

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) |

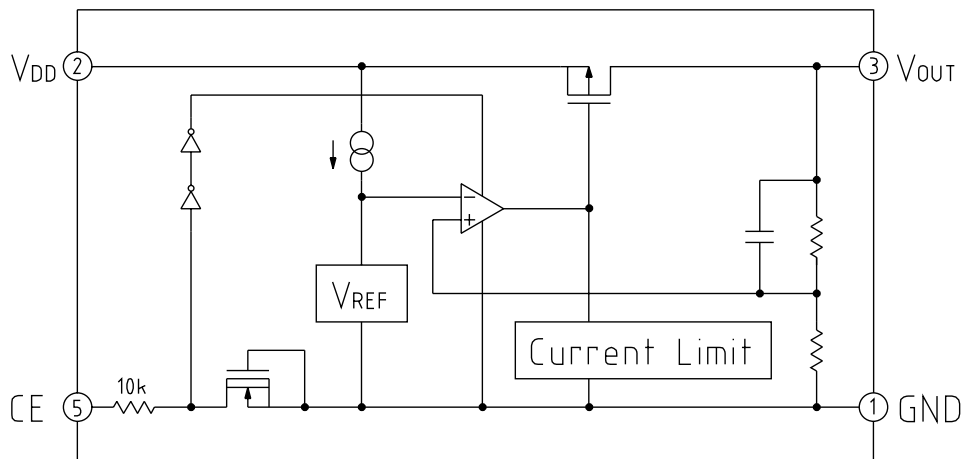
Package

SC-82AB

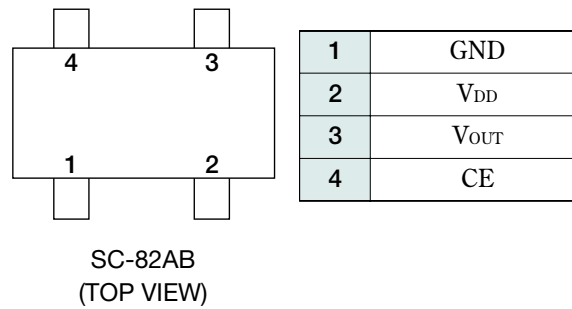
Applications

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="margin-left: 20px;"> <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 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

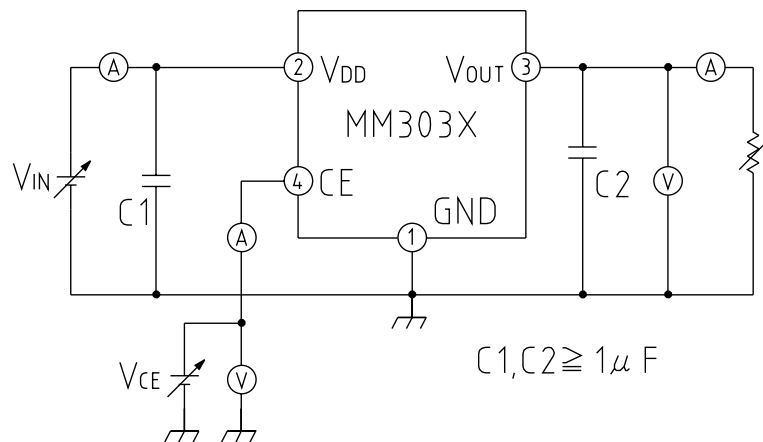
Electrical Characteristics (Ambient Temperature, $T_a=25^{\circ}\text{C}$, $V_{IN}=V_{CE}$)

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

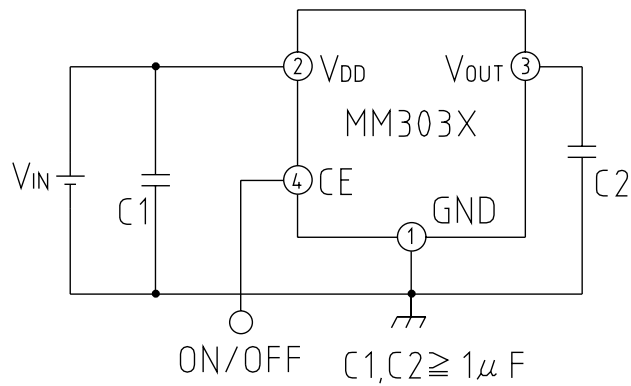
Electrical Characteristics 2 (Ambient Temperature, Ta=25°C, VIN=VCE)

