EM79L

#### **General Description**

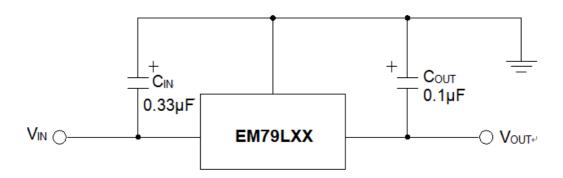
The EM79L series of fixed-voltage monolithic integrated circuit voltage regulators is designed for a wide range of applications. These applications include on-card regulation for elimination of noise and distribution problems associated with single-point regulation. In addition, they can be used with power-pass elements to make high-current voltage regulators.

Each of these regulators can deliver up to 100mA of output current. The internal limiting and thermal shutdown features of these regulators make them essentially immune to overload. When used a s a replacement for a Zener diodes-resistor combination, an effective improvement in output impedance can be obtained together with lower-bias current.

#### **Features**

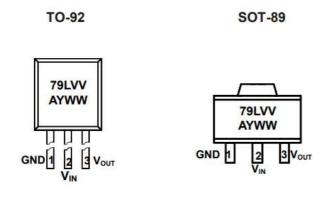
- Maximum output current up 100mA
- Fixed output voltage options: -5V, -6V, -8V, -9V, -12V, -15V, -18V and -24V
- No external components required
- Internal thermal overload protection
- Internal short circuit current limiting
- Available in TO-92, SOT-89 and SOP-8 packages

## **Typical Application Circuit**



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## **Marking Information and Pin Configurations (Top View)**

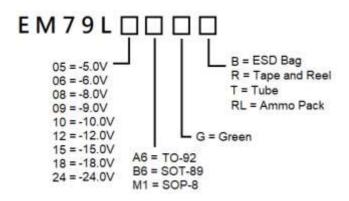


VV: Output Voltage Codes (05: -5.0V, ...12:-12V)

A: Assembly/Test Site Code

Y: Year WW: Week

#### **Ordering Information**



Ordering Number	Vout	Package	Shipping
EM79L00A6GB	00 = -5.0V	TO-92	1,000 Units/ESD Bag
EM79L00A6GRL	-6.0V -8.0V	TO-92	2,000 Units/Ammo Pack (Tape)
EM79L00B6GR	-9.0V -10.0V -12.0V	SOT-89	1,000 Units/Tape and Reel
EM79L00M1GT	-15.0V -15.0V -18.0V	SOP-8	100 Units/Tube
EM79L00M1GR	-24.0V	SOP-8	2,500 Units/Tape & Reel

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## **Absolute Maximum Ratings**

PARAMETER		SYMBOL	RATINGS	UNITS
	EM79L05 to EM79L09		30	
Input Voltage	EM79L12 to EM79L18	$V_{l}$	35	V
	EM79L24		40	
Operating Ambient T	emperature	T <sub>A</sub>	0 to 125	°C
Storage Temperature	9	T <sub>stg</sub>	- 60 to 150	°C

# **Recommended Operating Conditions**

PARAMETER		SYMBOL	Min	Max	UNITS
PARAMETER  Input Voltage  Output Current  Operating Ambient Tempera	EM79L05		-7	-20	
	EM79L06		-8	-20	
	EM79L08		-10.5	23	
Input Valtage	EM79L09	V	-12	-20 -20	V
input voitage	EM79L12	V <sub>I</sub>	-14.5	-27	V
	EM79L15		-7 -20 -8 -20 -10.5 23 -12 -24 -14.5 -27 -17.5 -30 -20.5 -33 -27 -38		
	EM79L18		-20.5	-33	
	EM79L24		-27	-38	
Output Current		Io		100	mA
Operating Ambient To	emperature	T <sub>A</sub>	0	125	°C



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## EM79L05 Electrical Characteristics (V<sub>I</sub> = - 10V, I<sub>O</sub> = 40mA unless otherwise noted)

