Regulator with ON/OFF
Monolithic IC MM3042□~MM3045□N

Outline

This IC is a low current consumption (2.5μA typ.), small CMOS regulator ("L" Active type) with ON/OFF control.

The output current capability has been increased from that of MM3051□~ MM3055□V type regulators.

Features

1. I/O voltage difference (MM3043L ~ MM3043V)   0.3V typ. (I_O=60mA)
2. Current consumption   2.5μA typ. (V_{IN}=V_{OUT}+1V)
3. Output current (MM3045L ~ MM3045R)   100mA min. (V_{IN}−V_{OUT}=1.0V)
4. Output voltage rank   2.0~5.5V (0.1V step)
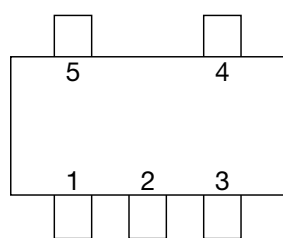5. Output ON/OFF control function   High: OFF, Low: ON

Package

SOT-25A (Mini mold)

Applications

1. Portable equipment
2. Cellular telephone, PHS
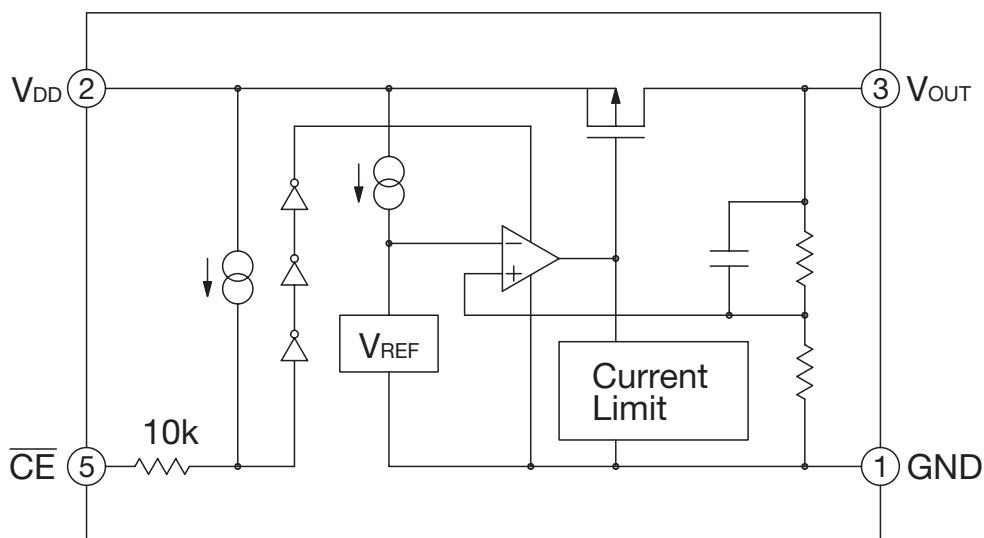3. Cordless telephone
4. Other battery-powered portable equipment

Pin Assignment

5	4
1	2	3

SOT-25A
(TOP VIEW)

1	GND
2	V_{DD}
3	V_{OUT}
4	NC
5	$\overline{CE}$

Equivalent Circuit Diagram

Pin Description

Pin No.	Pin name	Function
1	GND	GND pin
2	V_{DD}	Voltage-Supply pin
3	V_{OUT}	Regulator output pin
4	NC	
5	$\overline{CE}$	ON/OFF-Control pin **$\overline{CE}$** / **Output** L / ON H / OFF Connect $\overline{CE}$ pin with GND pin, when it is not used.

Absolute Maximum Ratings (Except where noted therwise, Ta=25°C)

Item	Symbol	Ratings	Units
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 (Except where noted therwise, Ta=25°C)

Item	Symbol	Ratings	Units
Operating temperature	T_{OP}	−30~+85	°C
Supply voltage	V_{OP}	V_{OUT}+0.3~8	V

