

# 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. ( $I_o=60\text{mA}$ )             |
| 2. Current consumption                        | 2.5μA typ. ( $V_{IN}=V_{OUT}+1\text{V}$ )   |
| 3. Output current (MM3045L ~ MM3045R)         | 100mA min. ( $V_{IN}-V_{OUT}=1.0\text{V}$ ) |
| 4. Output voltage rank                        | 2.0~5.5V (0.1V step)                        |
| 5. Output ON/OFF control function             | High: OFF, Low: ON                          |

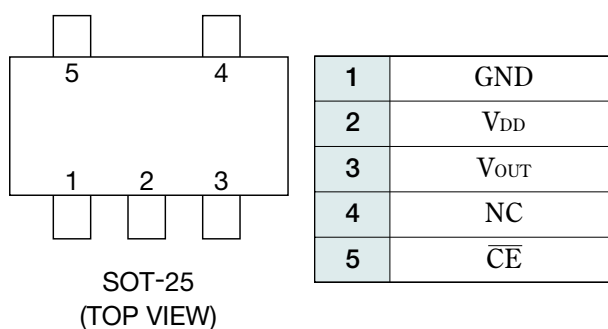
## Package

SOT-25 (Mini mold)

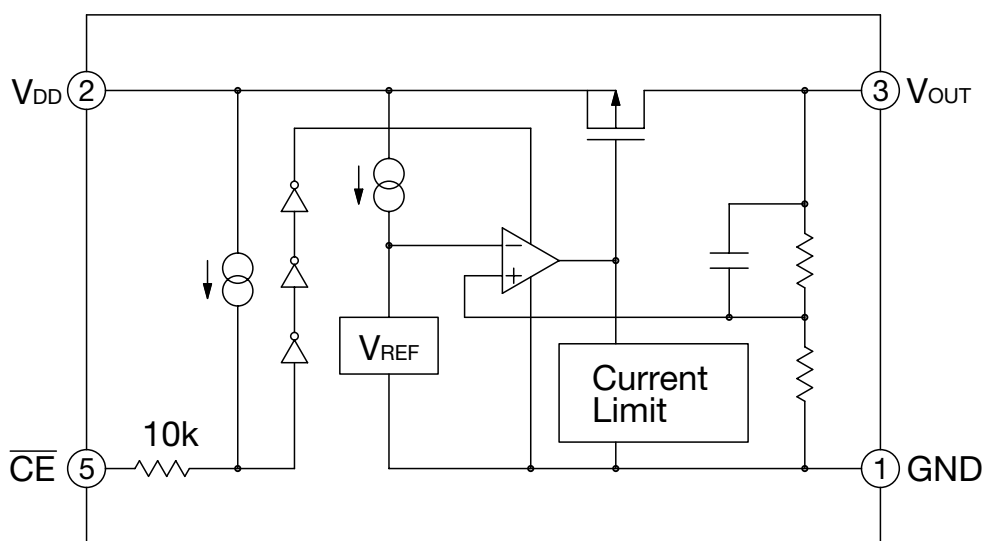
## Applications

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

## Pin Assignment



## Equivalent Circuit Diagram



## Pin Description

Pin No.	Pin name	Function						
1	GND	GND pin						
2	V <sub>DD</sub>	Voltage-Supply pin						
3	V <sub>OUT</sub>	Regulator output pin						
4	NC	No connection pin						
5	$\overline{\text{CE}}$	ON/OFF-Control pin						
		<table><tr><td><math>\overline{\text{CE}}</math></td><td>Output</td></tr><tr><td>L</td><td>ON</td></tr><tr><td>H</td><td>OFF</td></tr></table>	$\overline{\text{CE}}$	Output	L	ON	H	OFF
		$\overline{\text{CE}}$	Output					
		L	ON					
		H	OFF					
Connect $\overline{\text{CE}}$ 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 <sub>STG</sub>	-40~+125	°C
Operating temperature	T <sub>OPR</sub>	-30~+85	°C
Supply voltage	V <sub>DD</sub>	-0.3~+9	V
Output current	I <sub>OUT</sub>	150	mA
Allowable loss	P <sub>d</sub>	150 (Alone)	mW

## Recommended Operating Conditions (Except where noted therwise, Ta=25°C)

Item	Symbol	Ratings	Units
Operating temperature	T <sub>OP</sub>	-30~+85	°C
Supply voltage	V <sub>OP</sub>	V <sub>OUT</sub> +0.3~8	V

