

**Ultralow-Noise, High PSRR, Fast RF
 Low-Dropout CMOS Voltage Regulator**

CE6300 Series

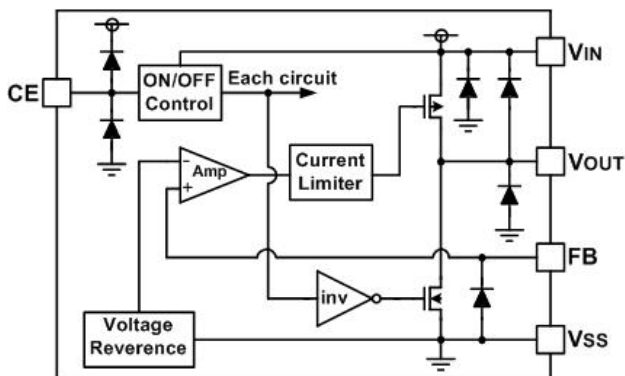
■ **INTRODUCTION**

The CE6300 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 CE6300 series work with low-ESR ceramic capacitors, reducing the amount of board space necessary for power applications. The CE6300 series consume less than 0.1uA in shutdown mode and have fast turn-on time less than 50us. The series are very suitable for the battery-powered equipments, such as RF applications and other systems requiring a quiet voltage source.

■ **APPLICATIONS**

- RF: VCOs, Receivers, ADCs
- Cellular and Cordless Telephones
- Handheld Organizers

■ **BLOCK DIAGRAM**



■ **FEATURES**

- 300mA RF Low-Dropout Regulator With Enable
- Ultralow-Noise: 40μV_{RMS} (10Hz~100kHz)
- High PSRR: 70dB@10kHz
- Fast Start-Up Time (20μs)
- Excellent Load/Line Transient Response
- Low Dropout Voltage: 120mV@100mA
- Stable With a 1μF Ceramic Capacitor
- Available in Adjustable Voltage Version (1.0V to 5.5V)
- Built-in Current Limiter, Short-Circuit Protection
- Audio
- Bluetooth, Wireless LAN
- Tablet, MID

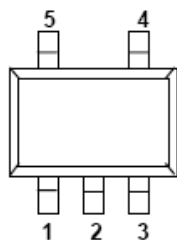
■ **ORDER INFORMATION**

CE6300①②

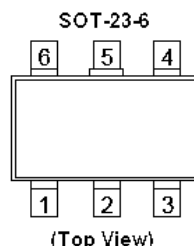
DESIGNATOR	SYMBOL	DESCRIPTION
①	B	High Active, pull-down resistor built in, with C _{OUT} discharge resistor
②	M	Package:SOT-23-5
	E	Package:SOT-23-6

■ PIN CONFIGURATION

SOT-23-5/SOT-353(SC-70-5)



SOT-23-6



PIN NUMBER		PIN NAME	FUNCTION
M	E		
1	1	V_{IN}	Power input Pin
2	2	V_{SS}	Ground
3	3	CE	Chip Enable Pin
4	5	FB	Feedback Pin: Used to Set Output Voltage
5	6	V_{OUT}	Output Pin
	4	NC	Not Connection

■ TYPICAL APPLICATION

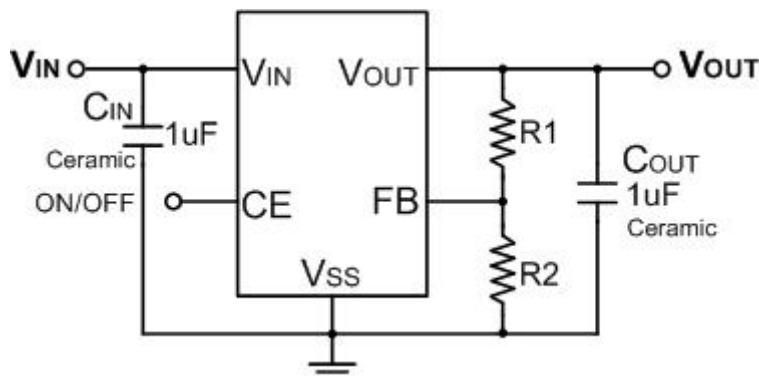


Fig.1 Typical Application Circuit

■ ABSOLUTE MAXIMUM RATINGS

(Unless otherwise specified, $T_A=25^{\circ}C$)

