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LA59700MC

Monolithic Linear IC

Adjustable Voltage Type Regulator

Overview

LA59700MC is an adjustable voltage regulator which has chip enable function.

The maximum current of 1.0A can be output.

Features

- Adjustable output voltage
- Maximum output current: 1.0A
- Chip enable function
- Build-in over current protection circuit
- Available ceramic capacitors

Specifications

Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC \text{ max}}$		16	V
Maximum input voltage	$V_{IN \text{ max}}$		16	V
Allowable power dissipation	$P_d \text{ max}$	Mounted on a specified board *1	1.8	W
Operating temperature	T_{opr}		-40 to +85	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

*1. Specified board: 50mm × 50mm × 1.6mm, glass epoxy double side board.

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

LA59700MC

Recommended Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage (V _{CC1})	V _{CC1}		3.5 to 15	V
Input voltage (V _{CC2})	V _{CC2}		*2 (V _{OUT} +V _{DROP}) to 15	V
Input voltage (EN)	V _{EN}		0 to 15	V
Output voltage	V _{OUT}		1.5 to (V _{CC1} -1.5)	V

*2. V_{DROP}: Dropout voltage

Electrical Characteristics at Ta = 25°C, V_{CC1} = V_{CC2} = 3.5V, V_{EN} = 1.6V, V_{OUT} = 1.5V

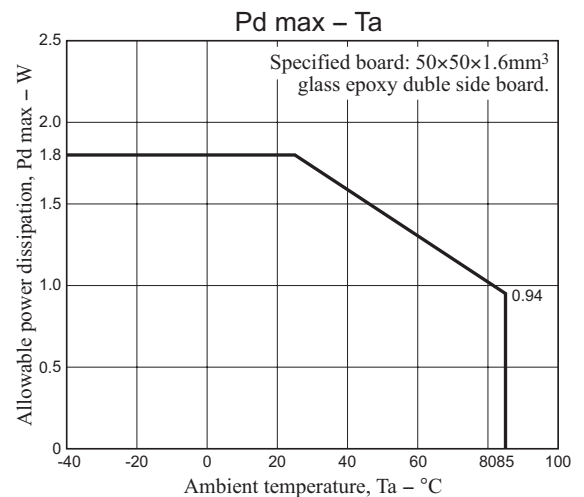
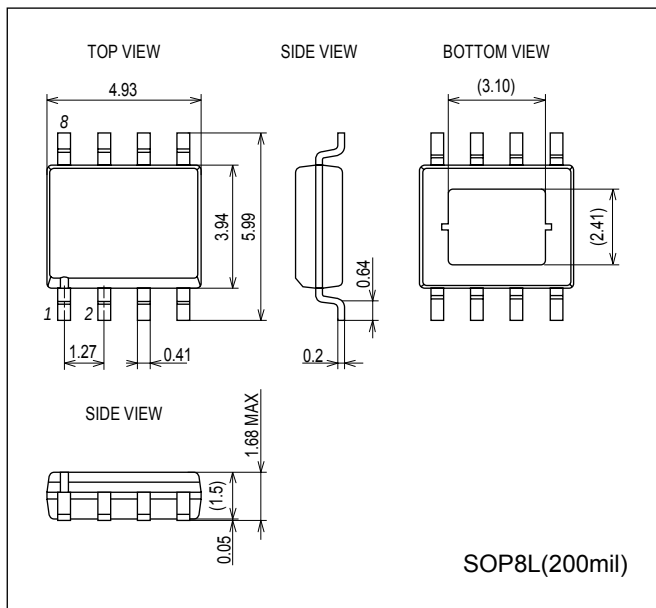
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply current	I _{CC}	V _{EN} = 1.6V		3.5	7	mA
Standby current	I _{STBY}	V _{EN} = 0V			1	μA
Output voltage	V _{OUT}	OUT = ADJ, I _{OUT} = 10mA	1.225	1.25	1.275	V
Output current	I _{OUT}		1.0			A
Dropout voltage (V _{CC2} -V _{OUT})	V _{DROP}	I _{OUT} = 500mA		0.42	0.6	V
		I _{OUT} = 1.0A		0.84	1.2	V
ADJ source current	I _{ADJ}	ADJ = 0V, OUT = Open		160	300	nA
Load regulation	R _{LD}	I _{OUT} = 10mA to 500mA			10	mV
Line regulation	R _{LN}	V _{CC1} = V _{CC2} = 3.5V to 7V, I _{OUT} = 10mA			10	mV
Output voltage temperature coefficient *3	ΔV / ΔT	Ta = -40 to +85°C, I _{OUT} = 10mA		±100		ppm/°C
Ripple rejection *3	R _R	V _{CC1} = V _{CC2} = 4.25V, OUT = ADJ, I _{OUT} = 10mA, V _{Rpp} = 1V, f _{RR} = 120Hz C _{OUT} = Ceramic 10μF		65		dB
Chip enable voltage	V _{EN}		1.6			V
Disable voltage	V _{DIS}				0.4	V
EN input current	I _{EN}	V _{EN} = 1.6V		50		μA
Thermal shutdown temperature *3	T _{TSD}	Junction temperature		170		°C
TSD hysteresis *3	T _{HYS}			30		°C

*3. Design guarantee value, Do not measurement.

