DESCRIPTION

The A6304A 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 1.5V~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 foldback 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 A6304A are available in SOT-25 and SC70-5 packages.

ORDERING INFORMATION

Package Type	Part Number	
SOT-25	E5	A6304AE5R-XX
		A6304AE5VR-XX
SC70-5	C5	A6304AC5R-XX
		A6304AC5VR-XX
Note	XX: Output Voltage V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products Suffix " V " means Halogen free Package		

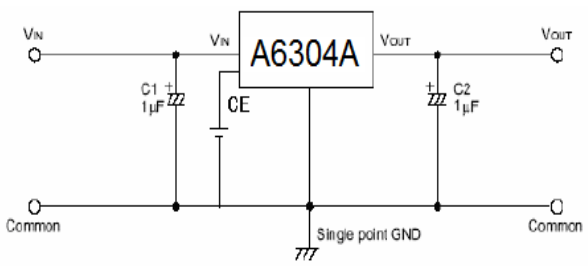
FEATURES

- 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 70μA (TYP.)
- Maximum Output Current 300mA
- Standby Current less than 2μA
- Internal protector current limiter and short protector
- Available in SOT-25 and SC70-5 Packages

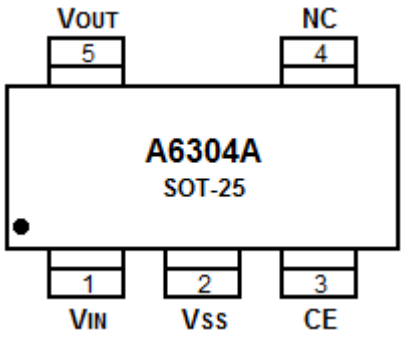
APPLICATION

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

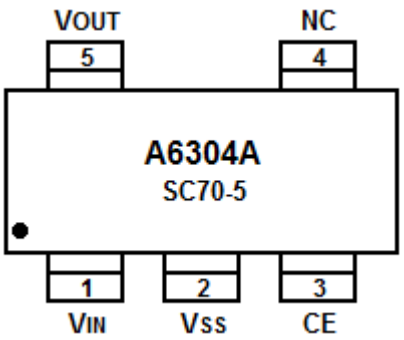
TYPICAL APPLICATION



PIN DESCRIPTION



Top View



Top View

Pin #		Symbol	Function
SOT25	SC70-5		
1	1	V_{IN}	Supply Power
2	2	V_{SS}	Ground
3	3	CE	Enable Pin
4	4	NC	NC
5	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 /SC70-5	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
SC70-5	333°C/W	170°C/W

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

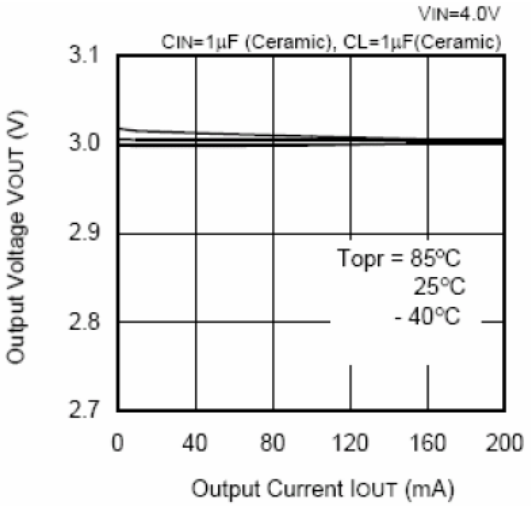
ELECTRICAL CHARACTERISTICS

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} ≤ 8V 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	-	70	-	μA	2
Input Voltage	V_{IN}		2.0	-	8	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	-	40	-	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
Current Limit	I_{LIM}	R_{LOAD}=1Ω	-	-	700	mA	-

