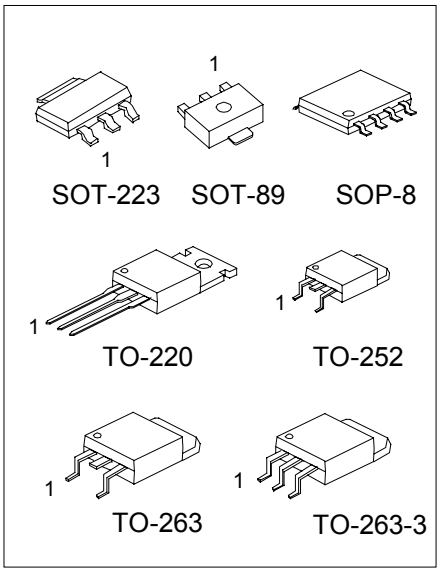
UTC UR233 LINEAR INTEGRATED CIRCUIT

LOW DROP FIXED AND ADJUSTABLE POSITIVE VOLTAGE REGULATORS



SOP-8 1: GND; 2,3,6,7: Vout;
4: Vin; 5,8: NC

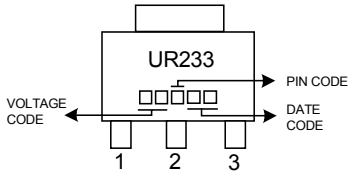
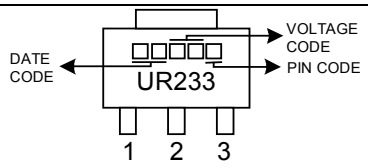
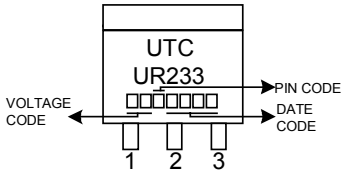
DESCRIPTION

The UTC UR233 is a LOW DROP Voltage Regulator able to provide up to 0.8A of Output Current, available even in adjustable version (Vref=1.25V). Concerning fixed versions, are offered the following Output Voltages: 1.8V, 2.5V, 2.85V, 3.0V, 3.3V and 5.0V. The device is supplied in: SOT-223, SOT-89,TO-252, TO-263, TO-263-3, SOP-8 and TO-220. The SOT-223,SOT-89,SOP-8,TO-263,TO-263-3 and TO-252 surface mount packages optimize the thermal characteristics even offering a relevant space saving effect. High efficiency is assured by NPN pass transistor. In fact in the case, unlike than PNP one, the Quiescent Current flows mostly into the load. Only a very common 10μF minimum capacitor is needed for stability. On chip trimming allows the regulator to reach a very tight output voltage tolerance, within ±1% at 25°C. The ADJUSTABLE UR233 is pin to pin compatible with the other standard Adjustable voltage regulators maintaining the better performances in terms of Drop and Tolerance.

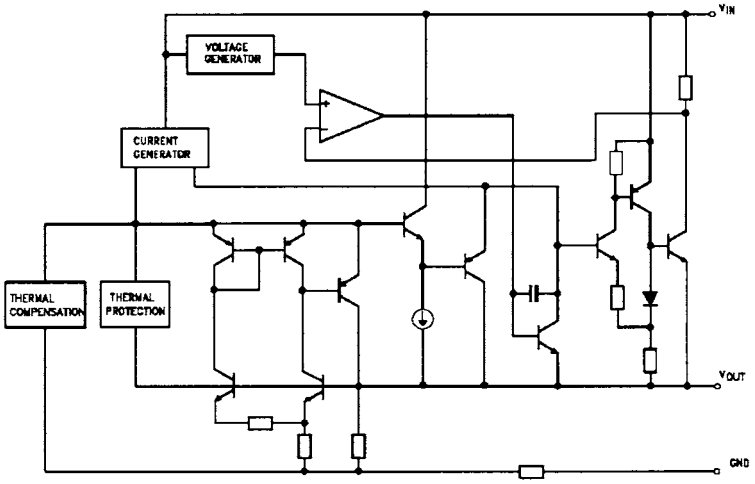
FEATURES

*Low dropout voltage (1V Typ.)
*Output current up to 0.8A
*Fixed output voltage of: 1.8V,2.5V, 2,85V, 3.0V, 3.3V, 5.0V
*Adjustable version availability (Vref=1.25V)
*Internal current and thermal limit
*Available in ±1%(at 25°C) and 2% in all temperature range
*Supply voltage rejection: 75dB (TYP)
*Temperature range: 0°C to 125°C

