1A Positive Voltage Regulators (Preliminary)

CYT8117

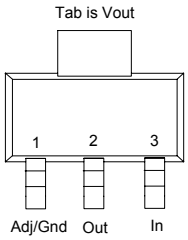
Description

The CYT8117 series of high performance low dropout voltage regulators are designed for applications that require efficient conversion and fast transient response.

Features

- Low Dropout Performance.
- Guaranteed 1A Output Current.
- Wide Input Supply Voltage Range.
- Over-temperature and Over-current Protection.
- Fixed or Adjustable Output Voltage.
- Rugged 3KV ESD withstand capability.
- Available in SOT-223 Packages.

Pin Configuration



SOT-223

Application

- Active SCSI Terminators.
- High Efficiency Linear Regulators.
- 5V to 3.3V Linear Regulators
- Motherboard Clock Supplies.

Ordering Information

Device	Package	V_{OUT} Volts
CYT8117TXX	SOT-223	Fixed output voltages; XX denotes voltage options (1.5V, 1.8V, 2.5V, 3.0V, and 3.3V).
CYT8117TA		Adjustable output voltage.
CYT8117TXXLF	SOT-223 (Lead-free)	Fixed output voltages; XX denotes voltage options (1.5V, 1.8V, 2.5V, 3.0V, and 3.3V).
CYT8117TALF		Adjustable output voltage.

Absolute Maximum Rating

Symbol	Parameter	Maximum	Units
V_{IN}	Input Supply Voltage	9	V
θ_{JA}	Thermal Resistance Junction to Ambient SOT-223	60	°C/W
T_J	Operating Junction Temperature Range	0 to 125	°C
T_{STG}	Storage Temperature Range	-40 to 150	°C
T_{LEAD}	Lead Temperature (Soldering 10 Sec)	260	°C

Electrical Characteristic

$V_{IN,MAX}$ ≤ 8V, $V_{IN,MIN}$ – V_{OUT} = 1.5V, I_{OUT} = 10mA, C_{IN} = 10μF, C_{OUT} = 22μF, T_J = 0 – 125°C, unless otherwise specified.

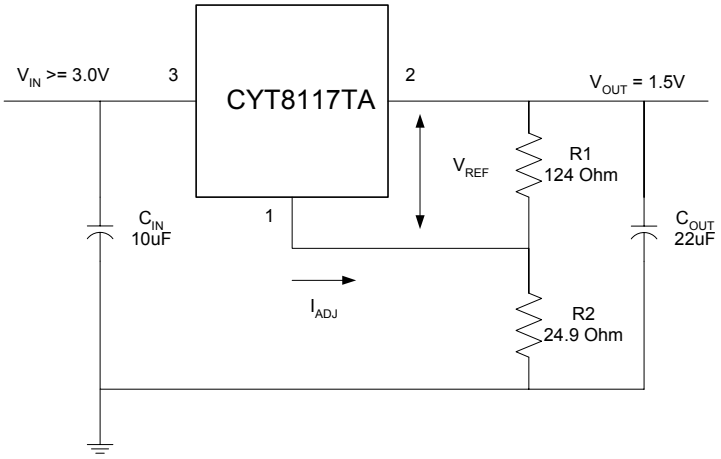
Symbol	Parameter	Test Condition	Min	Typ	Max	Units
V_O	Output Voltage (1)	(V_{IN} - V_{OUT}) = 1.5V, I_{OUT} = 10mA, T_A = 25°C, CYT8117T15 CYT8117T18 CYT8117T25 CYT8117T30 CYT8117T33	(-2%)	1.5 1.8 2.5 3.0 3.3	(+2%)	V
V_{REF}	Reference Voltage (1) (Adj. Voltage Version)	(V_{IN} - V_{OUT}) = 1.5V I_{OUT} = 10mA	(-2%)	1.250	(+2%)	V
V_{SR}	Line Regulation (1)	V_{OUT} + 1.5V < V_{IN} < 8V I_{OUT} = 10mA	--	0.3	--	%
V_{LR}	Load Regulation (1)	(V_{IN} - V_{OUT}) = 1.5V 10mA ≤ I_{OUT} ≤ 1A	--	0.4	--	%
I_Q	Quiescent Current	Fixed Output Version	--	10	--	mA
I_{ADJ}	Adjust Pin Current		--	48	--	μA
ΔI_{ADJ}	Adjust Pin Current Change	V_{OUT} + 1.5V < V_{IN} < 8V 10mA ≤ I_{OUT} ≤ 1A	--	0.2	--	μA
V_D	Dropout Voltage (2)	ΔV_{REF} = 1%, I_{OUT} = 1A	--	1.1	--	V
I_O	Minimum Load Current		--	4	--	mA
I_{CL}	Current Limit		--	1.8	--	A
T_C	Temperature Coefficient		--	0.07	--	%/°C
OTP	Thermal Protection		--	175	--	°C
V_N	RMS Output Noise	T_A = 25°C, 10Hz ≤ f ≤ 10kHz	--	0.003	--	%V_O
R_A	Ripple Rejection Ratio	f = 120Hz, C_{OUT} = 22μF (Tantalum), (V_{IN} - V_{OUT}) = 3V, I_{OUT} = 1A	--	35	--	dB

