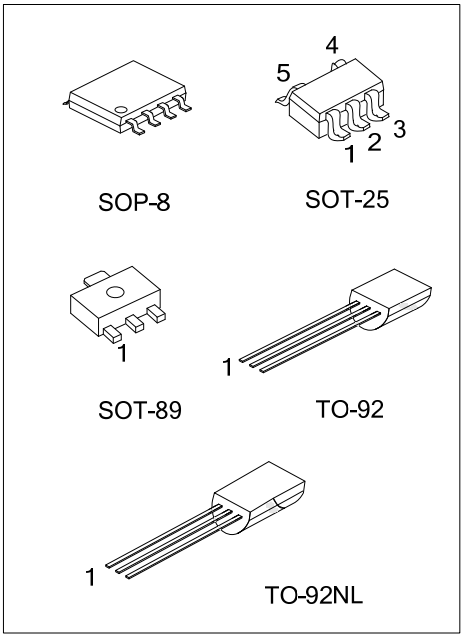
3-TERMINAL 0.1A POSITIVE VOLTAGE REGULATOR



■ DESCRIPTION

The UTC **78LXX** family is monolithic fixed voltage regulator integrated circuit. They are suitable for applications that required supply current up to 100mA.

■ FEATURES

* Output current up to 100mA
* Fixed output voltage of 5V, 6V, 8V, 9V, 10V, 12V, 15V and 18V available
* Thermal overload shutdown protection
* Short circuit current limiting

■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
-	78LXXG-AB3-R	SOT-89	O	G	I	-	-	-	-	-	Tape Reel
-	78LXXG-AB3-C-R	SOT-89	G	I	O	-	-	-	-	-	Tape Reel
-	78LXXG-AF5-R	SOT-25	G	I	O	N	N				Tape Reel
-	78LXXG-S08-R	SOP-8	O	G	G	N	N	G	G	I	Tape Reel
78LXXL-T92-B	78LXXG-T92-B	TO-92	O	G	I	-	-	-	-	-	Tape Box
78LXXL-T92-K	78LXXG-T92-K	TO-92	O	G	I	-	-	-	-	-	Bulk
78LXXL-T9N-B	78LXXG-T9N-B	TO-92NL	O	G	I	-	-	-	-	-	Tape Box
78LXXL-T9N-K	78LXXG-T9N-K	TO-92NL	O	G	I	-	-	-	-	-	Bulk

Note: 1. XX: Output Voltage, refer to Marking Information.
2. Pin Assignment: O: Output G: GND I: Input N: No Connection

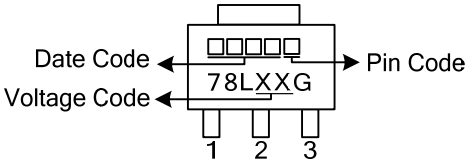
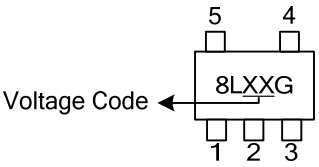
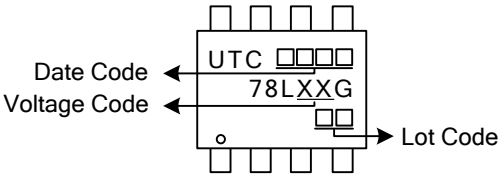
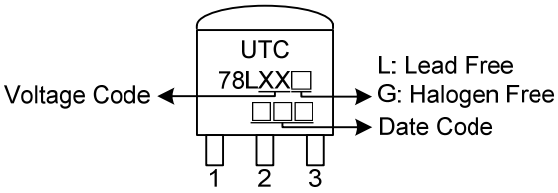
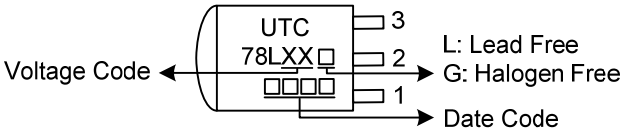
78LXXG-AB3-C-R

(1)Packing Type
(2)Pin Assignment
(3)Package Type
(4)Green Package
(5)Output Voltage Code

(1) B: Tape Box, K: Bulk, R: Tape Reel
(2) refer to Pin Assignment
(3) AB3: SOT-89, AF5: SOT-25, S08: SOP-8, T92: TO-92, T9N: TO-92NL
(4) G: Halogen Free and Lead Free, L: Lead Free
(5) XX: refer to Marking Information

