■General description

ELM86xxxxBxA is dual CMOS Voltage Regulator which consists of 2 large current LDOs. With the chip enable function of each channel, it is possible to control on/off independently. This chip enable control logic is managed by positive logic. The standby current is designed to be 0.1μA (Typ.). ELM86 series is available only in SOT-26 PKG, while the output voltage is fixed within the range of 1.2 ～ 4.0V. The internal short protection function will limit output current when VOUT pin is in short condition; meanwhile, thermal protection circuit will shut off the output voltage and current when an unusual high chip temperature is detected.

■Features

- Output voltage range : 1.2V～4.0V (by 0.1V)
- Input-output voltage difference : Typ.120mV (Vout=3.0V, Iout=100mA)
- Standby current consumption : Typ. 0.1μA
- Current consumption : Typ. 25μA
- Input stability : Typ. 0.02%/V (Iout=40mA)
- Load stability : Typ. 5mV (1mA≦Iout≦100mA)
- Accuracy of output voltage : ±2.0% (Vout＞1.5V),
  ±30mV (Vout≦1.5V)
- Short circuit current limiter : Typ. 40mA (Vout=0V)
- Thermal shutdown protection : Typ. 165℃
- Package : SOT-26

■Application

- Portable electronics
- Wireless devices
- Cell phones
- Battery-operated devices

■Maximum absolute ratings

Parameter	Symbol	Limit	Unit
Input voltage	Vin	Vss-0.3～10.0	V
CE1,CE2 Input voltage	Vce	Vss-0.3～Vin+0.3	V
Vout1,Vout2 voltage	Vout	Vss-0.3～Vin+0.3	V
Output current Iout1+Iout2	Iout	800	mA
Power dissipation	Pd	300	mW
Thermal resistance junction to ambient	Rθja	400	℃/W
Operationg Temperature	Top	-40～+85	℃
Storage Temperature	Tstg	-55～+125	℃

■Selection guide

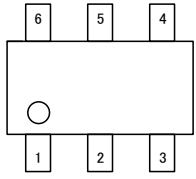
ELM86xxxxBxA-S

Symbol		
a,b	Output voltage1 (Vout1)	e.g. : 12: Vout=1.2V 18: Vout=1.8V 30: Vout=3.0V 33: Vout=3.3V
c,d	Output voltage2 (Vout2)	e.g. : 12: Vout=1.2V 18: Vout=1.8V 30: Vout=3.0V 33: Vout=3.3V
e	Package	B : SOT-26
f	Pin configuration type	1 : Type1 2 : Type2
g	Product version	A
h	Taping direction	S : Refer to PKG file

ELM86 x x x x B x A - S
↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑
a b c d e f g h

■Pin configuration

SOT-26 (TOP VIEW)



ELM86xxxxB1A

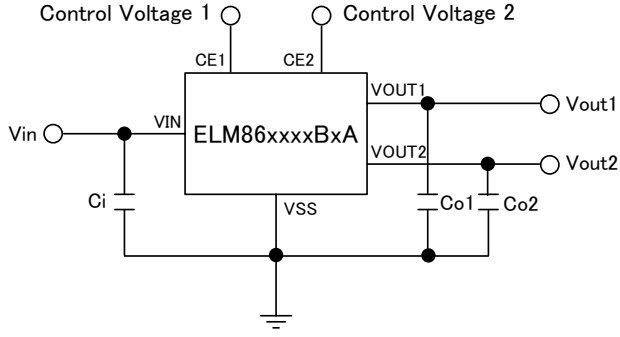
Pin No.	Pin name
1	VOUT2
2	VSS
3	CE2 *
4	CE1 *
5	VIN
6	VOUT1

ELM86xxxxB2A

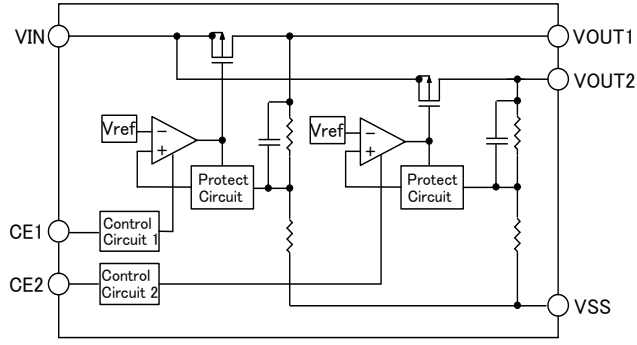
Pin No.	Pin name
1	CE1 *
2	VIN
3	CE2 *
4	VOUT2
5	VSS
6	VOUT1

