1000mA Regulator IC
Monolithic IC MM342XX

Outline

This IC is a series regulator that has been developed to be the best choice for stationary as well as mobile equipment in which power consumption shall be reduced when the power is off or the equipment is in its standby mode.
The regulator can output the maximum current of 1000mA.
This IC has a chip enable function and the model implemented in the smaller SSON-6 package is also available for the high-density packaging.

Features

1.	Consumption current under no load condition	45μA typ.
2.	Consumption current when power is off	0.1μA typ
3.	High ripple rejection	70dB / 1kHz
4.	Output capacitor	Compatible with 1μF ceramic capacitor
5.	Protection circuit	Current limit circuit and Thermal shutdown circuit

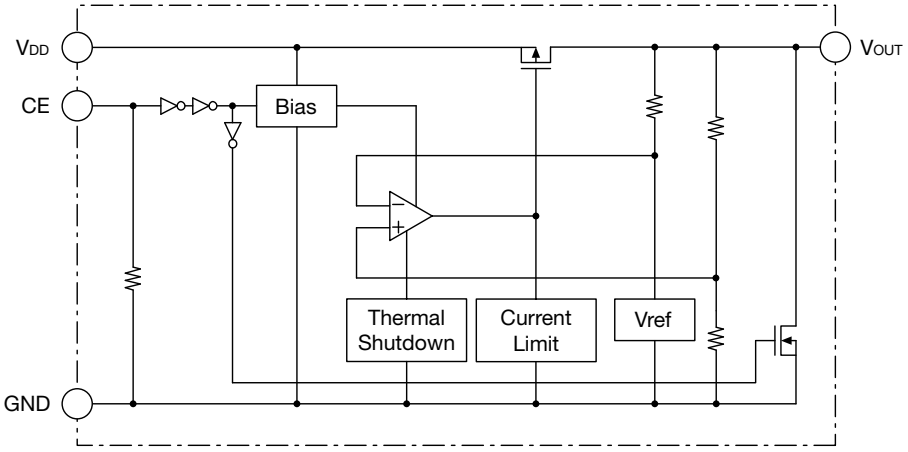
Package

SSON-6
HSOP-8A
SOT-25A

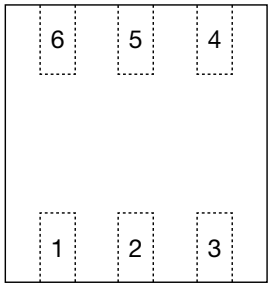
Applications

1. TVs
2. Portable equipments
3. DVD, Blu-ray recorders

Block Diagram

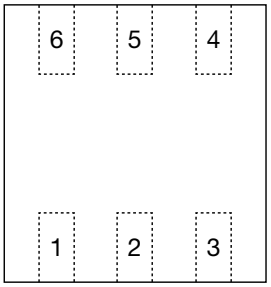


Pin Assignment



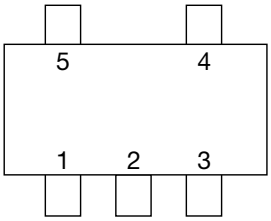
HSOP-8A
(TOP VIEW)

1	VDD
2	NC
3	VOUT
4	NC
5	GND
6	CE



SSON-6
(TOP VIEW)

1	VDD
2	NC
3	VOUT
4	NC
5	GND
6	CE



SOT-25A
(TOP VIEW)

1	VDD
2	GND
3	CE
4	NC
5	VOUT

Pin Description

HSOP-8A

Pin No.	Pin name	Functions
1	V_{DD}	Voltage-supply pin
2,4	NC	No connection
3	V_{OUT}	Outout pin
5	GND	Ground pin
6	CE	ON/OFF-Control pin CE: Low = OFF, High = ON Connect CE pin with V_{DD} pin, when it is not used.

SSON-6

Pin No.	Pin name	Functions
1	V_{DD}	Voltage-supply pin
2,4	NC	No connection
3	V_{OUT}	Outout pin
5	GND	Ground pin
6	CE	ON/OFF-Control pin CE: Low = OFF, High = ON Connect CE pin with V_{DD} pin, when it is not used.

