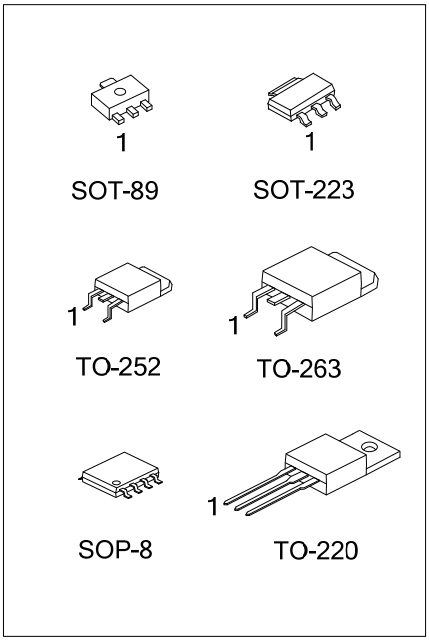
LR1116/B

LINEAR INTEGRATED CIRCUIT

LOW DROP POSITIVE VOLTAGE REGULATORS



■ DESCRIPTION

The UTC **LR1116/B** is a low drop voltage regulator able to provide up to 0.8/0.5A of output current. Output consists of PNP power transistor. So that dropout voltage can be extremely low.

■ FEATURES

* 2.85V Device are Suitable for SCSI-2 Active Termination
* Output Current up to 0.8/0.5A
* Internal Current and Thermal Limit
* Available in ±1%(at 25°C) and 2% in all Temperature

■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free Plating	Halogen Free		1.	2.	3.	4.	5.	6.	7.	8.	
LR1116①L-xx-AA3-A-R	LR1116①G-xx-AA3-A-R	SOT-223	G	O	I	-	-	-	-	-	Tape Reel
LR1116①L-xx-AA3-B-R	LR1116①G-xx-AA3-B-R	SOT-223	O	G	I	-	-	-	-	-	Tape Reel
LR1116①L-xx-AA3-C-R	LR1116①G-xx-AA3-C-R	SOT-223	G	I	O	-	-	-	-	-	Tape Reel
LR1116①L-xx-AA3-D-R	LR1116①G-xx-AA3-D-R	SOT-223	I	G	O	-	-	-	-	-	Tape Reel
LR1116①L-xx-AB3-A-R	LR1116①G-xx-AB3-A-R	SOT-89	G	O	I	-	-	-	-	-	Tape Reel
LR1116①L-xx-AB3-B-R	LR1116①G-xx-AB3-B-R	SOT-89	O	G	I	-	-	-	-	-	Tape Reel
LR1116①L-xx-TA3-D-T	LR1116①G-xx-TA3-D-T	TO-220	I	G	O	-	-	-	-	-	Tube
LR1116①L-xx-TN3-A-R	LR1116①G-xx-TN3-A-R	TO-252	G	O	I	-	-	-	-	-	Tape Reel
LR1116①L-xx-TN3-B-R	LR1116①G-xx-TN3-B-R	TO-252	O	G	I						Tape Reel
LR1116①L-xx-TN3-D-R	LR1116①G-xx-TN3-D-R	TO-252	I	G	O	-	-	-	-	-	Tape Reel
LR1116①L-xx-TQ2-D-R	LR1116①G-xx-TQ2-D-R	TO-263	I	G	O	-	-	-	-	-	Tape Reel
LR1116①L-xx-TQ2-D-T	LR1116①G-xx-TQ2-D-T	TO-263	I	G	O	-	-	-	-	-	Tube
LR1116①L-xx-S08-R	LR1116①G-xx-S08-R	SOP-8	G	O	O	I	x	O	O	x	Tape Reel

Notes: 1. ①: Current code: Blank: 0.8A B: 0.5A
2. Pin Assignment: I:V_{IN} O:V_{OUT} G:GND x:NC
3. xx: Output Voltage, Refer to Marking Information.