Parameter	Test Cond	lition	Min	Тур	Max	Unit
		25°C	-4.8	-5.0	-5.2	
Output Voltage	I <sub>O</sub> =1mA to 40mA V <sub>I</sub> = -7V to -20V	0°C to	-4.75	-5.0	-5.25	V
	I <sub>O</sub> = 1mA to 70mA	125°C	-4.75	-5.0	-5.2 -5.25 -5.25 150 100 60 30 6 5.5 1.5	
Land Development	V <sub>I</sub> = -7V to -20V	0500		15	150	
Input Regulation	V <sub>I</sub> = -8V to -20V	25°C	-4.8 -5.0 -5.2  to -4.75 -5.0 -5.25  -4.75 -5.0 -5.25  15 150  12 100  41 49  20 60  10 30  40  1.7  3.8 6  5.5  1.5	mV		
Ripple Rejection	V <sub>I</sub> = -8V to -18V, f = 120KHz	25°C	41	49		dB
0.1	I <sub>O</sub> = 1mA to 100mA	0500		20	60	
Output Regulation	I <sub>O</sub> = 1mA to 40mA	25°C		10	30	mV
Output Noise Voltage	F = 10Hz to 100KHz	25°C		40		μV
Dropout Voltage		25°C		1.7		V
E		25°C		3.8	6	350V <b>A</b> 7
Bias Current		125°C		15 150 12 100 41 49 20 60 10 30 40 1.7 3.8 6 5.5	5.5	mA
D: 0	V <sub>I</sub> = -8V to -20V	0°C to 125°C			1.5	
Bias Current Change	I <sub>O</sub> = 1mA to 40mA				0.1	mA

## EM79L06 Electrical Characteristics (V<sub>I</sub> = -11V, I<sub>O</sub> = 40mA unless otherwise noted)

Parameter	Test Cond	lition	Min	Тур	Max	Unit
		25°C	<b>-</b> 5.75	<b>-</b> 6.0	-6.25	9
Output Regulation Output Noise Voltage	I <sub>O</sub> =1mA to 40mA V <sub>I</sub> = -8V to -20V	0°C to	-5.70	-6.0	-6.30	٧
	I <sub>O</sub> = 1mA to 70mA	125°C	-5.70	-6.0	-6.25	
	V <sub>I</sub> = -8V to -20V	0500		20	175	
Input Regulation	$V_1 = -9V \text{ to } -20V$	25°C		15	125	mV
Ripple Rejection	V <sub>I</sub> = -9V to -18V, f = 120KHz	25°C	40	48		dB
	I <sub>O</sub> = 1mA to 100mA	0500		21	80	
Output Regulation	I <sub>O</sub> = 1mA to 40mA	25°C		11	40	mV
Output Noise Voltage	F = 10Hz to 100KHz	25°C		44		μV
Dropout Voltage		25°C		1.7		V
		25°C		3.9	6	
Bias Current		125°C			0 -6.30 175 125 8 80 40 40 7 6 5.5 1.5	mA
	V <sub>I</sub> = -9V to -20V				1.5	
Bias Current Change	I <sub>O</sub> = 1mA to 40mA	0°C to 125°C			0.1	mA

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## EM79L08 Electrical Characteristics (V<sub>I</sub> = -14V, I<sub>O</sub> = 40mA unless otherwise noted)

Parameter	Test Cond	lition	Min	Тур	Max	Unit
		25°C	-7.7	-8.0	-8.3	
Output Voltage  Input Regulation  Ripple Rejection  Output Regulation  Output Noise Voltage	I <sub>O</sub> =1mA to 40mA V <sub>I</sub> = -10.5V to -23V	0°C to 125°C	-7.6	-8.0	-8.4	V
	I <sub>O</sub> = 1mA to 70mA		-7.6	-8.0	-8.4	
L. L. D. L. P.	V <sub>I</sub> = -10.5V to -23V			42	200	
input Regulation	V <sub>I</sub> = -11V to -23V	25°C		36	-8.3 -8.4 -8.4 200 150	mV
Ripple Rejection	V <sub>I</sub> = -13V to -23V, f = 120KHz	25°C	37	46		dB
	I <sub>O</sub> = 1mA to 100mA			30	100	
Output Regulation	Io = 1mA to 40mA	25°C		15	-8.3 -8.4 -8.4 200 150 100 50 6 5.5 1.5	mV
Output Noise Voltage	F = 10Hz to 100KHz	25°C		54		μV
Dropout Voltage		25°C		1.7		V
D		25°C			6	S25500 A II
Bias Current		125°C			-8.3 -8.4 -8.4 200 150 100 50 6 5.5 1.5	mA
Di - 0 1 Ol	V <sub>I</sub> = 11V to 23V	000 + 40500			1.5	
Bias Current Change	I <sub>O</sub> = 1mA to 40mA	0°C to 125°C			0.1	mA

