3-TERMINAL 0.1A POSITIVE VOLTAGE REGULATORS

This series of fixed-voltage monolithic integrated-circuit voltage regulators is designed for a wide range of applications.

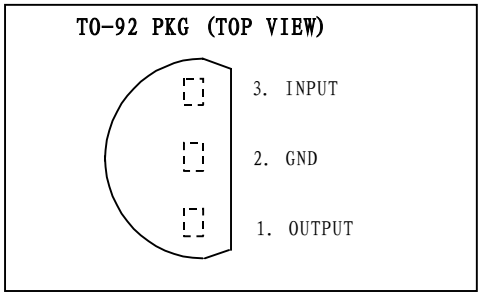
These applications include on-card regulation for elimination of noise and distribution problems associated with single-point regulation.

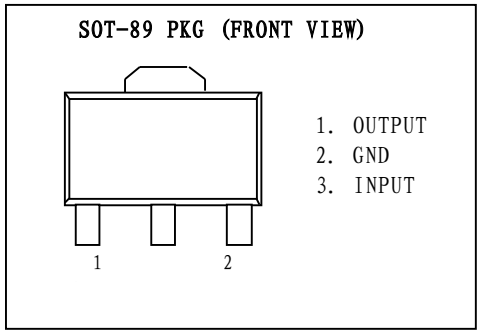
In addition, they can be used with power-pass elements to make high current voltage regulators.

Each of these regulators can deliver up to 100 of output current.

The internal limiting and thermal shutdown features of these regulators make them essentially immune to overload.

When used as a replacement for a zener diode-resistor combination, an effective improvement in output impedance can be obtained together with lower-bias current.





ORDERING INFORMATION

Device	Marking	Package
LM78LXX	LM78LXX	TO-92
LM78L05-A/C	LM78L05-A/C	
LM78L05NF	85N	SOT-89
LM78L05-AF/CF	85A/85C	
LM78L06F~24F	806~824	

FEATURES

◇ Output Current Up to 100

◇ No External Components

◇ Internal Thermal Overload Protection

◇ Internal Short-Circuit Limiting

◇ Output Voltage of 5V, 6V, 8V, 9V, 10V, 12V, 15V, 18V and 24V

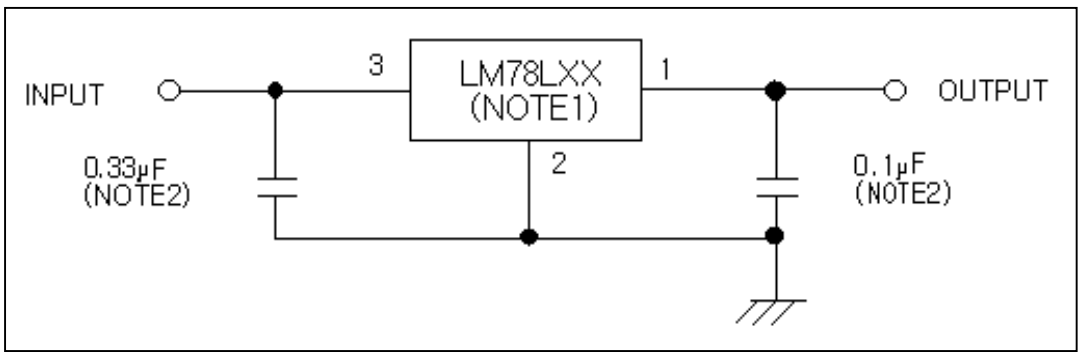
ABSOLUTE MAXIMUM RATINGS

Characteristic		Symbol	Value	Unit
Input voltage	LM78L05 /A/C LM78L10	V_I	30	V
	LM78L12 LM78L18		35	
	LM78L24		40	
Operating junction temperature		Topr	0 +150	℃
Storage temperature		Tstg	-65 +150	
Soldering temperature and time		Tsol	260/10sec	