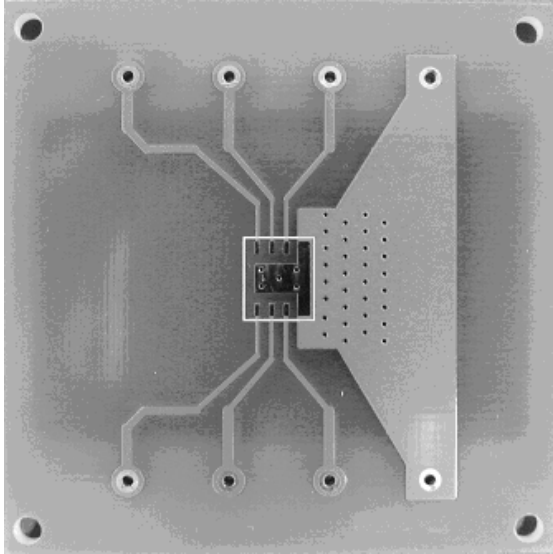
Package Dimensions

unit : mm (typ)

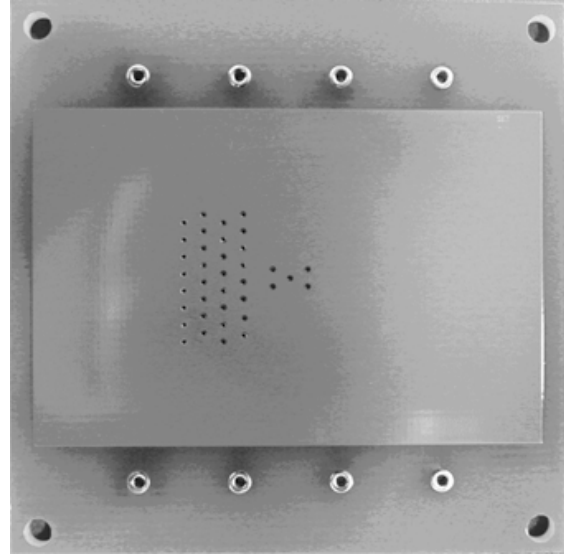
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⟨⟨front⟩⟩

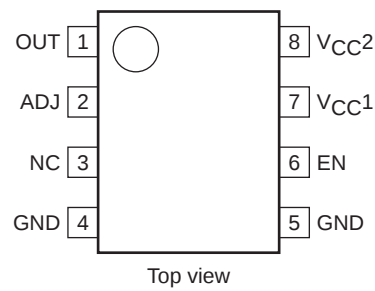


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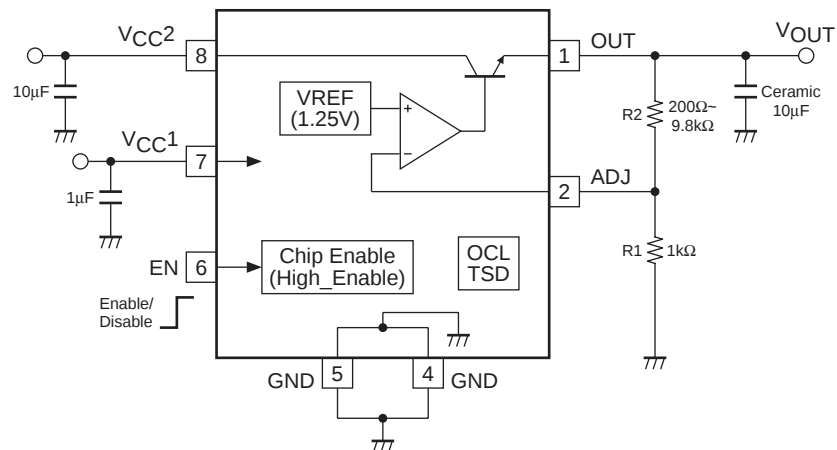


Specification of evaluation board: 50mm × 50mm × 1.6mm, glass epoxy, double side board

Pin Assignment



Block Diagram and Application Circuit Example



Formula of Output Voltage Adjustment

$$V_{OUT} = V_{ADJ} (\approx 1.25V) \times (R1+R2)/R1$$

Note: Set the resistance of R1 and R2 so that a large enough current flows through the two resistors, making the effect on the source current from the ADJ pin negligible.

