Low-Dropout CMOS Voltage Regulators

Features

- 500mA RF Low-Dropout Regulator With Enable
- Ultralow-Noise：40μVRMS(10Hz~100kHz)
- High PSRR: 70dB@1kHz
- Fast Start-Up Time (20μs)
- Excellent Load/Line Transient Response
- Low Dropout Voltage: 110mV@100mA
- Stable With a 1μF Ceramic Capacitor
- Available in Adjustable Voltage Version (0.6V to 5.5V)
- Built-in Current Limiter, Short-Circuit Protection
- ESD Protected up to 4KV (HBM),200V(MM)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free. “Green” Device (Note 1)
- Lead Free Finish/RoHS Compliant ("P" Suffix designates RoHS Compliant. See ordering information)

Applications

- RF: VCOs, Receivers, ADCs
- Cellular and Cordless Telephones
- Handheld Organizers
- Audio
- Bluetooth, Wireless LAN
- Tablet, MID

Description

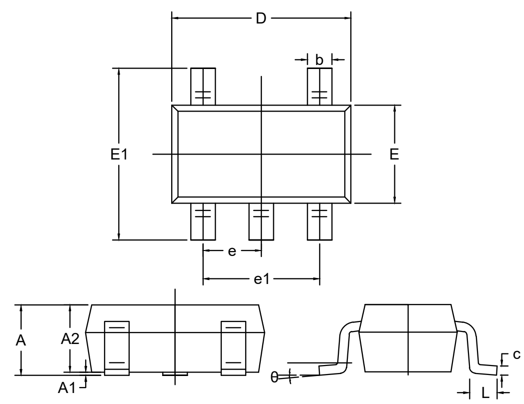
The MC6300 series are a group of positive voltage regulators manufactured by CMOS technologies with high ripple rejection, ultra low noise, low power consumption and low dropout voltage, which can prolong battery life in portable electronics. The MC6300 series work with low-ESR ceramic capacitors, reducing the amount of board space necessary for power applications. The MC6300 series consume less than 0.1μA in shutdown mode and have fast turn-on time less than 50μs.The series are very suitable for the battery-powered equipments, such as RF applications and other systems requiring a quiet voltage source.

MCC Part Number	Device Marking
MC6300-ADJ	A6YM(2)

Note：
1. Halogen free "Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

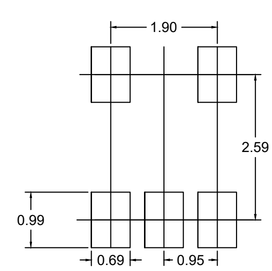
2. Y: year, M: month.

SOT23-5L

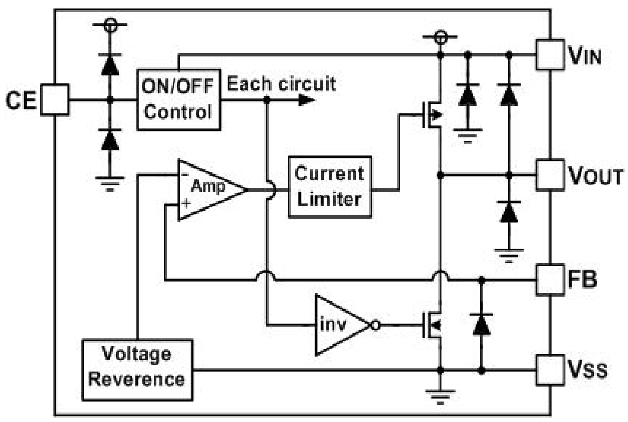


DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.041	0.049	1.05	1.25	
A1	0.000	0.004	0.00	0.10	
A2	0.041	0.045	1.05	1.15	
b	0.012	0.020	0.30	0.50	
c	0.004	0.008	0.10	0.20	
D	0.111	0.119	2.82	3.02	
E	0.059	0.067	1.50	1.70	
E1	0.104	0.116	2.65	2.95	
e	0.037(BSC)		0.950(BSC)		
e1	0.071	0.079	1.80	2.00	
L	0.012	0.024	0.30	0.60	
θ	0°	8°	0°	8°	

