

# ELM88xxxxA CMOS 300mA LDO Voltage regulator

## ■ General description

ELM88xxxxA is high current and low dropout(LOD) CMOS fixed voltage regulator. There are 2 types of CE selection for ELM88 series: non-chip enable function and “H” active. Thermal shutdown protective function and short circuit current limiter are included in the IC. The standard output voltages are 1.2V, 1.8V, 2.5V, 3.0V, 3.3V, 5.0V; ELM88 series can also be designed as semi-customed IC within the range of 0.8V~5.0V by 0.1V step.

## ■ Features

- Output voltage range : 0.8V~5.0V (by 0.1V)
- Output current : 300mA
- Stand by current consumption : Typ. 0.1 $\mu$ A
- Input stability : Typ. 0.02%/V ( $I_{out}=40mA$ )
- Load stability : Typ. 5mV ( $1mA \leq I_{out} \leq 100mA$ )
- Accuracy of output voltage :  $\pm 2.0\%$  ( $V_{out} > 1.5V$ )  
 $\pm 30mV$  ( $V_{out} \leq 1.5V$ )
- Input-output voltage difference : Typ. 350mV ( $V_{out}=3.0V, I_{out}=300mA$ )
- Short circuit current limiter : Typ. 40mA ( $V_{out}=0V$ )
- Thermal shutdown protection : Typ. 165 $^{\circ}C$
- Chip enable pin : “H” active (ELM88xx3xA)
- Package : SOT-89, SOT-89-5,  
SOT-23, SOT-25,  
SC-70(SOT-323), SC-70-5

## ■ Application

- Battery operated devices
- Camera and Video recorders
- Reference voltage source
- Portable electronics

## ■ Maximum absolute ratings

| Parameter             | Symbol    | Limit   | Unit        |
|-----------------------|-----------|---|-------------|
| Input voltage         | $V_{in}$  | $V_{SS}-0.3 \sim 7.0$   | V           |
| CE Input voltage      | $V_{ce}$  | $V_{SS}-0.3 \sim V_{in}+0.3$  | V           |
| Output voltage        | $V_{out}$ | $V_{SS}-0.3 \sim V_{in}+0.3$  | V           |
| Output current        | $I_{out}$ | 600   | mA          |
| Power dissipation     | $P_d$     | 300 (SOT-89)<br>500 (SOT-89-5)<br>200 (SOT-23)<br>300 (SOT-25)<br>150 (SC-70)(SOT-323)<br>150 (SC-70-5) | mW          |
| Operating Temperature | $T_{op}$  | -40~+85   | $^{\circ}C$ |
| Storage Temperature   | $T_{stg}$ | -55~+125  | $^{\circ}C$ |

## ■ Selection guide

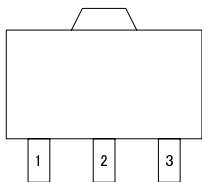
### ELM88xxxxA-x

| Symbol |                  |  |
|--------|------------------|--|
| a,b    | Output voltage   | e.g. :<br>12: Vout=1.2V    18: Vout=1.8V<br>25: Vout=2.5V    30: Vout=3.0V<br>33: Vout=3.3V    50: Vout=5.0V |
| c      | CE selection     | 1 : No CE<br>3 : CE="H" active   |
| d      | Package          | A : SOT-89, SOT-89-5<br>B : SOT-23, SOT-25<br>C : SC-70(SOT-323), SC-70-5                                    |
| e      | Product version  | A  |
| f      | Taping direction | S : Refer to PKG file<br>N : Refer to PKG file   |

ELM88    x   x   x   x   A - x  
           ↑   ↑   ↑   ↑   ↑   ↑  
           a   b   c   d   e   f

## ■ Pin configuration

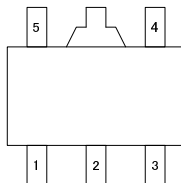
SOT-89 (TOP VIEW)



ELM88xx1AA

| Pin No. | Pin name |
|---------|----------|
| 1       | VSS      |
| 2       | VIN      |
| 3       | VOU      |

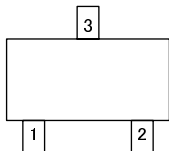
SOT-89-5 (TOP VIEW)



ELM88xx3AA

| Pin No. | Pin name |
|---------|----------|
| 1       | VSS      |
| 2       | VIN      |
| 3       | VOU      |
| 4       | NC       |
| 5       | CE       |

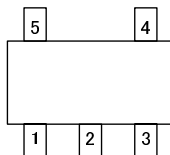
SOT-23 (TOP VIEW)



ELM88xx1BA

| Pin No. | Pin name |
|---------|----------|
| 1       | VSS      |
| 2       | VOU      |
| 3       | VIN      |

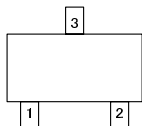
SOT-25 (TOP VIEW)



ELM88xx3BA

| Pin No. | Pin name |
|---------|----------|
| 1       | VSS      |
| 2       | VIN      |
| 3       | VOU      |
| 4       | NC       |
| 5       | CE       |

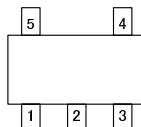
SC-70 (TOP VIEW)



ELM88xx1CA

| Pin No. | Pin name |
|---------|----------|
| 1       | VSS      |
| 2       | VOU      |
| 3       | VIN      |

SC-70-5 (TOP VIEW)



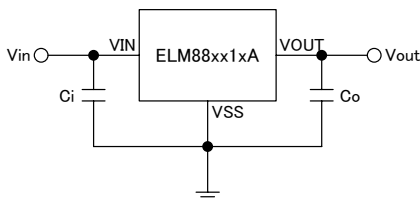
ELM88xx3CA

| Pin No. | Pin name |
|---------|----------|
| 1       | VSS      |
| 2       | VIN      |
| 3       | VOU      |
| 4       | NC       |
| 5       | CE       |

# ELM88xxxxA CMOS 300mA LDO Voltage regulator

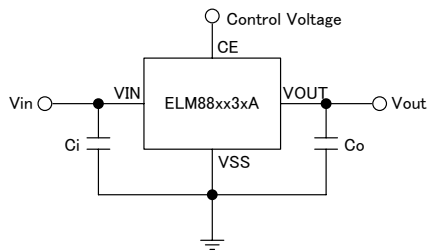
## Standard circuit

ELM88xx1xA



\*  $C_i=1\mu\text{F}$ ,  $C_o=1\mu\text{F}$  or greater

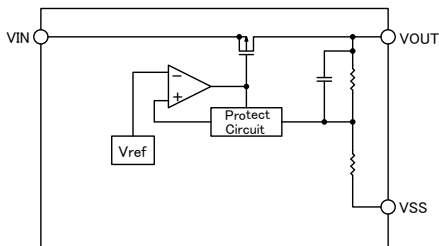
ELM88xx3xA



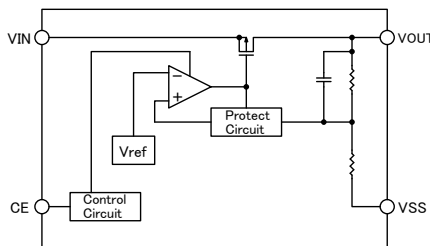
\*  $C_i=1\mu\text{F}$ ,  $C_o=1\mu\text{F}$  or greater

