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 ±2%.

Features

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

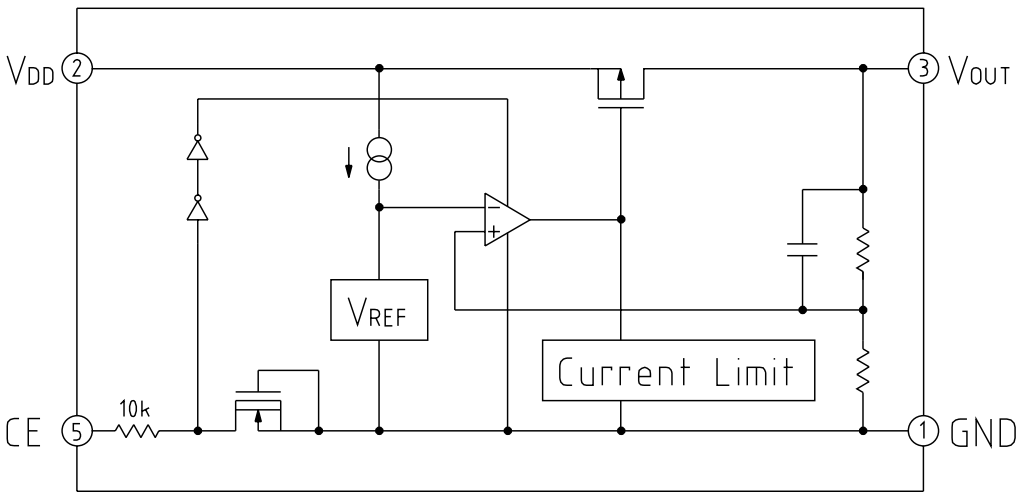
Package

SC-82AB

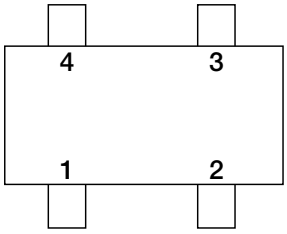
Applications

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

Block Diagram



Pin Assignment



1	GND
2	V_{DD}
3	V_{OUT}
4	CE

SC-82AB
(TOP VIEW)

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 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	Pd	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

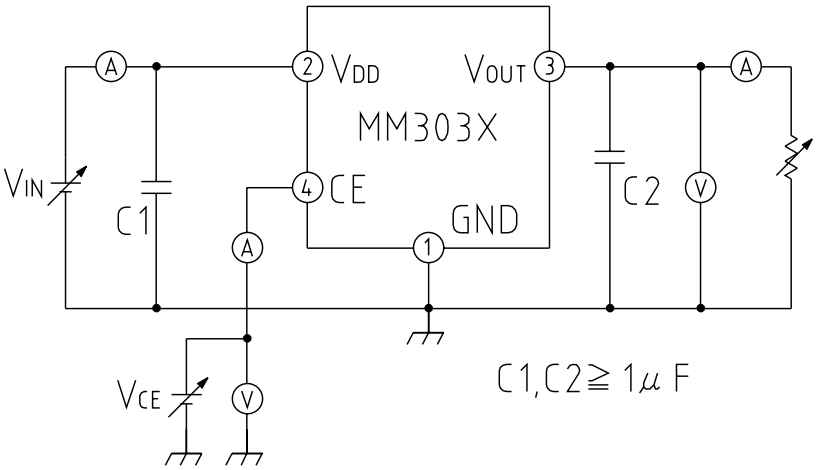
Electrical Characteristics (Ambient Temperature, Ta=25°C, V_{IN}=V_{CE})

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)	Istandby	V_{IN}=V_{OUT}+2.0V, V_{CE}=0V		0.1	1.0	µA
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}$	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	$\Delta V_{OUT}/\Delta V_{opt}$	I_{OUT}=10mA −30°C ≦ T_{OPT} ≦ 85°C		±100		ppm/°C
Short current	Ilim	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

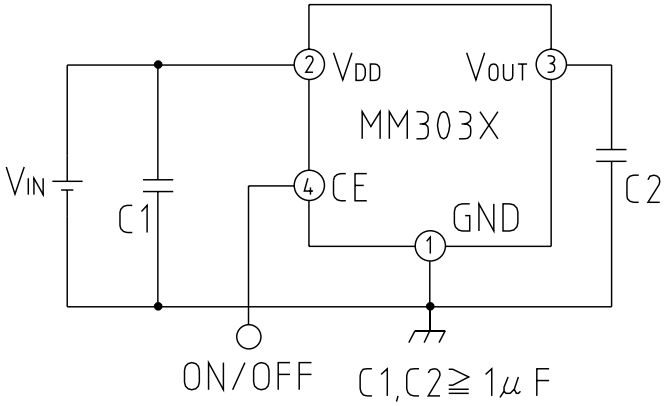
Electrical Characteristics 2 (Ambient Temperature, Ta=25°C, V_{IN}=V_{CE})