Copyright © 2014 Unisonic Technologies Co., Ltd

■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-89	05:5.0V 06:6.0V 08:8.0V 09:9.0V 10:10V 12:12V 15:15V 18:18V	
SOT-25		
SOP-8		
TO-92		
TO-92NL		

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Input Voltage	V_{OUT}=5~9V	V_{IN}	30	V
	V_{OUT}=10~18V		35	
Output Current		I_{OUT}	100	mA
Power Dissipation	SOT-89	P_D	350	mW
	SOT-25		240	mW
	SOP-8		300	mW
	TO-92/TO-92NL		625	mW
Junction Temperature		T_J	+150	°C
Operating Temperature		T_{OPR}	-40~+85	°C
Storage Temperature		T_{STG}	-55~+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.

■ ELECTRICAL CHARACTERISTICS

For UTC78L05 (V_{IN}=10V, I_{OUT}=40mA, 0°C<T_J<150°C, C1=0.33μF, Co=0.1μF, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	T_J=25°C	4.80	5.0	5.20	V
		7V≤V_{IN}≤20V,I_{OUT}=1mA-40mA	4.75		5.25	V
		7V≤V_{IN}≤V_{MAX},I_{OUT}=1mA-70mA	4.75		5.25	V (note 2)
Load Regulation	ΔV_{OUT}	T_J=25°C,I_{OUT}=1mA-100mA		15	60	mV
		T_J=25°C,I_{OUT}=1mA-40mA		8	30	mV
Line regulation	ΔV_{OUT}	7V≤V_{IN}≤20V,T_J=25°C		8	150	mV
		8V≤V_{IN}≤20V,T_J=25°C		6	100	mV
Quiescent Current	I_Q	V_{IN}=10V,I_{OUT}=0mA,T_J=25°C		2.0	5.5	mA
Quiescent Current Change	ΔI_Q	8V≤V_{IN}≤20V			1.5	mA
		1mA≤V_{IN}≤40mA			0.1	mA
Output Noise Voltage	eN	10Hz≤f≤100kHz		40		μV
Temperature coefficient of V_{OUT}	$\Delta V_O/\Delta_T$	I_{OUT}=5mA		-0.65		mV/°C
Ripple Rejection	RR	8V≤V_{IN}≤20V,f=120Hz,T_J=25°C	41	80		dB
Dropout Voltage	V_D	T_J=25°C		1.7		V

For UTC78L06 (V_{IN}=12V, I_{OUT}=40mA, 0°C<T_J<150°C, C1=0.33μF, Co=0.1μF, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	T_J=25°C	5.76	6.0	6.24	V
		8.5V≤V_{IN}≤20V,I_{OUT}=1mA-40mA	5.70		6.30	V
		8.5V≤V_{IN}≤V_{MAX}, I_{OUT}=1mA-70mA	5.70		6.30	V(note 2)
Load Regulation	ΔV_{OUT}	T_J=25°C,I_{OUT}=1mA-100mA		16	80	mV
		T_J=25°C,I_{OUT}=1mA-40mA		9	40	mV
Line regulation	ΔV_{OUT}	8.5V≤V_{IN}≤20V,T_J=25°C		64	175	mV
		9V≤V_{IN}≤20V,T_J=25°C		54	125	mV
Quiescent Current	I_Q	V_{IN}=12V,I_{OUT}=0mA,T_J=25°C		3.9	6.0	mA
Quiescent Current Change	ΔI_Q	9V≤V_{IN}≤20V			1.5	mA
		1mA≤V_{IN}≤40mA			0.1	mA
Output Noise Voltage	eN	10Hz≤f≤100kHz		49		μV
Temperature coefficient of V_{OUT}	$\Delta V_O/\Delta_T$	I_{OUT}=5mA		-0.75		mV/°C
Ripple Rejection	RR	10V≤V_{IN}≤20V,f=120Hz, T_J=25°C	40	46		dB
Dropout Voltage	V_D	T_J=25°C		1.7		V

■ ELECTRICAL CHARACTERISTICS (Cont.)