## Block diagram

ELM88xx1xA



ELM88xx3xA



## Electrical characteristics (ELM88xx1xA)

$V_{out}=1.2\text{V}$  (ELM88121xA), No CE pin

$T_{op}=25^\circ\text{C}$

| Parameter                              | Symbol                            | Condition   | Min.  | Typ.      | Max.  | Unit                  |
|--|-----------------------------------|---|-------|-----------|-------|-----------------------|
| Output voltage                         | $V_{out}$                         | $V_{in}=2.2\text{V}$ , $I_{out}=40\text{mA}$  | 1.170 | 1.200     | 1.230 | V                     |
| Output current                         | $I_{out}$                         | $V_{in}=2.2\text{V}$  | 300   |           |       | mA                    |
| Input stability                        | $\Delta V_{out} / \Delta V_{in}$  | $I_{out}=40\text{mA}$ , $2.0\text{V} \leq V_{in} \leq 6.0\text{V}$                                    |       | 0.05      | 0.20  | %/V                   |
| Load stability                         | $\Delta V_{out} / \Delta I_{out}$ | $1\text{mA} \leq I_{out} \leq 100\text{mA}$ , $V_{in}=2.2\text{V}$                                    |       | 5         | 20    | mV                    |
| Input-Output voltage differential      | $V_{dif}$                         | $I_{out}=100\text{mA}$  |       | 380       | 620   | mV                    |
| Current consumption                    | $I_{ss}$                          | $V_{in}=2.2\text{V}$ , No-load  |       | 15        | 50    | $\mu\text{A}$         |
| Input voltage                          | $V_{in}$                          |   | 1.4   |           | 6.0   | V                     |
| Output voltage temperature coefficient | $\Delta V_{out} / \Delta T_{op}$  | $-40^\circ\text{C} \leq T_{op} \leq +85^\circ\text{C}$ , $I_{out}=40\text{mA}$ , $V_{in}=2.2\text{V}$ |       | $\pm 100$ |       | ppm/ $^\circ\text{C}$ |
| Short circuit current                  | $I_{lim}$                         | $V_{out}=0\text{V}$   |       | 40        |       | mA                    |
| Ripple rejection ratio                 | RR                                | $f=1\text{kHz}$ , $I_{out}=40\text{mA}$   |       | 60        |       | dB                    |
| Thermal shutdown temperature           | $T_{sd}$                          |   |       | 165       |       | $^\circ\text{C}$      |
| Output noise                           | $V_{no}$                          | $BW=10\text{Hz} \sim 100\text{kHz}$   |       | 30        |       | $\mu\text{V}_{rms}$   |

# ELM88xxxxA CMOS 300mA LDO Voltage regulator

Vout=1.8V (ELM88181xA), No CE pin

Top=25°C

| Parameter                              | Symbol                          | Condition   | Min.  | Typ.      | Max.  | Unit          |
|--|---------------------------------|---|-------|-----------|-------|---------------|
| Output voltage                         | Vout                            | Vin=2.8V, Iout=40mA   | 1.764 | 1.800     | 1.836 | V             |
| Output current                         | Iout                            | Vin=2.8V  | 300   |           |       | mA            |
| Input stability                        | $\Delta V_{out}/\Delta V_{in}$  | Iout=40mA, $2.3V \leq V_{in} \leq 6.0V$                               |       | 0.02      | 0.20  | %/V           |
| Load stability                         | $\Delta V_{out}/\Delta I_{out}$ | $1mA \leq I_{out} \leq 100mA$ , Vin=2.8V                              |       | 5         | 20    | mV            |
| Input-Output voltage differential      | Vdif                            | Iout=100mA  |       | 145       | 230   | mV            |
| Current consumption                    | Iss                             | Vin=2.8V, No-load   |       | 15        | 50    | $\mu A$       |
| Input voltage                          | Vin                             |   | 1.4   |           | 6.0   | V             |
| Output voltage temperature coefficient | $\Delta V_{out}/\Delta T_{op}$  | $-40^{\circ}C \leq T_{op} \leq +85^{\circ}C$ ,<br>Iout=40mA, Vin=2.8V |       | $\pm 100$ |       | ppm/°C        |
| Short circuit current                  | Ilim                            | Vout=0V   |       | 40        |       | mA            |
| Ripple rejection ratio                 | RR                              | f=1kHz, Iout=40mA   |       | 60        |       | dB            |
| Thermal shutdown temperature           | Tsd                             |   |       | 165       |       | °C            |
| Output noise                           | Vno                             | BW=10Hz~100kHz  |       | 30        |       | $\mu V_{rms}$ |

Vout=2.5V (ELM88251xA), No CE pin

Top=25°C

| Parameter                              | Symbol                          | Condition   | Min.  | Typ.      | Max.  | Unit          |
|--|---------------------------------|---|-------|-----------|-------|---------------|
| Output voltage                         | Vout                            | Vin=3.5V, Iout=40mA   | 2.450 | 2.500     | 2.550 | V             |
| Output current                         | Iout                            | Vin=3.5V  | 300   |           |       | mA            |
| Input stability                        | $\Delta V_{out}/\Delta V_{in}$  | Iout=40mA, $3.0V \leq V_{in} \leq 6.0V$                               |       | 0.02      | 0.20  | %/V           |
| Load stability                         | $\Delta V_{out}/\Delta I_{out}$ | $1mA \leq I_{out} \leq 100mA$ , Vin=3.5V                              |       | 5         | 20    | mV            |
| Input-Output voltage differential      | Vdif                            | Iout=100mA  |       | 120       | 190   | mV            |
| Current consumption                    | Iss                             | Vin=3.5V, No-load   |       | 15        | 50    | $\mu A$       |
| Input voltage                          | Vin                             |   | 1.4   |           | 6.0   | V             |
| Output voltage temperature coefficient | $\Delta V_{out}/\Delta T_{op}$  | $-40^{\circ}C \leq T_{op} \leq +85^{\circ}C$ ,<br>Iout=40mA, Vin=3.5V |       | $\pm 100$ |       | ppm/°C        |
| Short circuit current                  | Ilim                            | Vout=0V   |       | 40        |       | mA            |
| Ripple rejection ratio                 | RR                              | f=1kHz, Iout=40mA   |       | 60        |       | dB            |
| Thermal shutdown temperature           | Tsd                             |   |       | 165       |       | °C            |
| Output noise                           | Vno                             | BW=10Hz~100kHz  |       | 30        |       | $\mu V_{rms}$ |

# ELM88xxxxA CMOS 300mA LDO Voltage regulator

Vout=3.0V (ELM88301xA), No CE pin

Top=25°C

| Parameter                              | Symbol                          | Condition   | Min.  | Typ.      | Max.  | Unit          |
|--|---------------------------------|---|-------|-----------|-------|---------------|
| Output voltage                         | Vout                            | Vin=4.0V, Iout=40mA   | 2.940 | 3.000     | 3.060 | V             |
| Output current                         | Iout                            | Vin=4.0V  | 300   |           |       | mA            |
| Input stability                        | $\Delta V_{out}/\Delta V_{in}$  | Iout=40mA, $3.5V \leq V_{in} \leq 6.0V$                               |       | 0.02      | 0.20  | %/V           |
| Load stability                         | $\Delta V_{out}/\Delta I_{out}$ | $1mA \leq I_{out} \leq 100mA$ , Vin=4.0V                              |       | 5         | 20    | mV            |
| Input-Output voltage differential      | Vdif                            | Iout=100mA  |       | 110       | 175   | mV            |
| Current consumption                    | Iss                             | Vin=4.0V, No-load   |       | 15        | 50    | $\mu A$       |
| Input voltage                          | Vin                             |   | 1.4   |           | 6.0   | V             |
| Output voltage temperature coefficient | $\Delta V_{out}/\Delta T_{op}$  | $-40^{\circ}C \leq T_{op} \leq +85^{\circ}C$ ,<br>Iout=40mA, Vin=4.0V |       | $\pm 100$ |       | ppm/°C        |
| Short circuit current                  | Ilim                            | Vout=0V   |       | 40        |       | mA            |
| Ripple rejection ratio                 | RR                              | f=1kHz, Iout=40mA   |       | 60        |       | dB            |
| Thermal shutdown temperature           | Tsd                             |   |       | 165       |       | °C            |
| Output noise                           | Vno                             | BW=10Hz~100kHz  |       | 30        |       | $\mu V_{rms}$ |