RECOMMENDED OPERATING CONDITIONS

		Min.	Max.	Unit
Input voltage, V_I	LM78L05 / A / C	7	20	V
	LM78L06	8	20	
	LM78L08	10.5	23	
	LM78L09	11.5	24	
	LM78L10	12.5	25	
	LM78L12	14.5	27	
	LM78L15	17.5	30	
	LM78L18	20.5	33	
	LM78L24	26.5	39	
Output current,Io			100	
Operating virtual junction temperature, Tj		0	125	℃

TYPICAL APPLICATION



Notes

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

LM78L05 ELECTRICAL CHARACTERISTICS

(At specified virtual junction temperature, V_I=10V, I_O=40 (unless otherwise noted)

Characteistic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	V_{OUT}		25℃	4.8	5	5.2	V
		1 ≤ I_O ≤ 40 7V ≤ V_I ≤ 20V	0℃ 125℃	4.75	5	5.25	
		1 ≤ I_O ≤ 70		4.75	5	5.25	
Line regulation	Reg line	7V ≤ V_I ≤ 20V	25℃		32	150	
		8V ≤ V_I ≤ 20V			26	100	
Load regulation	Reg load	1 ≤ I_O ≤ 100	25℃		15	60	
		1 ≤ I_O ≤ 40			8	30	
Bias current	I_B		25℃		3.8	6	
			125℃			5.5	
Bias current change	△ I_B	9V ≤ V_I ≤ 20V	0℃ 125℃			1.5	
		1 ≤ I_O ≤ 40				0.1	
Output noise voltage	V_N	10Hz ≤ f ≤ 100kHz	25℃		42		
Ripple rejection	RR	8V ≤ V_I ≤ 18V f=120Hz	25℃	41	49		
Dropout voltage	V_D		25℃		1.7		V

Notes

*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.
Thermal effects must be taken into account separately.
All characteristics are measured with a 0.33 capacitor across the input and a 0.1 capacitor across the output.

**. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

LM78L05A ELECTRICAL CHARACTERISTICS

(At specified virtual junction temperature, V_I=10V, I_O=40 (unless otherwise noted)

Characteistic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	V_{OUT}		25℃	4.9	5	5.1	V
		1 ≤ I_O ≤ 40 7V ≤ V_I ≤ 20V	0℃ 125℃	4.9	5	5.1	
		1 ≤ I_O ≤ 70		4.9	5	5.1	
Line regulation	Reg line	7V ≤ V_I ≤ 20V	25℃		5	50	
		8V ≤ V_I ≤ 20V			3	25	
Load regulation	Reg load	1 ≤ I_O ≤ 100	25℃		15	60	
		1 ≤ I_O ≤ 40			8	30	
Bias current	I_B		25℃		3.8	6	
			125℃			5.5	
Bias current change	△ I_B	9V ≤ V_I ≤ 20V	0℃ 125℃			1.5	
		1 ≤ I_O ≤ 40				0.1	
Output noise voltage	V_N	10Hz ≤ f ≤ 100kHz	25℃		42		
Ripple rejection	RR	8V ≤ V_I ≤ 18V f=120Hz	25℃	41	49		
Dropout voltage	V_D		25℃		1.7		V

Notes

*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.
Thermal effects must be taken into account separately.
All characteristics are measured with a 0.33 capacitor across the input and a 0.1 capacitor across the output.

**. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

LM78L05C ELECTRICAL CHARACTERISTICS

(At specified virtual junction temperature, V_I=10V, I_O=40 (unless otherwise noted)