LR1116①L-xx-AA3-A-R

(1) Packing Type
(2) Pin Assignment
(3) Package Type
(4) Output Voltage Code
(5) Lead Free
(6) Current Code

(1) R: Tape Reel, T: Tube
(2) Refer to Pin Assignment
(3) AA3: SOT-223, AB3: SOT-89, TA3: TO-220
TN3: TO-252, TQ2: TO-263, S08: SOP-8
(4) xx: Refer to Marking Information
(5) G: Halogen Free, L: Lead Free
(6) Blank: 0.8A, B: 0.5A

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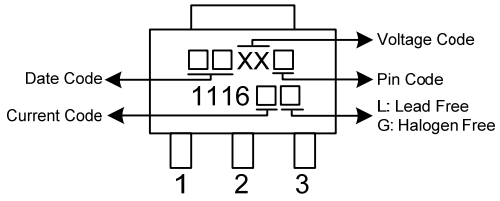
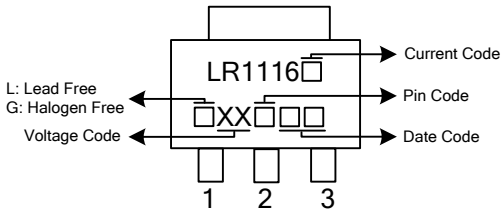
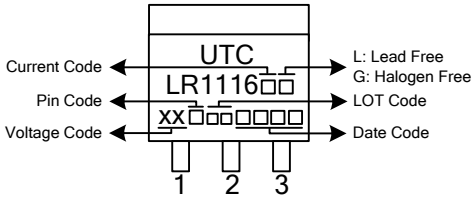
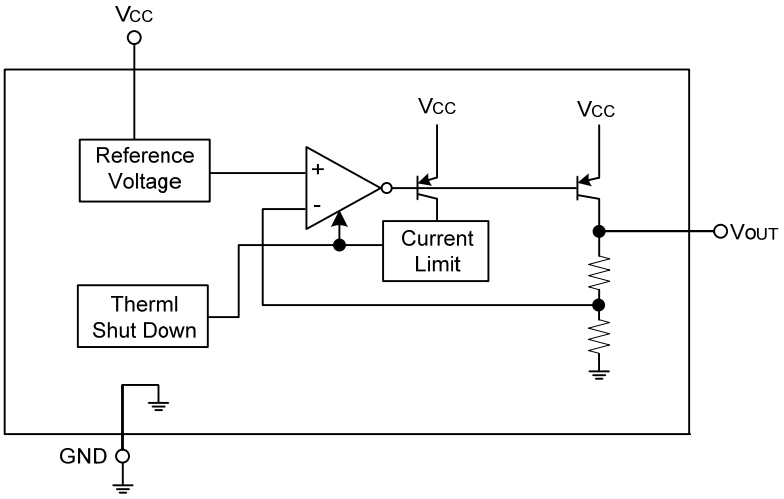
■ MARKING INFORMATION

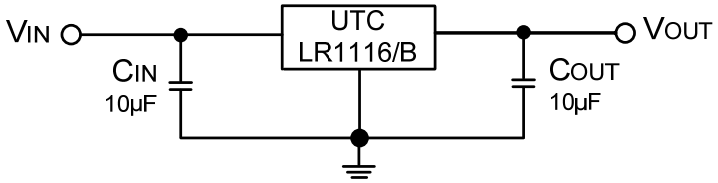
PACKAGE	VOLTAGE CODE	MARKING
SOT-89	12 :1.2V 15 :1.5V 18 :1.8V 25 :2.5V 2J :2.85V 30 :3.0V 33 :3.3V 36 :3.6V 50 :5.0V	
SOT-223		
TO-220 TO-252 TO-263		

Note: Current code: Blank: 0.8A B:0.5A

■ BLOCK DIAGRAM



■ APPLICATION CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
DC Input Voltage	V_{IN}	15	V
Operating Junction Temperature	T_{OPR}	0 ~ +125	°C
Storage Temperature	T_{STG}	-40 ~ +150	°C

Note: 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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Case	SOT-223/SOT-89	θ_{JC}	15	°C/W
	SOP-8		20	°C/W
	TO-252		8	°C/W
	TO-220/TO-263		4	°C/W

■ ELECTRICAL CHARACTERISTICS

(Ta=25℃, refer to the test circuits, T_J=-0~125℃, C_O=10μF, unless otherwise specified).

