

ELM98xxxB CMOS Voltage regulator

■ General description

ELM98xxxB is CMOS voltage regulator which mainly consists of reference voltage source, error amplifier, short-protected control transistor, output voltage setting resistors. The standard output voltage are 2.7V, 3.0V, 3.3V, 5.0V; this output voltage is fixed internally with high accuracy. ELM98 series can also be made as semi-custom IC within the range of 1.2V~6.0V by 0.1V step.

■ Features

- Output voltage range : 1.2V~6.0V (by 0.1V)
- Low current consumption : Typ. 4.0 μ A (ELM9830xB)
- Input stability : Typ. 0.1%/V ($I_{out}=50mA$)
- Load stability : Typ. 10mV ($1mA \leq I_{out} \leq 50mA$)
- Accuracy of output voltage : $\pm 2.0\%$
- Output voltage temperature coefficient : $\pm 100ppm/^{\circ}C$
- Package : SOT-89
SOT-23

■ Application

- Battery operated devices
- Digital cameras
- Video recorders
- Reference voltage source

■ Maximum absolute ratings

Parameter	Symbol	Limit	Unit
Input voltage	Vin	12	V
Output voltage	Vout	V _{SS} -0.3~Vin+0.3	V
Output current	Iout	200	mA
Power dissipation	Pd	300 (SOT-89) 200 (SOT-23)	mW
Operating temperature	Top	-40~+85	$^{\circ}C$
Storage temperature	Tstg	-55~+125	$^{\circ}C$

* Output current must not exceed power dissipation specified in maximum absolute ratings.

■ Selection guide

ELM98xxxB-x

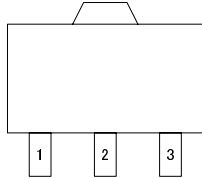
Symbol		
a,b	Output voltage	e.g. : 27: Vout=2.7V 30: Vout=3.0V 33: Vout=3.3V 50: Vout=5.0V
c	Package	A : SOT-89 B : SOT-23
d	Package	B
e	Taping direction	S : Refer to PKG file N : Refer to PKG file

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ELM98xxxB CMOS Voltage regulator

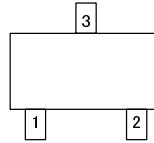
Pin configuration

SOT-89 (TOP VIEW)



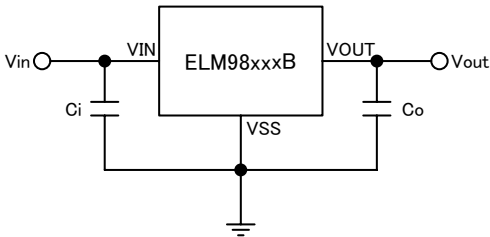
Pin No.	Pin name
1	VSS
2	VIN
3	VOUT

SOT-23 (TOP VIEW)

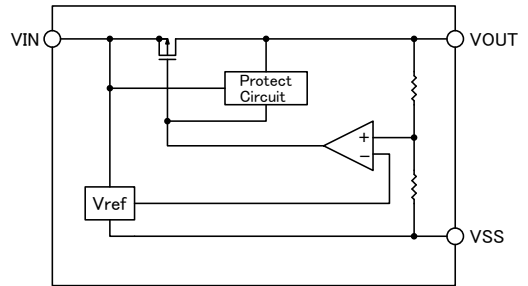


Pin No.	Pin name
1	VSS
2	VOUT
3	VIN

Standard circuit



Block diagram



Electrical characteristics

Vout=2.7V (ELM9827xB)

Top=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Output voltage	Vout	Vin=4.7V, Iout=1mA	2.646	2.700	2.754	V
Output current	Iout	Vin=3.3V	40			mA
Input stability	$\Delta V_{out} / \Delta V_{in}$	Iout=50mA, 3.7V ≤ Vin ≤ 6.7V		0.100	0.275	%/V
Load stability	$\Delta V_{out} / \Delta I_{out}$	1mA ≤ Iout ≤ 50mA, Vin=4.7V		10	20	mV
Input/output voltage differential	Vdif	Iout=10mA		115	150	mV
Current consumption	Iss	Vin=4.7V, No-load	0.4	4.0	7.0	μA
Input voltage	Vin				10	V
Output voltage temperature coefficient	$\Delta V_{out} / \Delta T_{op}$	-40°C ≤ Top ≤ +85°C, Vin=4.7V, Iout=1mA		±100		ppm/°C

