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 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=60mA)
2. Output noise voltage	30μV_{RMS} typ. (Cn=0.01μF)
3. Maximum output current	150mA max.
4. No-load input current	170μA 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

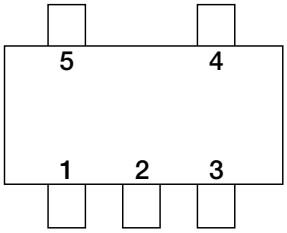
Package

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

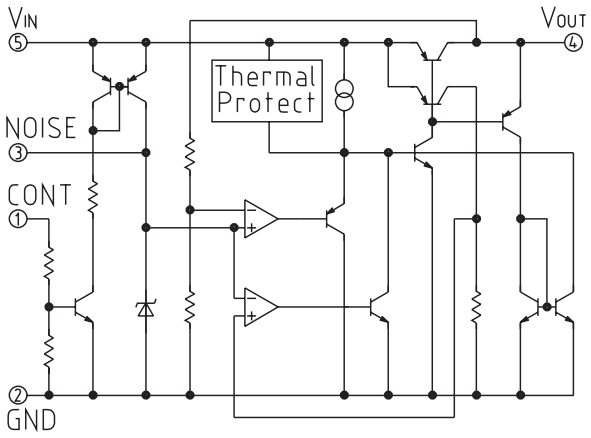


SOT-25A

1	CONT
2	GND
3	NOISE
4	VOUT
5	VIN

Equivalent Circuit Diagram

(MM1320)



Absolute Maximum Ratings

Item	Symbol	Ratings	Units
Storage temperature	TSTG	–40~+125	°C
Operating temperature	TOPR	–20~+75	°C
Power supply current	VCC	–0.3~+12	V
Output current	IOUT	200	mA
Power consumption	Pd	150	mW

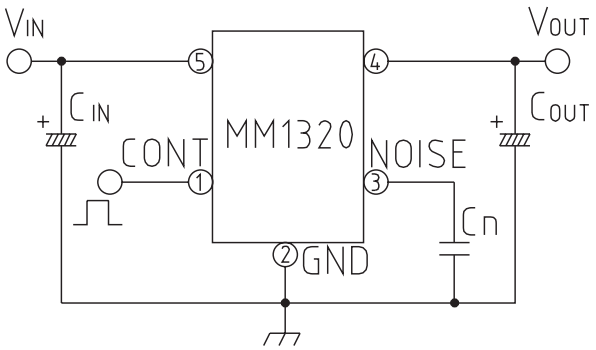
Recommended Operating Conditions

Item	Symbol	Ratings	Units
Operating temperature	TOPS	–20~+75	°C
Output current	IOPS	150	mA
Operating voltage	VOP	1.8~10	V

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

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Output voltage	Vo	V_{IN}=V_{OUT}+1V, Io=30mA	V_{OUT}-2%	V_{OUT}	V_{OUT}+2%	V
No-load consumption current	Iccq1	V_{IN}=V_{OUT}+1V, Io=0mA		170	340	µA
Input current while off	Iccq2	V_{IN}=V_{OUT}+1V, Vcont=0V			1	µA
I/O voltage difference	Vd min.	V_{IN}=V_{OUT}–0.2V, Io=60mA		0.15	0.25	V
Input fluctuations	⊿V1	V_{IN}=V_{OUT}+1V~5V, Io=30mA		10	20	mV
Load fluctuation	⊿V2	Io=0~100mA, V_{IN}=V_{OUT}+1V		30	60	mV
Output voltage temperature coefficient	⊿Vo/⊿T	Tj=–20~+75°C, Io=30mA V_{IN}=V_{OUT}+1V		100		ppm/°C
Ripple rejection rate	RR	V_{IN}=V_{OUT}+1V, f=120Hz V_{RIPPLE}=1V, Io=30mA	50	60		dB
Output noise voltage	Vn	V_{IN}=V_{OUT}+1V, f=20~80kHz Io=30mA, Cnoise=0.01uF		30 (3V item)		µVrms
C_{ONT} pin current while off	I_{OFF}	Vcont=0.4V		1	3	µA
C_{ONT} pin current while on	I_{ON}	Vcont=1.6V		5	10	µA
C_{ONT} pin high level	H		1.6		V_{IN}+0.3	V
C_{ONT} pin low level	L		–0.3		0.4	V

Measuring Circuit



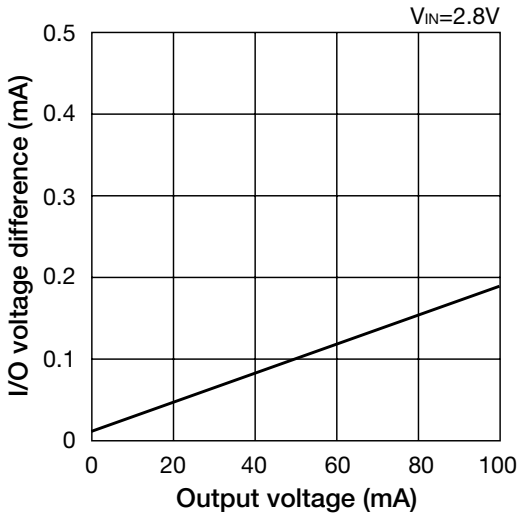
＊C_{IN} ≧4.7µF
C_{OUT} ≧4.7µF(tantalum)
C_n ≧0.01µF