Product Name	PARAMETER												
	Output Voltage				Output Current			Load Regulation			Input-Output differential Voltage		
	V_{OUT} (V)				I_{OUT} (mA)			$\Delta V_{OUT}/\Delta I_{OUT}$ (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		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								50	75
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								40	60
MM3032K		2.842	2.900	2.958									
MM3033A		2.940	3.000	3.060		50		V_{IN}–V_{OUT} =2.0V 1mA ≦ I_{OUT} ≦ 50mA	40	60			
MM3033B		3.038	3.100	3.162									
MM3033C		3.136	3.200	3.264								35	55
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								30	45
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		V_{IN}–V_{OUT} =2.0V 1mA ≦ I_{OUT} ≦ 65mA	50	70		25	40
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		V_{IN}–V_{OUT} =2.0V 1mA ≦ I_{OUT} ≦ 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



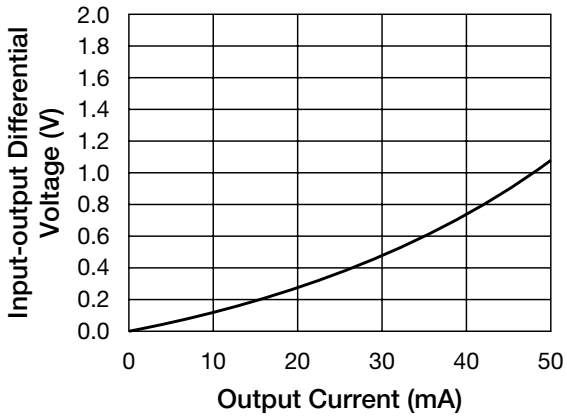
Typical Application Circuit



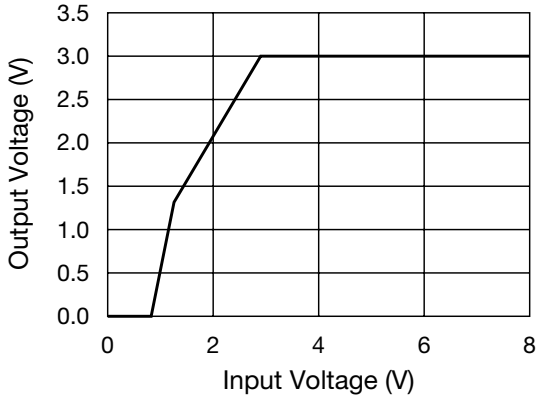
Note: This regulator is not internally compensated and thus requires an external output-capacitor(COUT) for stability.

Characteristics (3.0V product Ambient Temperature, Ta=25°C)

