

Microminiature Low-Noise, Low-Saturation Three-Pin Regulator Monolithic IC MM1320

Outline

This IC is a microminiature low-noise stabilized power supply device featuring a highly precise output voltage and a small input/output voltage difference of only 0.15V at an output current of 60mA.

The IC delivers output currents of up to rated 200mA, and through use of a noise pin output noise is diminished even further. An on/off pin can be used to turn the output on and off.

Features

- | | |
|---|---|
| 1. Input/output voltage difference | 0.15V typ. ($I_o=60\text{mA}$) |
| 2. Output noise voltage | $30\mu\text{Vrms}$ typ. ($C_n=0.01\mu\text{F}$) |
| 3. Recommended maximum output current | 150mA max. |
| 4. No-load input current | $170\mu\text{A}$ typ. |
| 5. With internal overcurrent protection and thermal shutdown circuits | |
| 6. Output voltage ranks | 2~3.3V (0.1 V steps)
3.5V, 4V, 4.5V, 5V |
| 7. Output on/off control function | High : ON, Low : OFF |

Package

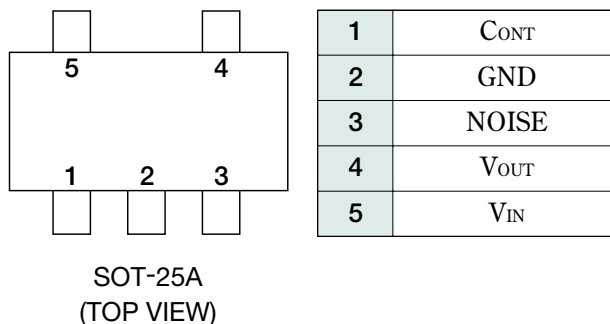
SOT-25A (MM1320□N)

*The output voltage rank appears in the boxes.

Applications

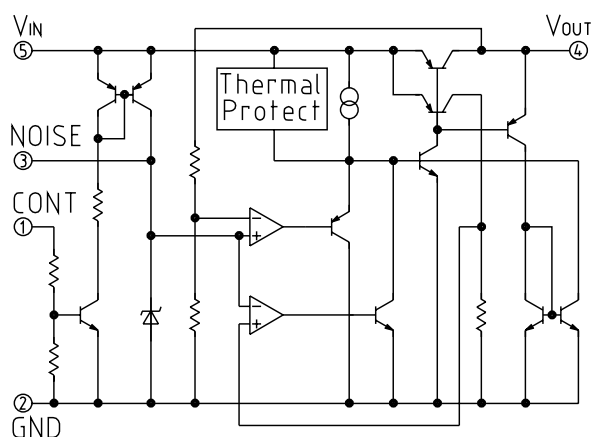
1. Cordless phones
2. Portable phones, PHS
3. Portable minidiscs
4. Other portable equipment which uses batteries

Pin Assignment



Equivalent Circuit Diagram

(MM1320)



Absolute Maximum Ratings

Item	Symbol	Ratings	Units
Storage temperature	T_{STG}	-40~+125	°C
Operating temperature	T_{OPR}	-20~+75	°C
Power supply voltage	V_{CC}	-0.3~+12	V
Output current	I_{OUT}	200	mA
Power consumption	P_d	150	mW

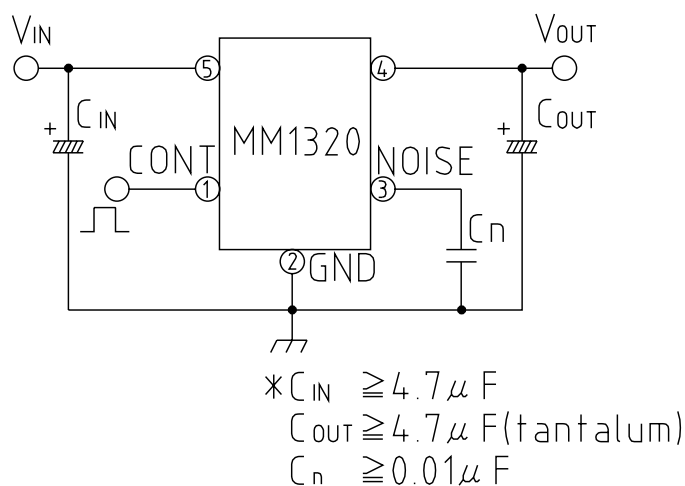
Recommended Operating Conditions

Item	Symbol	Ratings	Units
Operating temperature	T_{OPS}	-20~+75	°C
Output current	I_{OPS}	150	mA
Operating voltage	V_{OP}	1.8~10	V

