DESCRIPTION

The A6304 series are highly precise, low noise, positive voltage LDO regulators manufactured using CMOS processes. The series achieves high ripple rejection and low dropout and consists of a standard voltage source, an error correction, current limiter and a phase compensation circuit plus a driver transistor. Output voltage is selectable in 100mV increments within a range of 1.0V ~ 5.0V. The series is also compatible with low ESR ceramic capacitors which give added output stability. This stability can be maintained even during load fluctuations due to the excellent transient response of the series.

The current limiter's feedback circuit also operates as a short protect for the output current limiter and the output pin The CE function enables the output to be turned off, resulting in greatly reduced power consumption.

The A6304 is available in SOT-25 package.

ORDERING INFORMATION

Package Type	Part Number	
SOT-25 SPQ: 3,000pcs/Reel	E5	A6304E5R-XX
		A6304E5VR-XX
Note	XX: Output Voltage V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

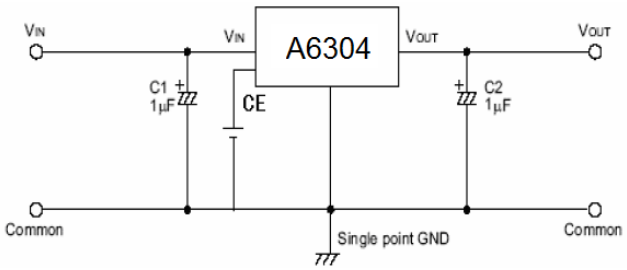
FEATURES

- Output Voltage Range 1.0V to 5.0V (selectable in 100mV steps)
- Highly Accurate ± 2%
- Dropout Voltage 300mV @ 100mA (3.0V type)
- High Ripple Rejection 70dB (10 kHz)
- Low Power Consumption 20μA (TYP.)
- Maximum Output Current 300mA (V_{IN} ≧ V_{OUT}+1V)
- Standby Current less than 0.1μA
- Internal protector current limiter, short protector and anti back irrigation
- Available in SOT-25 Package

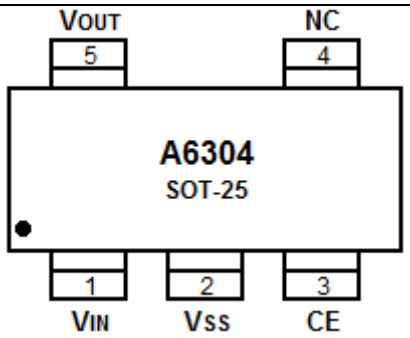
APPLICATION

- Mobile phones
- Cordless phones
- Cameras, Video cameras
- Portable games
- Portable AV equipment
- Reference voltage
- Battery powered equipment

TYPICAL APPLICATION



PIN DESCRIPTION



Top View

Pin #	Symbol	Function
1	V_{IN}	Supply Power
2	V_{SS}	Ground
3	CE	Enable Pin
4	NC	NC
5	V_{OUT}	Voltage Output

ABSOLUTE MAXIMUM RATINGS

V_{IN}, Input Voltage		V_{SS}-0.3V ~ V_{SS}+8V
$V_{ON/OFF}$, Input Voltage		V_{SS}-0.3V ~ V_{IN}+0.3V
V_{OUT}, Output Current		V_{SS}-0.3V ~ V_{IN}+0.3V
P_D, Power Dissipation	SOT-25	250mW
T_{OPR}, Operating Ambient Temperature		-40°C ~ +85°C
T_{STG}, Storage Temperature		-40°C ~ +125°C

Stress beyond above listed “Absolute Maximum Ratings” may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

THERMAL RESISTANCE

Package	θ_{JA}	θ_{JC}
SOT-25	250°C/W	130°C/W

NOTE: Thermal Resistance is specified with approximately 1 square of 1 oz copper.