Startup Method

This IC can be started in one of the following two ways:

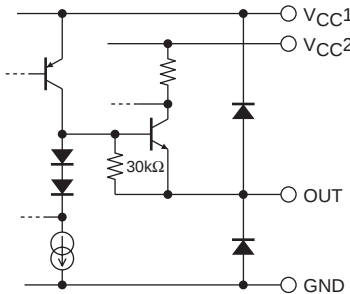
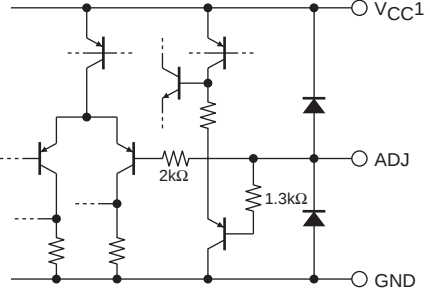
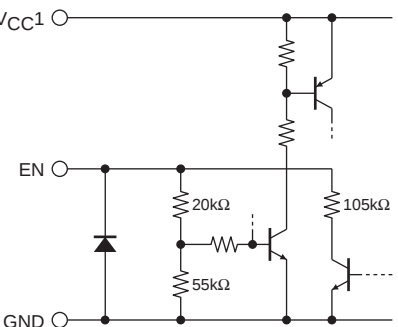
(1) Start the IC by turning on and off the EN pin after applying power to V_{CC1} and V_{CC2}.

(2) Short circuit the V_{CC1}, V_{CC2}, and EN pins.