For LR1116/B-1.2V

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=V_{OUT}+1.5V, I_{OUT}=10mA, T_J=25°C	1%	1.188	1.2	1.212	V
			2%	1.176		1.224	
Output Voltage	V_{OUT}	V_{IN} =(V_{OUT}+2V)~15V LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA		1.176	1.2	1.224	V
Line Regulation	ΔV_{OUT}	V_{IN} =(V_{OUT}+2V)~15V, I_{OUT} =0mA			0.1	0.6	%
Load Regulation	ΔV_{OUT}	V_{IN} =V_{OUT}+2V LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA			2	3	%
Temperature Stability	ΔV_{OUT}				0.5		%
Long Term Stability	ΔV_{OUT}	1000 hrs, T_J=125°C			0.3		%
Operating Input Voltage	V_{IN}	I_{OUT}=100mA				15	V
Quiescent Current	I_D	V_{IN}≤10V			5	10	mA
Output Current	I_{OUT}	V_{IN}=V_{OUT}+4.5V, T_J=25°C		800	950	1200	mA
Output Noise Voltage	eN	B=10Hz~10KHz, T_J=25°C			100		μV
Supply Voltage Rejection	SVR	I_{OUT}=40mA, f=120Hz, T_J=25°C V_{IN}=V_{OUT}+2.5V, V_{RIPPLE}=1Vpp		60	75		dB
Dropout Voltage	V_D	I_{OUT}= 100mA			0.9	1.0	V
		I_{OUT}= 500mA			1.1	1.3	V
		I_{OUT}= 800mA(only for LR1116)			1.2	1.4	V
Thermal Regulation		Ta=25°C, 30ms Pulse			0.01	0.10	%/W

■ ELECTRICAL CHARACTERISTICS (Cont.)

For LR1116/B-1.5V

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$, $T_J=25°C$	1%	1.485	1.5	1.515	V
			2%	1.470		1.530	
Output Voltage	V_{OUT}	$V_{IN}=(V_{OUT}+2V)$~15V LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA		1.470	1.5	1.530	V
Line Regulation	ΔV_{OUT}	$V_{IN}=(V_{OUT}+2V)$~15V, I_{OUT} =0mA			0.1	0.6	%
Load Regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2V$ LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA			2	3	%
Temperature Stability	ΔV_{OUT}				0.5		%
Long Term Stability	ΔV_{OUT}	1000 hrs, T_J=125°C			0.3		%
Operating Input Voltage	V_{IN}	I_{OUT}=100mA				15	V
Quiescent Current	I_D	$V_{IN}\leq 10V$			5	10	mA
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+4.5V$, T_J=25°C		800	950	1200	mA
Output Noise Voltage	eN	B=10Hz~10KHz, T_J=25°C			100		μV
Supply Voltage Rejection	SVR	I_{OUT}=40mA, f=120Hz, T_J=25°C $V_{IN}=V_{OUT}+2.5V$, V_{RIPPLE}=1Vpp		60	75		dB
Dropout Voltage	V_D	I_{OUT}= 100mA			0.6	0.75	V
		I_{OUT}= 500mA			0.80	0.95	V
		I_{OUT}= 800mA(only for LR1116)			0.95	1.1	V
Thermal Regulation		Ta=25°C, 30ms Pulse			0.01	0.10	%/W

For LR1116/B-1.8V

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$, $T_J=25°C$	1%	1.782	1.8	1.818	V
			2%	1.764		1.836	
Output Voltage	V_{OUT}	$V_{IN}=(V_{OUT}+2V)$~15V LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA		1.764	1.8	1.836	V
Line Regulation	ΔV_{OUT}	$V_{IN}=(V_{OUT}+2V)$~15V, I_{OUT} =0mA			0.1	0.6	%
Load Regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2V$ LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA			2	3	%
Temperature Stability	ΔV_{OUT}				0.5		%
Long Term Stability	ΔV_{OUT}	1000 hrs, T_J=125°C			0.3		%
Operating Input Voltage	V_{IN}	I_{OUT}=100mA				15	V
Quiescent Current	I_D	$V_{IN}\leq 10V$			5	10	mA
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+4.5V$, T_J=25°C		800	950	1200	mA
Output Noise Voltage	eN	B=10Hz~10KHz, T_J=25°C			100		μV
Supply Voltage Rejection	SVR	I_{OUT}=40mA, f=120Hz, T_J=25°C $V_{IN}=V_{OUT}+2.5V$, V_{RIPPLE}=1Vpp		60	75		dB
Dropout Voltage	V_D	I_{OUT}= 100mA			0.4	0.5	V
		I_{OUT}= 500mA			0.6	0.8	V
		I_{OUT}= 800mA(only for LR1116)			0.8	0.95	V
Thermal Regulation		Ta=25°C, 30ms Pulse			0.01	0.10	%/W

■ ELECTRICAL CHARACTERISTICS (Cont.)