* CE1,CE2 : Active high

■Standard circuit



■Block diagram



■Electrical characteristics

Vout1, Vout2=1.2V (ELM861212BxA) Top=25℃

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	240			mA
Input stability	ΔVout/ΔVin	Iout=40mA, 1.7V≦Vin≦6.0V		0.02	0.20	%/V
Load stability	ΔVout/ΔIout	1mA≦Iout≦100mA, Vin=2.2V		5	20	mV
Input−Output voltage differential	Vdif	Iout=100mA		380	620	mV
Current consumption	Iss	Vin=Vce=2.2V, No-load		15	50	μA
Standby current consumption	Istandby	Vin=2.2V, Vce=0V		0.1	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	0.00		0.25	V
CE input current High	Iceh	Vin=Vce=2.2V	−0.5	0.05	0.5	μA
CE input current Low	Icel	Vin=2.2V, Vce=0V	−0.5	0.0	0.5	μA
Output voltage temperature coefficient	ΔVout/ΔTop	−40℃≦Top≦+85℃, Iout=40mA, Vin=2.2V		±100		ppm/℃
Short circuit current	Ilim	Vout=0V		40		mA
Ripple rejection ratio	RR	f=1kHz, Iout=40mA		60		dB
Thermal shutdown temperature	Tsd			165		℃
Output noise	Vno	BW=10Hz ～ 100kHz		30		μVrms

*: Electrical characteristics of both channels are identical while this table only represents those of one channel.

Vout1, Vout2=1.8V (ELM861818BxA) Top=25℃

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	ΔVout/ΔVin	Iout=40mA, 2.3V≦Vin≦6.0V		0.02	0.20	%/V
Load stability	ΔVout/ΔIout	1mA≦Iout≦100mA, Vin=2.8V		5	20	mV
Input-Output voltage differential	Vdif	Iout=100mA		145	230	mV
Current consumption	Iss	Vin=Vce=2.8V, No-load		15	50	μA
Standby current consumption	Istandby	Vin=2.8V, Vce=0V		0.1	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	0.00		0.25	V
CE input current High	Iceh	Vin=Vce=2.8V	-0.5	0.05	0.5	μA
CE input current Low	Icel	Vin=2.8V, Vce=0V	-0.5	0.0	0.5	μA
Output voltage temperature coefficient	ΔVout/ΔTop	-40℃≦Top≦+85℃, Iout=40mA, Vin=2.8V		±100		ppm/℃
Short circuit current	Ilim	Vout=0V		40		mA
Ripple rejection ratio	RR	f=1kHz, Iout=40mA		60		dB
Thermal shutdown temperature	Tsd			165		℃
Output noise	Vno	BW=10Hz ～ 100kHz		30		μVrms

*: Electrical characteristics of both channels are identical while this table only represents those of one channel.

Vout1, Vout2=3.0V (ELM863030BxA) Top=25℃

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	400			mA
Input stability	ΔVout/ΔVin	Iout=40mA, 3.5V≦Vin≦6.0V		0.02	0.20	%/V
Load stability	ΔVout/ΔIout	1mA≦Iout≦100mA, Vin=4.0V		5	20	mV
Input-Output voltage differential	Vdif	Iout=100mA		110	175	mV
Current consumption	Iss	Vin=Vce=4.0V, No-load		15	50	μA
Standby current consumption	Istandby	Vin=4.0V, Vce=0V		0.1	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	0.00		0.25	V
CE input current High	Iceh	Vin=Vce=4.0V	-0.5	0.05	0.5	μA
CE input current Low	Icel	Vin=4.0V, Vce=0V	-0.5	0.0	0.5	μA
Output voltage temperature coefficient	ΔVout/ΔTop	-40℃≦Top≦+85℃, Iout=40mA, Vin=4.0V		±100		ppm/℃
Short circuit current	Ilim	Vout=0V		40		mA
Ripple rejection ratio	RR	f=1kHz, Iout=40mA		60		dB
Thermal shutdown temperature	Tsd			165		℃
Output noise	Vno	BW=10Hz ～ 100kHz		30		μVrms

*: Electrical characteristics of both channels are identical while this table only represents those of one channel.