SOT-25A

Pin No.	Pin name	Functions
1	V_{DD}	Voltage-supply pin
2	GND	Ground pin
3	CE	ON/OFF-Control pin CE: Low = OFF, High = ON Connect CE pin with V_{DD} pin, when it is not used.
4	NC	No connection
5	V_{OUT}	Outout pin

Absolute Maximum Ratings (Except where noted otherwise Ta=25°C)

Item	Symbol	Ratings		Units
Storage temperature	T_{STG}	−55~+150		°C
Supply voltage	V_{DD}	6.5		V
CE input voltage	V_{CE}	−0.3~V_{DD}+0.3		V
Output voltage	V_{OUT}	−0.3~V_{DD}+0.3		V
Output current	Iomax	1200mA		mA
Power dissipation	Pd	1300(Note1)	(HSOP-8A)	mW
		180(Note1)	(SSON-6A)	
		350(Note1)	(SOT-25A)	

Note1 : With the double sided PC Board of glass epoxy
(Copper plane 80%, 25 × 25 × 1.6^{t}mm)

Recommended Operating Conditions (Except where noted otherwise Ta=25°C)

Item	Symbol	Ratings	Units
Operating ambient temperature	T_{JOP}	−40~85	°C
Operating voltage	V_{OP}	2~6	V
Output current	I_O	0~1000	mA

Electrical Characteristics 1 (Except where noted otherwise $V_{DD}=V_{OUT}$(typ.)+1V, $V_{CE}=V_{DD}$, Ta=25°C)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Input current(OFF)	I_{DDoff}	V_{CE}=0V		0.1	1.0	µA
No-Load input current	I_{DD}	I_{OUT}=0mA		40	70	µA
Output voltage	V_{OUT}	I_{OUT}=30mA	×0.98		×1.02	V
Line regulation	V_{LINE}	V_{DD}=Vo(typ.)+0.5~6V, I_{OUT}=30mA (V_{OUT}≦1.6V, V_{DD}=2.2~6V)		0.02	0.10	%/V
Load regulation	V_{LOAD}	1mA≦I_{OUT}≦1000mA		50	180	mV
Dropout voltage	Vio	Please refer to another page				V
Ripple rejection 1 (Note2)	RR1	f=1kHz, Vripple=0.5V, I_{OUT}=30mA (V_{OUT}≦1.7V, V_{DD}=V_{OUT}+1.2V)		70		dB
Ripple rejection 2 (Note2)	RR2	f=10kHz, Vripple=0.5V, I_{OUT}=30mA (V_{OUT}≦1.7V, V_{DD}=V_{OUT}+1.2V)		50		dB
V_{OUT} temperature coefficient (Note2)	$\Delta V_{OUT}/\Delta T$	I_{OUT}=30mA −40°C≦T_{OP}≦85°C		±100		ppm/°C
Output noise voltage (Note2)	Vn	f_{BW}=10~100kHz I_{OUT}=30mA		30		µVrms
Output short-circuit current (Note2)	Ilim	V_{OUT}=0V		40		mA
CE Pull-down resistance	Rpd		0.7	2	8	MΩ
CE H threshold voltage	V_{CEH}		1.5		V_{DD}	V
CE L threshold voltage	V_{CEL}		0		0.3	V
Output NMOS ON resistance	R_{DON}	V_{CE}=0V V_{DD}=4V(V_{OUT}<3V)		30		Ω

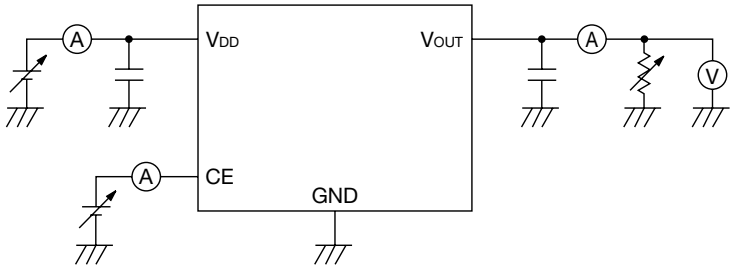
Note2 : The parameter is guaranteed by design.

Electrical Characteristics 2 (Except where noted otherwise $V_{DD}=V_O$(typ.)+1V, $V_{CE}=V_{DD}$, Ta=25°C)

