40V Input, 150mA Linear Regulator with Fixed Output Voltage

DESCRIPTION

ETA5094 is a linear regulator features wide input range, high power-supply rejection ratio(PSRR) and low noise. The device provides fixed output voltages of 3.3V and 5V.

The device also includes short circuit protection, over voltage protection and thermal shutdown. The shutdown current of ETA5094 is as low as 2uA.

Therefore, ETA5094 is an ideal power supply for power delivery, personal digital assistants, low power battery-powered applications.

ETA5094 is available in SOT89-3 package

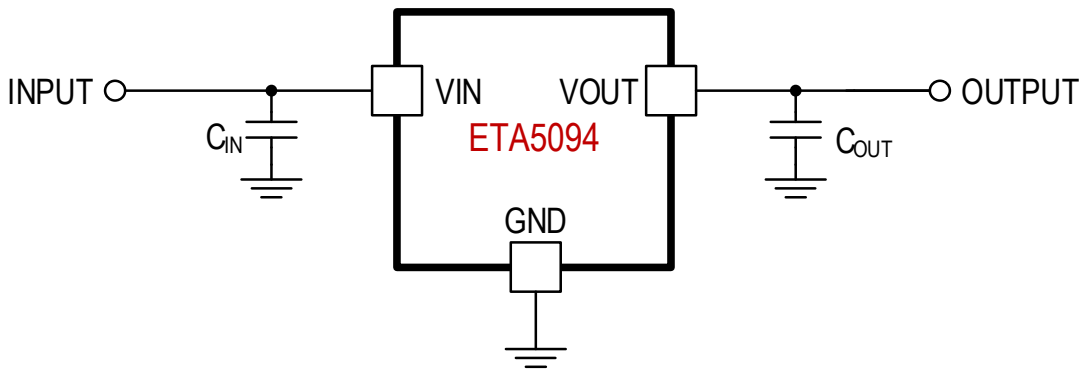
FEATURES

- Wide Input Voltage Range: From 6V to 40V
- Fixed Output Voltage: 3.3V and 5V
- Up to 150mA Output Current
- High PSRR, 60dB
- Integrated Thermal and Current Limit

APPLICATIONS

- Space-Sensitive Applications
- Battery-Powered Equipment
- Cordless and Mobile Phones
- Industrial and Medical Equipment
- Portable Equipment

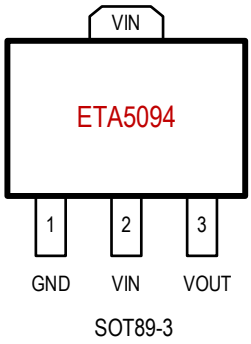
TYPICAL APPLICATION



ORDERING INFORMATION

PART No.	PACKAGE	TOP MARK	Pcs/Reel
ETA5094V33S8D	SOT89-3	JaYW	1000
ETA5094V50S8D	SOT89-3	JnYW	1000

PIN CONFIGURATION



SOT89-3

Figure 1: Pin Configuration

ABSOLUTE MAXIMUM RATINGS

(Note: Exceeding these limits may damage the device. Exposure to absolute maximum rating conditions for long periods may affect device reliability.)

VIN to GND Voltage ..... -0.3V to 42V
VOUT to GND Voltage..... -0.3V to 42V
VOUT current ..... Internally limited
Operating Temperature Range .....-40°C to 85°C
Storage Temperature Range .....-55°C to 150°C
Thermal Resistance θ_{JC} θ_{JA}
SOT89-3……..……9……..52 ..... °C /W
Lead Temperature (Soldering,10sec) .....260°C
ESD HBM (Human Body Mode) 2KV
ESD MM (Machine Mode) 200V

ELECTRICAL CHARACTERISTICS

(V_{IN} = $V_{OUT(TYP)}$+≥1V, unless otherwise specified. Typical values are at TA = 25°C.)