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Vout=3.0V (ELM9830xB)

Top=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Output voltage	Vout	Vin=5.0V, Iout=1mA	2.940	3.000	3.060	V
Output current	Iout	Vin=3.6V	50			mA
Input stability	$\Delta V_{out} / \Delta V_{in}$	Iout=50mA, 4.0V ≤ Vin ≤ 7.0V		0.100	0.275	%/V
Load stability	$\Delta V_{out} / \Delta I_{out}$	1mA ≤ Iout ≤ 50mA, Vin=5.0V		10	20	mV
Input/output voltage differential	Vdif	Iout=10mA		105	145	mV
Current consumption	Iss	Vin=5.0V, No-load	1.0	4.0	7.0	μA
Input voltage	Vin				10	V
Output voltage temperature coefficient	$\Delta V_{out} / \Delta T_{op}$	-40°C ≤ Top ≤ +85°C, Vin=5.0V, Iout=1mA		±100		ppm/°C

Vout=3.3V (ELM9833xB)

Top=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Output voltage	Vout	Vin=5.3V, Iout=1mA	3.234	3.300	3.366	V
Output current	Iout	Vin=3.9V	55			mA
Input stability	$\Delta V_{out} / \Delta V_{in}$	Iout=50mA, 4.3V ≤ Vin ≤ 7.3V		0.100	0.275	%/V
Load stability	$\Delta V_{out} / \Delta I_{out}$	1mA ≤ Iout ≤ 50mA, Vin=5.3V		10	20	mV
Input/output voltage differential	Vdif	Iout=10mA		105	145	mV
Current consumption	Iss	Vin=5.3V, No-load	1.0	4.5	8.0	μA
Input voltage	Vin				10	V
Output voltage temperature coefficient	$\Delta V_{out} / \Delta T_{op}$	-40°C ≤ Top ≤ +85°C, Vin=5.3V, Iout=1mA		±100		ppm/°C

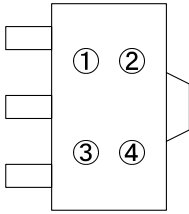
Vout=5.0V (ELM9850xB)

Top=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Output voltage	Vout	Vin=7.0V, Iout=1mA	4.900	5.000	5.100	V
Output current	Iout	Vin=5.6V	70			mA
Input stability	$\Delta V_{out} / \Delta V_{in}$	Iout=50mA, 6.0V ≤ Vin ≤ 9.0V		0.100	0.275	%/V
Load stability	$\Delta V_{out} / \Delta I_{out}$	1mA ≤ Iout ≤ 50mA, Vin=7.0V		10	20	mV
Input/output voltage differential	Vdif	Iout=10mA		72	110	mV
Current consumption	Iss	Vin=7.0V, No-load	1.0	5.0	9.0	μA
Input voltage	Vin				10	V
Output voltage temperature coefficient	$\Delta V_{out} / \Delta T_{op}$	-40°C ≤ Top ≤ +85°C, Vin=7.0V, Iout=1mA		±100		ppm/°C

■ Marking

SOT-89



• SOT-89 package

No. ① : the decimal digit of the output voltage

Mark	Vout	Mark	Vout
0	*.0V	5	*.5V
1	*.1V	6	*.6V
2	*.2V	7	*.7V
3	*.3V	8	*.8V
4	*.4V	9	*.9V

No. ② : the integer digit of the output voltage

Mark	Vout	Mark	Vout
A	2.*V	D	5.*V
B	3.*V	E	6.*V
C	4.*V	F	1.*V

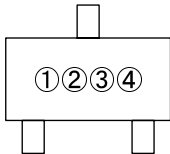
No. ③ : Assembly lot No.

A~Z (I, O, X excepted)

No. ④ : Assembly lot No.

