

VSU1117B-XXX

FEATURES

- Low Dropout Voltage: 1.3V at 1A Output Current
- Trimmed Current Limit
- On-Chip Thermal Shutdown
- Three-Terminal Adjustable or Fixed 1.8V, 2.5V, 3.3V, 5V
- Operation Junction Temperature: -40 °C to 125°C



GENERAL DESCRIPTION

The VSU1117B-XXX is a series of low dropout three-terminal regulators with a dropout of 1.3V at 1A output current.

The VSU1117B-XXX series provides current limiting and thermal shutdown. Its circuit includes a trimmed bandgap reference to assure output voltage accuracy to be within 1.5%. Current limit is trimmed to ensure specified output current and controlled short-circuit current. On-chip thermal shutdown provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

The VSU1117B-XXX has an adjustable version, that can provide the output voltage from 1.25V to 12V with only 2 external resistors.

APPLICATIONS

- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD-Video Player
- NIC/Switch
- Telecom Modem
- ADSL Modem
- Printer and other peripheral Equipment

MAXIMUM RATINGS

ORDERING INFORMATION

Package	Operating Junction Temperature Range	Part NO.
TO-252-2L	-40 to 125°C	VSU1117B-ADJ
		VSU1117B-1.8
		VSU1117B-2.5
		1117B-3.3
		VSU1117B-5.0

ABSOLUTE MAXIMUM RATINGS (T_a=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Input Voltage	V _I	20	V
Thermal Resistance from Junction to Ambient	R _{θJA}	80	°C/W
Operating Ambient Temperature	T _A	-40~+85	°C
Operating Junction Temperature	T _J	-40~+125	°C
Storage Temperature	T _{stg}	-40~+150	°C
Lead Temperature (Soldering, 10sec.)	T _L	260°C, 10s	

Note: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Value	Unit
Input Voltage	V _I	15	V
Operating Junction Temperature	T _J	-40~+125	°C

ESD RATINGS

Parameter	Symbol	Value	Unit
Electrostatic discharge	V _{ESD-HBM}	2000	V
	V _{ESD-MM}	400	

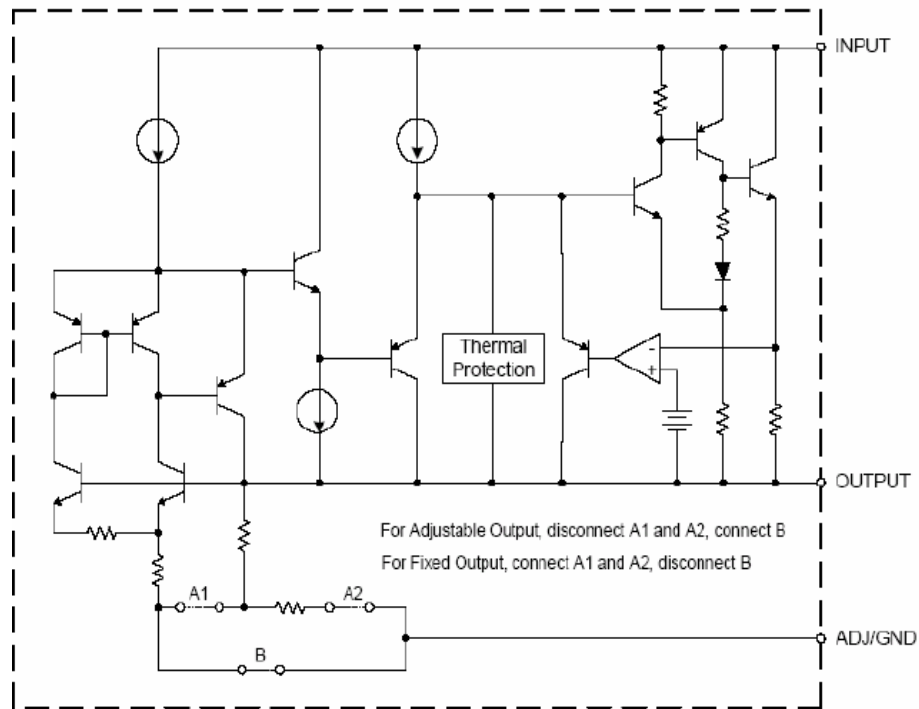
Note: ESD testing is conducted in accordance with the relevant specifications formulated by the Joint Electronic Equipment Engineering Commission (JEDEC). The human body mode (HBM) electrostatic discharge test is based on the JESD22-114D test standard, using a 100pF capacitor and discharging to each pin of the device through a resistance of 1.5kΩ. The electrostatic discharge test in mechanical mode (MM) is based on the JESD22-115-A test standard and uses a 200pF capacitor to discharge directly to each pin of the device.

