



## LD1117/A

### LINEAR INTEGRATED CIRCUIT

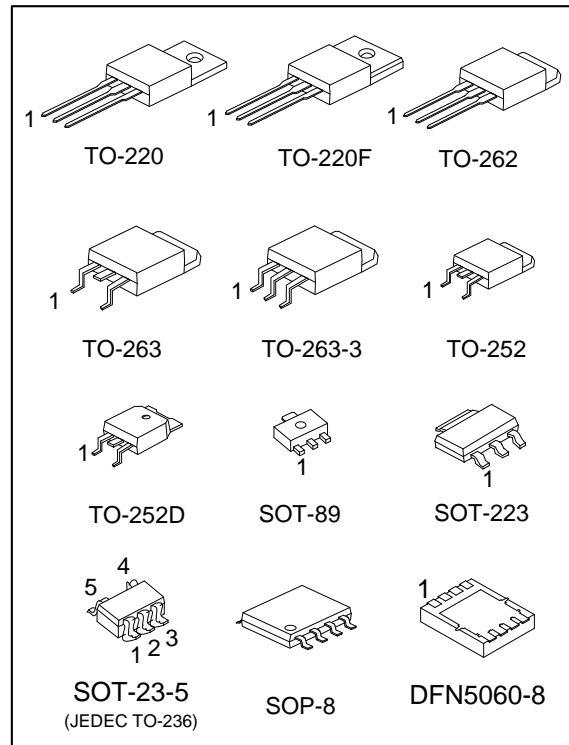
## LOW DROP FIXED AND ADJUSTABLE POSITIVE VOLTAGE REGULATORS

### DESCRIPTION

The UTC LD1117/A is a low dropout, 3-terminal positive voltage regulator designed to provide output current up to 800mA/1A, There are adjustable version ( $V_{REF}=1.25V$ ) and various fixed versions.

### FEATURES

- \* Low dropout voltage
- \* Suitable for SCSI-2 active termination if  $V_{OUT}$  set to 2.85V
- \* Output current up to 0.8A for 1117 and 1.0A for 1117A
- \* Built-in current limit and over temperature protection
- \* Low current consumption
- \* Support MLCC



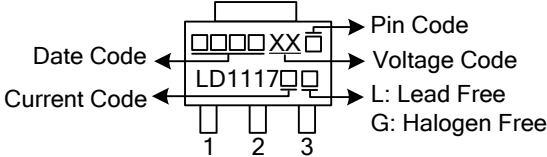
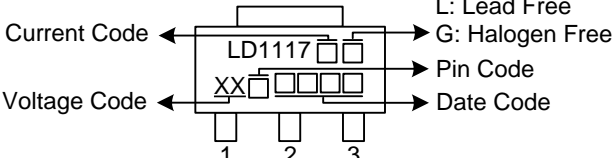
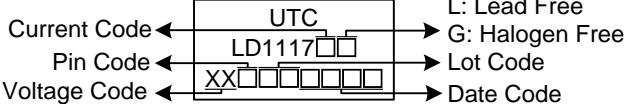
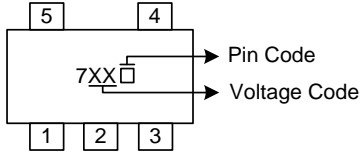
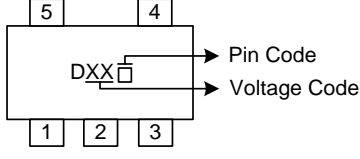
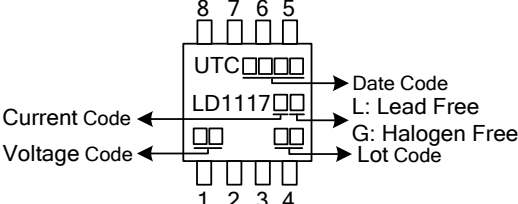
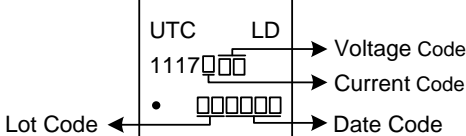
## ORDERING INFORMATION

Ordering Number		Package	② Pin Assignment				③ Packing															
Lead Free	Halogen Free		Pin Code	1	2	3																
LD1117①L-xx-AA3-②-③	LD1117①G-xx-AA3-②-③	SOT-223	<table border="1"> <tr><td>A</td><td>G</td><td>O</td><td>I</td></tr> <tr><td>B</td><td>O</td><td>G</td><td>I</td></tr> <tr><td>C</td><td>G</td><td>I</td><td>O</td></tr> <tr><td>D</td><td>I</td><td>G</td><td>O</td></tr> </table>	A	G	O	I	B	O	G	I	C	G	I	O	D	I	G	O	R: Tape Reel T: Tube		
A	G	O		I																		
B	O	G		I																		
C	G	I		O																		
D	I	G		O																		
LD1117①L-xx-AB3-②-③	LD1117①G-xx-AB3-②-③	SOT-89																				
LD1117①L-xx-TA3-②-③	LD1117①G-xx-TA3-②-③	TO-220																				
LD1117①L-xx-TF3-②-③	LD1117①G-xx-TF3-②-③	TO-220F																				
LD1117①L-xx-TN3-②-③	LD1117①G-xx-TN3-②-③	TO-252																				
LD1117①L-xx-TND-②-③	LD1117①G-xx-TND-②-③	TO-252D																				
LD1117①L-xx-T2Q-②-③	LD1117①G-xx-T2Q-②-③	TO-262																				
LD1117①L-xx-TQ2-②-③	LD1117①G-xx-TQ2-②-③	TO-263																				
LD1117①L-xx-TQ3-②-③	LD1117①G-xx-TQ3-②-③	TO-263-3																				
LD1117①L-xx-AE5-G-③	LD1117①G-xx-AE5-G-③	SOT-23-5	GOINN																			
LD1117①L-xx-S08-③	LD1117①G-xx-S08-③	SOP-8	GOOIxOOx																			
LD1117①L-xx-K08-5060-R	LD1117①G-xx-K08-5060-R	DFN5060-8	GOOIxOOx			Tape Reel																

- Notes: 1. ① : Current code: Blank: 800mA    A: 1A  
 2. Pin Assignment: I: V<sub>IN</sub>    O: V<sub>OUT</sub>    G: GND/ADJ  
 3. xx: Output Voltage, Refer to Marking Information.