For UTC78L08 (V_{IN}=14V, I_{OUT}=40mA, 0°C<T_J<150°C, C1=0.33μF, Co=0.1μF, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	T_J=25°C	7.68	8.0	8.32	V
		10.5V≤V_{IN}≤23V,I_{OUT}=1mA-40mA	7.60		8.40	V
		10.5V≤V_{IN}≤V_{MAX}, I_{OUT}=1mA-70mA	7.60		8.40	V(note 2)
Load Regulation	ΔV_{OUT}	T_J=25°C,I_{OUT}=1mA-100mA		18	80	mV
		T_J=25°C,I_{OUT}=1mA-40mA		10	40	mV
Line regulation	ΔV_{OUT}	10.5V≤V_{IN}≤23V,T_J=25°C		10	175	mV
		11V≤V_{IN}≤23V,T_J=25°C		8	125	mV
Quiescent Current	I_Q	V_{IN}=14V,I_{OUT}=0mA,T_J=25°C		2.0	5.5	mA
Quiescent Current Change	ΔI_Q	11V≤V_{IN}≤23V			1.5	mA
		1mA≤V_{IN}≤40mA			0.1	mA
Output Noise Voltage	eN	10Hz≤f≤100kHz		49		μV
Temperature coefficient of V_o	$\Delta V_O/\Delta_T$	I_{OUT}=5mA		-0.75		mV/°C
Ripple Rejection	RR	11V≤V_{IN}≤23V,f=120Hz,T_J=25°C	39	70		dB
Dropout Voltage	V_D	T_J=25°C		1.7		V

For UTC78L09 (V_{IN}=15V, I_{OUT}=40mA, 0°C<T_J<150°C, C1=0.33μF, Co=0.1μF, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	T_J=25°C	8.64	9.0	9.36	V
		11.5V≤V_{IN}≤24V,I_{OUT}=1mA-40mA	8.55		9.45	V
		11.5V≤V_{IN}≤V_{MAX}, I_{OUT}=1mA-70mA	8.55		9.45	V(note 2)
Load Regulation	ΔV_{OUT}	T_J=25°C,I_{OUT}=1mA-100mA		19	90	mV
		T_J=25°C,I_{OUT}=1mA-40mA		11	40	mV
Line regulation	ΔV_{OUT}	11.5V≤V_{IN}≤24V,T_J=25°C		90	200	mV
		13V≤V_{IN}≤24V,T_J=25°C		100	150	mV
Quiescent Current	I_Q	V_{IN}=15V,I_{OUT}=0mA,T_J=25°C		2.0	6.0	mA
Quiescent Current Change	ΔI_Q	13V≤V_{IN}≤24V			1.5	mA
		1mA≤V_{IN}≤40mA			0.1	mA
Output Noise Voltage	eN	10Hz≤f≤100kHz		70		μV
Temperature coefficient of V_{OUT}	$\Delta V_O/\Delta_T$	I_{OUT}=5mA		-0.75		mV/°C
Ripple Rejection	RR	12V≤V_{IN}≤24V,f=120Hz,T_J=25°C	38	44		dB
Dropout Voltage	V_D	T_J=25°C		1.7		V

For UTC78L10 (V_{IN}=16V, I_{OUT}=40mA, 0°C<T_J<150°C, C1=0.33μF, Co=0.1μF, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	T_J=25°C	9.6	10.0	10.4	V
		12.5V≤V_{IN}≤25V,I_{OUT}=1mA-40mA	9.5		10.5	V
		12.5V≤V_{IN}≤V_{MAX}, I_{OUT}=1mA-70mA	9.5		10.5	V(note 2)
Load Regulation	ΔV_{OUT}	T_J=25°C, I_{OUT}=1mA-100mA		20	90	mV
		T_J=25°C, I_{OUT}=1mA-40mA		11	40	mV
Line regulation	ΔV_{OUT}	12.5V≤V_{IN}≤25V,T_J=25°C		100	200	mV
		14V≤V_{IN}≤25V,T_J=25°C		100	170	mV
Quiescent Current	I_Q	V_{IN}=17V,I_{OUT}=0mA,T_J=25°C		2.0	6.0	mA
Quiescent Current Change	ΔI_Q	12.5V≤V_{IN}≤25V			1.5	mA
		1mA≤V_{IN}≤40mA			0.1	mA
Output Noise Voltage	eN	10Hz≤f≤100kHz		74		μV
Temperature coefficient of V_{OUT}	$\Delta V_O/\Delta_T$	I_{OUT}=5mA		-0.8		mV/°C
Ripple Rejection	RR	15V≤V_{IN}≤25V,f=120Hz,T_J=25°C	38	43		dB
Dropout Voltage	V_D	T_J=25°C		1.7		V

■ ELECTRICAL CHARACTERISTICS (Cont.)