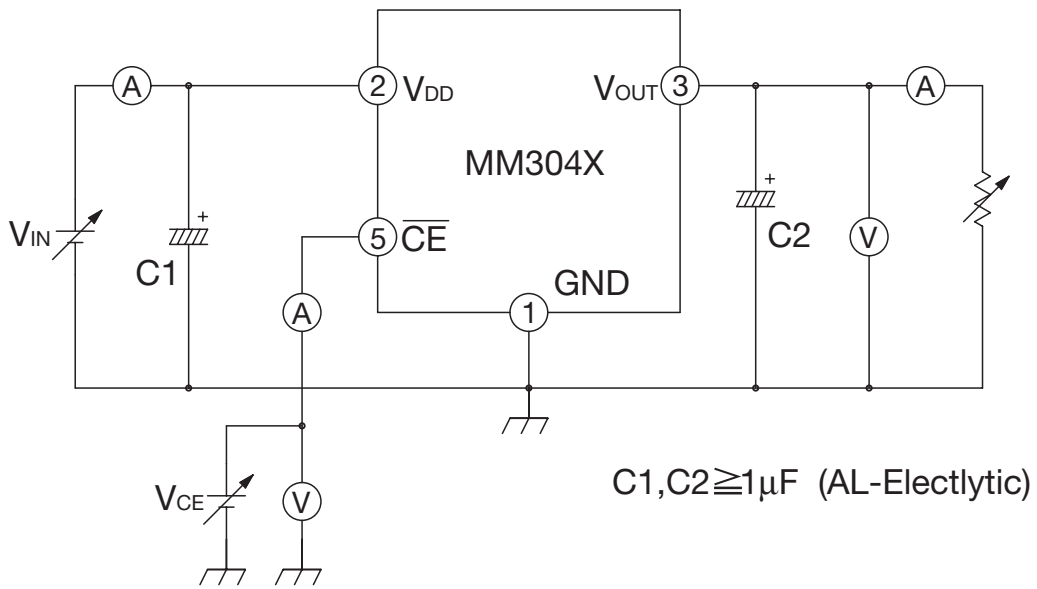## Electrical Characteristics (Except where noted therwise, Ta=25°C, V$_{CE}$=GND)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Supply current	I$_{SS}$	V$_{IN}$=V$_{OUT}$+1.0V, Excluding CE pin current (I$_{CE}$)		2.5	5.0	μA
Supply current (OFF)	Istandby	V$_{IN}$=V$_{OUT}$+1.0V, V$_{CE}$=V$_{IN}$		0.1	1.0	μA
Line regulation	$\varDelta$V$_{OUT}$/$\varDelta$V$_{IN}$	I$_{OUT}$=30mA, V$_{OUT}$+0.5V ≤ V$_{IN}$ ≤ 8V	0	0.15	0.30	%/V
Input voltage	V$_{IN}$				8.0	V
Vo temperature coefficient	$\varDelta$V$_{OUT}$/$\varDelta$V$_{opt}$	I$_{OUT}$=10mA −30°C ≤ T$_{OPT}$ ≤ 85°C		±100		ppm/°C
Output short-circuit current	Ilim	V$_{IN}$=V$_{OUT}$+1.0V, V$_{OUT}$=0V		60		mA
High threshold voltage	V$_{CEH}$		1.5			V
Low threshold voltage	V$_{CEL}$				0.25	V
$\overline{CE}$ pin current "H"	I$_{CEH}$	V$_{CE}$=V$_{IN}$		0	0.1	μA
$\overline{CE}$ pin current "L"	I$_{CEL}$	V$_{CE}$=GND	−4.0	−2.0	−1.0	μA

Note: V$_{OUT}$ is the output voltage typ. value in the specifications.

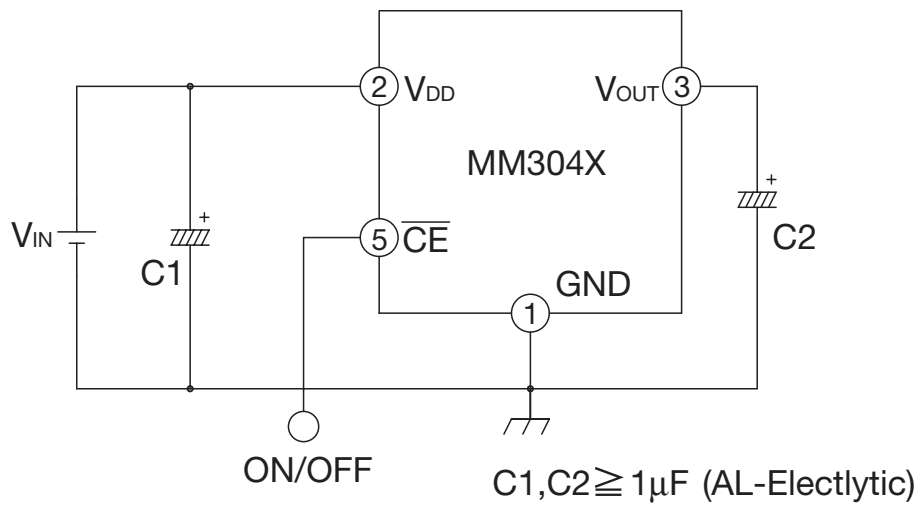Make sure that output current does not exceed loss tolerance.