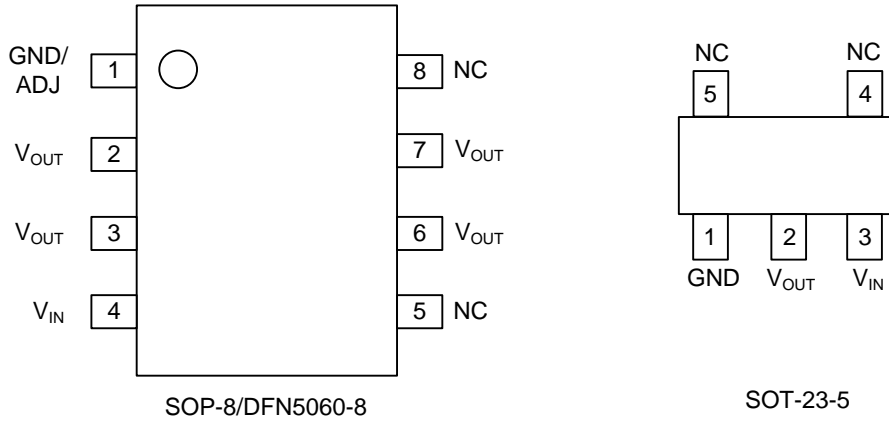
<p>LD1117①G-xx-AA3-②-③</p> <p>(1) Packing Type          (2) Pin Assignment          (3) Package Type          (4) Output Voltage Code          (5) Green Package          (6) Current Code</p>	<p>(1) R: Tape Reel, T: Tube          (2) refer to Pin Assignment          (3) AA3: SOT-223, AB3: SOT-89, TA3: TO-220,          TF3: TO-220F, TN3: TO-252, TND: TO-252D          T2Q: TO-262, TQ2: TO-263, TQ3: TO-263-3,          AE5: SOT-23-5, S08: SOP-8, K08-5060: DFN5060-8          (4) xx: refer to Marking Information          (5) G: Halogen Free and Lead Free, L: Lead Free          (6) Blank: 800mA, A: 1A</p>
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### MARKING INFORMATION

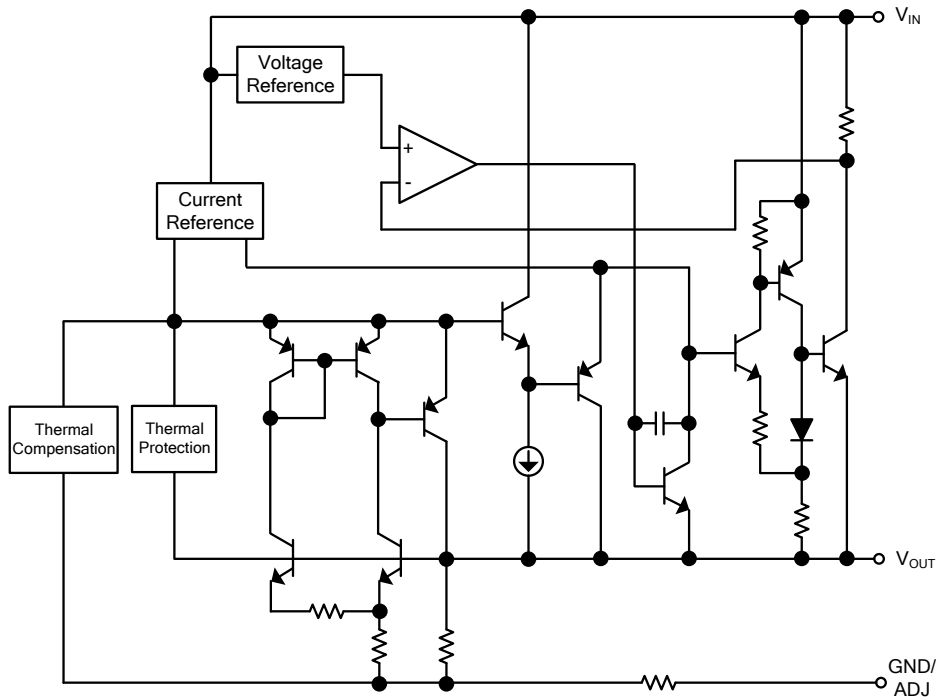
PACKAGE	VOLTAGE CODE	MARKING
SOT-89		
SOT-223		
TO-220 TO-220F TO-252 TO-252D TO-262 TO-263 TO-263-3		
SOT-23-5 (LD1117)	12 :1.2V 15 :1.5V 18 :1.8V 25 :2.5V 2J :2.85V 30 :3.0V 33 :3.3V 36 :3.6V 50 :5.0V AD :ADJ	
SOT-23-5 (LD1117A)		
SOP-8		
DFN5060-8		

Note: Current code: Blank: 0.8A A: 1A

## ■ PIN CONFIGURATION of SOP-8, DFN5060-8 & SOT-23-5



## ■ BLOCK DIAGRAM



■ **ABSOLUTE MAXIMUM RATINGS** ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
DC Input Voltage	$V_{IN}$	18	V
Power Dissipation	$P_D$	Internally limited	
Junction Temperature	$T_J$	+150	$^{\circ}\text{C}$
Operating Temperature (Note 2)	$T_{OPR}$	-40 ~ +125	$^{\circ}\text{C}$
Storage temperature	$T_{STG}$	-65 ~ +150	$^{\circ}\text{C}$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. This condition is only determined from design. It can't be 100% tested in mass production.

■ **RECOMMENDED OPERATING RATINGS**

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	$V_{IN}$	15	V

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	$\theta_{JA}$	165	$^{\circ}\text{C/W}$
	SOT-89		180	$^{\circ}\text{C/W}$
	SOT-23-5		280	$^{\circ}\text{C/W}$
	SOP-8		150	$^{\circ}\text{C/W}$
	TO-252/TO-252D		112	$^{\circ}\text{C/W}$
	TO-220		54	$^{\circ}\text{C/W}$
	TO-262/TO-263		64	$^{\circ}\text{C/W}$
	DFN5060-8		38	$^{\circ}\text{C/W}$
Junction to Case	SOT-223	$\theta_{JC}$	15	$^{\circ}\text{C/W}$
	SOT-89		50	$^{\circ}\text{C/W}$
	SOT-23-5		90	$^{\circ}\text{C/W}$
	SOP-8		20	$^{\circ}\text{C/W}$
	TO-252/TO-252D		12	$^{\circ}\text{C/W}$
	TO-220/TO-262		4	$^{\circ}\text{C/W}$
	TO-263			$^{\circ}\text{C/W}$
	DFN5060-8		15.6	$^{\circ}\text{C/W}$

## ■ ELECTRICAL CHARACTERISTICS

( $T_A=25^\circ\text{C}$ , refer to the test circuits,  $T_J=0 \sim 125^\circ\text{C}$ ,  $C_O=10\mu\text{F}$  unless otherwise specified)