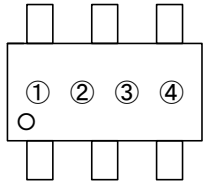
Vout1, Vout2=3.3V (ELM863333BxA) Top=25℃

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	400			mA
Input stability	ΔVout/ΔVin	Iout=40mA, 3.8V≦Vin≦6.0V		0.02	0.20	%/V
Load stability	ΔVout/ΔIout	1mA≦Iout≦100mA, Vin=4.3V		5	20	mV
Input-Output voltage differential	Vdif	Iout=100mA		110	175	mV
Current consumption	Iss	Vin=Vce=4.3V, No-load		15	50	μA
Standby current consumption	Istandby	Vin=4.3V, Vce=0V		0.1	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	0.00		0.25	V
CE input current High	Iceh	Vin=Vce=4.3V	-0.5	0.05	0.5	μA
CE input current Low	Icel	Vin=4.3V, Vce=0V	-0.5	0.0	0.5	μA
Output voltage temperature coefficient	ΔVout/ΔTop	-40℃≦Top≦+85℃, Iout=40mA, Vin=4.3V		±100		ppm/℃
Short circuit current	Ilim	Vout=0V		40		mA
Ripple rejection ratio	RR	f=1kHz, Iout=40mA		60		dB
Thermal shutdown temperature	Tsd			165		℃
Output noise	Vno	BW=10Hz ～ 100kHz		30		μVrms

*: Electrical characteristics of both channels are identical while this table only represents those of one channel.

■Marking

SOT-26

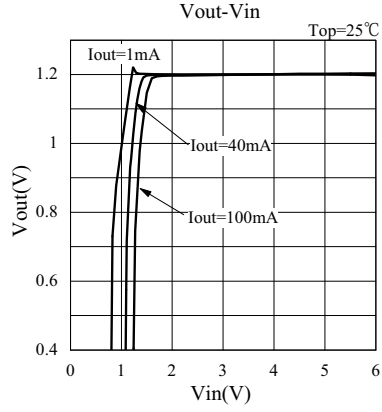


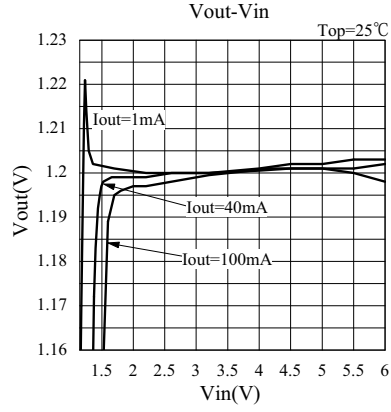
No. ①～④ : Assembly lot No.
A～Z (I, O, X excepted) and 0～9

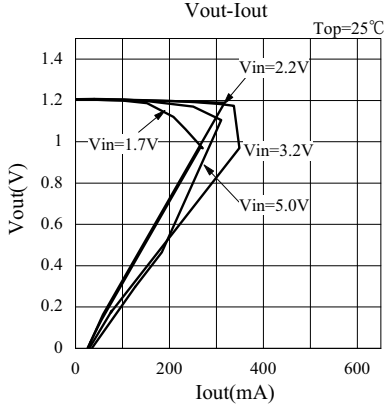
■Typical characteristics

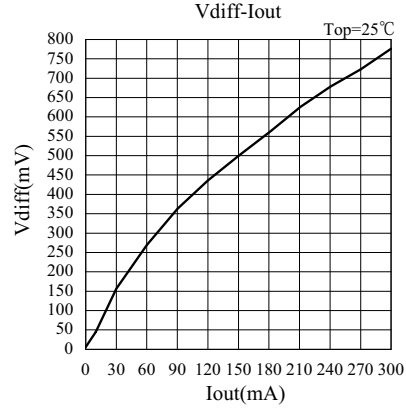
(Electrical characteristics of both channels are identical and the following graphs represent typical characteristics of one channel.)