0~9

SOT-23



• SOT-23 package

No. ① : the integer digit of the output voltage

Mark	Vout	Mark	Vout
2	2.*V	5	5.*V
3	3.*V	6	6.*V
4	4.*V	1	1.*V

No. ② : the decimal digit of the output voltage

Mark	Vout	Mark	Vout
0	*.0V	5	*.5V
1	*.1V	6	*.6V
2	*.2V	7	*.7V
3	*.3V	8	*.8V
4	*.4V	9	*.9V

No. ③ : Assembly lot No.

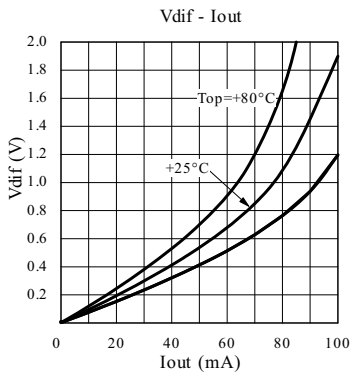
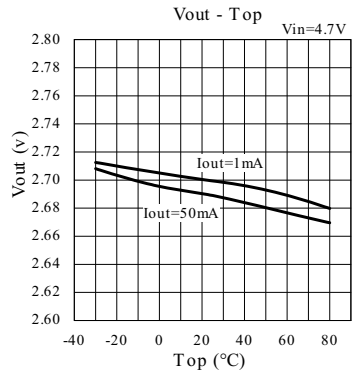
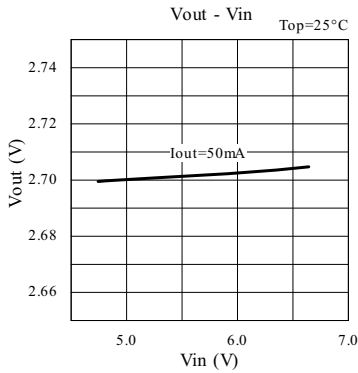
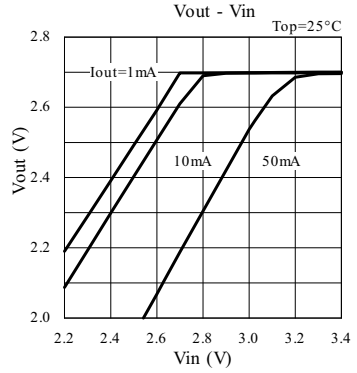
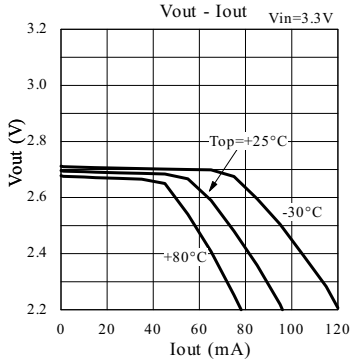
A~Z (I, O, X excepted)

No. ④ : Assembly lot No.

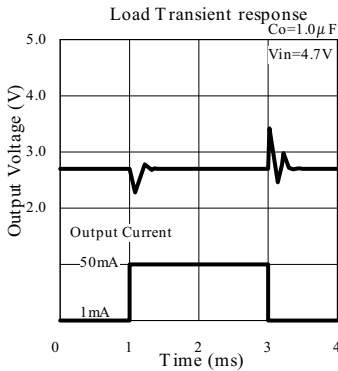
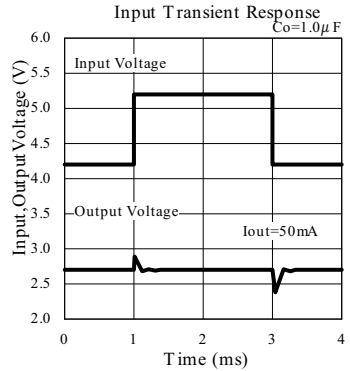
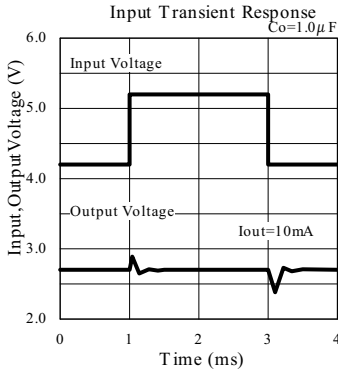
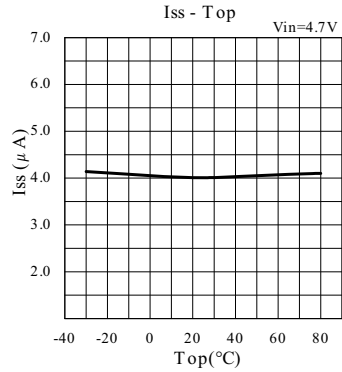
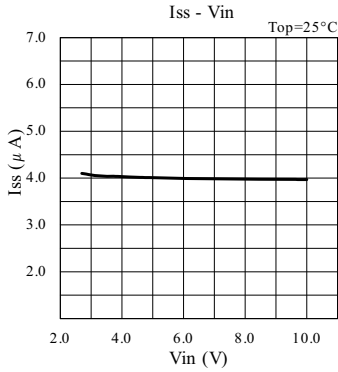
0~9

