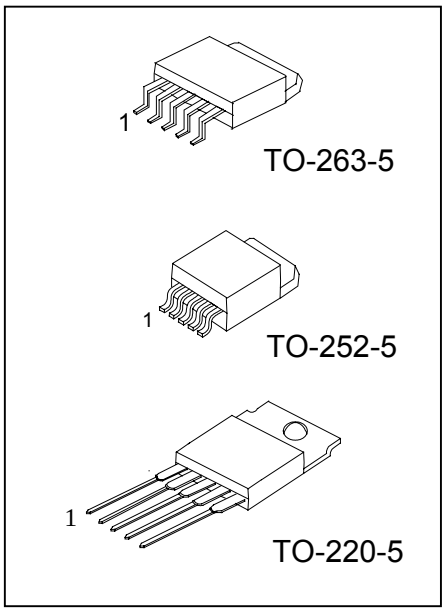
5A ADJUSTABLE/FIXED ULTRA LOW DROP-OUT LINEAR REGULATOR



*Pb-free plating product number: UR533L

■ DESCRIPTION

The UTC **UR533** is ultra-low dropout regulators with 5A output current capability. This device has been optimized for low voltage applications including V_{TT} bus termination, where transient response and minimum input voltage is critical. The UTC **UR533** is ideal for low voltage microprocessor applications requiring a regulated output from 1.3V ~ 5.7V with a power input supply of 1.75V ~ 6.5V.

Current limit ensures controlled short-circuit current. On-chip thermal limiting provides protection against any combination of overload and ambient temperature that would create excessive junction temperatures.

■ FEATURES

* Ultra Low dropout voltage
* Remote sense operation
* Fast transient response
* Load regulation: 0.05% typical
* 0.5% initial accuracy
* On-chip thermal limiting

■ ORDERING INFORMATION

Order Number		Package	Packing
Normal	Lead Free Plating		
UR533-xx-TQ5-R	UR533L-xx-TQ5-R	TO-263-5	Tape Reel
UR533-xx-TQ5-T	UR533L-xx-TQ5-T	TO-263-5	Tube
UR533-xx-TN5-R	UR533L-xx-TN5-R	TO-252-5	Tape Reel
UR533-xx-TN5-T	UR533L-xx-TN5-T	TO-252-5	Tube
UR533-xx-TA5-T	UR533L-xx-TA5-T	TO-220-5	Tube

Note: xx: Output Voltage, refer to Marking Information.

UR533L-xx-TQ5-R

(1)Packing Type
(2)Package Type
(3)Output Voltage Code
(4)Lead Plating

(1) R: Tape Reel, T:Tube
(2) TQ5: TO-263-5, TN5: TO-252-5, TA5: TO-220-5
(3) xx: refer to Marking Information
(4) L: Lead Free Plating, Blank: Pb/Sn

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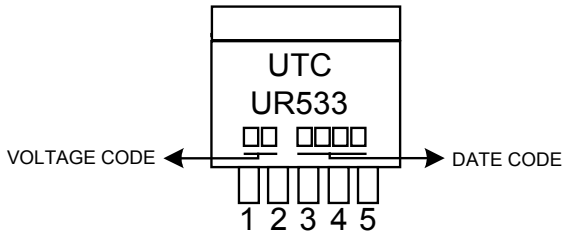
■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
TO-220-5 TO-252-5 TO-263-5	15 :1.5V 25 :2.5V AD:ADJ	