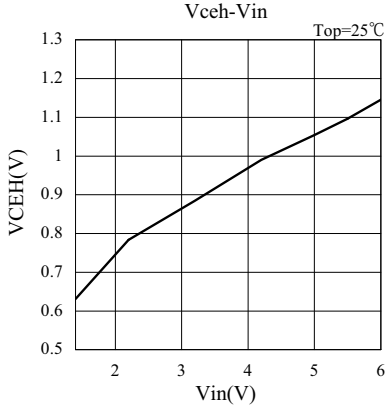
・1.2V Vout unit

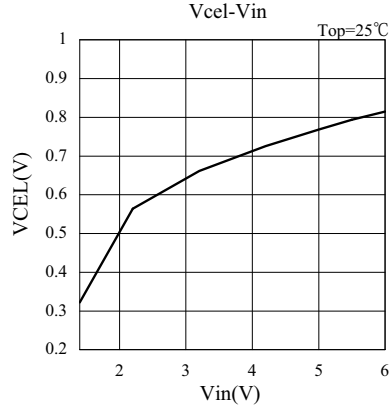


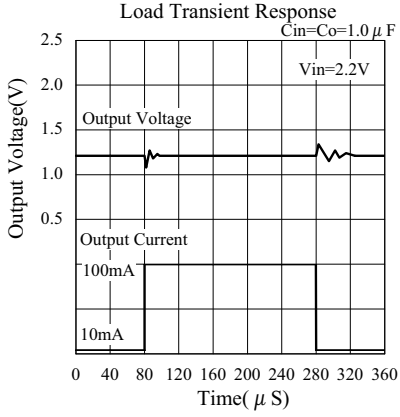


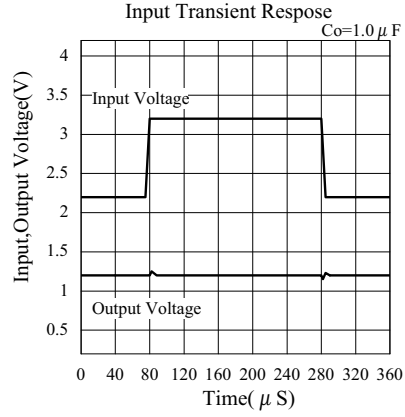


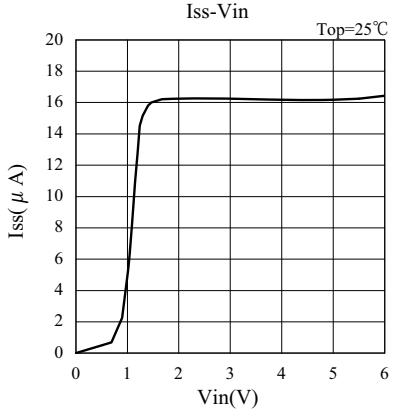


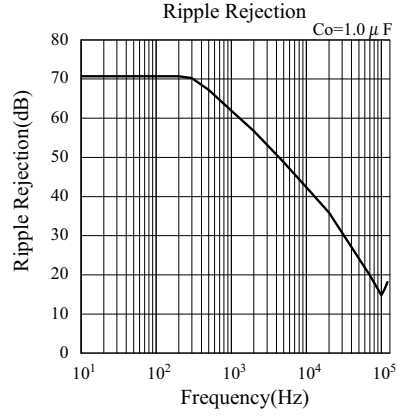




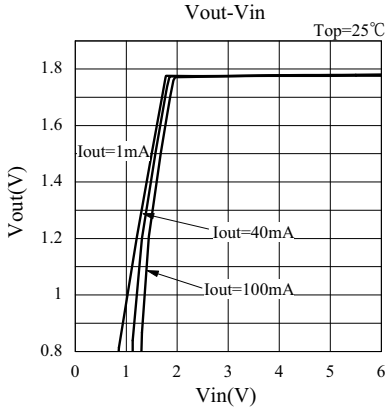

Load Transient Response
Cin=Co=1.0μF
Vin=2.2V
Output Voltage
Output Current
100mA
10mA
Output Voltage(V)
2.5
2.0
1.5
1.0
0.5
0 40 80 120 160 200 240 280 320 360
Time(μS)

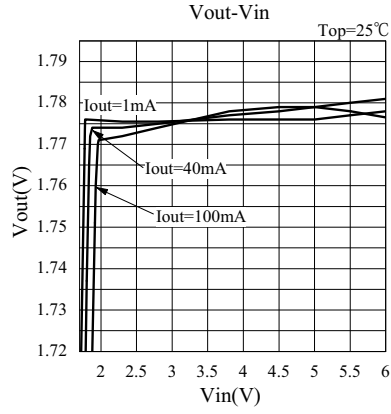

Input Transient Respose
Co=1.0μF
Input Voltage
Output Voltage
Input,Output Voltage(V)
4
3.5
3
2.5
2
1.5
1
0.5
0 40 80 120 160 200 240 280 320 360
Time(μS)

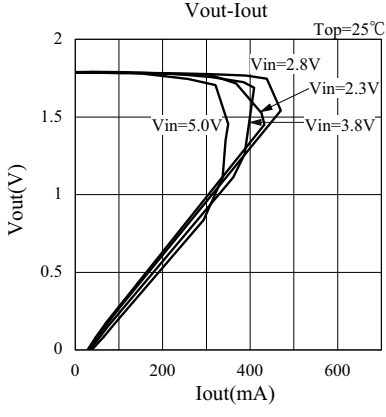

Iss-Vin
Top=25℃
Iss(μA)
20
18
16
14
12
10
8
6
4
2
0
0 1 2 3 4 5 6
Vin(V)