For LR1116/B-2.5V

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$, $T_J=25°C$	1%	2.475	2.5	2.525	V
			2%	2.450		2.550	
Output Voltage	V_{OUT}	$V_{IN}=(V_{OUT}+2V)$~15V LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA		2.45	2.5	2.55	V
Line Regulation	ΔV_{OUT}	$V_{IN}=(V_{OUT}+2V)$~15V, I_{OUT} =0mA			0.1	0.6	%
Load Regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2V$ LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA			2	3	%
Temperature Stability	ΔV_{OUT}				0.5		%
Long Term Stability	ΔV_{OUT}	1000 hrs, T_J=125°C			0.3		%
Operating Input Voltage	V_{IN}	I_{OUT}=100mA				15	V
Quiescent Current	I_D	$V_{IN}\leq 10V$			5	10	mA
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+4.5V$, T_J=25°C		800	950	1200	mA
Output Noise Voltage	eN	B=10Hz~10KHz, T_J=25°C			100		μV
Supply Voltage Rejection	SVR	I_{OUT}=40mA, f=120Hz, T_J=25°C $V_{IN}=V_{OUT}+2.5V$, V_{RIPPLE}=1Vpp		60	75		dB
Dropout Voltage	V_D	I_{OUT}= 100mA			0.16	0.3	V
		I_{OUT}= 500mA			0.4	0.6	V
		I_{OUT}= 800mA(only for LR1116)			0.6	0.8	V
Thermal Regulation		Ta=25°C, 30ms Pulse			0.01	0.10	%/W

For LR1116/B-2.85V

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+1.5V$, $I_{OUT}=10mA$, $T_J=25°C$	1%	2.822	2.85	2.878	V
			2%	2.793		2.907	
Output Voltage	V_{OUT}	$V_{IN}=(V_{OUT}+2V)$~15V LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA		2.793	2.85	2.907	V
Line Regulation	ΔV_{OUT}	$V_{IN}=(V_{OUT}+2V)$~15V, I_{OUT} =0mA			0.1	0.6	%
Load Regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2V$ LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA			2	3	%
Temperature Stability	ΔV_{OUT}				0.5		%
Long Term Stability	ΔV_{OUT}	1000 hrs, T_J=125°C			0.3		%
Operating Input Voltage	V_{IN}	I_{OUT}=100mA				15	V
Quiescent Current	I_D	$V_{IN}\leq 10V$			5	10	mA
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+4.5V$, T_J=25°C		800	950	1200	mA
Output Noise Voltage	eN	B=10Hz~10KHz, T_J=25°C			100		μV
Supply Voltage Rejection	SVR	I_{OUT}=40mA, f=120Hz, T_J=25°C $V_{IN}=V_{OUT}+2.5V$, V_{RIPPLE}=1Vpp		60	75		dB
Dropout Voltage	V_D	I_{OUT}= 100mA			0.16	0.3	V
		I_{OUT}= 500mA			0.45	0.6	V
		I_{OUT}= 800mA(only for LR1116)			0.6	0.8	V
Thermal Regulation		Ta=25°C, 30ms Pulse			0.01	0.10	%/W

■ ELECTRICAL CHARACTERISTICS (Cont.)