Vout=3.3V (ELM88331xA), No CE pin

Top=25°C

| Parameter                              | Symbol                          | Condition   | Min.  | Typ.      | Max.  | Unit          |
|--|---------------------------------|---|-------|-----------|-------|---------------|
| Output voltage                         | Vout                            | Vin=4.3V, Iout=40mA   | 3.234 | 3.300     | 3.366 | V             |
| Output current                         | Iout                            | Vin=4.3V  | 300   |           |       | mA            |
| Input stability                        | $\Delta V_{out}/\Delta V_{in}$  | Iout=40mA, $3.8V \leq V_{in} \leq 6.0V$                               |       | 0.02      | 0.20  | %/V           |
| Load stability                         | $\Delta V_{out}/\Delta I_{out}$ | $1mA \leq I_{out} \leq 100mA$ , Vin=4.3V                              |       | 5         | 20    | mV            |
| Input-Output voltage differential      | Vdif                            | Iout=100mA  |       | 110       | 175   | mV            |
| Current consumption                    | Iss                             | Vin=4.3V, No-load   |       | 15        | 50    | $\mu A$       |
| Input voltage                          | Vin                             |   | 1.4   |           | 6.0   | V             |
| Output voltage temperature coefficient | $\Delta V_{out}/\Delta T_{op}$  | $-40^{\circ}C \leq T_{op} \leq +85^{\circ}C$ ,<br>Iout=40mA, Vin=4.3V |       | $\pm 100$ |       | ppm/°C        |
| Short circuit current                  | Ilim                            | Vout=0V   |       | 40        |       | mA            |
| Ripple rejection ratio                 | RR                              | f=1kHz, Iout=40mA   |       | 60        |       | dB            |
| Thermal shutdown temperature           | Tsd                             |   |       | 165       |       | °C            |
| Output noise                           | Vno                             | BW=10Hz~100kHz  |       | 30        |       | $\mu V_{rms}$ |

# ELM88xxxxA CMOS 300mA LDO Voltage regulator

Vout=5.0V (ELM88501xA), No CE pin

Top=25°C

| Parameter                              | Symbol                          | Condition                                | Min.  | Typ.  | Max.  | Unit              |
|--|---------------------------------|--|-------|-------|-------|-------------------|
| Output voltage                         | Vout                            | Vin=6.0V, Iout=40mA                      | 4.900 | 5.000 | 5.100 | V                 |
| Output current                         | Iout                            | Vin=6.0V                                 | 300   |       |       | mA                |
| Input stability                        | $\Delta V_{out}/\Delta V_{in}$  | Iout=40mA, 5.5V ≤ Vin ≤ 6.0V             |       | 0.02  | 0.20  | %/V               |
| Load stability                         | $\Delta V_{out}/\Delta I_{out}$ | 1mA ≤ Iout ≤ 100mA, Vin=6.0V             |       | 5     | 20    | mV                |
| Input-Output voltage differential      | Vdif                            | Iout=100mA                               |       | 100   | 160   | mV                |
| Current consumption                    | I <sub>ss</sub>                 | Vin=6.0V, No-load                        |       | 15    | 50    | μA                |
| Input voltage                          | Vin                             |  | 1.4   |       | 6.0   | V                 |
| Output voltage temperature coefficient | $\Delta V_{out}/\Delta T_{op}$  | -40°C ≤ Top ≤ +85°C, Iout=40mA, Vin=6.0V |       | ±100  |       | ppm/°C            |
| Short circuit current                  | I <sub>lim</sub>                | Vout=0V                                  |       | 40    |       | mA                |
| Ripple rejection ratio                 | RR                              | f=1kHz, Iout=40mA                        |       | 60    |       | dB                |
| Thermal shutdown temperature           | T <sub>sd</sub>                 |  |       | 165   |       | °C                |
| Output noise                           | V <sub>no</sub>                 | BW=10Hz~100kHz                           |       | 30    |       | μV <sub>rms</sub> |

## ■ Electrical characteristics (ELM88xx3xA)

Vout=1.2V (ELM88123xA), CE="H" active

Top=25°C

| Parameter                              | Symbol                          | Condition                                | Min.  | Typ.  | Max.  | Unit              |
|--|---------------------------------|--|-------|-------|-------|-------------------|
| Output voltage                         | Vout                            | Vin=2.2V, Iout=40mA                      | 1.170 | 1.200 | 1.230 | V                 |
| Output current                         | Iout                            | Vin=2.2V                                 | 300   |       |       | mA                |
| Input stability                        | $\Delta V_{out}/\Delta V_{in}$  | Iout=40mA, 2.0V ≤ Vin ≤ 6.0V             |       | 0.05  | 0.20  | %/V               |
| Load stability                         | $\Delta V_{out}/\Delta I_{out}$ | 1mA ≤ Iout ≤ 100mA, Vin=2.2V             |       | 5     | 20    | mV                |
| Input-Output voltage differential      | Vdif                            | Iout=100mA                               |       | 380   | 620   | mV                |
| Current consumption                    | I <sub>ss</sub>                 | Vin=2.2V, No-load                        |       | 15    | 50    | μA                |
| Stand-by current consumption           | I <sub>standby</sub>            | Vin=2.2V, Vce=0                          |       |       | 0.5   | μA                |
| Input voltage                          | Vin                             |  | 1.4   |       | 6.0   | V                 |
| CE input voltage High                  | Vceh                            | Vin=6.0V                                 | 1.8   |       | Vin   | V                 |
| CE input voltage Low                   | Vcel                            | Vin=1.4V                                 | 0.0   |       | 0.2   | V                 |
| CE input current High                  | Iceh                            | Vce=Vin=6.0V                             | -0.2  | 0.0   | 0.2   | μA                |
| CE input current Low                   | Icel                            | Vce=Vss, Vin=6.0V                        | -0.2  | 0.0   | 0.2   |                   |
| Output voltage temperature coefficient | $\Delta V_{out}/\Delta T_{op}$  | -40°C ≤ Top ≤ +85°C, Iout=40mA, Vin=2.2V |       | ±100  |       | ppm/°C            |
| Short circuit current                  | I <sub>lim</sub>                | Vout=0V                                  |       | 40    |       | mA                |
| Ripple rejection ratio                 | RR                              | f=1kHz, Iout=40mA                        |       | 60    |       | dB                |
| Thermal shutdown temperature           | T <sub>sd</sub>                 |  |       | 165   |       | °C                |
| Output noise                           | V <sub>no</sub>                 | BW=10Hz~100kHz                           |       | 30    |       | μV <sub>rms</sub> |

# ELM88xxxxA CMOS 300mA LDO Voltage regulator

Vout=1.8V (ELM88183xA), CE="H" active

Top=25°C

| Parameter                              | Symbol                          | Condition                                  | Min.  | Typ.  | Max.  | Unit   |
|--|---------------------------------|--|-------|-------|-------|--------|
| Output voltage                         | Vout                            | Vin=2.8V, Iout=40mA                        | 1.764 | 1.800 | 1.836 | V      |
| Output current                         | Iout                            | Vin=2.8V                                   | 300   |       |       | mA     |
| Input stability                        | $\Delta V_{out}/\Delta V_{in}$  | Iout=40mA, 2.3V ≤ Vin ≤ 6.0V               |       | 0.02  | 0.20  | %/V    |
| Load stability                         | $\Delta V_{out}/\Delta I_{out}$ | 1mA ≤ Iout ≤ 100mA, Vin=2.8V               |       | 5     | 20    | mV     |
| Input-Output voltage differential      | Vdif                            | Iout=100mA                                 |       | 145   | 230   | mV     |
| Current consumption                    | I <sub>ss</sub>                 | Vin=2.8V, No-load                          |       | 15    | 50    | μA     |
| Stand-by current consumption           | I <sub>standby</sub>            | Vin=2.8V, Vce=0                            |       |       | 0.5   | μA     |
| Input voltage                          | Vin                             |  | 1.4   |       | 6.0   | V      |
| CE input voltage High                  | Vceh                            | Vin=6.0V                                   | 1.8   |       | Vin   | V      |
| CE input voltage Low                   | Vcel                            | Vin=1.4V                                   | 0.0   |       | 0.2   | V      |
| CE input current High                  | Iceh                            | Vce=Vin=6.0V                               | -0.2  | 0.0   | 0.2   | μA     |
| CE input current Low                   | Icel                            | Vce=Vss, Vin=6.0V                          | -0.2  | 0.0   | 0.2   |        |
| Output voltage temperature coefficient | $\Delta V_{out}/\Delta T_{op}$  | -40°C ≤ Top ≤ +85°C<br>Iout=40mA, Vin=2.8V |       | ±100  |       | ppm/°C |
| Short circuit current                  | I <sub>lim</sub>                | Vout=0V                                    |       | 40    |       | mA     |
| Ripple rejection ratio                 | RR                              | f=1kHz, Iout=40mA                          |       | 60    |       | dB     |
| Thermal shutdown temperature           | Tsd                             |  |       | 165   |       | °C     |
| Output noise                           | Vno                             | BW=10Hz~100kHz                             |       | 30    |       | μVrms  |