## EM79L09 Electrical Characteristics (V<sub>I</sub> = -16V, I<sub>O</sub> = 40mA unless otherwise noted)

Parameter	Test Cond	lition	Min	Тур	Max	Unit
		25°C	-8.6	-9.0	0 -9.4 0 -9.45 0 -9.45 175 1 125 6 100 6 50	
Output Voltage	I <sub>O</sub> =1mA to 40mA V <sub>I</sub> = -12V to -24V	0°C to 125°C	-8.55	-9.0	-9.45	V
	I <sub>O</sub> = 1mA to 70mA		-8.55	-9.0	-9.45	
	V <sub>I</sub> = -12V to -24V	0500		45	175	1
Input Regulation	V <sub>I</sub> = -13V to -24V	25°C		40	0 -9.4 0 -9.45 0 -9.45 175 125 100 5 50 7 6.2 5.7	mV
Ripple Rejection	V <sub>I</sub> = -15V to -24V, f = 120KHz	25°C	40	45		dB
0	I <sub>O</sub> = 1mA to 100mA	lacar		30	100	
Output Regulation	I <sub>O</sub> = 1mA to 40mA	25°C		15	-9.4 -9.45 -9.45 175 125 100 50 6.2 5.7 1.5	mV
Output Noise Voltage	F = 10Hz to 100KHz	25°C		62		μV
Dropout Voltage		25°C		1.7		V
aput Regulation  Lipple Rejection  Output Regulation  Output Noise Voltage  Propout Voltage  ias Current		25°C			6.2	NEW YORK
Bias Current		125°C			5.7	mA
Output Regulation Output Noise Voltage	V <sub>I</sub> = -13V to -24V				1.5	
Bias Current Change	I <sub>O</sub> = 1mA to 40mA	0°C to 125°C			0.1	mA

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## EM79L12 Electrical Characteristics (V<sub>I</sub> = -19V, I<sub>O</sub> = 40mA unless otherwise noted)

Parameter	Test Cond	lition	Min	Тур	Max	Unit
		25°C	-11.5	-12	-12.5	J
Dutput Regulation Output Noise Voltage	I <sub>O</sub> =1mA to 40mA V <sub>I</sub> = -14V to -27V	0°C to 125°C	-11.4	-12	-12.6	V
	Io = 1mA to 70mA	-11.4	-12	-12.6		
	V <sub>I</sub> = -14V to -27V	0500		50	250	
Input Regulation	V <sub>I</sub> = -16V to -27V	25°C		40	-12.5 -12.6 -12.6	mV
Ripple Rejection	V <sub>I</sub> = -15V to -25V, f = 120KHz	25°C	37	42		dB
	I <sub>O</sub> = 1mA to 100mA			24	100	>/
Output Regulation	Io = 1mA to 40mA	25°C		15	-12.5 -12.6 -12.6 250 200 100 50 6.5 6 1.5	mV
Output Noise Voltage	F = 10Hz to 100KHz	25°C		80		μV
Dropout Voltage		25°C		1.7	,	V
aput Regulation  Lipple Rejection  Output Regulation  Output Noise Voltage  Propout Voltage  ias Current		25°C			6.5	352201.
Bias Current		125°C			6	mA
Output Regulation Output Noise Voltage	V <sub>I</sub> = -16V to -27V	200 / 10-00			1.5	320
Bias Current Change	I <sub>O</sub> = 1mA to 40mA	0°C to 125°C			0.1	mA

## EM79L15 Electrical Characteristics (V<sub>I</sub> = -23V, I<sub>O</sub> = 40mA unless otherwise noted)

Parameter	Test Cond	ition	Min	Тур	Max	Unit
		25°C	-14.4	-15	-15.6	
Output Voltage  Input Regulation  Ripple Rejection  Output Regulation  Output Noise Voltage  Dropout Voltage  Bias Current	I <sub>O</sub> =1mA to 40mA V <sub>I</sub> = -17.5V to -30V	0°C to 125°C	-14.25	-15	-15.75	V
	I <sub>O</sub> = 1mA to 70mA		-14.25	-15	-15.75	
1.0	V <sub>I</sub> = -17.5V to -30V			60	300	
Input Regulation	V <sub>I</sub> = -19V to -30V	25°C	ľ I	.4 -15 -15.6 25 -15 -15.75 25 -15 -15.75 60 300 50 250	mV	
Ripple Rejection	V <sub>I</sub> = -18.5V to -28.5V, f = 120KHz	25°C	34	39		dB
Outrat Demoleties	I <sub>O</sub> = 1mA to 100mA			25	150	
Output Regulation	I <sub>O</sub> = 1mA to 40mA	25°C	l l	15	15 -15.6 15 -15.75 15 -15.75 16 300 250 39 25 150 15 75 30 30 45 6.5 6 1.5	mV
Output Noise Voltage	F = 10Hz to 100KHz	25°C		90		μV
Dropout Voltage		25°C	1	1.7		V
5. 6		25°C		4.6	6.5	
Bias Current		125°C			-15.6 -15.75 -15.75 300 250 150 75 6.5 6 1.5	mA
5. 6 . 6.	V <sub>I</sub> = -19V to -30V	0.00 / 1.05.00			1.5	929
Bias Current Change	I <sub>O</sub> = 1mA to 40mA	0°C to 125°C			0.1	mA