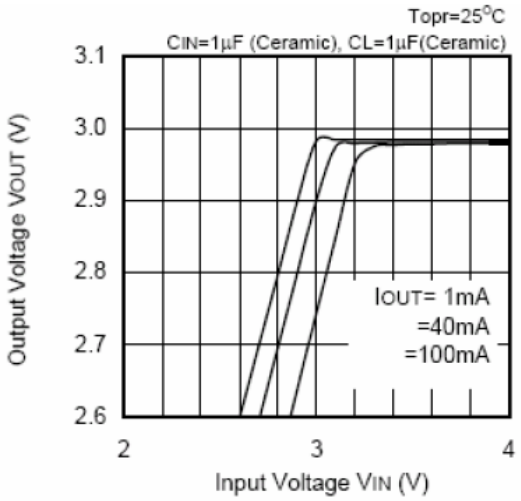
TYPICAL PERFORMANCE CHARACTERISTICS

3.0V Output

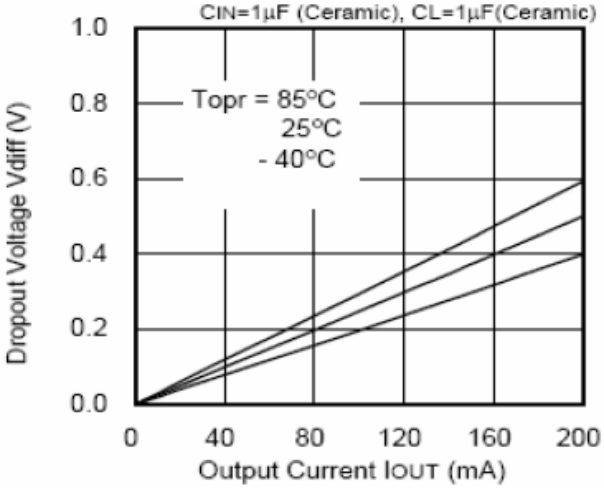
1. Output Voltage vs. Output Current



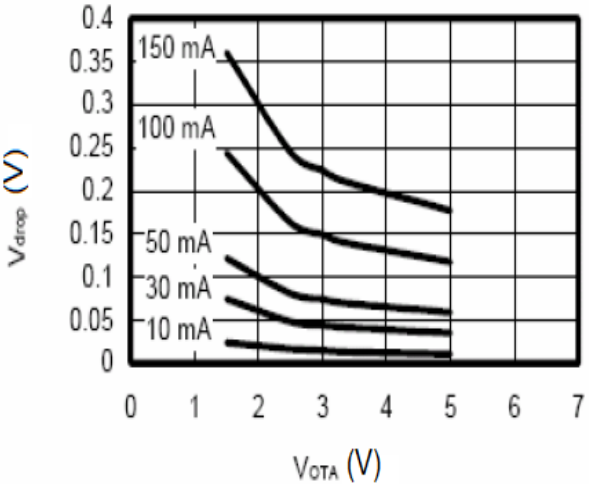
2. Output Voltage vs. Input Voltage(Contd.)



