Description

YJ1117E-series of linear regulators offer 1A output current, 1.1V typical drop-out voltage, and fixed / adjustable output voltage levels.

The superior PSRR performance (typically at 70dB) benefit various applications in which clean power are pre-requisite. As a result, signal integrity and reliable operation of sensitive analog circuitry in adopting systems can be assured. Embedded with protection function (thermal shut-down, current limiting) and precision band-gap reference, YJ1117E delivers highly accurate (±1%) output voltages at either fixed values (1.2 ~ 5.0V) or adjustable values (V_{REF} = 1.25V).

All devices are manufactured free of halogen / lead / antimony and fully RoHS compliant. Packages offered include SOT-223-3L.

Features and Benefits

- Accurate V_{OUT} (tolerance = ±1%) and low-noise (PSRR = 70dB typical); RMS O/P Noise = 0.003% of V_{OUT}) output at 1.2 ~ 5.0V
- Drop-out voltage (I_{OUT} = 1A) at 1.1V typically
- Outstanding line regulation (I_{OUT} = 30mA) at 0.001%/V typically and load regulation (1mA ≤ I_{OUT} ≤ 1A) at 0.2%/A typically
- Stable operation with MLCC capacitors (1.0μF / 1.0μF) of low ESR values (≤ 1.5Ω) close to input & output pins over wide range of T_J from -40ºC to 125ºC
- Built-in protection features: current limiting, thermal shut-down
- Lead-free package assembled with 'green' molding compound

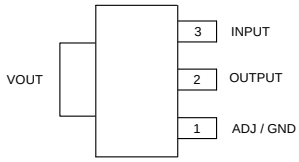
Applications

- Voltage regulation for clean energy to electronic loads
- Mainboards in FPTVs, PC Monitors, Digital Signage Displays, Set Top Boxes, Network / Communication Switches & Routers
- Motherboards in Industrial PCs, Slot Machines, Arcade Game Consoles, Smart Meters

Pin Assignment

Top View

(SOT-223-3L)



Ordering Information

YJ1117E X X X

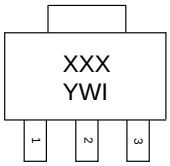
Product Prefix	Package	Output Voltage	Packing
	E : SOT-223-3L	ADJ: V_{OUT} = Adjustable 12: V_{OUT} = 1.2V 18: V_{OUT} = 1.8V; 25: V_{OUT} = 2.5V 33: V_{OUT} = 3.3V; 50: V_{OUT} = 5.0V	TR : Tape & Reel

Product Name	Package	Marking	MSL	T_J (ºC)	Media	Quantity (pcs)
YJ1117EE-ADJ	SOT-223-3L	H5I	3	-40 ~ 125	13" T&R	4,000
YJ1117EE-12		H5K				
YJ1117EE-18		H5J				
YJ1117EE-25		H5M				
YJ1117EE-33		H5H				
YJ1117EE-50		H5E				

Marking Information

Top View

(SOT-223-3L)



First Line: Marking (see *Ordering Information*)

Second Line: Date Code
Y: Year of Molding
W: Work-week of Molding
I: Internal Code

