

CMOS Regulator Monolithic IC MM303X Series

Outline

This IC is a high precision, low current consumption, low output voltage regulator IC developed using the CMOS process.

Also, in addition to low current consumption, the chip enable function contributes to longer battery life.

A space-saving small SSON-4A package ($1.1 \times 1.4 \times 0.55\text{mm}$) is used.

Features

1. Input Voltage Range	2~8V
2. Output Voltage Range	1.7~5.5V
3. Output Voltage accuracy	$V_{OUT} \pm 2\%$
4. Maximum Output Current	80mA
5. Supply Current	1.5 μA typ. (no-Load Input Current) 0.1 μA Typ. (OFF)
6. Output Capacitor	1 μF
7. Dropout Voltage	30mV typ./50mV max. ($I_o=1\text{mA}$)
8. Output Short-Circuit Current	60mA
9. Line Regulation	0.05%/V ($I_o=1\text{mA}$)
10. Load Regulation	30mV typ./50mV max. ($I_o=1\sim 80\text{mA}$)

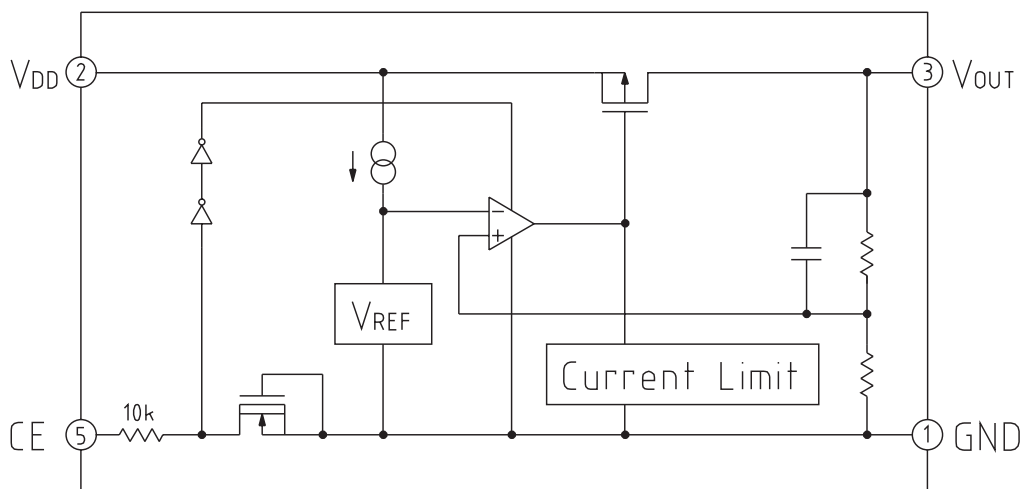
Package

SC-82ABA, SC-82ABB, SSON-4A

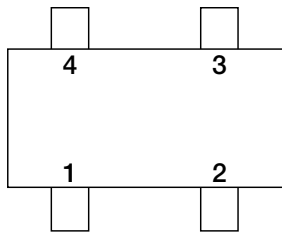
Applications

1. Cellular Phone
2. Portotable Game Device
3. PDAs
4. Digital Cameras
5. Note PCs

Block Diagram

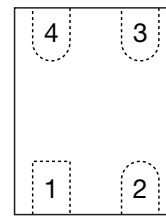


Pin Assignment



SC-82ABA
SC-82ABB
(TOP VIEW)

1	GND
2	V _{DD}
3	V _{OUT}
4	CE



SSON-4A
(TOP VIEW)

1	GND
2	CE
3	V _{OUT}
4	V _{DD}

Pin Description

Pin No.		Pin name	Functions			
SC-82ABA SC-82ABB	SSON-4A					
1	1	GND	GND Pin			
2	4	V _{DD}	Voltage-Supply pin			
3	3	V _{OUT}	Regulator output pin			
4	2	CE	ON/OFF-Control pin			
			<table border="1"> <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
CE	OUTPUT					
L	OFF					
H	ON					
			ON/OFF-Control pin Connect CE-pin with V _{DD} -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, $T_a=25^{\circ}\text{C}$, $V_{IN}=V_{CE}$)

