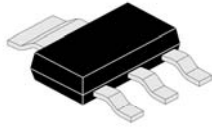


SOT-223 LOW DROPOUT LINEAR REGULATOR

LM1117XX



SOT-223
Surface Mount
Plastic Package
RoHS compliant

SOT-223

FEATURES:

1. Low Dropout Voltage: 1.15V at 1A Output Current
2. Trimmed Current Limit
3. On-chip Thermal Shutdown
4. Three-terminal Adjustable or Fixed 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, 5.0V
5. Operation Junction Temperature: -40 to 125°C

APPLICATION:

1. PC Motherboard
2. LCD Monitor
3. Graphic Card
4. DVD-video Player
5. NIC/Switch
6. Telecom Equipment
7. ADSL Modem
8. Printer and other Peripheral Equipment

ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C Unless otherwise specified) (Note:1)

PARAMETER	SYMBOL	VALUE		UNIT
		MIN	MAX	
Input Voltage	V _{IN}	--	20	V
Maximum Junction Temperature	T _J	--	150	°C
Storage Temperature	T _S	-65	150	°C
Lead Temperature (Soldering, 10sec)	T _{LEAD}	--	300	°C
ESD (Machine Model)	ESD	--	600	V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation 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

Input Voltage	V _{IN}	--	15	V
Operating Junction Temperature Range	T _J	-40	125	°C

LM1117XX
 Rev01 29062020E

ELECTRICAL CHARACTERISTICS at (Ta = 25 °C Unless otherwise specified)

LM1117-ADJ Electrical Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Reference Voltage	V _{REF}	I _{OUT} = 10mA, V _{IN} -V _{OUT} = 2V	1.238	1.250	1.262	V
		10mA ≤ I _{OUT} ≤ 1A, 1.4V ≤ V _{IN} -V _{OUT} ≤ 8V, P ≤ Maximum Power Dissipation	1.225	1.250	1.270	
Line Regulation	ΔV _{OUT}	I _{OUT} = 10mA, 1.5V ≤ V _{IN} -V _{OUT} ≤ 10V	--	0.035	0.20	%
Load Regulation	ΔV _{OUT}	V _{IN} -V _{OUT} = 2V, 10mA ≤ I _{OUT} ≤ 1A	--	0.2	0.4	%
Dropout Voltage		ΔV _{REF} = 1%, I _{OUT} = 0.1A	--	1.00	1.1	V
		ΔV _{REF} = 1%, I _{OUT} = 0.5A	--	1.08	1.18	
		ΔV _{REF} = 1%, I _{OUT} = 1.0A	--	1.15	1.25	
Current Limit	I _{LIMIT}	V _{IN} -V _{OUT} = 2V	1.25	1.35	--	A
Adjust Pin Current			--	60	120.0	μA
Adjust Pin Current Charge		1.4V ≤ V _{IN} -V _{OUT} ≤ 10V, 10mA ≤ I _{OUT} ≤ 1A	--	0.2	5	μA
Minimum Load Current (ADJ)		1.5V ≤ V _{IN} -V _{OUT} ≤ 10V (ADJ only)	--	1.7	5	mA
Quiescent Current		V _{IN} =V _{OUT} +1.25V	--	5	10	mA
Ripple Rejection		I _O = 1.0A, f = 120Hz, T _J = 25°C V _{in} - V _O = 3V, V _{ripple} = 1 V _{PP}	60	75	--	dB
Temperature Stability			--	0.5	--	%
Long -Term Stability		T _A =125°C, 1000hrs	--	0.3	--	%
RMS Output Noise(%of V _{OUT})		T _A =25°C, 10Hz ≤ f ≤ 10kHz	--	0.003	--	%
Thermal Resistance, Junction to Case	θ _{JC}		--	15	--	°C/W
Thermal Shutdown		Junction Temperature	--	150	--	°C
Thermal Shutdown Hysteresis			--	25	--	°C

