ELM85xxxxA CMOS 600mA/800mA LDO voltage regulator

■General description

 ELM85xxxxA is CMOS voltage regulator which is characterized with high current and low dropout (55mV at Iout=100mA). There are 2 types of CE selection of ELM85 series: non-chip enable function and "H" active. The standard output voltages are 3.0V, 3.3V. ELM85 series can also be made as semi-custom IC within the range of 1.2V to 4.0V by 0.1V step. This series also includes short circuit current limiter and thermal shutdown circuit. Ceramic capacitors with low ESR can be used as input and output ones.

■Features

- Output voltage range   : 1.2V to 4.0V (by 0.1V)
- Output current   : 600mA(Vout<3.0V), 800mA(Vout≥3.0V)
- Current consumption   : Typ.40μA
- Input stability   : Typ.0.02%/V
- Load stability   : Typ.20mV(1mA≤Iout≤300mA)
- Accuracy of output voltage   : ±2.0%(Vout>1.5V), ±30mV(Vout≤1.5V)
- Input-output voltage difference   : Typ.55mV(Vout=3.0V, Iout=100mA)
- Short circuit current limiter   : Typ.70mA(Vout=0V)
- Package   : SON8-3x3, SOT-89, SOT-89-5
  SOT-23, SOT-25

■Application

- Battery operated devices
- Portable AV equipments

■Maximum absolute ratings

Parameter	Symbol	Limit		Unit
Input voltage	Vin	Vss-0.3 to 7.0		V
Output voltage	Vout	Vss-0.3 to Vin+0.3		V
Output current	Iout	1000		mA
Power dissipation (Ta=25°C)	Pd	SON8-3x3	500 [*1]	mW
			1000 [*2]	
		SOT-89	500 [*1]	
			1000 [*2]	
		SOT-89-5	500 [*1]	
			1000 [*2]	
		SOT-23	250 [*1]	
			500 [*2]	
		SOT-25	250 [*1]	
			600 [*2]	
Operating temperature	Top	-40 to +85		°C
Storage temperature	Tstg	-55 to +125		°C

* 1. No mounted, IC alone.

* 2. When mounted on glass epoxy 2-layers PCB (EIJ/JEDEC standard size: 76.2 mm×114.3 mm×1.6 mm), Cu thickness 35 μm, copper foil area ratio 20% on the front side, back side 100% .

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■Selection guide

ELM85xxxxA-x

| Symbol		
a, b	Output voltage	e.g. : 30: Vout=3.0V, 33: Vout=3.3V
c	CE selection	1: NO CE 3: CE="H" active
d	Package	A: SOT-89, SOT-89-5 B: SOT-23, SOT-25 G: SON8-3x3
e	Product version	A
f	Taping direction	S, N: Refer to PKG file

ELM85 x x x x A - x
↑ ↑ ↑ ↑ ↑ ↑
a b c d e f

■Pin configuration

SOT-89(TOP VIEW)
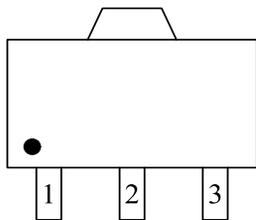
ELM85xx1AA

Pin No.	Pin name
1	VSS
2	VIN
3	VOUT

SOT-89-5(TOP VIEW)
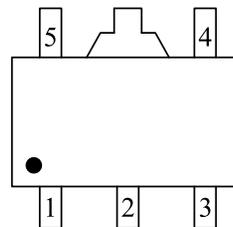
ELM85xx3AA

Pin No.	Pin name
1	VSS
2	VIN
3	VOUT
4	NC
5	CE

SOT-23(TOP VIEW)
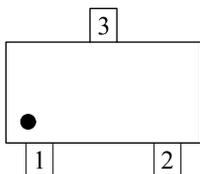
ELM85xx1BA

Pin No.	Pin name
1	VSS
2	VOUT
3	VIN

SOT-25(TOP VIEW)
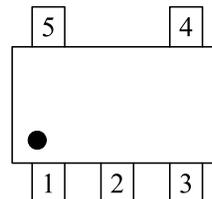
ELM85xx3BA

Pin No.	Pin name
1	VIN
2	VSS
3	CE
4	NC
5	VOUT
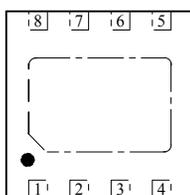
SON8-3x3(TOP VIEW)   SON8-3x3(BOTTOM VIEW)
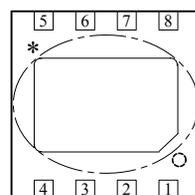
ELM85xx3GA

Pin No.	Pin name	Pin No.	Pin name
1	VOUT	5	NC
2	VOUT	6	CE
3	VIN	7	NC
4	VIN	8	VSS

* The potential of the tab on the back is the circuit one (VIN). Please
set it to be open or connect to VIN pin(recommended).