Typical Application Circuit

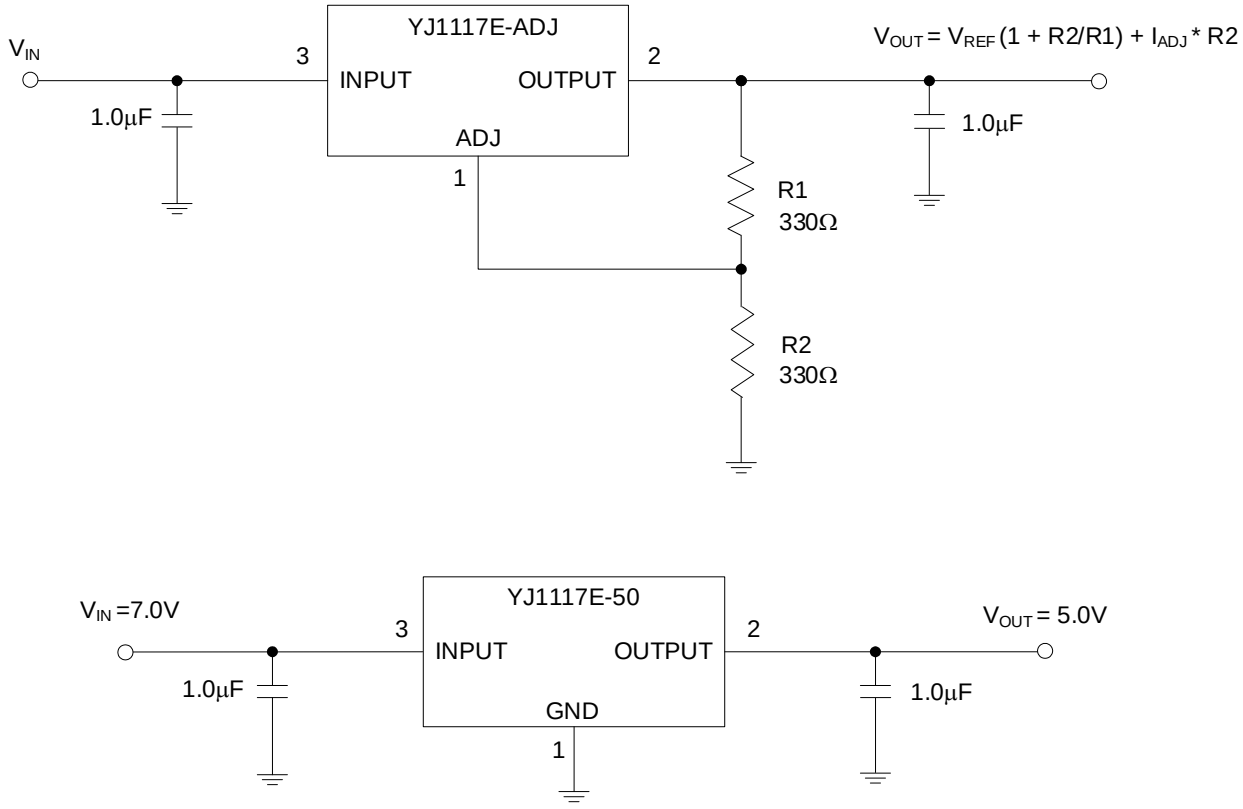


Fig. 1: Application Circuits

Notes: The YJ1117E is designed to work well with MLCC capacitors of low ESR. While input and output capacitors with values of ≥ 1.0μF are recommended, ESR of the output capacitor must be < 1.5Ω. Whenever a capacitor is populated near pin 2 (OUTPUT) of YJ1117E and in parallel to the output capacitor, its capacitance must be < 0.68μF. In the case that this capacitor is as small as 0.1μF, it must be positioned ≥ 5mm away from pin 2.