For UTC78L12 (V_{IN}=19V, I_{OUT}=40mA, 0°C<T_J<150°C, C1=0.33μF, Co=0.1μF, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	T_J=25°C	11.52	12.0	12.48	V
		14.5V≤V_{IN}≤27V,I_{OUT}=1mA-40mA	11.40		12.60	V
		14.5V≤V_{IN}≤V_{MAX}, I_{OUT}=1mA-70mA	11.40		12.60	V(note 2)
Load Regulation	ΔV_{OUT}	T_J=25°C, I_{OUT}=1mA-100mA		22	100	mV
		T_J=25°C, I_{OUT}=1mA-40mA		13	50	mV
Line regulation	ΔV_{OUT}	14.5V≤V_{IN}≤27V,T_J=25°C		25	300	mV
		16V≤V_{IN}≤27V,T_J=25°C		20	250	mV
Quiescent Current	I_Q	V_{IN}=19V,I_{OUT}=0mA,T_J=25°C		2.0	6.0	mA
Quiescent Current Change	ΔI_Q	16V≤V_{IN}≤27V			1.5	mA
		1mA≤V_{IN}≤40mA			0.1	mA
Output Noise Voltage	eN	10Hz≤f≤100kHz		80		μV
Temperature coefficient of V_{OUT}	$\Delta V_O/\Delta T$	I_{OUT}=5mA		-1.0		mV/°C
Ripple Rejection	RR	15V≤V_{IN}≤25V,f=120Hz,T_J=25°C	37	65		dB
Dropout Voltage	V_D	T_J=25°C		1.7		V

For UTC78L15 (V_{IN}=23V, I_{OUT}=40mA, 0°C<T_J<150°C, C1=0.33μF, Co=0.1μF, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	T_J=25°C	14.40	15.0	15.60	V
		17.5V≤V_{IN}≤30V,I_{OUT}=1mA-40mA	14.25		15.75	V
		17.5V≤V_{IN}≤V_{MAX}, I_{OUT}=1mA-70mA	14.25		15.75	V(note 2)
Load Regulation	ΔV_{OUT}	T_J=25°C, I_{OUT}=1mA-100mA		25	150	mV
		T_J=25°C, I_{OUT}=1mA-40mA		15	75	mV
Line Regulation	ΔV_{OUT}	17.5V≤V_{IN}≤30V,T_J=25°C		25	150	mV
		20V≤V_{IN}≤30V,T_J=25°C		15	75	mV
Quiescent Current	I_Q	V_{IN}=23V,I_{OUT}=0mA,T_J=25°C		2.2	6.5	mA
Quiescent Current Change	ΔI_Q	20V≤V_{IN}≤30V			1.5	mA
		1mA≤V_{IN}≤40mA			0.1	mA
Output Noise Voltage	eN	10Hz≤f≤100kHz		90		μV
Temperature Coefficient of V_{OUT}	$\Delta V_O/\Delta T$	I_{OUT}=5mA		-1.3		mV/°C
Ripple Rejection	RR	18.5V≤V_{IN}≤28.5V,f=120Hz, T_J=25°C	34	63		dB
Dropout Voltage	V_D	T_J=25°C		1.7		V

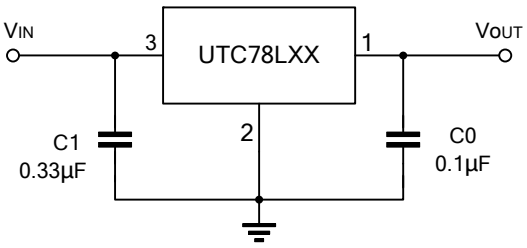
For UTC78L18 (V_{IN}=27V, I_{OUT}=40mA, 0°C<T_J<150°C, C1=0.33μF, Co=0.1μF, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	T_J=25°C	17.64	18.0	18.36	V
		21V≤V_{IN}≤33V,I_{OUT}=1mA-40mA	17.46		18.54	V
		21V≤V_{IN}≤V_{MAX},I_{OUT}=1mA-70mA	17.46		18.54	V(note 2)
Load Regulation	ΔV_{OUT}	T_J=25°C, I_{OUT}=1mA-100mA		27	180	mV
		T_J=25°C, I_{OUT}=1mA-40mA		19	90	mV
Line Regulation	ΔV_{OUT}	21V≤V_{IN}≤33V,T_J=25°C		145	300	mV
		22V≤V_{IN}≤33V,T_J=25°C		135	250	mV
Quiescent Current	I_Q	V_{IN}=27V,I_{OUT}=0mA,T_J=25°C		2.0	6.0	mA
Quiescent Current Change	ΔI_Q	21V≤V_{IN}≤33V			1.5	mA
		1mA≤V_{IN}≤40mA			0.1	mA
Output Noise Voltage	eN	10Hz≤f≤100kHz		150		μV
Temperature Coefficient of V_{OUT}	$\Delta V_O/\Delta T$	I_{OUT}=5mA		-1.8		mV/°C
Ripple Rejection	RR	23V≤V_{IN}≤33V,f=120Hz,T_J=25°C	34	48		dB
Dropout Voltage	V_D	T_J=25°C		1.7		V