PARAMETER	SYMBOL	RATINGS	UNITS
Input Voltage	V_{IN}	$V_{SS} - 0.3 \sim V_{SS} + 8$	V
Output Current	I_{OUT}	600	mA
Output Voltage	V_{OUT}	$V_{SS} - 0.3 \sim V_{IN} + 0.3$	V
Power Dissipation	SOT-23-5	P_d	400
	SOT-23-6	P_d	400
Operating Temperature	T_{opr}	$-40 \sim +85$	$^{\circ}C$
Storage Temperature	T_{stg}	$-40 \sim +125$	$^{\circ}C$
Soldering Temperature & Time	T_{solder}	$260^{\circ}C, 10s$	

■ ELECTRICAL CHARACTERISTICS

CE6300 Series ($V_{IN}=V_{OUT}+1V$, $C_{IN}=C_{OUT}=1\mu F$, $T_A=25^\circ C$, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Voltage	V_{IN}	—	1.8 ⁽¹⁾		7.0	V
Output Current	I_{OUT}	—	300			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	V
FB Voltage	V_{FB}	$I_{OUT}=1mA$	0.588	0.600	0.612	V
FB pin current		$V_{FB}=1.8V$			1	μA
Output voltage range			1.0		$5.5 - V_{DO}$	V
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta V_{IN}}$	$I_{OUT} = 10mA$ $V_{OUT} + 1V \leq V_{IN} \leq 7V$		0.01	0.2	%/V
Load Regulation	ΔV_{OUT}	$V_{IN} = V_{OUT} + 1V$, $1mA \leq I_{OUT} \leq 100mA$		10		mV
Dropout Voltage ⁽²⁾	V_{dif}	$I_{OUT} = 100mA$ $V_{OUT} \geq 3.0V$		120		mV
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T \times V_{OUT}}$	$I_{OUT} = 10mA$ $-40 \leq T \leq +85$		50		ppm
Current Limit	I_{LIM}		310	450		mA
Short Current	I_{SHORT}	$V_{OUT} = V_{SS}$		50		mA
Power Supply Ripple Rejection	$V_{OUT} = 1.2V$	PSRR	$f=100Hz$, $I_{OUT}=50mA$		88	dB
			$f=1kHz$, $I_{OUT}=50mA$		80	
			$f=10kHz$, $I_{OUT}=50mA$		70	
Output noise voltage		BW=10Hz to 100kHz, $I_{OUT}=10mA$		40		μV_{RMS}
Time, start-up		$I_{OUT}=0mA$, $C_{OUT}=1\mu F$		20		μS

