

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) |

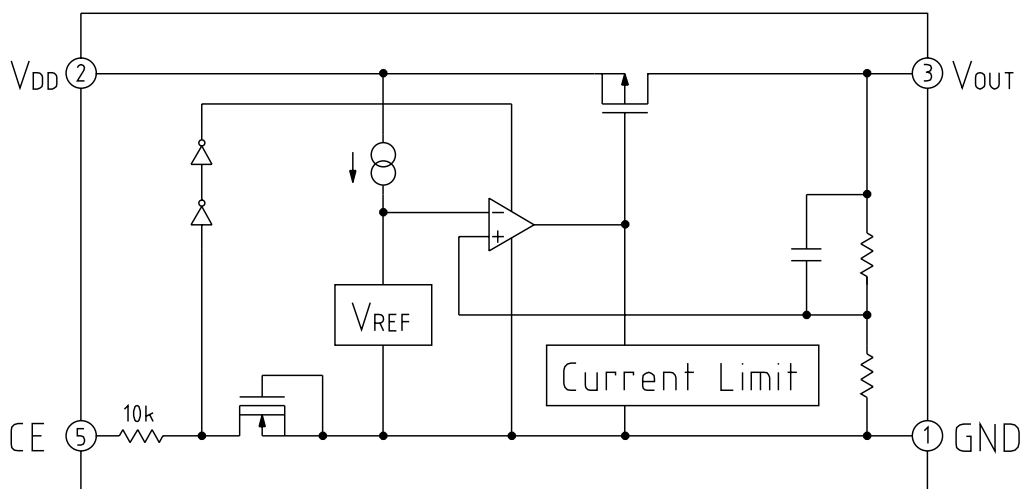
Package

SC-82AB

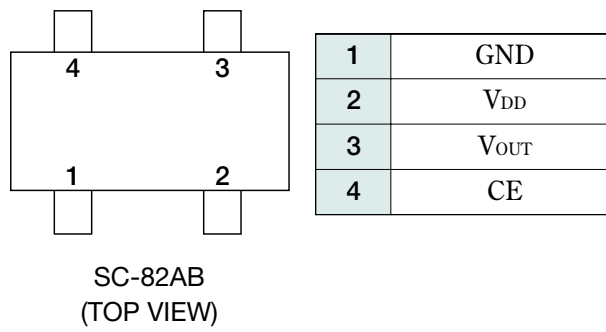
Applications

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 border="1" style="width: 100%;"> <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

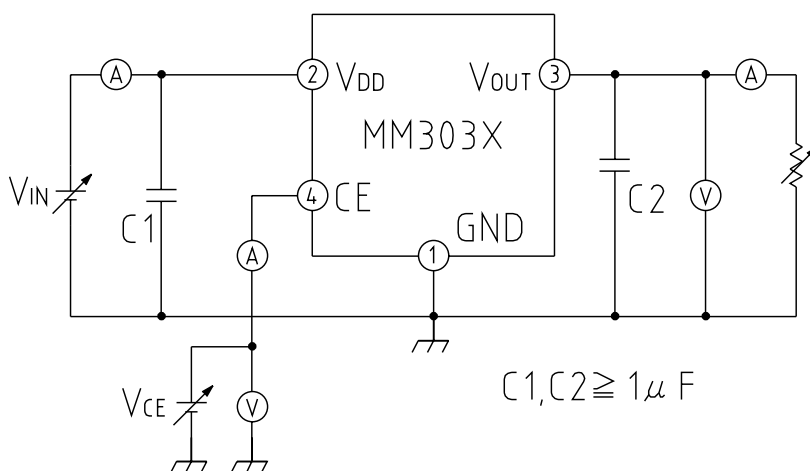
Electrical Characteristics (Ambient Temperature, $T_a=25^{\circ}\text{C}$, $V_{IN}=V_{CE}$)

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

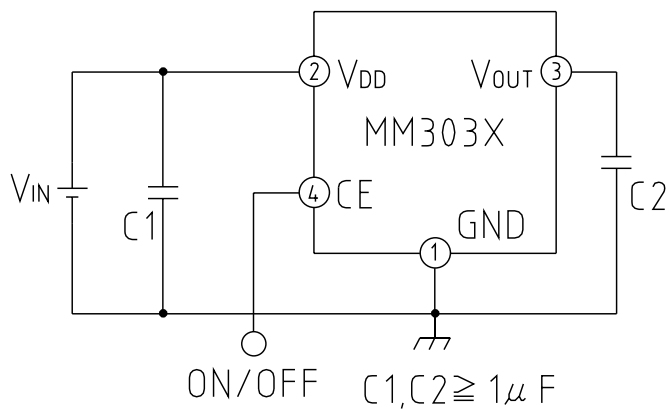
Electrical Characteristics 2 (Ambient Temperature, Ta=25°C, VIN=VCE)