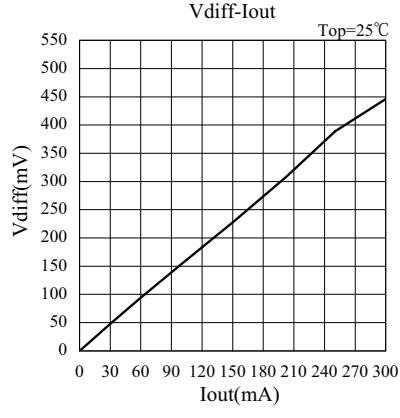

Ripple Rejection
Co=1.0μF
Ripple Rejection(dB)
80
70
60
50
40
30
20
10
0
10¹ 10² 10³ 10⁴ 10⁵
Frequency(Hz)

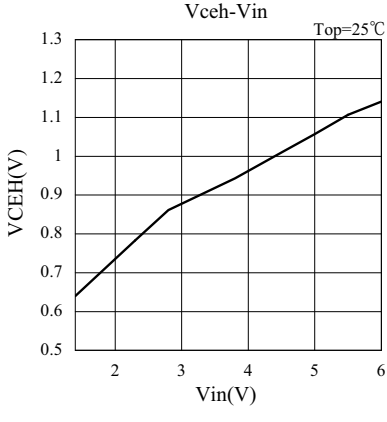
・1.8V Vout unit

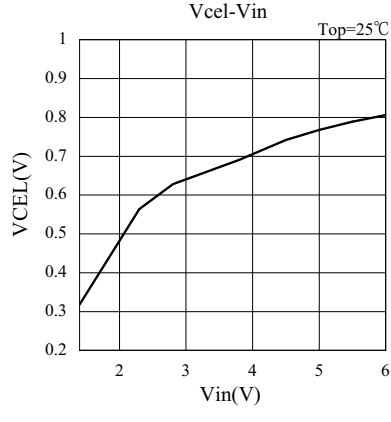


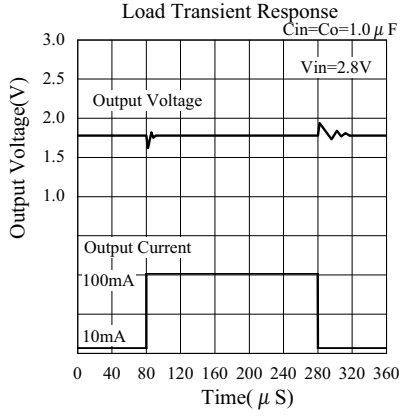


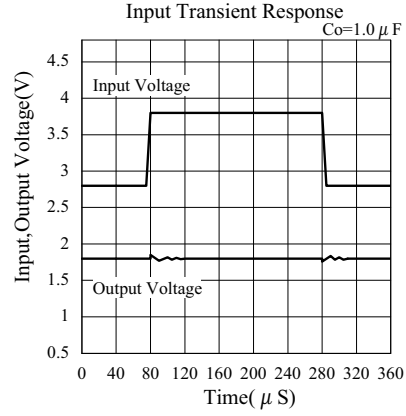


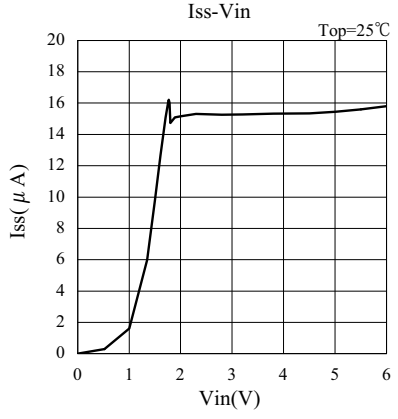


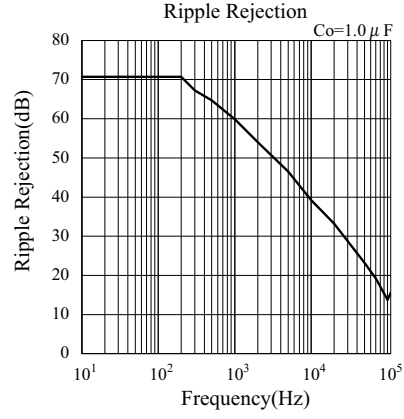




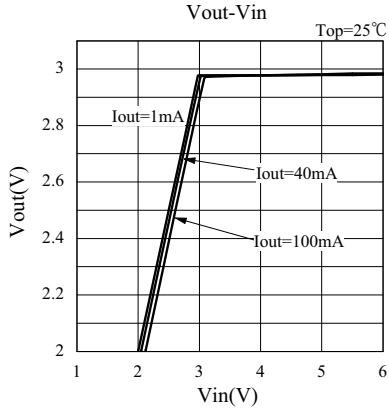

Load Transient Response
Cin=Co=1.0μF
Vin=2.8V
Output Voltage
Output Current
100mA
10mA
Output Voltage(V)
