

Microminiature Low-Power Consumption Low-Saturation Regulator Monolithic IC MM1385

Outline

This IC is a microminiature stabilized power supply device featuring an output voltage precision of within $\pm 2\%$ and output currents of up to 200mA; the input/output voltage difference at 50mA is only 0.1V. This chip is provided with an output noise reduction pin and output on/off control pin, and is ideal for use in portable equipment.

Features

- | | |
|---------------------------|--|
| 1. No-load input current | 95 μ A typ. |
| 2. I/O voltage difference | 0.1V typ.(I _o =50mA) |
| 3. Ripple rejection ratio | 70dB typ. |
| 4. Output current | 150mA max. |
| 5. Output noise voltage | 35 μ Vrms typ. |
| 6. Output voltage rank | 2~3.3V(0.1V step), 3.5V/3.8V/4V/4.2V/4.5V/4.8V/5V/5.2V |
| 7. Output on/off control | High→ON, Low→OFF |

Package

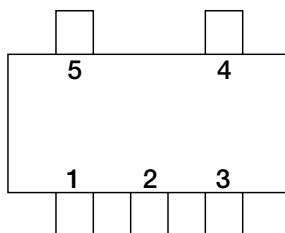
SOT-25A (MM1385□N)

*The output voltage rank appears in the boxes.

Applications

1. Cordless phones
2. Portable phones, PHS
3. Portable minidiscs
4. Other portable equipment which uses batteries

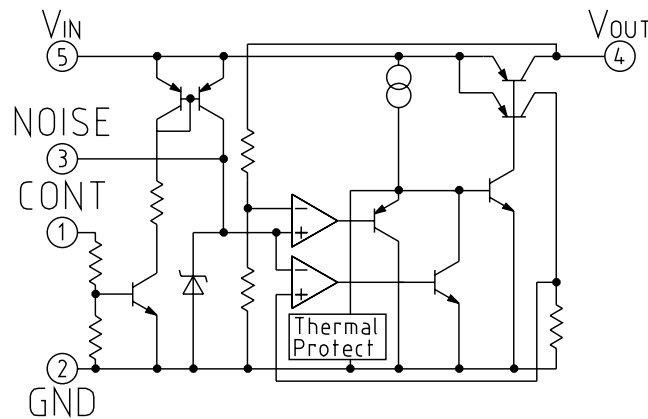
Pin Assignment



SOT-25A
(TOP VIEW)

1	CONT
2	GND
3	NOISE
4	V _{OUT}
5	V _{IN}

Block Diagram



Absolute Maximum Ratings

Item	Symbol	Ratings	Units
Storage temperature	T _{STG}	-40~+125	°C
Operating temperature	T _{OPR}	-20~+75	°C
Power supply current	V _{CC}	-0.3~+12	V
Output current	I _{OUT}	200	mA
Power consumption	P _d	150	mW

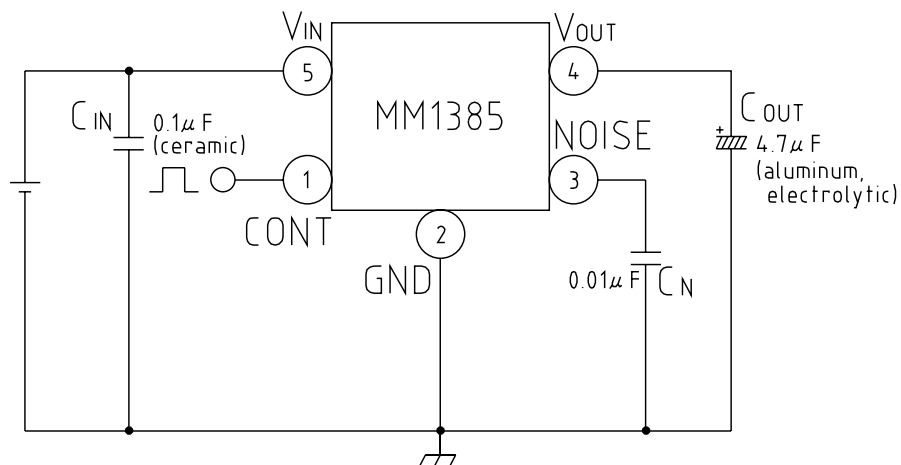
Recommended Operating Conditions

Item	Symbol	Ratings	Units
Operating temperature	T _{OP}	-20~+75	°C
Output current	I _{OP}	0~150	mA
Operating voltage	V _{OP}	1.8~12	V