Notes:

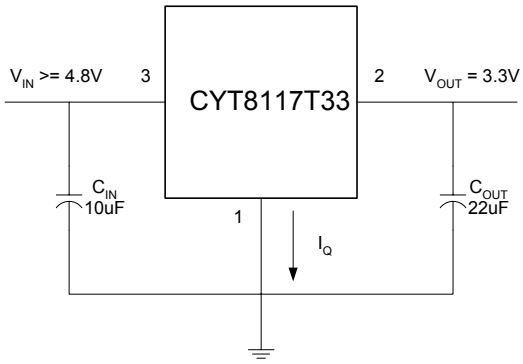
1. Low duty cycle pulse testing with which T_J remains unchanged.
2. ΔV_{OUT}, ΔV_{REF} = 1%.

Typical Application

Adjustable Voltage Regulator



Fixed Voltage Regulator



Application Hints

Like any linear voltage regulator, CYT8117 requires external capacitors to ensure stability. The external capacitors must be carefully selected to ensure performance.

Input Capacitor

An input capacitor of at least 10μF is required. Ceramic or Tantalum can be used. The value can be increase without upper limit.

Output Capacitor

An output capacitor is required for stability. It must be placed no more than 1 cm away from the V_{OUT} pin, and connected directly between V_{OUT} and GND pins. The minimum value is 22μF but may be increase without limit.

Thermal Considerations

It is important that the thermal limit of the package is not exceeded. The CYT8117 has built-in thermal protection. When the thermal limit is exceeded, the IC will enter protection, and V_{OUT} will be pulled to ground. The power dissipation for a given application can be calculated as following:

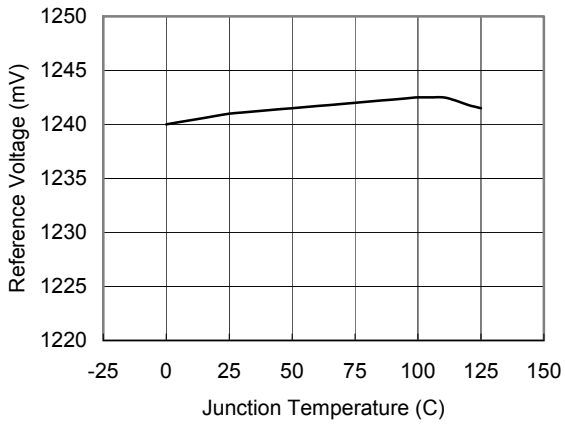
The power dissipation (P_D) is

$P_D = I_{OUT} * [V_{IN} – V_{OUT}]$

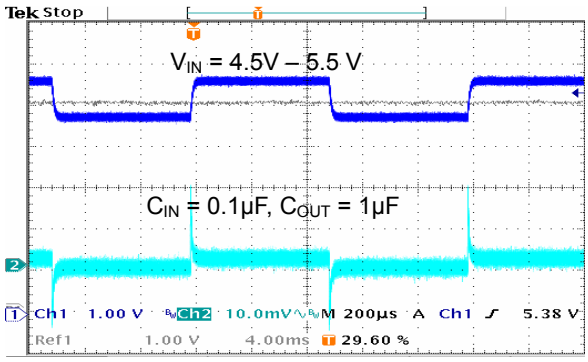
The thermal limit of the package is then limited to $P_{D(MAX)} = [T_J – T_A]/\Theta_{JA}$ where T_J is the junction temperature, TA is the ambient temperature, and Θ_{JA} is around 60°C/W for CYT8117.CYT8117 is designed to enter thermal protection at 175°C. For example, if T_A is 25°C then the maximum P_D is limited to about 2.5W. In other words, if $I_{OUT(MAX)}$ = 1A, then $[V_{IN} – V_{OUT}]$ cannot exceed 2.5V.