3.0
2.5
2.0
1.5
1.0
0 40 80 120 160 200 240 280 320 360
Time(μS)

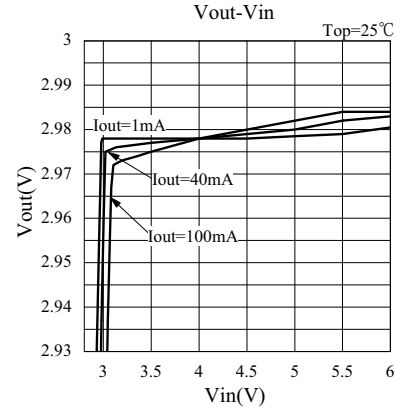

Input Transient Response
Co=1.0μF
Input Voltage
Output Voltage
Input,Output Voltage(V)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0 40 80 120 160 200 240 280 320 360
Time(μS)

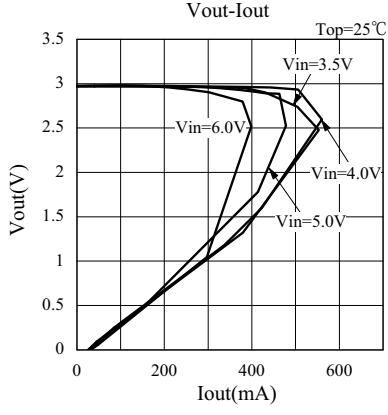

Iss-Vin
Top=25℃
Iss(μA)
20
18
16
14
12
10
8
6
4
2
0
0 1 2 3 4 5 6
Vin(V)

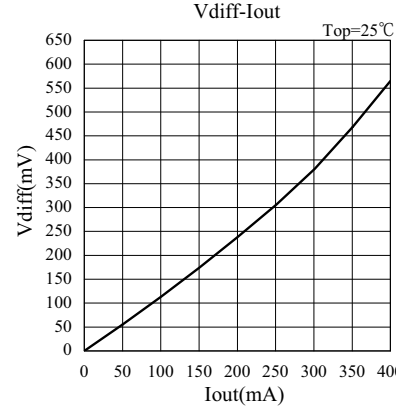

Ripple Rejection
Co=1.0μF
Ripple Rejection(dB)
80
70
60
50
40
30
20
10
0
10¹ 10² 10³ 10⁴ 10⁵
Frequency(Hz)