Electrical Characteristics (Except where noted otherwise, Ta=25°C)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Output voltage	V_o	$V_{IN}=V_{OUT}+1V$, $I_o=30mA$	$V_{OUT}-2\%$	V_{OUT}	$V_{OUT}+2\%$	V
No-load consumption current	I_{ccq1}	$V_{IN}=V_{OUT}+1V$, $I_o=0mA$		170	340	μA
Input current while off	I_{ccq2}	$V_{IN}=V_{OUT}+1V$, $V_{cont}=0V$			1	μA
I/O voltage difference	V_d min.	$V_{IN}=V_{OUT}-0.2V$, $I_o=60mA$		0.15	0.25	V
Input fluctuations	ΔV_1	$V_{IN}=V_{OUT}+1V \sim 5V$, $I_o=30mA$		10	20	mV
Load fluctuation	ΔV_2	$I_o=0 \sim 100mA$, $V_{IN}=V_{OUT}+1V$		30	60	mV
Output voltage temperature coefficient	$\Delta V_o / \Delta T$	$T_j = -20 \sim +75^\circ C$, $I_o=30mA$ $V_{IN}=V_{OUT}+1V$		100		ppm/ $^\circ C$
Ripple rejection rate	RR	$V_{IN}=V_{OUT}+1V$, $f=120Hz$ $V_{RIPPLE}=1V$, $I_o=30mA$	50	60		dB
Output noise voltage	V_n	$V_{IN}=V_{OUT}+1V$, $f=20 \sim 80kHz$ $I_o=30mA$, $C_{noise}=0.01\mu F$		30 (3V item)		μV_{rms}
CONT pin current while off	I_{OFF}	$V_{cont}=0.4V$		1	3	μA
CONT pin current while on	I_{ON}	$V_{cont}=1.6V$		5	10	μA
CONT pin high level	H		1.6		$V_{IN}+0.3$	V
CONT pin low level	L		-0.3		0.4	V

Measuring Circuit



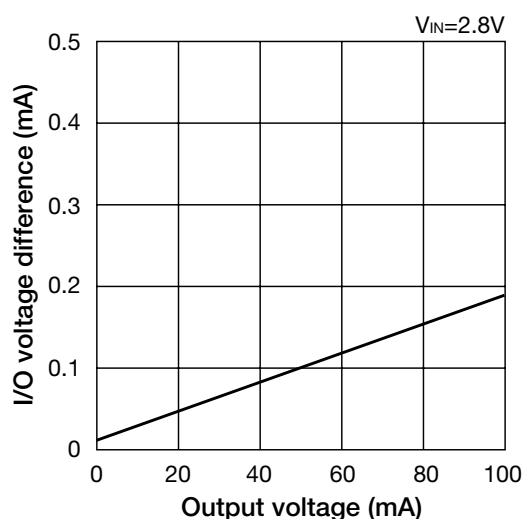
Note : The cause of oscillation is due to set wiring and capacitance changes in capacitor caused by temperatures changes, so please take extra care in placing the wires.

Output voltage rank

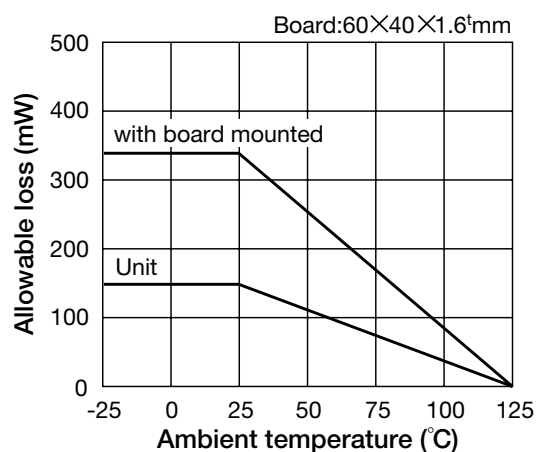
Rnak	Voltage	Rnak	Voltage
A	5.0V	K	2.8V
B	4.5V	L	2.7V
C	4.0V	M	2.6V
D	3.5V	N	2.5V
E	3.3V	P	2.4V
F	3.2V	R	2.3V
G	3.1V	S	2.2V
H	3.0V	T	2.1V
J	2.9V	U	2.0V

Characteristics (Represent model MM1320H)