Functional Blocks

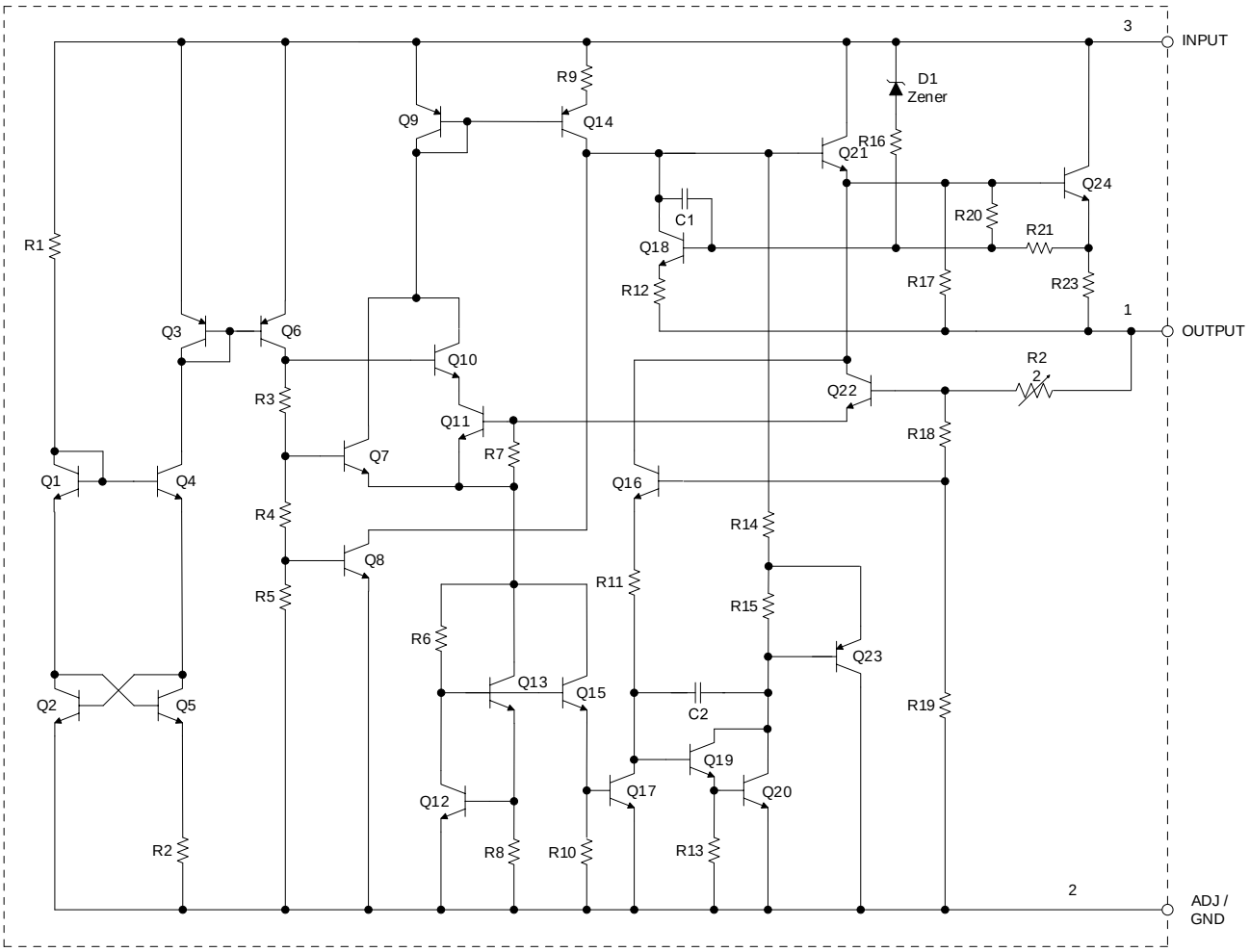


Fig. 2: Diagram of Functional Blocks

Absolute Maximum Ratings *1

Symbol	Parameter	Rating	Unit
V_{IN}	Input Voltage	16	V
T_J	Operating Junction Temperature	155	ºC
T_{LEAD}	Lead Temperature (soldering, 10s)	260	ºC
T_{STG}	Storage Temperature Range	-65 ~ 150	ºC
$R_{\Theta JA}$	Thermal Resistance (junction-to-ambient) *2	65	ºC/W
HBM	ESD (Human Body Model)	2000	V
MM	ESD (Machine Model)	200	V

Notes: *1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. While these are stress ratings only, functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" are not implied. Exposure to "Absolute Maximum Ratings" over extended periods may adversely affect the device reliability.

*2: The device is soldered to 200mm^2 (16mm x 12.5mm) copper (top-side solder mask) of 2oz on 2-layer FR-4 p.c.b. with eight via holes (0.5mm diameter)

Recommended Operating Conditions

Symbol	Parameter	Min.	Max.	Unit
V_{IN}	Input Voltage	–	13	V
T_J	Operating Junction Temperature Range	-40	125	ºC