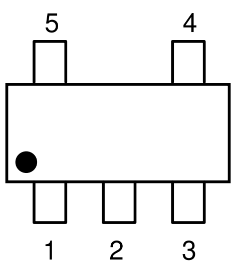
Suggested Solder Pad Layout



Functional Block Diagram

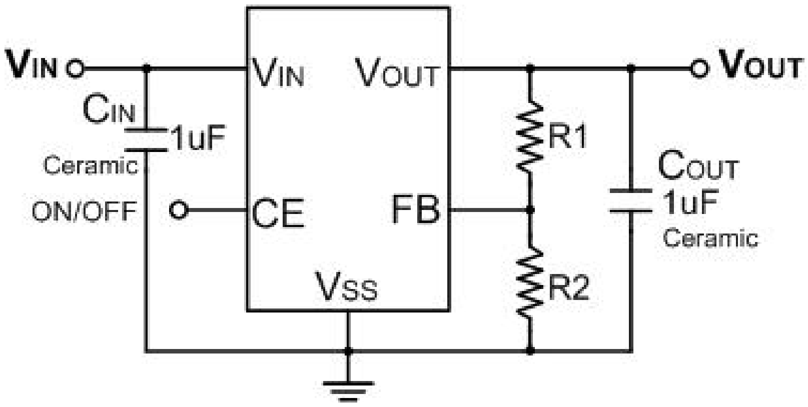


Pin Configuration and Functions (Top View)



Number	Name	Function
1	V_{IN}	Power input Pin
2	V_{SS}	Ground
3	CE	Chip Enable Pin
4	FB	Feedback Pin: Used to Set Output Voltage
5	V_{OUT}	Output Pin

Typical Application Circuit



Absolute Maximum Ratings

- Input Voltage: VSS -0.3V~VSS+8V
- Output Current: 750mA
- Output Voltage: VSS -0.3V~VIN+0.3V
- BS Pin Voltage: 0.3V to 23V
- Operating Junction Temperature Range: -40~+85°C
- Storage Temperature Range: -40~+125°C
- Thermal Resistance: 258°C/W Junction to Ambient
- Thermal Resistance: 82°C/W Junction to Case
- Lead Temperature & Time: 260°C, 10s
- Power Dissipation: 380mW

*Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

Electrical Characteristics

(V_{IN}=V_{OUT}+1V, C_{IN}=C_{OUT}=1μF，T_A=25°C, unless otherwise specified)