For LR1116/B-3.0V

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=V_{OUT}+1.5V, I_{OUT}=10mA,T_J=25°C	2.970	3.0	3.030	V
Output Voltage	V_{OUT}	V_{IN}=(V_{OUT}+2V)~15V LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA	2.940	3.0	3.060	V
Line Regulation	ΔV_{OUT}	V_{IN}=(V_{OUT}+2V)~15V, I_{OUT}=0mA		0.1	0.6	%
Load Regulation	ΔV_{OUT}	V_{IN}=V_{OUT}+2V LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA		2	3	%
Temperature Stability	ΔV_{OUT}			0.5		%
Long Term Stability	ΔV_{OUT}	1000 hrs, T_J=125°C		0.3		%
Operating Input Voltage	V_{IN}	I_{OUT}=100mA			15	V
Quiescent Current	I_D	V_{IN}≤10V		5	10	mA
Output Current	I_{OUT}	V_{IN}=V_{OUT}+4.5V, T_J=25°C	800	950	1200	mA
Output Noise Voltage	eN	B=10Hz ~ 10KHz, T_J=25°C		100		μV
Supply Voltage Rejection	SVR	I_{OUT}=40mA, f=120Hz, T_J=25°C V_{IN}=V_{OUT}+2.5V, V_{RIPPLE}=1Vpp	60	75		dB
Dropout Voltage	V_D	I_{OUT}= 100mA		0.16	0.3	V
		I_{OUT}= 500mA		0.45	0.6	V
		I_{OUT}= 800mA (only for LR1116)		0.6	0.8	V
Thermal Regulation		Ta=25°C, 30ms Pulse		0.01	0.10	%/W

For LR1116/B-3.3V

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=V_{OUT}+1.5V, I_{OUT}=10mA,T_J=25°C	3.267	3.3	3.333	V
Output Voltage	V_{OUT}	V_{IN}=(V_{OUT}+2V)~15V LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA	3.234	3.3	3.366	V
Line Regulation	ΔV_{OUT}	V_{IN}=(V_{OUT}+2V)~15V, I_{OUT}=0mA		0.1	0.6	%
Load Regulation	ΔV_{OUT}	V_{IN}=V_{OUT}+2V LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA		2	3	%
Temperature Stability	ΔV_{OUT}			0.5		%
Long Term Stability	ΔV_{OUT}	1000 hrs, T_J=125°C		0.3		%
Operating Input Voltage	V_{IN}	I_{OUT}=100mA			15	V
Quiescent Current	I_D	V_{IN}≤10V		5	10	mA
Output Current	I_{OUT}	V_{IN}=V_{OUT}+4.5V, T_J=25°C	800	950	1200	mA
Output Noise Voltage	eN	B=10Hz ~ 10KHz, T_J=25°C		100		μV
Supply Voltage Rejection	SVR	I_{OUT}=40mA, f=120Hz, T_J=25°C V_{IN}=V_{OUT}+2.5V, V_{RIPPLE}=1Vpp	60	75		dB
Dropout Voltage	V_D	I_{OUT}= 100mA		0.16	0.3	V
		I_{OUT}= 500mA		0.4	0.6	V
		I_{OUT}= 800mA (only for LR1116)		0.6	0.8	V
Thermal Regulation		Ta=25°C, 30ms Pulse		0.01	0.10	%/W

■ ELECTRICAL CHARACTERISTICS (Cont.)

For LR1116/B-3.6V

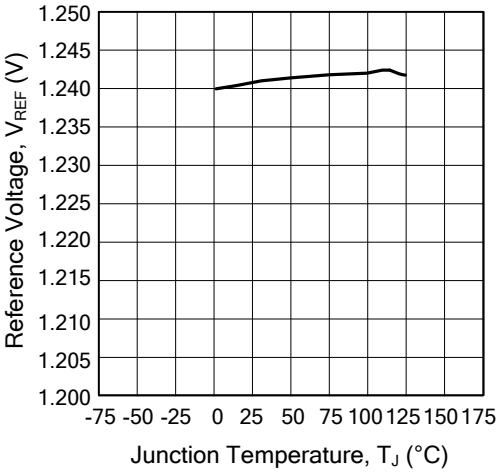
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=V_{OUT}+1.5V, I_{OUT}=10mA,T_J=25°C	3.564	3.6	3.636	V
Output Voltage	V_{OUT}	V_{IN}=(V_{OUT}+2V)~15V LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA	3.528	3.6	3.672	V
Line Regulation	ΔV_{OUT}	V_{IN}=(V_{OUT}+2V)~15V, I_{OUT}=0mA		0.1	0.6	%
Load Regulation	ΔV_{OUT}	V_{IN}=V_{OUT}+2V LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA		2	3	%
Temperature Stability	ΔV_{OUT}			0.5		%
Long Term Stability	ΔV_{OUT}	1000 hrs, T_J=125°C		0.3		%
Operating Input Voltage	V_{IN}	I_{OUT}=100mA			15	V
Quiescent Current	I_D	V_{IN}≤10V		5	10	mA
Output Current	I_{OUT}	V_{IN}=V_{OUT}+4.5V, T_J=25°C	800	950	1200	mA
Output Noise Voltage	eN	B=10Hz ~ 10KHz, T_J=25°C		100		μV
Supply Voltage Rejection	SVR	I_{OUT}=40mA, f=120Hz, T_J=25°C V_{IN}=V_{OUT}+2.5V, V_{RIPPLE}=1Vpp	60	75		dB
Dropout Voltage	V_D	I_{OUT}= 100mA		0.16	0.3	V
		I_{OUT}= 500mA		0.4	0.6	V
		I_{OUT}= 800mA (only for LR1116)		0.6	0.8	V
Thermal Regulation		Ta=25°C, 30ms Pulse		0.01	0.10	%/W