### For LD1117/A-1.2

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN}=3.2\text{V}$ , $I_{OUT}=10\text{mA}$ , $T_J=25^\circ\text{C}$	1.176	1.200	1.224	V
Output Voltage	$V_{OUT}$	$V_{IN}=2.7$ to $8\text{V}$ LD1117 : $I_{OUT}=10\sim 800\text{mA}$ LD1117A : $I_{OUT}=10\sim 1000\text{mA}$	1.176	1.200	1.224	V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=2.7$ to $8\text{V}$ , $I_{OUT}=10\text{mA}$		1	6	mV
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=2.7\text{V}$ LD1117 : $I_{OUT}=10\sim 800\text{mA}$ LD1117A : $I_{OUT}=10\sim 1000\text{mA}$		1	10	mV
Temperature stability	$\Delta V_{OUT}$			0.5		%
Long Term Stability	$\Delta V_{OUT}$	1000 hrs, $T_J=125^\circ\text{C}$		0.3		%
Operating Input Voltage	$V_{IN}$	$I_{OUT}=100\text{mA}$			15	V
Quiescent Current	$I_Q$	$V_{IN}\leq 10\text{V}$		5	10	mA
Current Limit	$I_{LIMIT}$	$V_{IN}=6.2\text{V}$ , $T_J=25^\circ\text{C}$	LD1117	800		mA
			LD1117A	1000		
Minimum Load Current	$I_{O(MIN)}$	$V_{IN}=15\text{V}$		2	5	mA
Output Noise Voltage	$e_N$	$B=10\text{Hz}$ to $10\text{KHz}$ , $T_J=25^\circ\text{C}$		100		$\mu\text{V}$
Supply Voltage Rejection	SVR	$I_{OUT}=40\text{mA}$ , $f=120\text{Hz}$ , $T_J=25^\circ\text{C}$ , $V_{IN}=4.2\text{V}$ , $V_{RIPPLE}=1\text{V}_{PP}$	60	75		dB
Dropout Voltage	$V_D$	$I_{OUT}=100\text{mA}$		1.00	1.10	V
		$I_{OUT}=500\text{mA}$		1.15	1.25	
		$I_{OUT}=800\text{mA}$		1.20	1.30	
		$I_{OUT}=1\text{A}$		1.20	1.30	
Thermal Regulation		$T_A=25^\circ\text{C}$ , 30ms Pulse		0.01	0.10	%/W

### For LD1117/A-1.5

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$V_{IN}=3.5\text{V}$ , $I_{OUT}=10\text{mA}$ , $T_J=25^\circ\text{C}$	1.470	1.500	1.530	V
Output Voltage	$V_{OUT}$	$V_{IN}=3$ to $8\text{V}$ LD1117 : $I_{OUT}=0\sim 800\text{mA}$ LD1117A : $I_{OUT}=0\sim 1000\text{mA}$	1.470	1.500	1.530	V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=3$ to $8\text{V}$ , $I_{OUT}=0\text{mA}$		1	6	mV
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=3\text{V}$ LD1117 : $I_{OUT}=0\sim 800\text{mA}$ LD1117A : $I_{OUT}=0\sim 1000\text{mA}$		1	10	mV
Temperature stability	$\Delta V_{OUT}$			0.5		%
Long Term Stability	$\Delta V_{OUT}$	1000 hrs, $T_J=125^\circ\text{C}$		0.3		%
Operating Input Voltage	$V_{IN}$	$I_{OUT}=100\text{mA}$			15	V
Quiescent Current	$I_Q$	$V_{IN}\leq 10\text{V}$		5	10	mA
Current Limit	$I_{LIMIT}$	$V_{IN}=6.5\text{V}$ , $T_J=25^\circ\text{C}$	LD1117	800		mA
			LD1117A	1000		
Output Noise Voltage	$e_N$	$B=10\text{Hz}$ to $10\text{KHz}$ , $T_J=25^\circ\text{C}$		100		$\mu\text{V}$
Supply Voltage Rejection	SVR	$I_{OUT}=40\text{mA}$ , $f=120\text{Hz}$ , $T_J=25^\circ\text{C}$ , $V_{IN}=4.5\text{V}$ , $V_{RIPPLE}=1\text{V}_{PP}$	60	75		dB
Dropout Voltage	$V_D$	$I_{OUT}=100\text{mA}$		1.00	1.10	V
		$I_{OUT}=500\text{mA}$		1.15	1.25	
		$I_{OUT}=800\text{mA}$		1.20	1.30	
		$I_{OUT}=1\text{A}$		1.20	1.30	
Thermal Regulation		$T_A=25^\circ\text{C}$ , 30ms Pulse		0.01	0.10	%/W

## ■ ELECTRICAL CHARACTERISTICS(Cont.)

For LD1117/A-1.8

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V <sub>OUT</sub>	V <sub>IN</sub> =3.8V, I <sub>OUT</sub> =10mA, T <sub>J</sub> =25°C	1.764	1.800	1.836	V
Output Voltage	V <sub>OUT</sub>	V <sub>IN</sub> =3.3 to 8V LD1117 : I <sub>OUT</sub> =0~800mA LD1117A : I <sub>OUT</sub> =0~1000mA	1.764	1.800	1.836	V
Line Regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =3.3 to 8V, I <sub>OUT</sub> =0mA		1	6	mV
Load Regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =3.3V LD1117 : I <sub>OUT</sub> =0~800mA LD1117A : I <sub>OUT</sub> =0~1000mA		1	10	mV
Temperature stability	ΔV <sub>OUT</sub>			0.5		%
Long Term Stability	ΔV <sub>OUT</sub>	1000 hrs, T <sub>J</sub> =125°C		0.3		%
Operating Input Voltage	V <sub>IN</sub>	I <sub>OUT</sub> =100mA			15	V
Quiescent Current	I <sub>Q</sub>	V <sub>IN</sub> ≤10V		5	10	mA
Current Limit	I <sub>LIMIT</sub>	V <sub>IN</sub> =6.8V, T <sub>J</sub> =25°C	LD1117	800		mA
			LD1117A	1000		
Output Noise Voltage	e <sub>N</sub>	B=10Hz to 10KHz, T <sub>J</sub> =25°C		100		μV
Supply Voltage Rejection	SVR	I <sub>OUT</sub> =40mA, f=120Hz, T <sub>J</sub> =25°C, V <sub>IN</sub> =5.5V, V <sub>RIPPLE</sub> =1V <sub>PP</sub>	60	75		dB
Dropout Voltage	V <sub>D</sub>		I <sub>OUT</sub> =100mA	1.00	1.10	V
			I <sub>OUT</sub> =500mA	1.15	1.25	
			I <sub>OUT</sub> =800mA	1.20	1.30	
			I <sub>OUT</sub> =1A	1.20	1.30	
Thermal Regulation		T <sub>A</sub> =25°C, 30ms Pulse		0.01	0.10	%/W

