

# μA7800 SERIES

## 3-TERMINAL POSITIVE VOLTAGE REGULATORS

### FAIRCHILD LINEAR INTEGRATED CIRCUITS

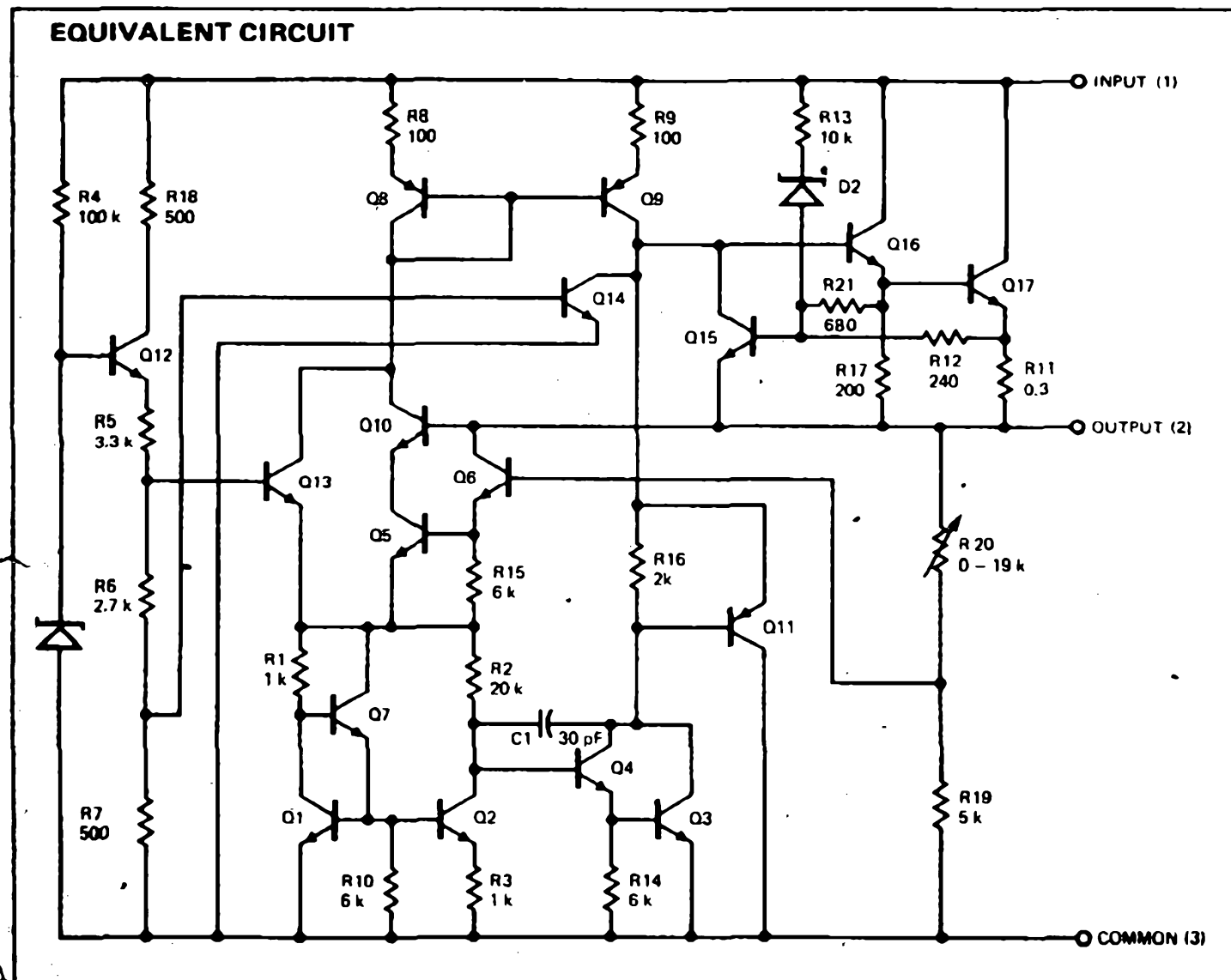
**GENERAL DESCRIPTION** — The μA7800 series of monolithic 3-Terminal Positive Voltage Regulators is constructed using the Fairchild Planar\* epitaxial process. These regulators employ internal current limiting, thermal shutdown and safe area compensation, making them essentially indestructible. If adequate heat sinking is provided, they can deliver over 1 A output current. They are intended as fixed voltage regulators in a wide range of applications including local (on card) regulation for elimination of distribution problems associated with single point regulation. In addition to use as fixed voltage regulators, these devices can be used with external components to obtain adjustable output voltages and currents.