Vout=2.5V (ELM88253xA), CE="H" active

Top=25°C

| Parameter                              | Symbol                          | Condition                                  | Min.  | Typ.  | Max.  | Unit   |
|--|---------------------------------|--|-------|-------|-------|--------|
| Output voltage                         | Vout                            | Vin=3.5V, Iout=40mA                        | 2.450 | 2.500 | 2.550 | V      |
| Output current                         | Iout                            | Vin=3.5V                                   | 300   |       |       | mA     |
| Input stability                        | $\Delta V_{out}/\Delta V_{in}$  | Iout=40mA, 3.0V ≤ Vin ≤ 6.0V               |       | 0.02  | 0.20  | %/V    |
| Load stability                         | $\Delta V_{out}/\Delta I_{out}$ | 1mA ≤ Iout ≤ 100mA, Vin=3.5V               |       | 5     | 20    | mV     |
| Input-Output voltage differential      | Vdif                            | Iout=100mA                                 |       | 120   | 190   | mV     |
| Current consumption                    | I <sub>ss</sub>                 | Vin=3.5V, No-load                          |       | 15    | 50    | μA     |
| Stand-by current consumption           | I <sub>standby</sub>            | Vin=3.5V, Vce=0                            |       |       | 0.5   | μA     |
| Input voltage                          | Vin                             |  | 1.4   |       | 6.0   | V      |
| CE input voltage High                  | Vceh                            | Vin=6.0V                                   | 1.8   |       | Vin   | V      |
| CE input voltage Low                   | Vcel                            | Vin=1.4V                                   | 0.0   |       | 0.2   | V      |
| CE input current High                  | Iceh                            | Vce=Vin=6.0V                               | -0.2  | 0.0   | 0.2   | μA     |
| CE input current Low                   | Icel                            | Vce=Vss, Vin=6.0V                          | -0.2  | 0.0   | 0.2   |        |
| Output voltage temperature coefficient | $\Delta V_{out}/\Delta T_{op}$  | -40°C ≤ Top ≤ +85°C<br>Iout=40mA, Vin=3.5V |       | ±100  |       | ppm/°C |
| Short circuit current                  | I <sub>lim</sub>                | Vout=0V                                    |       | 40    |       | mA     |
| Ripple rejection ratio                 | RR                              | f=1kHz, Iout=40mA                          |       | 60    |       | dB     |
| Thermal shutdown temperature           | Tsd                             |  |       | 165   |       | °C     |
| Output noise                           | Vno                             | BW=10Hz~100kHz                             |       | 30    |       | μVrms  |

# ELM88xxxxA CMOS 300mA LDO Voltage regulator

Vout=3.0V (ELM88303xA), CE="H" active

Top=25°C

| Parameter                              | Symbol                          | Condition                                | Min.  | Typ.  | Max.  | Unit   |
|--|---------------------------------|--|-------|-------|-------|--------|
| Output voltage                         | Vout                            | Vin=4.0V, Iout=40mA                      | 2.940 | 3.000 | 3.060 | V      |
| Output current                         | Iout                            | Vin=4.0V                                 | 300   |       |       | mA     |
| Input stability                        | $\Delta V_{out}/\Delta V_{in}$  | Iout=40mA, 3.5V ≤ Vin ≤ 6.0V             |       | 0.02  | 0.20  | %/V    |
| Load stability                         | $\Delta V_{out}/\Delta I_{out}$ | 1mA ≤ Iout ≤ 100mA, Vin=4.0V             |       | 5     | 20    | mV     |
| Input-Output voltage differential      | Vdif                            | Iout=100mA                               |       | 110   | 175   | mV     |
| Current consumption                    | I <sub>ss</sub>                 | Vin=4.0V, No-load                        |       | 15    | 50    | μA     |
| Stand-by current consumption           | I <sub>standby</sub>            | Vin=4.0V, Vce=0                          |       |       | 0.5   | μA     |
| Input voltage                          | Vin                             |  | 1.4   |       | 6.0   | V      |
| CE input voltage High                  | Vceh                            | Vin=6.0V                                 | 1.8   |       | Vin   | V      |
| CE input voltage Low                   | Vcel                            | Vin=1.4V                                 | 0.0   |       | 0.2   | V      |
| CE input current High                  | Iceh                            | Vce=Vin=6.0V                             | -0.2  | 0.0   | 0.2   | μA     |
| CE input current Low                   | Icel                            | Vce=Vss, Vin=6.0V                        | -0.2  | 0.0   | 0.2   |        |
| Output voltage temperature coefficient | $\Delta V_{out}/\Delta T_{op}$  | -40°C ≤ Top ≤ +85°C, Iout=40mA, Vin=4.0V |       | ±100  |       | ppm/°C |
| Short circuit current                  | I <sub>lim</sub>                | Vout=0V                                  |       | 40    |       | mA     |
| Ripple rejection ratio                 | RR                              | f=1kHz, Iout=40mA                        |       | 60    |       | dB     |
| Thermal shutdown temperature           | Tsd                             |  |       | 165   |       | °C     |
| Output noise                           | Vno                             | BW=10Hz~100kHz                           |       | 30    |       | μVrms  |

Vout=3.3V (ELM88333xA), CE="H" active

Top=25°C

| Parameter                              | Symbol                          | Condition                                | Min.  | Typ.  | Max.  | Unit   |
|--|---------------------------------|--|-------|-------|-------|--------|
| Output voltage                         | Vout                            | Vin=4.3V, Iout=40mA                      | 3.234 | 3.300 | 3.366 | V      |
| Output current                         | Iout                            | Vin=4.3V                                 | 300   |       |       | mA     |
| Input stability                        | $\Delta V_{out}/\Delta V_{in}$  | Iout=40mA, 3.8V ≤ Vin ≤ 6.0V             |       | 0.02  | 0.20  | %/V    |
| Load stability                         | $\Delta V_{out}/\Delta I_{out}$ | 1mA ≤ Iout ≤ 100mA, Vin=4.3V             |       | 5     | 20    | mV     |
| Input-Output voltage differential      | Vdif                            | Iout=100mA                               |       | 110   | 175   | mV     |
| Current consumption                    | I <sub>ss</sub>                 | Vin=4.3V, No-load                        |       | 15    | 50    | μA     |
| Stand-by current consumption           | I <sub>standby</sub>            | Vin=4.3V, Vce=0                          |       |       | 0.5   | μA     |
| Input voltage                          | Vin                             |  | 1.4   |       | 6.0   | V      |
| CE input voltage High                  | Vceh                            | Vin=6.0V                                 | 1.8   |       | Vin   | V      |
| CE input voltage Low                   | Vcel                            | Vin=1.4V                                 | 0.0   |       | 0.2   | V      |
| CE input current High                  | Iceh                            | Vce=Vin=6.0V                             | -0.2  | 0.0   | 0.2   | μA     |
| CE input current Low                   | Icel                            | Vce=Vss, Vin=6.0V                        | -0.2  | 0.0   | 0.2   |        |
| Output voltage temperature coefficient | $\Delta V_{out}/\Delta T_{op}$  | -40°C ≤ Top ≤ +85°C, Iout=40mA, Vin=4.3V |       | ±100  |       | ppm/°C |
| Short circuit current                  | I <sub>lim</sub>                | Vout=0V                                  |       | 40    |       | mA     |
| Ripple rejection ratio                 | RR                              | f=1kHz, Iout=40mA                        |       | 60    |       | dB     |
| Thermal shutdown temperature           | Tsd                             |  |       | 165   |       | °C     |
| Output noise                           | Vno                             | BW=10Hz~100kHz                           |       | 30    |       | μVrms  |