$V_{IN} \leq 10V$, $T_J = 25^\circ C$ unless otherwise specified.

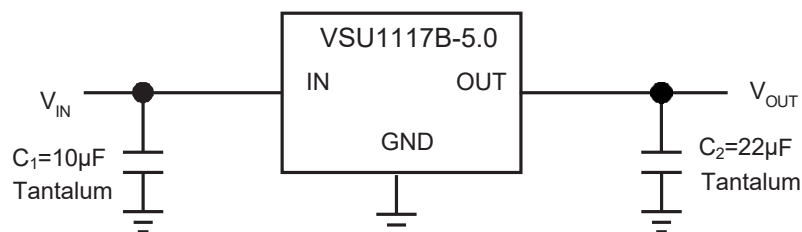
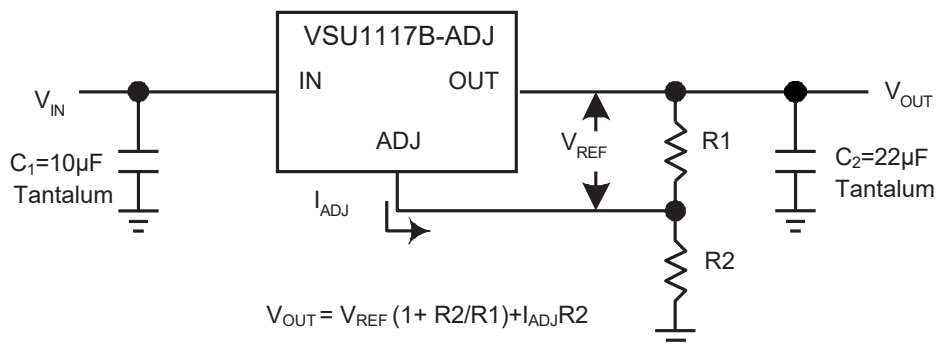
Parameter	Symbol	Part No.	Test Conditions	Min	Typ	Max	Unit
Reference Voltage	V_{IROC}	VSU1117B-ADJ	$I_{OUT}=10mA$, $V_{IN}=3.23V$	1.231	1.250	1.269	V
			$10mA \leq I_{OUT} \leq 1A$, $2.75V \leq V_{IN} - V_{OUT} \leq 13.25V$	1.225	1.250	1.275	
Output Voltage	V_O	VSU1117B-1.8	$I_{OUT}=10mA$, $V_{IN}=3.8V$	1.773	1.8	1.827	V
			$10mA \leq I_{OUT} \leq 1A$, $3.3V \leq V_{IN} \leq 12V$	1.764	1.8	1.836	
		VSU1117B-2.5	$I_{OUT}=10mA$, $V_{IN}=4.5V$	2.463	2.5	2.538	V
			$10mA \leq I_{OUT} \leq 1A$, $4V \leq V_{IN} \leq 12V$	2.450	2.5	2.550	
		1117B-3.3	$I_{OUT}=10mA$, $V_{IN}=5.3V$	3.251	3.3	3.350	V
			$10mA \leq I_{OUT} \leq 1A$, $4.8V \leq V_{IN} \leq 12V$	3.234	3.3	3.366	
		VSU1117B-5.0	$I_{OUT}=10mA$, $V_{IN}=7.0V$	4.925	5.0	5.075	V
			$10mA \leq I_{OUT} \leq 1A$, $6.5V \leq V_{IN} \leq 12V$	4.9	5.0	5.1	
Line Regulation	LNR	VSU1117B-ADJ	$I_{OUT}=10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 12V$			0.2	mV
		VSU1117B-1.8	$I_{OUT}=10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 10.2V$			7	
		VSU1117B-2.5	$I_{OUT}=10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 9.5V$			7	
		1117B-3.3	$I_{OUT}=10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 8.7V$			7	
		VSU1117B-5.0	$I_{OUT}=10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 7V$			10	
Load Regulation	LDR	VSU1117B-ADJ	$V_{IN} - V_{OUT} = 1.5V$, $10mA \leq I_{OUT} \leq 1A$			0.4	mV
		VSU1117B-1.8				7.2	
		VSU1117B-2.5				10	
		1117B-3.3				13.2	
		VSU1117B-5.0				20	
Dropout Voltage	V_D		$\Delta V_{REF} = 1\%$, $I_{OUT} = 1.0A$		1.3	1.4	V
Adjust Pin Current	I_{Adj}	VSU1117B-ADJ	$V_{IN} = 5V$, $10mA \leq I_{OUT} \leq 0.8A$		55	120	μA
Minimum Load Current	I_L		$2.75V \leq V_{IN} - V_{OUT} \leq 12V$ (ADJ only)		2	10	μA
Quiescent Current	I_q		$V_{IN} = 12V$ (ADJ except)		2	5	mA
Ripple Rejection	PSRR		$f = 10kHz$, $C_{OUT} = 22\mu F$ Tantalum, $V_{IN} - V_{OUT} = 3V$, $I_{OUT} = 1A$	60	70		dB
Temperature Stability					0.5		%
Long-Term Stability			$T_A = 125^\circ C$, 1000hrs		0.3		%
RMS Output Noise (% of VOUT)			$T_A = 25^\circ C$, $10Hz \leq f \leq 10kHz$		0.003		%
Thermal Shutdown Hysteresis					25		$^\circ C$