Product Name	PARAMETER												
	Output Voltage			Output Current			Load Regulation			Input-Output differential Voltage			
	VOUT (V)			IOUT (mA)			ΔVOUT/ΔIOUT (mV)			VDIF (V)			
	TEST CONDITIONS	MIN.	TYP.	MAX.	TEST CONDITIONS	MIN.	TYP.	TEST CONDITIONS	TYP.	MAX.	TEST CONDITIONS	TYP.	MAX.
MM3031H	VIN-VOUT=2.0V 10μA ≤ IOUT ≤ 10mA	1.666	1.700	1.734	VIN-VOUT=2.0V	35		VIN-VOUT=2.0V 1mA ≤ IOUT ≤ 35mA	30	45		60	90
MM3031J													
MM3031K													
MM3032A													
MM3032B													
MM3032C													
MM3032D													
MM3032E													
MM3032F													
MM3032G													
MM3032H													
MM3032J													
MM3032K													
MM3033A													
MM3033B													
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MM3034K													
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MM3035F													

Measuring Circuit



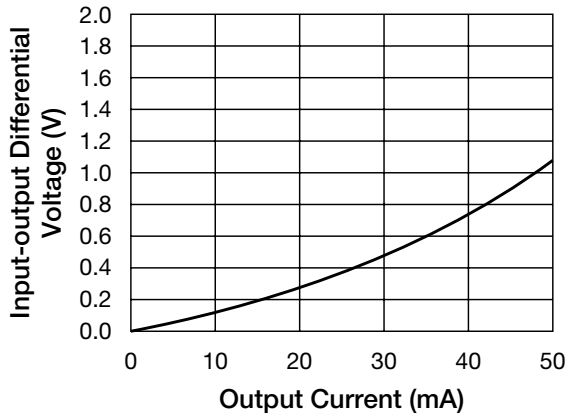
Typical Application Circuit



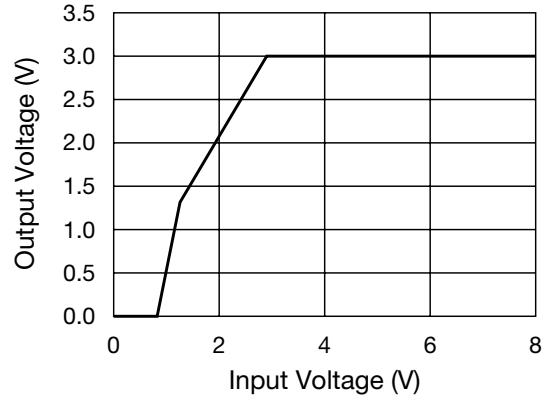
Note: This regulator is not internally compensated and thus requires an external output-capacitor(COUT) for stability.