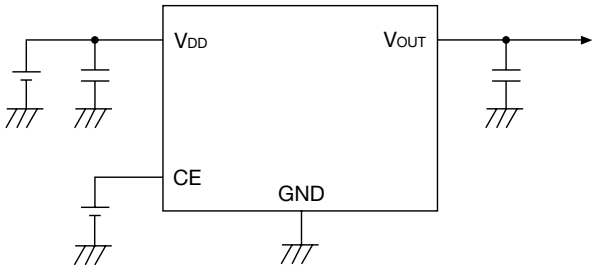
Output voltage Vo1, Vo2	Item							
	Output voltage				Dropout voltage			
	Vo1, Vo2 (V)				Vio1, Vio2 (V)			
	Measurement conditions	Min.	Typ.	Max.	Measurement conditions	Min.	Typ.	Max.
1.5V		1.470	1.500	1.530	(Note3)			
1.6V		1.568	1.600	1.632				
1.7V		1.666	1.700	1.734				
1.8V		1.764	1.800	1.836				
1.9V		1.862	1.900	1.938				
2.0V		1.960	2.000	2.040				
2.1V		2.058	2.100	2.142	2.1V≦Vo≦2.7V Io=1000mA		0.55	1.00
2.2V		2.156	2.200	2.244				
2.3V		2.254	2.300	2.346				
2.4V		2.352	2.400	2.448				
2.5V		2.450	2.500	2.550				
2.6V		2.548	2.600	2.652				
2.7V		2.646	2.700	2.754				
2.8V		2.744	2.800	2.856	2.5V≦Vo≦5.0V		0.46	0.90
2.9V		2.842	2.900	2.958				
3.0V		2.940	3.000	3.060				
3.1V		3.038	3.100	3.162				
3.2V		3.136	3.200	3.264				
3.3V		3.234	3.300	3.366				
3.4V		3.332	3.400	3.468				
3.5V		3.430	3.500	3.570				
3.6V		3.528	3.600	3.672				
3.7V		3.626	3.700	3.774				
3.8V		3.724	3.800	3.876				
3.9V		3.822	3.900	3.978				
4.0V		3.920	4.000	4.080				
4.1V		4.018	4.100	4.182				
4.2V		4.116	4.200	4.284				
4.3V		4.214	4.300	4.386				
4.4V		4.312	4.400	4.488				
4.5V		4.410	4.500	4.590				
4.6V		4.508	4.600	4.692				
4.7V		4.606	4.700	4.794				
4.8V		4.704	4.800	4.896				
4.9V		4.802	4.900	4.998				
5.0V		4.900	5.000	5.100				

Note3 : The parameter is not guaranteed in the model less than Vo=2.0V.

Measuring Circuit



Application Circuit



(Reference example of external parts)

· Output capacitor Ceramic capacitor 1.0µF

· Input capacitor Ceramic capacitor 1.0µF

* Temperature Characteristics : B

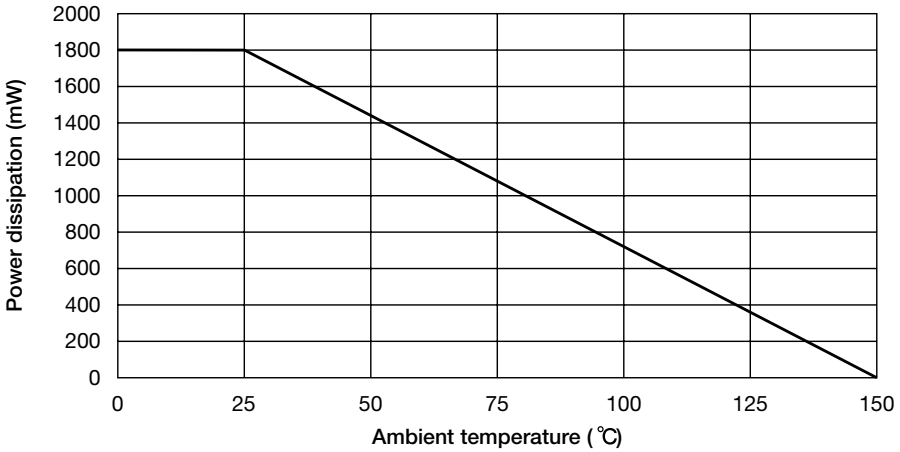
· Note

1. The output capacitor is required between output and GND to prevent oscillation.
2. The ESR of capacitor must be defined in ESR stability area.
   It is possible to use a ceramic capacitor without ESR resistance for output.
   The ceramic capacitor must be used more than 1.0µF and B temperature characteristics.
3. The wire of Vcc and GND is required to print full ground plane for noise and stability.
4. The input capacitor must be connected a distance of less than 1cm from input pin.
5. In case the output voltage is above the input voltage, the overcurrent flow by internal parastic diode from output to input.