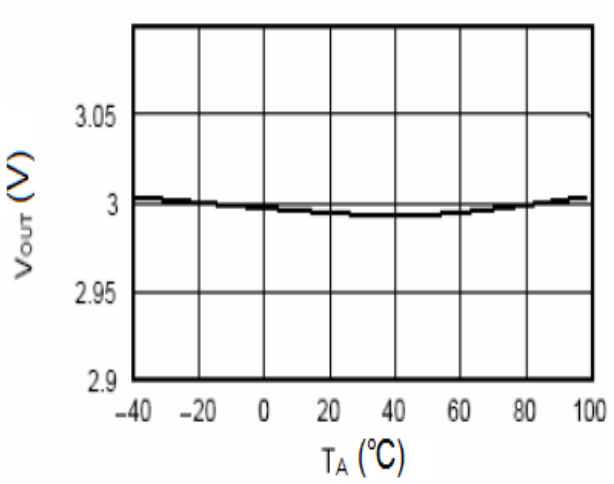
3. Dropout Voltage vs. Output Current



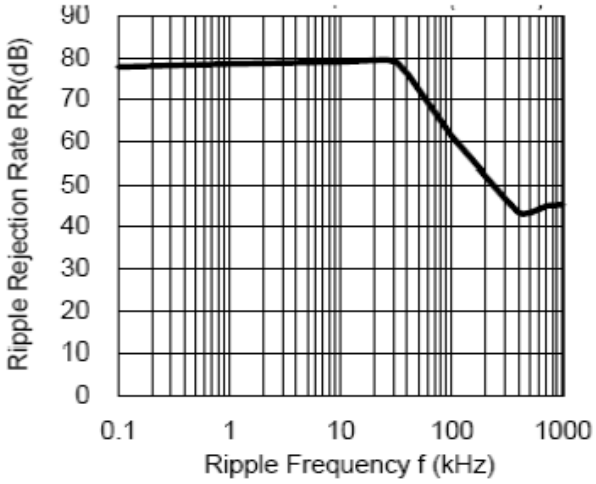
4. Dropout Voltage vs. Output Voltage



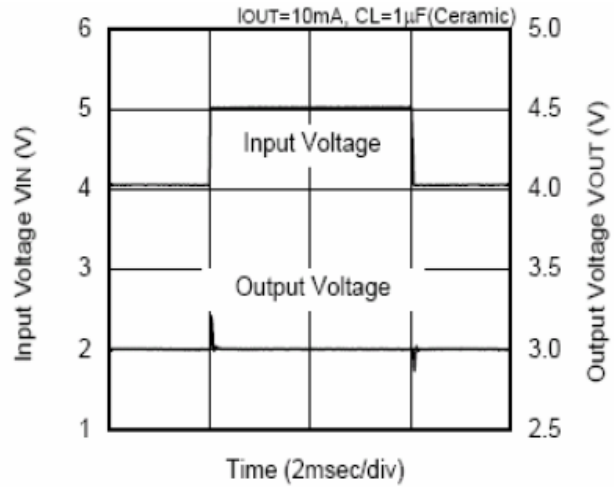
5. Output Voltage vs. Ambient Temperature



