Dual Channel, 60dB PSRR, Low Noise, Fast Response 300mA LDO

DESCRIPTION

ETA5254 is a dual channel, low-dropout (LDO) low-power linear voltage regulator that features high power-supply rejection ratio (PSRR), ultralow-noise, fast start-up, and excellent line and load transient responses. Its PSRR can be as high as 60dB with quiescent current is about 35uA for each channel.

Each individual LDO channel has its own enable pin and output voltage target, resulting in greatly reduced power consumption and enhanced PCB design flexibility. It also has other features include current limit and thermal shutdown protection.

ETA5254 is available in SOT23-6.

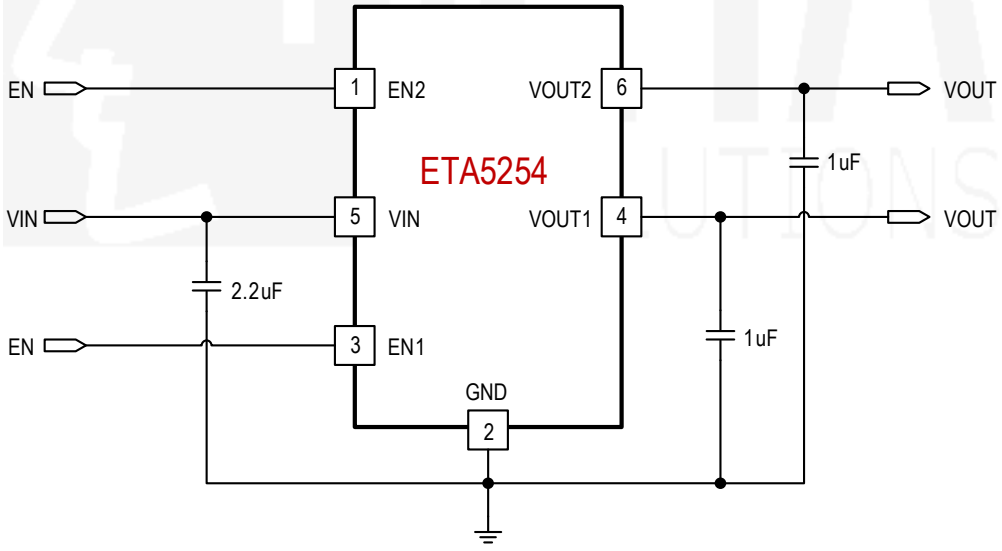
FEATURES

- High PSRR, 60dB
- 300mA Output Current
- Stable with a Wide Range of Ceramic Capacitor
- Excellent Load and Line Transient Response
- 0.24V Dropout Voltage for 200mA at Vout=3.3V
- 35uA Iq for each channel

APPLICATIONS

- DSP Power Supply
- Portable/Battery Powered equipments
- Security Camera

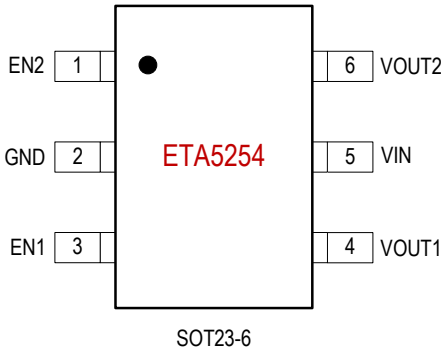
TYPICAL APPLICATION



ORDERING INFORMATION

PART No.	PACKAGE	TOP MARK	Pcs/Reel
ETA5254VXXXXOS2G	SOT23-6	PPPYW	3000
XXXX: voltage code, for example, 3.3V/1.5V is 3315 O=N: no discharge; O=D: discharge; O=W: fast discharge		PPP: product code YW: date code	

PIN CONFIGURATION



SOT23-6

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, EN, VOUT Voltage.....–0.3V to 6V
Operating Temperature Range.....–40°C to 85°C
Storage Temperature Range.....–55°C to 150°C