- **OUTPUT CURRENT IN EXCESS OF 1 A**
- **NO EXTERNAL COMPONENTS**
- **INTERNAL THERMAL OVERLOAD PROTECTION**
- **INTERNAL SHORT CIRCUIT CURRENT LIMITING**
- **OUTPUT TRANSISTOR SAFE AREA COMPENSATION**
- **AVAILABLE IN THE TO-220 AND THE TO-3 PACKAGE**
- **OUTPUT VOLTAGES OF 5, 6, 8, 8.5, 12, 15, 18, AND 24 V**

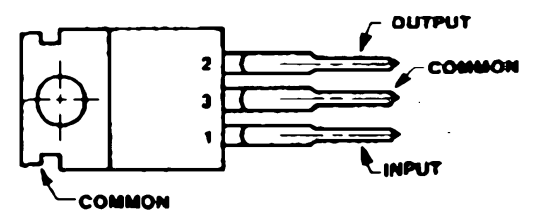
#### ABSOLUTE MAXIMUM RATINGS

Input Voltage (5 V through 18 V)	35 V
(24 V)	40 V
Internal Power Dissipation	Internally Limited
Storage Temperature Range	-65°C to +150°C
Operating Junction Temperature Range	-55°C to +150°C
	0°C to +150°C
Lead Temperature (Soldering, 60 s time limit) TO-3 Package	300°C
(Soldering, 10 s time limit) TO-220 Package	230°C

#### EQUIVALENT CIRCUIT



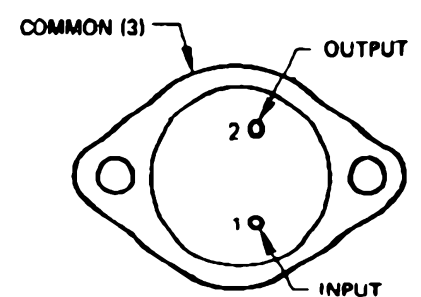
#### CONNECTION DIAGRAMS TO-220 PACKAGE (SIDE VIEW)



#### ORDER INFORMATION

OUTPUT VOLTAGE	TYPE	PART NO.
5 V	μA7805C	μA7805UC
6 V	μA7806C	μA7806UC
8 V	μA7808C	μA7808UC
8.5 V	μA7885C	μA7885UC
12 V	μA7812C	μA7812UC
15 V	μA7815C	μA7815UC
18 V	μA7818C	μA7818UC
24 V	μA7824C	μA7824UC

#### TO-3 PACKAGE (TOP VIEW)



#### ORDER INFORMATION

OUTPUT VOLTAGE	TYPE	PART NO.
5 V	μA7805	μA7805KM
6 V	μA7806	μA7806KM
8 V	μA7808	μA7808KM
8.5 V	μA7885	μA7885KM
12 V	μA7812	μA7812KM
15 V	μA7815	μA7815KM
18 V	μA7818	μA7818KM
24 V	μA7824	μA7824KM
5 V	μA7805C	μA7805KC
6 V	μA7806C	μA7806KC
8 V	μA7808C	μA7808KC
8.5 V	μA7885C	μA7885KC
12 V	μA7812C	μA7812KC
15 V	μA7815C	μA7815KC
18 V	μA7818C	μA7818KC
24 V	μA7824C	μA7824KC

\*Planar is a patented Fairchild process.

## FAIRCHILD • $\mu$ A7800 SERIES

### $\mu$ A7815

**ELECTRICAL CHARACTERISTICS:**  $V_{IN} = 23 \text{ V}$ ,  $I_{OUT} = 500 \text{ mA}$ ,  $-55^\circ\text{C} \leq T_J \leq 150^\circ\text{C}$ ,  $C_{IN} = 0.33 \mu\text{F}$ ,  $C_{OUT} = 0.1 \mu\text{F}$ ,  
unless otherwise specified.