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

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Output voltage	V_o	$V_{IN}=V_o+1\text{V}$, $I_o=30\text{mA}$,	$V_{OUT}^{-2\%}$	V_{OUT}	$V_{OUT}^{+2\%}$	V
No-load consumption current	I_{ccq1}	$V_{IN}=V_o+1\text{V}$, $I_o=0\text{mA}$		95	190	μA
Input current while off	I_{ccq2}	$V_{IN}=V_o+1\text{V}$, $V_{CONT}=0\text{V}$			0.1	μA
I/O voltage difference	V_d min.	$V_{IN}=V_o-0.2\text{V}$, $I_o=50\text{mA}$		0.1	0.2	V
Input fluctuations	ΔV_1	$V_{IN}=V_o+1\text{V}\sim 10\text{V}$, $I_o=50\text{mA}$		10	20	mV
Load fluctuation	ΔV_2	$V_{IN}=V_o+1\text{V}$, $I_o=0\sim 100\text{mA}$		30	60	mV
Output voltage temperature coefficient	$\Delta V_o/\Delta T$	$T_j=-20\sim +75^\circ\text{C}$, $V_{IN}=V_o+1\text{V}$, $I_o=30\text{mA}$		100		ppm/ $^\circ\text{C}$
Ripple rejection rate	RR	$V_{IN}=V_o+1\text{V}$, $I_o=30\text{mA}$, $V_{RIPPLE}=1V_{P-P}$, $f=120\text{Hz}$	50	70		dB
Output noise voltage	V_n	$V_{IN}=V_o+1\text{V}$, $f=20\sim 80\text{kHz}$, $I_o=30\text{mA}$, $C_n=0.01\mu\text{F}$		$\overset{35}{(3V\text{ item})}$		μV_{rms}
CONT pin current while on	I_{ON}	$V_{CONT}=1.6\text{V}$		5	10	μA
CONT pin high level	H		1.6		$V_{IN}^{+0.3\text{V}}$	V
CONT pin low level	L		-0.3		0.4	V

Measuring Circuit

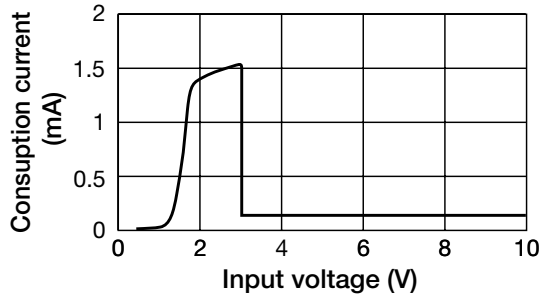


Output Voltage Rank

Rank	Voltage	Rank	Voltage
W	5.2V	G	3.1V
A	5.0V	H	3.0V
Q	4.9V	J	2.9V
Z	4.8V	K	2.8V
X	4.6V	L	2.7V
B	4.5V	M	2.6V
V	4.2V	N	2.5V
C	4.0V	P	2.4V
Y	3.8V	R	2.3V
I	3.6V	S	2.2V
D	3.5V	T	2.1V
E	3.3V	U	2.0V
F	3.2V		

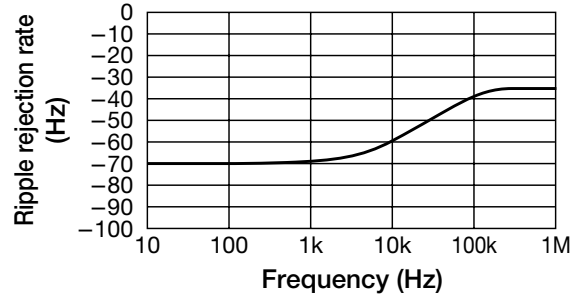
Characteristics (Represent data. H rank)