■ Typical characteristics

- $V_{out}=2.7V$ (ELM9827xB)

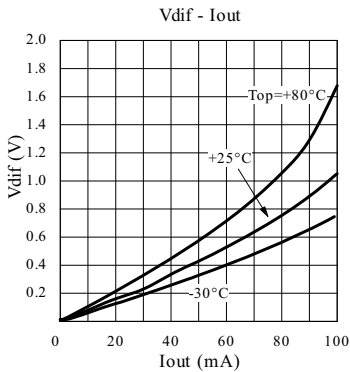
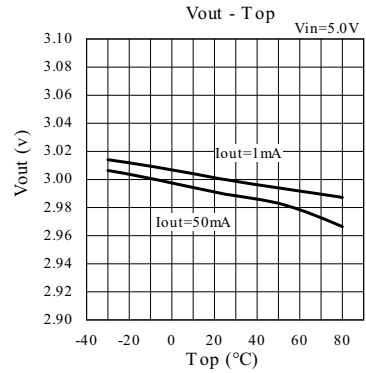
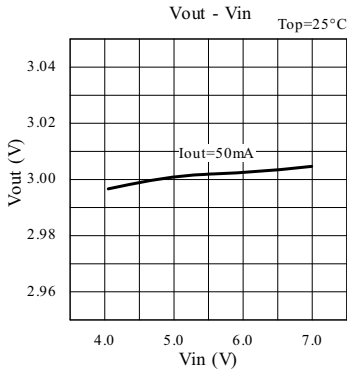
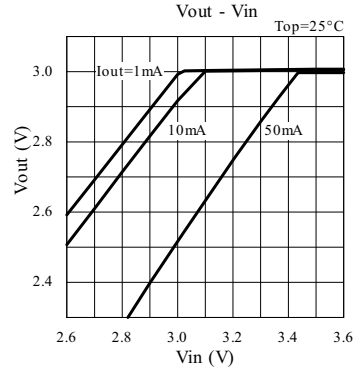
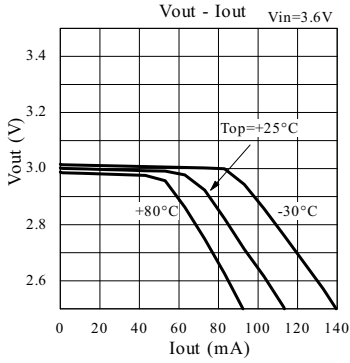