## Electrical Characteristics (Except where noted otherwise, $T_a=25^{\circ}\text{C}$ , $V_{CE}=\text{GND}$ )

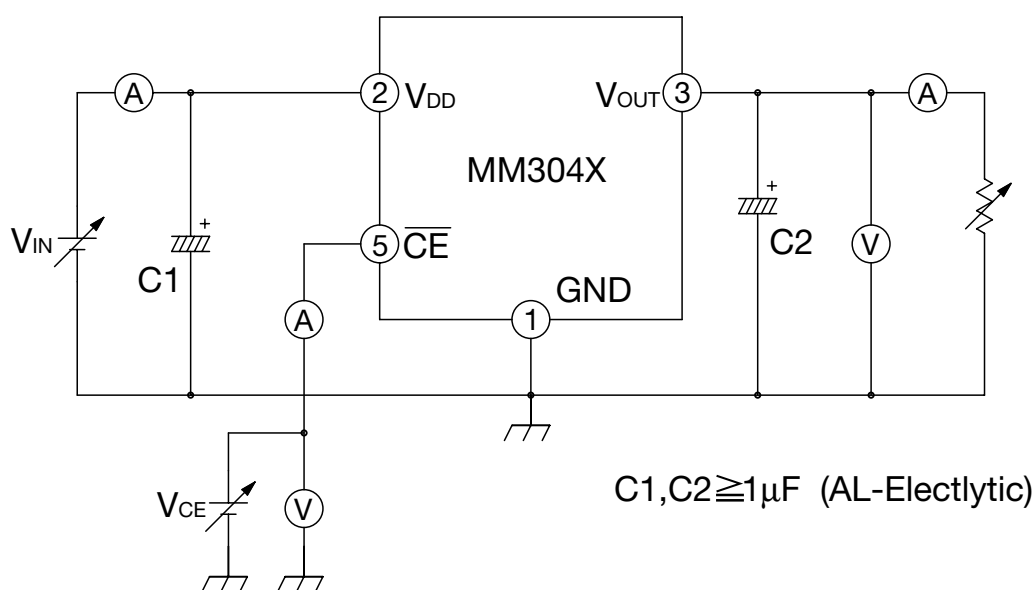
Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Supply current	$I_{SS}$	$V_{IN}=V_{OUT}+1.0\text{V}$ , Excluding CE pin current ( $I_{CE}$ )		2.5	5.0	$\mu\text{A}$
Supply current (OFF)	$I_{standby}$	$V_{IN}=V_{OUT}+1.0\text{V}$ , $V_{CE}=V_{IN}$		0.1	1.0	$\mu\text{A}$
Line regulation	$\Delta V_{OUT}/\Delta V_{IN}$	$I_{OUT}=30\text{mA}$ , $V_{OUT}+0.5\text{V} \leq V_{IN} \leq 8\text{V}$	0	0.15	0.30	%/V
Input voltage	$V_{IN}$				8.0	V
Vo temperature coefficient	$\Delta V_{OUT}/\Delta T_{opt}$	$I_{OUT}=10\text{mA}$ $-30^{\circ}\text{C} \leq T_{OPT} \leq 85^{\circ}\text{C}$		$\pm 100$		ppm/ $^{\circ}\text{C}$
Output short-circuit current	$I_{lim}$	$V_{IN}=V_{OUT}+1.0\text{V}$ , $V_{OUT}=0\text{V}$		60		mA
High threshold voltage	$V_{CEH}$		1.5			V
Low threshold voltage	$V_{CEL}$				0.25	V
CE pin current "H"	$I_{CEH}$	$V_{CE}=V_{IN}$		0	0.1	$\mu\text{A}$
CE pin current "L"	$I_{CEL}$	$V_{CE}=\text{GND}$	-4.0	-2.0	-1.0	$\mu\text{A}$

Note)  $V_{OUT}$  is the output voltage typ. value in the specifications.  
 Make sure that output current does not exceed loss tolerance.