For LR1116/B-5.0V

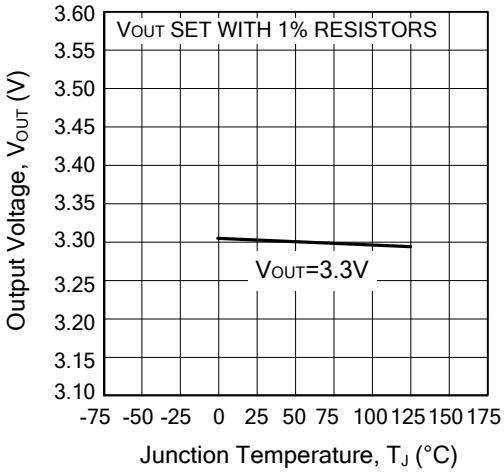
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=V_{OUT}+1.5V, I_{OUT}=10mA,T_J=25°C	4.95	5.0	5.05	V
Output Voltage	V_{OUT}	V_{IN}=(V_{OUT}+2V)~15V LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA	4.90	5.0	5.10	V
Line Regulation	ΔV_{OUT}	V_{IN}=(V_{OUT}+2V)~15V, I_{OUT}=0mA		0.1	0.6	%
Load Regulation	ΔV_{OUT}	V_{IN}=V_{OUT}+2V LR1116 : I_{OUT}=0 to 800mA LR1116B : I_{OUT}=0 to 500mA		2	3	%
Temperature Stability	ΔV_{OUT}			0.5		%
Long Term Stability	ΔV_{OUT}	1000 hrs, T_J=125°C		0.3		%
Operating Input Voltage	V_{IN}	I_{OUT}=100mA			15	V
Quiescent Current	I_D	V_{IN}≤10V		5	10	mA
Output Current	I_{OUT}	V_{IN}=V_{OUT}+4.5V, T_J=25°C	800	950	1200	mA
Output Noise Voltage	eN	B=10Hz ~ 10KHz, T_J=25°C		100		μV
Supply Voltage Rejection	SVR	I_{OUT}=40mA, f=120Hz, T_J=25°C V_{IN}=V_{OUT}+2.5V, V_{RIPPLE}=1Vpp	60	75		dB
Dropout Voltage	V_D	I_{OUT}= 100mA		0.16	0.3	V
		I_{OUT}= 500mA		0.4	0.6	V
		I_{OUT}= 800mA (only for LR1116)		0.6	0.8	V
Thermal Regulation		Ta=25°C, 30ms Pulse		0.01	0.10	%/W

■ TYPICAL PERFORMANCE CHARACTERISTICS

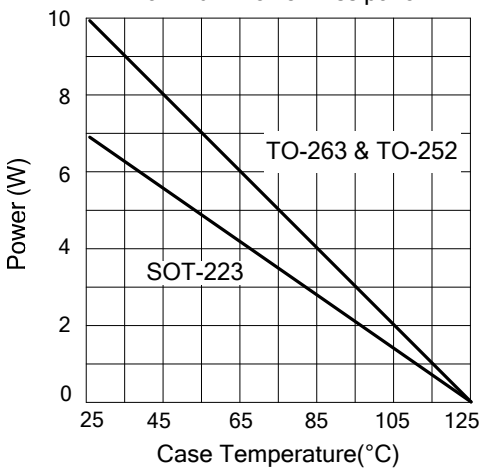
Reference Voltge vs. Temperature



Output Voltage vs. Temperautre



Maximum Power Dissipation



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