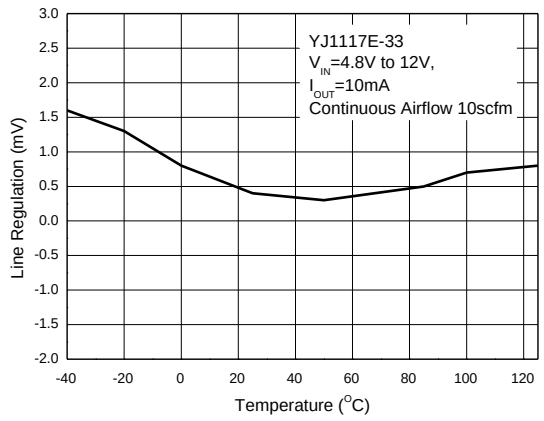
Electrical Characteristics

Conditions [$V_{IN} = V_{OUT} + 1.5V$; $C_{IN} = 1.0\mu F$ (ceramic); $C_{OUT} = 1.0\mu F$ (ceramic); $T_A = 25°C$] apply to the following measurement unless otherwise specified. Numbers in *italic* & bold are valid over -40ºC ≤ T_J ≤ 125ºC.

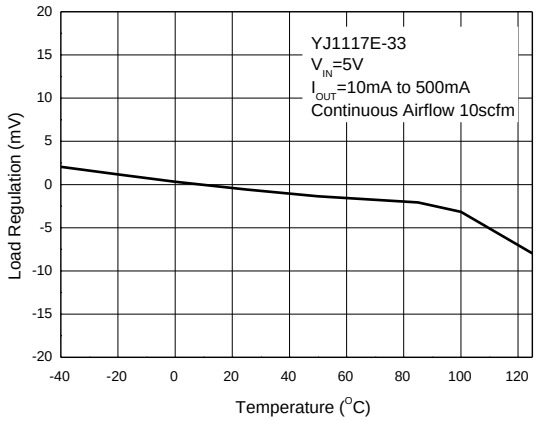
Symbol	Parameter	Conditions		Min.	Typ.	Max.	Unit
V_{OUT}	Output Voltage (fixed versions)	for V_{OUT} = 1.2V: $V_{OUT} + 1.5V \le V_{IN} \le 12V$; I_{OUT} = 10mA		98% x V_{OUT}	V_{OUT}	102% x V_{OUT}	
				96% x V_{OUT}	V_{OUT}	***104% x V_{OUT}***	
		for V_{OUT} = 1.8 ~ 5.0V: $V_{OUT} + 1.5V \le V_{IN} \le 12V$; I_{OUT} = 10mA		99% x V_{OUT}	V_{OUT}	101% x V_{OUT}	V
				98% x V_{OUT}	V_{OUT}	***102% x V_{OUT}***	
I_{OUT_Max}	Maximum Output Current	$1.5V \le V_{IN} - V_{OUT}$		1.0	1.3	–	A
V_{REF}	Reference Voltage	$V_{OUT} + 1.5V \le V_{IN} \le 12V$ I_{OUT} = 10mA		1.238	1.250	1.262	V
				98% x V_{OUT}	V_{OUT}	***102% x V_{OUT}***	
V_{DROP}	Drop-out Voltage	I_{OUT} = 1A		–	1.1	1.3	V
V_{RLINE}	Line Regulation	$1.5V \le V_{IN}-V_{OUT} \le 10V$ I_{OUT} = 30mA		–	0.001	0.040	%
V_{RLOAD}	Load Regulation	$V_{IN} = V_{OUT} + 1.5V$ $1mA \le I_{OUT} \le 1A$		–	0.2	0.6	%
I_Q	Quiescent Current	for Fixed V_{OUT}; I_{OUT} = 0mA		–	3.5	6.0	mA
-	Minimum Load Current	for Adjustable V_{OUT}: $1.5V \le V_{IN} - V_{OUT} \le 10V$		–	2.0	5.0	mA
I_{ADJ}	Adjustable Pin Current	–		–	45	90	µA
ΔI_{ADJ}	Adjustable Pin Current Change	$1.5V \le V_{IN} - V_{OUT} \le 10V$		–	0.2	5.0	µA
$(\Delta V_{OUT} / V_{OUT}) / \Delta T$	Output Voltage Temp. Coefficient	I_{OUT} = 30mA		–	±30	–	ppm / ºC
PSRR	Power Supply Rejection Ratio	Ripple 1.0 V_{PP} $V_{IN} = V_{OUT} + 2V$ I_{OUT} = 100mA	f = 120Hz	–	70	–	dB
			f = 1kHz	–	70	–	
NOISE	RMS Output Noise (% of V_{OUT})	10Hz ≤ F ≤ 10kHz, no Load		–	0.003	–	%
T_{TSD}	Thermal Shut-down Temperature			–	170	–	ºC
T_{TSD_HYS}	Thermal Shut-down Hysteresis			–	20	–	ºC
$R_{\theta JC}$	Thermal Resistance	Junction-to-Case (SOT-223-3L)		–	40	–	ºC / W