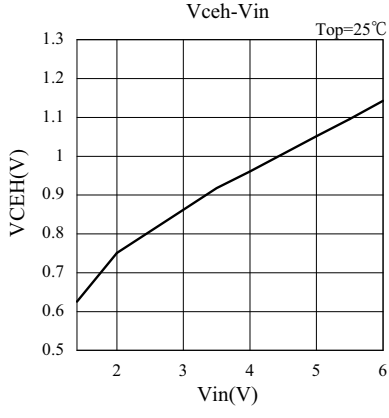
・3.0V Vout unit

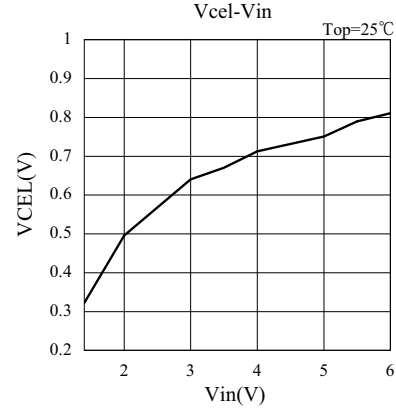


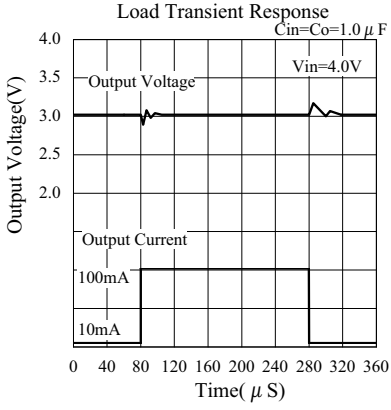


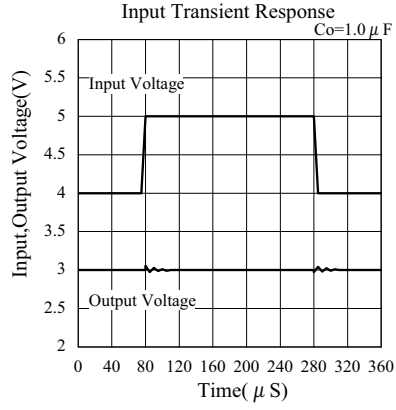


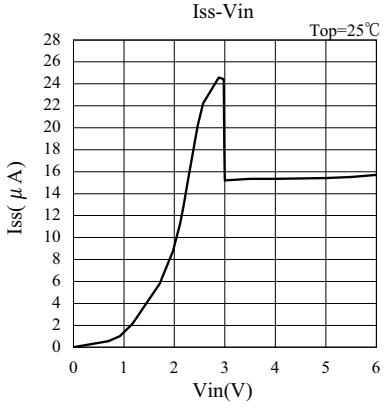


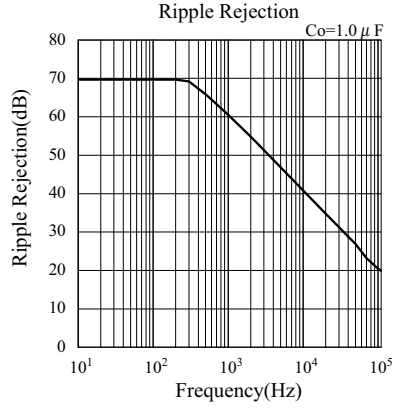




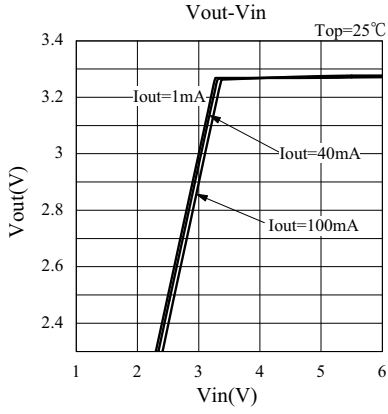

Load Transient Response
Cin=Co=1.0μF
Vin=4.0V
Output Voltage
Output Current
100mA
10mA
Output Voltage(V)
4.0
3.5
3.0
2.5
2.0
0 40 80 120 160 200 240 280 320 360
Time(μS)

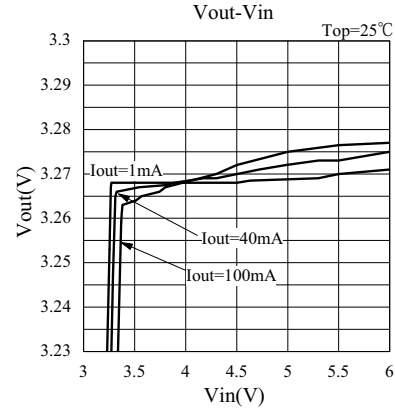

Input Transient Response
Co=1.0μF
Input Voltage
Output Voltage
Input,Output Voltage(V)
6
5.5
5
4.5
4
3.5
3
2.5
2
0 40 80 120 160 200 240 280 320 360
Time(μS)

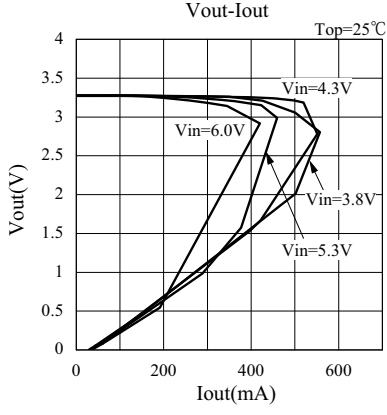

Iss-Vin
Top=25℃
Iss(μA)
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
0 1 2 3 4 5 6
Vin(V)

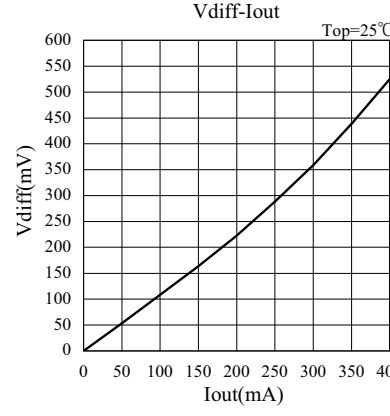

Ripple Rejection
Co=1.0μF
Ripple Rejection(dB)
80
70
60
50
40
30
20
10
0
10¹ 10² 10³ 10⁴ 10⁵
Frequency(Hz)