MARKING INFORMATION

PACKAGE	VOLTAGE CODE	PIN CODE	PIN 1	PIN 2	PIN 3	MARKING
SOT-223	18:1.8V 25:2.5V 28:2.85V 30:3.0V 33:3.3V 50:5.0V AD:ADJ	A	GND	OUT	IN	
		B	OUT	GND	IN	
		C	GND	IN	OUT	
		D	IN	GND	OUT	
SOT-89		A	GND	OUT	IN	
		B	OUT	GND	IN	
		C	GND	IN	OUT	
		D	IN	GND	OUT	
TO-220 TO-252 TO-263 TO-263-3		A	GND	OUT	IN	
		B	OUT	GND	IN	
		C	GND	IN	OUT	
		D	IN	GND	OUT	

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
DC Input Voltage	V_{IN}	12	V
Power Dissipation	Ptot	12	W
Storage temperature	Tstg	-65 ~ +150	°C
Operating Junction Temperature	Top	0 ~ +125	°C

Note: Absolute Maximum Ratings are those value beyond which damage to the device may occur. Functional operation under there condition is not implied. Over the above suggested Max Power Dissipation a Short Circuit could definitively damage the device.

THERMAL DATA

PARAMETER	SYMBOL	VALUE	UNIT
Thermal Resistance Junction-case	Rth-case		
SOT-223		15	°C/W
SOP-8		20	°C/W
TO-252		8	°C/W
TO-220		3	°C/W
TO-263		3	°C/W
Thermal Resistance Junction-ambient	Rthj-amb		
TO-220		50	°C/W

UTC UR233-1.8 ELECTRICAL CHARACTERISTICS

(refer to the test circuits, Tj=0 to 125°C, Co=10μF unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Vin=3.8V, Io=10mA, Tj=25°C	1.782	1.800	1.818	V
Output Voltage	Vo	Io=0 to 800mA, Vin=3.2 to 10V	1.764		1.836	V
Line Regulation	ΔVo	Vin=3.2 to 10V, Io=0mA		1	6	mV
Load Regulation	ΔVo	Vin=3.2V, Io=0 to 800/mA		1	10	mV
Temperature stability	ΔVo			0.5		%
Long Term Stability	ΔVo	1000 hrs, Tj=125°C		0.3		%
Operating Input Voltage	Vin	Io=100mA			12	V
Quiescent Current	Id	Vin≤10V		5	10	mA
Output Current	Io	Vin=6.8V, Tj=25°C	800	950	1200	mA
Output Noise Voltage	eN	B=10Hz to 10KHz, Tj=25°C		100		μV
Supply Voltage Rejection	SVR	Io=40mA, f=120Hz, Tj=25°C, Vin=4.8V, Vripple=1Vpp	60	75		dB
Dropout Voltage	Vd				1.50	V
Thermal Regulation		Ta=25°C, 30ms Pulse		0.01	0.10	%/W

UTC UR233 ELECTRICAL CHARACTERISTICS

(refer to the test circuits, Tj=0 to 125°C, Co=10μF unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Vin=4.5V, Io=10mA, Tj=25°C	±1%	2.475	2.500	2.525	V
			±2%	2.450	2.500	2.550	V
Output Voltage	Vo	Io=0 to 800mA,	±2%	2.450		2.550	V
		Vin=3.9 to 10V	±4%	2.400		2.600	V
Line Regulation	ΔVo	Vin=3.9 to 10V, Io=0mA			1	6	mV

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Load Regulation	ΔVo	Vin=3.9V, Io=0 to 800mA		1	10	mV
Temperature stability	ΔVo			0.5		%
Long Term Stability	ΔVo	1000 hrs, Tj=125°C		0.3		%
Operating Input Voltage	Vin	Io=100mA			12	V
Quiescent Current	Id	Vin≤10V		5	10	mA
Output Current	Io	Vin=7.5V, Tj=25°C	800	950	1200	mA
Output Noise Voltage	eN	B=10Hz to 10KHz, Tj=25°C		100		μV
Supply Voltage Rejection	SVR	Io=40mA, f=120Hz, Tj=25°C, Vin=5.5V, Vripple=1Vpp	60	75		dB
Dropout Voltage	Vd				1.50	V
Thermal Regulation		Ta=25°C, 30ms Pulse		0.01	0.10	%/W

UTC UR233-2.85 ELECTRICAL CHARACTERISTICS

(refer to the test circuits, Tj=0 to 125°C, Co=10μF unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Vin=4.85V, Io=10mA, Tj=25°C	2.82	2.85	2.88	V
Output Voltage	Vo	Io=0 to 800mA,Vin=4.25 to 10V	2.79		2.91	V
Line Regulation	ΔVo	Vin=4.25 to 10V, Io=0mA		1	6	mV
Load Regulation	ΔVo	Vin=4.25V, Io=0 to 800mA		1	10	mV
Temperature stability	ΔVo			0.5		%
Long Term Stability	ΔVo	1000 hrs, Tj=125°C		0.3		%
Operating Input Voltage	Vin	Io=100mA			12	V
Quiescent Current	Id	Vin≤10V		5	10	mA
Output Current	Io	Vin=7.85V, Tj=25°C	800	950	1200	mA
Output Noise Voltage	eN	B=10Hz to 10KHz, Tj=25°C		100		μV
Supply Voltage Rejection	SVR	Io=40mA, f=120Hz, Tj=25°C, Vin=5.85V, Vripple=1Vpp	60	75		DB
Dropout Voltage	Vd				1.50	V
Thermal Regulation		Ta=25°C, 30ms Pulse		0.01	0.10	%/W