Thermal Resistance	θ_{JA}	θ_{JC}	
SOT23-6	180	90	°C/W

Lead Temperature (Soldering 10sec).....260°C
ESD HBM (Human Body Mode) 2KV
ESD CDM (Charged Device Mode) 1KV

ELECTRICAL CHARACTERISTICS

(V_{IN} = V_{OUT}+1V, C_{IN}=2.2μF, C_{OUT}=1μF, unless otherwise specified. Typical values are at TA = 25°C.)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage Range (1)		1.6		6.0	V
Ground Current	No Load		35	60	μA
Shutdown Current	V_{EN} = 0V, 1.8V ≤ VIN ≤ 6V		0	1	μA
Dropout Voltage	IOUT = 300mA ,VOUT=1.05V		1050	1200	mV
	IOUT = 300mA ,VOUT=1.2V		850	1000	mV
	IOUT = 300mA ,VOUT=1.5V		720	850	mV
	IOUT = 300mA ,VOUT=1.8V		550	700	mV
	IOUT = 300mA ,VOUT=3.0V		350	500	mV
	IOUT = 300mA ,VOUT=3.3V		330	450	mV
Continuous Output Current				300	mA
Output Current Limit	VOUT = 95%	350	500		mA
Output Foldback Current Limit	VOUT = 0V		250		mA
Line Regulation	VOUT + 1V ≤ VIN ≤ 6V			0.12	%/V
Load Regulation	0μA ≤ IOUT ≤ 200 mA		20		mV
Output Voltage Range	Available in 50mV steps	0.8		3.95	V
Vout Voltage accuracy	IOUT =30mA	-2		+2	%
Power Supply Rejection Ratio	Freq = 100Hz		60		dB
Start-up time,			50		μs
EN pin input Logic Low	1.8V ≤ VIN ≤6V			0.4	V
EN pin input Logic High	1.8V ≤ VIN ≤ 6V	1.4			V
Input current at EN pin (2)	V_{EN}=3V		1		μA
Thermal Shutdown	Rising, Hysteresis =30°C		150		°C

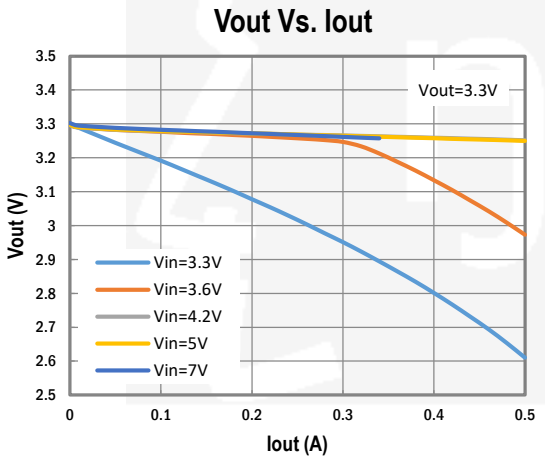
(1): Minimum V_{IN} is 1.6V or V_{OUT} + $V_{DROPOUT}$, whichever is greater.
(2): There is a 3MΩ resistor between EN and ground on the device.