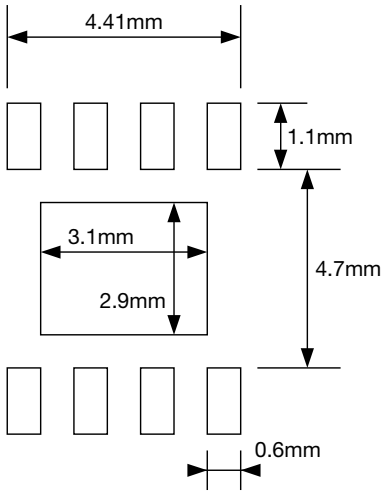
About Power dissipation

This IC's GND pin and Heat Spreader Bottom effectively radiate heat. By increasing these copper foil pattern area of PCB, Power dissipation improves. Please kindly design PCB pattern taking care of above features about power dissipation.

Power Dissipation

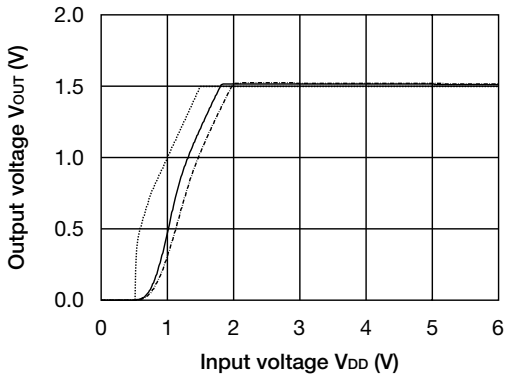


Land Pattern Recommendation

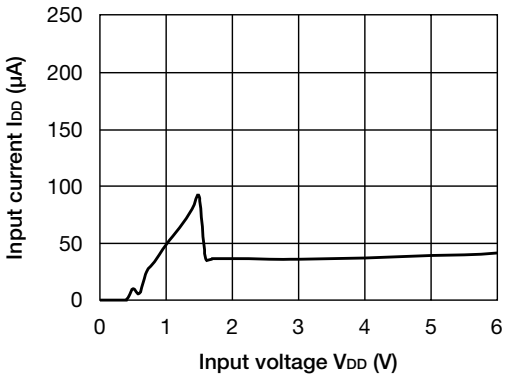


Characteristics (Vo=1.5V) (Except where noted otherwise V_{DD}=V_{OUT} (typ.) +1V, V_{CE}=V_{DD}, Ta=25°C)

