



## 78NXX

## LINEAR INTEGRATED CIRCUIT

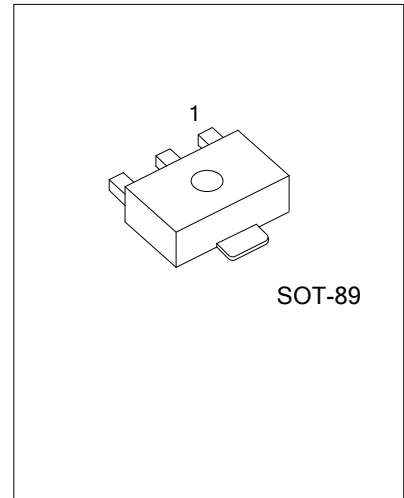
### 3-TERMINAL 300mA POSITIVE VOLTAGE REGULATOR

#### DESCRIPTION

The UTC **78NXX** family is monolithic fixed voltage regulator integrated circuit. They are suitable for applications requiring supply current up to 300mA.

#### FEATURES

- \* Output Current up to 300mA
- \* Fixed Output Voltage of 5V, 6V, 8V
- \* Thermal Overload Shutdown Protection
- \* Short Circuit Current Limiting



#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
78NXXL-AB3-R	78NXXG-AB3-R	SOT-89	O	G	I	Tape Reel

Note: 1. xx: Output Voltage, refer to Marking Information

<p>78NXXG-xx-AB3-R</p>	<p>(1) R: Tape Reel,  (2) AB3: SOT-89  (3) xx: Refer to Marking Information  (4) G: Halogen Free, L: Lead Free</p>
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#### MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-89	05:5.0V 06:6.0V 08:8.0V	

### ■ ABSOLUTE MAXIMUM RATING

(Operating temperature range applies unless otherwise specified.) (Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	$V_{IN}$	30	V
Output Current	$I_{OUT}$	300	mA
Power Dissipation	$P_D$	500	mW
Operating Temperature (Note 2)	$T_{OPR}$	-40~+150	°C
Storage Temperature	$T_{STG}$	-55~+150	°C

Note: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

1. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. It is guarantee by design, not 100% be tested.

### ■ ELECTRICAL CHARACTERISTICS

(0°C< $T_J$ <125°C,  $C_1=0.33\mu F$ ,  $C_o=0.1\mu F$ , unless otherwise specified) (Note 1)

For UTC78N05 ( $V_{IN}=10V$ ,  $I_{OUT}=40mA$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$T_J=25^\circ C$	4.80	5.0	5.20	V
		$7V \leq V_{IN} \leq V_{MAX}$ $I_{OUT}=1mA-300mA$	4.75		5.25	V (Note 2)
Load Regulation	$\Delta V_{OUT}$	$T_J=25^\circ C, I_{OUT}=1mA - 300mA$		11	60	mV
		$T_J=25^\circ C, I_{OUT}=1mA - 40mA$		5.0	30	mV
Line Regulation	$\Delta V_{OUT}$	$7V \leq V_{IN} \leq 20V, T_J=25^\circ C$		8	150	mV
		$8V \leq V_{IN} \leq 20V, T_J=25^\circ C$		6	100	mV
Quiescent Current	$I_Q$			2.0	5.5	mA
Quiescent Current Change	$\Delta I_Q$	$8V \leq V_{IN} \leq 20V$			1.5	mA
		$1mA \leq V_{IN} \leq 40mA$			0.1	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		40		$\mu V$
Temperature Coefficient of $V_{OUT}$	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		-0.65		$mV/^\circ C$
Ripple Rejection	RR	$8V \leq V_{IN} \leq 20V, f=120Hz, T_J=25^\circ C$	41	80		dB
Dropout Voltage	$V_D$	$T_J=25^\circ C$		1.7		V