Performance Characteristics

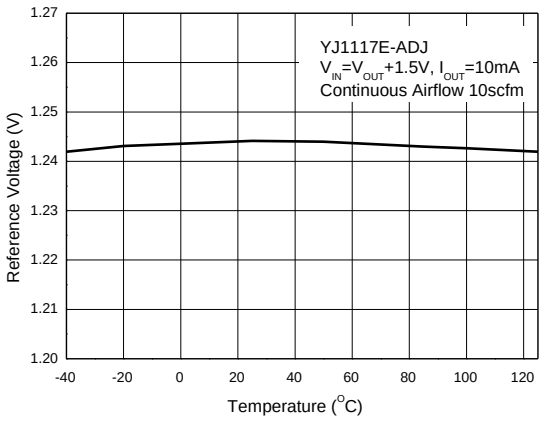
Graph 1: Line Regulation vs. Junction Temp.



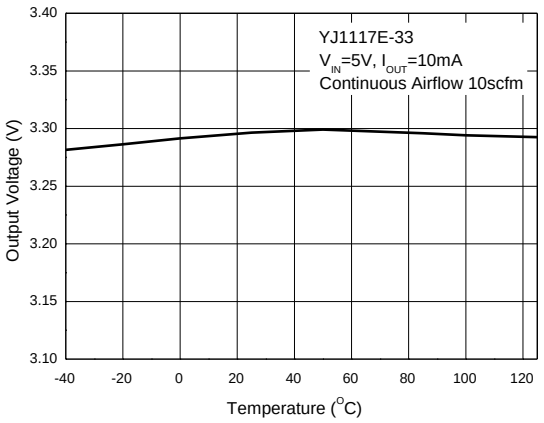
Graph 2: Load Regulation vs. Junction Temp.



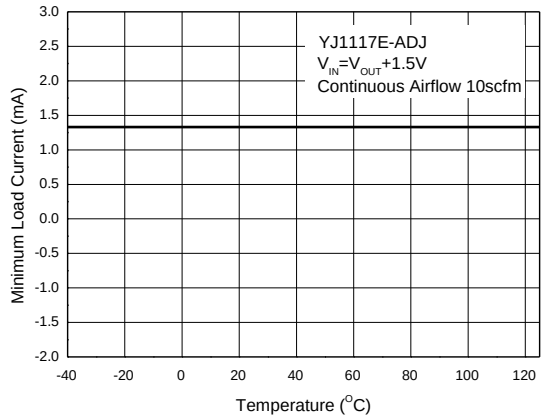
Graph 3: Reference Voltage vs. Junction Temp.



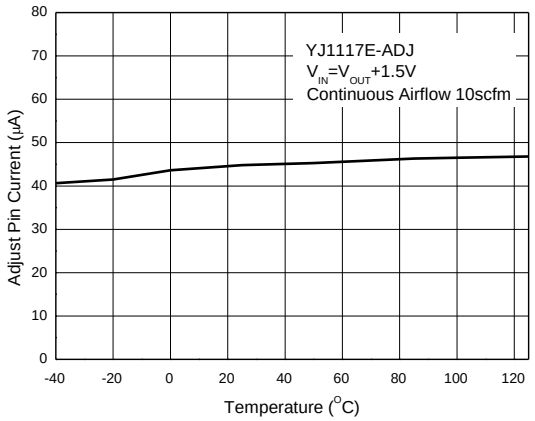
Graph 4: Output Voltage vs. Junction Temp.