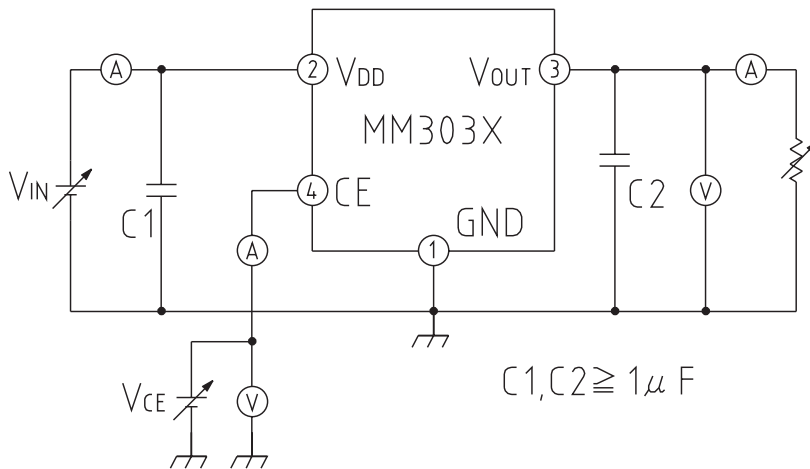
Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Unit
Quiescent Current	I_{SS}	$V_{IN}=V_{OUT}+2.0\text{V}$		1.5	3.0	μA
Input Current(OFF)	$I_{standby}$	$V_{IN}=V_{OUT}+2.0\text{V}$, $V_{CE}=0\text{V}$		0.1	1.0	μA
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}$	$I_{OUT}=1\text{mA}$, $V_{OUT}+0.5\text{V} \leq V_{IN} \leq 8\text{V}$	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

Phased Out Products

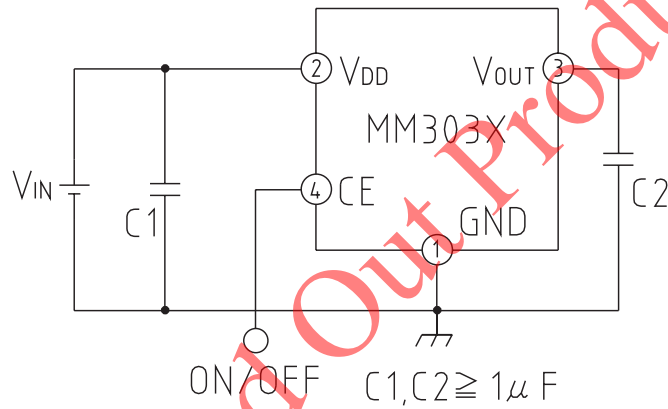
Electrical Characteristics 2 (Ambient Temperature, Ta=25°C, VIN=VCE)

Product Name	PARAMETER												
	Output Voltage			Output Current			Load Regulation			Input-Output differential Voltage			
	V _{OUT} (V)			I _{OUT} (mA)			ΔV _{OUT} /ΔI _{OUT} (mV)			V _{DIF} (V)			
	TEST CONDISIONS	MIN.	TYP.	MAX.	TEST CONDISIONS	MIN.	TYP.	TEST CONDISIONS	TYP.	MAX.	TEST CONDISIONS	TYP.	MAX.
MM3031H	V _{IN} -V _{OUT} = 2.0V 10μA ≤ I _{OUT} ≤ 10mA	1.666	1.700	1.734	V _{IN} -V _{OUT} = 2.0V	35		V _{IN} -V _{OUT} =2.0V 1mA ≤ I _{OUT} ≤ 35mA	30	45	I _{OUT} = 1mA	60	90
MM3031J													
MM3031K													
MM3032A													
MM3032B													
MM3032C													
MM3032D													
MM3032E													
MM3032F													
MM3032G													
MM3032H													
MM3032J													
MM3032K													
MM3033A													
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MM3035B													
MM3035C													
MM3035D													
MM3035E													
MM3035F													
						50		1mA ≤ I _{OUT} ≤ 50mA	40	60		35	55
						65		V _{IN} -V _{OUT} =2.0V 1mA ≤ I _{OUT} ≤ 65mA	50	70		25	40
						80		V _{IN} -V _{OUT} =2.0V 1mA ≤ I _{OUT} ≤ 80mA	60	90			