Characteistic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	V_{OUT}		25℃	4.95	5	5.05	V
		1 ≤ I_O ≤ 40 7V ≤ V_I ≤ 20V	0℃ 125℃	4.95	5	5.05	
		1 ≤ I_O ≤ 70		4.95	5	5.05	
Line regulation	Reg line	7V ≤ V_I ≤ 20V	25℃		5	50	
		8V ≤ V_I ≤ 20V			3	25	
Load regulation	Reg load	1 ≤ I_O ≤ 100	25℃		15	50	
		1 ≤ I_O ≤ 40			8	25	
Bias current	I_B		25℃		3.8	6	
			125℃			5.5	
Bias current change	△ I_B	9V ≤ V_I ≤ 20V	0℃ 125℃			1.5	
		1 ≤ I_O ≤ 40				0.1	
Output noise voltage	V_N	10Hz ≤ f ≤ 100kHz	25℃		42		
Ripple rejection	RR	8V ≤ V_I ≤ 18V f=120Hz	25℃	41	49		
Dropout voltage	V_D		25℃		1.7		V

Notes

*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.
Thermal effects must be taken into account separately.
All characteristics are measured with a 0.33 capacitor across the input and a 0.1 capacitor across the output.

**. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

LM78L06 ELECTRICAL CHARACTERISTICS

(At specified virtual junction temperature, V_I=10V, I_O=40 (unless otherwise noted)

Characteistic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	V_{OUT}		25℃	5.75	6	6.25	V
		1 ≤ I_O ≤ 40 8V ≤ V_I ≤ 20V	0℃ 125℃	5.7	6	6.3	
		1 ≤ I_O ≤ 70		5.7	6	6.3	
Line regulation	Reg line	8V ≤ V_I ≤ 20V	25℃		35	175	
		9V ≤ V_I ≤ 20V			29	125	
Load regulation	Reg load	1 ≤ I_O ≤ 100	25℃		16	80	
		1 ≤ I_O ≤ 40			9	40	
Bias current	I_B		25℃		3.9	6	
			125℃			5.5	
Bias current change	△ I_B	9V ≤ V_I ≤ 20V	0℃ 125℃			1.5	
		1 ≤ I_O ≤ 40				0.1	
Output noise voltage	V_N	10Hz ≤ f ≤ 100kHz	25℃		46		
Ripple rejection	RR	9V ≤ V_I ≤ 19V f=120Hz	25℃	40	48		
Dropout voltage	V_D		25℃		1.7		V

Notes

*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.
Thermal effects must be taken into account separately.
All characteristics are measured with a 0.33 capacitor across the input and a 0.1 capacitor across the output.

**. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

LM78L08 ELECTRICAL CHARACTERISTICS

(At specified virtual junction temperature, V_I=14V, I_O=40 (unless otherwise noted)

Characteistic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	V_{OUT}		25℃	7.7	8	8.3	V
		1 ≤ I_O ≤ 40 10.5V ≤ V_I ≤ 23V	0℃ 125℃	7.6	8	8.4	
		1 ≤ I_O ≤ 70		7.6	8	8.4	
Line regulation	Reg line	10.5V ≤ V_I ≤ 23V	25℃		42	175	
		11V ≤ V_I ≤ 23V			36	125	
Load regulation	Reg load	1 ≤ I_O ≤ 100	25℃		18	80	
		1 ≤ I_O ≤ 40			10	40	
Bias current	I_B		25℃		4	6	
			125℃			5.5	
Bias current change	ΔI_B	11V ≤ V_I ≤ 23V	0℃ 125℃			1.5	
		1 ≤ I_O ≤ 40				0.1	
Output noise voltage	V_N	10Hz ≤ f ≤ 100kHz	25℃		54		
Ripple rejection	RR	13V ≤ V_I ≤ 23V f=120Hz	25℃	37	46		
Dropout voltage	V_D		25℃		1.7		V

Notes

*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.
Thermal effects must be taken into account separately.
All characteristics are measured with a 0.33 capacitor across the input and a 0.1 capacitor across the output.

**. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

MOBICON Electronic Components

LM78L09 ELECTRICAL CHARACTERISTICS

(At specified virtual junction temperature, V_I=16V, I_O=40 (unless otherwise noted)

Characteistic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	V_{OUT}		25℃	8.6	9	9.4	V
		1 ≤ I_O ≤ 40 12V ≤ V_I ≤ 24V	0℃ 125℃	8.55	9	9.45	
		1 ≤ I_O ≤ 70		8.55	9	9.45	
Line regulation	Reg line	12V ≤ V_I ≤ 24V	25℃		45	175	
		13V ≤ V_I ≤ 24V			40	125	
Load regulation	Reg load	1 ≤ I_O ≤ 100	25℃		19	90	
		1 ≤ I_O ≤ 40			11	40	
Bias current	I_B		25℃		4.1	6	
			125℃			5.5	
Bias current change	△ I_B	13V ≤ V_I ≤ 24V	0℃ 125℃			1.5	
		1 ≤ I_O ≤ 40				0.1	
Output noise voltage	V_N	10Hz ≤ f ≤ 100kHz	25℃		58		
Ripple rejection	RR	13V ≤ V_I ≤ 23V f=120Hz	25℃	38	45		
Dropout voltage	V_D		25℃		1.7		V

Notes

*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.
Thermal effects must be taken into account separately.
All characteristics are measured with a 0.33 capacitor across the input and a 0.1 capacitor across the output.

**. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

LM78L10 ELECTRICAL CHARACTERISTICS

(At specified virtual junction temperature, V_I=17V, I_O=40 (unless otherwise noted)

Characteistic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	V_{OUT}		25℃	9.6	10	10.4	V
		1 ≤ I_O ≤ 40 13V ≤ V_I ≤ 25V	0℃ 125℃	9.5	10	10.5	
		1 ≤ I_O ≤ 70		9.5	10	10.5	
Line regulation	Reg line	13V ≤ V_I ≤ 25V	25℃		51	175	
		14V ≤ V_I ≤ 25V			42	125	
Load regulation	Reg load	1 ≤ I_O ≤ 100	25℃		20	90	
		1 ≤ I_O ≤ 40			11	40	
Bias current	I_B		25℃		4.2	6	
			125℃			5.5	
Bias current change	△ I_B	14V ≤ V_I ≤ 25V	0℃ 125℃			1.5	
		1 ≤ I_O ≤ 40				0.1	
Output noise voltage	V_N	10Hz ≤ f ≤ 100kHz	25℃		62		
Ripple rejection	RR	15V ≤ V_I ≤ 25V f=120Hz	25℃	37	44		
Dropout voltage	V_D		25℃		1.7		V

Notes

*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.
Thermal effects must be taken into account separately.
All characteristics are measured with a 0.33 capacitor across the input and a 0.1 capacitor across the output.

**. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

LM78L12 ELECTRICAL CHARACTERISTICS

(At specified virtual junction temperature, V_I=19V, I_O=40 (unless otherwise noted)

Characteistic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	V_{OUT}		25℃	11.5	12	12.5	V
		1 ≤ I_O ≤ 40 14V ≤ V_I ≤ 27V	0℃ 125℃	11.4	12	12.6	
		1 ≤ I_O ≤ 70		11.4	12	12.6	
Line regulation	Reg line	14.5V ≤ V_I ≤ 27V	25℃		55	250	
		16V ≤ V_I ≤ 27V			49	200	
Load regulation	Reg load	1 ≤ I_O ≤ 100	25℃		22	100	
		1 ≤ I_O ≤ 40			13	50	
Bias current	I_B		25℃		4.3	6.5	
			125℃			6	
Bias current change	△ I_B	16V ≤ V_I ≤ 27V	0℃ 125℃			1.5	
		1 ≤ I_O ≤ 40				0.1	
Output noise voltage	V_N	10Hz ≤ f ≤ 100kHz	25℃		70		
Ripple rejection	RR	15V ≤ V_I ≤ 25V f=120Hz	25℃	37	42		
Dropout voltage	V_D		25℃		1.7		V

Notes

*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.
Thermal effects must be taken into account separately.
All characteristics are measured with a 0.33 capacitor across the input and a 0.1 capacitor across the output.

**. This specification applies only for DC power dissipation permitted by absolute maximum ratings.