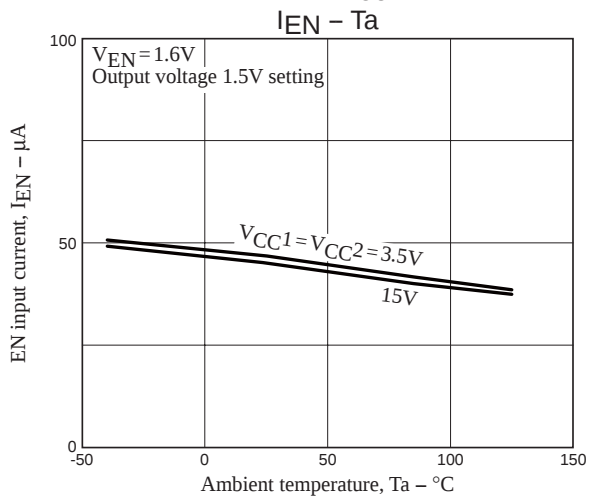
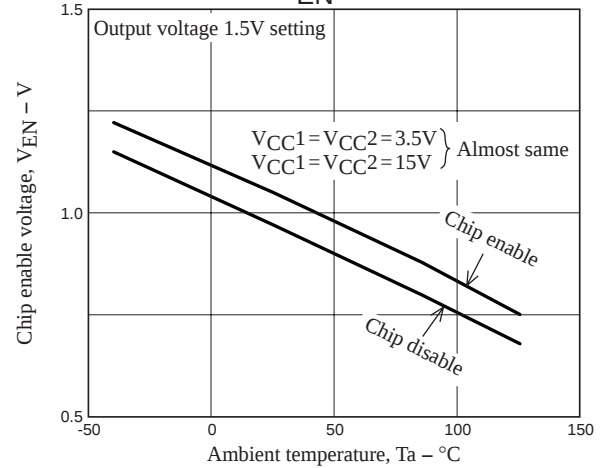
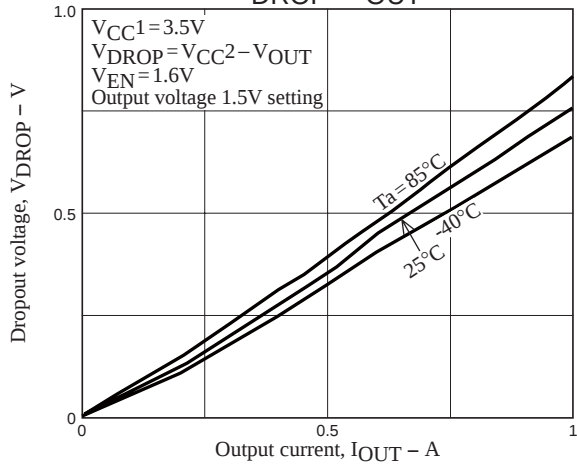
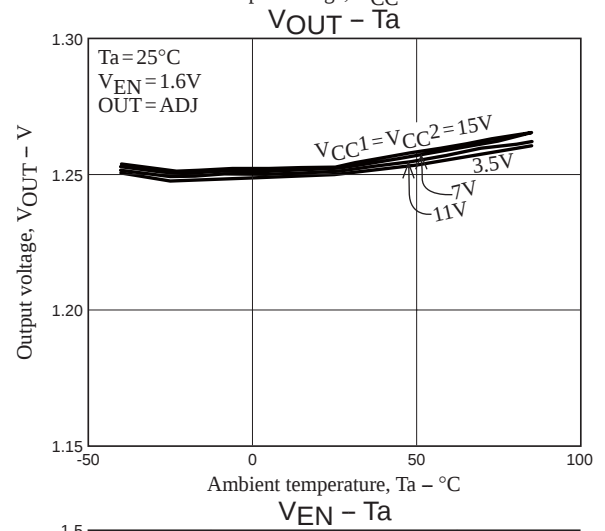
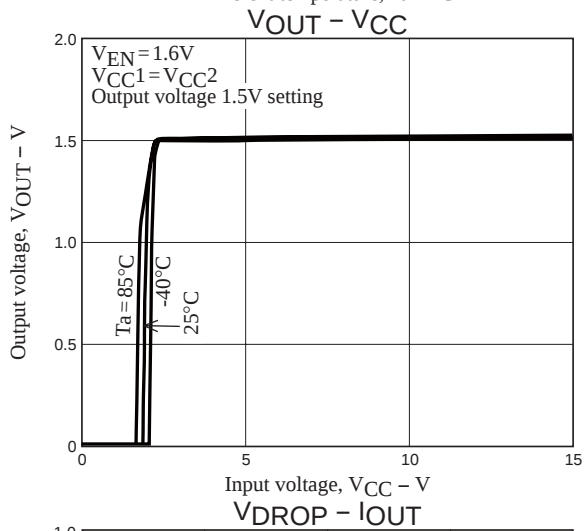
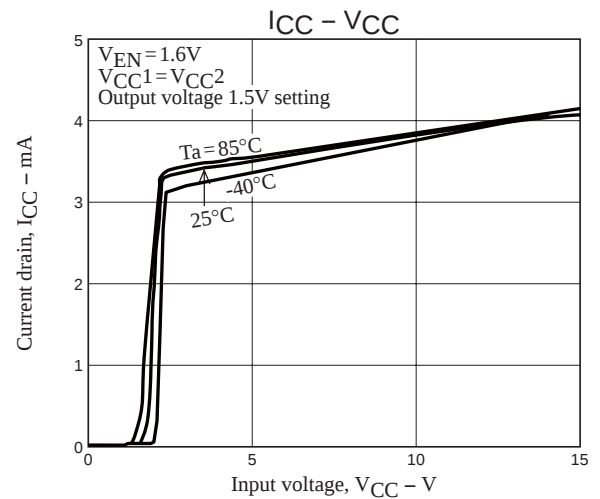
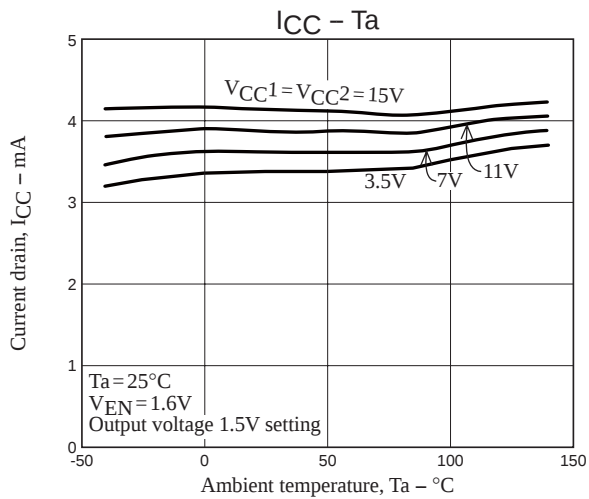
When using method (1), apply power to V_{CC1} and V_{CC2} simultaneously, or in the order of V_{CC1} to V_{CC2}, then to the EN pin.