# ELM88xxxxA CMOS 300mA LDO Voltage regulator

Vout=5.0V (ELM88503xA), CE="H" active

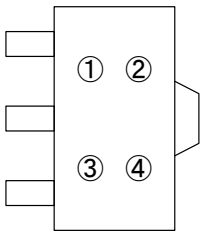
Top=25°C

| Parameter                              | Symbol                          | Condition                                | Min.  | Typ.  | Max.  | Unit              |
|--|---------------------------------|--|-------|-------|-------|-------------------|
| Output voltage                         | Vout                            | Vin=6.0V, Iout=40mA                      | 4.900 | 5.000 | 5.100 | V                 |
| Output current                         | Iout                            | Vin=6.0V                                 | 300   |       |       | mA                |
| Input stability                        | $\Delta V_{out}/\Delta V_{in}$  | Iout=40mA, 5.5V ≤ Vin ≤ 6.0V             |       | 0.02  | 0.20  | %/V               |
| Load stability                         | $\Delta V_{out}/\Delta I_{out}$ | 1mA ≤ Iout ≤ 100mA, Vin=6.0V             |       | 5     | 20    | mV                |
| Input-Output voltage differential      | Vdif                            | Iout=100mA                               |       | 100   | 160   | mV                |
| Current consumption                    | I <sub>ss</sub>                 | Vin=6.0V, No-load                        |       | 15    | 50    | μA                |
| Stand-by current consumption           | I <sub>standby</sub>            | Vin=6.0V, Vce=0                          |       |       | 0.5   | μA                |
| Input voltage                          | Vin                             |  | 1.4   |       | 6.0   | V                 |
| CE input voltage High                  | Vceh                            | Vin=6.0V                                 | 1.8   |       | Vin   | V                 |
| CE input voltage Low                   | Vcel                            | Vin=1.4V                                 | 0.0   |       | 0.2   | V                 |
| CE input current High                  | Iceh                            | Vce=Vin=6.0V                             | -0.2  | 0.0   | 0.2   | μA                |
| CE input current Low                   | Icel                            | Vce=V <sub>ss</sub> , Vin=6.0V           | -0.2  | 0.0   | 0.2   |                   |
| Output voltage temperature coefficient | $\Delta V_{out}/\Delta T_{op}$  | -40°C ≤ Top ≤ +85°C, Iout=40mA, Vin=6.0V |       | ±100  |       | ppm/°C            |
| Short circuit current                  | I <sub>lim</sub>                | Vout=0V                                  |       | 40    |       | mA                |
| Ripple rejection ratio                 | RR                              | f=1kHz, Iout=40mA                        |       | 60    |       | dB                |
| Thermal shutdown temperature           | T <sub>sd</sub>                 |  |       | 165   |       | °C                |
| Output noise                           | V <sub>no</sub>                 | BW=10Hz~100kHz                           |       | 30    |       | μV <sub>rms</sub> |

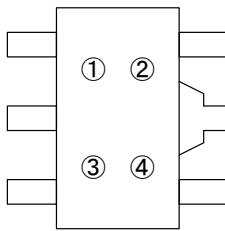
## ■ Marking

- SOT-89, SOT-23 package : ELM88xx1xA
- SOT-89-5, SOT-25 package : ELM88xx3xA (with CE)
- SC-70 package : ELM88xx1CA
- SC-70-5 package : ELM88xx3CA (with CE)

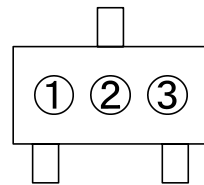
SOT-89



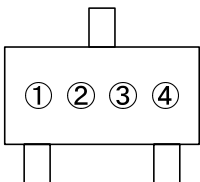
SOP-89-5



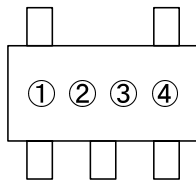
SC-70



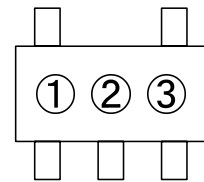
SOT-23



SOT-25



SC-70-5

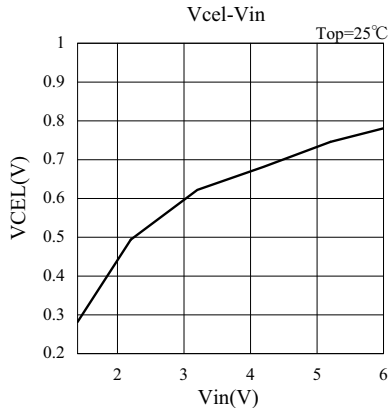
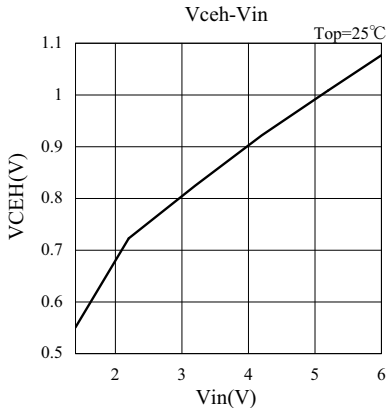
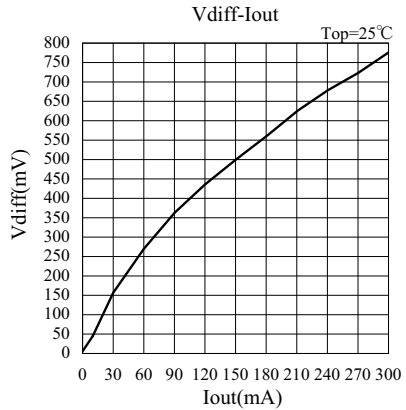
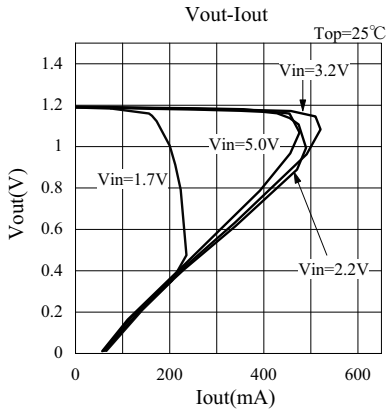
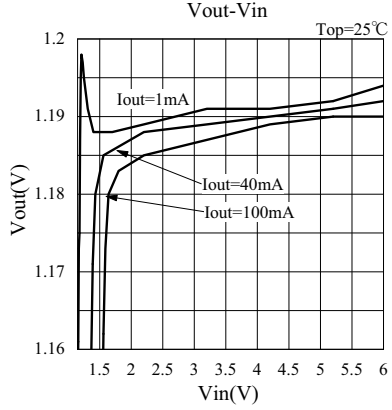
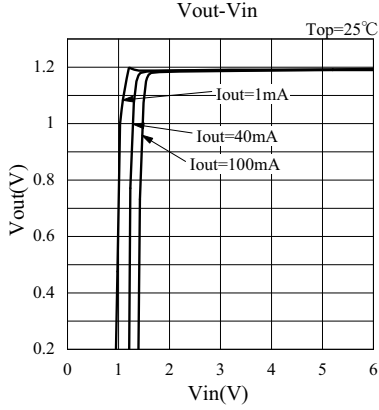