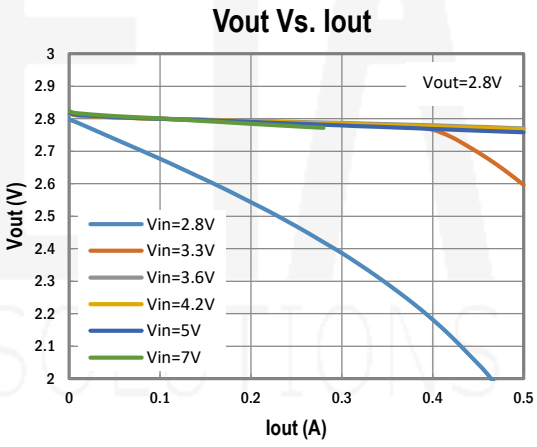
PIN DESCRIPTION

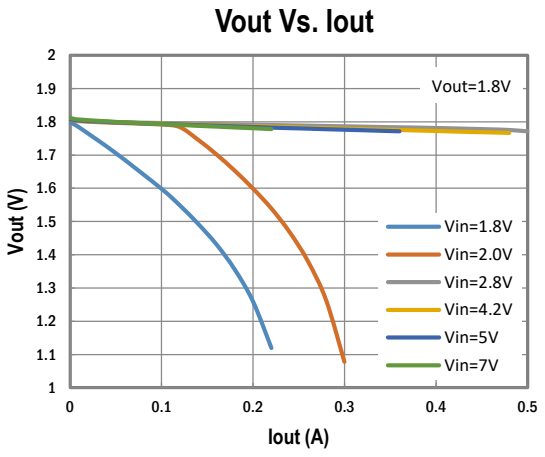
SOT23-6 PIN #	NAME	DESCRIPTION
1	EN2	Channel2 Enable Pin. Drive it high to enable IC, drive it low to disable. EN can be connected to IN if not used.
2	GND	Ground
3	EN1	Channel2 Enable Pin. Drive it high to enable IC, drive it low to disable. EN can be connected to IN if not used.
4	VOUT1	Output of regulator for Channel1
5	VIN	Input supply pin
6	VOUT2	Output of regulator for Channel2

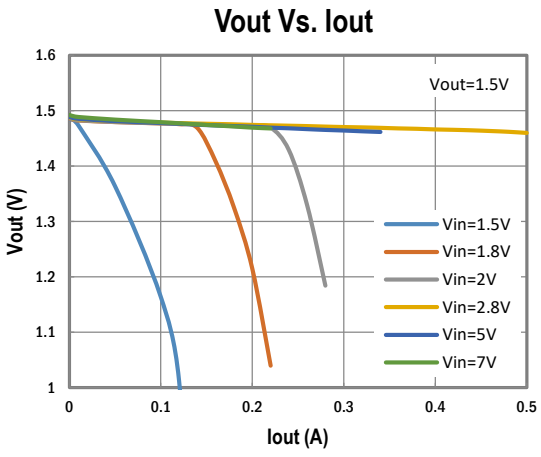
TYPICAL CHARACTERISTICS

(Typical values are at T_A = 25°C unless otherwise specified.)





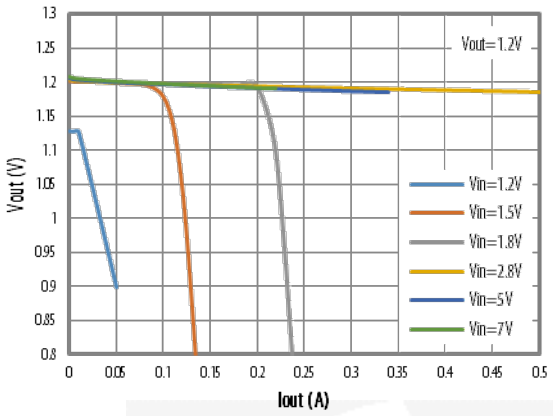




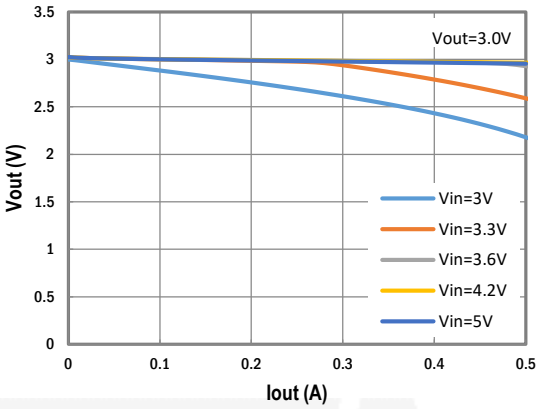
TYPICAL CHARACTERISTICS Cont'd

(Typical values are at T_A = 25°C unless otherwise specified.)