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{IN_RANGE}	Input Supply Range		6		40	V
UVLO	Under Voltage Lock Output	V_{IN} Rising		6		V
	UVLO Hysteresis	V_{IN} Falling		500		mV
OVP	IN Over Voltage Protection Threshold	V_{IN} Rising		40.5	44	V
	OVP Hysteresis	V_{IN} Falling		1		V
I_Q	Quiescent Current			75	200	μA
I_{SD}	Shutdown Current			2	5	μA
V_{DROP}	Dropout Voltage	I_{OUT} = 100mA		1	1.5	V
V_{OUT_ACC}	Output Voltage Accuracy	T_J=25°C	-2		+2	%
		-40°C<T_J<125°C	-3		+3	%
I_{LIM}	Output Current Limit		170			mA
I_{FB}	Foldback Current Limit	V_{OUT} = 0V		20		mA
V_{LOAD}	Static Load Regulation	1mA<I_{OUT}<150mA		0.003		%/mA
V_{LINE}	Static Line Regulation	V_{OUT} + 2V < V_{IN} <40V		0.05		%/V
Noise	Output Noise Voltage	V_{OUT} = 3.3V, integrated noise (10hz – 20khz)		250		μV_{RMS}
PSRR	Power Supply Rejection Ratio	Frequency = 1kHz, no output cap		60		dB
		Frequency = 10kHz, no output cap		50		dB
T_{SHUT}	Thermal Shutdown Threshold			150		˚C
	Thermal Shutdown Threshold Hysteresis			30		

PIN DESCRIPTION

SOT89-3 PIN#	PIN NAME	DESCRIPTION
1	GND	Ground Pin
2	IN	Input Supply Pin
3	OUT	Output of regulator

FUNCTIONAL BLOCK DIAGRAM

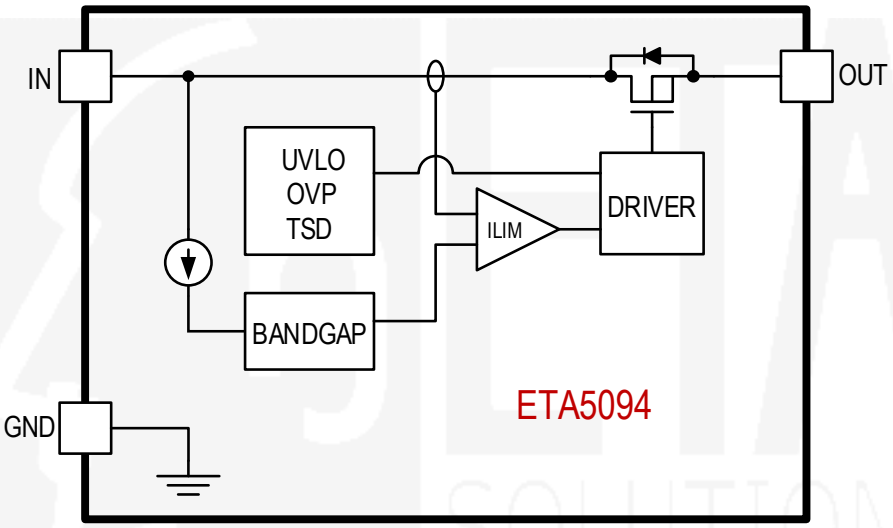
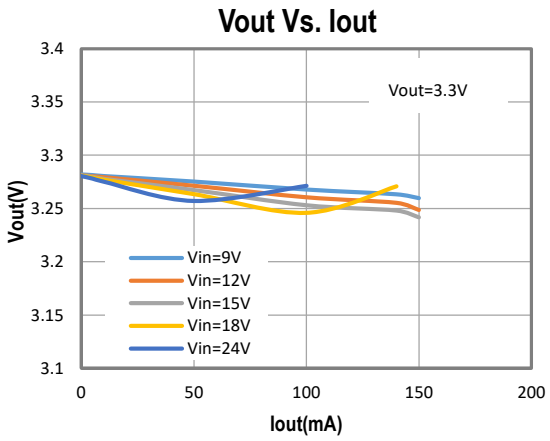
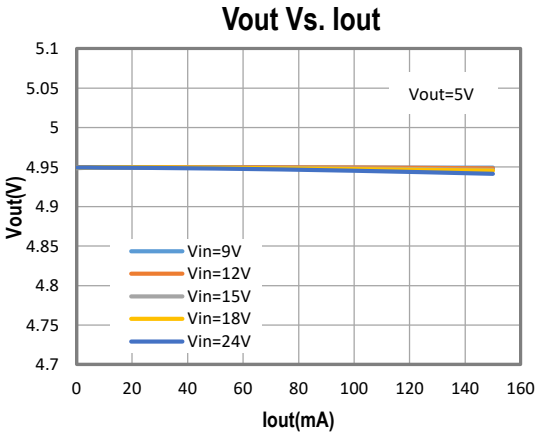