Output voltage rank

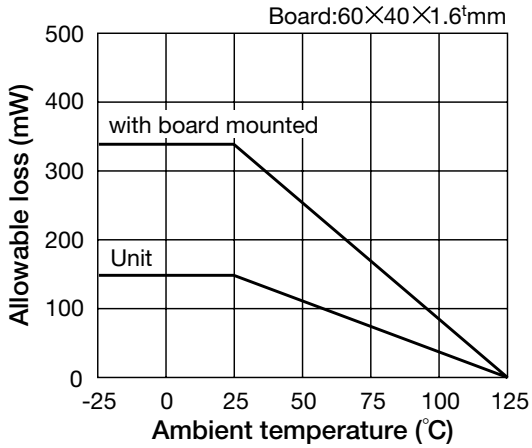
Rnak	Voltage	Rnak	Voltage
A	5.0V	K	2.8V
B	4.5V	L	2.7V
C	4.0V	M	2.6V
D	3.5V	N	2.5V
E	3.3V	P	2.4V
F	3.2V	R	2.3V
G	3.1V	S	2.2V
H	3.0V	T	2.1V
J	2.9V	U	2.0V

Characteristics (MM1320)

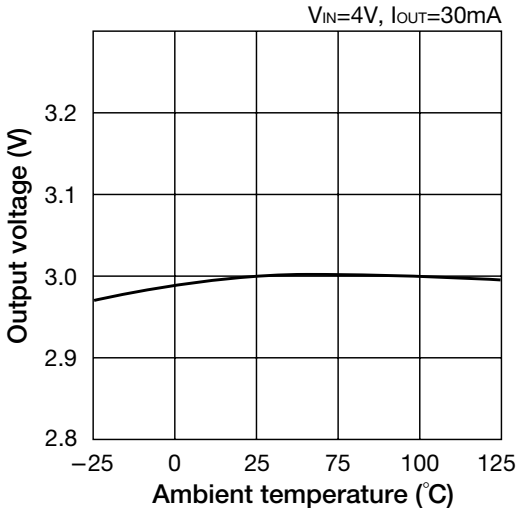
I/O voltage difference



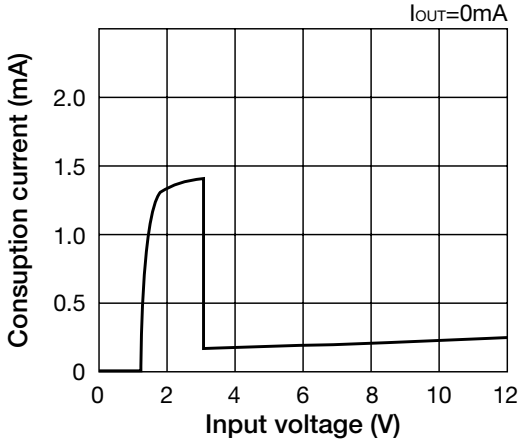
Allowable loss



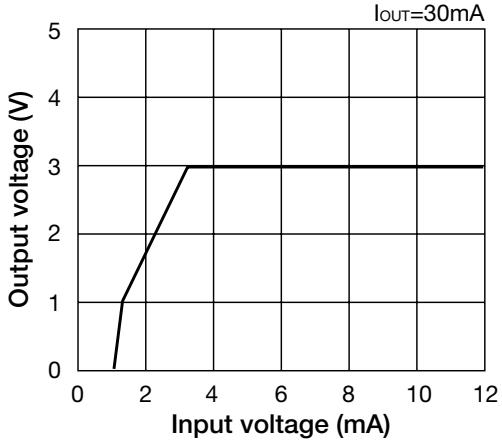
Output voltage temperature characteristic



