



UR533

LINEAR INTEGRATED CIRCUIT

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

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

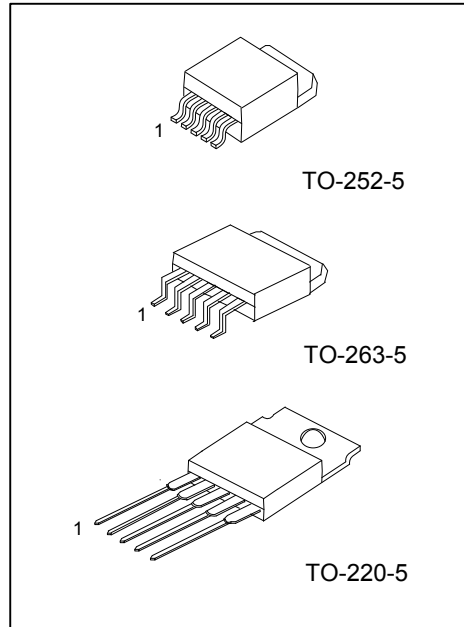
- * Ultra Low dropout voltage
- * Remote sense operation
- * Fast transient response
- * Load regulation: 0.05% typical
- * 0.5% initial accuracy
- * On-chip thermal limiting

ORDERING INFORMATION

Ordering Number			Package	Packing
Normal	Lead Free	Halogen Free		
UR533-xx-TA5-T	UR533L-xx-TA5-T	UR533G-xx-TA5-T	TO-220-5	Tube
UR533-xx-TN5-R	UR533L-xx-TN5-R	UR533G-xx-TN5-R	TO-252-5	Tape Reel
UR533-xx-TQ5-R	UR533L-xx-TQ5-R	UR533G-xx-TQ5-R	TO-263-5	Tape Reel
UR533-xx-TQ5-T	UR533L-xx-TQ5-T	UR533G-xx-TQ5-T	TO-263-5	Tube

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

	<p>(1) R: Tape Reel, T: Tube</p> <p>(2) TA5: TO-220-5, TN5: TO-252-5, TQ5: TO-263-5</p> <p>(3) xx: refer to Marking Information</p> <p>(4) G: Halogen Free, L: Lead Free, Blank: Pb/Sn</p>
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Lead-free: UR533L-xx
Halogen-free: UR533G-xx

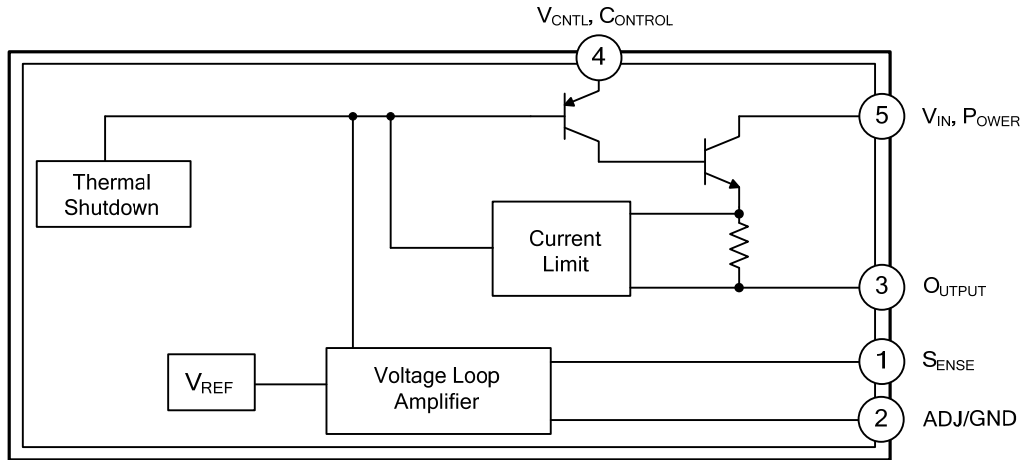
MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
TO-220-5	15 :1.5V	<p> UTC UR533 □ XX □ □ □ □ 1 2 3 4 5 </p> <p> L: Lead Free G: Halogen Free Date Code </p>
TO-252-5	25 :2.5V	
TO-263-5	AD:ADJ	