No. ①~④ :  
 Assembly lot No.  
 A~Z (I, O, X excepted) and 0~9

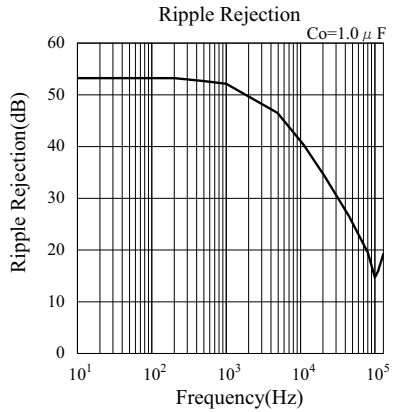
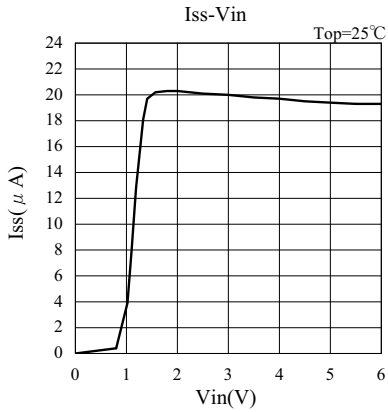
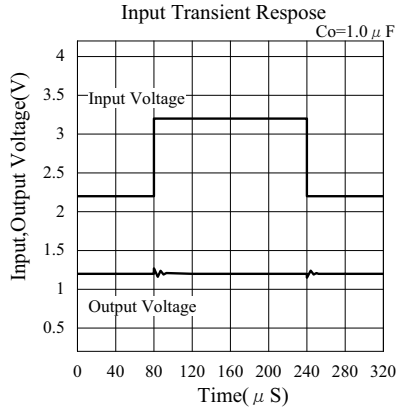
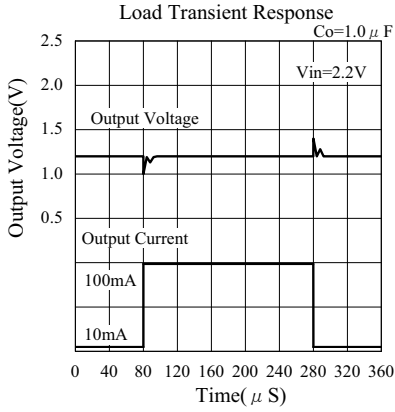
No. ①~③ :  
 Assembly lot No.  
 A~Z (I, O, X excepted) and 0~9

## ■ Typical characteristics

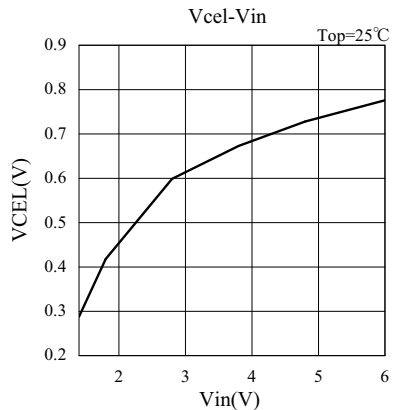
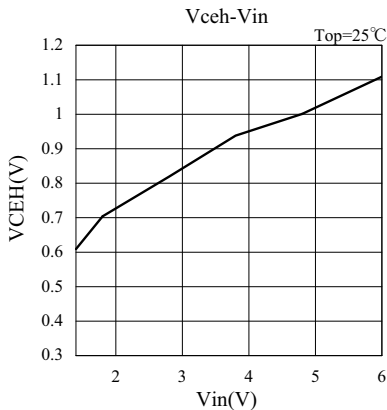
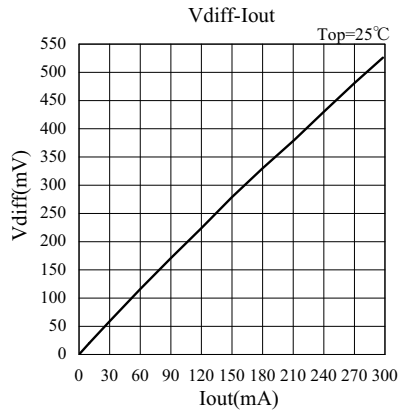
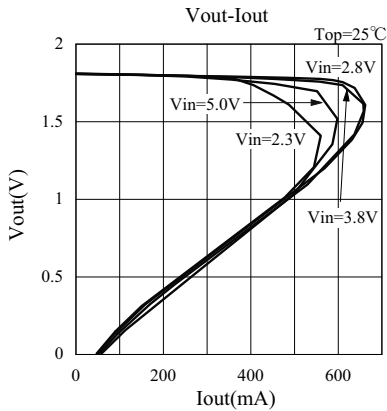
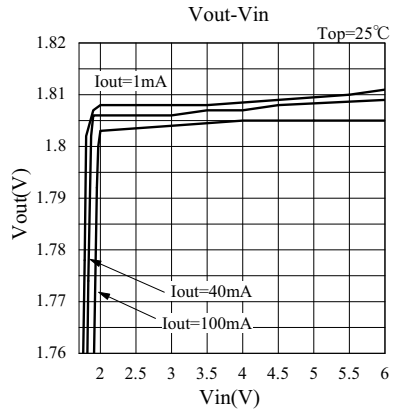
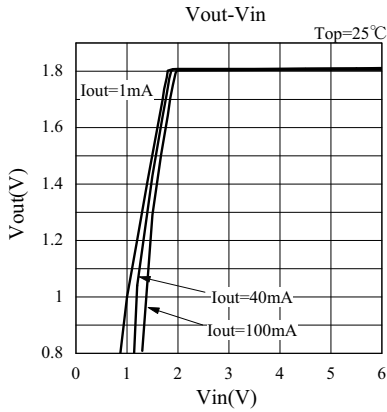
- 1.2V Vout unit (ELM8812xxA)

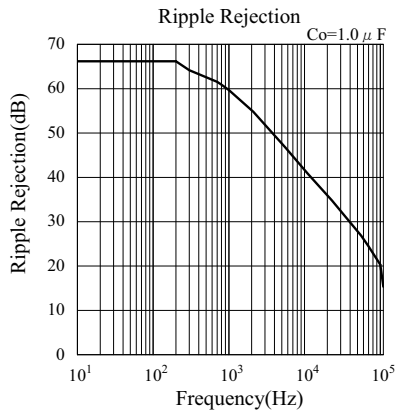
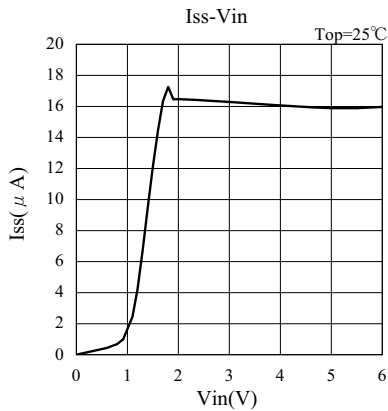
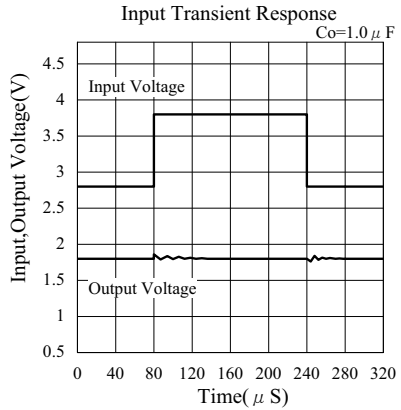
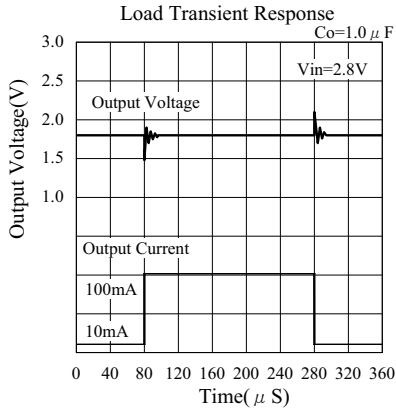