For LD1117/A-2.5

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V <sub>OUT</sub>	V <sub>IN</sub> =4.5V, I <sub>OUT</sub> =10mA, T <sub>J</sub> =25°C	2.450	2.500	2.550	V
Output Voltage	V <sub>OUT</sub>	V <sub>IN</sub> =3.9 to 10V LD1117 : I <sub>OUT</sub> =0~800mA LD1117A : I <sub>OUT</sub> =0~1000mA	2.450	2.500	2.550	V
Line Regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =3.9 to 10V, I <sub>OUT</sub> =0mA		1	6	mV
Load Regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =3.9V LD1117 : I <sub>OUT</sub> =0~800mA LD1117A : I <sub>OUT</sub> =0~1000mA		1	10	mV
Temperature stability	ΔV <sub>OUT</sub>			0.5		%
Long Term Stability	ΔV <sub>OUT</sub>	1000 hrs, T <sub>J</sub> =125°C		0.3		%
Operating Input Voltage	V <sub>IN</sub>	I <sub>OUT</sub> =100mA			15	V
Quiescent Current	I <sub>Q</sub>	V <sub>IN</sub> ≤10V		5	10	mA
Current Limit	I <sub>LIMIT</sub>	V <sub>IN</sub> =7.5V, T <sub>J</sub> =25°C	LD1117	800		mA
			LD1117A	1000		
Output Noise Voltage	e <sub>N</sub>	B=10Hz to 10KHz, T <sub>J</sub> =25°C		100		μV
Supply Voltage Rejection	SVR	I <sub>OUT</sub> =40mA, f=120Hz, T <sub>J</sub> =25°C, V <sub>IN</sub> =5.5V, V <sub>RIPPLE</sub> =1V <sub>PP</sub>	60	75		dB
Dropout Voltage	V <sub>D</sub>		I <sub>OUT</sub> =100mA	1.00	1.10	V
			I <sub>OUT</sub> =500mA	1.15	1.25	
			I <sub>OUT</sub> =800mA	1.20	1.30	
			I <sub>OUT</sub> =1A	1.20	1.30	
Thermal Regulation		T <sub>A</sub> =25°C, 30ms Pulse		0.01	0.10	%/W

## ■ ELECTRICAL CHARACTERISTICS(Cont.)

For LD1117/A-2.85

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$V_{IN}=4.85V, I_{OUT}=10mA, T_J=25^{\circ}C$	2.793	2.850	2.907	V
Output Voltage	$V_{OUT}$	$V_{IN}=4.25$ to $10V$ LD1117 : $I_{OUT}=0\sim 800mA$ LD1117A : $I_{OUT}=0\sim 1000mA$	2.793	2.850	2.907	V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=4.25$ to $10V, I_{OUT}=0mA$		1	6	mV
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=4.25V$ LD1117 : $I_{OUT}=0\sim 800mA$ LD1117A : $I_{OUT}=0\sim 1000mA$		1	10	mV
Temperature stability	$\Delta V_{OUT}$			0.5		%
Long Term Stability	$\Delta V_{OUT}$	1000 hrs, $T_J=125^{\circ}C$		0.3		%
Operating Input Voltage	$V_{IN}$	$I_{OUT}=100mA$			15	V
Quiescent Current	$I_Q$	$V_{IN}\leq 10V$		5	10	mA
Current Limit	$I_{LIMIT}$	$V_{IN}=7.85V, T_J=25^{\circ}C$	LD1117	800		mA
			LD1117A	1000		
Output Noise Voltage	$e_N$	$B=10Hz$ to $10KHz, T_J=25^{\circ}C$		100		$\mu V$
Supply Voltage Rejection	SVR	$I_{OUT}=40mA, f=120Hz, T_J=25^{\circ}C,$ $V_{IN}=5.85V, V_{RIPPLE}=1V_{PP}$	60	75		dB
Dropout Voltage	$V_D$		$I_{OUT}=100mA$	1.00	1.10	V
			$I_{OUT}=500mA$	1.15	1.25	
			$I_{OUT}=800mA$	1.20	1.30	
			$I_{OUT}=1A$	1.20	1.30	
Thermal Regulation		$T_A=25^{\circ}C, 30ms$ Pulse		0.01	0.10	%/W

For LD1117/A-3.0

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN}=5V, I_{OUT}=10mA, T_J=25^{\circ}C$	2.940	3.000	3.060	V
Output Voltage	$V_{OUT}$	$V_{IN}=4.5$ to $10V$ LD1117 : $I_{OUT}=0\sim 800mA$ LD1117A : $I_{OUT}=0\sim 1000mA$	2.940	3.000	3.060	V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=4.5$ to $12V, I_{OUT}=0mA$		1	6	mV
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=4.5V$ LD1117 : $I_{OUT}=0\sim 800mA$ LD1117A : $I_{OUT}=0\sim 1000mA$		1	10	mV
Temperature stability	$\Delta V_{OUT}$			0.5		%
Long Term Stability	$\Delta V_{OUT}$	1000 hrs, $T_J=125^{\circ}C$		0.3		%
Operating Input Voltage	$V_{IN}$	$I_{OUT}=100mA$			15	V
Quiescent Current	$I_Q$	$V_{IN}\leq 15V$		5	10	mA
Current Limit	$I_{LIMIT}$	$V_{IN}=8V, T_J=25^{\circ}C$	LD1117	800		mA
			LD1117A	1000		
Output Noise Voltage	$e_N$	$B=10Hz$ to $10KHz, T_J=25^{\circ}C$		100		$\mu V$
Supply Voltage Rejection	SVR	$I_{OUT}=40mA, f=120Hz, T_J=25^{\circ}C,$ $V_{IN}=6V, V_{RIPPLE}=1V_{PP}$	60	75		dB
Dropout Voltage	$V_D$		$I_{OUT}=100mA$	1.00	1.10	V
			$I_{OUT}=500mA$	1.15	1.25	
			$I_{OUT}=800mA$	1.20	1.30	
			$I_{OUT}=1A$	1.20	1.30	
Thermal Regulation		$T_A=25^{\circ}C, 30ms$ Pulse		0.01	0.10	%/W



## ■ ELECTRICAL CHARACTERISTICS(Cont.)

For LD1117/A-3.3

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN}=5.3V, I_{OUT}=10mA, T_J=25^{\circ}C$	3.234	3.300	3.366	V
Output Voltage	$V_{OUT}$	$V_{IN}=4.75$ to $10V$ LD1117 : $I_{OUT}=0\sim 800mA$ LD1117A : $I_{OUT}=0\sim 1000mA$	3.234	3.300	3.366	V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=4.75$ to $15V, I_{OUT}=0mA$		1	6	mV
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=4.75V$ LD1117 : $I_{OUT}=0\sim 800mA$ LD1117A : $I_{OUT}=0\sim 1000mA$		1	10	mV
Temperature stability	$\Delta V_{OUT}$			0.5		%
Long Term Stability	$\Delta V_{OUT}$	1000 hrs, $T_J=125^{\circ}C$		0.3		%
Operating Input Voltage	$V_{IN}$	$I_{OUT}=100mA$			15	V
Quiescent Current	$I_Q$	$V_{IN}\leq 15V$		5	10	mA
Current Limit	$I_{LIMIT}$	$V_{IN}=8.3V, T_J=25^{\circ}C$	LD1117	800		mA
			LD1117A	1000		
Output Noise Voltage	$e_N$	$B=10Hz$ to $10KHz, T_J=25^{\circ}C$		100		$\mu V$
Supply Voltage Rejection	SVR	$I_{OUT}=40mA, f=120Hz, T_J=25^{\circ}C,$ $V_{IN}=6.3V, V_{RIPPLE}=1V_{PP}$	60	75		dB
Dropout Voltage	$V_D$		$I_{OUT}=100mA$	1.00	1.10	V
			$I_{OUT}=500mA$	1.15	1.25	
			$I_{OUT}=800mA$	1.20	1.30	
			$I_{OUT}=1A$	1.20	1.30	
Thermal Regulation		$T_A=25^{\circ}C, 30ms$ Pulse		0.01	0.10	%/W