PIN DESCRIPTIONS

PIN NO.	PIN NAME	DESCRIPTION
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.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V _{IN}	7	V
Control Voltage	V _{CNTL}	13.2	V
Operating Junction Temperature	T _{OPR}	0~+125	°C
Storage Temperature	T _{STG}	-65~+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	TO-220-5	θ _{JC}	3	°C/W
	TO-252-5		8	°C/W
	TO-263-5		4	°C/W

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

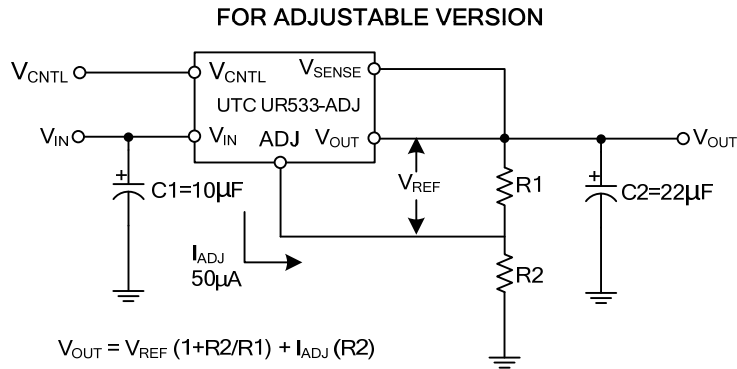
For UR533-AD(Adjustable)

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		°C

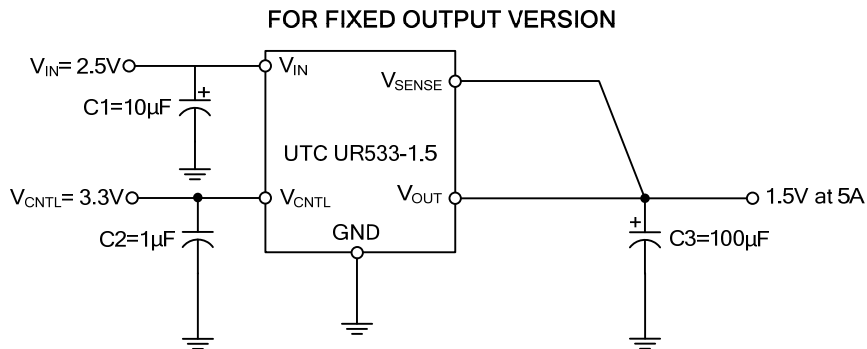
For UR533-xx(Fixed)