For UTC78N06 ( $V_{IN}=12V$ ,  $I_{OUT}=40mA$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$T_J=25^\circ C$	5.76	6.0	6.24	V
		$8.5V \leq V_{IN} \leq V_{MAX}$ , $I_{OUT}=1mA - 300mA$	5.7		6.3	V (note 2)
Load Regulation	$\Delta V_{OUT}$	$T_J=25^\circ C, I_{OUT}=1mA - 300mA$		12.8	80	mV
		$T_J=25^\circ C, I_{OUT}=1mA - 40mA$		5.8	40	mV
Line Regulation	$\Delta V_{OUT}$	$8.5V \leq V_{IN} \leq 20V, T_J=25^\circ C$		64	175	mV
		$9V \leq V_{IN} \leq 20V, T_J=25^\circ C$		54	125	mV
Quiescent Current	$I_Q$			2.0	5.5	mA
Quiescent Current Change	$\Delta I_Q$	$9V \leq V_{IN} \leq 20V$			1.5	mA
		$1mA \leq V_{IN} \leq 40mA$			0.1	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		49		$\mu V$
Temperature Coefficient of $V_{OUT}$	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		0.75		$mV/^\circ C$
Ripple Rejection	RR	$10V \leq V_{IN} \leq 20V, f=120Hz, T_J=25^\circ C$	40	46		dB
Dropout Voltage	$V_D$	$T_J=25^\circ C$		1.7		V

■ ELECTRICAL CHARACTERISTICS (Cont.)

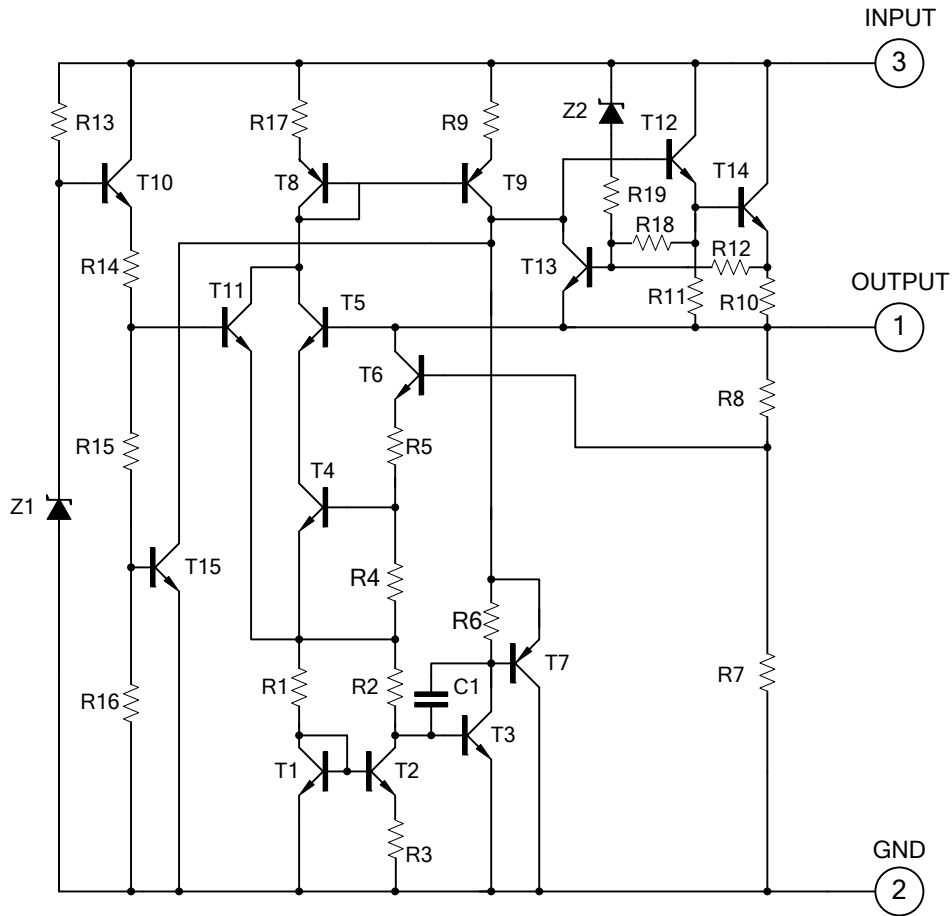
For UTC78N08 ( $V_{IN}=14V, I_{OUT}=40mA$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$T_J=25^{\circ}C$	7.68	8.0	8.32	V
		$10.5V \leq V_{IN} \leq V_{MAX},$ $I_{OUT}=1mA - 300mA$	7.60		8.40	V (note 2)
Load Regulation	$\Delta V_{OUT}$	$T_J=25^{\circ}C, I_{OUT}=1mA - 300mA$		15	80	mV
		$T_J=25^{\circ}C, I_{OUT}=1mA - 40mA$		8.0	40	mV
Line Regulation	$\Delta V_{OUT}$	$10.5V \leq V_{IN} \leq 23V, T_J=25^{\circ}C$		10	175	mV
		$11V \leq V_{IN} \leq 23V, T_J=25^{\circ}C$		8	125	mV
Quiescent Current	$I_Q$			2.0	5.5	mA
Quiescent Current Change	$\Delta I_Q$	$11V \leq V_{IN} \leq 23V$			1.5	mA
		$1mA \leq V_{IN} \leq 40mA$			0.1	mA
Output Noise Voltage	eN	$10Hz \leq f \leq 100kHz$		49		$\mu V$
Temperature Coefficient of $V_{OUT}$	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		0.75		$mV/^{\circ}C$
Ripple Rejection	RR	$11V \leq V_{IN} \leq 23V, f=120Hz, T_J=25^{\circ}C$	39	70		dB
Dropout Voltage	$V_D$	$T_J=25^{\circ}C$		1.7		V