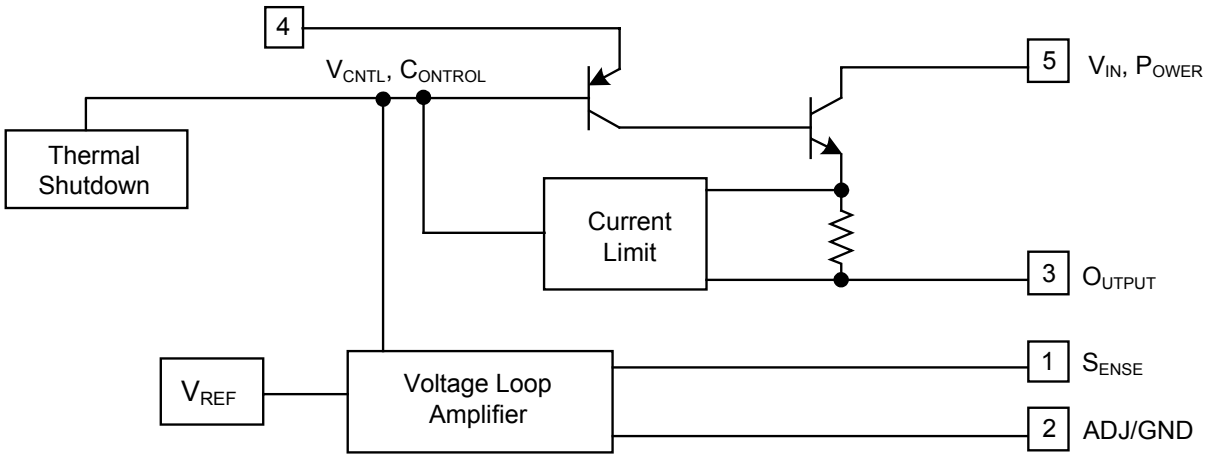
■ PIN DESCRITIONS

PIN NO	PIN NAME	DESCRITION
1	V_{SENSE}	Remote Voltage Sense.
2	ADJ/GND	Adjust for **UR533-ADJ**, the output voltage determined by feedback voltage. Ground for fixed output products(**UR533-xx)**
3	V_{OUT}	Output Voltage.
4	V_{CNTL}	Control Voltage.
5	V_{IN}	Input Voltage.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Thermal Resistance Junction-Case	TO-220-5	θ_{JC}	3	°C/W
	TO-252-5		8	
	TO-263-5		4	

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (Ta = 25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	7	V
Control Voltage	V_{CNTL}	13.2	V
Operating Junction Temperature	T_{OPR}	0 ~ +125	℃
Storage Temperature	T_{STG}	-65 ~ +150	℃

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.

■ ELECTRICAL CHARACTERISTICS(T_C= 25℃, V_{OUT} = V_S, V_{ADJ} = 0V unless otherwise specified.)

For UR533-AD(Adjustable)

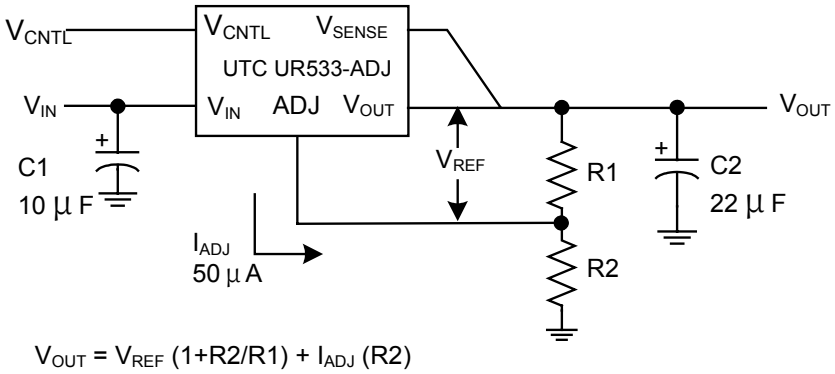
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Reference Voltage	V_{REF}	V_{IN} = 2.0V, V_{CNTL} = 2.75V,I_{OUT} = 10mA	1.243	1.250	1.257	V
		2.05V ≤ V_{IN} ≤ 5.5V,2.7V ≤ V_{CNTL} ≤12V, 10mA ≤ I_{OUT} ≤ 5A	1.237	1.250	1.263	V
Output Voltage	V_{OUT}	3V ≤ V_{IN} ≤ 7V, 10mA ≤ I_{OUT} ≤ 5A	V_{REF}	1.5	5.7	V
Line Regulation	ΔV_{OUT}	1.75V ≤ V_{IN} ≤ 5.5V, 2.5V ≤ V_{CNTL} ≤ 12V, I_{OUT} = 10mA		1	3	mV
Load Regulation	ΔV_{OUT}	V_{IN} = 2.1V, V_{CNTL} = 2.75V, 10mA ≤ I_{OUT} ≤ 5A		1	5	mV
Dropout Voltage	V_{CNTL}–V_{OUT}	V_{IN} = 2.05V, ΔV_{REF} = 1%, I_{OUT} = 5A		1.05	1.18	V
	V_{IN} –V_{OUT}	V_{CNTL} = 2.75V, ΔV_{REF} = 1%,I_{OUT} = 5A		0.4	0.5	V
Current Limit	I_{LIMIT}	V_{IN} = 2.05V, V_{CNTL} = 2.75V	5.2			A
Control Pin Current	I_{CTRL}	V_{IN} = 2.05V, V_{CNTL} = 2.75V,I_{OUT} = 10mA		2	6	mA
Adjust Pin Current	I_{ADJ}	V_{IN} = 2.05V, V_{CNTL} = 2.75V		50	120	μA
Minimum Load Current	I_{LOAD}	V_{IN} = 3.3V, V_{CNTL} = 5V		5.0	10	mA
Ripple Rejection	RR	V_{IN} = 3.75V, V_{CNTL} = 3.75V, f = 120Hz, C_{OUT} = 22μF Tantalum, I_{OUT} = 2.5A		80		dB
Thermal Regulation		T_a = 25°C, 30ms pulse		0.002	0.02	%/W
Thermal Shutdown				150		℃