Graph 5: Minimum Load Current vs. Junction Temp.

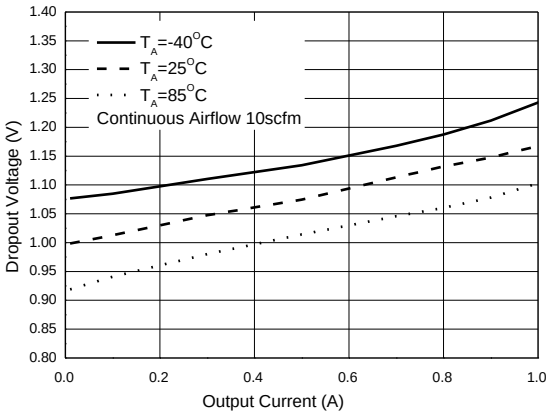


Graph 6: Adjust Pin Current vs. Junction Temp.

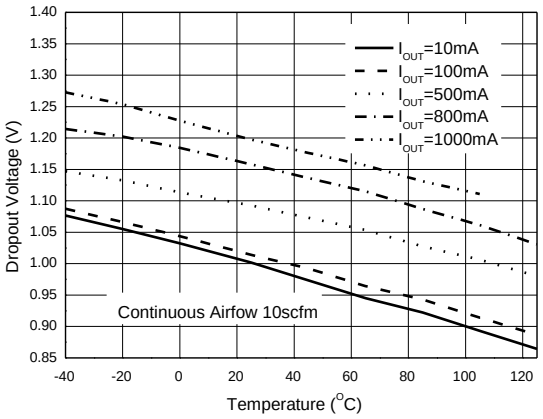


Performance Characteristics (continued)

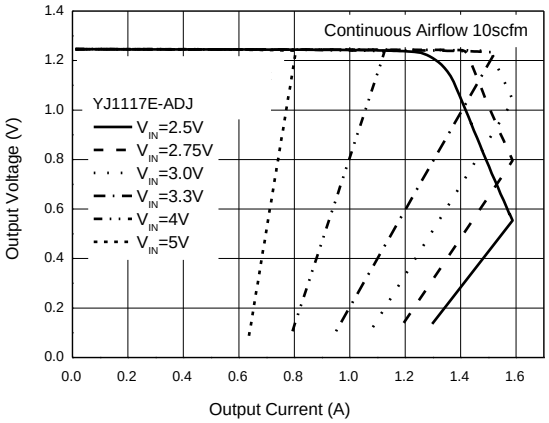
Graph 7: Drop-out Voltage vs. Output Current



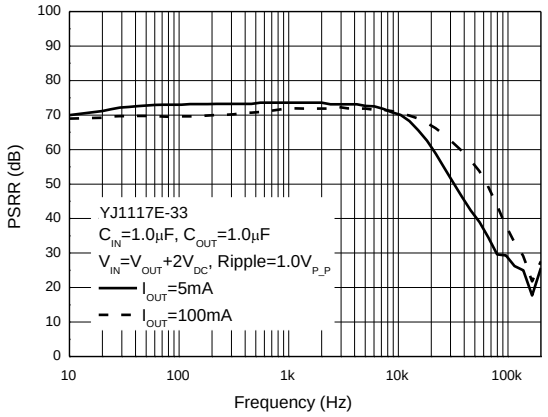
Graph 8: Drop-out Voltage vs. Junction Temp.



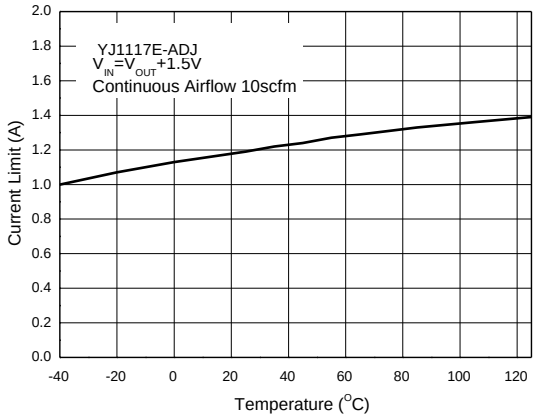
Graph 9: Output Voltage vs. Output Current