CHARACTERISTICS	CONDITIONS (Note 1)		MIN	TYP	MAX	UNITS
Output Voltage	$T_J = 25^\circ\text{C}$		14.4	15.0	15.6	V
Line Regulation	$T_J = 25^\circ\text{C}$	$17.5 \text{ V} < V_{IN} < 30 \text{ V}$		11	150	mV
		$20 \text{ V} < V_{IN} < 26 \text{ V}$		3	75	mV
Load Regulation	$T_J = 25^\circ\text{C}$	$5 \text{ mA} < I_{OUT} < 1.5 \text{ A}$		12	150	mV
		$250 \text{ mA} < I_{OUT} < 750 \text{ mA}$		4	75	mV
Output Voltage	$18.5 \text{ V} < V_{IN} < 30 \text{ V}$ $5 \text{ mA} < I_{OUT} < 1.0 \text{ A}$ $P < 15 \text{ W}$		14.25		15.75	V
Quiescent Current	$T_J = 25^\circ\text{C}$			4.4	6.0	mA
Quiescent Current Change	with line	$18.5 \text{ V} < V_{IN} < 30 \text{ V}$			0.8	mA
	with load	$5 \text{ mA} < I_{OUT} < 1.0 \text{ A}$			0.5	mA
Output Noise Voltage	$T_A = 25^\circ\text{C}$ , $10 \text{ Hz} < f < 100 \text{ kHz}$			8	40	$\mu\text{V}/V_{OUT}$
Ripple Rejection	$f = 120 \text{ Hz}$ , $18.5 \text{ V} < V_{IN} < 28.5 \text{ V}$		60	70		dB
Dropout Voltage	$I_{OUT} = 1.0 \text{ A}$ , $T_J = 25^\circ\text{C}$			2.0	2.5	V
Output Resistance	$f = 1 \text{ kHz}$			19		$\text{m}\Omega$
Short Circuit Current	$T_J = 25^\circ\text{C}$ , $V_{IN} = 35 \text{ V}$			0.75		A
Peak Output Current	$T_J = 25^\circ\text{C}$		1.3	2.2	3.3	A
Average Temperature Coefficient of Output Voltage	$I_{OUT} = 5 \text{ mA}$	$-55^\circ\text{C} \leq T_J \leq +25^\circ\text{C}$			0.4	$\text{mV}/^\circ\text{C}/V_{OUT}$
		$+25^\circ\text{C} \leq T_J \leq +150^\circ\text{C}$			0.3	$V_{OUT}$

### $\mu$ A7815C

**ELECTRICAL CHARACTERISTICS:**  $V_{IN} = 23 \text{ V}$ ,  $I_{OUT} = 500 \text{ mA}$ ,  $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$ ,  $C_{IN} = 0.33 \mu\text{F}$ ,  $C_{OUT} = 0.1 \mu\text{F}$ ,  
unless otherwise specified.

CHARACTERISTICS	CONDITIONS (Note 1)		MIN	TYP	MAX	UNITS
Output Voltage	$T_J = 25^\circ\text{C}$		14.4	15.0	15.6	V
Line Regulation	$T_J = 25^\circ\text{C}$	$17.5 \text{ V} < V_{IN} < 30 \text{ V}$		11	300	mV
		$20 \text{ V} < V_{IN} < 26 \text{ V}$		3	150	mV
Load Regulation	$T_J = 25^\circ\text{C}$	$5 \text{ mA} < I_{OUT} < 1.5 \text{ A}$		12	300	mV
		$250 \text{ mA} < I_{OUT} < 750 \text{ mA}$		4	150	mV
Output Voltage	$17.5 \text{ V} < V_{IN} < 30 \text{ V}$ $5 \text{ mA} < I_{OUT} < 1.0 \text{ A}$ $P < 15 \text{ W}$		14.25		15.75	V
Quiescent Current	$T_J = 25^\circ\text{C}$			4.4	8.0	mA
Quiescent Current Change	with line	$17.5 \text{ V} < V_{IN} < 30 \text{ V}$			1.0	mA
	with load	$5 \text{ mA} < I_{OUT} < 1.0 \text{ A}$			0.5	mA
Output Noise Voltage	$T_A = 25^\circ\text{C}$ , $10 \text{ Hz} < f < 100 \text{ kHz}$			90		$\mu\text{V}$
Ripple Rejection	$f = 120 \text{ Hz}$ , $18.5 \text{ V} < V_{IN} < 28.5 \text{ V}$		54	70		dB
Dropout Voltage	$I_{OUT} = 1.0 \text{ A}$ , $T_J = 25^\circ\text{C}$			2.0		V
Output Resistance	$f = 1 \text{ kHz}$			19		$\text{m}\Omega$
Short Circuit Current	$T_J = 25^\circ\text{C}$ , $V_{IN} = 35 \text{ V}$			230		mA
Peak Output Current	$T_J = 25^\circ\text{C}$			2.1		A
Average Temperature Coefficient of Output Voltage	$I_{OUT} = 5 \text{ mA}$ , $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$			-1.0		$\text{mV}/^\circ\text{C}$

**NOTE:**

- All characteristics except noise voltage and ripple rejection ratio are measured using pulse techniques ( $t_w \leq 10 \text{ ms}$ , duty cycle  $\leq 5\%$ ). Output voltage changes due to changes in internal temperature must be taken into account separately.