Typical Performance Characteristics

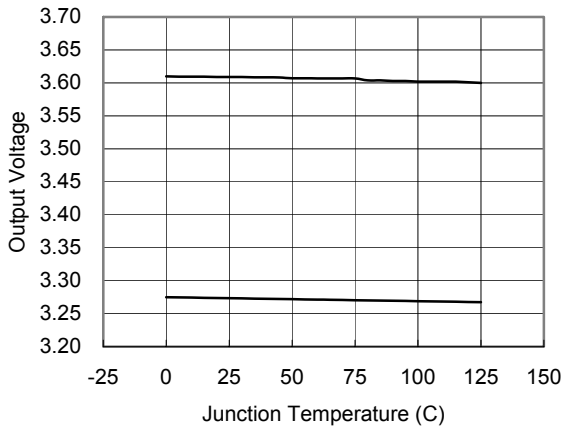
Reference Voltage vs Junction Temperature



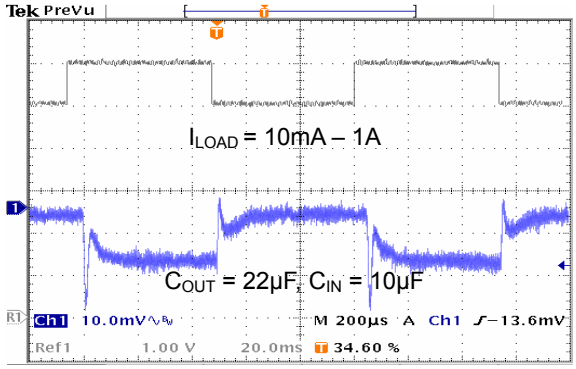
Line Transcients



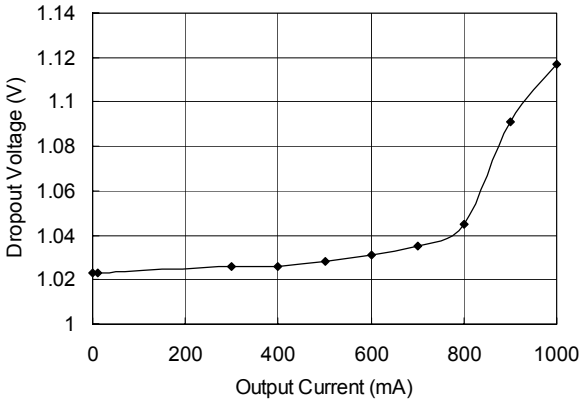
Output Voltage vs Junction Temperature



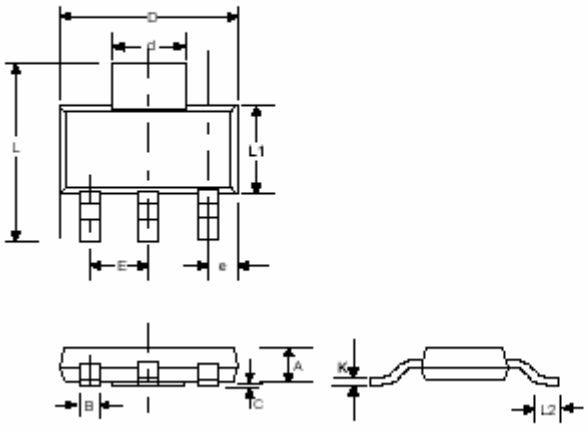
Load Transcients



Dropout Voltage vs Output Current



Outline Drawing for SOT-223



DIMENSIONS				
DIM[N]	INCHES		MM	
	MIN	MAX	MIN	MAX
A	—	0.071	—	1.80
B	0.025	0.033	0.640	0.840
C	0.012	—	0.31	—
D	0.248	0.264	6.30	6.71
d	0.115	0.124	2.95	3.15
E	—	0.090	—	2.29
e	0.033	0.041	0.840	1.04
L	0.264	0.287	6.71	7.29
L1	0.130	0.148	3.30	3.71
L2	0.012	—	0.310	—
K	0.010	0.014	0.250	0.360