Note 1. The Maximum steady state usable output current is dependent on input voltage, heat sinking, lead length of the package and copper pattern of PCB.

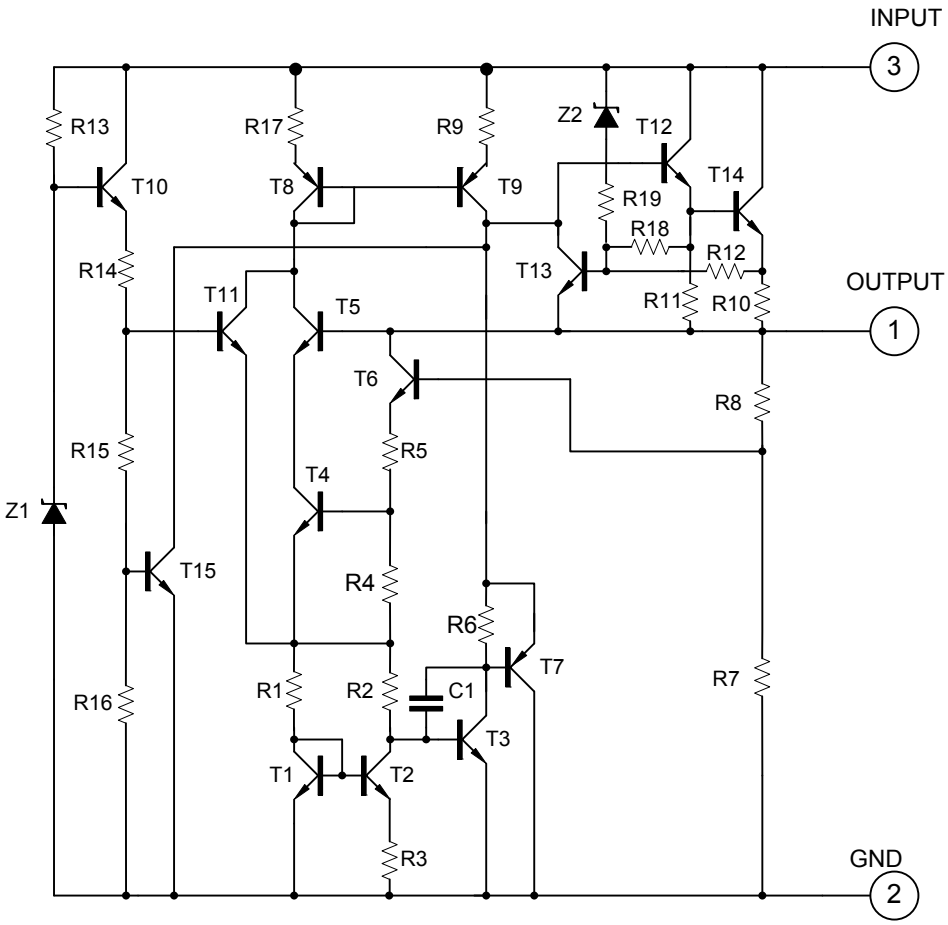
2. Power dissipation<0.5W

■ APPLICATION CIRCUIT



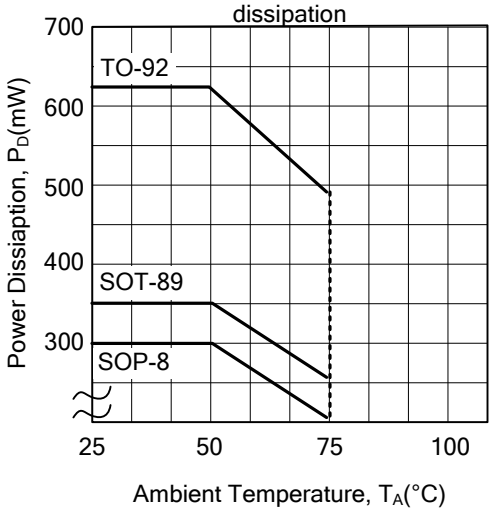
Notes: 1. To specify an output voltage, substitute voltage value for "XX".
2. Bypass capacitors are recommended for optimum stability and transient response and should be located as close as possible to the regulators.