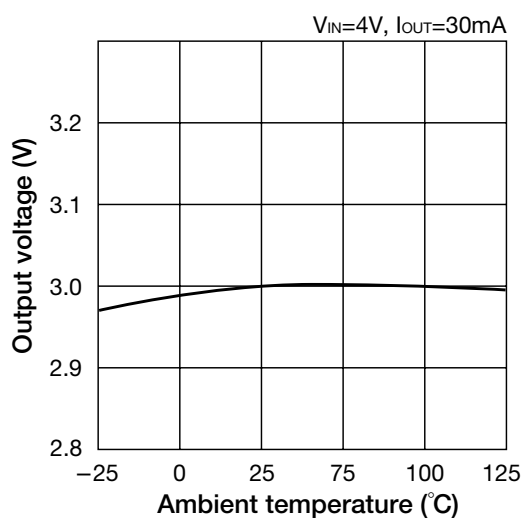
I/O voltage difference



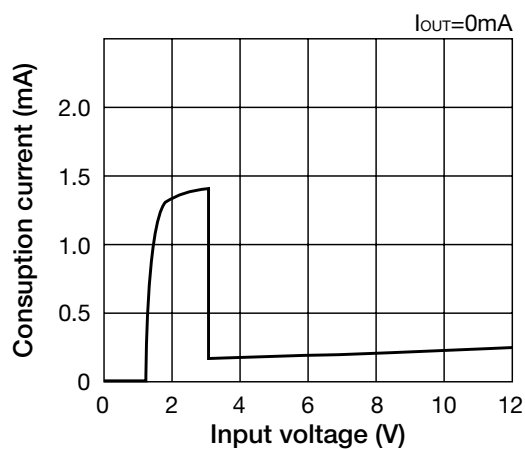
Allowable loss



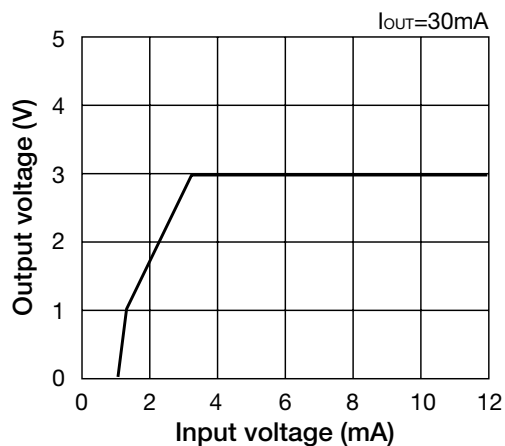
Output voltage temperature characteristic