LM1117-1.2V Electrical Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$I_{OUT} = 10mA, V_{IN} = 3.2V$	1.176	1.2	1.224	V
		$10mA \leq I_{OUT} \leq 1A, 3.0V \leq V_{IN} \leq 10V$	1.152	1.2	1.248	
Line Regulation	ΔV_{OUT}	$I_{OUT} = 10mA, 1.5V \leq V_{IN} - V_{OUT} \leq 10V$	--	1	6	mV
Load Regulation	ΔV_{OUT}	$V_{IN} - V_{OUT} = 2V, 10mA \leq I_{OUT} \leq 1A$	--	1	10	mV
Dropout Voltage		$\Delta V_{OUT} = 1\%, I_{OUT} = 0.1A$	--	1.00	1.1	V
		$\Delta V_{OUT} = 1\%, I_{OUT} = 0.5A$	--	1.08	1.18	
		$\Delta V_{OUT} = 1\%, I_{OUT} = 1.0A$	--	1.15	1.25	
Current Limit	I_{LIMIT}	$V_{IN} - V_{OUT} = 2V$	1.25	1.35		A
Quiescent Current		$V_{IN} = V_{OUT} + 1.25V$	--	5	10	mA
Ripple Rejection		$I_O = 1.0A, f = 120Hz, T_J = 25^\circ C, V_{in} - V_O = 3V, V_{ripple} = 1 V_{PP}$	60	75	--	dB
Temperature Stability			--	0.5	--	%
Long -Term Stability		$T_A = 125^\circ C, 1000hrs$	--	0.3	--	%
RMS Output Noise(%of V_{OUT})		$T_A = 25^\circ C, 10Hz \leq f \leq 10kHz$	--	0.003	--	%
Thermal Resistance, Junction to Case	θ_{JC}		--	15	--	$^\circ C/W$
Thermal Shutdown		Junction Temperature	--	150	--	$^\circ C$
Thermal Shutdown Hysteresis			--	25	--	$^\circ C$

LM1117-1.5V Electrical Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$I_{OUT} = 10mA, V_{IN} = 3.5V$	1.485	1.5	1.515	V
		$10mA \leq I_{OUT} \leq 1A, 3.0V \leq V_{IN} \leq 10V$	1.470	1.5	1.530	
Line Regulation	ΔV_{OUT}	$I_{OUT} = 10mA, 1.5V \leq V_{IN} - V_{OUT} \leq 10V$	--	1	6	mV
Load Regulation	ΔV_{OUT}	$V_{IN} - V_{OUT} = 2V, 10mA \leq I_{OUT} \leq 1A$	--	1	10	mV
Dropout Voltage		$\Delta V_{OUT} = 1\%, I_{OUT} = 0.1A$	--	1.00	1.1	V
		$\Delta V_{OUT} = 1\%, I_{OUT} = 0.5A$	--	1.08	1.18	
		$\Delta V_{OUT} = 1\%, I_{OUT} = 1.0A$	--	1.15	1.25	
Current Limit	I_{LIMIT}	$V_{IN} - V_{OUT} = 2V$	1.25	1.35		A
Quiescent Current		$V_{IN} = V_{OUT} + 1.25V$	--	5	10	mA
Ripple Rejection		$I_O = 1.0A, f = 120Hz, T_J = 25^\circ C, V_{in} - V_O = 3V, V_{ripple} = 1 V_{PP}$	60	75	--	dB
Temperature Stability			--	0.5	--	%
Long -Term Stability		$T_A = 125^\circ C, 1000hrs$	--	0.3	--	%
RMS Output Noise(%of V_{OUT})		$T_A = 25^\circ C, 10Hz \leq f \leq 10kHz$	--	0.003	--	%
Thermal Resistance, Junction to Case	θ_{JC}		--	15	--	$^\circ C/W$
Thermal Shutdown		Junction Temperature	--	150	--	$^\circ C$
Thermal Shutdown Hysteresis			--	25	--	$^\circ C$