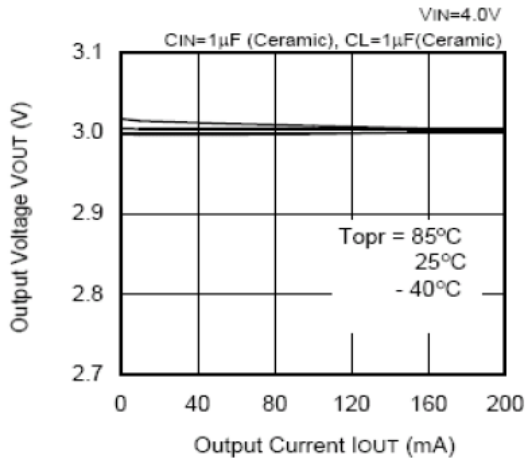
ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	Circuit
Output Voltage	$V_{OUT(E)}$	V_{IN} = $V_{OUT(S)}$ + 1.0V, I_{OUT} = 30mA	$V_{OUT(S)}$ × 0.98	$V_{OUT(S)}$	$V_{OUT(S)}$ × 1.02	V	1
Output Current	I_{OUT}	V_{IN} ≥ $V_{OUT(S)}$ + 1.0V	300	-	-	mA	1
Dropout Voltage	V_{DROP}	I_{OUT} = 50mA	-	0.12	0.20	V	1
		I_{OUT} = 100mA		0.30	0.45		
Line Regulations	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \times V_{OUT}}$	$V_{OUT(S)}$+ 0.5V ≤ V_{IN} ≤ 7V, I_{OUT} = 30mA	-	0.10	0.2	%/V	
Load Regulation	ΔV_{OUT2}	V_{IN} = $V_{OUT(S)}$ + 1.0V, 1.0mA ≤ I_{OUT} ≤ 100mA	-	50	100	mV	
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$	V_{IN} = $V_{OUT(S)}$ + 1.0V, I_{OUT} = 10mA, -40°C ≤ T_A ≤ 85°C	-	±100	-	ppm/°C	
Supply Current	I_{SS1}	V_{IN} = $V_{OUT(S)}$ + 1.0V	-	20	-	μA	2
Input Voltage	V_{IN}		2.0	-	7	V	
Ripple-Rejection	|PSRR|	V_{IN} = $V_{OUT(S)}$ + 1.0V, f = 10kHz, V_{RIP} = 0.5Vrms, I_{OUT} = 50mA	-	70	-	dB	1
Short-circuit Current	I_{SHORT}	V_{IN} = $V_{OUT(S)}$ + 1.0V, V_{CE} = on V_{OUT} = GND	-	60	-	mA	1
CE "High" Voltage	V_{CEH}		1.6	-	V_{IN}	V	1
CE "Low" Voltage	V_{CEL}		-	-	0.25	V	1
CE "High" Current	I_{CEH}	V_{IN} = V_{CE} = $V_{OUT(T)}$ + 1.0V	-0.1	-	0.1	μA	2
CE "Low" Current	I_{CEL}	V_{IN} = $V_{OUT(T)}$ + 1.0V, V_{CE} = V_{SS}	-0.1	-	0.1	μA	2