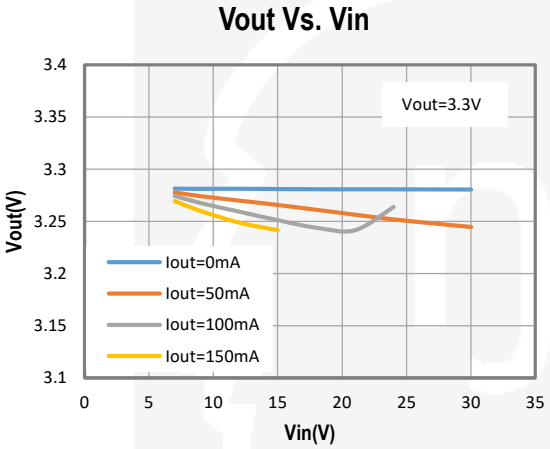
Figure 2: Functional Block Diagram

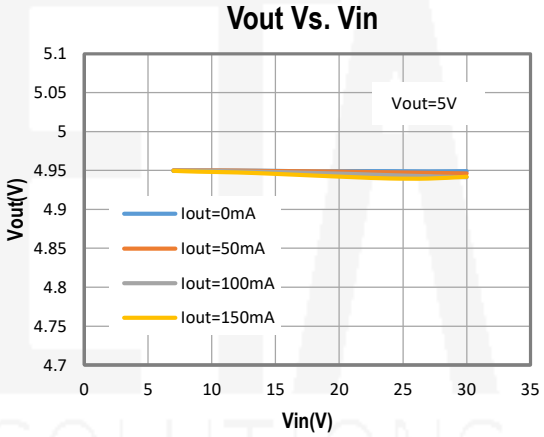
TYPICAL PERFORMANCE CHARACTERISTICS

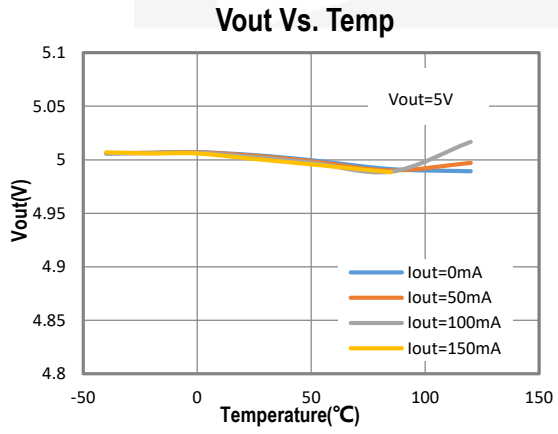
(TA=25°C, V_{IN} = 12V if not specified)

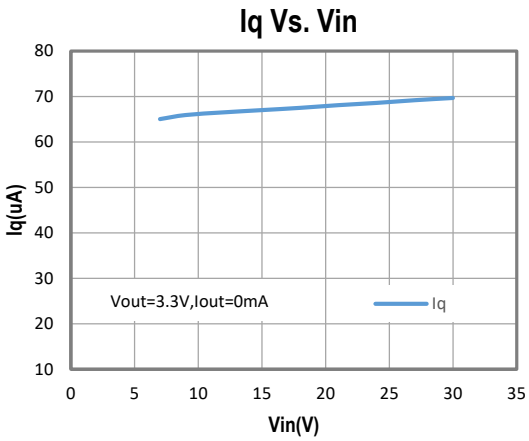








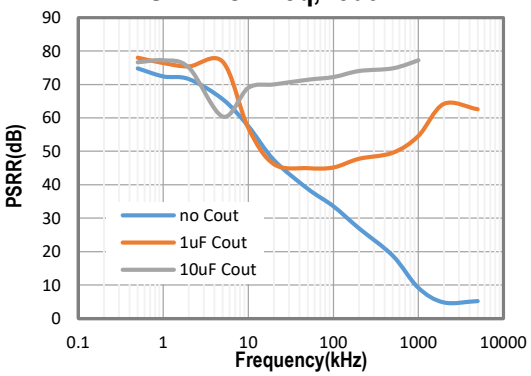




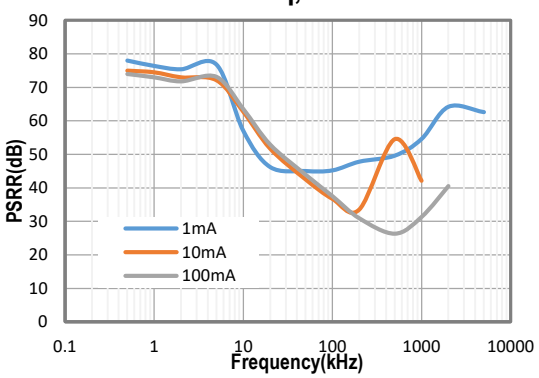
TYPICAL PERFORMANCE CHARACTERISTICS Cont'd