LM1117XX

Rev01 29062020E

LM1117-1.8V Electrical Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$I_{OUT} = 10mA, V_{IN} = 3.8V$	1.782	1.8	1.818	V
		$10mA \leq I_{OUT} \leq 1A, 3.2V \leq V_{IN} \leq 10V$	1.746	1.8	1.854	
Line Regulation	ΔV_{OUT}	$I_{OUT} = 10mA, 1.5V \leq V_{IN} - V_{OUT} \leq 10V$	--	1	6	mV
Load Regulation	ΔV_{OUT}	$V_{IN} - V_{OUT} = 2V, 10mA \leq I_{OUT} \leq 1A$	--	1	10	mV
Dropout Voltage		$\Delta V_{OUT} = 1\%, I_{OUT} = 0.1A$	--	1.00	1.1	V
		$\Delta V_{OUT} = 1\%, I_{OUT} = 0.5A$	--	1.08	1.18	
		$\Delta V_{OUT} = 1\%, I_{OUT} = 1.0A$	--	1.15	1.25	
Current Limit	I_{LIMIT}	$V_{IN} - V_{OUT} = 2V$	1.25	1.35		A
Quiescent Current		$V_{IN} = V_{OUT} + 1.25V$	--	5	10	mA
Ripple Rejection		$I_O = 1.0A, f = 120Hz, T_J = 25^\circ C, V_{in} - V_O = 3V, V_{ripple} = 1 V_{PP}$	60	75	--	dB
Temperature Stability			--	0.5	--	%
Long -Term Stability		$T_A = 125^\circ C, 1000hrs$	--	0.3	--	%
RMS Output Noise(%of V_{OUT})		$T_A = 25^\circ C, 10Hz \leq f \leq 10kHz$	--	0.003	--	%
Thermal Resistance, Junction to Case	θ_{JC}		--	15	--	$^\circ C/W$
Thermal Shutdown		Junction Temperature	--	150	--	$^\circ C$
Thermal Shutdown Hysteresis			--	25	--	$^\circ C$

LM1117-2.5V Electrical Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$I_{OUT} = 10mA, V_{IN} = 4.5V$	2.475	2.5	2.525	V
		$10mA \leq I_{OUT} \leq 1A, 3.9V \leq V_{IN} \leq 10V$	2.450	2.5	2.550	
Line Regulation	ΔV_{OUT}	$I_{OUT} = 10mA, 1.5V \leq V_{IN} - V_{OUT} \leq 10V$	--	1	6	mV
Load Regulation	ΔV_{OUT}	$V_{IN} - V_{OUT} = 2V, 10mA \leq I_{OUT} \leq 1A$	--	1	10	mV
Dropout Voltage		$\Delta V_{OUT} = 1\%, I_{OUT} = 0.1A$	--	1.00	1.1	V
		$\Delta V_{OUT} = 1\%, I_{OUT} = 0.5A$	--	1.08	1.18	
		$\Delta V_{OUT} = 1\%, I_{OUT} = 1.0A$	--	1.15	1.25	
Current Limit	I_{LIMIT}	$V_{IN} - V_{OUT} = 2V$	1.25	1.35		A
Quiescent Current		$V_{IN} = V_{OUT} + 1.25V$	--	5	10	mA
Ripple Rejection		$I_O = 1.0A, f = 120Hz, T_J = 25^\circ C, V_{in} - V_O = 3V, V_{ripple} = 1 V_{PP}$	60	75	--	dB
Temperature Stability			--	0.5	--	%
Long -Term Stability		$T_A = 125^\circ C, 1000hrs$	--	0.3	--	%
RMS Output Noise(%of V_{OUT})		$T_A = 25^\circ C, 10Hz \leq f \leq 10kHz$	--	0.003	--	%
Thermal Resistance, Junction to Case	θ_{JC}		--	15	--	$^\circ C/W$
Thermal Shutdown		Junction Temperature	--	150	--	$^\circ C$
Thermal Shutdown Hysteresis			--	25	--	$^\circ C$

