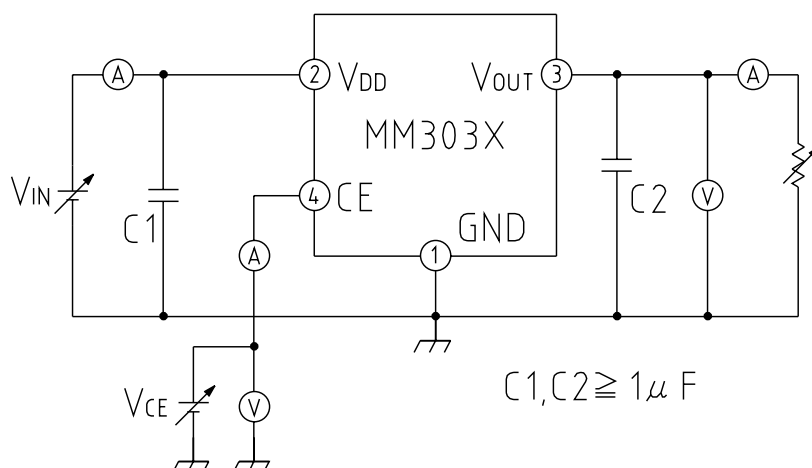
Electrical Characteristics (Ambient Temperature, Ta=25°C, VIN=VCE)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Unit
Quiescent Current	I _{SS}	V _{IN} =V _{OUT} +2.0V		1.5	3.0	μA
Input Current(OFF)	I _{standby}	V _{IN} =V _{OUT} +2.0V, V _{CE} =0V		0.1	1.0	μA
Line Regulation	ΔV _{OUT} /ΔV _{IN}	I _{OUT} =1mA, V _{OUT} +0.5V ≤ V _{IN} ≤ 8V	0	0.05	0.20	%/V
Input Voltage	V _{IN}				8	V
Output voltage temperature coefficient	ΔV _{OUT} /ΔT _{opt}	I _{OUT} =10mA -30°C ≤ T _{OPT} ≤ 85°C		±100		ppm/°C
Short current	I _{lim}	V _{IN} =V _{OUT} +2.0V, V _{OUT} =0V		60		mA
CE pin current when ON	I _{CE}	V _{IN} =V _{OUT} +2.0V		0.1	1.0	μA
CE input voltage "H"	V _{CEH}	V _{IN} =V _{OUT} +2.0V	V _{IN} -1		V _{IN}	V
CE input voltage "L"	V _{CEL}	V _{IN} =V _{OUT} +2.0V			0.25	V

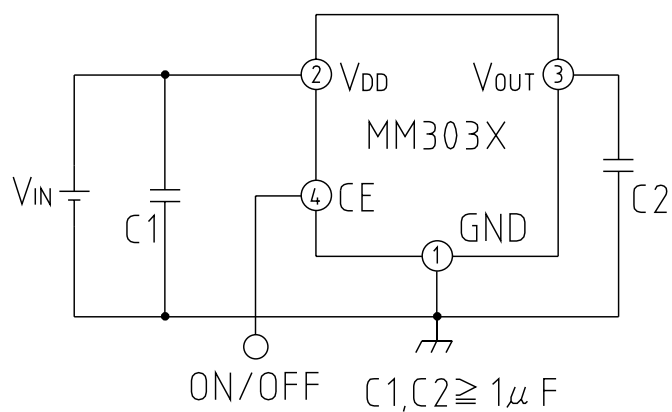
Electrical Characteristics 2

[illegible]

Measuring Circuit



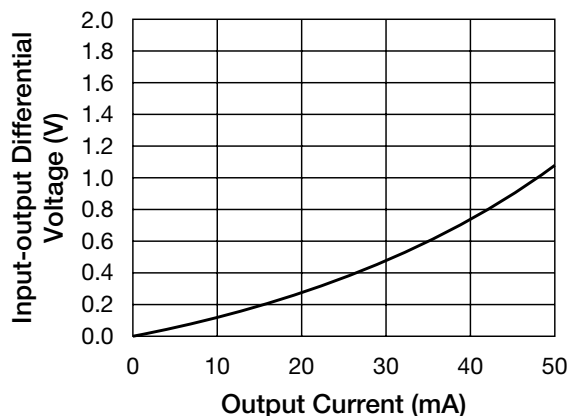
Typical Application Circuit



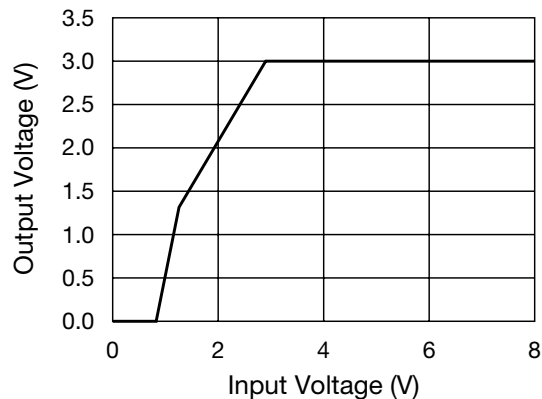
Note: This regulator is not internally compensated and thus requires an external output-capacitor(C_{OUT}) for stability.