# ELM88xxxxA CMOS 300mA LDO Voltage regulator

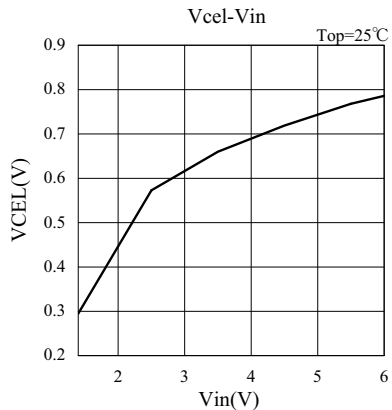
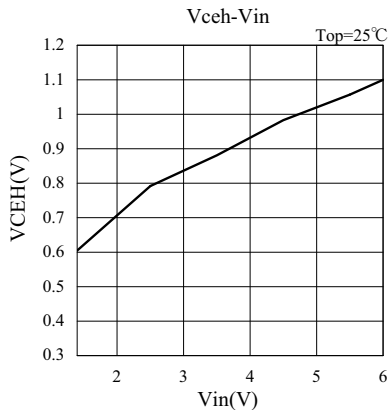
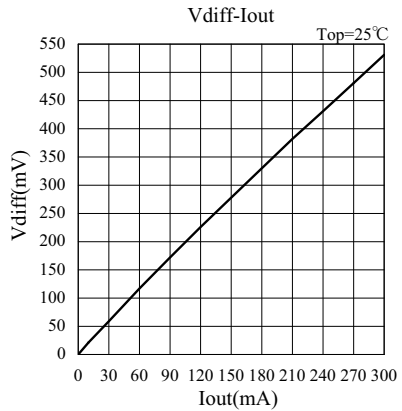
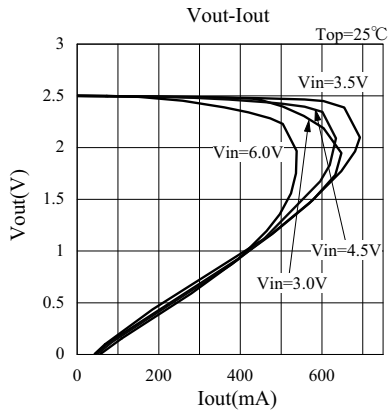
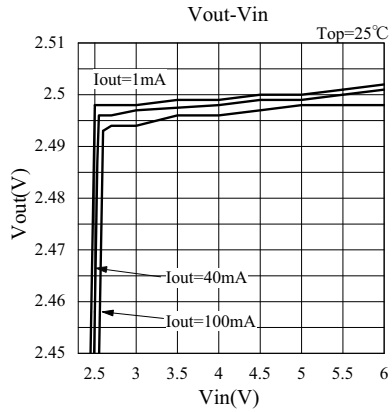
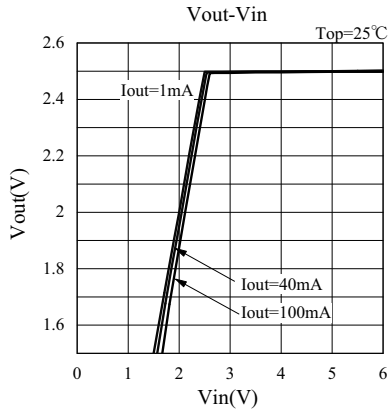


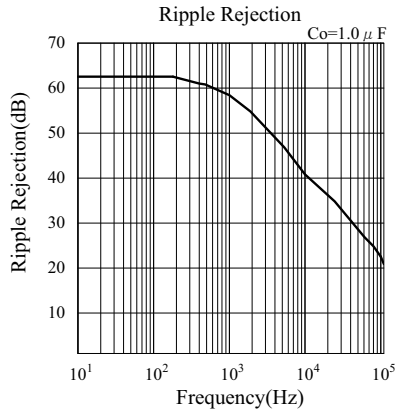
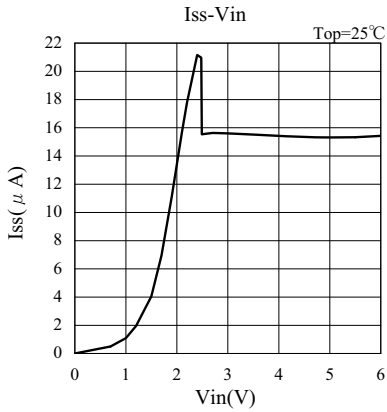
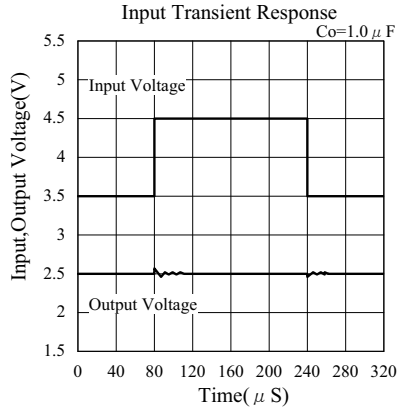
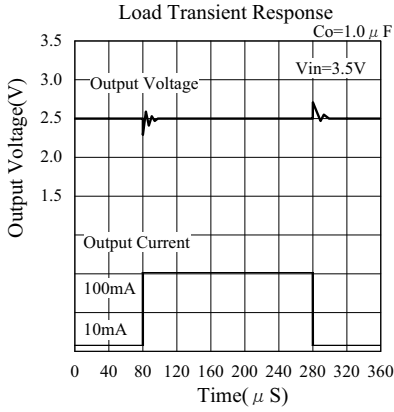
• 1.8V Vout unit (ELM8818xxA)



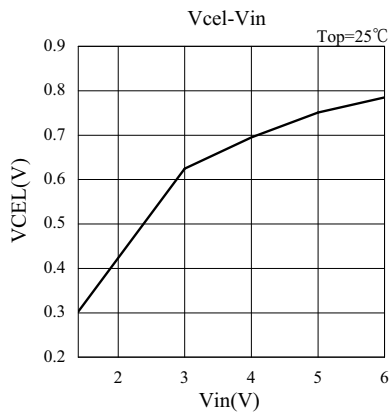
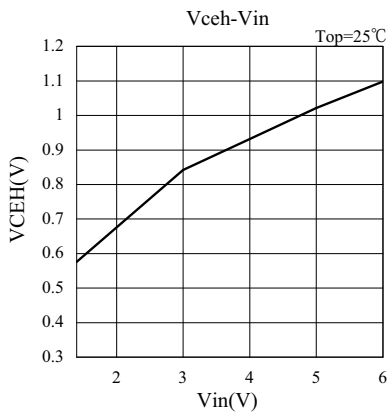
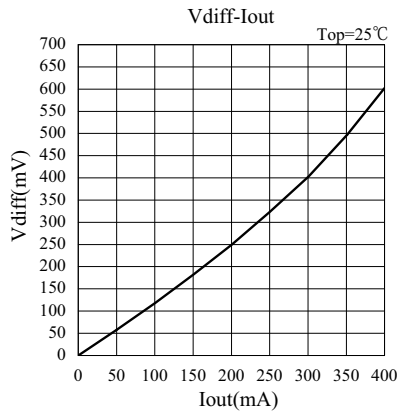
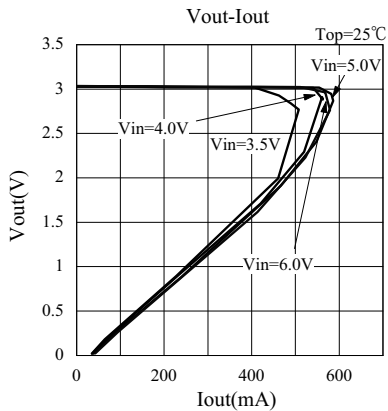
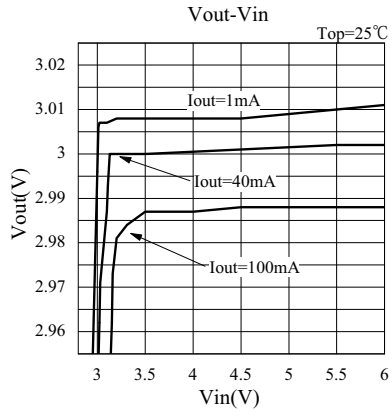
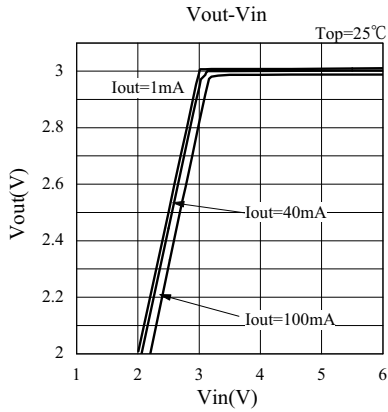