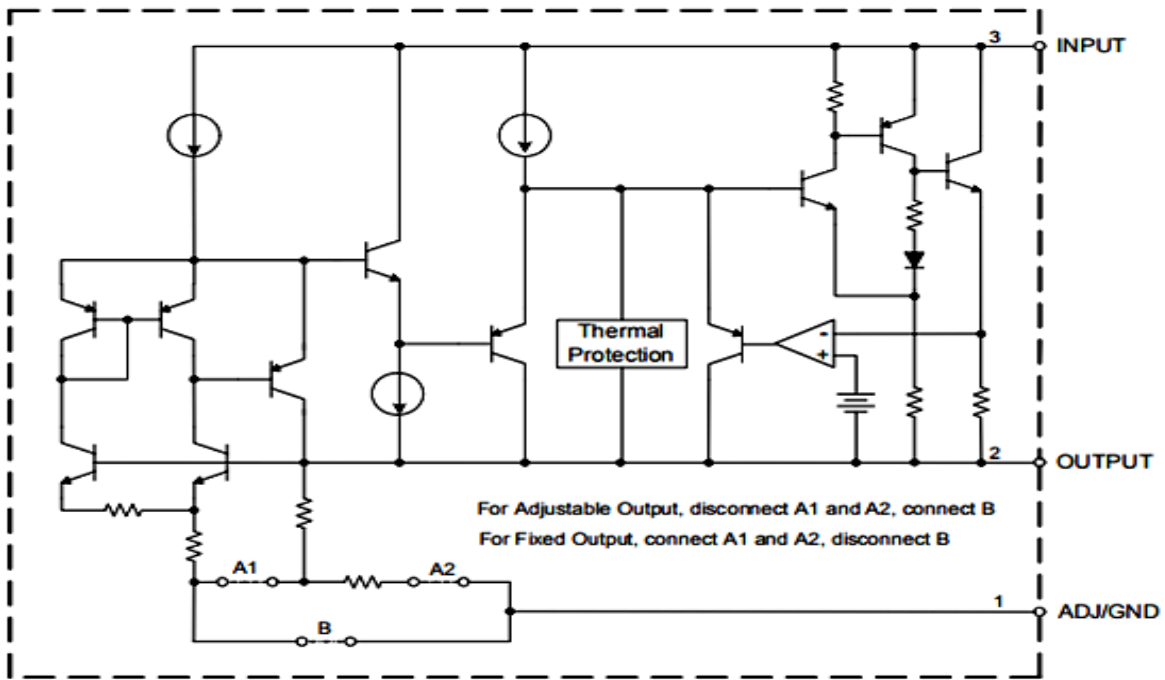
LM1117-3.3V Electrical Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$I_{OUT} = 10mA, V_{IN} = 5.0V$	3.267	3.3	3.333	V
		$10mA \leq I_{OUT} \leq 1A, 4.75V \leq V_{IN} \leq 10V$	3.235	3.3	3.365	
Line Regulation	ΔV_{OUT}	$I_{OUT} = 10mA, 1.5V \leq V_{IN} - V_{OUT} \leq 10V$	--	1	6	mV
Load Regulation	ΔV_{OUT}	$V_{IN} - V_{OUT} = 2V, 10mA \leq I_{OUT} \leq 1A$	--	1	10	mV
Dropout Voltage		$\Delta V_{OUT} = 1\%, I_{OUT} = 0.1A$	--	1.00	1.1	V
		$\Delta V_{OUT} = 1\%, I_{OUT} = 0.5A$	--	1.08	1.18	
		$\Delta V_{OUT} = 1\%, I_{OUT} = 1.0A$	--	1.15	1.25	
Current Limit	I_{LIMIT}	$V_{IN} - V_{OUT} = 2V$	1.25	1.35		A
Quiescent Current		$V_{IN} = V_{OUT} + 1.25V$	--	5	10	mA
Ripple Rejection		$I_O = 1.0A, f = 120Hz, T_J = 25^\circ C, V_{in} - V_O = 3V, V_{ripple} = 1 V_{PP}$	60	75	--	dB
Temperature Stability			--	0.5	--	%
Long -Term Stability		$T_A = 125^\circ C, 1000hrs$	--	0.3	--	%
RMS Output Noise(%of V_{OUT})		$T_A = 25^\circ C, 10Hz \leq f \leq 10kHz$	--	0.003	--	%
Thermal Resistance, Junction to Case	θ_{JC}		--	15	--	$^\circ C/W$
Thermal Shutdown		Junction Temperature	--	150	--	$^\circ C$
Thermal Shutdown Hysteresis			--	25	--	$^\circ C$