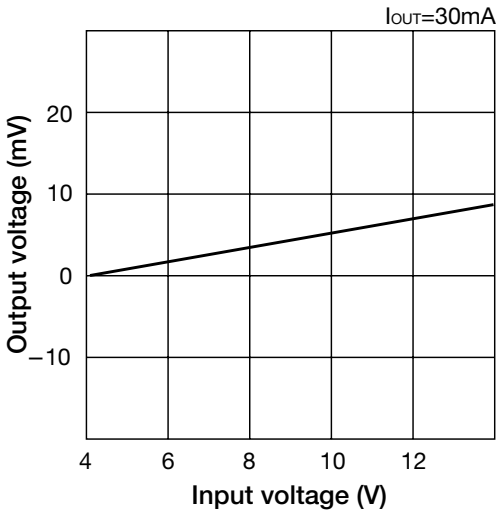
No-load consumption current



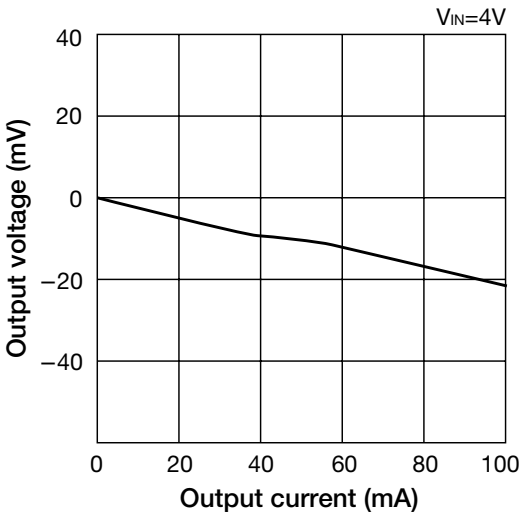
Output voltage



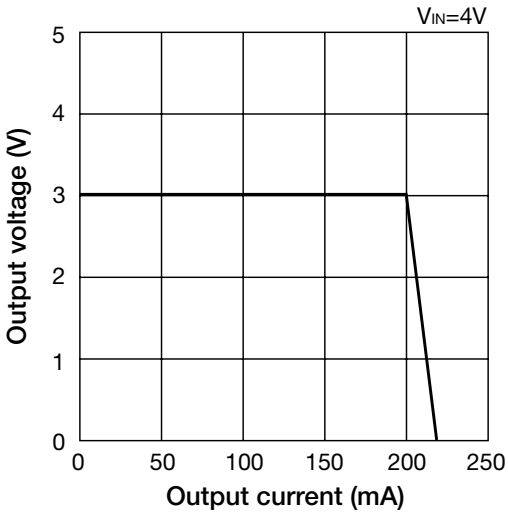
Input fluctuction



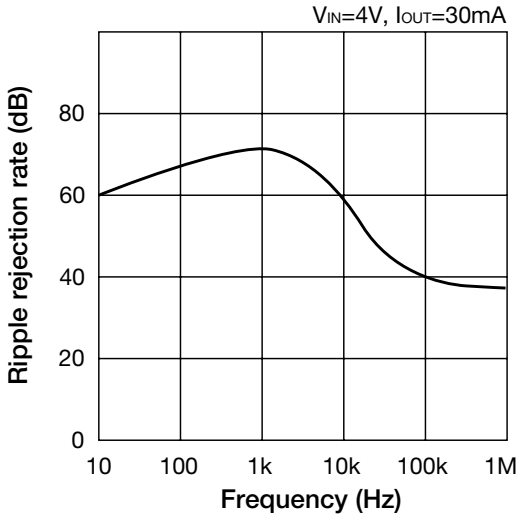
Load fluctuation



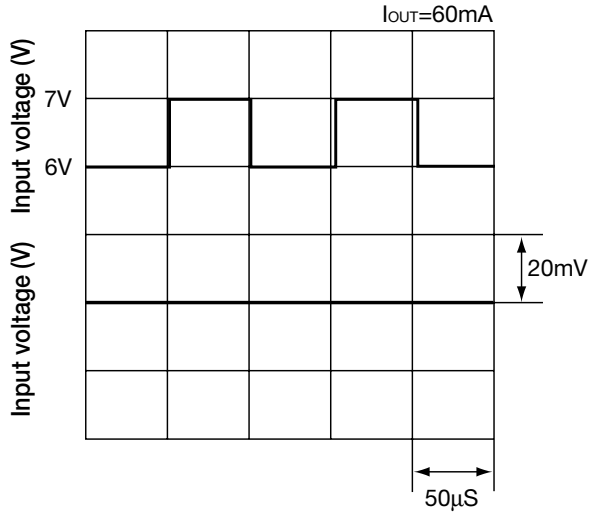
Current limit



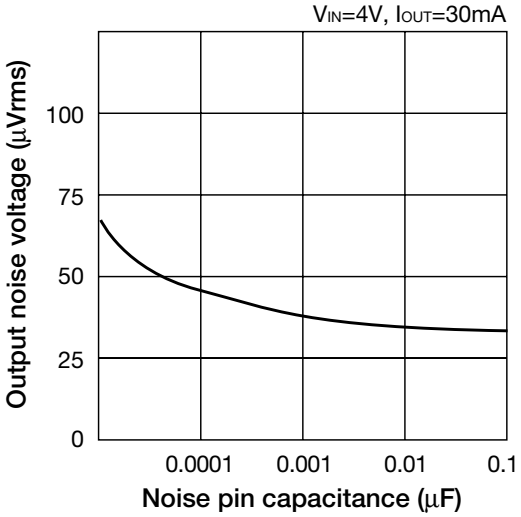
Ripple rejection rate



Input transient response



Output noise voltage



Input transient response