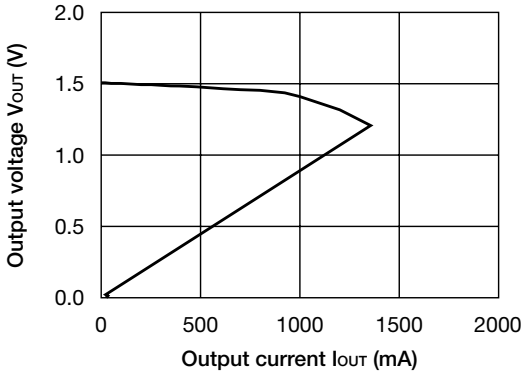
Output – Input voltage



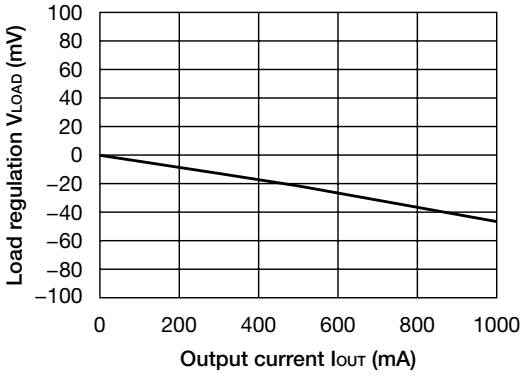
Input current - Input voltage



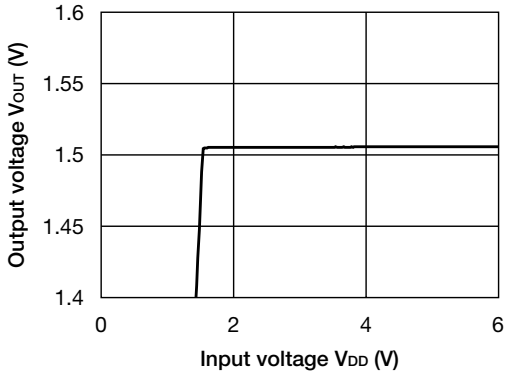
Output voltage - Output current



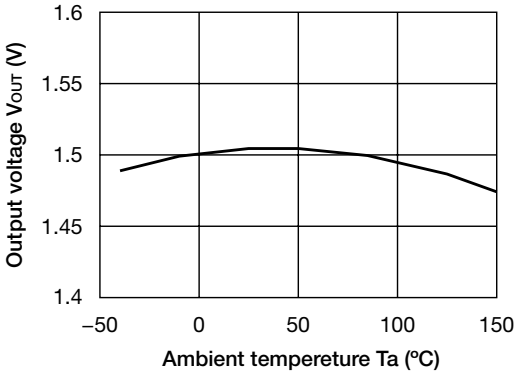
Load regulation



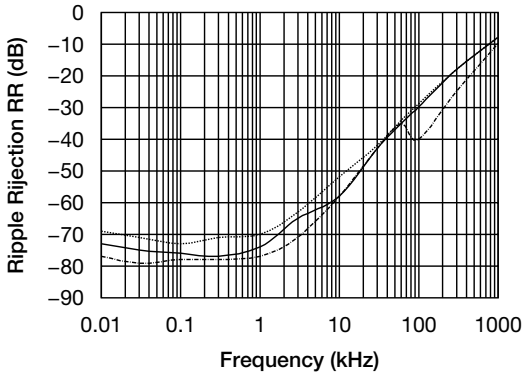
Line regulation



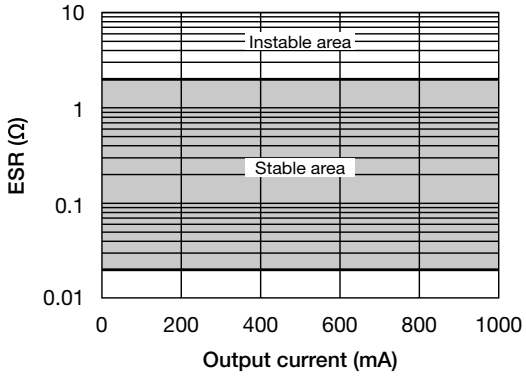
Output voltage - Ambient tempereture



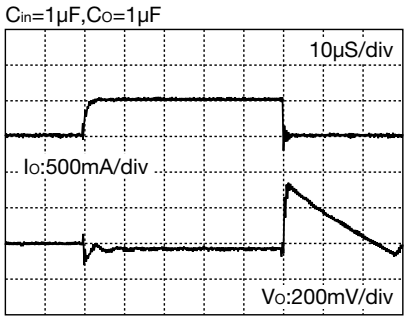
Ripple Rejection



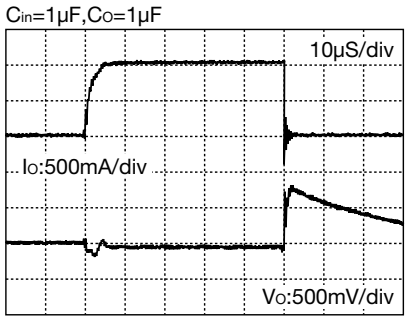
ESR stability area

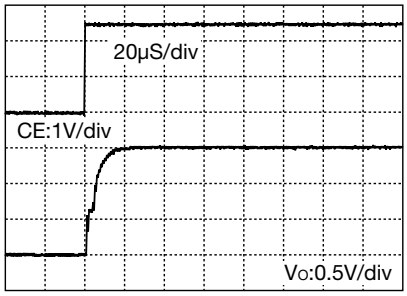


Load transient response (Io=10→500mA)



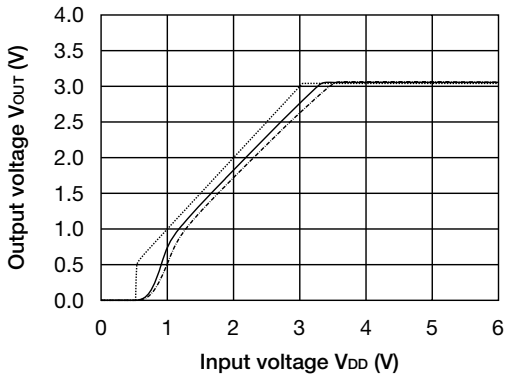
Load transient response (Io=10→1000mA)



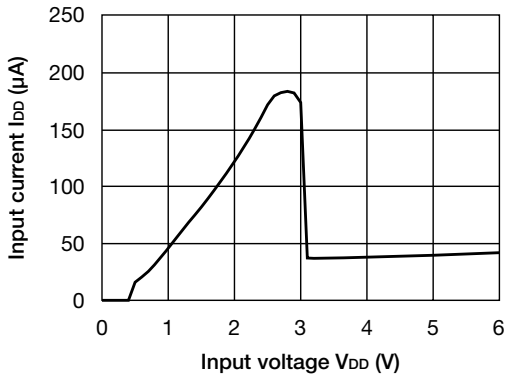


Characteristics (Vo=3.0V) (Except where noted otherwise $V_{DD}=V_{OUT}$ (typ.) +1V, $V_{CE}=V_{DD}$, Ta=25°C)