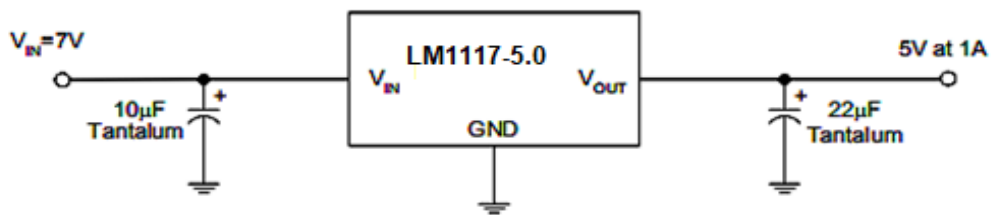
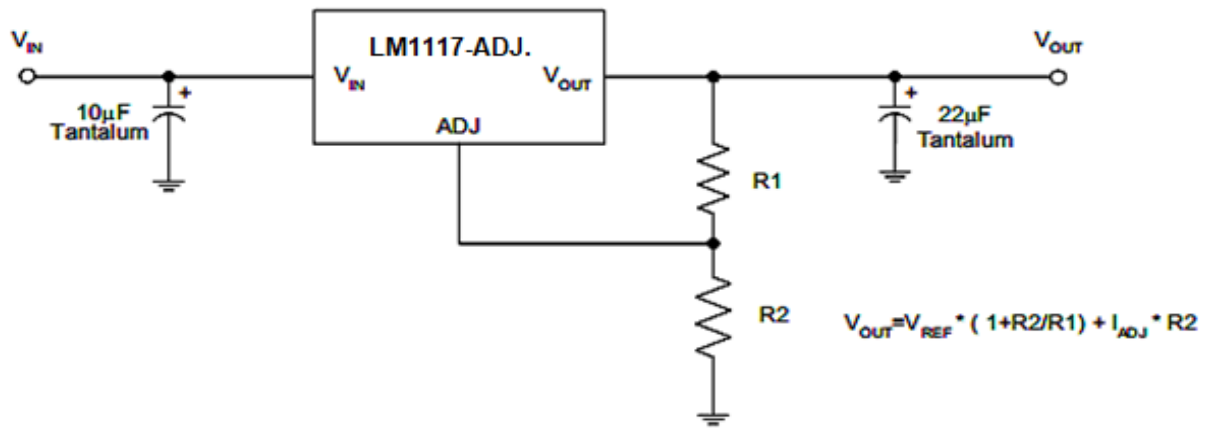
LM1117-5.0V Electrical Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$I_{OUT} = 10mA, V_{IN} = 7.0V$	4.950	5.0	5.050	V
		$10mA \leq I_{OUT} \leq 1A, 6.5V \leq V_{IN} \leq 10V$	4.900	5.0	5.100	
Line Regulation	ΔV_{OUT}	$I_{OUT} = 10mA, 1.5V \leq V_{IN} - V_{OUT} \leq 10V$	--	1	6	mV
Load Regulation	ΔV_{OUT}	$V_{IN} - V_{OUT} = 2V, 10mA \leq I_{OUT} \leq 1A$	--	1	10	mV
Dropout Voltage		$\Delta V_{OUT} = 1\%, I_{OUT} = 0.1A$	--	1.00	1.1	V
		$\Delta V_{OUT} = 1\%, I_{OUT} = 0.5A$	--	1.08	1.18	
		$\Delta V_{OUT} = 1\%, I_{OUT} = 1.0A$	--	1.15	1.25	
Current Limit	I_{LIMIT}	$V_{IN} - V_{OUT} = 2V$	1.25	1.35		A
Quiescent Current		$V_{IN} = V_{OUT} + 1.25V$	--	5	10	mA
Ripple Rejection		$I_O = 1.0A, f = 120Hz, T_J = 25^\circ C, V_{in} - V_O = 3V, V_{ripple} = 1 V_{PP}$	60	75	--	dB
Temperature Stability			--	0.5	--	%
Long -Term Stability		$T_A = 125^\circ C, 1000hrs$	--	0.3	--	%
RMS Output Noise(%of V_{OUT})		$T_A = 25^\circ C, 10Hz \leq f \leq 10kHz$	--	0.003	--	%
Thermal Resistance, Junction to Case	θ_{JC}		--	15	--	$^\circ C/W$
Thermal Shutdown		Junction Temperature	--	150	--	$^\circ C$
Thermal Shutdown Hysteresis			--	25	--	$^\circ C$

