



ET78 XX

- 3-Terminal Regulators
- Output Current Up to 1.5 A
- No External Components
- Internal Thermal Overload Protection
- High Power Dissipation Protection
- Internal Short-Circuit Current Limiting
- Output Transistor Safe-Area Compensation

NOMINA OUTPUT VOLTAGE	REGULATOR
5V	ET7805
6V	ET7806
8V	ET7808
8.5V	ET7885
9V	ET7809
10V	ET7810
12V	ET7812
15V	ET7815
18V	ET7818
20V	ET7820
24V	ET7824
27V	ET7827

DESCRIPTION

This series of fixed-voltage monolithic integrated-circuit voltage regulators designed for a wide range of applications. These applications include on-card regulation for elimination of noise and distribution problems associated with single-point regulation. Each of these regulators can deliver up to 1.5 amperes of output current. The internal limiting and thermal shutdown features of these regulators make them essentially immune to overload.

Absolute maximum ratings over operating temperature range (unless otherwise noted)

	ET78--	UNIT
Input voltage	ET7824, ET7827	40
	All others	35
Continuous total dissipation at 25°C free-air temperature	2	W
Continuous total dissipation at (or below) 25°C case temperature	15	
Operating free-air, case, or virtual junctions temperature range	0 to 150	°C
Storage temperature range	-65 to 150	
Lead temperature 1.6mm (1/16) from case for 10 seconds	260	

Recommended operating conditions

PARAMETER	MIN	MAX	UNIT
Input voltage, V_I	ET7805	7	25
	ET7806	8	25
	ET7808	10.5	25
	ET7885	10.5	25
	ET7809	11.5	27
	ET7810	12.5	28
	ET7812	14.5	30
	ET7815	17.5	30
	ET7818	21	33
	ET7820	23	36
	μ A7824	27	38
μ A7827	30	40	
Output current, I_O		1.5	A
Operating virtual junction temperature, T_J	0	125	°C



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**μ A7805 electrical characteristics at specified virtual junction temperature, $V_1 = 10V$,
 $I_0 = 500mA$ (unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		ET7805			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	4.8	5	5.2	V
	$I_0 = 5mA$ to 1A, $V_1 = 8V$ to 21V, $P \leq 15W$	0°C to 125°C	4.75	5	5.25	
Input regulation	$V_1 = 8V$ to 25V	25°C		3	100	mV
	$V_1 = 8V$ to 12V			1	50	
Ripple rejection	$V_1 = 8V$ to 18V, $f = 120Hz$	0°C to 125°C	62	78		dB
Output regulation	$I_0 = 5mA$ to 1.5A	25°C		15	100	mV
	$I_0 = 250mA$ to 750mA			5	50	
Output resistance	$f = 1KHz$	0°C to 125°C		0.01 7		Ω
Temperature coefficient of output voltage	$I_0 = 5mA$	0°C to 125°C		-1.1		mV/°C
Output noise voltage	$f = 10Hz$ to 100KHz	25°C		40		μV
Dropout voltage	$I_0 = 1A$	25°C		2.0		V
Bias current		25°C		4.2	8	
Bias current change	$V_1 = 7V$ to 25V	0°C to 125°C			1.3	mA
	$I_0 = 5mA$ to 1A				0.5	
Short-circuit output current		25°C		750		
Peak output current		25°C		2.2		A

**μ A7806 electrical characteristics at specified virtual junction temperature, $V_1 = 11V$,
 $I_0 = 500mA$ (unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		ET7806			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	5.75	6	6.25	V
	$I_0 = 5mA$ to 1A, $V_1 = 8V$ to 21V, $P \leq 15W$	0°C to 125°C	5.7	6	6.3	
			5.7			
Input regulation	$V_1 = 8V$ to 25V	25°C		5	120	mV
	$V_1 = 9V$ to 13V			1.5	60	
Ripple rejection	$V_1 = 9V$ to 19V, $f = 120Hz$	0°C to 125°C	59	75		dB
Output regulation	$I_0 = 5mA$ to 1.5A	25°C		14	120	mV
	$I_0 = 250mA$ to 750mA			4	60	
Output resistance	$f = 1KHz$	0°C to 125°C		0.01 9		Ω
Temperature coefficient of output voltage	$I_0 = 5mA$	0°C to 125°C		-0.8		mV/°C
Output noise voltage	$f = 10Hz$ to 100KHz	25°C		45		μV
Dropout voltage	$I_0 = 1A$	25°C		2.0		V
Bias current		25°C		4.3	8	
Bias current change	$V_1 = 8V$ to 25V	0°C to 125°C			1.3	mA
	$I_0 = 5mA$ to 1A				0.5	
Short-circuit output current		25°C		550		
Peak output current		25°C		2.2		A