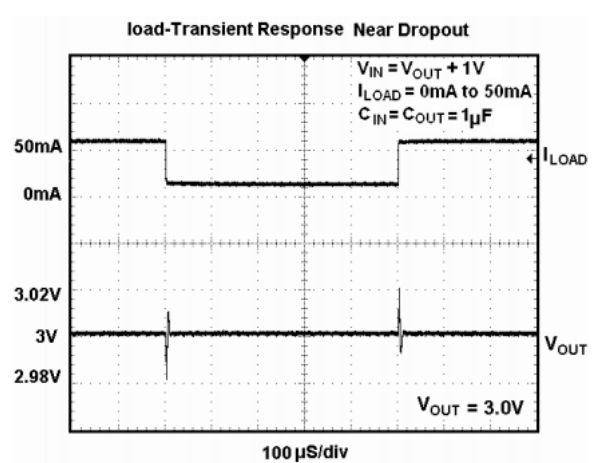
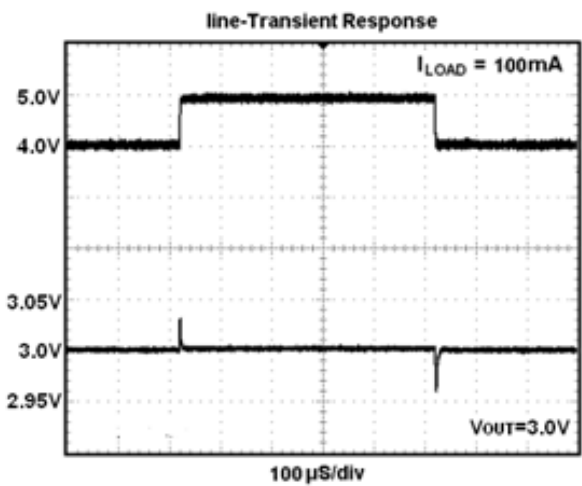
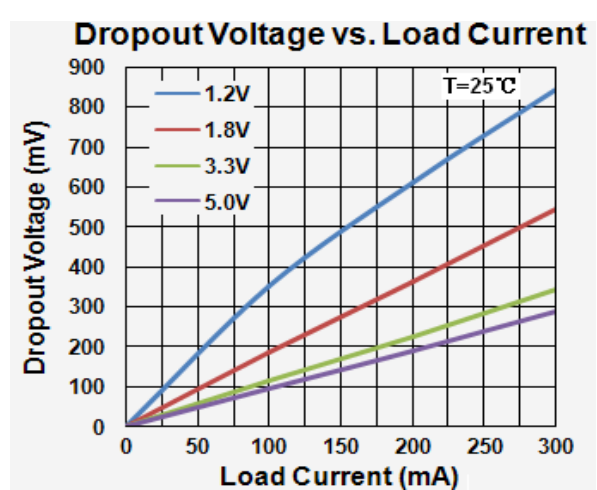
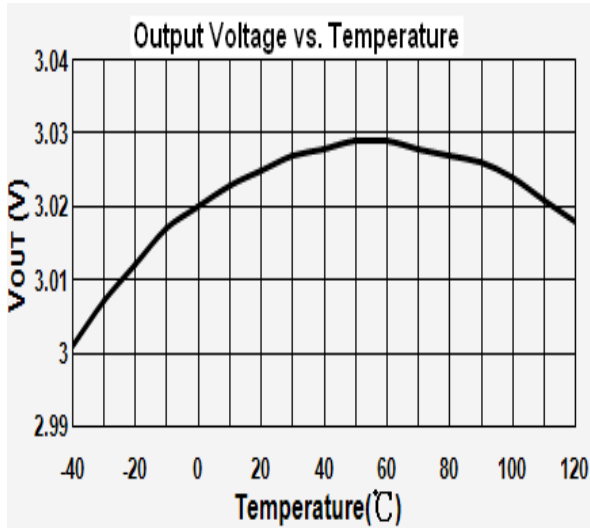
NOTE:

- (1) Minimum V_{IN} is 1.8V or $V_{OUT} + V_{DO}$, whichever is greater.
- (2) 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).