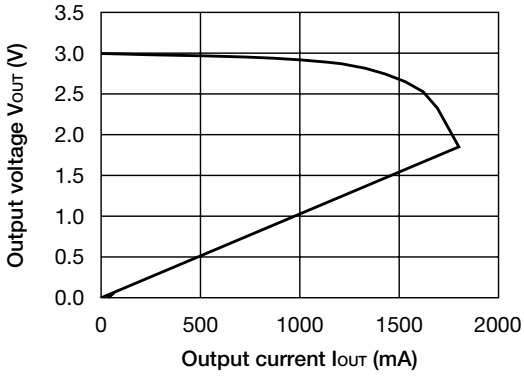
Output – Input voltage



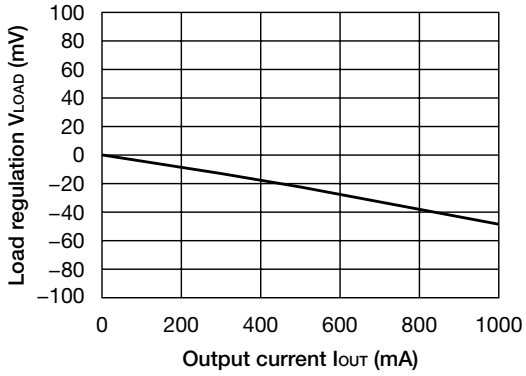
Input current - Input voltage



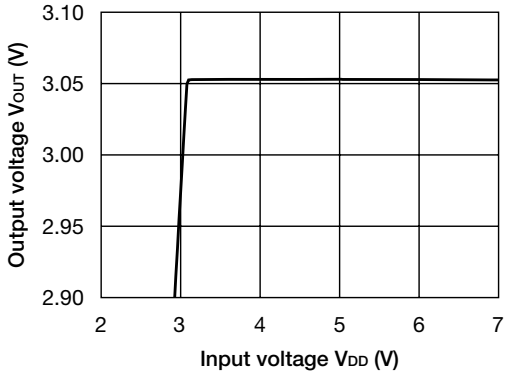
Output voltage - Output current



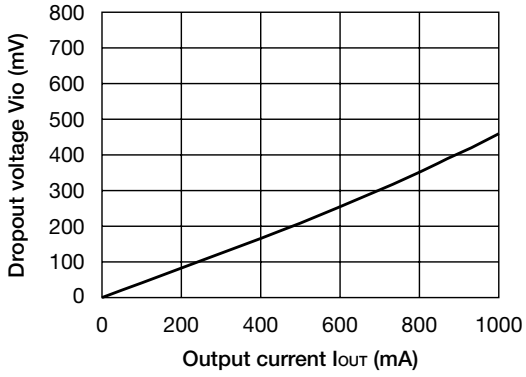
Load regulation



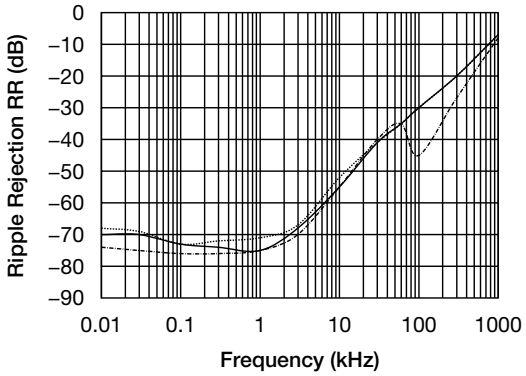
Line regulation



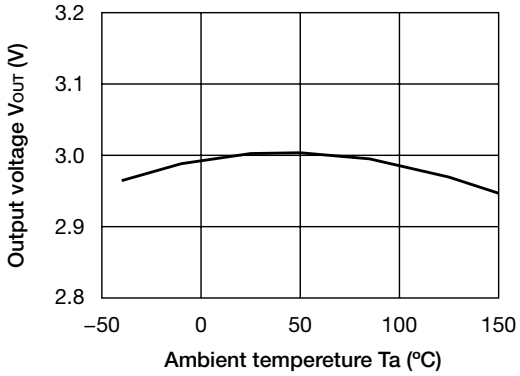
Dropout voltage



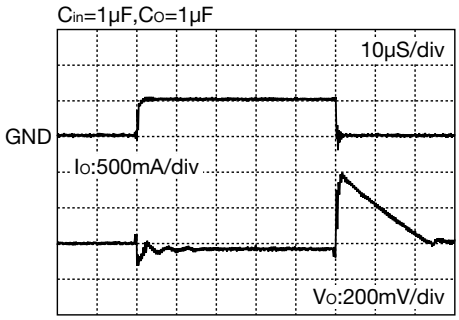
Ripple Rejection