Electrical Characteristics 2 (Except where noted therwise, Ta=25°C, V_{CE}=GND)

Product name	Output voltage V_{OUT} (V)				Output current I_{OUT} (mA)			Load regulation △V_{OUT}/△I_{OUT} (mV)			Input-Output differential voltage V_{DIF} (V)		
	Test conditions	Min.	Typ.	Max.	Test condisions	Min.	Typ.	Test condisions	Typ.	Max.	Test condisions	Typ.	Max.
MM3042L	$V_{IN}-V_{OUT}$ =1.0V I_{OUT} =10mA	1.960	2.000	2.040	$V_{IN}-V_{OUT}$ =1.0V	25	40	$V_{IN}-V_{OUT}$ =1.0V 1mA ≦ I_{OUT} ≦ 40mA	40	80	$V_{IN}=V_{OUT}$ −0.2V I_{OUT} =40mA	0.3	0.5
MM3042M		2.058	2.100	2.142									
MM3042N		2.156	2.200	2.244									
MM3042P		2.254	2.300	2.346									
MM3042Q		2.352	2.400	2.448									
MM3042R		2.450	2.500	2.550									
MM3042S		2.548	2.600	2.652									
MM3042T		2.646	2.700	2.754									
MM3042U		2.744	2.800	2.856									
MM3042V		2.842	2.900	2.958									
MM3043L		2.940	3.000	3.060		40	60	$V_{IN}-V_{OUT}$ =1.0V 1mA ≦ I_{OUT} ≦ 60mA			$V_{IN}=V_{OUT}$ −0.2V I_{OUT} =60mA		
MM3043M		3.038	3.100	3.162									
MM3043N		3.136	3.200	3.264									
MM3043P		3.234	3.300	3.366									
MM3043Q		3.332	3.400	3.468									
MM3043R		3.430	3.500	3.570									
MM3043S		3.528	3.600	3.672									
MM3043T		3.626	3.700	3.774									
MM3043U		3.724	3.800	3.876									
MM3043V		3.822	3.900	3.978									
MM3044L		3.920	4.000	4.080		50	80	$V_{IN}-V_{OUT}$ =1.0V 1mA ≦ I_{OUT} ≦ 80mA			$V_{IN}=V_{OUT}$ −0.2V I_{OUT} =80mA		
MM3044M		4.018	4.100	4.182									
MM3044N		4.116	4.200	4.284									
MM3044P		4.214	4.300	4.386									
MM3044Q		4.312	4.400	4.488									
MM3044R		4.410	4.500	4.590									
MM3044S		4.508	4.600	4.692									
MM3044T		4.606	4.700	4.794									
MM3044U		4.704	4.800	4.896									
MM3044V		4.802	4.900	4.998									
MM3045L		4.900	5.000	5.100		65	100	$V_{IN}-V_{OUT}$ =1.0V 1mA ≦ I_{OUT} ≦ 100mA			$V_{IN}=V_{OUT}$ −0.2V I_{OUT} =100mA		
MM3045M		4.998	5.100	5.202									
MM3045N		5.096	5.200	5.304									
MM3045P		5.194	5.300	5.406									
MM3045Q		5.292	5.400	5.508									
MM3045R		5.390	5.500	5.610									

Measuring Circuit

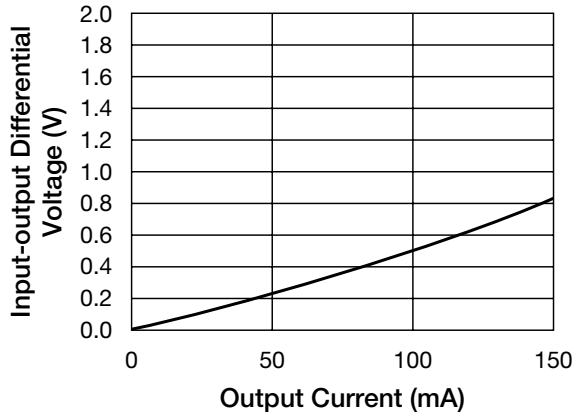C1,C2≧1μF (AL-Electlytic)

Typical Application Circuit
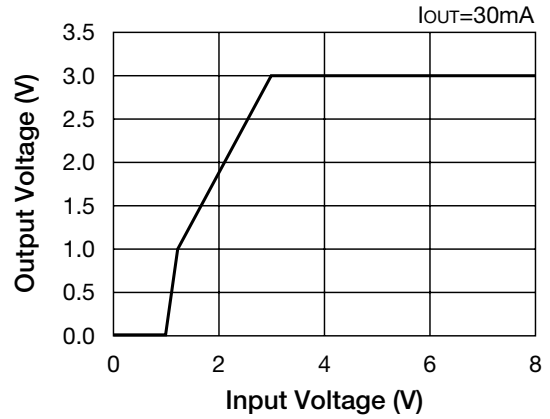

ON/OFF

C1,C2≧ 1μF (AL-Electlytic)