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		°C	

■ TYPICAL APPLICATION CIRCUIT

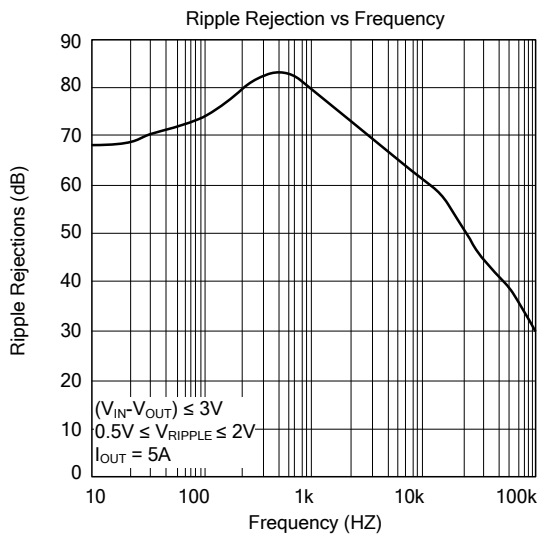
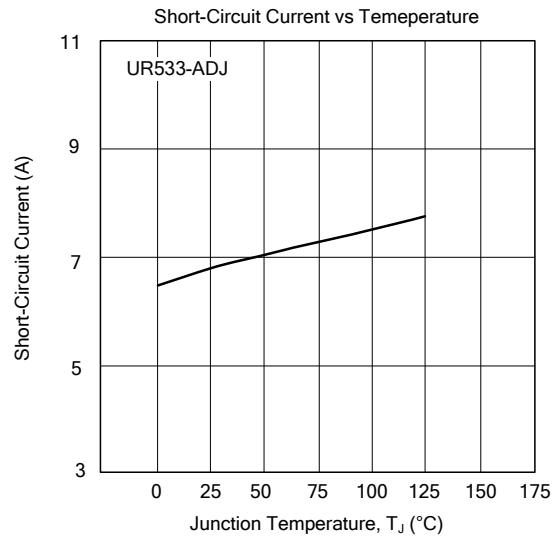
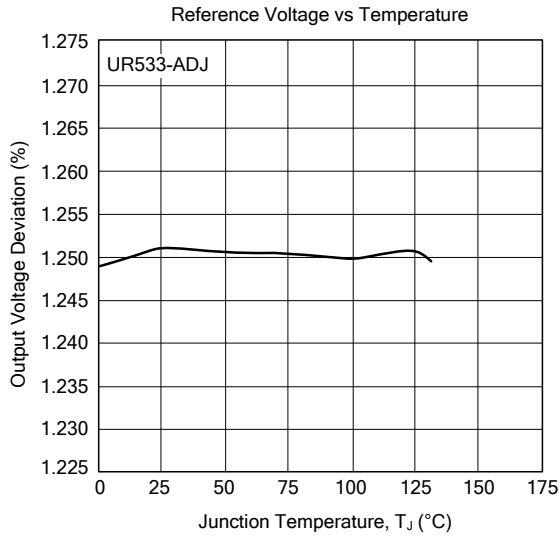
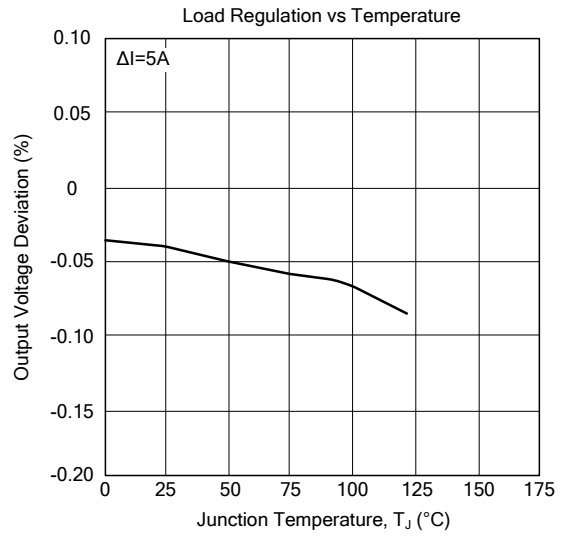
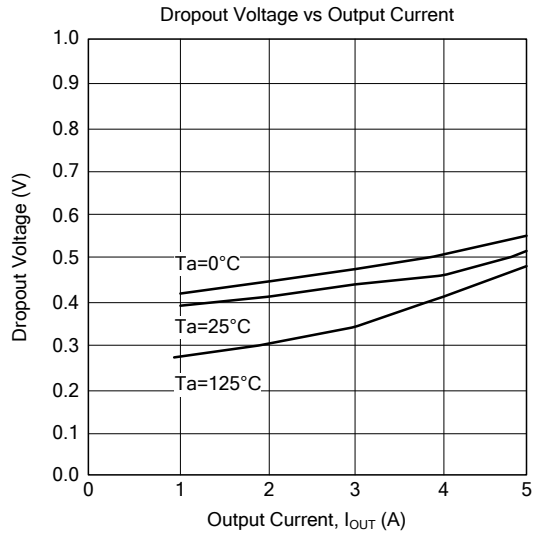


Note: C2 is recommended to use 22µF solid tantalum or 100µF aluminum electrolytic for output stability.



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

■ TYPICAL PERFORMANCE CHARACTERISTICS



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