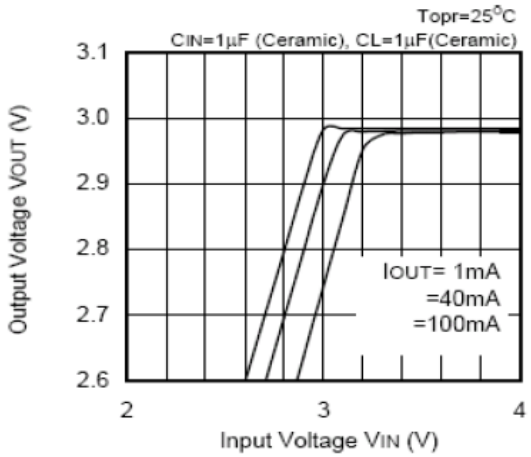
TYPICAL PERFORMANCE CHARACTERISTICS

3.0V Output

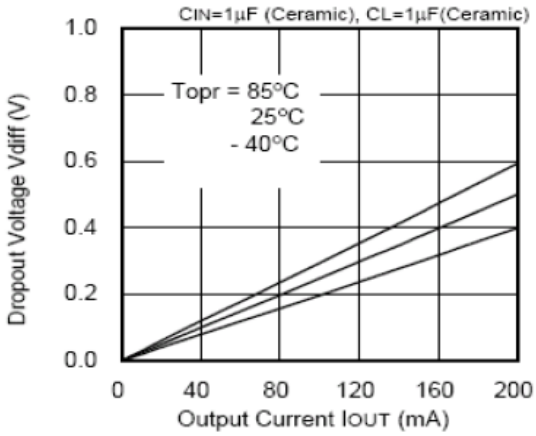
1. Output Voltage vs. Output Current



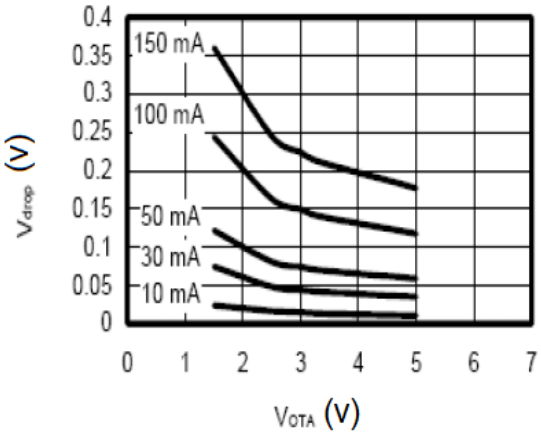
2. Output Voltage vs. Input Voltage(Contd.)



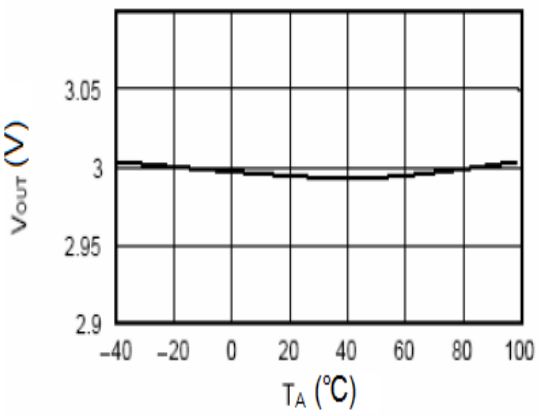
3. Dropout Voltage vs. Output Current



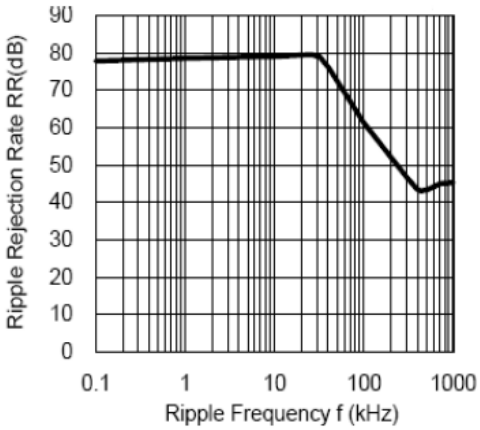
4. Dropout Voltage vs. Output Voltage



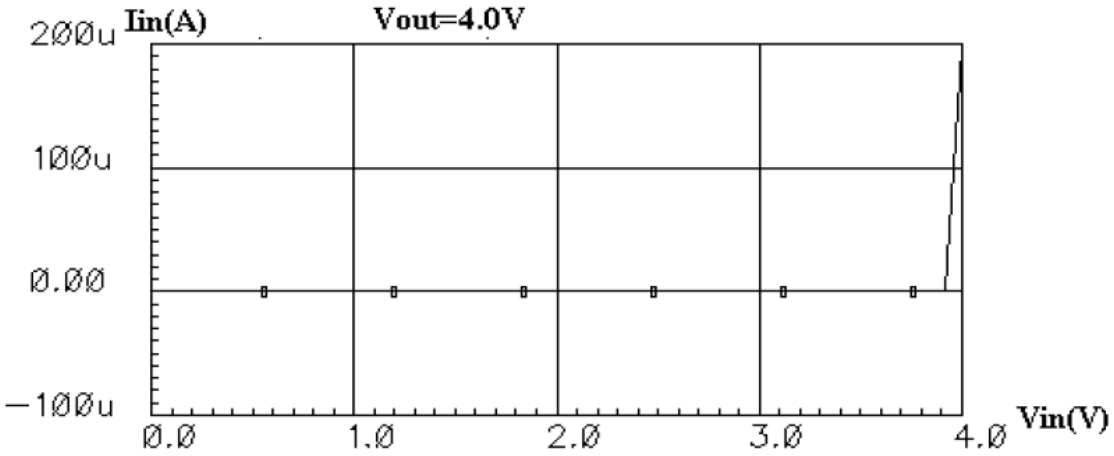
5. Output Voltage vs. Ambient Temperature