■ TEST CIRCUIT

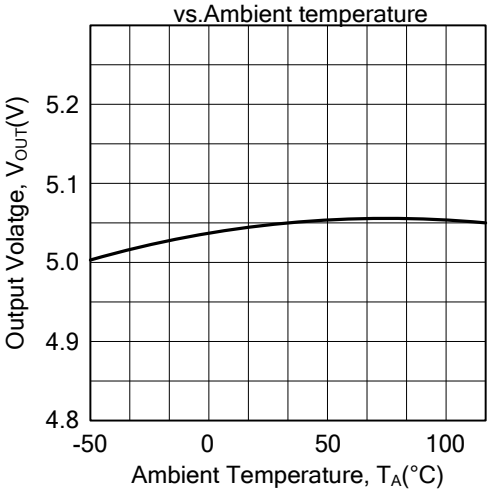


■ TYPICAL CHARACTERISTICS

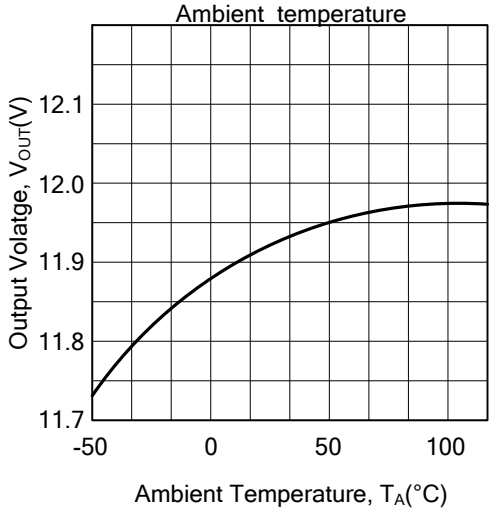
Ambient temperature vs. Power dissipation



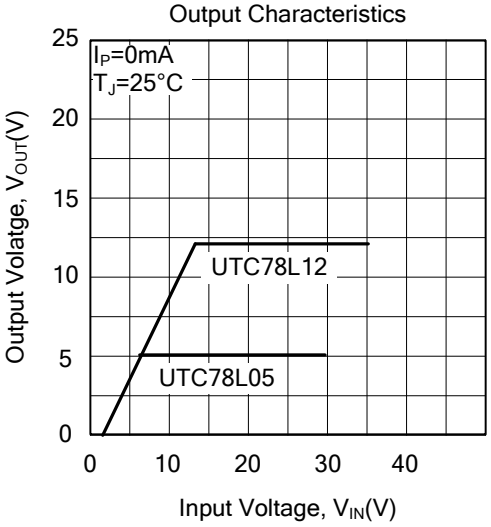
UTC78L05 Output Voltage vs.Ambient temperature



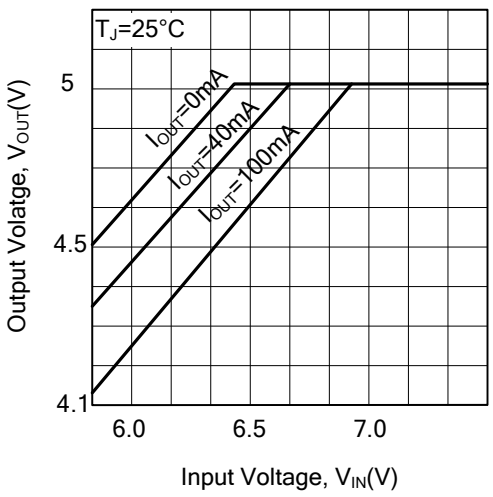
UTC78L12 Output Voltage vs. Ambient temperature