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**ET7808 electrical characteristics at specified virtual junction temperature, $V_1 = 14V$,
 $I_o = 500mA$ (unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		ET7808			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	7.7	8	8.3	V
	$I_o = 5mA$ to 1A, $V_1 = 10.5V$ to 23V, $P \leq 15W$	0°C to 125°C	7.6	8	8.4	
Input regulation	$V_1 = 10.5V$ to 25V	25°C		6	160	mV
	$V_1 = 11V$ to 17V			2	80	
Ripple rejection	$V_1 = 11.5V$ to 21.5V, $f = 120Hz$	0°C to 125°C	55	72		dB
Output regulation	$I_o = 5mA$ to 1.5A	25°C		12	160	mV
	$I_o = 250mA$ to 750mA			4	80	
Output resistance	$f = 1KHz$	0°C to 125°C		0.01 6		Ω
Temperature coefficient of output voltage	$I_o = 5mA$	0°C to 125°C		-0.8		mV/°C
Output noise voltage	$f = 10Hz$ to 100KHz	25°C		52		μV
Dropout voltage	$I_o = 1A$	25°C		2.0		V
Bias current		25°C		4.3	8	mA
Bias current change	$V_1 = 10.5V$ to 25V	0°C to 125°C			1	
	$I_o = 5mA$ to 1A				0.5	
Short-circuit output current		25°C		450		
Peak output current		25°C		2.2		A

**ET7885 electrical characteristics at specified virtual junction temperature, $V_1 = 15V$,
 $I_o = 500mA$ (unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		ET7885			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	8.15	8.5	8.85	V
	$I_o = 5mA$ to 1A, $V_1 = 11V$ to 23.5V, $P \leq 15W$	0°C to 125°C	8.1	8.5	8.9	
Input regulation	$V_1 = 10.5V$ to 25V	25°C		6	170	mV
	$V_1 = 11V$ to 17V			2	85	
Ripple rejection	$V_1 = 11.5V$ to 21.5V, $f = 120Hz$	0°C to 125°C	54	70		dB
Output regulation	$I_o = 5mA$ to 1.5A	25°C		12	170	mV
	$I_o = 250mA$ to 750mA			4	85	
Output resistance	$f = 1KHz$	0°C to 125°C		0.01 6		Ω
Temperature coefficient of output voltage	$I_o = 5mA$	0°C to 125°C		-0.8		mV/°C
Output noise voltage	$f = 10Hz$ to 100KHz	25°C		55		μV
Dropout voltage	$I_o = 1A$	25°C		2.0		V
Bias current		25°C		4.3	8	mA
Bias current change	$V_1 = 10.5V$ to 25V	0°C to 125°C			1	
	$I_o = 5mA$ to 1A				0.5	
Short-circuit output current		25°C		450		
Peak output current		25°C		2.2		A

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**ET7809 electrical characteristics at specified virtual junction temperature, $V_1 = 16V$,
 $I_o = 500mA$ (unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		ET7809			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	8.65	9	9.35	V
	$I_o = 5mA$ to 1A, $V_1 = 11.5V$ to 24V, $P \leq 15W$	0°C to 125°C	8.65	9	9.45	
Input regulation	$V_1 = 11.5V$ to 27V	25°C		7	180	mV
	$V_1 = 13V$ to 19V			2	90	
Ripple rejection	$V_1 = 12V$ to 22V, $f = 120Hz$	0°C to 125°C	55	70		dB
Output regulation	$I_o = 5mA$ to 1.5A	25°C		12	180	mV
	$I_o = 250mA$ to 750mA			4	90	
Output resistance	$f = 1KHz$	0°C to 125°C		0.018		Ω
Temperature coefficient of output voltage	$I_o = 5mA$	0°C to 125°C		-1.0		mV/°C
Output noise voltage	$f = 10Hz$ to 100KHz	25°C		60		μV
Dropout voltage	$I_o = 1A$	25°C		2.0		V
Bias current		25°C		4.3	8	mA
Bias current change	$V_1 = 11.5V$ to 27V	0°C to 125°C			1	
	$I_o = 5mA$ to 1A				0.5	
Short-circuit output current		25°C		400		
Peak output current		25°C		2.2		A