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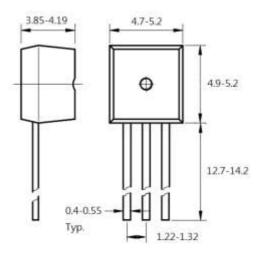
## EM78M18 Electrical Characteristics (V<sub>I</sub> = -26V, I<sub>O</sub> = 40mA unless otherwise noted)

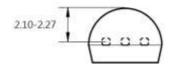
Parameter	Test Cond	ition	Min	Тур	Max	Unit
put Regulation ipple Rejection output Regulation output Regulation output Noise Voltage ropout Voltage		25°C	-17.3	-18	-18.7	
Output Voltage	I <sub>O</sub> =1mA to 40mA V <sub>I</sub> = -20.5V to -33V	0°C to 125°C	-17.1	-18	-18.9	V
	I <sub>0</sub> = 1mA to 70mA		-17.1	-18	-18.7	
1	V <sub>I</sub> = -20.5V to -33V	250		70	325	- 17
Input Regulation	V <sub>I</sub> = -22V to -33V	25°C -17.3 -18  0°C to 125°C -17.1 -18  -17.1 -18  70  25°C 60  25°C 33 49  25°C 19  25°C 150	60	275	mV	
Ripple Rejection	V <sub>I</sub> = -21.5V to -31.5V, f = 120KHz	25°C	33	49		dB
	I <sub>O</sub> = 1mA to 100mA			27	170	
Output Regulation	I <sub>O</sub> = 1mA to 40mA	25°C		-18 -18.7 -18 -18.9 -18 -18.9 70 325 60 275 49 27 170 19 85 150 1.7 6.5 6 1.5	mV	
Output Noise Voltage	F = 10Hz to 100KHz	25°C		150		μV
Dropout Voltage		25°C		1.7		V
		25°C			6.5	
Bias Current		125°C	li .		-18	mA
	V <sub>I</sub> = -22V to -33V				1.5	
Bias Current Change	I <sub>O</sub> = 1mA to 40mA	0°C to 125°C			0.1	mA

## EM78M24 Electrical Characteristics (V<sub>I</sub> = -32V, I<sub>O</sub> = 40mA unless otherwise noted)

Parameter	Test Cond	lition	Min	Тур	Max	Unit
		25°C	-23	-24	-25	
Output Voltage	I <sub>O</sub> =1mA to 40mA V <sub>I</sub> = -27V to -38V	0°C to 125°C	-22.8	-24	-25.2	V
	I <sub>O</sub> = 1mA to 70mA		-22.8	-24	-25 -25.2 -25.2 350 300 200 100 6.5 6 1.5	
In A Domitor	$V_1 = -27V \text{ to } -38V$	25°C		90	350	>/
Input Regulation	V <sub>I</sub> = -29V to -39V			75	300	mV
Ripple Rejection	V <sub>I</sub> = -29V to -35V, f = 120KHz	25°C	31	47		dB
Output Regulation	I <sub>O</sub> = 1mA to 100mA			40	200	.,
Output Regulation	I <sub>O</sub> = 1mA to 40mA	25°C		25	-24 -25 -24 -25.2 -24 -25.2 90 350 75 300 47 40 200 25 100 200 1.7 6.5 6	mV
Output Noise Voltage	f = 10Hz to 100KHz	25°C		200		μV
Dropout Voltage		25°C		1.7		V
un m		25°C			6.5	10001140
Bias Current		125°C			-24 -25.2 -24 -25.2 90 350 75 300 47 40 200 25 100 200 1.7 6.5 6 1.5	mA
	V <sub>I</sub> = -28V to -38V	2021 1270			1.5	
Bias Current Change	I <sub>O</sub> = 1mA to 40mA	0°C to 125°C			0.1	mA

## Package Outline Dimensions - TO 92





Dimensions are in millimeters

## Package Outline Dimensions - SOP-8