For UR533-xx(Fixed)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	UR533-15	V_{OUT}	3V ≤ V_{IN} ≤ 7V, 10mA ≤ I_{OUT} ≤ 5A	1.47	1.5	1.53	V
	UR533-25	V_{OUT}	5.1V ≤ V_{IN} ≤ 7V, 10mA ≤ I_{OUT} ≤ 5A	2.474	2.5	2.526	V
Line Regulation		ΔV_{OUT}	1.75V ≤ V_{IN} ≤ 5.5V, 2.5V ≤ V_{CNTL} ≤ 12V, I_{OUT} = 10mA		1	3	mV
Load Regulation		ΔV_{OUT}	V_{IN} = 2.1V, V_{CNTL} = 2.75V, 10mA ≤ I_{OUT} ≤ 5A		1	5	mV
Dropout Voltage		V_{CNTL}–V_{OUT}	V_{IN} = 2.05V, ΔV_{REF} = 1%, I_{OUT} = 5A		1.05	1.18	V
Dropout Voltage		V_{IN} –V_{OUT}	V_{CNTL} = 2.75V, ΔV_{REF} = 1%,I_{OUT} = 5A		0.4	0.5	V
Current Limit		I_{LIMIT}	V_{IN} = 2.05V, V_{CNTL} = 2.75V	5.2			A
Control Pin Current		I_{CTRL}	V_{IN} = 2.05V, V_{CNTL} = 2.75V,I_{OUT} = 10mA		2	6	mA
Minimum Load Current		I_{LOAD}	V_{IN} = 3.3V, V_{CNTL} = 5V		5.0	10	mA
Ripple Rejection		RR	V_{IN} = 3.75V, V_{CNTL} = 3.75V, f = 120Hz, C_{OUT} = 22μF Tantalum, I_{OUT} = 2.5A		80		dB
Thermal Regulation			T_a = 25°C, 30ms pulse		0.002	0.02	%/W
Thermal Shutdown					150		℃

■ TYPICAL APPLICATION CIRCUIT

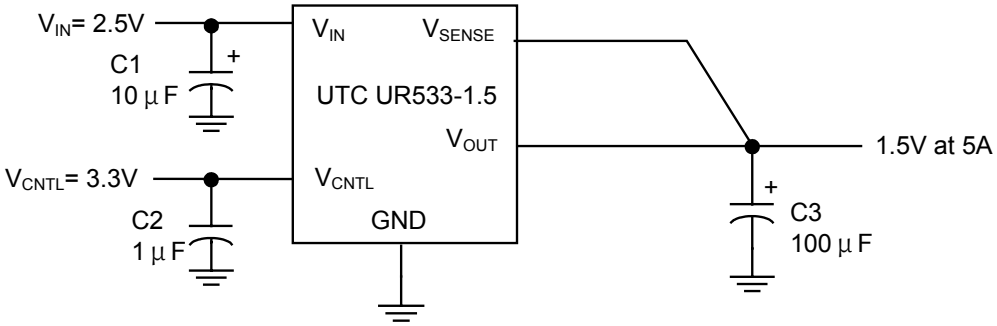
FOR ADJUSTABLE VERSION



$V_{OUT} = V_{REF} (1+R2/R1) + I_{ADJ} (R2)$

Note : C2 is recommended to use 22µF solid tantalum or 100µF aluminum electrolytic for output stability.