**ET7810 electrical characteristics at specified virtual junction temperature, $V_1 = 17V$,
 $I_o = 500mA$ (unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		ET7810			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	9.6	10	10.4	V
	$I_o = 5mA$ to 1A, $V_1 = 12.5V$ to 25V, $P \leq 15W$	0°C to 125°C	9.5	10	10.5	
Input regulation	$V_1 = 12.5V$ to 28V	25°C		7	200	mV
	$V_1 = 14V$ to 20V			2	100	
Ripple rejection	$V_1 = 13V$ to 23V, $f = 120Hz$	0°C to 125°C	55	71		dB
Output regulation	$I_o = 5mA$ to 1.5A	25°C		12	200	mV
	$I_o = 250mA$ to 750mA			4	100	
Output resistance	$f = 1KHz$	0°C to 125°C		0.018		Ω
Temperature coefficient of output voltage	$I_o = 5mA$	0°C to 125°C		-1.0		mV/°C
Output noise voltage	$f = 10Hz$ to 100KHz	25°C		70		μV
Dropout voltage	$I_o = 1A$	25°C		2.0		V
Bias current		25°C		4.3	8	mA
Bias current change	$V_1 = 12.5V$ to 28V	0°C to 125°C			1	
	$I_o = 5mA$ to 1A				0.5	
Short-circuit output current		25°C		400		
Peak output current		25°C		2.2		A

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**ET7812 electrical characteristics at specified virtual junction temperature, $V_1 = 19V$,
 $I_O = 500mA$ (unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		ET7812			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	11.5	12	12.5	V
	$I_O = 5mA$ to 1A, $V_1 = 14.5V$ to 27V, $P \leq 15W$	0°C to 125°C	11.4	12	12.6	
Input regulation	$V_1 = 14.5V$ to 30V	25°C		10	240	mV
	$V_1 = 16V$ to 22V			3	120	
Ripple rejection	$V_1 = 15V$ to 25V, $f = 120Hz$	0°C to 125°C	55	71		dB
Output regulation	$I_O = 5mA$ to 1.5A	25°C		12	240	mV
	$I_O = 250mA$ to 750mA			4	120	
Output resistance	$f = 1KHz$	0°C to 125°C		0.018		Ω
Temperature coefficient of output voltage	$I_O = 5mA$	0°C to 125°C		-1.0		mV/°C
Output noise voltage	$f = 10Hz$ to 100KHz	25°C		75		μV
Dropout voltage	$I_O = 1A$	25°C		2.0		V
Bias current		25°C		4.3	8	mA
Bias current change	$V_1 = 14.5V$ to 30V	0°C to 125°C			1	
	$I_O = 5mA$ to 1A				0.5	
Short-circuit output current		25°C		350		
Peak output current		25°C		2.2		A

**ET7815 electrical characteristics at specified virtual junction temperature, $V_1 = 23V$,
 $I_O = 500mA$ (unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		ET7815			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	14.4	15	15.6	V
	$I_O = 5mA$ to 1A, $V_1 = 17.5V$ to 30V, $P \leq 15W$	0°C to 125°C	14.25	15	15.75	
Input regulation	$V_1 = 17.5V$ to 30V	25°C		12	300	mV
	$V_1 = 20V$ to 26V			3	150	
Ripple rejection	$V_1 = 18.5V$ to 28.5V, $f = 120Hz$	0°C to 125°C	54	70		dB
Output regulation	$I_O = 5mA$ to 1.5A	25°C		12	300	mV
	$I_O = 250mA$ to 750mA			4	150	
Output resistance	$f = 1KHz$	0°C to 125°C		0.019		Ω
Temperature coefficient of output voltage	$I_O = 5mA$	0°C to 125°C		-1.0		mV/°C
Output noise voltage	$f = 10Hz$ to 100KHz	25°C		90		μV
Dropout voltage	$I_O = 1A$	25°C		2.0		V
Bias current		25°C		4.3	8	mA
Bias current change	$V_1 = 17.5V$ to 30V	0°C to 125°C			1	
	$I_O = 5mA$ to 1A				0.5	
Short-circuit output current		25°C		230		
Peak output current		25°C		2.1		A

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**ET7818 electrical characteristics at specified virtual junction temperature, $V_1 = 27V$,
 $I_o = 500mA$ (unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		ET7818			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	17.3	18	18.7	V
	$I_o = 5mA$ to 1A, $V_1 = 21V$ to 33V, $P \leq 15W$	0°C to 125°C	17.1	18	18.9	
Input regulation	$V_1 = 21V$ to 33V	25°C		15	360	mV
	$V_1 = 24V$ to 30V			5	180	
Ripple rejection	$V_1 = 22V$ to 32V, $f = 120Hz$	0°C to 125°C	53	69		dB
Output regulation	$I_o = 5mA$ to 1.5A	25°C		12	360	mV
	$I_o = 250mA$ to 750mA			4	180	
Output resistance	$f = 1KHz$	0°C to 125°C		0.022		Ω
Temperature coefficient of output voltage	$I_o = 5mA$	0°C to 125°C		-1.0		mV /°C
Output noise voltage	$f = 10Hz$ to 100KHz	25°C		110		μV
Dropout voltage	$I_o = 1A$	25°C		2.0		V
Bias current		25°C		4.5	8	mA
Bias current change	$V_1 = 21V$ to 33V	0°C to 125°C			1	
	$I_o = 5mA$ to 1A				0.5	
Short-circuit output current		25°C		200		
Peak output current		25°C		2.1		A