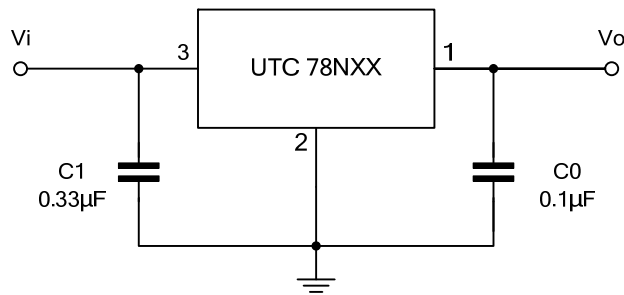
Notes: 1. The Maximum steady state usable output current are dependent on input voltage, heat sinking, lead length of the package and copper pattern of PCB. The data above represent pulse test conditions with junction temperatures specified at the initiation of test.

2. Power dissipation < 0.5W

■ BLOCK CIRCUIT



■ TYPICAL APPLICATION CIRCUIT



Note 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.

## TYPICAL CHARACTERISTICS

Fig.1 Ambient Temperature vs. Power Dissipation

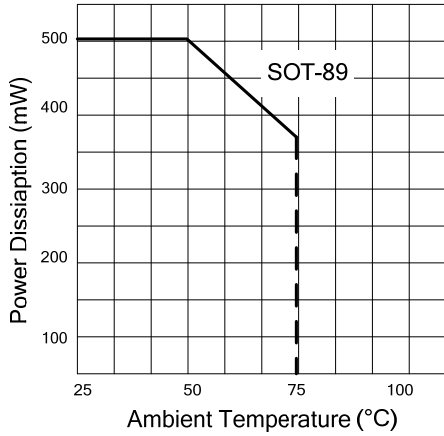


Fig.2 UTC 78N05 Output Voltage vs. Ambient Temperature

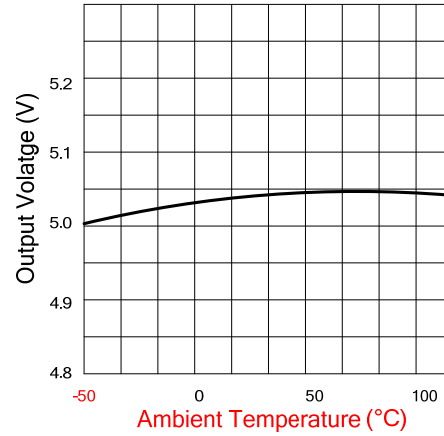


Fig.3 UTC 78N08 Output Voltage vs. Ambient Temperature

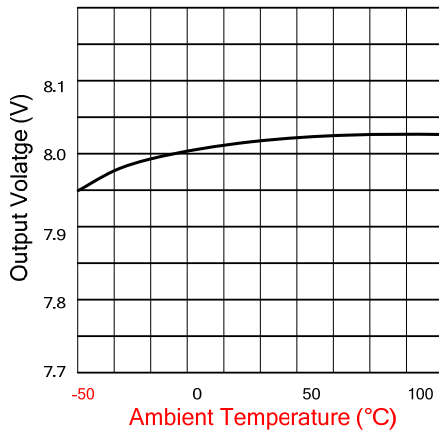


Fig.4 Output Characteristics (I<sub>OUT</sub>=0mA, T<sub>J</sub>=25°C)