Functional Block Diagram of LM1117



Typical Applications of LM1117



TYPICAL CHARACTERISTICS CURVES

Fig 1: Dropout Voltage vs. Output Current

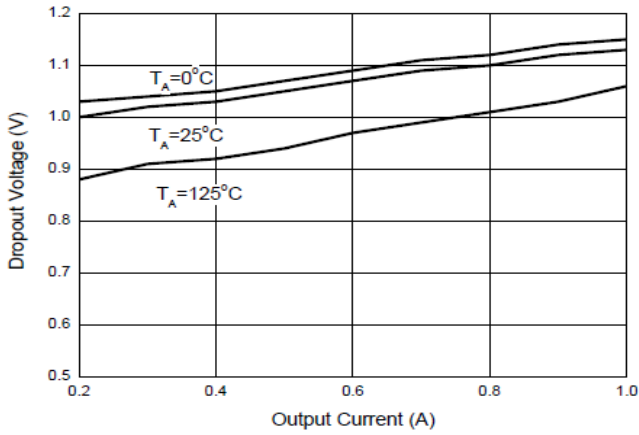


Fig 2: Load Regulation vs. Junction Temperature

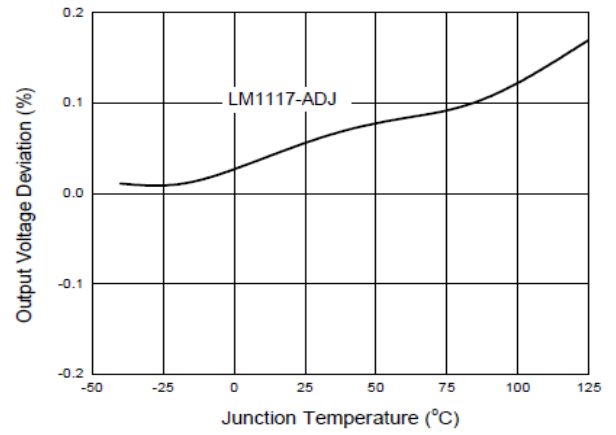


Fig 3: Reference Voltage vs. Junction Temperature

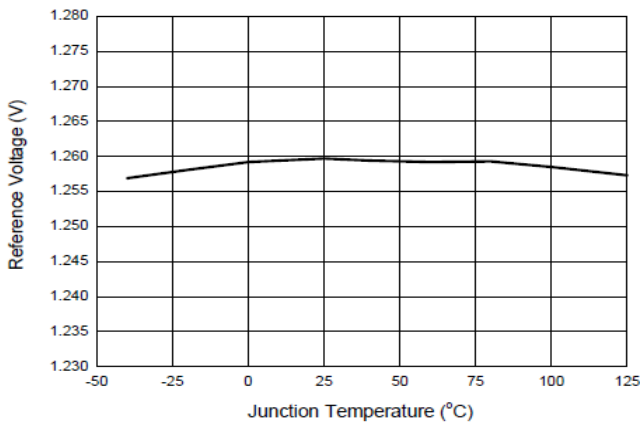


Fig 4: Output Voltage vs. Junction Temperature

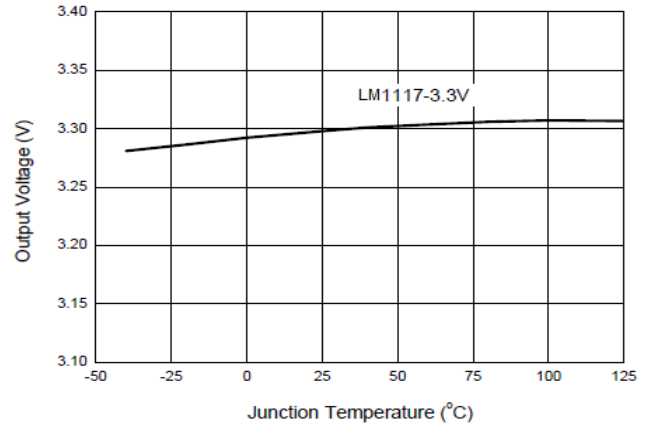


Fig 5: Minimum Load Current vs. Junction Temperature

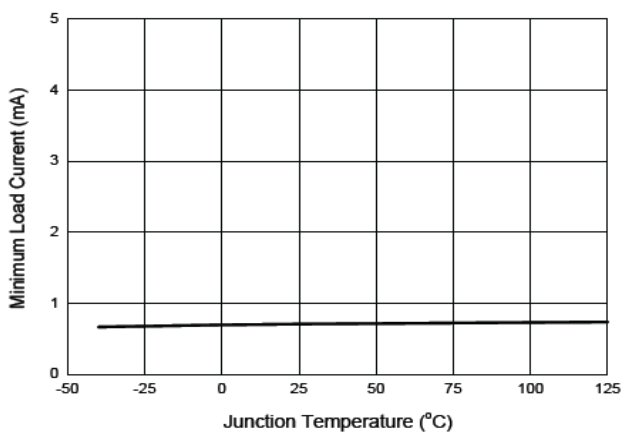


Fig 6: Adjust Pin Current vs. Temperature

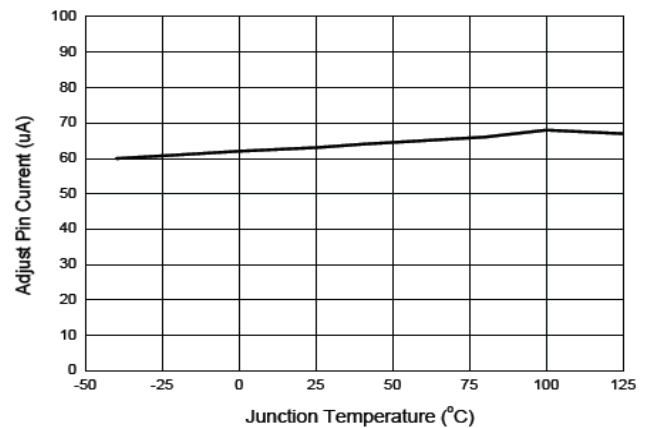


Fig 7: Short-Circuit Current vs. Junction Temperature

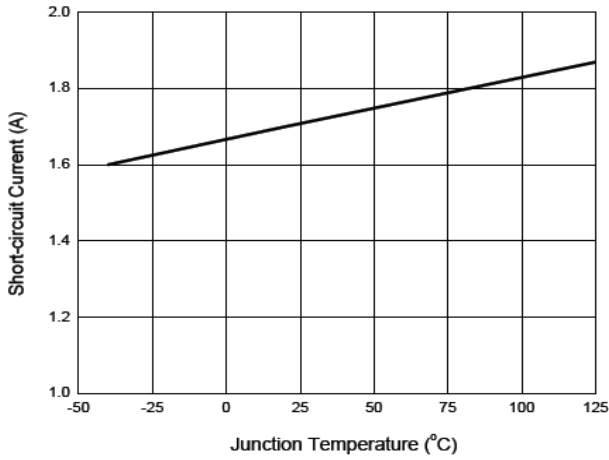


Fig 8: Maximum Power Dissipation

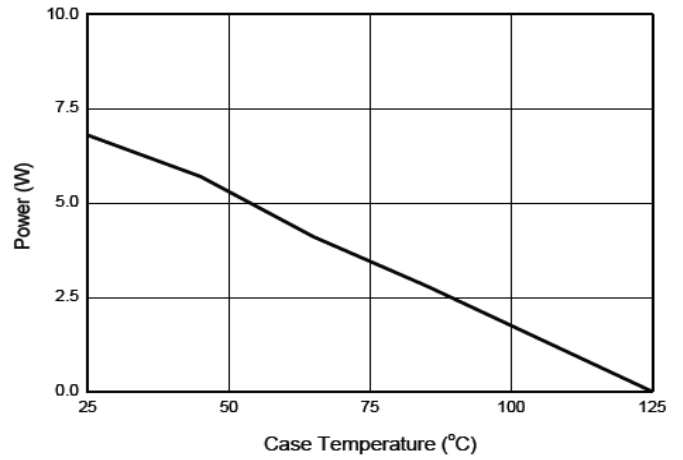


Fig 9: Line Transient Response

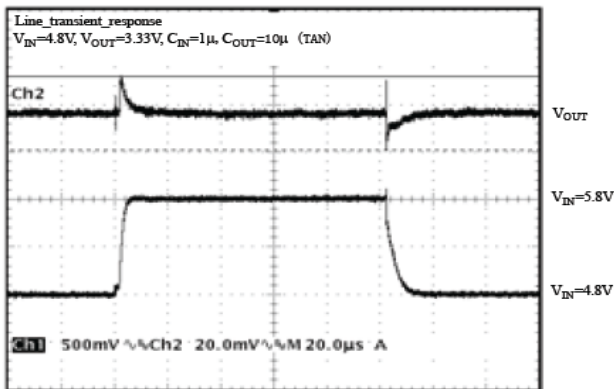


Fig 10: Load Transient Response

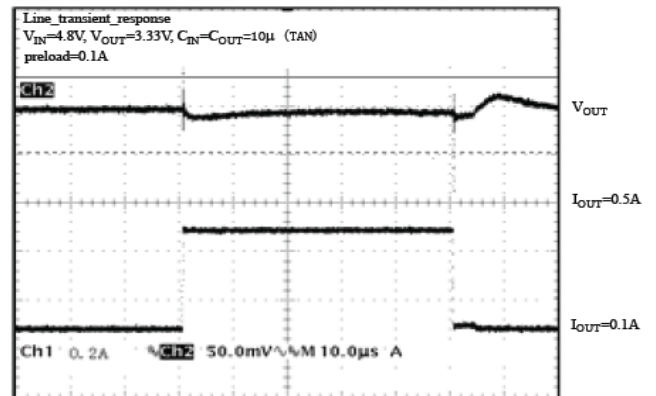
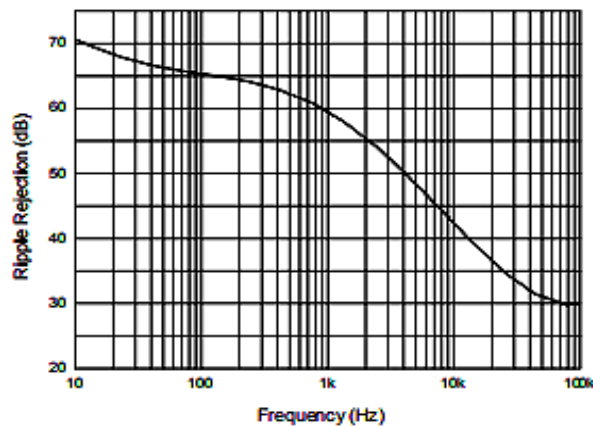
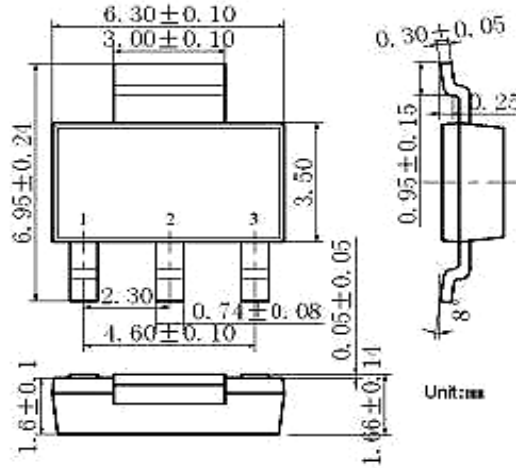


Fig 11: Ripple Rejection vs. Frequency



PACKAGE DETAILS

SOT-223 Surface Mount Plastic Package



Pin Configuration

1. ADJ/GND
2. OUTPUT
3. INPUT