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

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

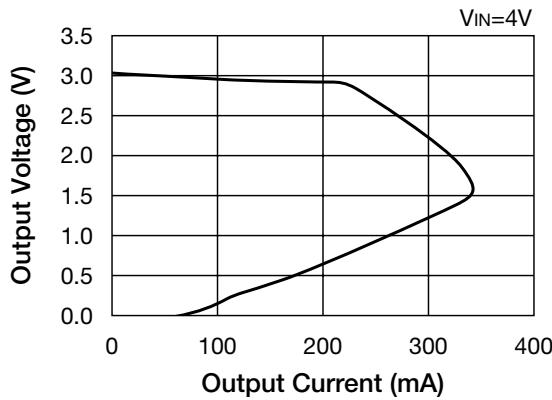## ■Input-Output Differential Voltage

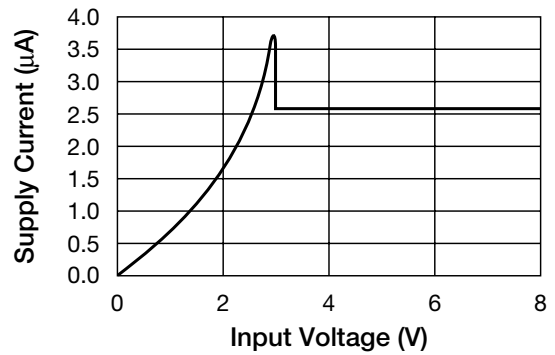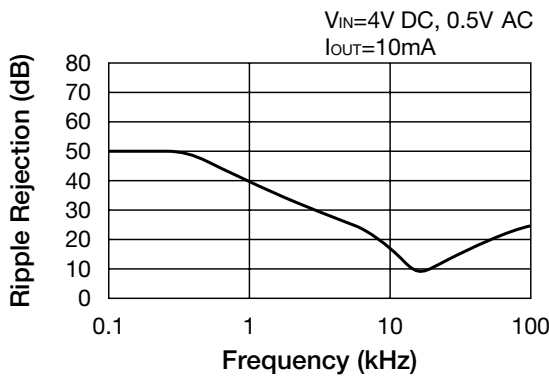X-axis: Output Current (mA), Y-axis: Input-output Differential Voltage (V)

■Line Regulation

$I_{OUT}=30mA$

X-axis: Input Voltage (V), Y-axis: Output Voltage (V)

■Load Regulation

$V_{IN}=4V$

X-axis: Output Current (mA), Y-axis: Output Voltage (V)

■Supply Current

X-axis: Input Voltage (V), Y-axis: Supply Current (μA)

■Ripple Rejection

$V_{IN}=4V$ DC, 0.5V AC
$I_{OUT}=10mA$

X-axis: Frequency (kHz), Y-axis: Ripple Rejection (dB)

■$\overline{CE}$ Pin Current − $\overline{CE}$ Pin Voltage

$V_{IN}=8V$

X-axis: CE Pin Voltage (V), Y-axis: CE Pin Current (μA)
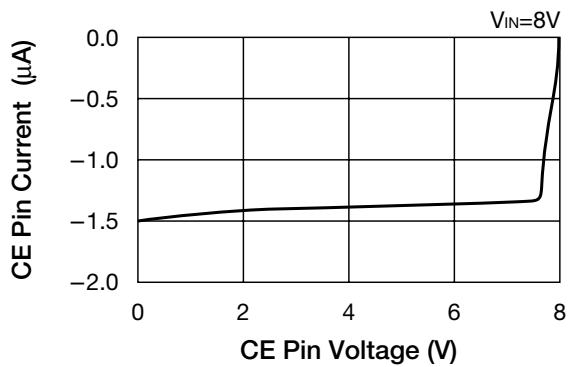
■ Output Voltage − Temperature

Output Voltage (V) vs Temperature (°C)

I_OUT=10mA
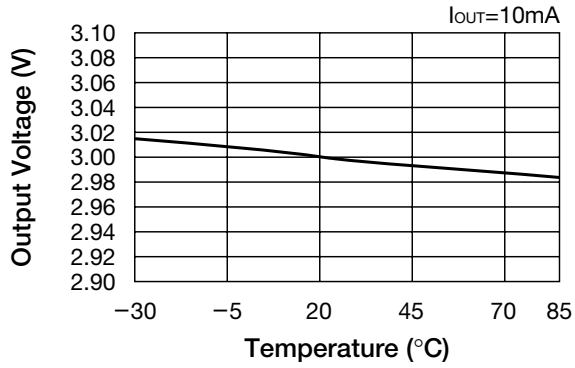
■ Input Current − Temperature

Input Current (μA) vs Temperature (°C)

■ Allowable Loss

Allowable Loss (mW) vs Temperature (°C)

- - - - - Alone

——— On Board (Glass Epoxy Resin)
11.9 × 17.9mm   t=0.7mm