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■Standard circuit

■Block diagram

ELM85xx1xA

ELM85xx3xA
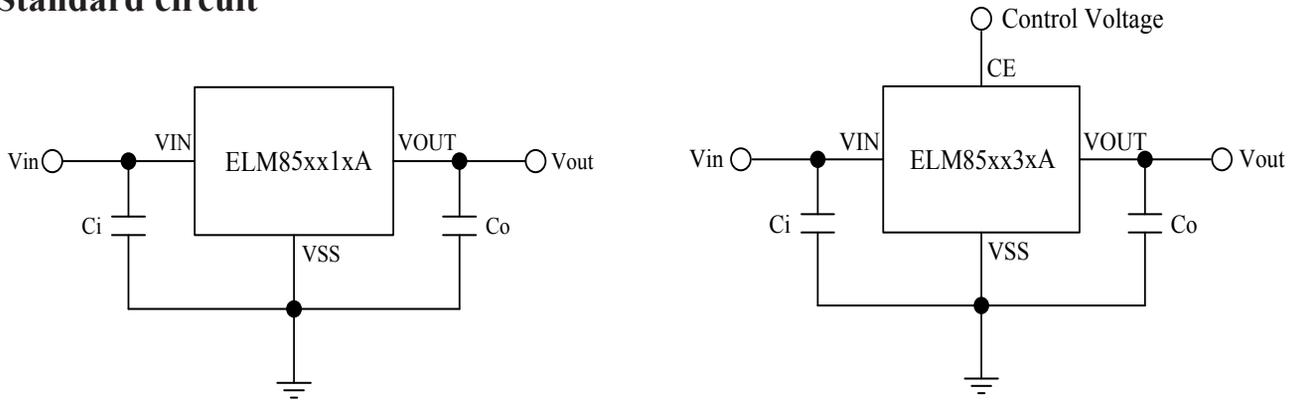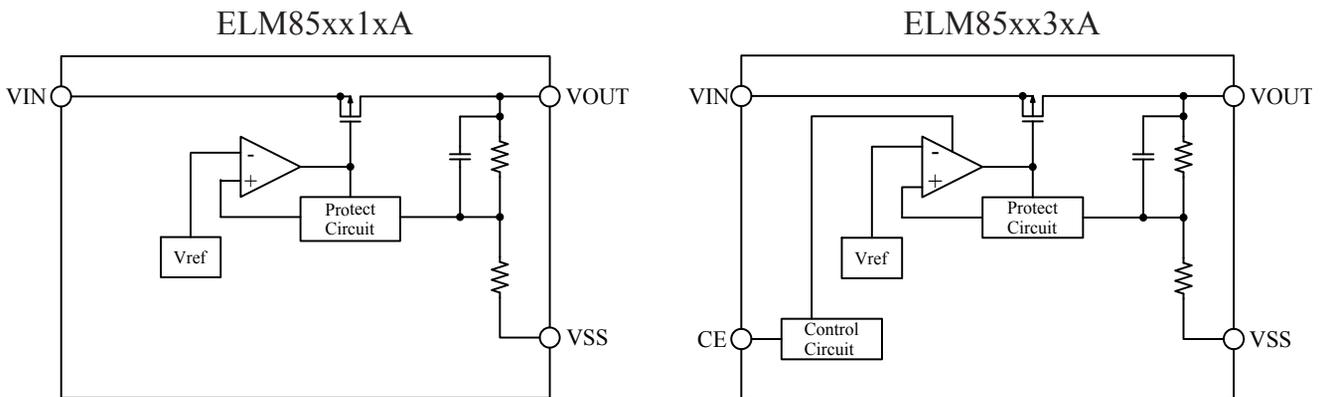
■Electrical characteristics (ELM85xx1xA)