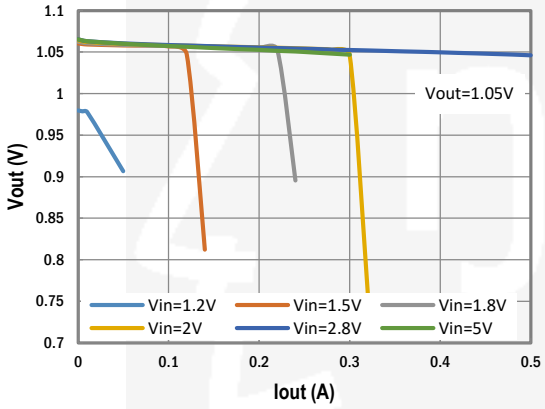
Vout Vs. Iout



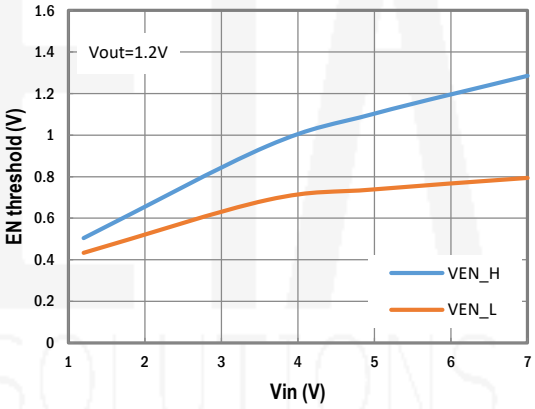
Vout Vs. Iout



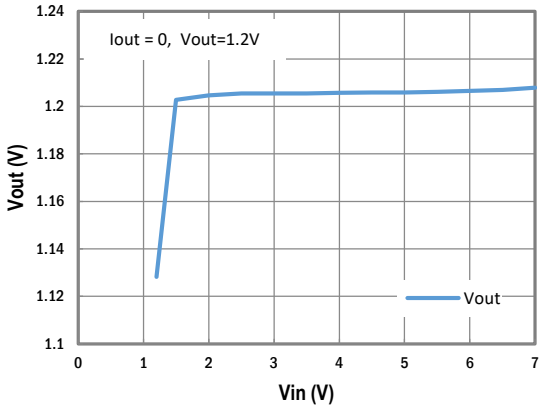
Vout Vs. Iout



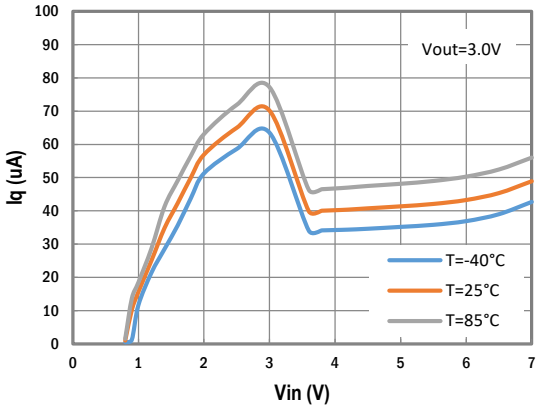
EN Threshold



Input Range



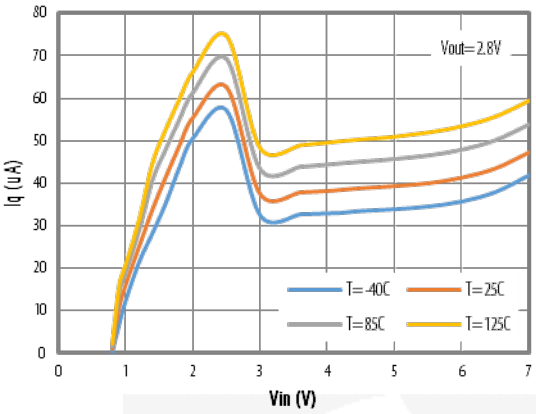
Iq Vs. Vin



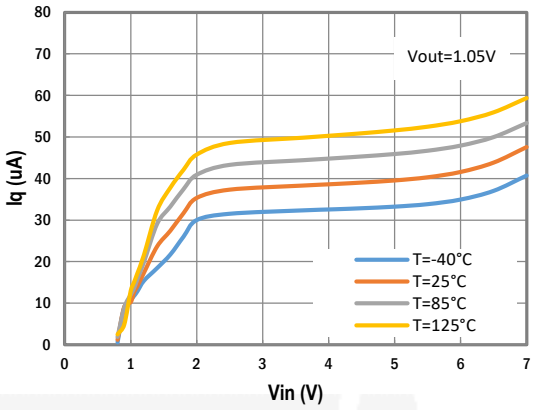
TYPICAL CHARACTERISTICS Cont'd

(Typical values are at T_A = 25°C unless otherwise specified.)