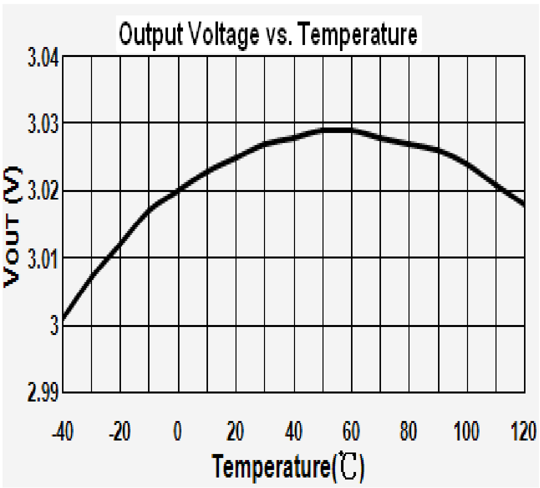
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage	V_{IN}		1.8[3]		7	V
Output Current	I_{OUT}	$V_{OUT}\geq1.8V$	500			mA
Supply Current	I_{SS}	I_{OUT}=0mA		45	80	μA
Standby Current	I_{STBY}	V_{CE}=0V			0.1	μA
CE "High" Voltage	V_{CEH}		1.2		V_{IN}	V
CE "Low" Voltage	V_{CEL}				0.3	V
CE Pin Current		V_{CE}=0V	-1		1	μA
FB Voltage	V_{FB}	I_{OUT}=1mA	0.588	0.6	0.612	V
FB Pin Current		V_{FB}=1.8V			1	μA
Output Voltage Range			0.6		5.5-V_{DO}	V
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}\times\Delta V_{IN}}$	I_{OUT}=10mA, $V_{OUT}+1V\leq V_{IN}\leq7V$		0.01	0.2	%/V
Load Regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+1V$, $1mA\leq I_{OUT}\leq100mA$		1		mV
Dropout Voltage[4]	V_{dif}	I_{OUT}=100mA, $V_{OUT}\geq3.0V$		110		mV
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T\times V_{OUT}}$	I_{OUT}=10mA, -40°C≤T≤+85°C		50		ppm
Current Limit	I_{LIM}		600	750		mA
Short Current	I_{SHORT}	$V_{OUT}=V_{SS}$		20		mA
Power Supply Ripple Rejection	PSRR	f=100Hz, I_{OUT}=50mA, V_{OUT}=1.2V		80		dB
		f=1KHz, I_{OUT}=50mA, V_{OUT}=1.2V		70		
		f=10KHz, I_{OUT}=50mA, V_{OUT}=1.2V		50		
Output Noise Voltage		BW=10Hz to 100kHz, I_{OUT}=10mA		40		μV_{RMS}
Time, start-up		I_{OUT}=0mA, C_{OUT}=1μF		20		μs

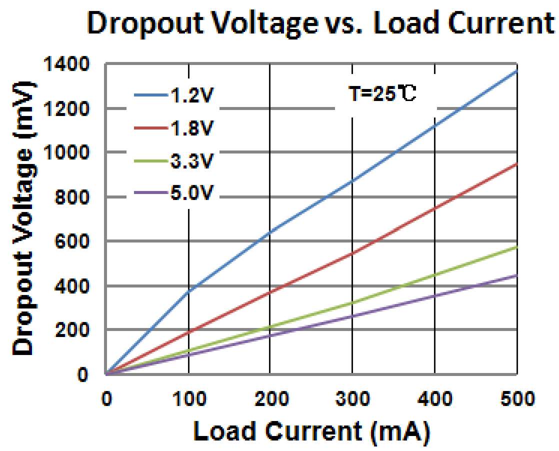
Note:

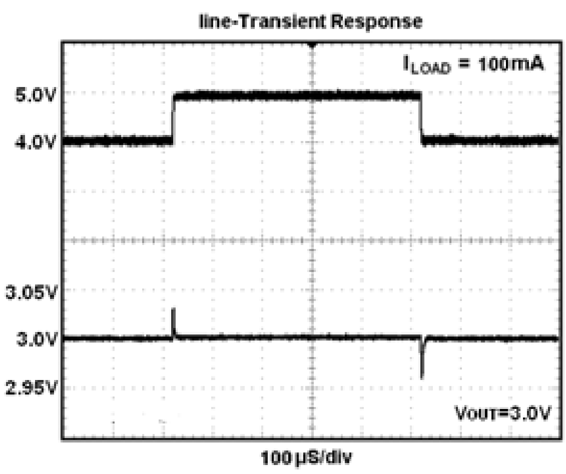
3. Minimum V_{IN} is 1.8V or V_{OUT} + V_{DO}, whichever is greater.