Vout=3.0V(ELM85301xA), No CE pin   Ci=1.0μF, Co=4.7μF, 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	800			mA
Input stability	ΔVout/ΔVin	3.5V≤Vin≤6.0V, Iout=100mA		0.02	0.20	%/V
Load stability	ΔVout/ΔIout	Vin=4.0V, 1mA≤Iout≤300mA		20	60	mV
Input-Output voltage differential	Vdif	Iout=100mA		55	90	mV
Current consumption	Iss	Vin=4.0V		40	100	μA
Input voltage	Vin		1.4		6.0	V
Output voltage temperature coefficient	ΔVout/ΔTop	-40°C≤Top≤+85°C, Vin=4.0V, Iout=40mA		±100		ppm/°C
Short circuit current	Ilim	Vout=0V		70		mA
Ripple rejection ratio	RR	f=1kHz, Iout=40mA		60		dB
Thermal shutdown temperature	Tsd			165		°C
Output noise	Vno	BW=10Hz to 100kHz		30		μVrms

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Vout=3.3V(ELM85331xA), No CE pin   Ci=1.0μF, Co=4.7μF, 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	800			mA
Input stability	ΔVout/ΔVin	3.8V≤Vin≤6.0V, Iout=100mA		0.02	0.20	%/V
Load stability	ΔVout/ΔIout	Vin=4.3V, 1mA≤Iout≤300mA		20	60	mV
Input-Output voltage differential	Vdif	Iout=100mA		55	90	mV
Current consumption	Iss	Vin=4.3V		40	100	μA
Input voltage	Vin		1.4		6.0	V
Output voltage temperature coefficient	ΔVout/ΔTop	-40°C≤Top≤+85°C, Vin=4.3V, Iout=40mA		±100		ppm/°C
Short circuit current	Ilim	Vout=0V		70		mA
Ripple rejection ratio	RR	f=1kHz, Iout=40mA		60		dB
Thermal shutdown temperature	Tsd			165		°C
Output noise	Vno	BW=10Hz to 100kHz		30		μVrms

■Electrical characteristics (ELM85xx3xA)

Vout=3.0V(ELM85303xA), CE="H" active   Ci=1.0μF, Co=4.7μF, 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	800			mA
Input stability	ΔVout/ΔVin	3.5V≤Vin≤6.0V, Iout=100mA		0.02	0.20	%/V
Load stability	ΔVout/ΔIout	Vin=4.0V,1mA≤Iout≤300mA		20	60	mV
Input-Output voltage differential	Vdif	Iout=100mA		55	90	mV
Current consumption	Iss	Vin=4.0V		40	100	μA
Standby current consumption	Istandby	Vin=4.0V, Vce=0V			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		0.2	μA
CE input current Low	Icel	Vce=Vss, Vin=6.0V	-0.2		0.2	μA
Output voltage temperature coefficient	ΔVout/ΔTop	-40°C≤Top≤+85°C, Vin=4.0V, Iout=40mA		±100		ppm/°C
Short circuit current	Ilim	Vout=0V		70		mA
Ripple rejection ratio	RR	f=1kHz, Iout=40mA		60		dB
Thermal shutdown temperature	Tsd			165		°C
Output noise	Vno	BW=10Hz to 100kHz		30		μVrms

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Vout=3.3V(ELM85333xA), CE="H" active   Ci=1.0μF, Co=4.7μF, 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	800			mA
Input stability	ΔVout/ΔVin	3.8V≤Vin≤6.0V, Iout=100mA		0.02	0.20	%/V
Load stability	ΔVout/ΔIout	Vin=4.3V,1mA≤Iout≤300mA		20	60	mV
Input-Output voltage differential	Vdif	Iout=100mA		55	90	mV
Current consumption	Iss	Vin=4.3V		40	100	μA
Standby current consumption	Istandby	Vin=4.3V, Vce=0V			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		0.2	μA
CE input current Low	Icel	Vce=Vss, Vin=6.0V	-0.2		0.2	μA
Output voltage temperature coefficient	ΔVout/ΔTop	-40°C≤Top≤+85°C, Vin=4.3V, Iout=40mA		±100		ppm/°C
Short circuit current	Ilim	Vout=0V		70		mA
Ripple rejection ratio	RR	f=1kHz, Iout=40mA		60		dB
Thermal shutdown temperature	Tsd			165		°C
Output noise	Vno	BW=10Hz to 100kHz		30		μVrms