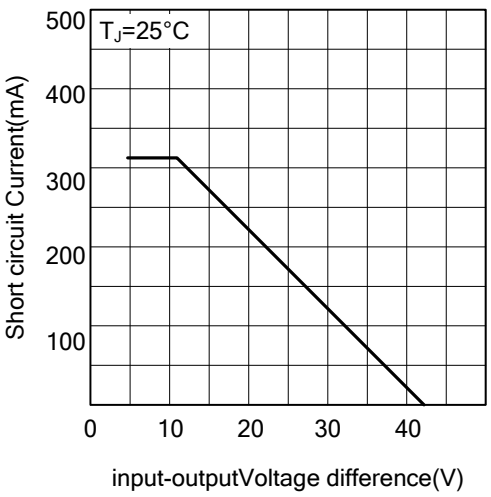
Output Characteristics



UTC78L05 Dropout Characteristics

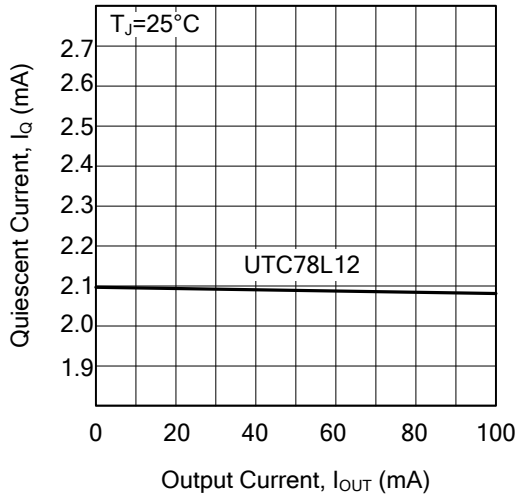


Short Circuit output current

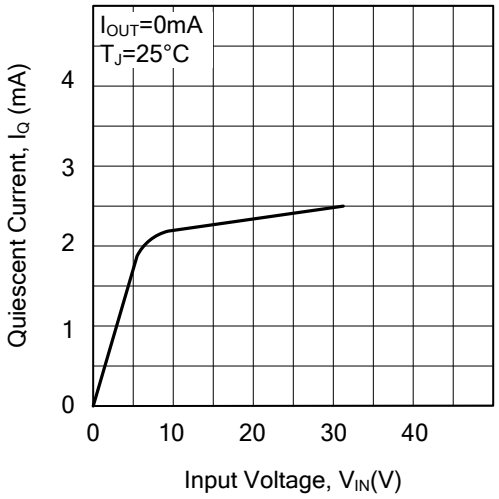


■ TYPICAL CHARACTERISTICS(Cont.)

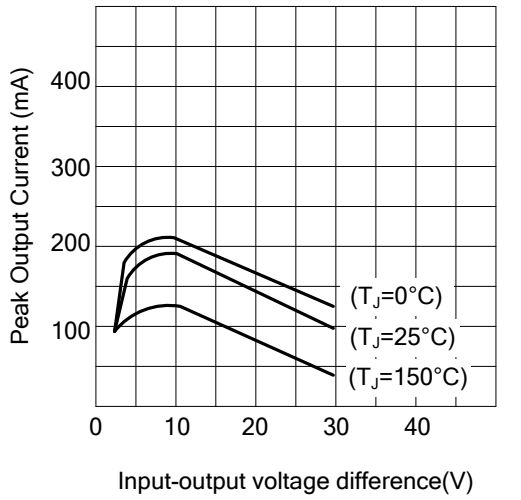
UTC78L12 Quiescent Current vs. Output Current



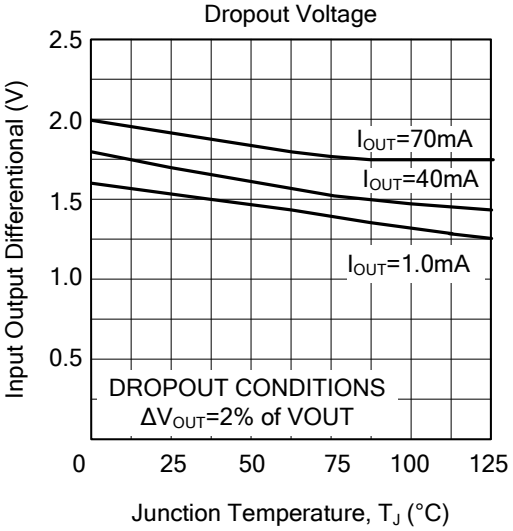
UTC78L05 Quiescent Current vs. Input Voltage



Peak Output Current vs. Dropout Voltage Difference



Dropout Voltage



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.