Measuring Circuit



Typical Application Circuit

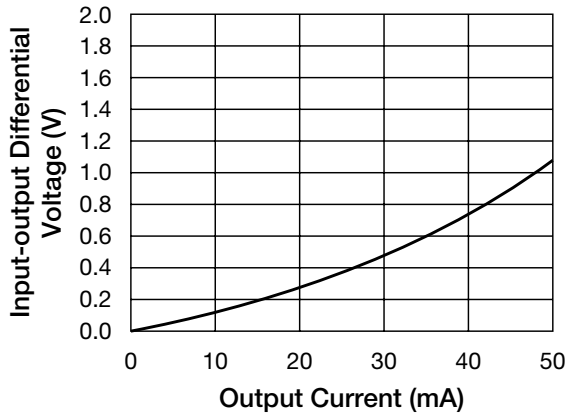


Note: This regulator is not internally compensated and thus requires an external output-capacitor(COUT) for stability.

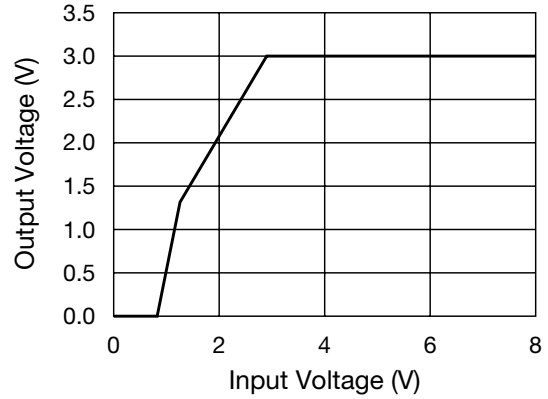
Phased Out Products

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

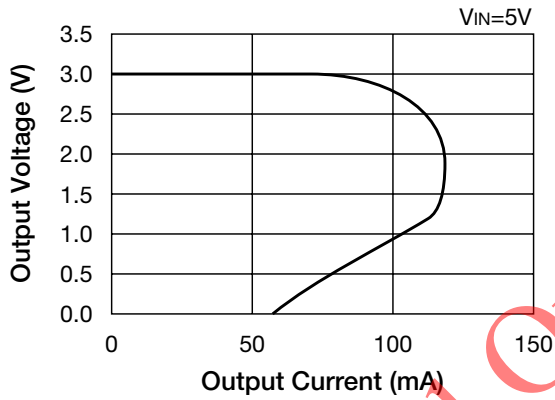
■ Input-output Differential Voltage



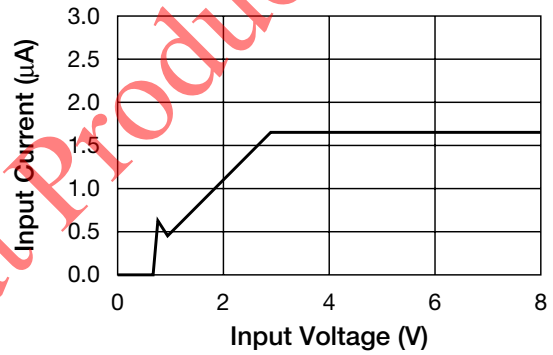