6. Ripple Rejection Rate

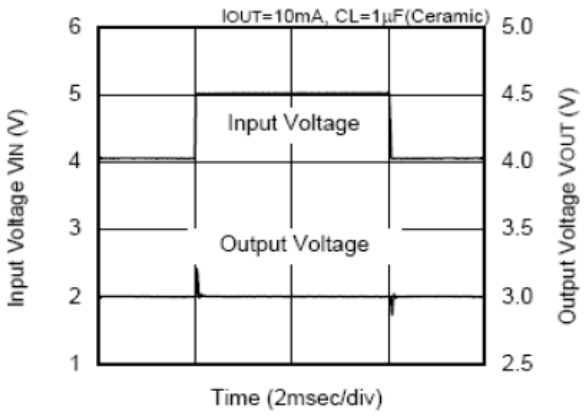


7. Anti Back Irrigation Current

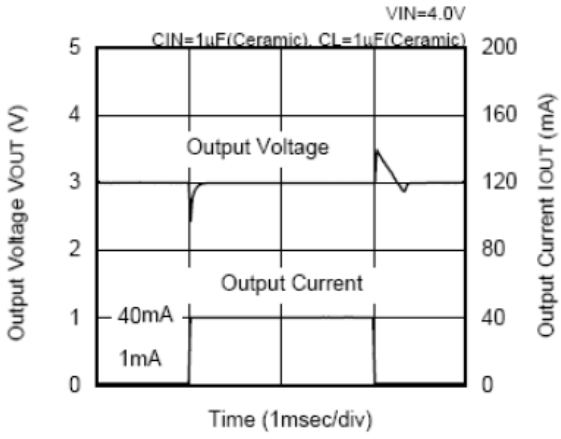


8. Transient Response

Input Transient Response

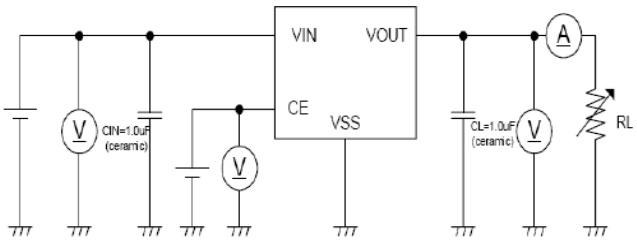


Load Transient Response

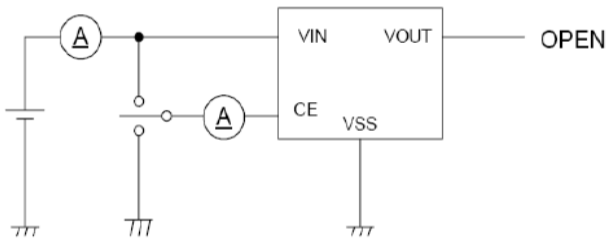


TEST CIRCUIT

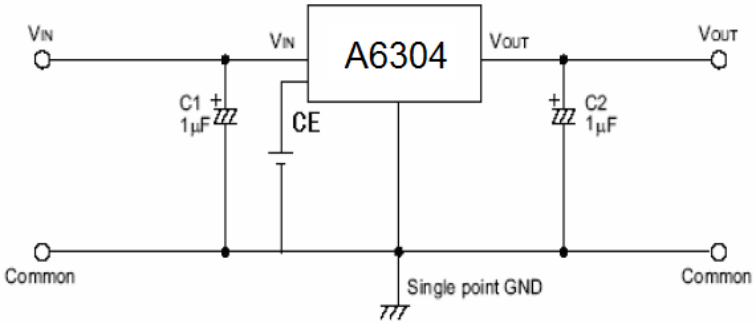
1. Test circuits 1



2. Test circuits 2



3. Typical application circuit



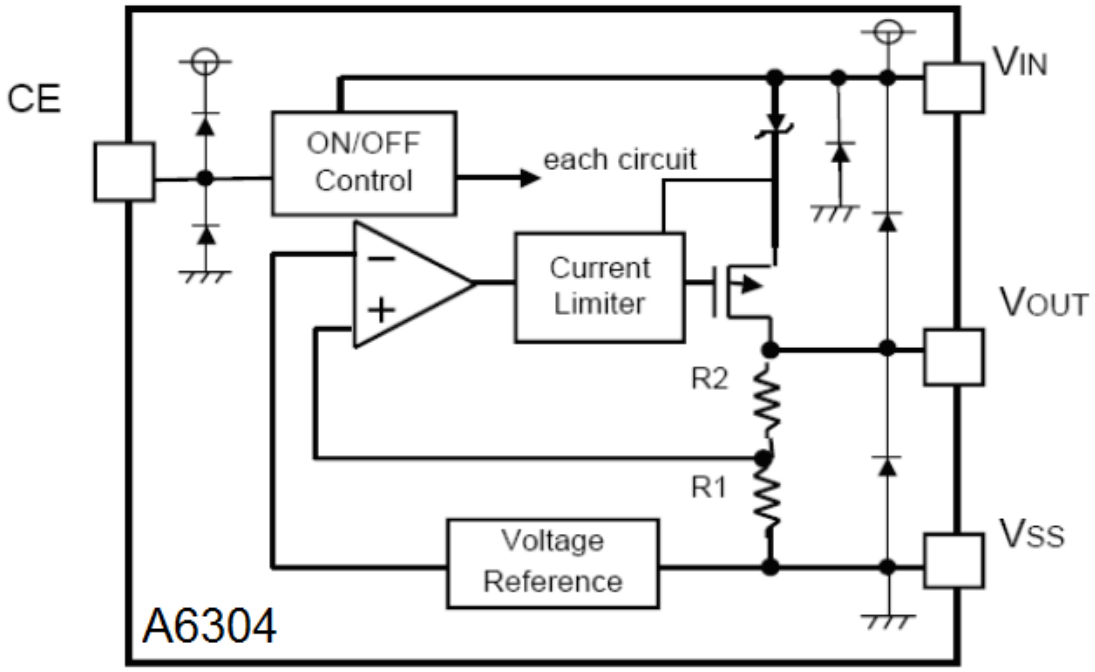
APPLICATION CONDITIONS

Input capacitor (C_{IN}): 1.0μF or more