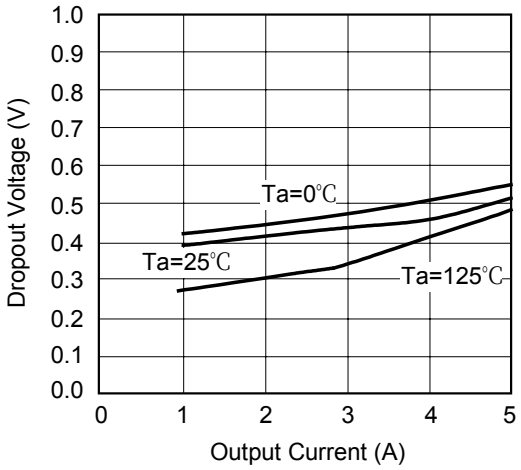
FOR FIXED OUTPUT VERSION



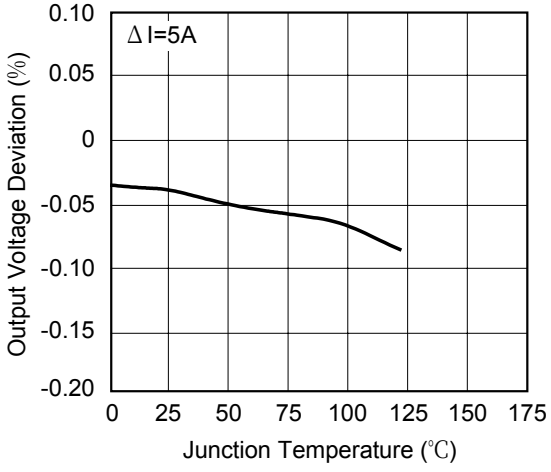
Note : C3 is recommended to use 22µF solid tantalum or 100µF aluminum electrolytic for output stability.

■ TYPICAL PERFOMANCE CHARACTERISTICS

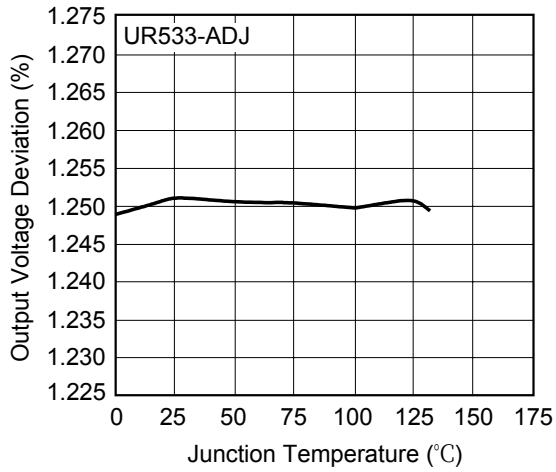
Dropout Voltage vs Output Current



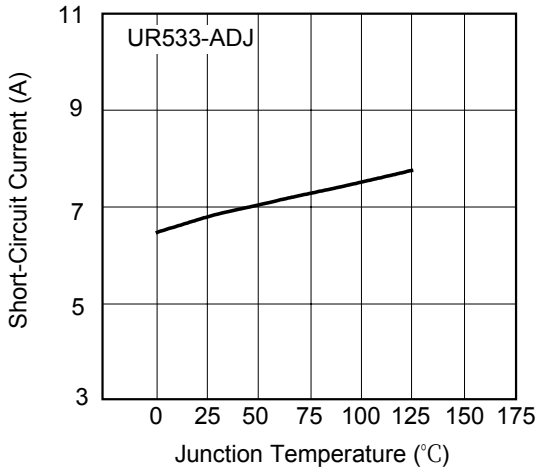
Load Regulation vs Temperature



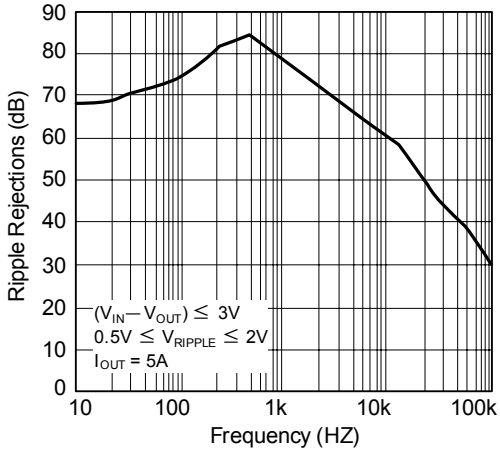
Reference Voltage vs Temperature



Short-Circuit Current vs Temeperature



Ripple Rejection vs Frequency



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