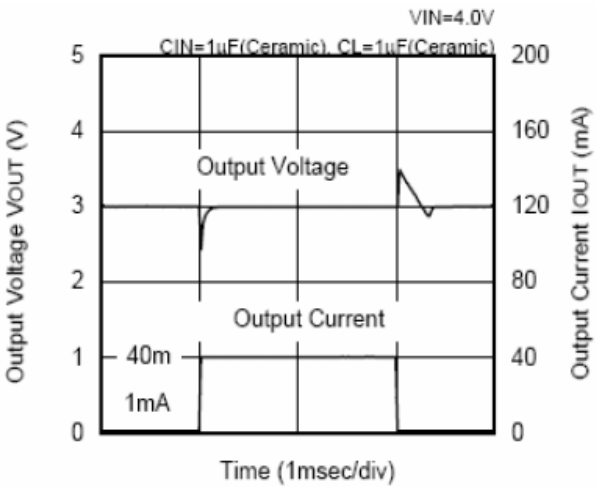
6. Ripple Rejection Rate



7. Transient Response Input Transient Response

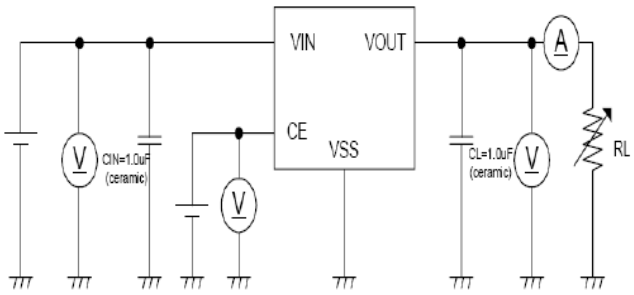


8. Load Transient Response

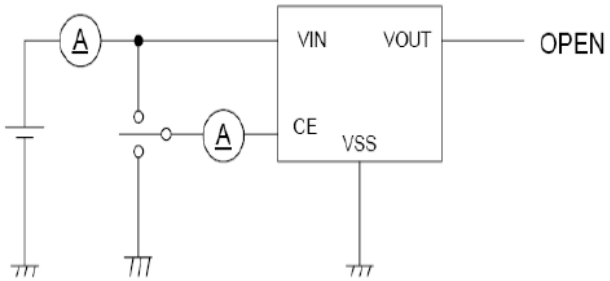


TEST CIRCUIT

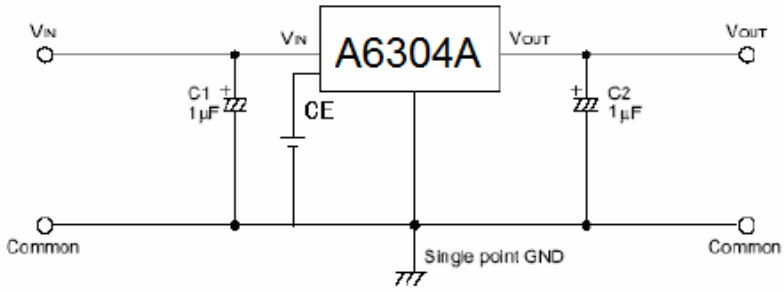
1. Test circuits



2. Test circuits



3. Typical application circuit



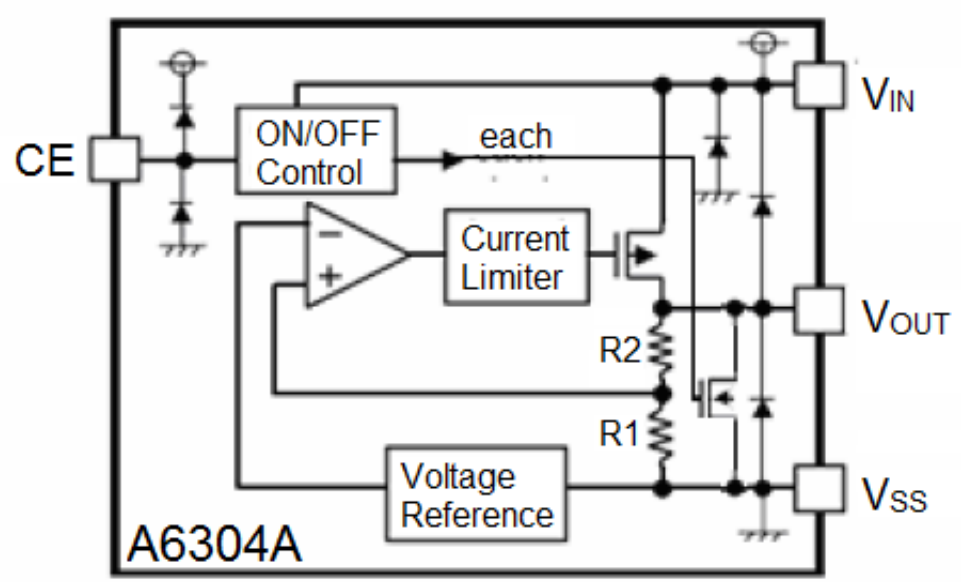
APPLICATION CONDITIONS

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

Output capacitor (C_L):0.1µF or more (tantalum capacitor)