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	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				
MM3031J		1.764	1.800	1.836										
MM3031K		1.862	1.900	1.938										
MM3032A		1.960	2.000	2.040										
MM3032B		2.058	2.100	2.142										
MM3032C		2.156	2.200	2.244										
MM3032D		2.254	2.300	2.346										
MM3032E		2.352	2.400	2.448										
MM3032F		2.450	2.500	2.550										
MM3032G		2.548	2.600	2.652										
MM3032H		2.646	2.700	2.754										
MM3032J		2.744	2.800	2.856										
MM3032K		2.842	2.900	2.958										
MM3033A		2.940	3.000	3.060		50		VIN-VOUT=2.0V 1mA ≤ IOUT ≤ 50mA	40	60				
MM3033B		3.038	3.100	3.162										
MM3033C		3.136	3.200	3.264										
MM3033D		3.234	3.300	3.366										
MM3033E		3.332	3.400	3.468										
MM3033F		3.430	3.500	3.570										
MM3033G		3.528	3.600	3.672										
MM3033H		3.626	3.700	3.774										
MM3033J		3.724	3.800	3.876										
MM3033K		3.822	3.900	3.978										
MM3034A		3.920	4.000	4.080		65		VIN-VOUT=2.0V 1mA ≤ IOUT ≤ 65mA	50	70				
MM3034B		4.018	4.100	4.182										
MM3034C		4.116	4.200	4.284										
MM3034D		4.214	4.300	4.386										
MM3034E		4.312	4.400	4.488										
MM3034F		4.410	4.500	4.590										
MM3034G		4.508	4.600	4.692										
MM3034H		4.606	4.700	4.794										
MM3034J		4.704	4.800	4.896										
MM3034K		4.802	4.900	4.998										
MM3035A		4.900	5.000	5.100		80		VIN-VOUT=2.0V 1mA ≤ IOUT ≤ 80mA	60	90				
MM3035B		4.998	5.100	5.202										
MM3035C	5.096	5.200	5.304											
MM3035D	5.194	5.300	5.406											
MM3035E	5.292	5.400	5.508											
MM3035F	5.390	5.500	5.610											

Measuring Circuit



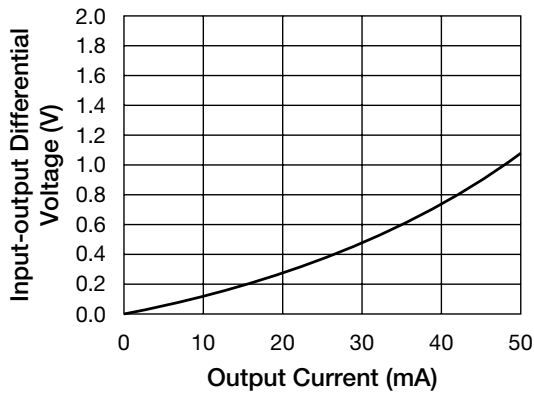
Typical Application Circuit



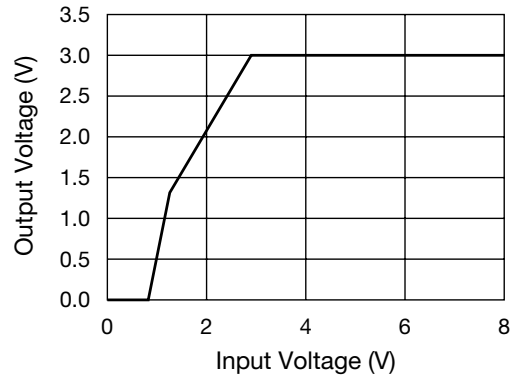
Note: This regulator is not internally compensated and thus requires an external output-capacitor(COUT) for stability.