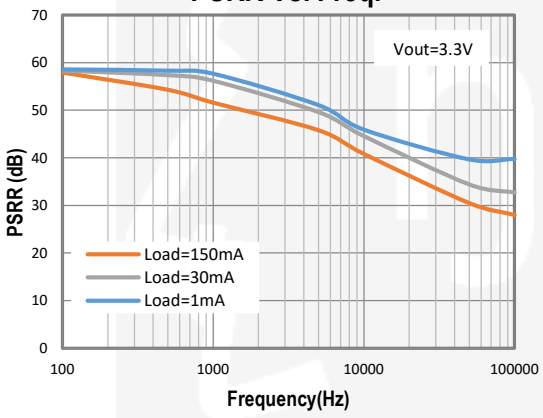
Iq Vs. Vin



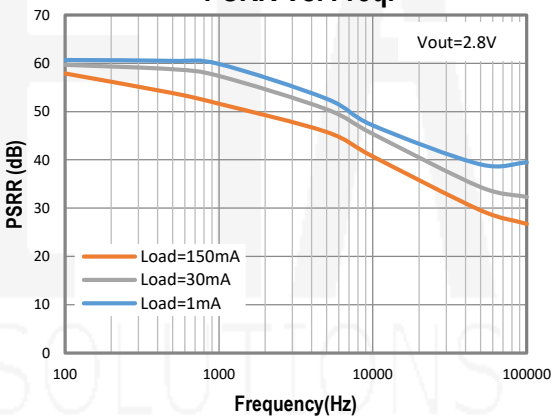
Iq Vs. Vin



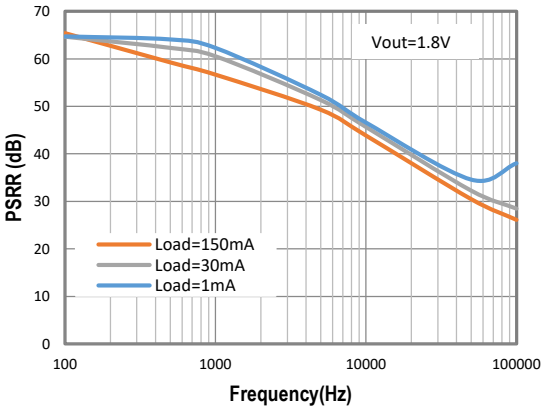
PSRR Vs. Freq.



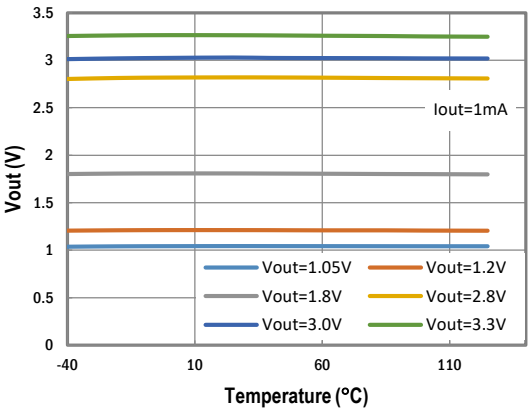
PSRR Vs. Freq.



PSRR Vs. Freq.