■Marking

SON8-3x3

ELM85

ab3GA

cde

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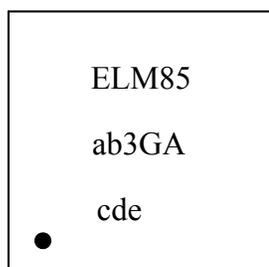
a, b : Output voltage. e.g. : 33(Vout=3.3V)
c to e : Assembly lot No. ―― 000 to 999

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| SOT-89 | SOT-89-5 | SOT-23 | SOT-25 |
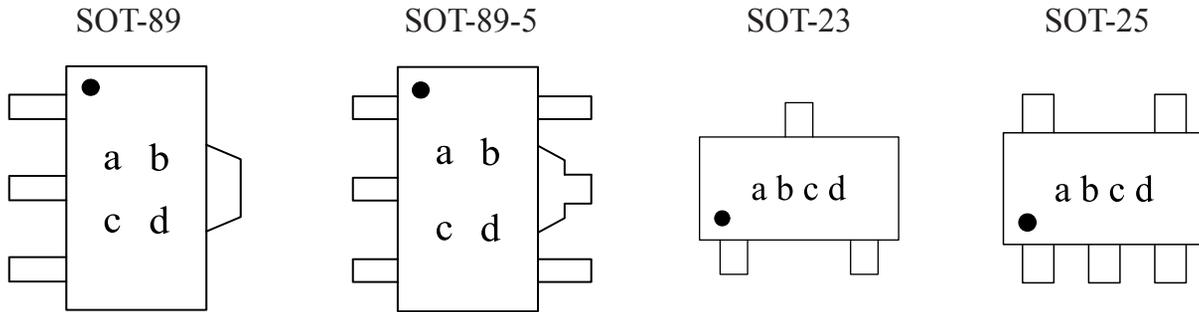
a, b : Represents Output voltage range , Package type and CE type.

Symbol	Output voltage range (V)	Package	CE Type
00	1.2~3.0	SOT-89	No CE
01	3.1~4.0	SOT-89	No CE
02	1.2~3.0	SOT-89-5	CE=High
03	3.1~4.0	SOT-89-5	CE=High
54	1.2~3.0	SOT-23	No CE
55	3.1~4.0	SOT-23	No CE
5Y	1.2~3.0	SOT-25	CE=High
5Z	3.1~4.0	SOT-25	CE=High

c : Represents Output voltage.

| Symbol	Output voltage(V)		Symbol	Output voltage(V)	
1		3.1	F	1.6	
2		3.2	G	1.7	
3		3.3	H	1.8	
4		3.4	J	1.9	
5		3.5	K	2.0	
6		3.6	L	2.1	
7		3.7	M	2.2	
8		3.8	N	2.3	
9		3.9	P	2.4	
0		4.0	Q	2.5	
A			R	2.6	
B	1.2		S	2.7	
C	1.3		T	2.8	
D	1.4		U	2.9	
E	1.5		V	3.0	

d : Represents the assembly lot number

　　0~9, A~Z repeated (I,O,X excepted)