- 2.5V Vout unit (ELM8825xxA)

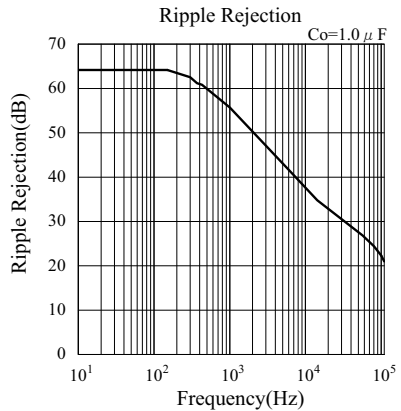
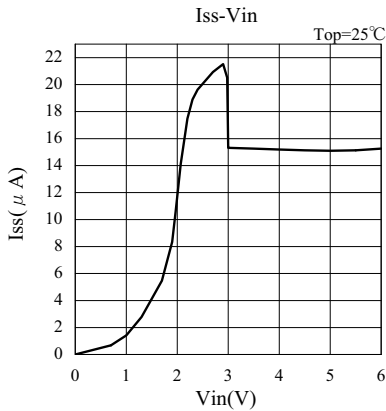
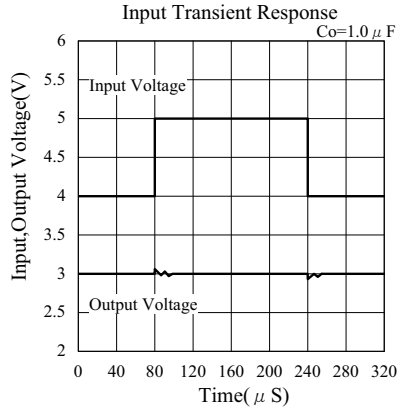
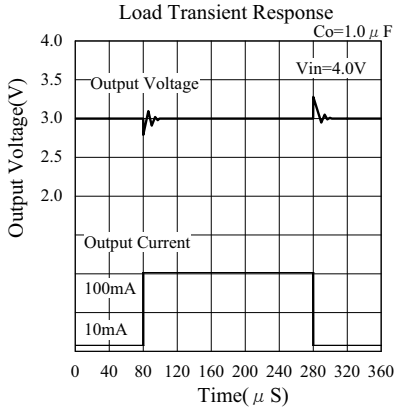




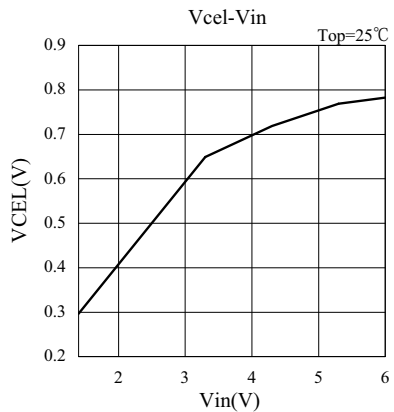
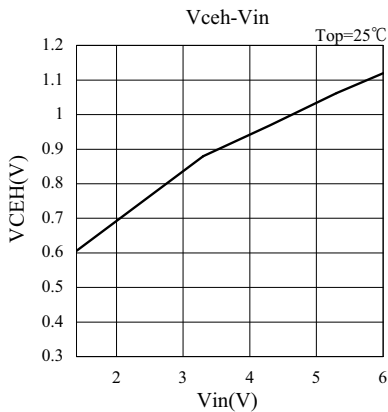
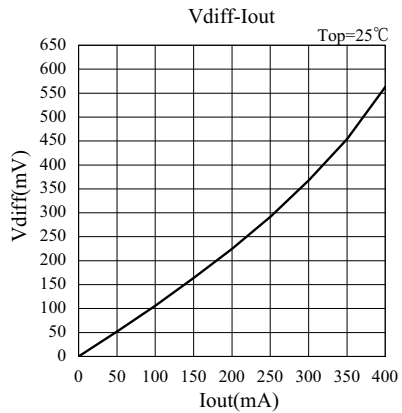
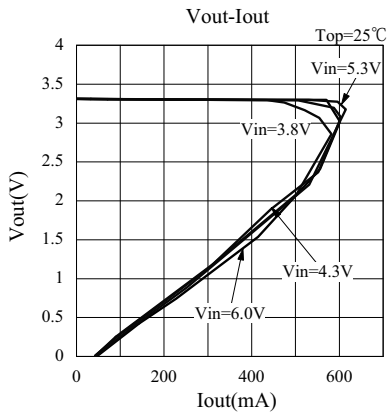
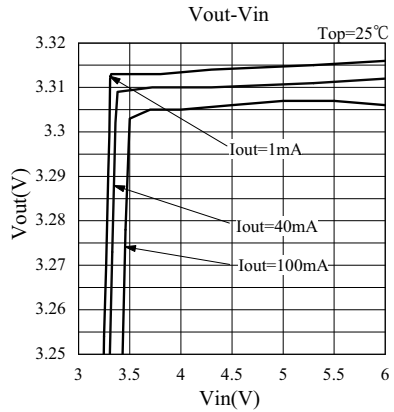
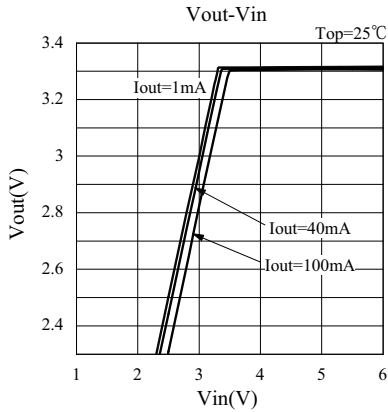
- 3.0V Vout unit (ELM8830xxA)

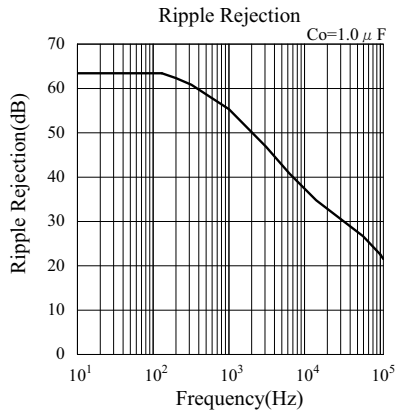
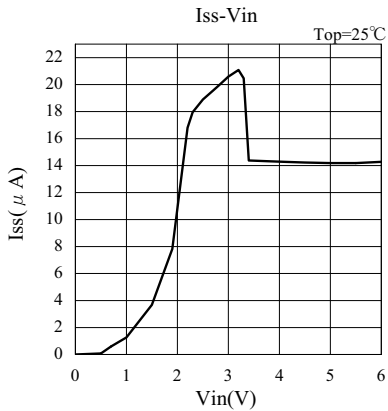
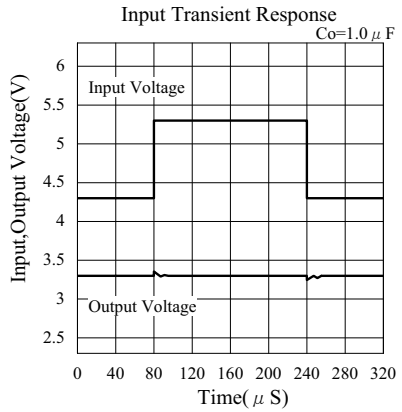
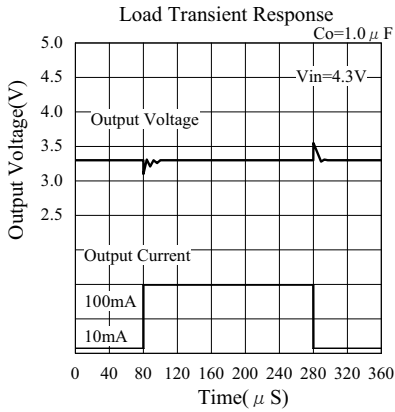






• 3.3V Vout unit (ELM8833xxA)





- 5.0V Vout unit (ELM8850xxA)