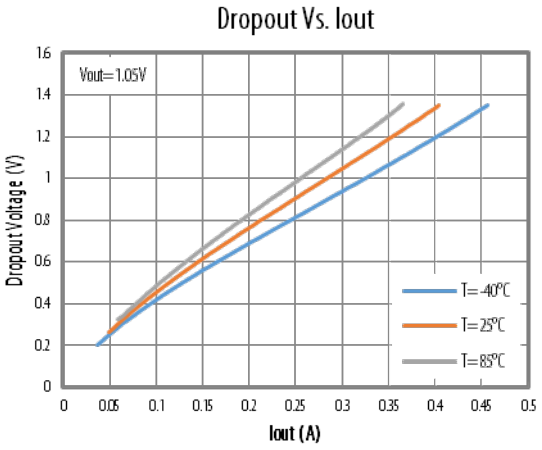


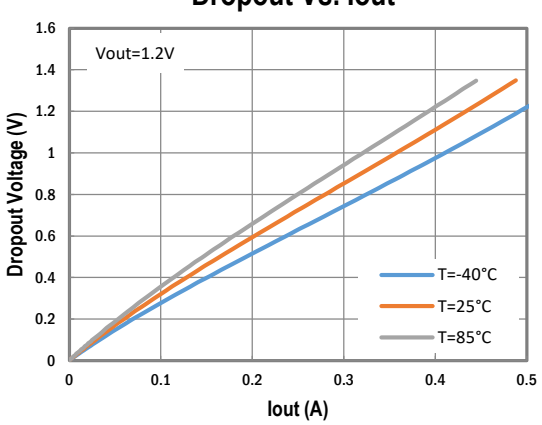
Vout Vs. Temp

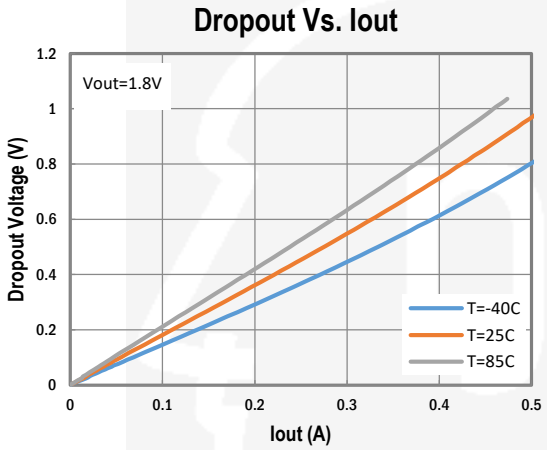


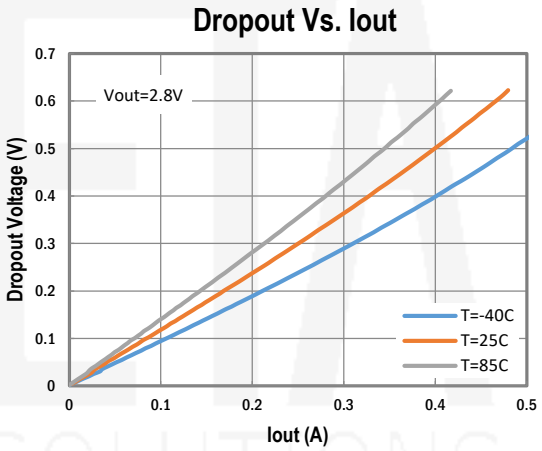
TYPICAL CHARACTERISTICS Cont'd

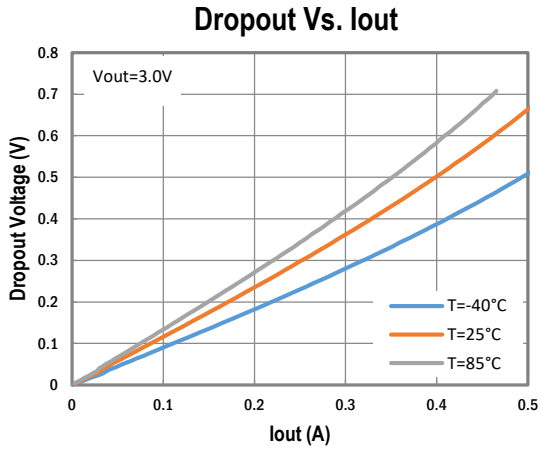
(Typical values are at T_A = 25°C unless otherwise specified.)