Graph 10: PSRR vs. Frequency

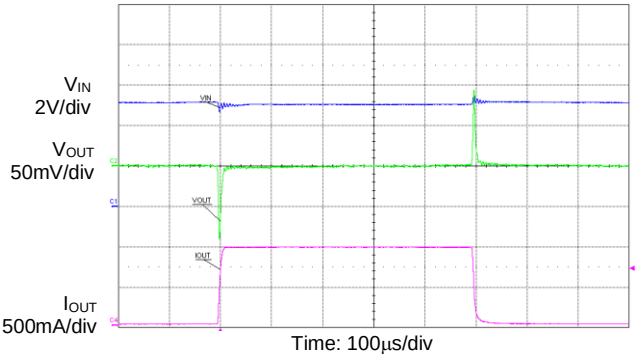


Graph 11: Current Limit (I_{OUT_Max}) vs. JunctionTemp.



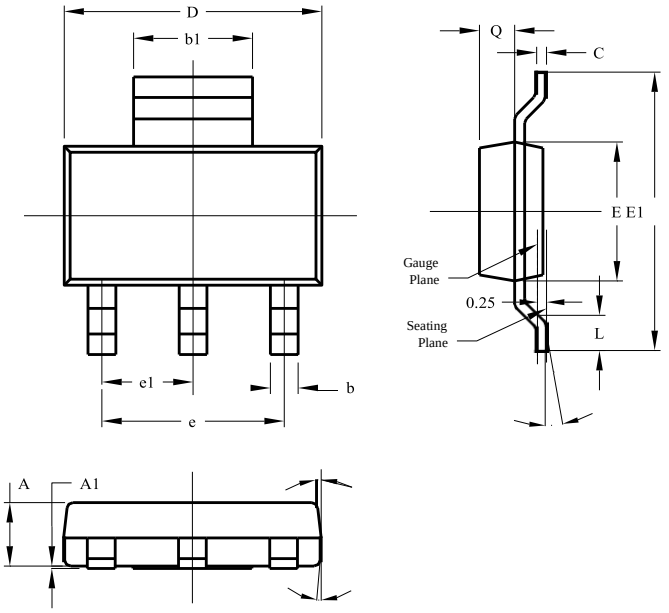
Graph 12: Load Transient Response

(YJ1117E-ADJ, V_{IN} = 5V, V_{OUT} = 3.3V, C_{IN} = 1.0µF C_{OUT} = 1.0µF)



Package Outline (All measurements in mm & inch)

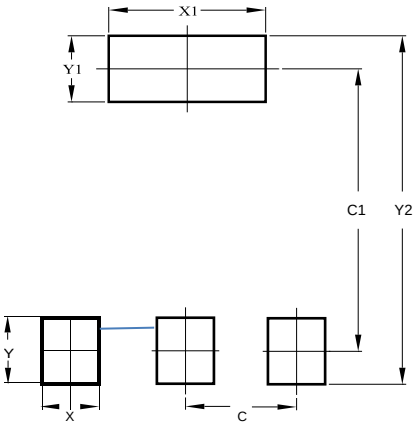
Package Type: SOT-223-3L (J1)



SOT-223-3L (J1)			
Dimension	Min.	Typ.	Max.
A	1.55	1.60	1.65
A1	0.01	0.05	0.15
b	0.60	0.70	0.80
b1	2.90	3.00	3.10
C	0.20	0.25	0.30
D	6.45	6.50	6.55
E	3.45	3.50	3.55
E1	6.90	7.00	7.10
e	-	4.60	-
e1	-	2.30	-
L	0.85	0.95	1.05
Q	0.84	0.89	0.94
All measurements in "mm"			

Suggested Pad Layout (All measurements in mm & inch)

Package Type: SOT-223-3L (J1)



SOT-223-3L (J1)	
Dimension	Value (mm)
C	2.3
C1	6.4
X	1.2
X1	3.3
Y	1.6
Y1	1.6
Y2	8.0

Disclaimer

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