# ELM85xxxxA CMOS 600mA/800mA LDO voltage regulator

■Typical characteristics

• 3.0V Vout unit (ELM8530xxA)
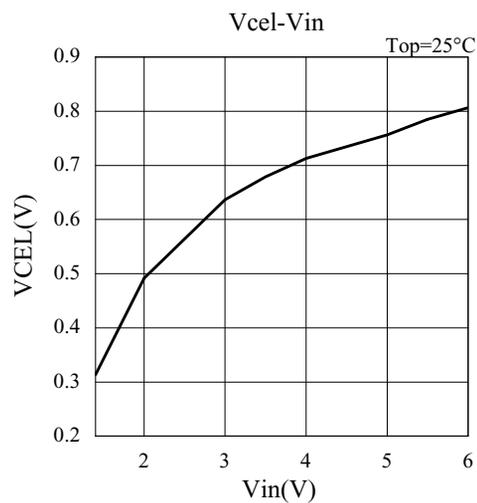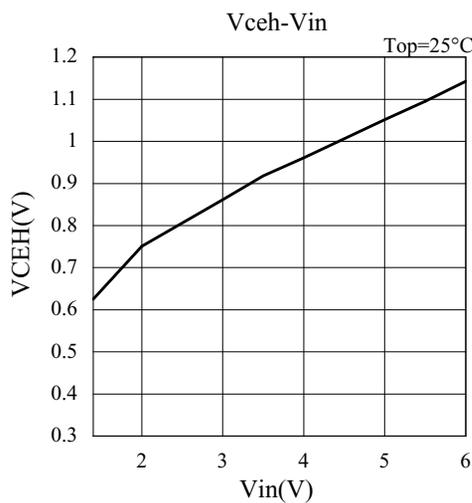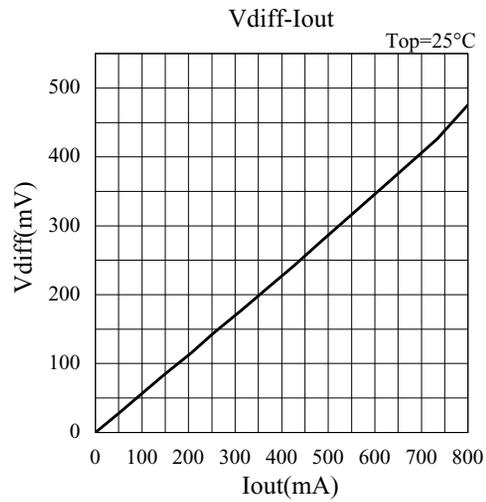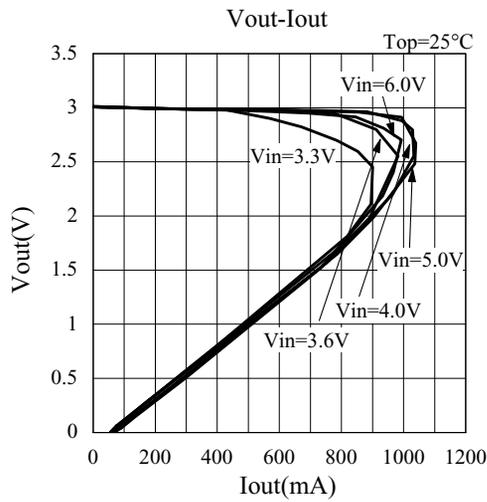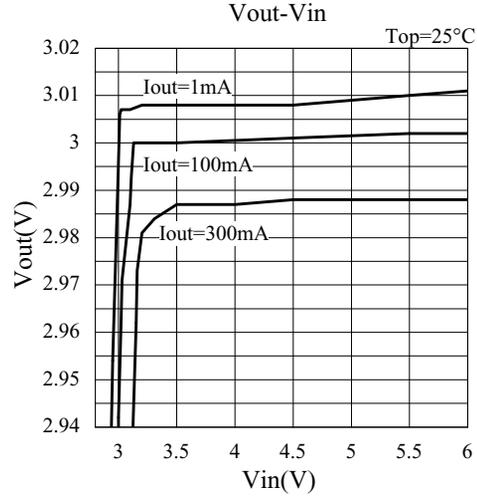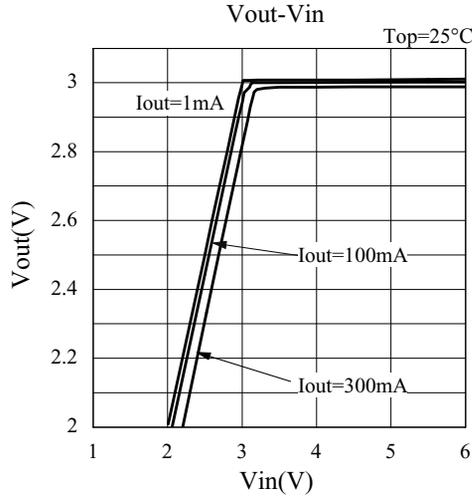
# ELM85xxxxA CMOS 600mA/800mA LDO voltage regulator

Load Transient Response

Ci=Co=4.7 μ F

Vin=4.0V

Output Voltage

Output Current

100mA

10mA

Output Voltage(V)