UTC UR233-3.0 ELECTRICAL CHARACTERISTICS

(refer to the test circuits, Tj=0 to 125°C, Co=10μF unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Vin=5V, Io=10mA, Tj=25°C	±1%	2.97	3.00	3.03	V
			±2%	2.94	3.00	3.06	V
Output Voltage	Vo	Io=0 to 800 mA	±2%	2.94		3.06	V
		Vin=4.5 to 10V	±4%	2.88		3.12	V
Line Regulation	ΔVo	Vin=4.5 to 12V, Io=0mA			1	6	mV
Load Regulation	ΔVo	Vin=4.5V, Io=0 to 800mA			1	10	mV
Temperature stability	ΔVo				0.5		%
Long Term Stability	ΔVo	1000 hrs, Tj=125°C			0.3		%
Operating Input Voltage	Vin	Io=100mA				12	V
Quiescent Current	Id	Vin≤12V			5	10	mA
Output Current	Io	Vin=8V, Tj=25°C		800	950	1200	mA
Output Noise Voltage	eN	B=10Hz to 10KHz, Tj=25°C			100		μV
Supply Voltage Rejection	SVR	Io=40mA, f=120Hz, Tj=25°C, Vin=6V, Vripple=1Vpp		60	75		dB
Dropout Voltage	Vd					1.50	V

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Thermal Regulation		Ta=25°C, 30ms Pulse		0.01	0.10	%/W

UTC UR233-3.3 ELECTRICAL CHARACTERISTICS

(refer to the test circuits, Tj=0 to 125°C, Co=10μF unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Vin=5.3V, Io=10mA, Tj=25°C ±1%	3.267	3.300	3.333	V
		±2%	3.235	3.300	3.365	V
Output Voltage	Vo	Io=0 to 800 mA, ±2%	3.235		3.365	V
		Vin=4.75 to 10V ±4%	3.160		3.440	V
Line Regulation	ΔVo	Vin=4.75 to 12V, Io=0mA		1	6	mV
Load Regulation	ΔVo	Vin=4.75V, Io=0 to 800mA		1	10	mV
Temperature stability	ΔVo			0.5		%
Long Term Stability	ΔVo	1000 hrs, Tj=125°C		0.3		%
Operating Input Voltage	Vin	Io=100mA			12	V
Quiescent Current	Id	Vin≤12V		5	10	mA
Output Current	Io	Vin=8.3V, Tj=25°C	800	950	1200	mA
Output Noise Voltage	eN	B=10Hz to 10KHz, Tj=25°C		100		μV
Supply Voltage Rejection	SVR	Io=40mA, f=120Hz, Tj=25°C, Vin=6.3V, Vripple=1Vpp	60	75		DB
Dropout Voltage	Vd				1.50	V
Thermal Regulation		Ta=25°C, 30ms Pulse		0.01	0.10	%/W

UTC UR233-5.0 ELECTRICAL CHARACTERISTICS

(refer to the test circuits, Tj=0 to 125°C, Co=10μF unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Vin=7V, Io=10mA, Tj=25°C ±1%	4.95	5.00	5.05	V
		±2%	4.90	5.00	5.10	V
Output Voltage	Vo	Io=0 to 800mA, ±2%	4.90		5.10	V
		Vin=6.5 to 12V ±4%	4.80		5.20	V
Line Regulation	ΔVo	Vin=6.5 to 12V, Io=0mA		1	10	mV
Load Regulation	ΔVo	Vin=6.5V, Io=0 to 800mA		1	15	mV
Temperature stability	ΔVo			0.5		%
Long Term Stability	ΔVo	1000 hrs, Tj=125°C		0.3		%
Operating Input Voltage	Vin	Io=100mA			12	V
Quiescent Current	Id	Vin≤12V		5	10	mA
Output Current	Io	Vin=10V, Tj=25°C	800	950	1200	mA
Output Noise Voltage	eN	B=10Hz to 10KHz, Tj=25°C		100		μV
Supply Voltage Rejection	SVR	Io=40mA, f=120Hz, Tj=25°C, Vin=8V, Vripple=1Vpp	60	75		dB
Dropout Voltage	Vd				1.50	V
Thermal Regulation		Ta=25°C, 30ms Pulse		0.01	0.10	%/W