For LD1117/A-3.6

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN}=5.6V, I_{OUT}=10mA, T_J=25^{\circ}C$	3.528	3.600	3.672	V
Output Voltage	$V_{OUT}$	$V_{IN}=5$ to $10V$ LD1117 : $I_{OUT}=0\sim 800mA$ LD1117A : $I_{OUT}=0\sim 1000mA$	3.528	3.600	3.672	V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=5$ to $15V, I_{OUT}=0mA$		1	6	mV
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=5V$ LD1117 : $I_{OUT}=0\sim 800mA$ LD1117A : $I_{OUT}=0\sim 1000mA$		1	10	mV
Temperature stability	$\Delta V_{OUT}$			0.5		%
Long Term Stability	$\Delta V_{OUT}$	1000 hrs, $T_J=125^{\circ}C$		0.3		%
Operating Input Voltage	$V_{IN}$	$I_{OUT}=100mA$			15	V
Quiescent Current	$I_Q$	$V_{IN}\leq 15V$		5	10	mA
Current Limit	$I_{LIMIT}$	$V_{IN}=8.6V, T_J=25^{\circ}C$	LD1117	800		mA
			LD1117A	1000		
Output Noise Voltage	$e_N$	$B=10Hz$ to $10KHz, T_J=25^{\circ}C$		100		$\mu V$
Supply Voltage Rejection	SVR	$I_{OUT}=40mA, f=120Hz, T_J=25^{\circ}C,$ $V_{IN}=6.6V, V_{RIPPLE}=1V_{PP}$	60	75		dB
Dropout Voltage	$V_D$		$I_{OUT}=100mA$	1.00	1.10	V
			$I_{OUT}=500mA$	1.15	1.25	
			$I_{OUT}=800mA$	1.20	1.30	
			$I_{OUT}=1A$	1.20	1.30	
Thermal Regulation		$T_A=25^{\circ}C, 30ms$ Pulse		0.01	0.10	%/W

## ■ ELECTRICAL CHARACTERISTICS(Cont.)

For LD1117/A-5.0

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN}=7V, I_{OUT}=10mA, T_J=25^{\circ}C$	4.900	5.000	5.100	V
Output Voltage	$V_{OUT}$	$V_{IN}=6.5$ to 15V LD1117 : $I_{OUT}=0\sim 800mA$ LD1117A : $I_{OUT}=0\sim 1.0A$	4.900	5.000	5.100	V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=6.5$ to 15V, $I_{OUT}=0mA$		1	10	mV
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=6.5V$ LD1117 : $I_{OUT}=0\sim 800mA$ LD1117A : $I_{OUT}=0\sim 1000mA$		1	15	mV
Temperature stability	$\Delta V_{OUT}$			0.5		%
Long Term Stability	$\Delta V_{OUT}$	1000 hrs, $T_J=125^{\circ}C$		0.3		%
Operating Input Voltage	$V_{IN}$	$I_{OUT}=100mA$			15	V
Quiescent Current	$I_Q$	$V_{IN}\leq 15V$		5	10	mA
Current Limit	$I_{LIMIT}$	$V_{IN}=10V, T_J=25^{\circ}C$	LD1117 800 LD1117A 1000			mA
Output Noise Voltage	$e_N$	$B=10Hz$ to 10KHz, $T_J=25^{\circ}C$		100		$\mu V$
Supply Voltage Rejection	SVR	$I_{OUT}=40mA, f=120Hz, T_J=25^{\circ}C,$ $V_{IN}=8V, V_{RIPPLE}=1V_{PP}$	60	75		dB
Dropout Voltage	$V_D$	$I_{OUT}=100mA$		1.00	1.10	V
		$I_{OUT}=500mA$		1.15	1.25	
		$I_{OUT}=800mA$		1.20	1.30	
		$I_{OUT}=1A$		1.20	1.30	
Thermal Regulation		$T_A=25^{\circ}C, 30ms$ Pulse		0.01	0.10	%/W

For LD1117/A-ADJ

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Reference Voltage	$V_{REF}$	$V_{IN}-V_{OUT}=2V, I_{OUT}=10mA, T_J=25^{\circ}C$	1.225	1.25	1.275	V
Reference Voltage	$V_{REF}$	$V_{IN}-V_{OUT}=1.4$ to 10V LD1117 : $I_{OUT}=10\sim 800mA$ LD1117A : $I_{OUT}=10\sim 1000mA$	1.225	1.25	1.275	V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}-V_{OUT}=1.5$ to 13.75V, $I_{OUT}=10mA$		0.035	0.2	%
Load Regulation	$\Delta V_{OUT}$	$V_{IN}-V_{OUT}=3V$ LD1117 : $I_{OUT}=10\sim 800mA$ LD1117A : $I_{OUT}=10\sim 1000mA$		0.1	0.4	%
Temperature stability	$\Delta V_{OUT}$			0.50		%
Long Term Stability	$\Delta V_{OUT}$	1000 hrs, $T_J=125^{\circ}C$		0.3		%
Operating Input Voltage	$V_{IN}$				15	V
Adjustment Pin Current	$I_{ADJ}$	$V_{IN}\leq 15V$		60	120	$\mu A$
Adjustment Pin Current Change	$\Delta I_{ADJ}$	$V_{IN}-V_{OUT}=1.4$ to 10V, LD1117 : $I_{OUT}=10\sim 800mA$ LD1117A : $I_{OUT}=10\sim 1000mA$		1	5	$\mu A$
Minimum Load Current	$I_{O(MIN)}$	$V_{IN}=15V$		2	5	mA
Current Limit	$I_{LIMIT}$	$V_{IN}-V_{OUT}=5V, T_J=25^{\circ}C$	LD1117 800 LD1117A 1000			mA
Output Noise (% $V_O$ )	$e_N$	$B=10Hz$ to 10KHz, $T_J=25^{\circ}C$		0.003		%
Supply Voltage Rejection	SVR	$I_{OUT}=40mA, f=120Hz, T_J=25^{\circ}C,$ $V_{IN}-V_{OUT}=3V, V_{RIPPLE}=1V_{PP}$	60	75		dB
Dropout Voltage	$V_D$	$I_{OUT}=100mA$		1.00	1.10	V
		$I_{OUT}=500mA$		1.15	1.25	
		$I_{OUT}=800mA$		1.20	1.30	
		$I_{OUT}=1A$		1.20	1.30	
Thermal Regulation		$T_A=25^{\circ}C, 30ms$ Pulse		0.01	0.10	%/W