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

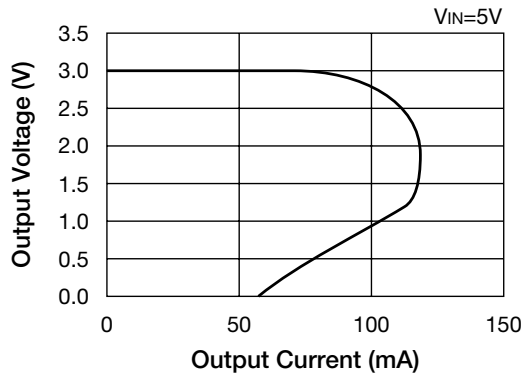
Input-output Differential Voltage



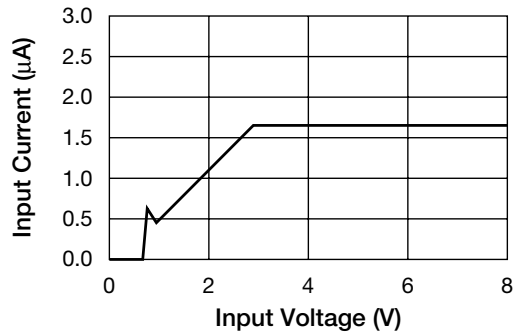
Line Regulation



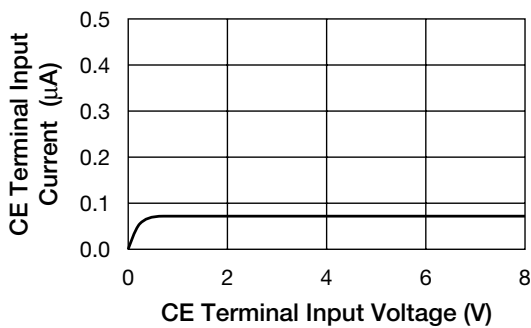
Load Regulation



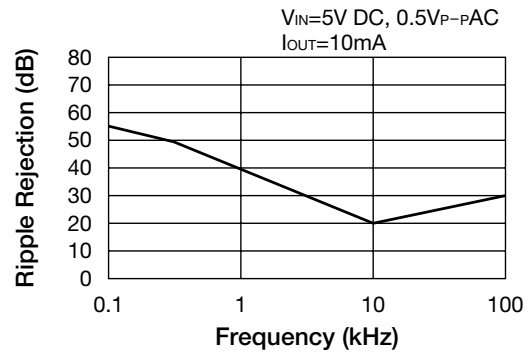
Input Current



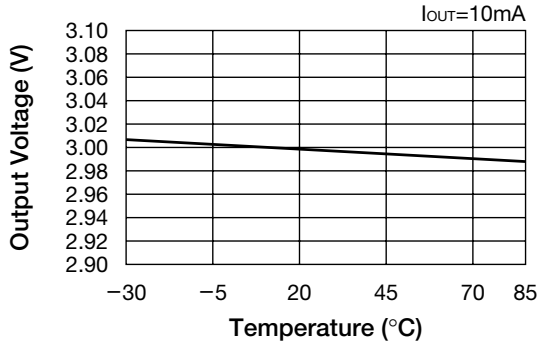
CE Terminal Input Current VS CE Terminal Input Voltage



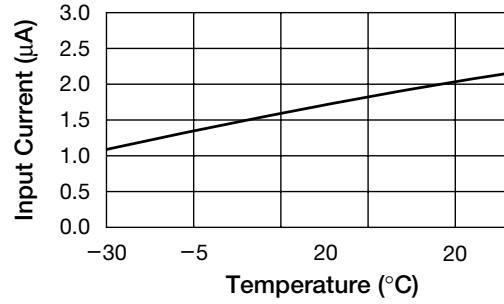
Ripple Rejection



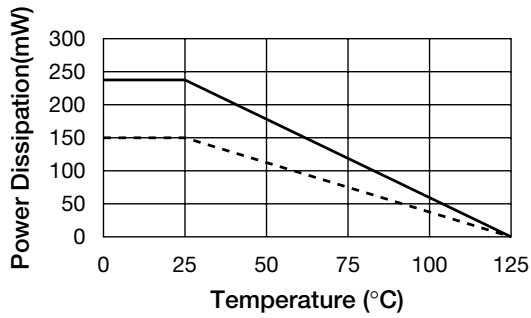
■ Output Voltage VS Temperature



■ Input Current VS Temperature



■ Power Dissipation



— On Board (Glass Epoxy Resin)
100 × 100 × 1.6mm
- - - Alone

■ ESR Stable region