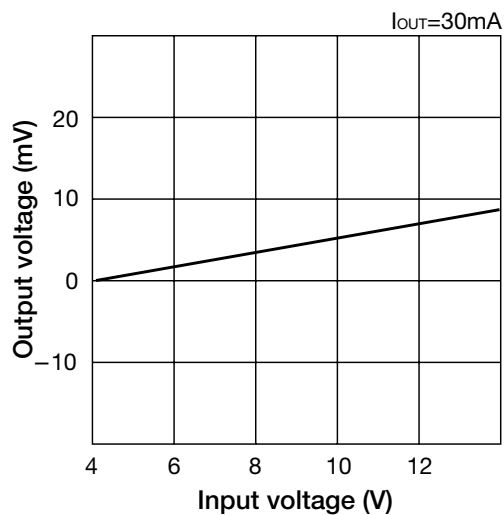
No-load consumption current



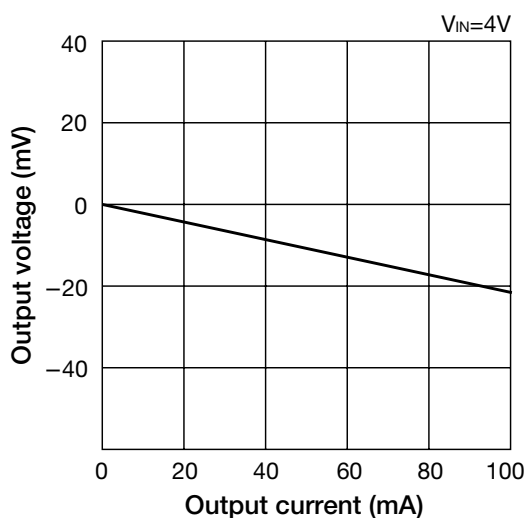
Output voltage



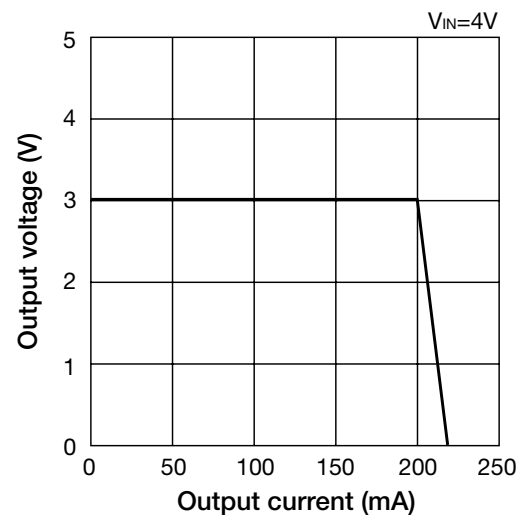
Input fluctuation



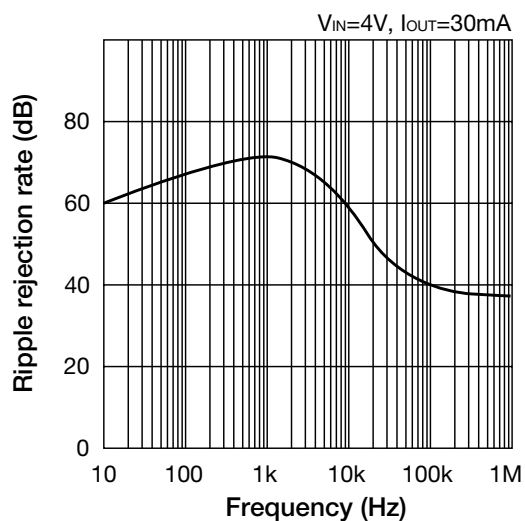
Load fluctuation



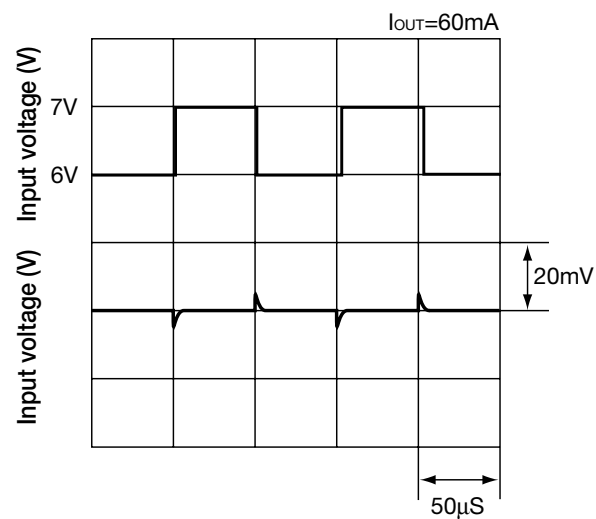
Current limit



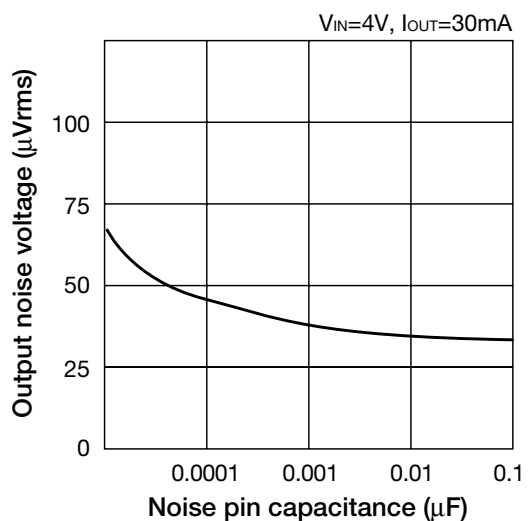
Ripple rejection rate



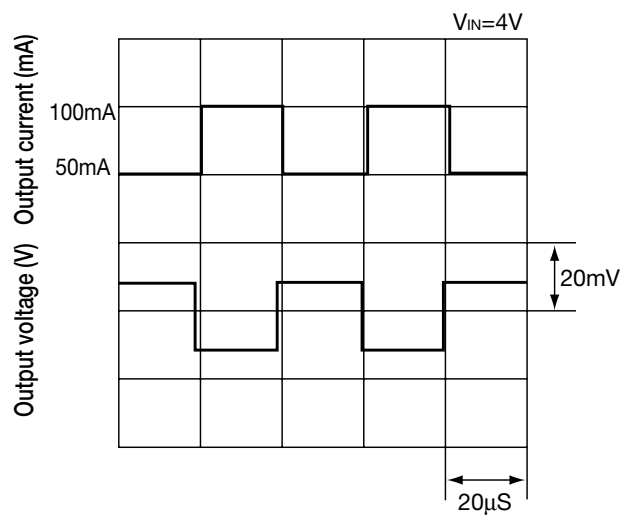
Input transient response



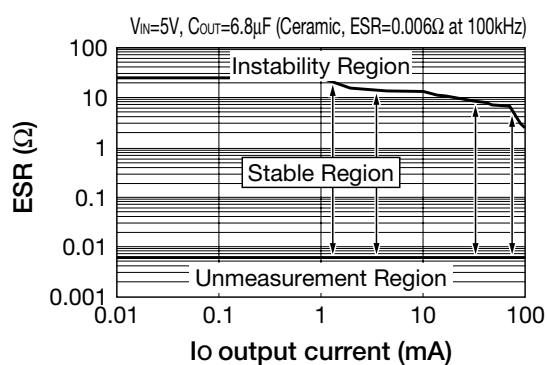
Output noise voltage



Input transient response



ESR Stable region (1320C)



Note: Reference data