Characteristics (3.0V product Ambient Temperature, $T_a=25^{\circ}\text{C}$)

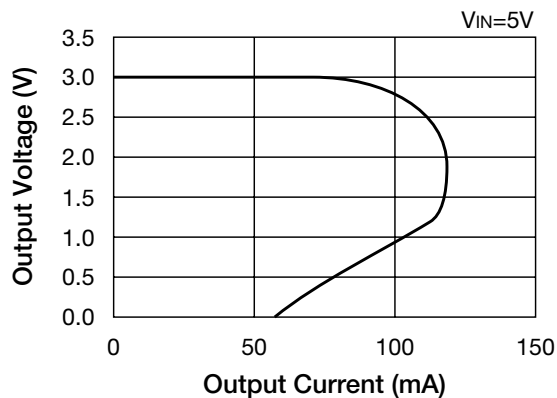
Input-output Differential Voltage



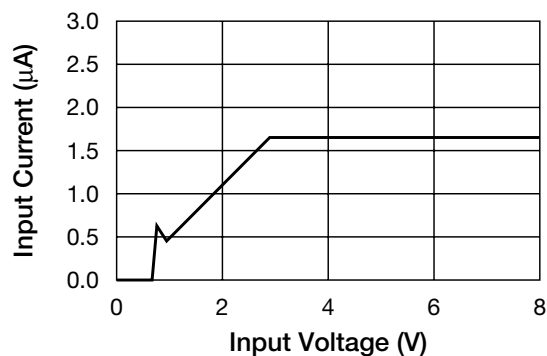
Line Regulation



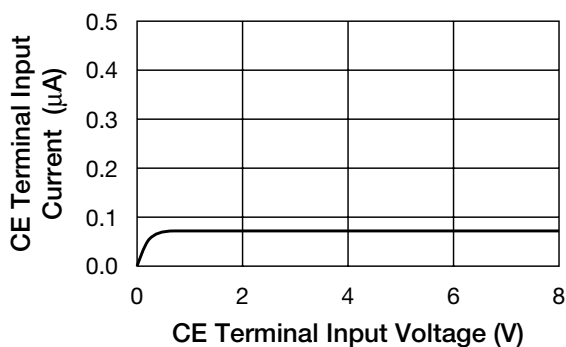
Load Regulation



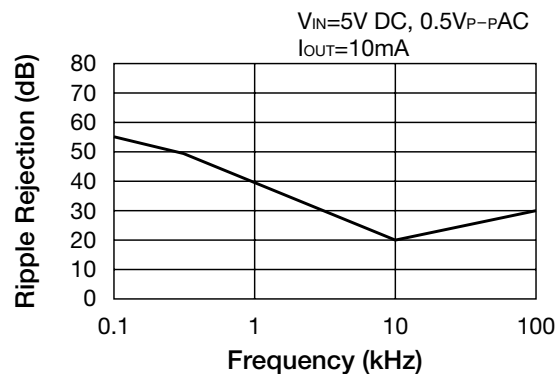
Input Current



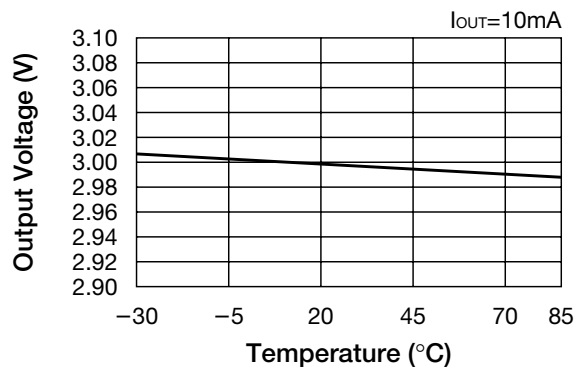
CE Terminal Input Current VS CE Terminal Input Voltage



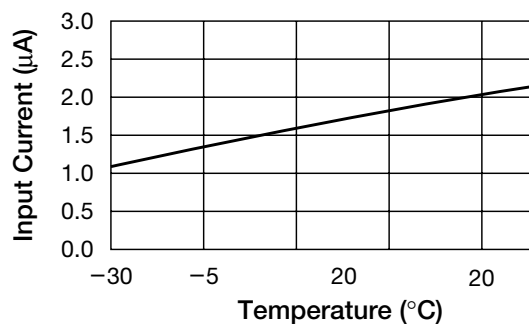
Ripple Rejection



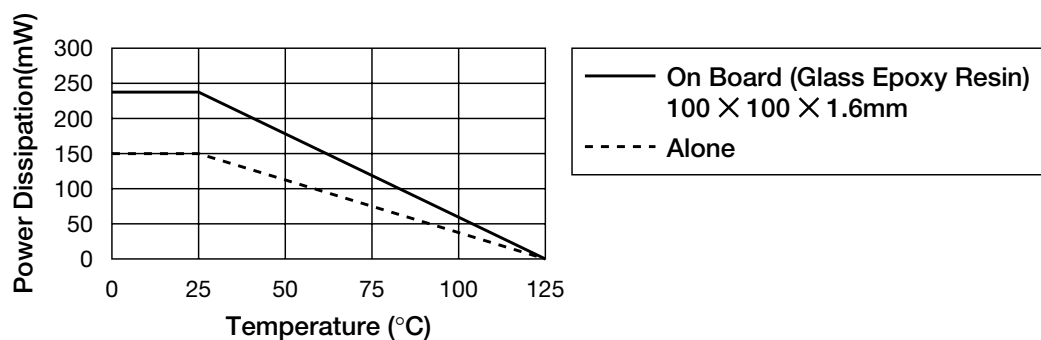
■ Output Voltage VS Temperature



■ Input Current VS Temperature



■ Power Dissipation



■ ESR Stable region