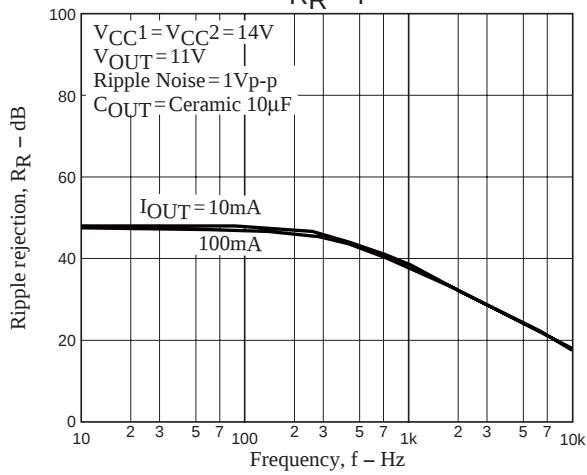
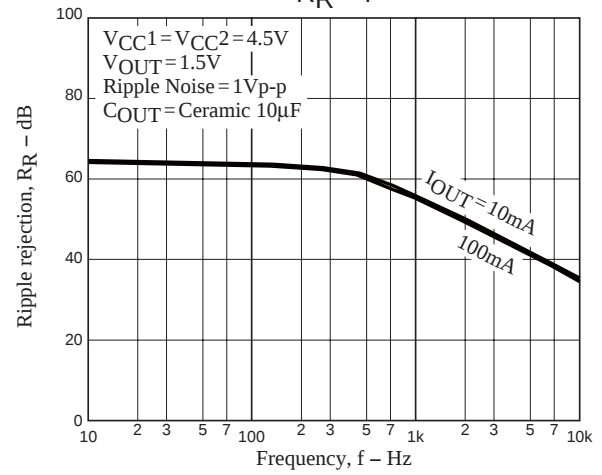
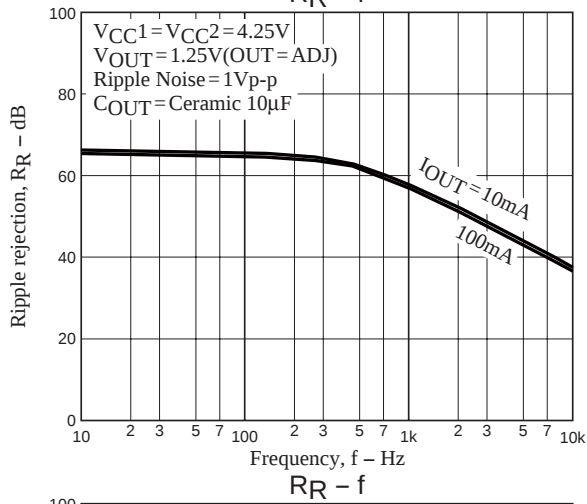
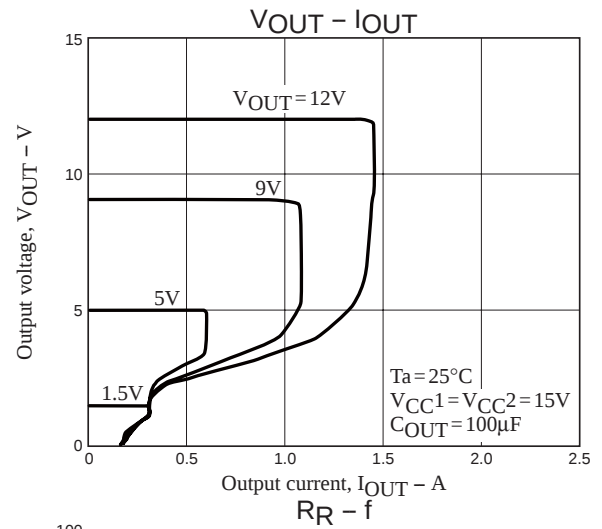
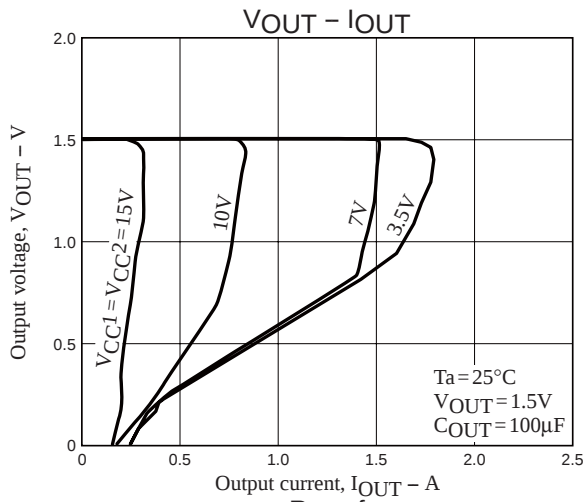
To shutdown the IC, follow the start-up procedure in reverse order.