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

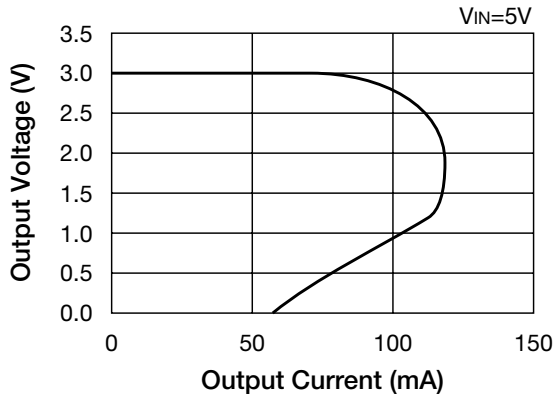
Input-output Differential Voltage



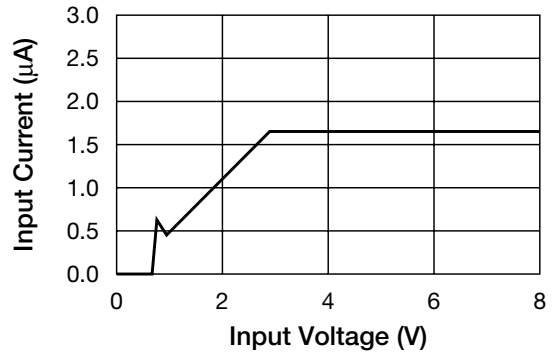
Line Regulation



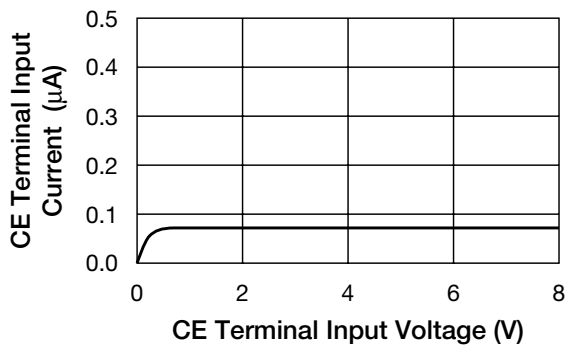
Load Regulation



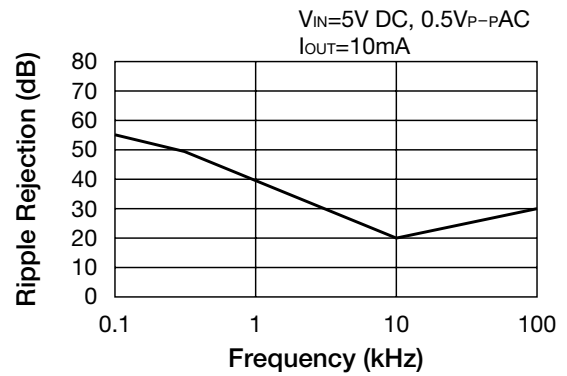
Input Current



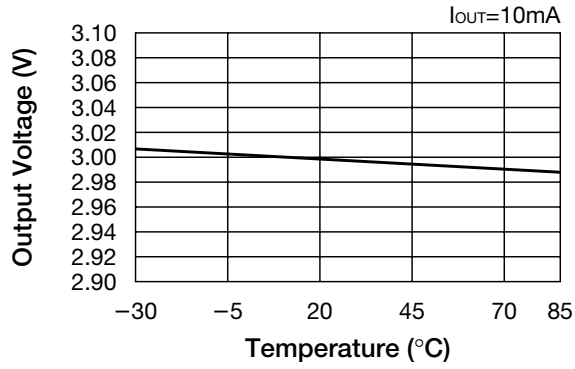
CE Terminal Input Current VS CE Terminal Input Voltage



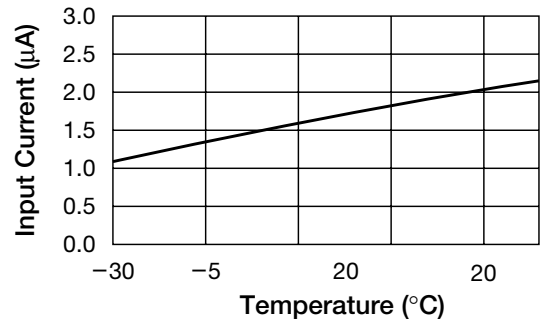
Ripple Rejection



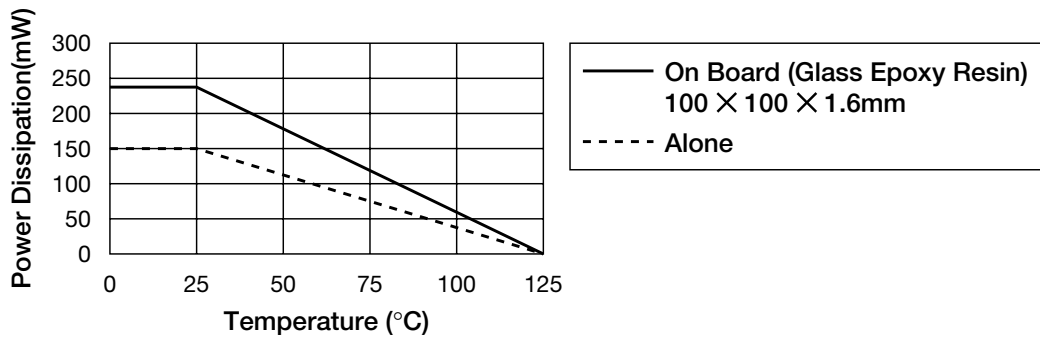
■ Output Voltage VS Temperature



■ Input Current VS Temperature



■ Power Dissipation



■ ESR Stable region