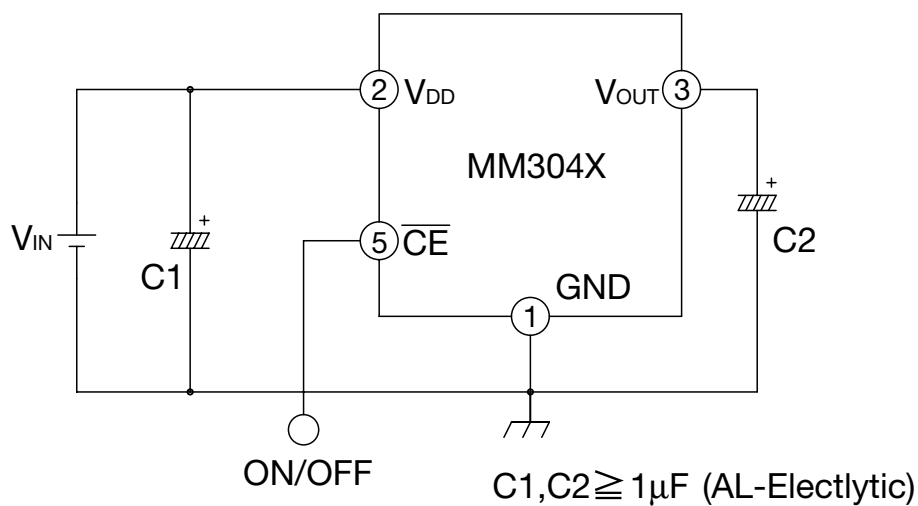
## Electrical Characteristics 2 (Except where noted therwise, Ta=25°C, V<sub>CE</sub>=GND)

Product name	Item												
	Output voltage				Output current			Load regulation			Input-Output differential voltage		
	V <sub>OUT</sub> (V)				I <sub>OUT</sub> (mA)			ΔV <sub>OUT</sub> /ΔI <sub>OUT</sub> (mV)			V <sub>DIF</sub> (V)		
	Test condions	Min.	Typ.	Max.	Test condions	Min.	Typ.	Test condions	Typ.	Max.	Test condions	Typ.	Max.
MM3042L	V <sub>IN</sub> -V <sub>OUT</sub> =1.0V  I <sub>OUT</sub> =10mA	1.960	2.000	2.040	V <sub>IN</sub> -V <sub>OUT</sub> =1.0V	25	40	V <sub>IN</sub> -V <sub>OUT</sub> =1.0V  1mA ≤ I <sub>OUT</sub> ≤ 40mA			V <sub>IN</sub> =V <sub>OUT</sub> -0.2V  I <sub>OUT</sub> =40mA		
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									
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									
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									
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



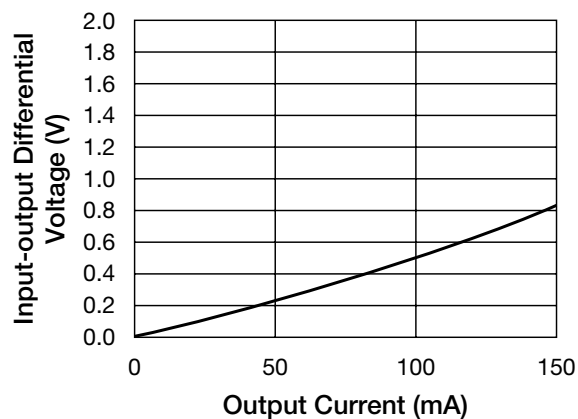
## Typical Application Circuit



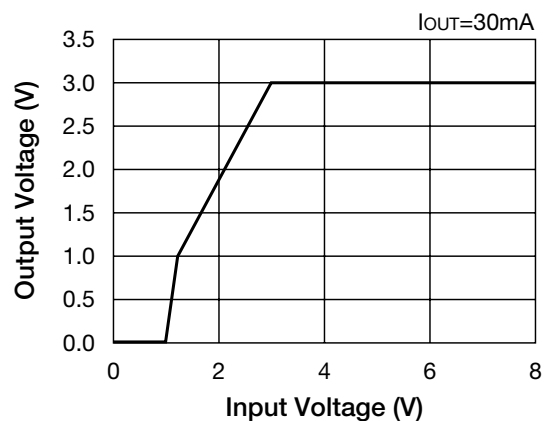
note) This regulator is not internally compensated and thus requires an external output-capacitor(C<sub>OUT</sub>) for stability.