Pin Function

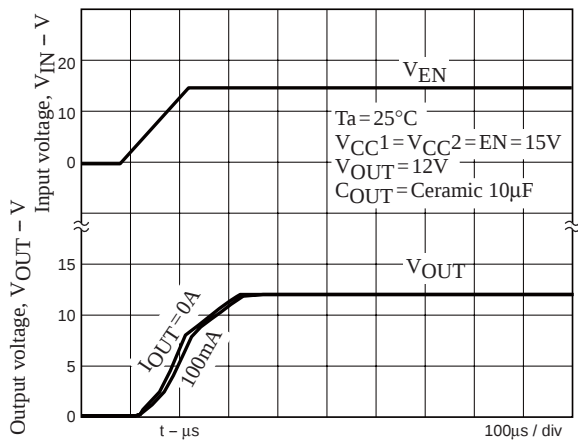
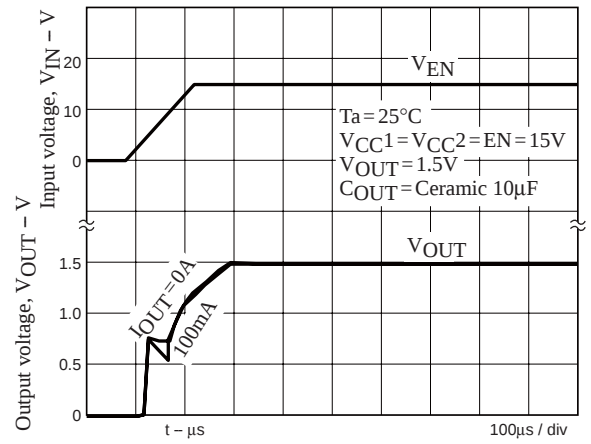
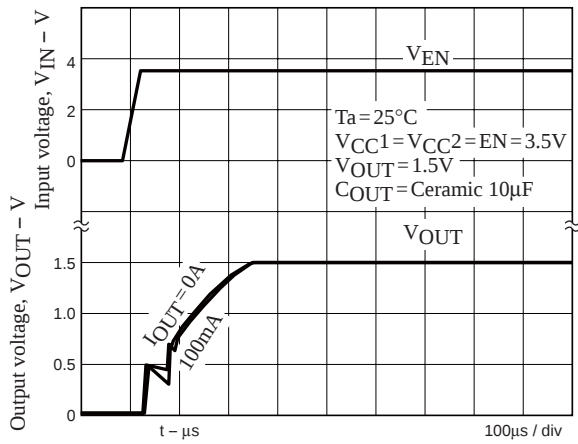
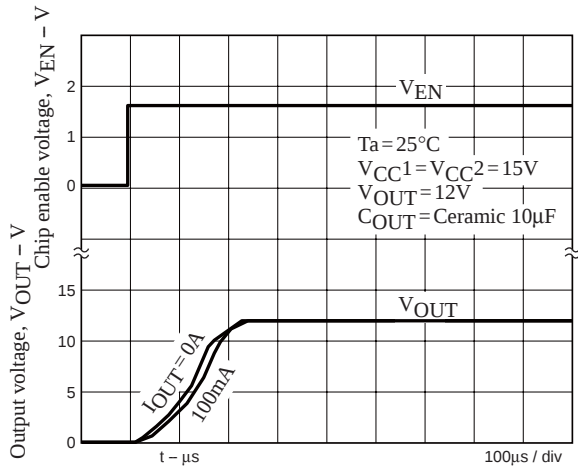
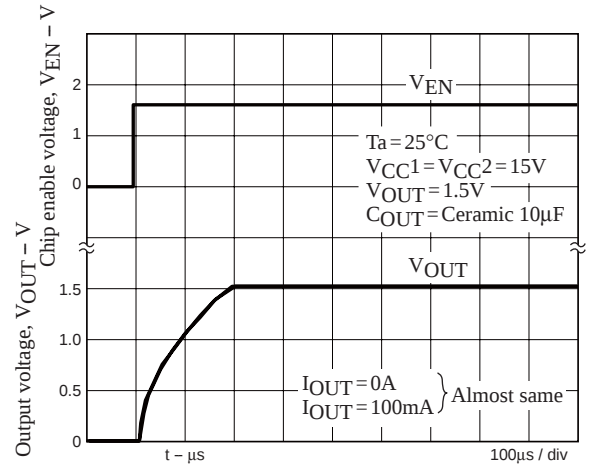
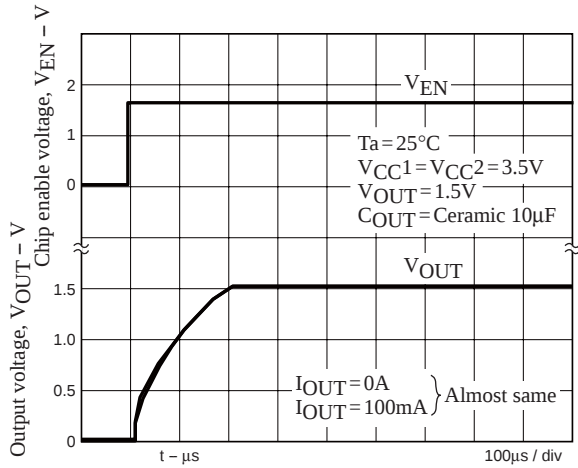
Pin No.	Pin name	Function	Equivalent circuit
1	OUT	Output.	
2	ADJ	Adjustable input.	
3	NC	No connection.	
4	GND	Ground. Connect to Pin 5 internally.	
5	GND	Ground. Connect to Pin 4 internally.	
6	EN	Chip Enable. (High Enable)	
7	V _{CC1}	Analog power supply.	
8	V _{CC2}	Output power supply.	