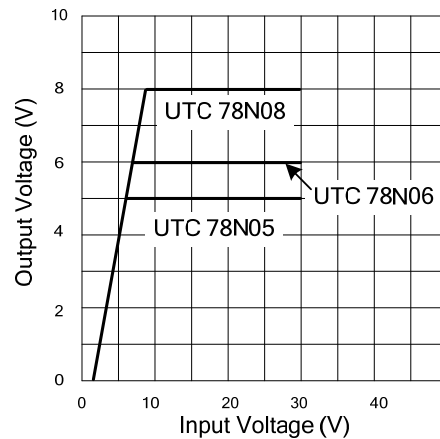


Fig.5 UTC 78N05 Dropout Characteristics (T<sub>J</sub>=25°C)

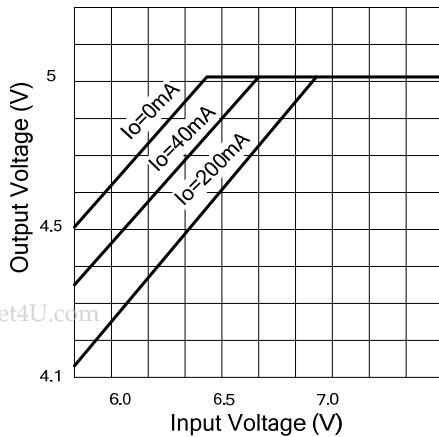
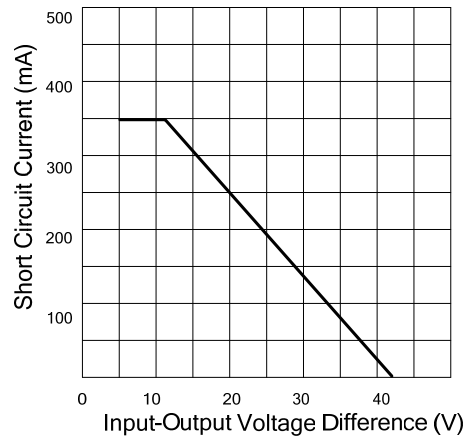


Fig.6 Short Circuit Output Current (T<sub>J</sub>=25°C)



■ TYPICAL CHARACTERISTICS(Cont.)

Fig.7 UTC 78N05 Quiescent Current vs. Input Voltage ( $I_{OUT}=0mA, T_J=25^{\circ}C$ )

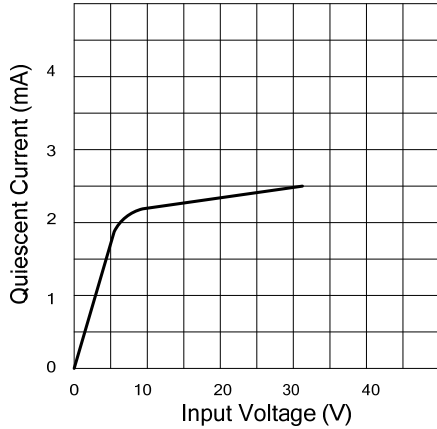
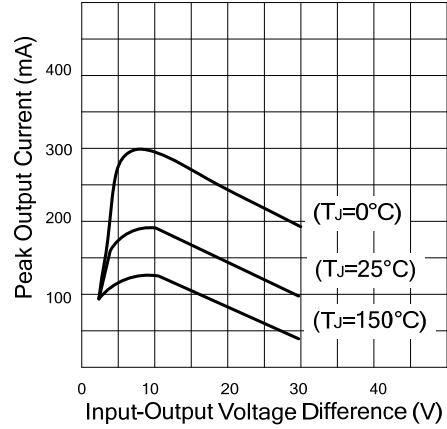


Fig.8 Peak Output Current vs Dropout Voltage Difference



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