■ Line Regulation



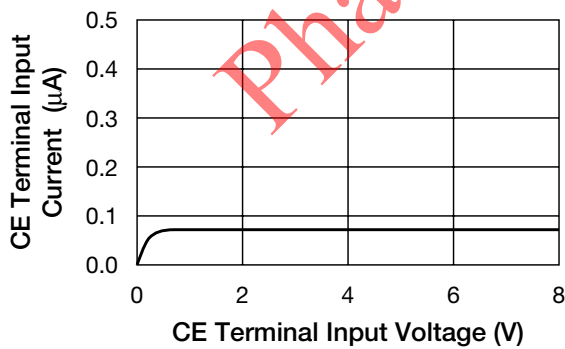
■ Load Regulation



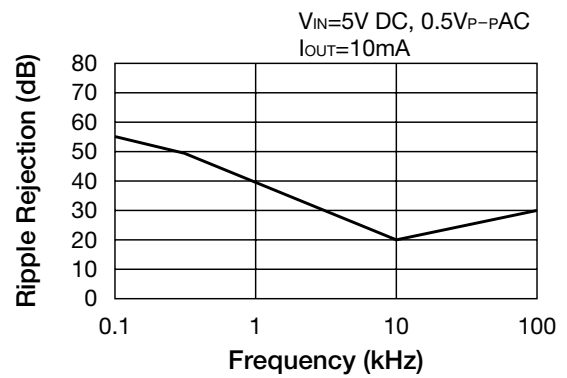
■ Input Current



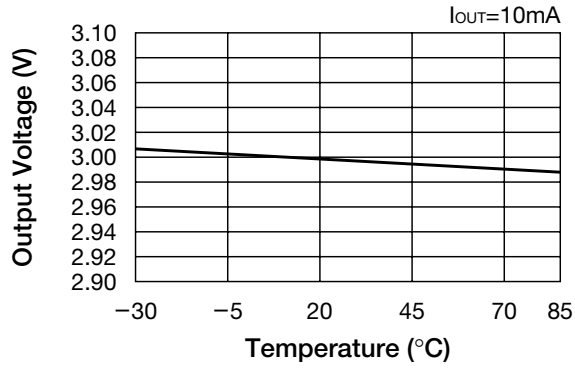
■ CE Terminal Input Current – CE Terminal Input Voltage



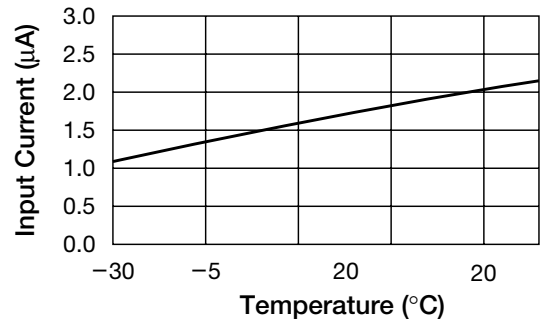
■ Ripple Rejection



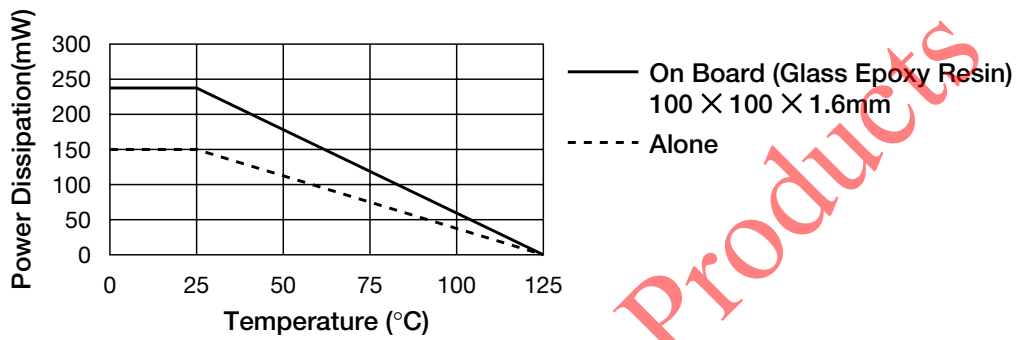
■ Output Voltage – Temperature



■ Input Current – Temperature



■ Power Dissipation



■ ESR Stable region