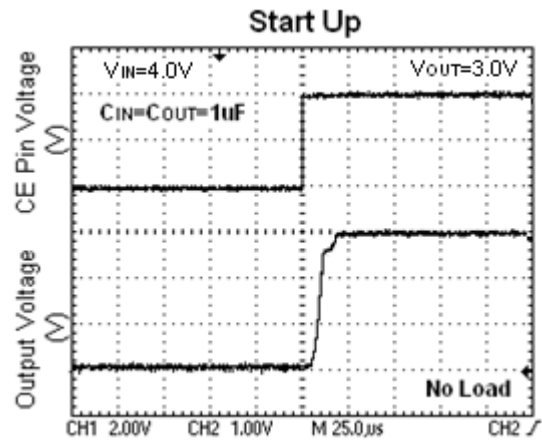
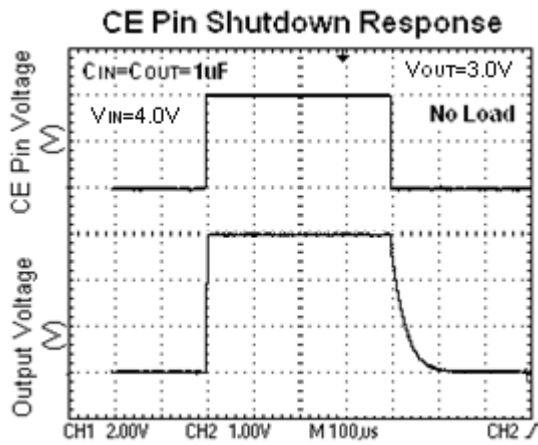
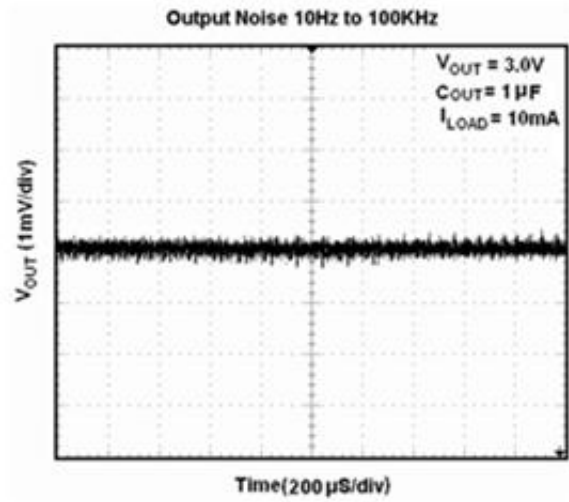
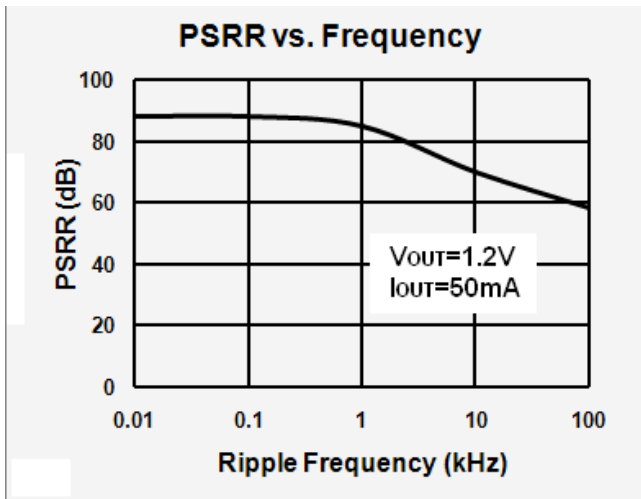
■ DROPOUT VOLTAGE CHART

Setting Output Voltage	Dropout Voltage(mV)@ I _{OUT} =100mA	
V _{OUT} (V)	Typ.	Max.
1.2	350	600
1.5	240	480
1.8	185	360
2.5	135	280
2.8	125	250
3.0	120	240
3.3	110	220
5.0	90	180

■ TYPICAL PERFORMANCE CHARACTERISTICS



■ TYPICAL PERFORMANCE CHARACTERISTICS(Continued)



■ APPLICATION INFORMATION

Setting The Output Voltage

Figure 1 shows the typical application circuit with CE6300. The external resistor sets the output voltage according to the following equation:

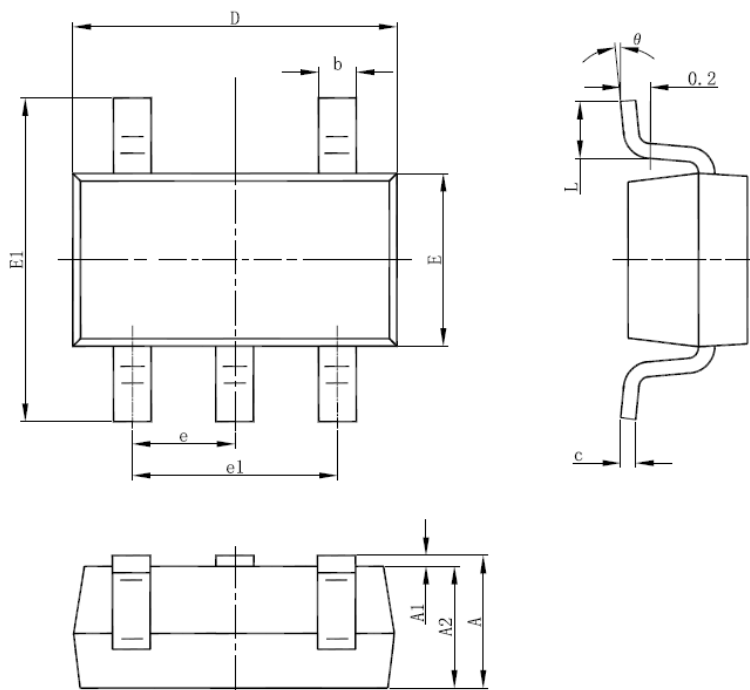
$$V_{OUT} = 0.6V \times \left(1 + \frac{R1}{R2}\right)$$