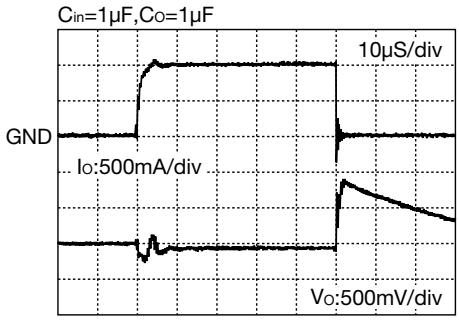
Output voltage - Ambient tempereture



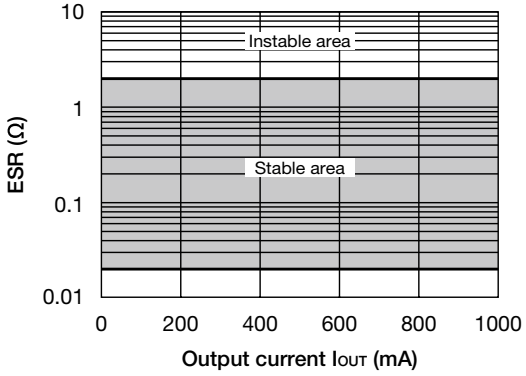
Load transient response (Io=10→500mA)

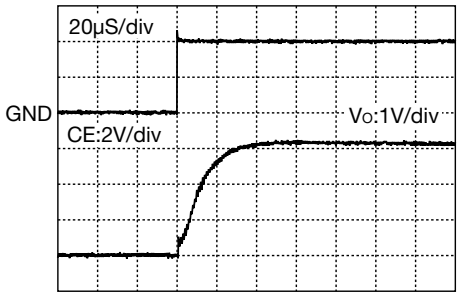


Load transient response (Io=10→1000mA)



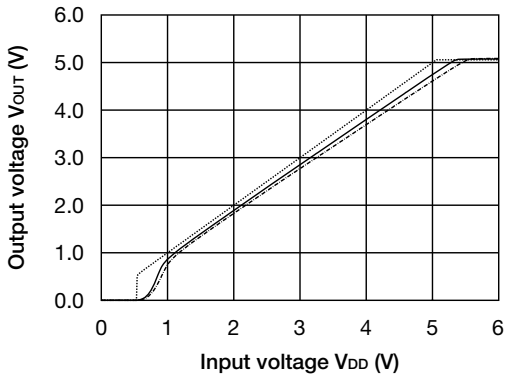
ESR stability area



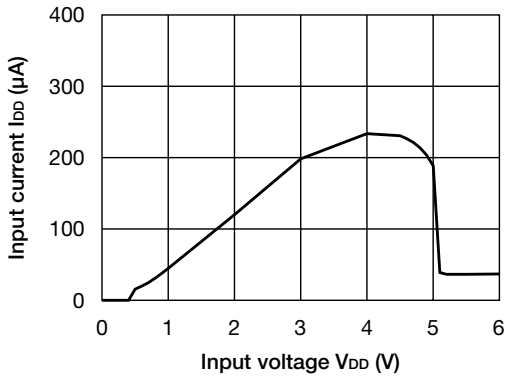


Characteristics (Vo=5.0V) (Except where noted otherwise $V_{DD}=V_{OUT}$ (typ.) +1V, $V_{CE}=V_{DD}$, Ta=25°C)