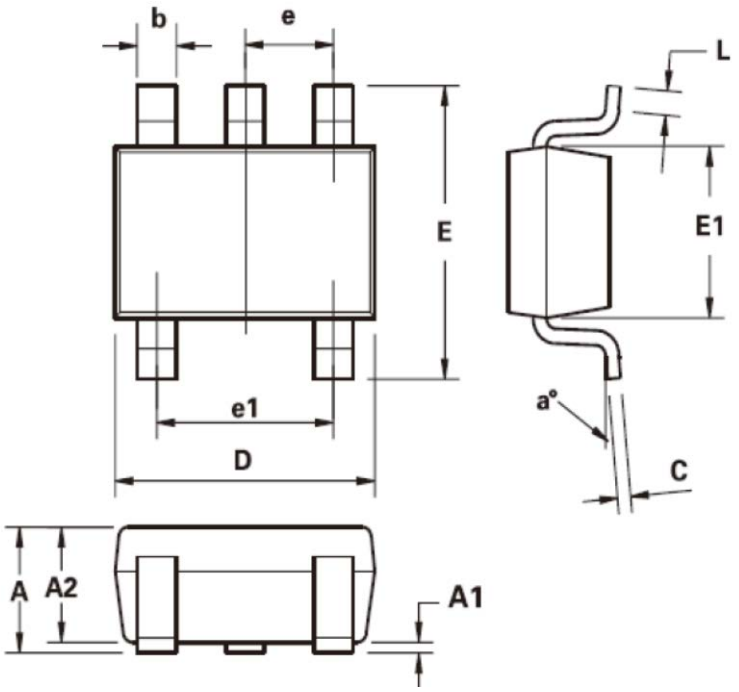
Caution A general series regulator may oscillate, depending on the external components selected. Check that no oscillation occurs with the application using the above capacitor.

BLOCK DIAGRAM



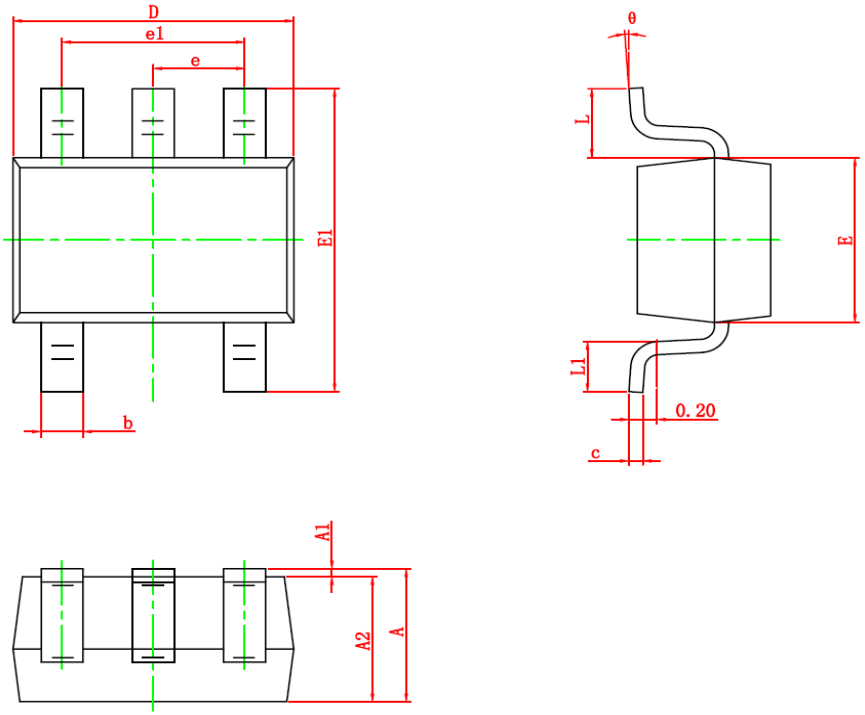
PACKAGE INFORMATION

Dimension in SOT-25 (Unit: mm)



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.90	1.45	0.0354	0.0570
A1	0.00	0.15	0.00	0.0059
A2	0.90	1.30	0.0354	0.0511
b	0.20	0.50	0.0078	0.0196
c	0.09	0.26	0.0035	0.0102
D	2.70	3.10	0.1062	0.1220
E	2.20	3.20	0.0866	0.1181
E1	1.30	1.80	0.0511	0.0708
e	0.95(REF)		0.0374(REF)	
e1	1.90(REF)		0.0745(REF)	
L	0.10	0.60	0.0039	0.0236
a°	0°	30°	0°	30°

Dimension in SC70-5 (Unit: mm)



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

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