Recommended Product Storage Environment for Discrete Semiconductor Devices

This storage environment assumes that the Diodes and transistors are packed properly inside the original packing supplied by CDIL.

- Temperature 5 °C to 30 °C
- Humidity between 40 to 70 %RH
- Air should be clean.
- Avoid harmful gas or dust.
- Avoid outdoor exposure or storage in areas subject to rain or water spraying .
- Avoid storage in areas subject to corrosive gas or dust. Product shall not be stored in areas exposed to direct sunlight.
- Avoid rapid change of temperature.
- Avoid condensation.
- Mechanical stress such as vibration and impact shall be avoided.
- The product shall not be placed directly on the floor.
- The product shall be stored on a plane area. They should not be turned upside down. They should not be placed against the wall.

Shelf Life of CDIL Products

The shelf life of products is the period from product manufacture to shipment to customers. The product can be unconditionally shipped within this period. The period is defined as 2 years.

If products are stored longer than the shelf life of 2 years the products shall be subjected to quality check as per CDIL quality procedure.

The products are further warranted for another one year after the date of shipment subject to the above conditions in CDIL original packing.

Floor Life of CDIL Products and MSL Level

When the products are opened from the original packing, the floor life will start.

For this, the following JEDEC table may be referred:

JEDEC MSL Level		
Level	Time	Condition
1	Unlimited	≤30 °C / 85% RH
2	1 Year	≤30 °C / 60% RH
2a	4 Weeks	≤30 °C / 60% RH
3	168 Hours	≤30 °C / 60% RH
4	72 Hours	≤30 °C / 60% RH
5	48 Hours	≤30 °C / 60% RH
5a	24 Hours	≤30 °C / 60% RH
6	Time on Label(TOL)	≤30 °C / 60% RH



Continental Device India Pvt. Limited

An IATF 16949, ISO9001 and ISO 14001 Certified Company



Customer Notes

Component Disposal Instructions

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

Disclaimer

The product information and the selection guides facilitate selection of the CDIL's Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Data Sheet and on the CDIL Web Site/CD are believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information. Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s). CDIL strives for continuous improvement and reserves the right to change the specifications of its products without prior notice.



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LM1117XX

Rev01 29062020E