## ■ TYPICAL APPLICATIONS

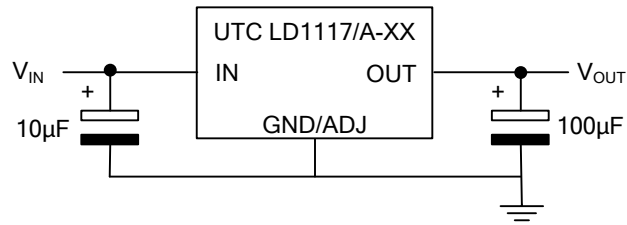


Fig.1 Tyncal Application Circuit

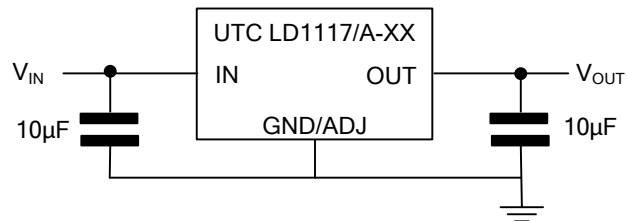


Fig.2 Tyncal Application Circuit (FOR MLCC)

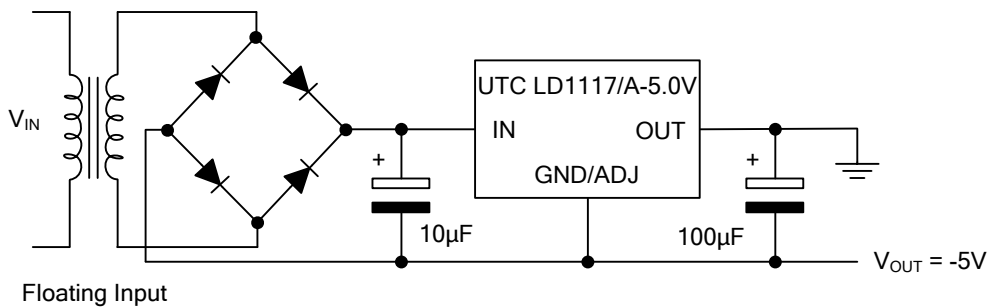


Fig.3 Negative Supply

■ TYPICAL APPLICATIONS (Cont.)

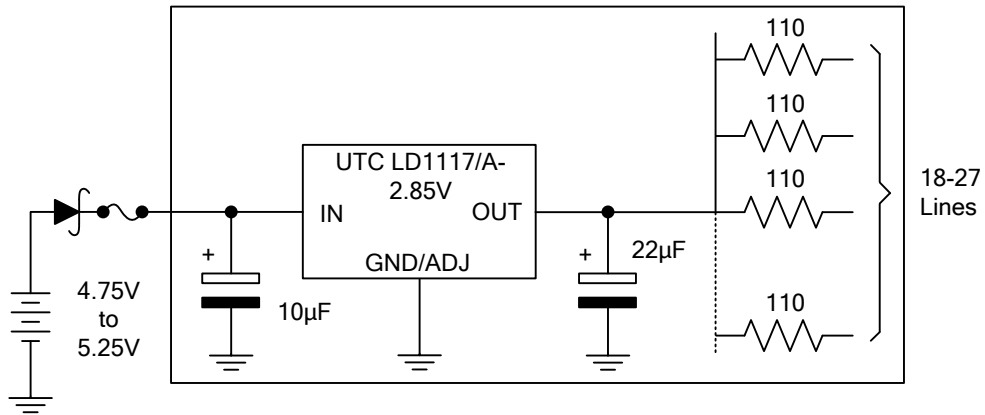


Fig.4 Active Terminator for SCSI-2 BUS

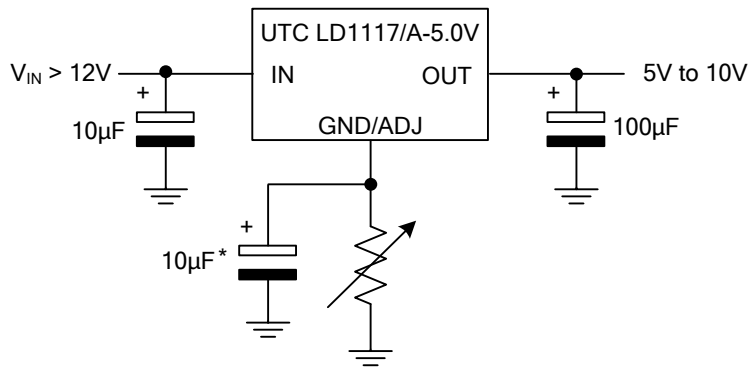


Fig.5 Circuit for Increasing Output Voltage

## ■ APPLICATION NOTE of LD1117/A ADJUSTABLE

The LD1117/A adjustable has a reference voltage of between the OUT and ADJ/GND pins.  $I_{ADJ}$  is 60µA typ. (120µA max.) and  $\Delta I_{ADJ}$  is 1µA typ. (5µA max.).

$R_1$  is normally fixed to 120Ω.

From figure 6 we obtain:

$$V_{OUT} = V_{REF} + R_2(I_{ADJ} + I_{R1}) = V_{REF} + R_2(I_{ADJ} + V_{REF}/R_1) = V_{REF}(1 + R_2/R_1) + R_2 \times I_{ADJ}$$

Usually  $R_2$  value is in the range of few KΩ, so the  $R_2 \times I_{ADJ}$  product could be neglected; then the above expression becomes:  $V_{OUT} = V_{REF}(1 + R_2/R_1)$

For better load regulation, realize a good Kelvin connection of  $R_1$  and  $R_2$  is important. Particularly  $R_1$  connection must be realized very close to OUT and ADJ/GND pin, while  $R_2$  ground connection must be placed as near as possible to the negative Load pin. Ripple rejection can be improved by introducing a 10µF electrolytic capacitor placed in parallel to the  $R_2$  resistor (See Fig. 8)

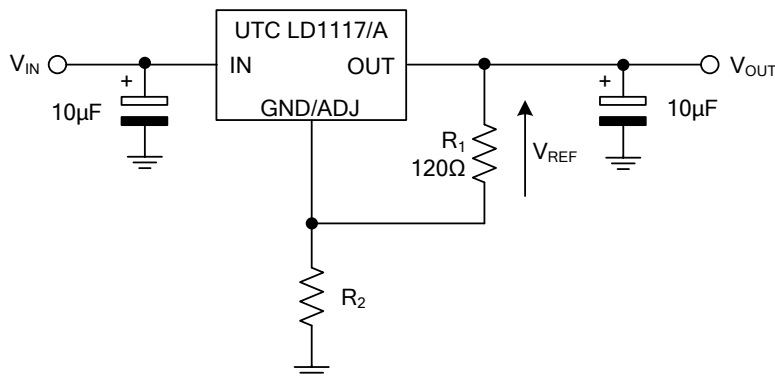


Fig.6 Adjustable Output Voltage Application Circuit

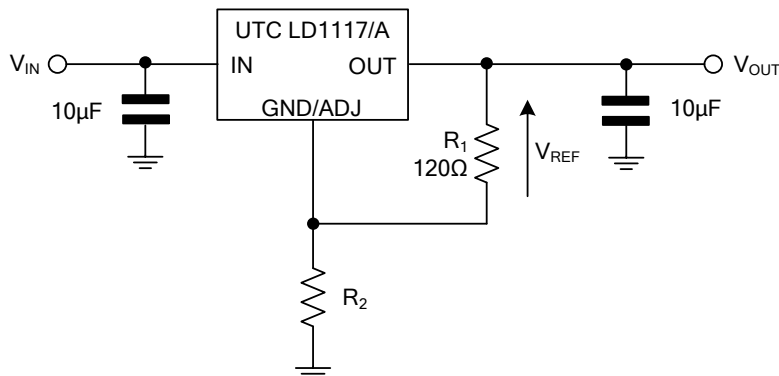


Fig.7 Adjustable Output Voltage Application Circuit (FOR MLCC)