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

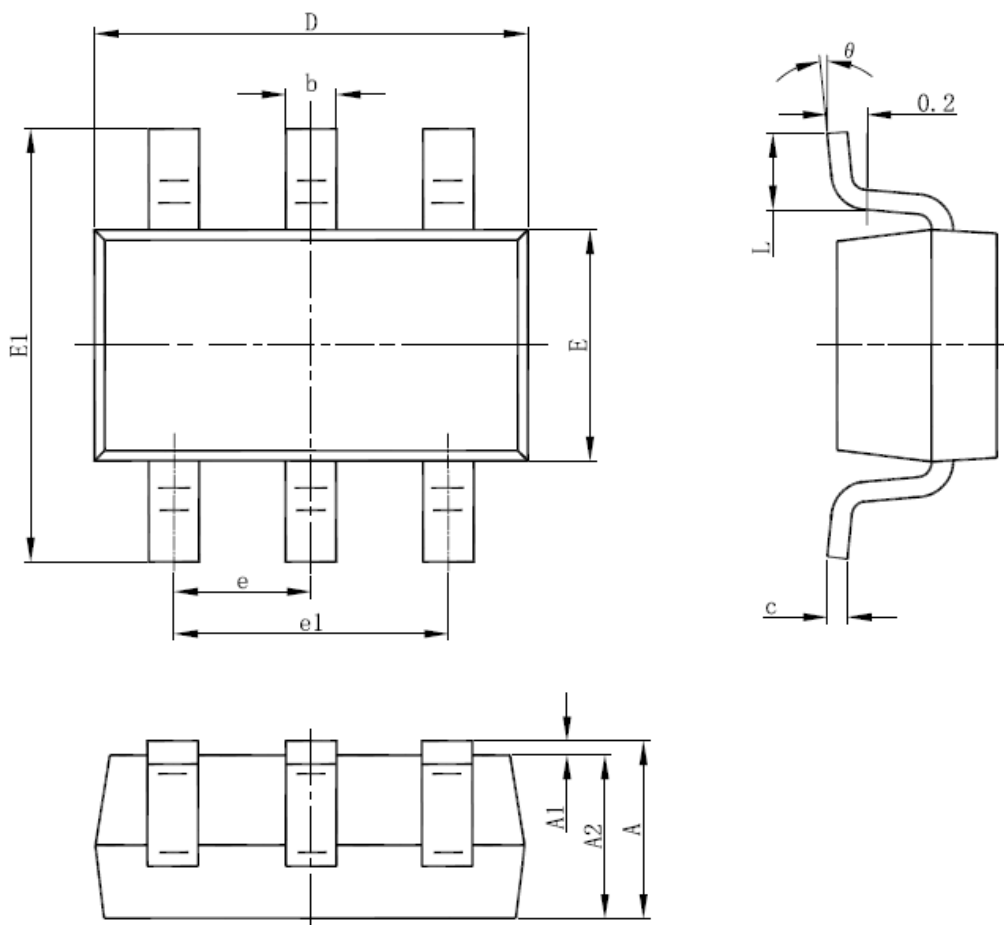
■ PACKAGING INFORMATION

● SOT-23-5 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

• SOT-23 -6 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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