No-load input current

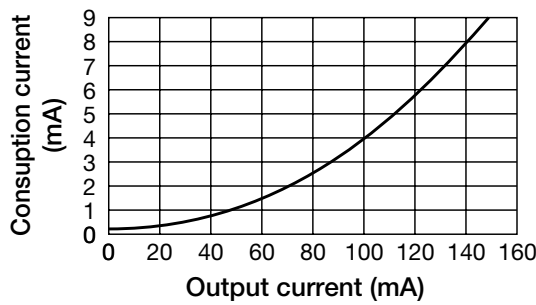


Ripple rejection rate

($V_{IN}=4V, I_o=30mA, V_{ripple}=1V, C_{OUT}=4.7\mu F$)

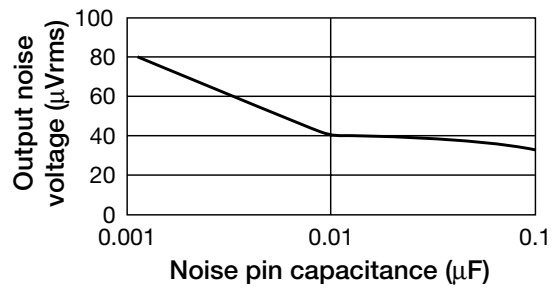


Consumption current ($V_{IN}=4V$)

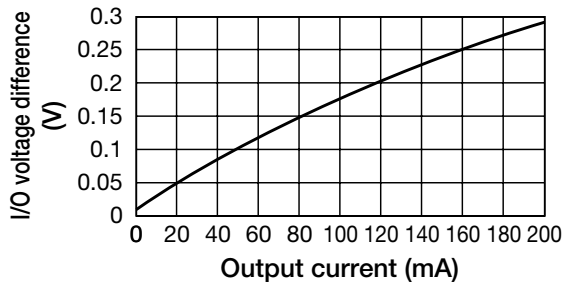


Output noise voltage

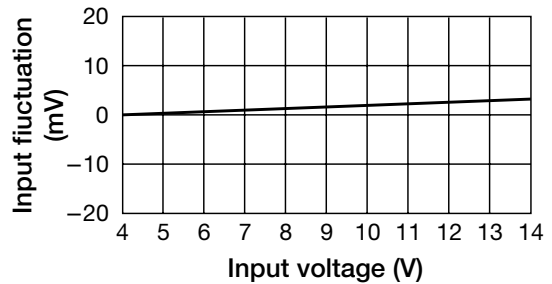
($V_{IN}=4V, I_o=30mA, C_{OUT}=4.7\mu F$)



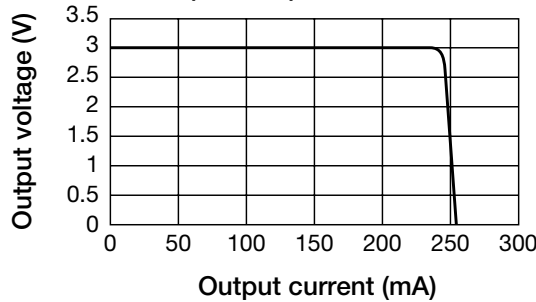
I/O voltage difference ($V_{IN}=2.8V$)



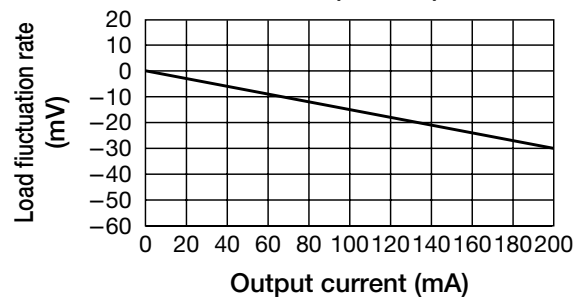
Input fluctuation ($I_o=30mA$)



Current limit ($V_{IN}=4V$)



Load fluctuation rate ($V_{IN}=4V$)



ESR Stable region

$V_{IN}=0\sim 12V, C_{OUT}=4.7\mu F$
(Ceramic, ESR=0.02Ω at 100kHz)