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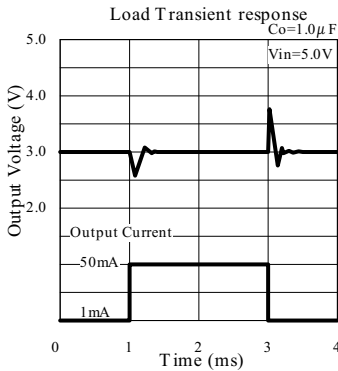
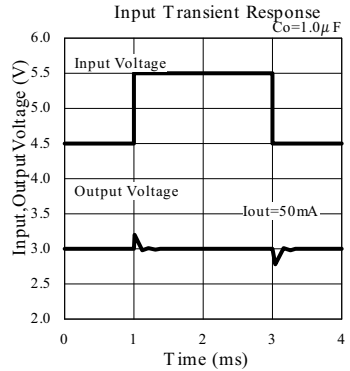
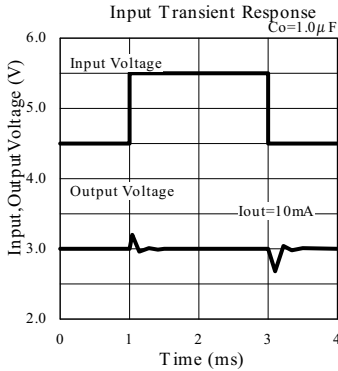
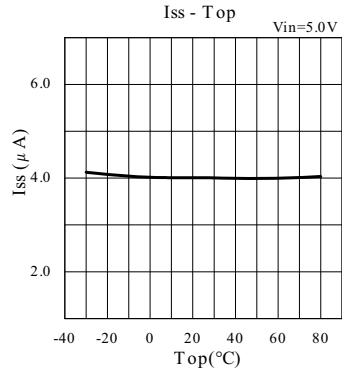
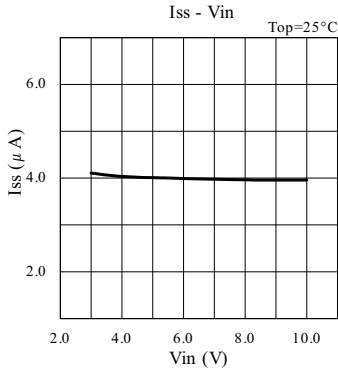


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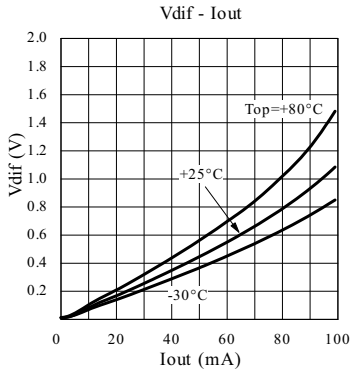
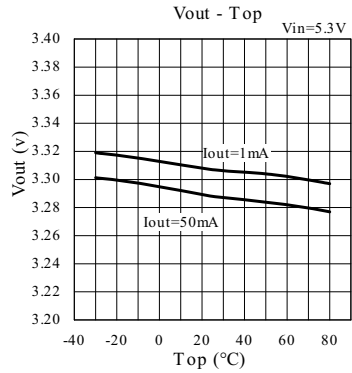
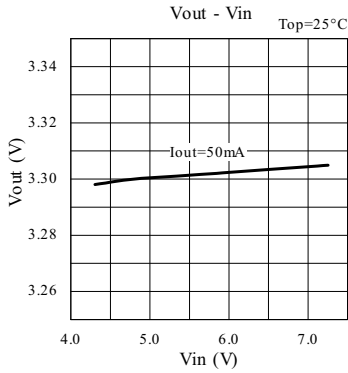
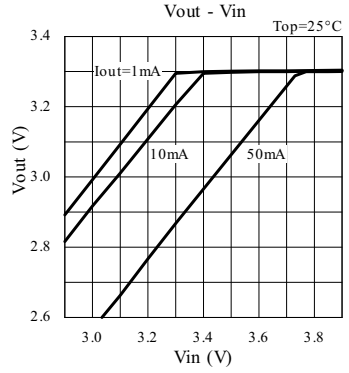
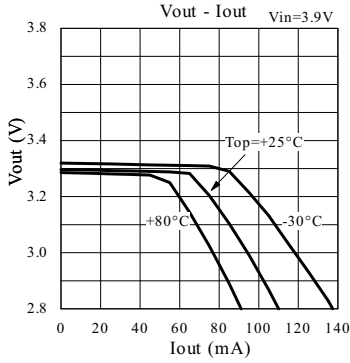
• $V_{out}=3.0V$ (ELM9830xB)