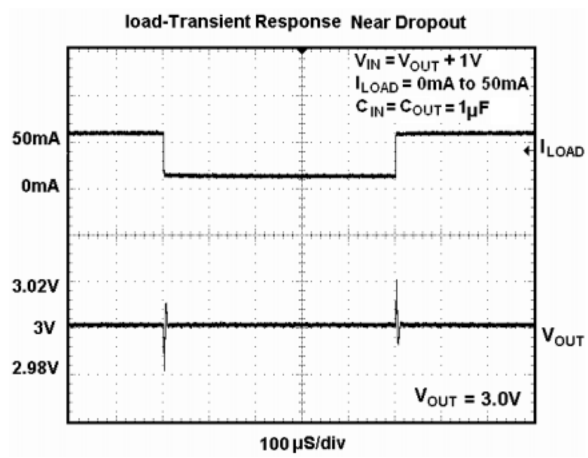
4. V_{dif}: The difference of output voltage and input voltage when input voltage is decreased gradually till output voltage equals to 98% of V_{OUT}(E). Voltage Equals To 98% Of V_{OUT}(E).

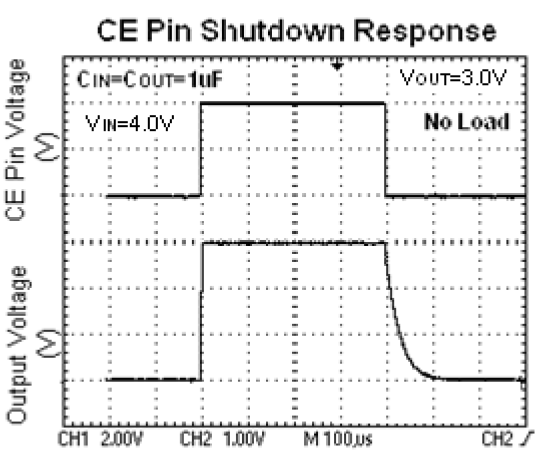
Curve Characteristics

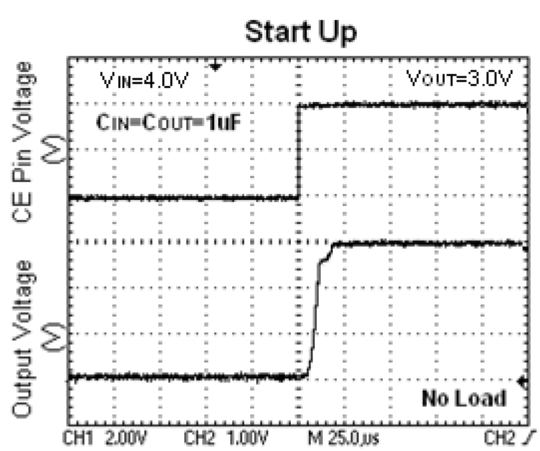












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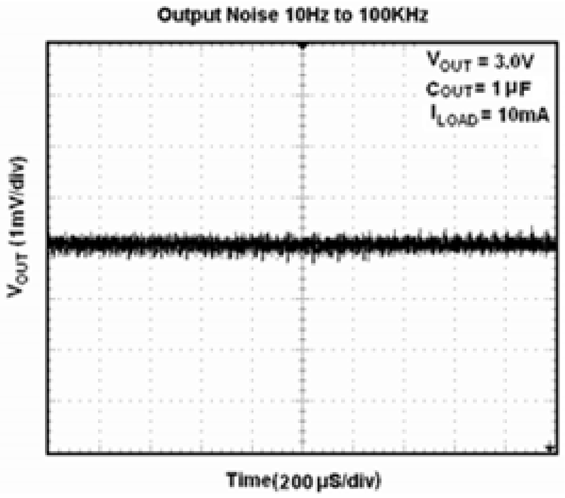

Application Information

Setting The Output Voltage

Figure 1 shows the typical application circuit with MC6300. The external resistor sets the output voltage according to the following equation:

$$V_{OUT} = 0.6V \times \left(1 + \frac{R1}{R2}\right)$$

Table 1.Resistor select for output voltage setting

V_{OUT}	R1	R2
1.2V	30.1K	30.1K
1.5V	45.3K	30.1K
1.8V	60.4K	30.1K
2.5V	95.3K	30.1k
2.8V	110K	30.1k
3.0V	120K	30.1K
3.3V	137K	30.1K
5.0V	221K	30.1k

Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 3Kpcs/Reel