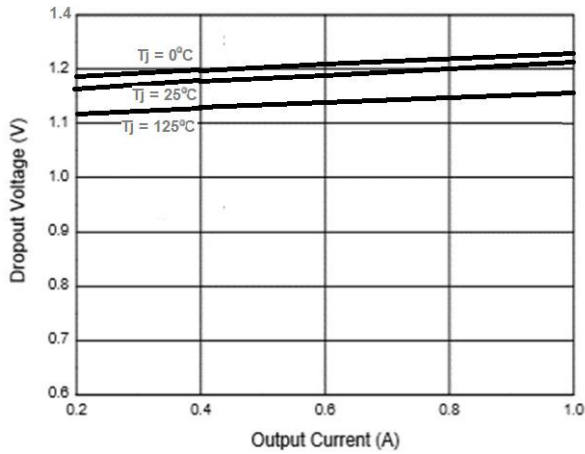
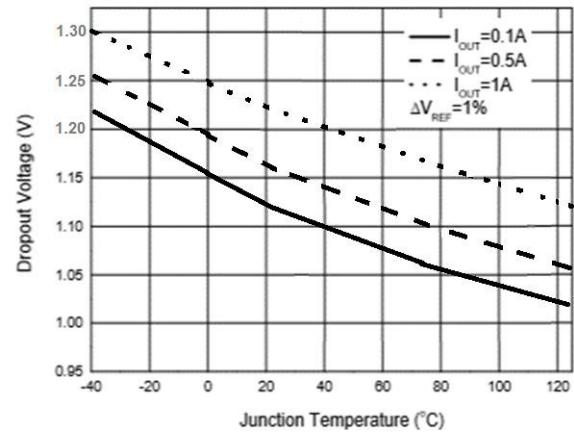
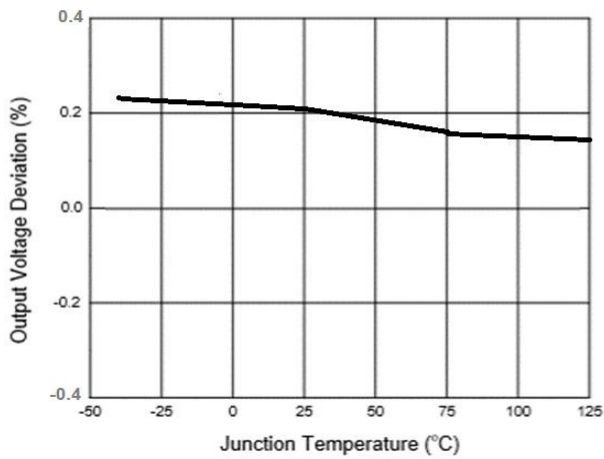
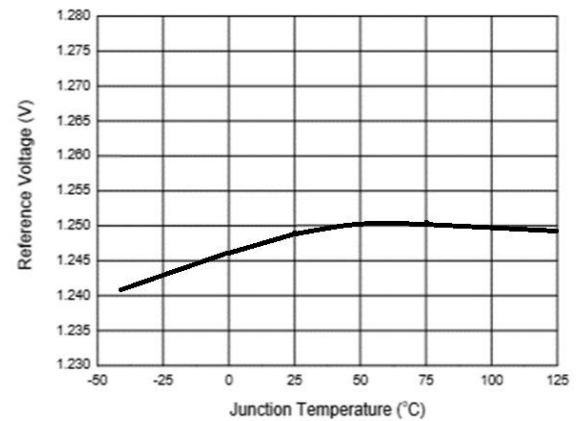
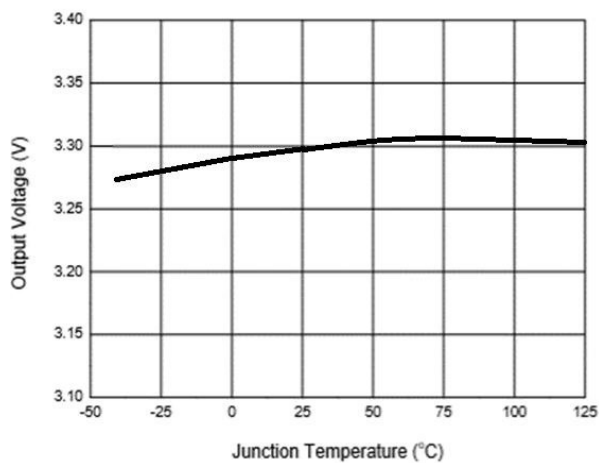
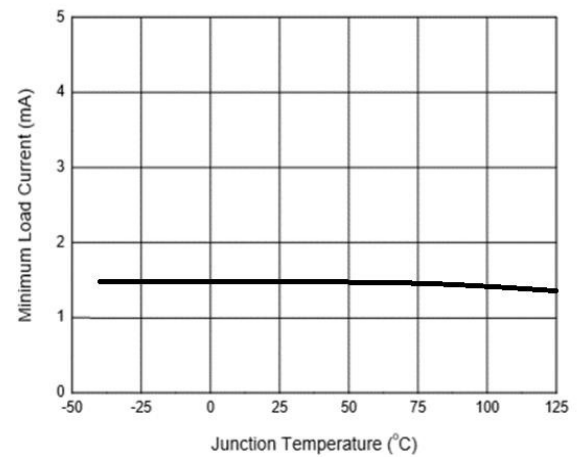
* With package soldering to copper area over backside ground plane or internal power plane $R_{\theta JA}$ can vary from $46^\circ C/W$ to $>90^\circ C/W$ depending on mounting technique and the size of the copper area