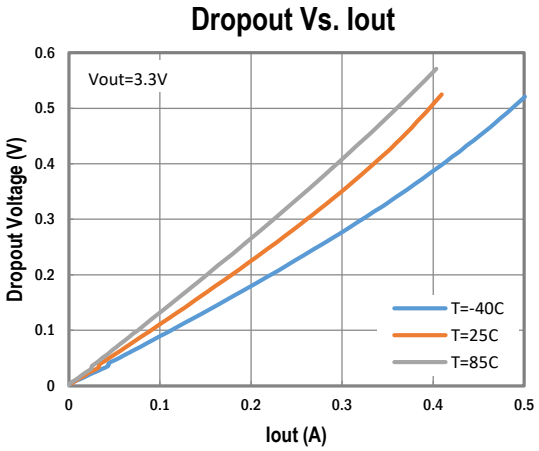










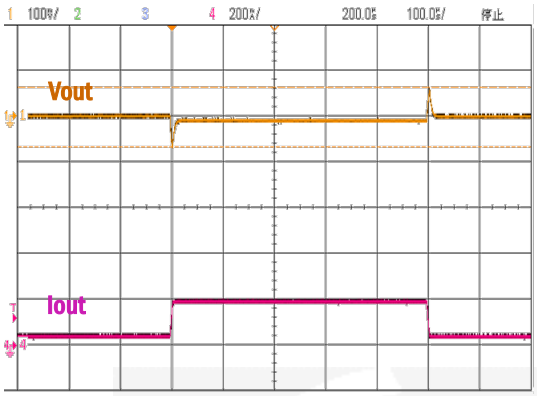


TYPICAL CHARACTERISTICS Cont'd

(Typical values are at T_A = 25°C unless otherwise specified.)