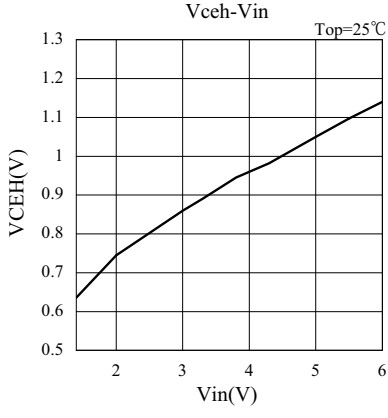
・3.3V Vout unit

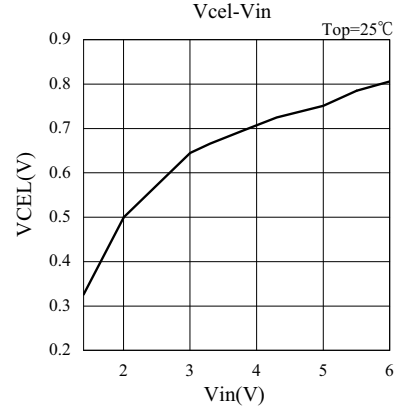


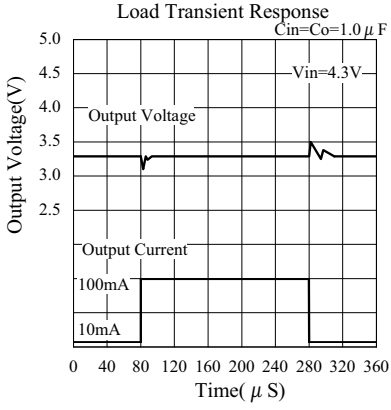


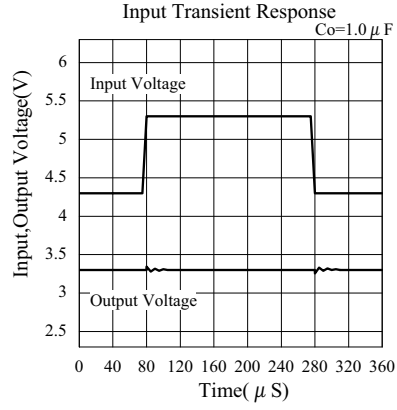


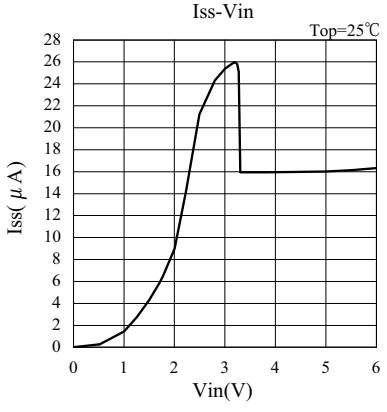


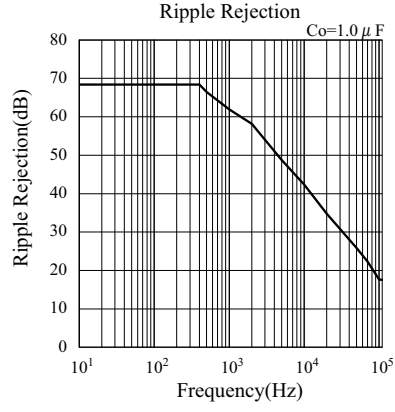





Load Transient Response
Cin=Co=1.0μF
Vin=4.3V
Output Voltage
Output Current
100mA
10mA
Output Voltage(V)
5.0
4.5
4.0
3.5
3.0
2.5
0 40 80 120 160 200 240 280 320 360
Time(μS)


Input Transient Response
Co=1.0μF
Input Voltage
Output Voltage
Input,Output Voltage(V)
6
5.5
5
4.5
4
3.5
3
2.5
0 40 80 120 160 200 240 280 320 360
Time(μS)


Iss-Vin
Top=25℃
Iss(μA)
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
0 1 2 3 4 5 6
Vin(V)


Ripple Rejection
Co=1.0μF
Ripple Rejection(dB)
80
70
60
50
40
30
20
10
0
10¹ 10² 10³ 10⁴ 10⁵
Frequency(Hz)