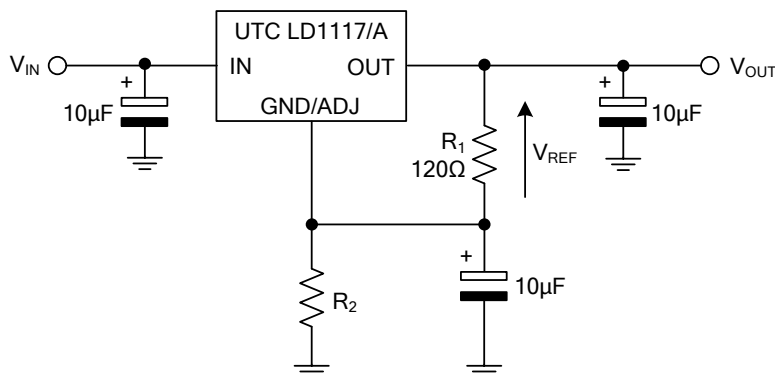
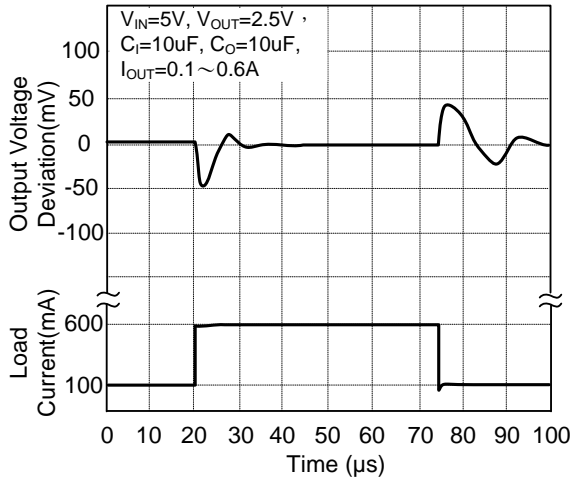


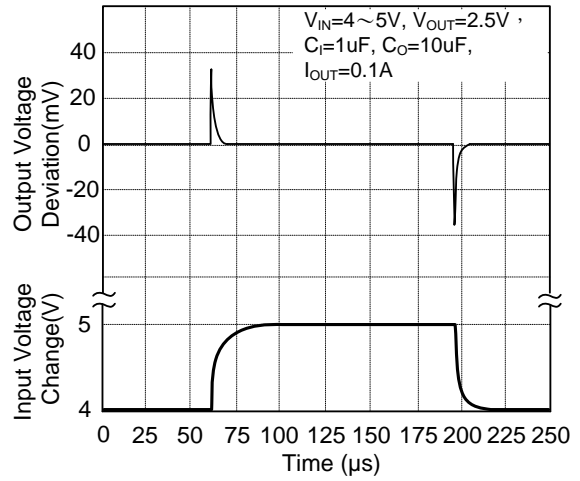
Fig.8 Adjustable Output Voltage Application with improved Ripple Rejection.

## ■ TYPICAL CHARACTERISTICS

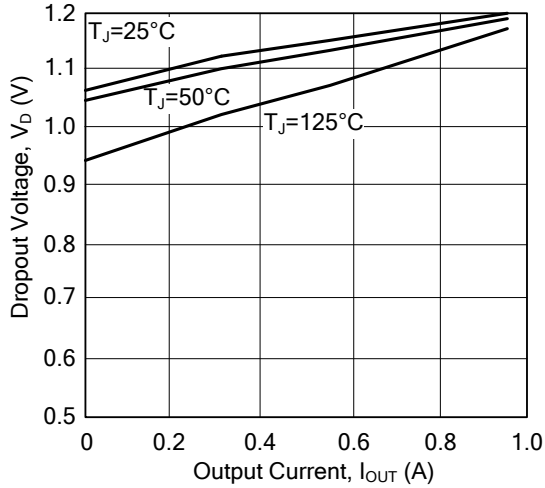
Load Transient Response



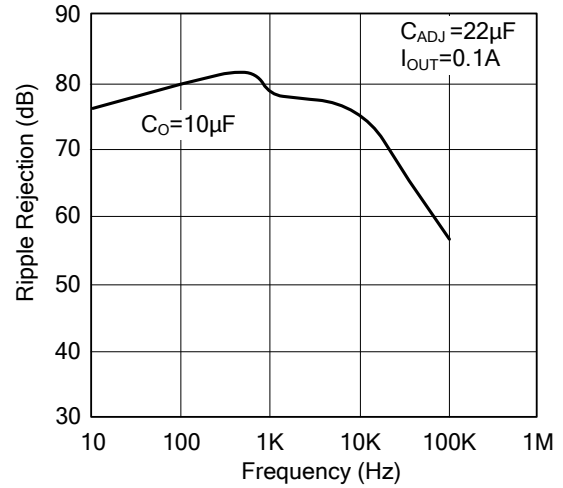
Line Transient Response



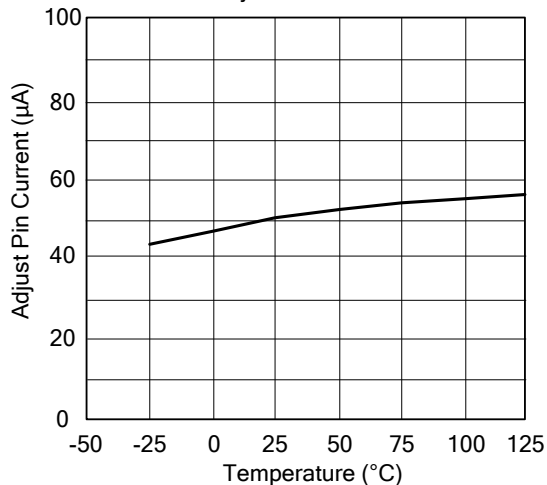
Dropout Voltage ( $V_{IN}-V_{OUT}$ )