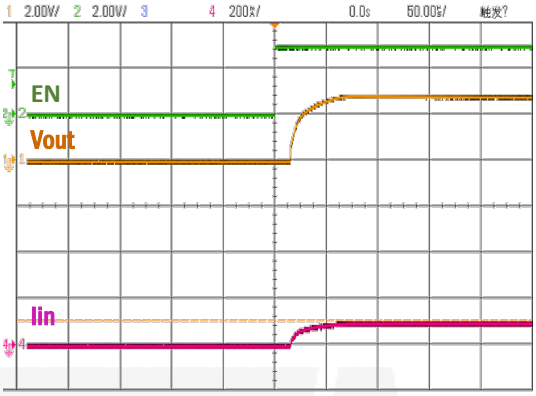
Load Transient Response

Vin=3.6V, Vout=2.8V, Iout=0.05-0.2A

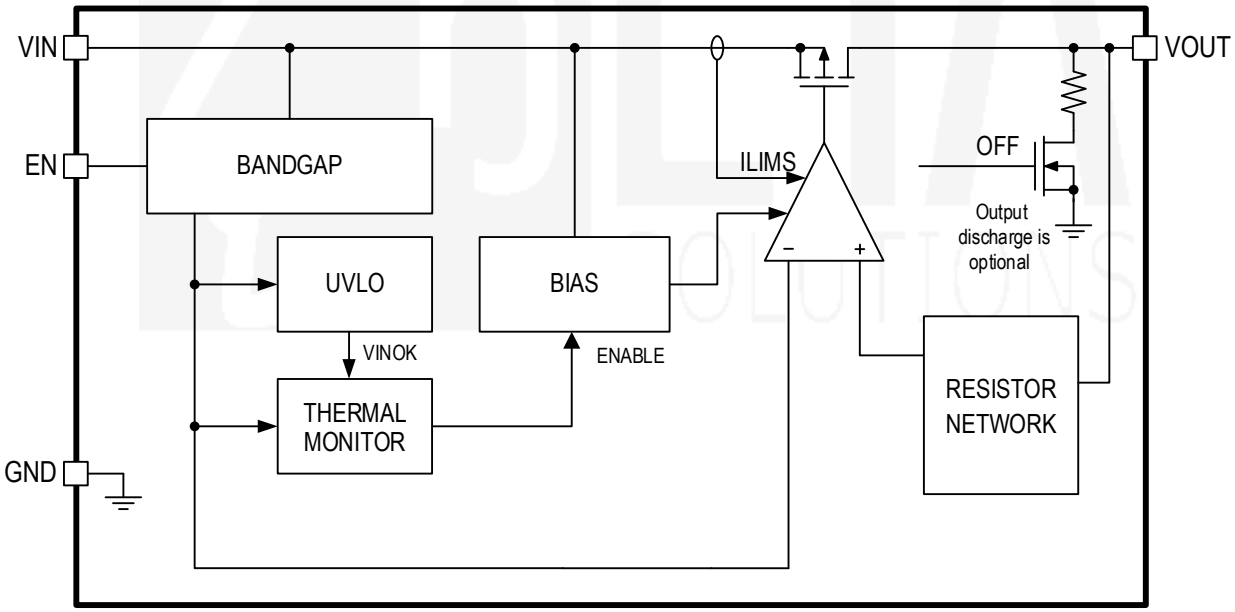


Startup Waveforms

Vin=3.6V, Vout=2.8V, Iout=100mA



FUNCTIONAL BLOCK DIAGRAM



FUNCTIONAL DESCRIPTION

The ETA5254 family of LDO regulators has been optimized for application in noise-sensitive equipment. The device features low dropout voltages, high PSRR, low quiescent current, and enable-input to reduce supply currents to less than 1μA when the regulator is turned off.

Enable Sequence

ETA5254 is enabled when all below conditions happen. Otherwise, ETA5254 is in standby mode.

- EN pin voltage above Logic High level
- Junction Temperature is not at Over-Temperature Protection level.

Once all above conditions happen, ETA5254 first enables BANDGAP and BIAS then enables LDO core.

ETA5254 is completed forced in shutdown mode when EN pin is at below LOGIC_LOW that supply current is less than 1μA. Otherwise, part only shutdown the VOUT while other circuit still in operation. Once ETA5254 is in shutdown conditions, Output is discharged by resistor (optional).

Output Current Limit and Foldback Current Limit

ETA5254 family features an internal current limit. In normal operation, the ETA5254 limits output current to approximately 500mA. When current limiting engages, the output voltage scales back linearly until the over current condition ends.

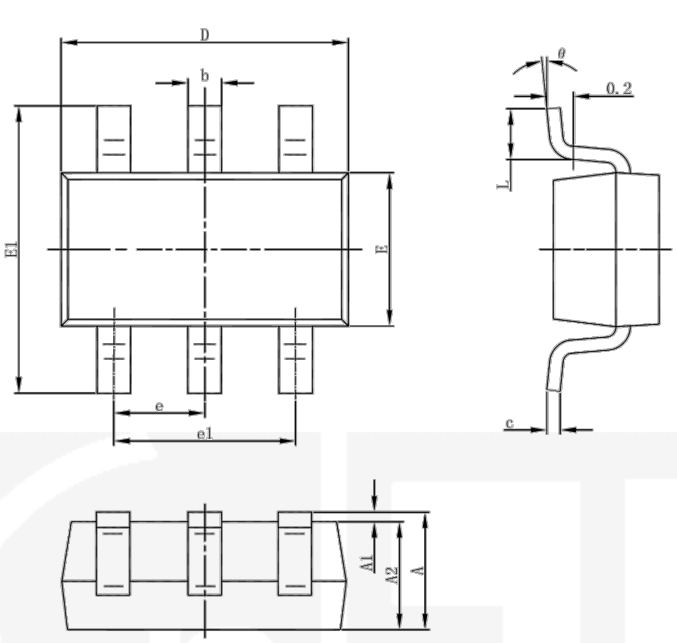
In case output is in hard short conditions, ETA5254 also features an internal foldback limit that reduces the output current limit to a lower level, 250mA, then reduce power dissipation ratings of the package.

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: SOT23-6



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°