**ET7820 electrical characteristics at specified virtual junction temperature, $V_1 = 29V$,
 $I_o = 500mA$ (unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		ET7820			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	19	20	20.8	V
	$I_o = 5mA$ to 1A, $V_1 = 23V$ to 35V, $P \leq 15W$	0°C to 125°C	19	20	21	
Input regulation	$V_1 = 23V$ to 35V	25°C		18	400	mV
	$V_1 = 26V$ to 32V			7	200	
Ripple rejection	$V_1 = 24V$ to 34V, $f = 120Hz$	0°C to 125°C	51	66		dB
Output regulation	$I_o = 5mA$ to 1.5A	25°C		15	400	mV
	$I_o = 250mA$ to 750mA			7	200	
Output resistance	$f = 1KHz$	0°C to 125°C		0.027		Ω
Temperature coefficient of output voltage	$I_o = 5mA$	0°C to 125°C		-1.3		mV /°C
Output noise voltage	$f = 10Hz$ to 100KHz	25°C		150		μV
Dropout voltage	$I_o = 1A$	25°C		2.0		V
Bias current		25°C		4.5	8	mA
Bias current change	$V_1 = 23V$ to 35V	0°C to 125°C			1	
	$I_o = 5mA$ to 1A				0.5	
Short-circuit output current		25°C		180		
Peak output current		25°C		2.1		A

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**ET7824 electrical characteristics at specified virtual junction temperature, $V_1 = 33V$,
 $I_o = 500mA$ (unless otherwise noted)**

PARAMETER	TEST CONDITIONS*		ET7824			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	23	24	25	V
	$I_o = 5mA$ to 1A, $V_1 = 27V$ to 38V, $P \leq 15W$	0°C to 125°C	22.8	24	25.2	
Input regulation	$V_1 = 27V$ to 38V	25°C		18	480	mV
	$V_1 = 30V$ to 36V			6	240	
Ripple rejection	$V_1 = 28V$ to 38V, $f = 120Hz$	0°C to 125°C	50	66		dB
Output regulation	$I_o = 5mA$ to 1.5A	25°C		12	480	mV
	$I_o = 250mA$ to 750mA			4	240	
Output resistance	$f = 1KHz$	0°C to 125°C		0.028		Ω
Temperature coefficient of output voltage	$I_o = 5mA$	0°C to 125°C		-1.5		mV /°C
Output noise voltage	$f = 10Hz$ to 100KHz	25°C		170		μV
Dropout voltage	$I_o = 1A$	25°C		2.0		V
Bias current		25°C		4.6	8	mA
Bias current change	$V_1 = 27V$ to 38V	0°C to 125°C			1	
	$I_o = 5mA$ to 1A				0.5	
Short-circuit output current		25°C		150		
Peak output current		25°C		2.1		A

**ET7827 electrical characteristics at specified virtual junction temperature, $V_1 = 36V$,
 $I_o = 500mA$ (unless otherwise noted)**


PARAMETER	TEST CONDITIONS*		ET7827			UNIT
			MIN	TYP	MAX	
Output voltage**		25°C	25.9	27	28.1	V
	$I_o = 5mA$ to 1A, $V_1 = 30V$ to 40V, $P \leq 15W$	0°C to 125°C	25.7	27	28.3	
Input regulation	$V_1 = 30V$ to 40V	25°C		25	540	mV
	$V_1 = 33V$ to 39V			10	270	
Ripple rejection	$V_1 = 30V$ to 40V, $f = 120Hz$	0°C to 125°C	50	64		dB
Output regulation	$I_o = 5mA$ to 1.5A	25°C		20	540	mV
	$I_o = 250mA$ to 750mA			9	270	
Output resistance	$f = 1KHz$	0°C to 125°C		0.030		Ω
Temperature coefficient of output voltage	$I_o = 5mA$	0°C to 125°C		-1.6		mV /°C
Output noise voltage	$f = 10Hz$ to 100KHz	25°C		200		μV
Dropout voltage	$I_o = 1A$	25°C		2.0		V
Bias current		25°C		4.8	8	mA
Bias current change	$V_1 = 30V$ to 40V	0°C to 125°C			1	
	$I_o = 5mA$ to 1A				0.5	
Short-circuit output current		25°C		120		
Peak output current		25°C		2.1		A

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Ordering Info

Package	Type	Packaging Type
TO-220	ET78XXD	TB

ET78XX  Package

Package:
D:TO-220

Packaging Type:
TB: Á Ĩ Đ
BB