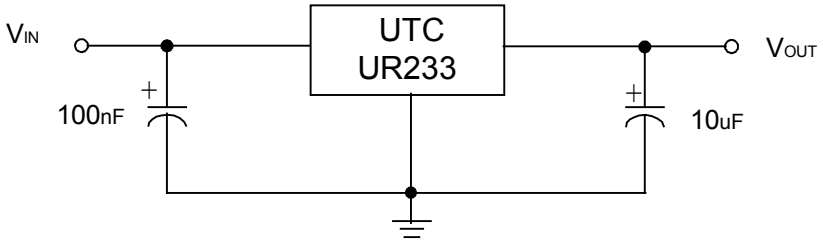
UTC UR233-ADJUSTABLE ELECTRICAL CHARACTERISTICS

(refer to the test circuits, Tj=0 to 125°C, Co=10μF unless otherwise specified)

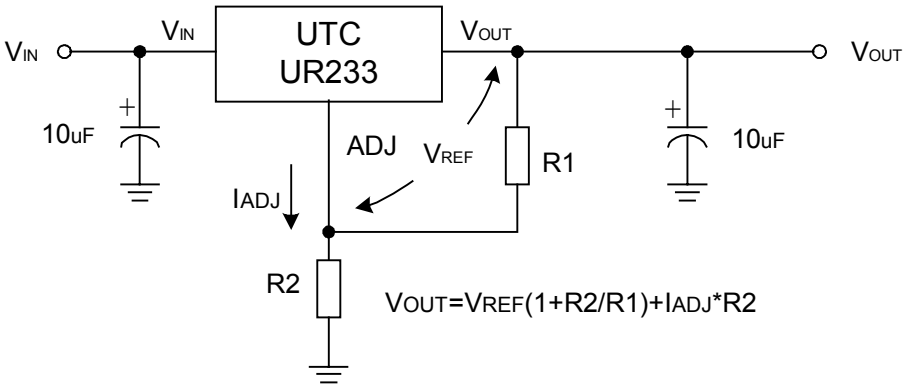
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Reference Voltage	Vref	Vin-VO=2V, Io=10mA, Tj=25°C	1.238	1.25	1.262	V
Reference Voltage	Vref	Io=10 to 800mA, Vin-Vo=1.5 to 10V	1.225		1.275	V
Line Regulation	ΔVo	Vin-Vo=1.5 to 13.75V, Io=10mA		0.035	0.200	%
Load Regulation	ΔVo	Vin-Vo=3V, Io=10 to 800mA		0.10	0.400	%
Temperature stability	ΔVo			0.50		%
Long Term Stability	ΔVo	1000 hrs, Tj=125°C		0.3		%
Operating Input Voltage	Vin				12	V
Adjustment Pin Current	Iadj	Vin≤12V		60	120	μA
Adjustment Pin Current Change	ΔIadj	Vin-Vo=1.5 to 10V, Io=10 to 800/mA		1	5	μA
Minimum Load Current	Io(min)	Vin=12V		2	5	mA
Output Current	Io	Vin-Vo=5V, Tj=25°C	800	950	1200	mA
Output Noise (%Vo)	eN	B=10Hz to 10KHz, Tj=25°C		0.003		%
Supply Voltage Rejection	SVR	Io=40mA, f=120Hz, Tj=25°C, Vin-Vo=3V, Vripple=1Vpp	60	75		dB
Dropout Voltage	Vd				1.50	V
Thermal Regulation		Ta=25°C, 30ms Pulse		0.01	0.10	%/W

APPLICATION CIRCUIT

FIXED VOLTAGE



ADJUSTABLE



TYPICAL CHARACTERISTICS

Fig.1 Reference Voltge vs. Temperature

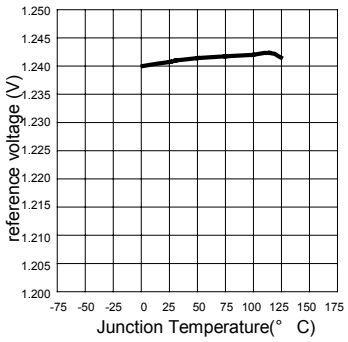


Fig.2 Output Voltage vs. Temperautre

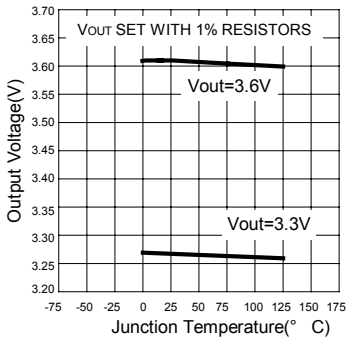


Fig.3 Maximum Power Dissipation