(TA=25°C, V_{IN} = 12V if not specified)

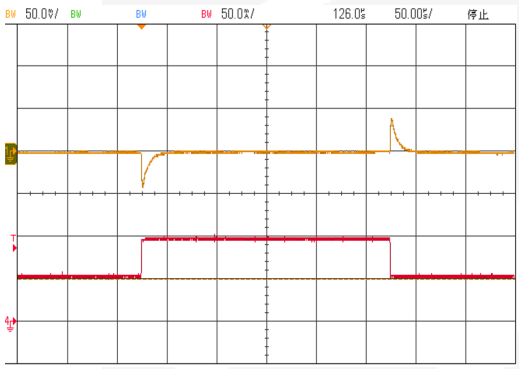
PSRR Vs. Freq, Iout=1mA



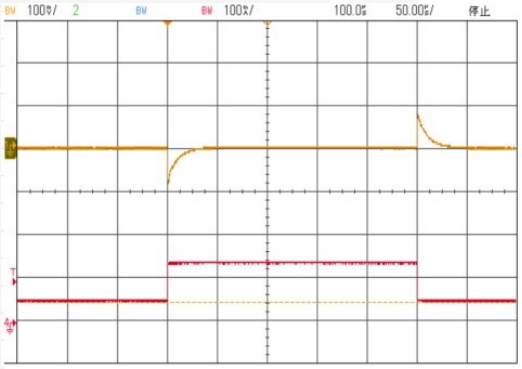
PSRR Vs. Freq, Cout=1uF



Output Load Transient V_{IN} = 12V, V_{OUT} = 3.3V



Output Load Transient V_{IN} = 24V, V_{OUT} = 5V



FUNCTIONAL DESCRIPTION

General Description

The main feature of the ETA5094 is its capability to operate with wide input range and with small input and output capacitors. ETA5094 use a new architecture of LDO to have sufficient phase margin over all positions of the output capacitor pole. It also includes protection features like input over voltage protection, short circuit protection and thermal shutdown.

Output Current Limit and Foldback Current Limit

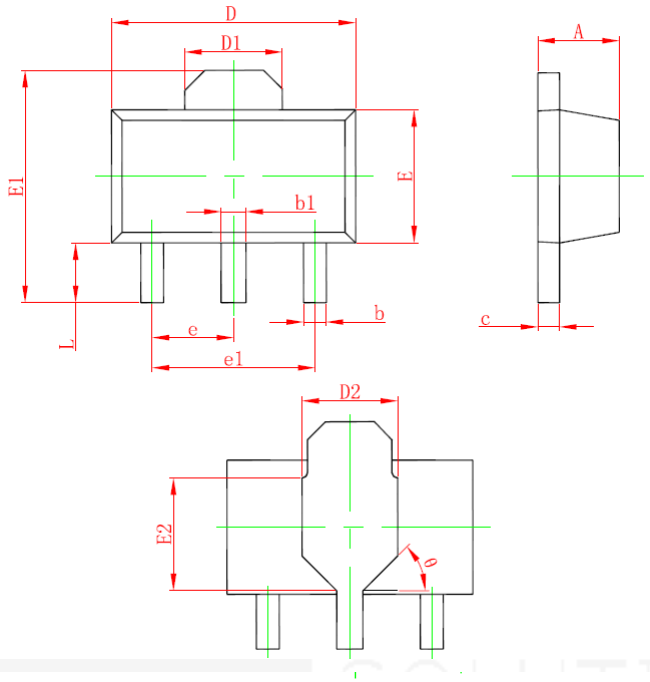
ETA5094 guarantees 150mA output current for all output voltage configuration, so it is designed with 250mA (typically). ETA5094 current limit is reduced when output voltage is less than 75% of the configuration. The reduction is linearity and finish when output voltage is at 25% when the limit is only 20mA (typically) left. This feature will make sure ETA5094 will always do its start-up successfully with any load less than maximum loading.

Over-Temperature Protection

Thermal protection disables the output when the junction temperature rises to approximately 150°C, allowing the device to cool down. When the junction temperature cools to approximately 120°C, the output circuitry is again enabled. Depending on power dissipation, thermal resistance, and ambient temperature, the thermal protection circuit may cycle on and off. This cycling limits regulator dissipation, protecting the device from damage as a result of overheating.

PACKAGE OUTLINE

Package: SOT89-3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
D2	1.750 REF.		0.069 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
E2	1.900 REF.		0.075 REF.	
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047
θ	45°		45°	