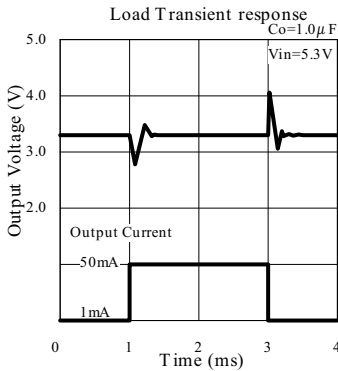
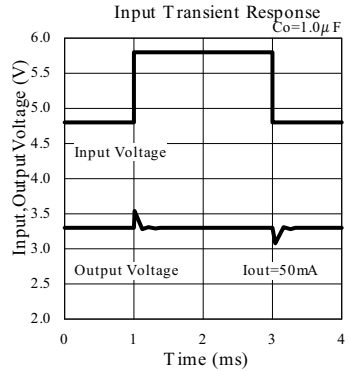
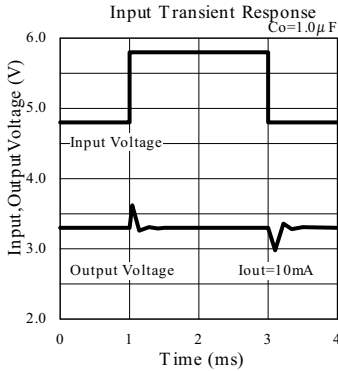
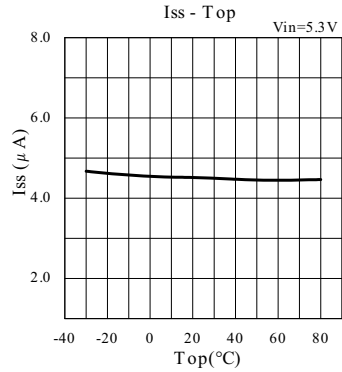
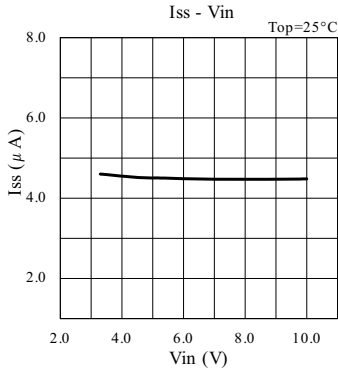
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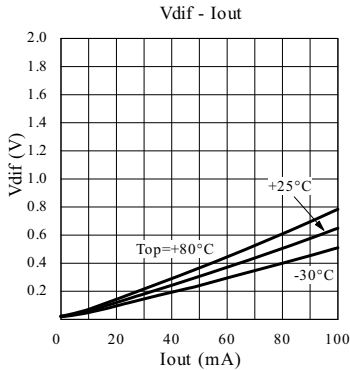
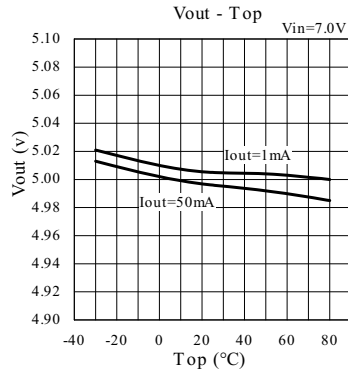
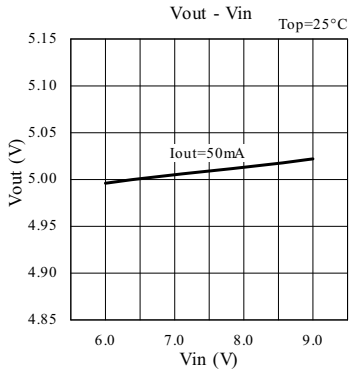
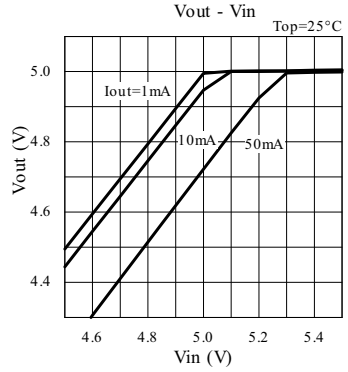
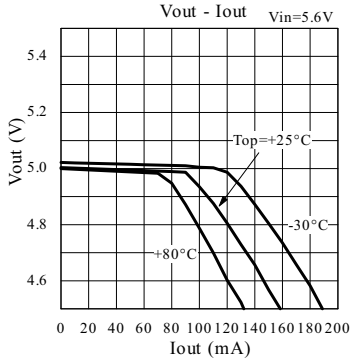
• $V_{out}=3.3V$ (ELM9833xB)



ELM98xxxB CMOS Voltage regulator



• $V_{out}=5.0V$ (ELM9850xB)



ELM98xxxB CMOS Voltage regulator