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

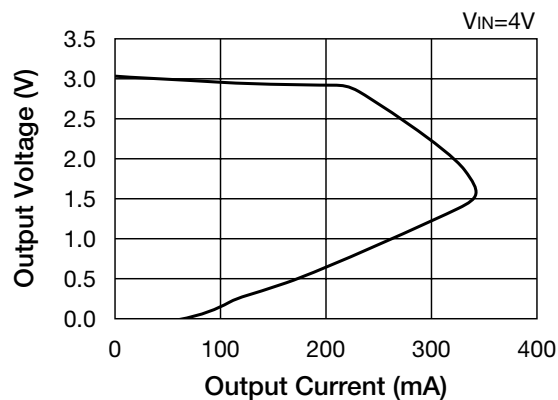
## Input-Output Differential Voltage



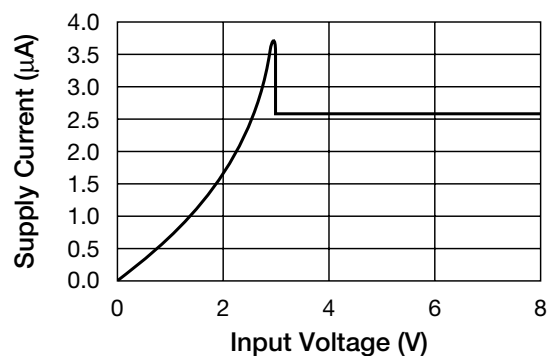
## Line Regulation



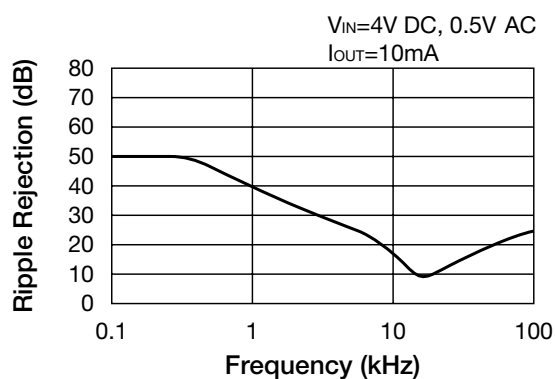
## Load Regulation



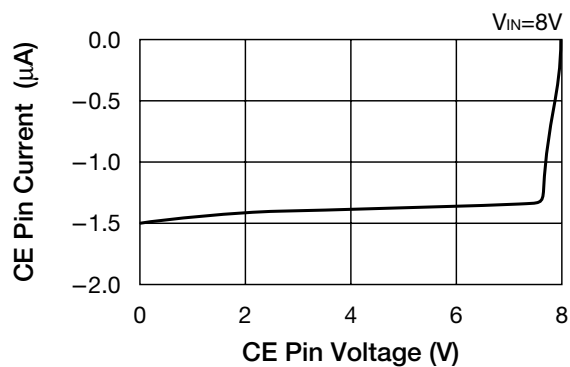
## Supply Current



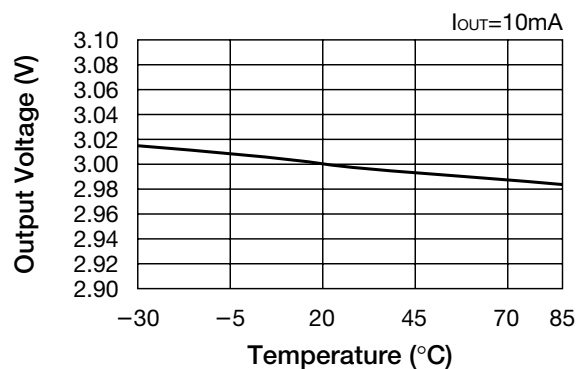
## Ripple Rejection



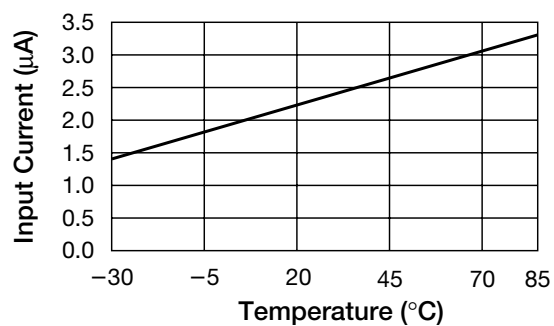
## CE Pin Current VS CE Pin Voltage



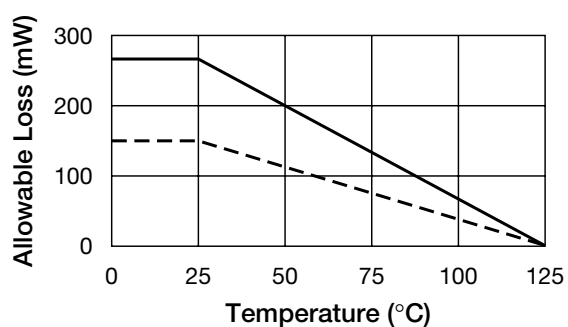
### Output Voltage VS Temperature



### Input Current VS Temperature



### Allowable Loss



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