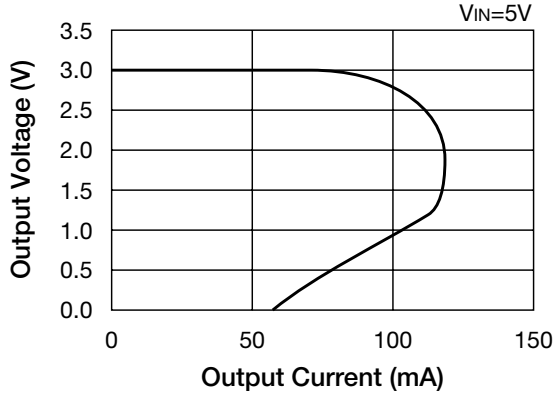
Input-output Differential Voltage



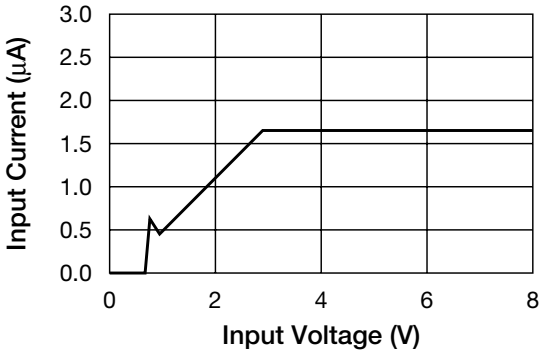
Line Regulation



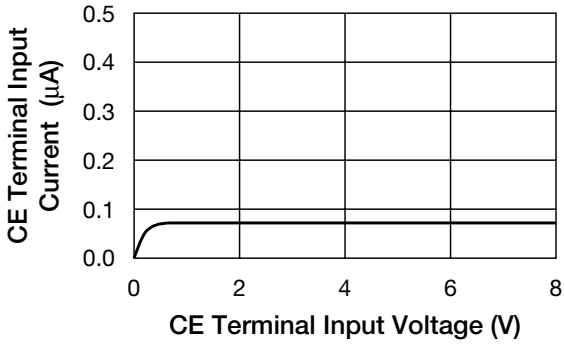
Load Regulation



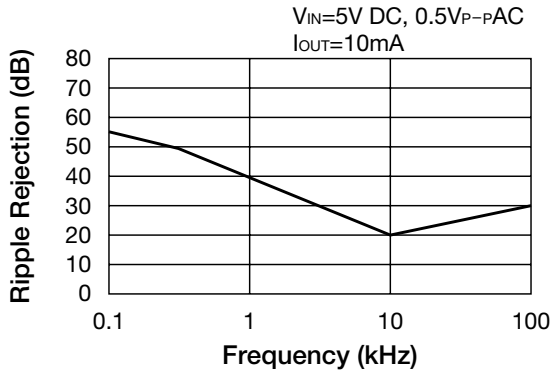
Input Current



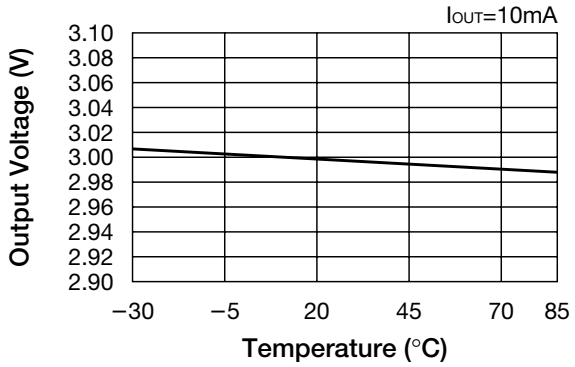
CE Terminal Input Current VS CE Terminal Input Voltage



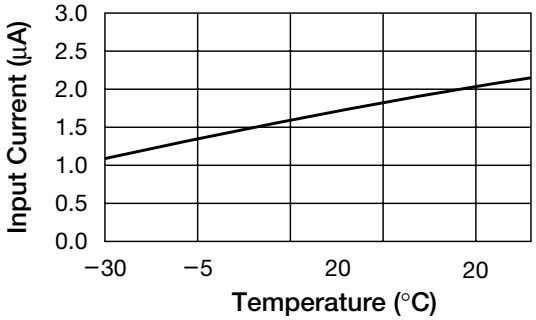
Ripple Rejection



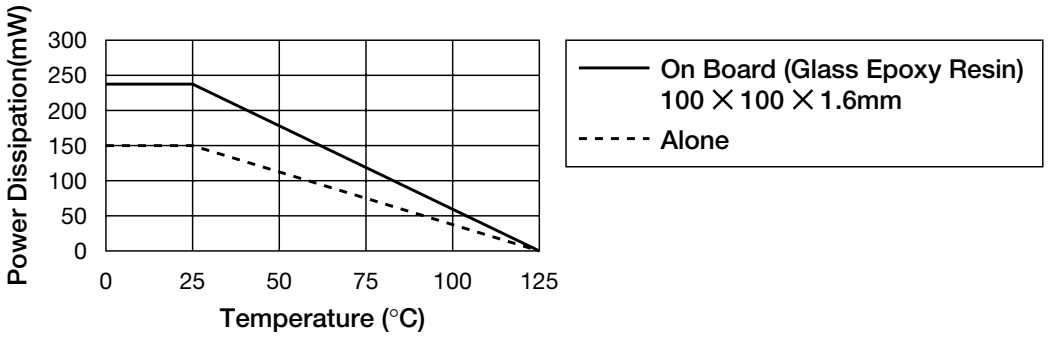
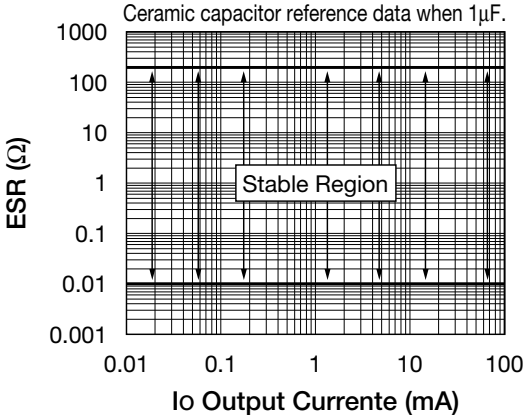
Output Voltage VS Temperature



Input Current VS Temperature



Power Dissipation



ESR Stable region