Output capacitor (C_L): 1.0μF or more (tantalum capacitor)

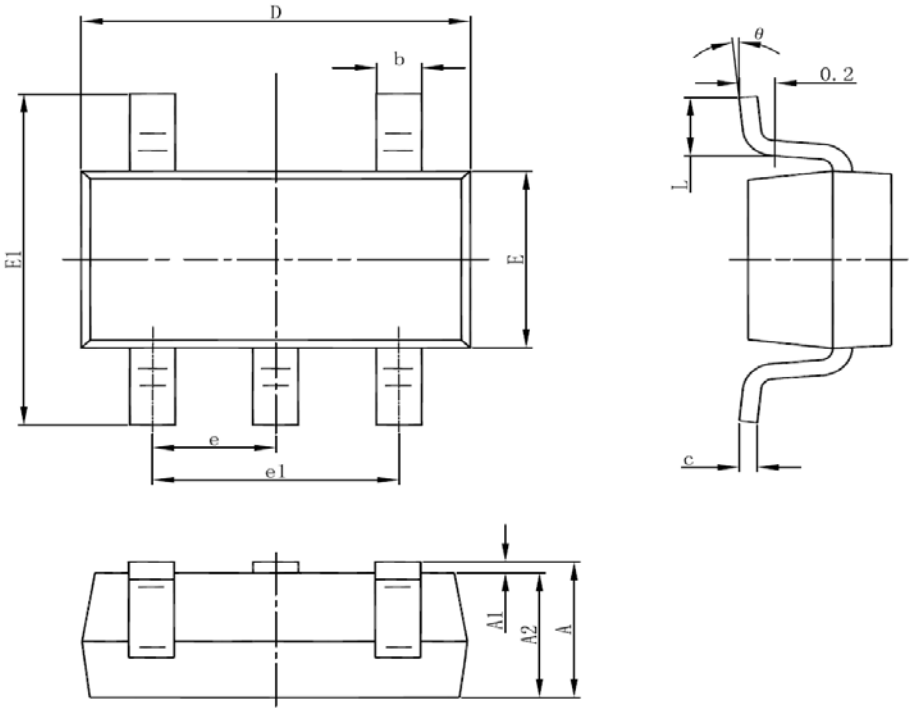
Caution A general series regulator may oscillate, depending on the external components selected. Check that no oscillation occurs with the application using the above capacitor.

BLOCK DIAGRAM



PACKAGE INFORMATION

Dimension in SOT-25 (Unit: mm)



Symbol	Min	Max
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950(BSC)	
e1	1.800	2.000
L	0.300	0.600
θ	0°	8°

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