*4 When you use this IC, Please short-circuit Exposed-Pad and GND-pin on the IC mounting side.



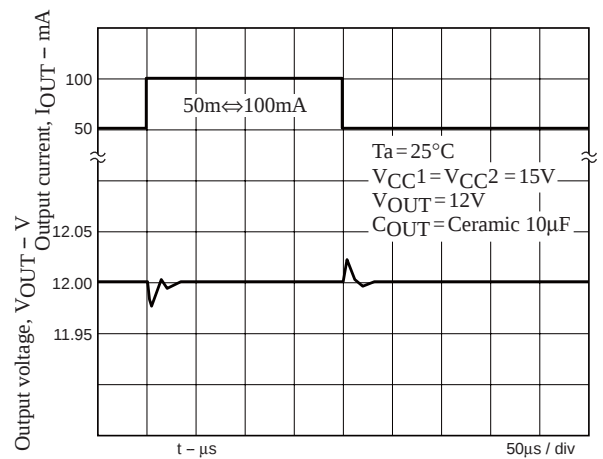
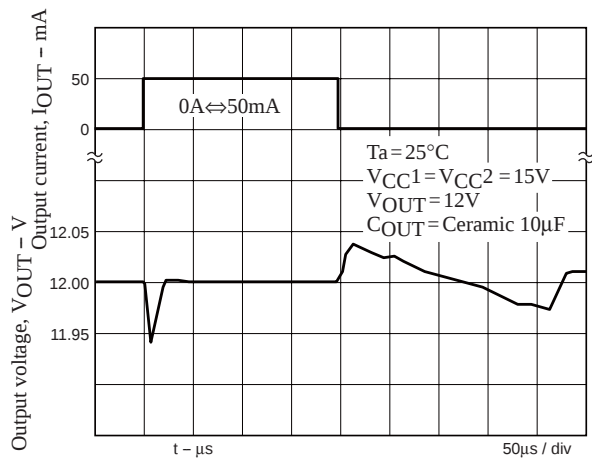
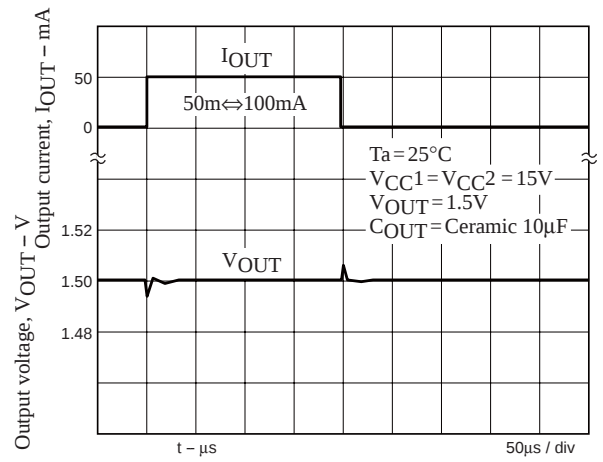
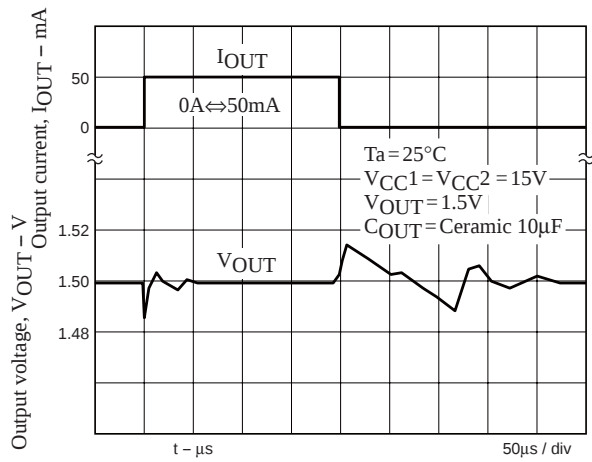
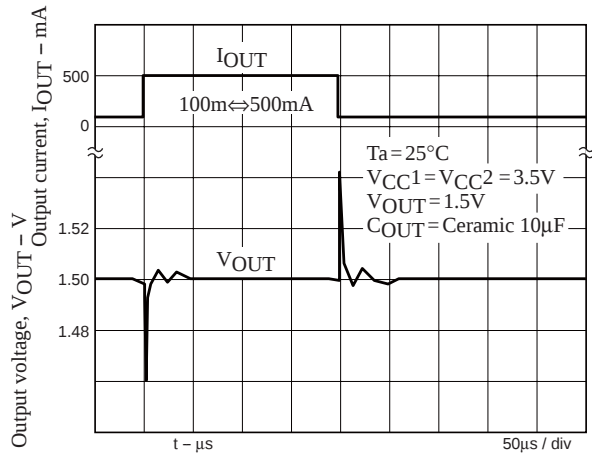
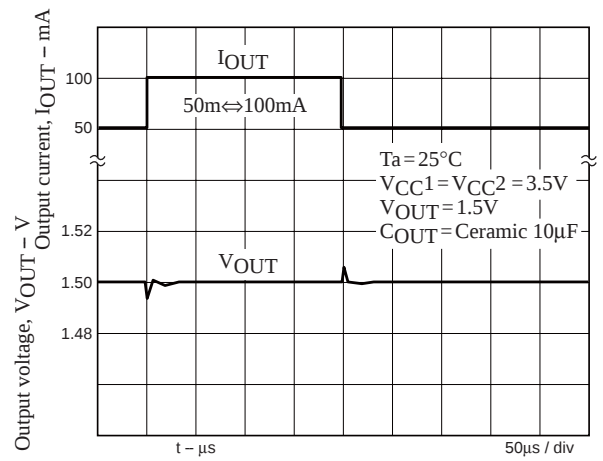