Time(μ S)

Input Transient Response

Iout=100mA, tr=tf=5.0μS, Co=4.7μF

Input Voltage

Output Voltage

Input,Output Voltage(V)

Time(μS)

Iss-Vin

Top=25°C

Iss(μA)

Vin(V)

Ripple Rejection

Vin=4.0V, Iout=40mA, Co=4.7μF

Ripple Rejection(dB)

Frequency(Hz)
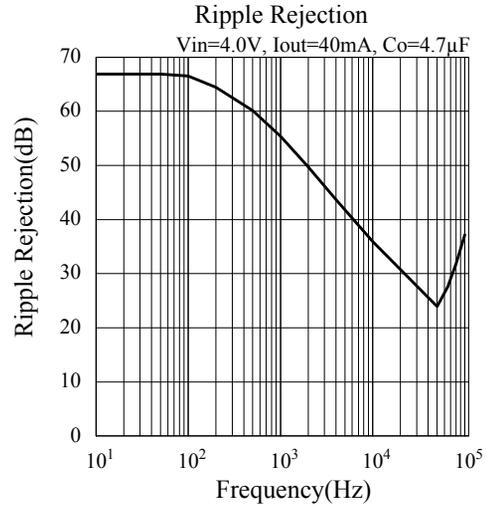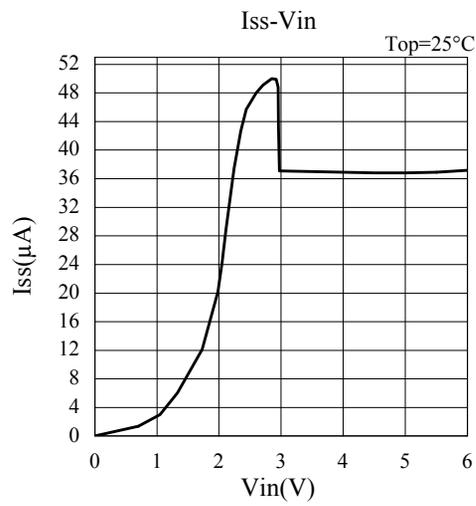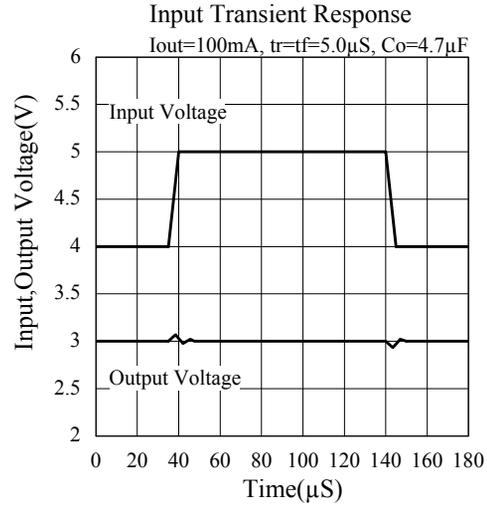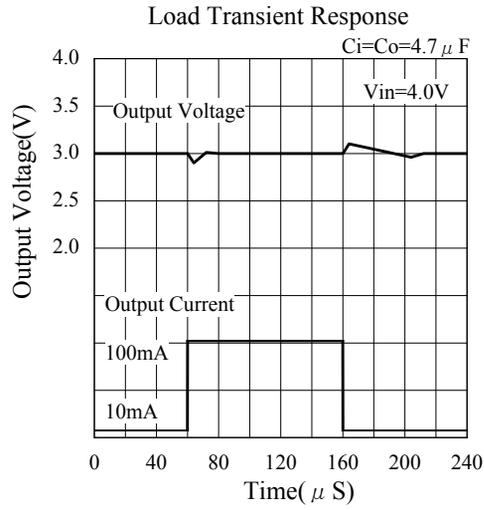
ELM85xxxxA CMOS 600mA/800mA LDO voltage regulator

- 3.3V Vout unit (ELM8533xxA)

Load Transient Response

Ci=Co=4.7 μF

Input Transient Response

Iout=100mA, tr=tf=5.0µS, Co=4.7µF

Iss-Vin

Top=25°C

Ripple Rejection

Vin=4.3V, Iout=40mA, Co=4.7µF