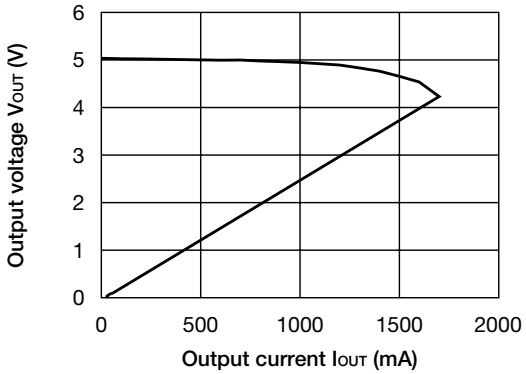
Output – Input voltage



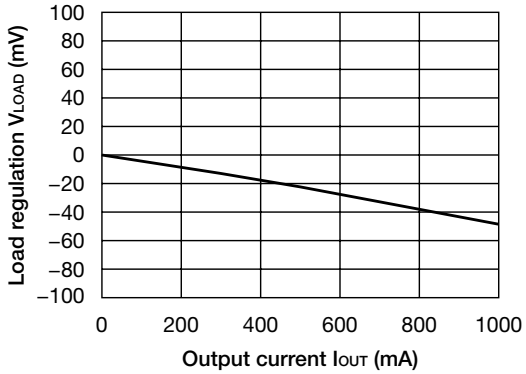
Input current - Input voltage



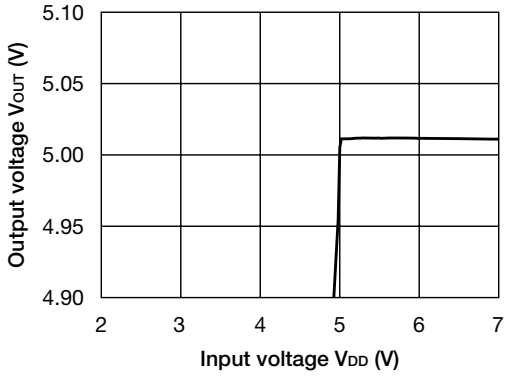
Output voltage - Output current



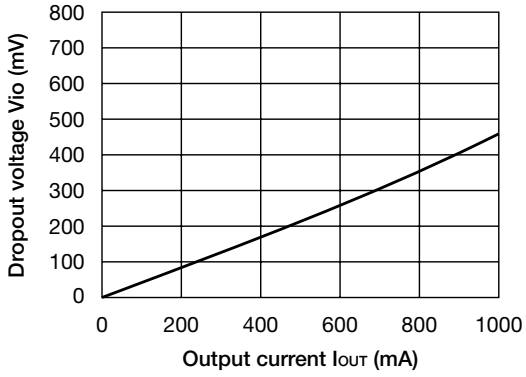
Load regulation



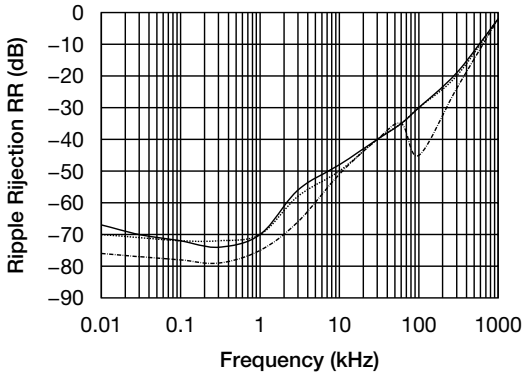
Line regulation



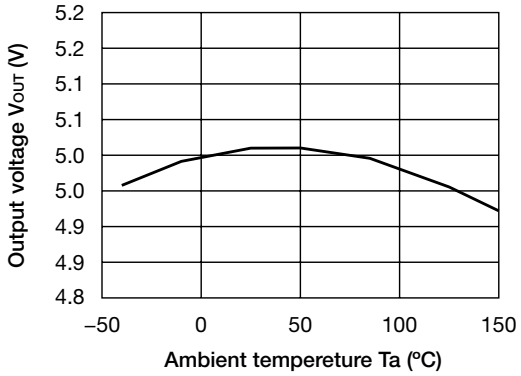
Dropout voltage



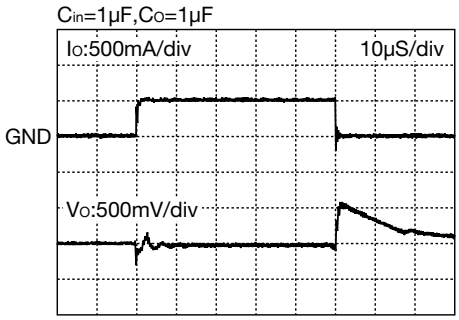
Ripple Rejection



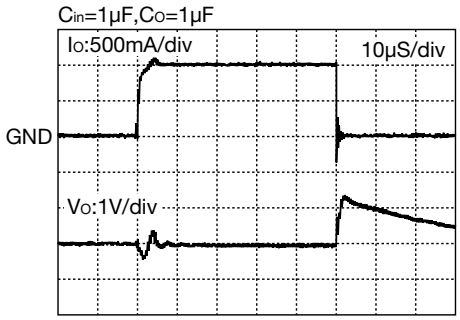
Output voltage - Ambient tempereture



Load transient response (Io=10→500mA)



Load transient response (Io=10→1000mA)



ESR stability area