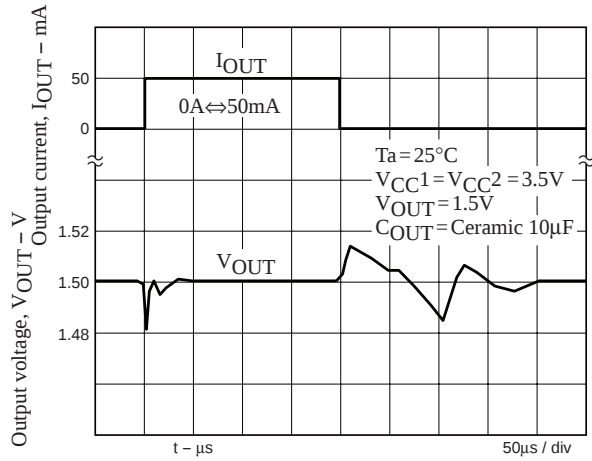


V_{OUT} Startup Characteristic

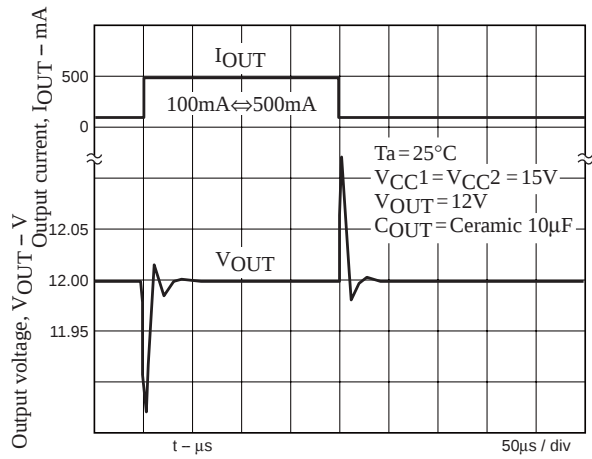


Note: The output voltage (V_{OUT}) may overshoot when V_{IN} starts up with slew rate of a voltage of $0.1\text{V}/\mu\text{s}$ or over.

Load Transient Response Characteristics



LA59700MC



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