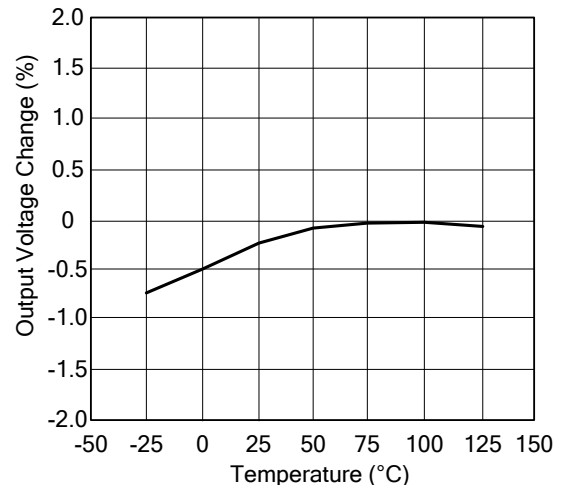
Ripple Rejection



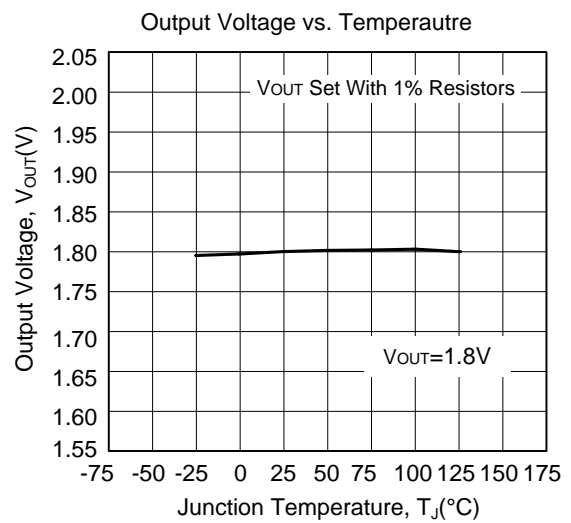
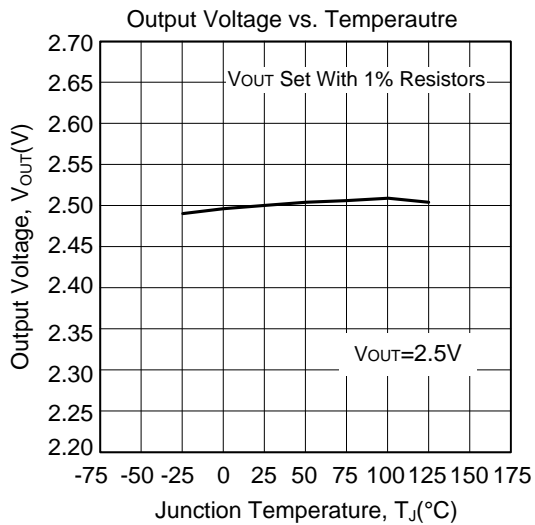
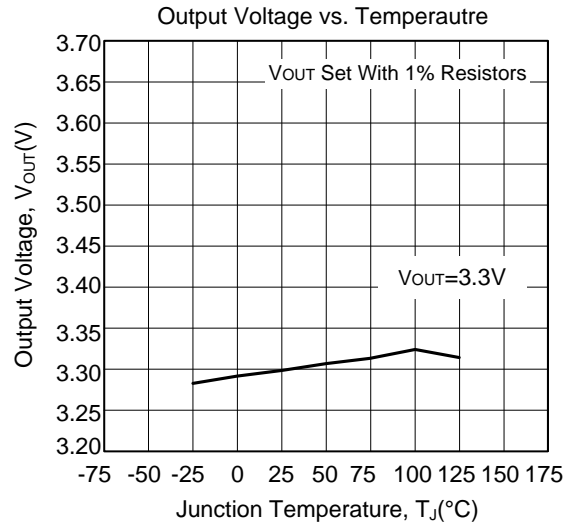
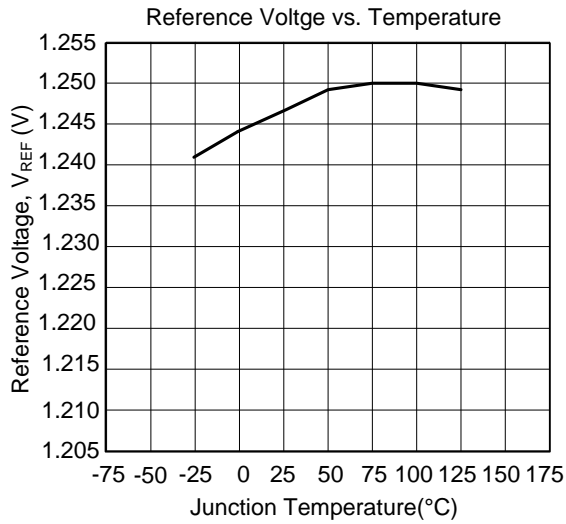
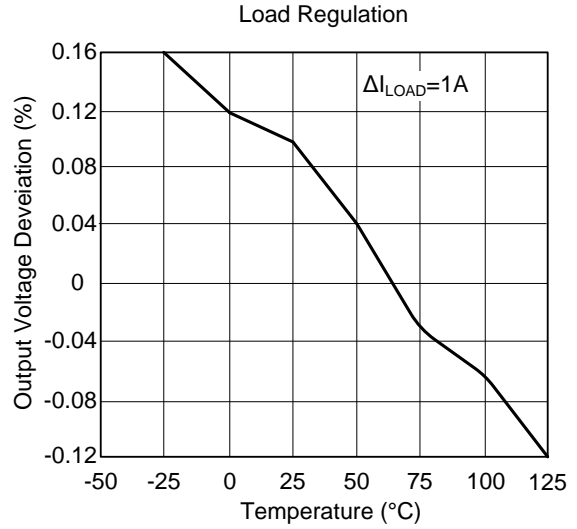
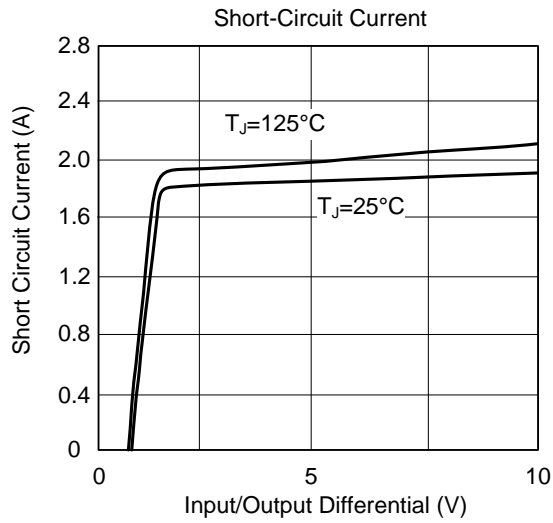
Adjust Pin Current



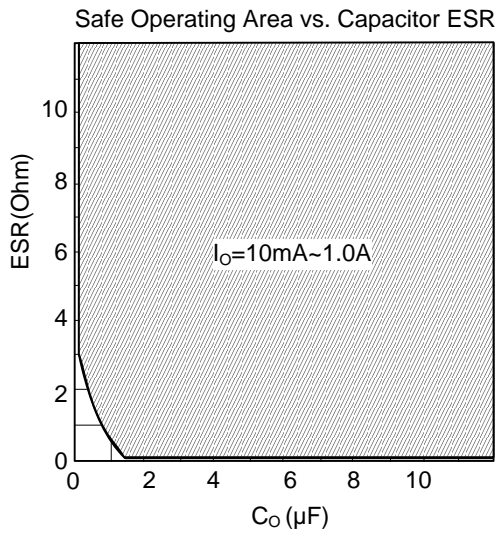
Temperature Stability



## ■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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