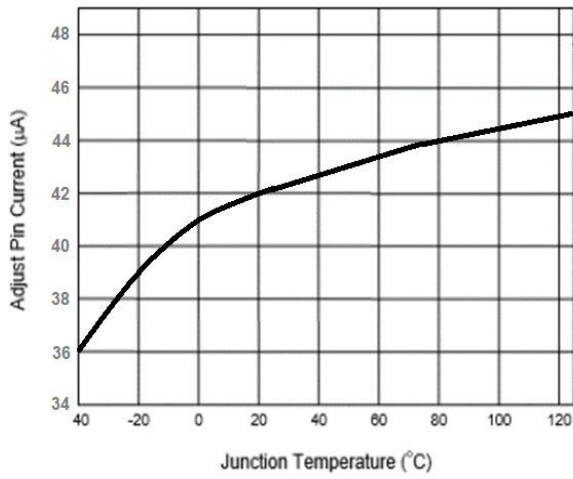
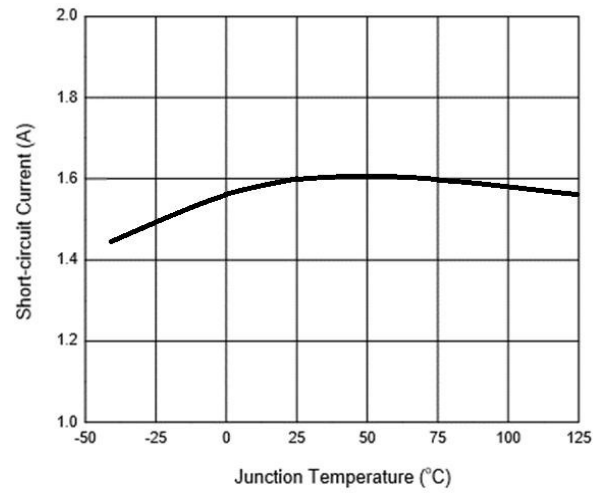
FUNCTIONAL BLOCK DIAGRAM



TYPICAL APPLICATION CIRCUIT



Dropout Voltage vs. Output Current

Dropout Voltage vs. Junction Temperature

Load Regulation vs. Junction Temperature

Reference Voltage vs. Junction Temperature

Output Voltage vs. Junction Temperature

Minimum Load Current vs. Junction Temperature


Adjust Pin Current vs. Junction Temperature

Short-circuit Current vs. Junction Temperature

Ripple Rejection vs. Frequency

$V_{in}=V_{out}+2.5\text{ V}$, $I_{out}=100\text{mA}$, $C_{out}=10\mu\text{F}$

