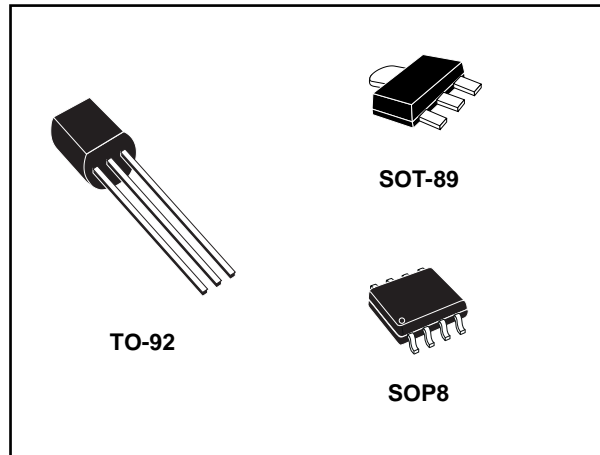


## POSITIVE VOLTAGE REGULATORS

- OUTPUT CURRENT UP TO 100 mA
- OUTPUT VOLTAGES OF 5;6;8;9;10;12;15;18;20;24;33V
- THERMAL OVERLOAD PROTECTION
- SHORT CIRCUIT PROTECTION
- NO EXTERNAL COMPONENTS ARE REQUIRED
- AVAILABLE IN EITHER  $\pm 5\%$

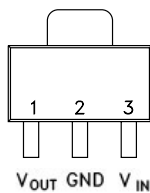
### DESCRIPTION

The LM78Lxx series of three-terminal positive regulators employ internal current limiting and thermal shutdown, making them essentially indestructible. If adequate heat-sink is provided, they can deliver up to 100 mA output current. They are intended as fixed voltage regulators in a wide range of applications including local or 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. The LM78Lxx series used as Zener diode/resistor combination replacement, offers an effective output impedance improvement of typically two

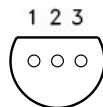


orders of magnitude, along with lower quiescent current and lower noise.

### CONNECTION DIAGRAM (top view)

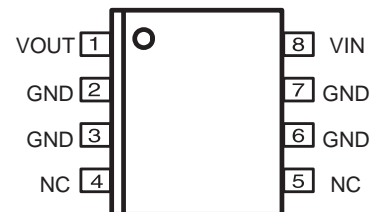


SOT-89



PIN 1 = V<sub>OUT</sub>  
PIN 2 = GND  
PIN 3 = V<sub>IN</sub>

TO-92



SOP8

### ORDERING INFORMATION

DEVICE	Package Type	MARKING	Packing	Packing Qty
LM78L05MK/TR	SOT-89	78L05	REEL	2500/reel
LM78L06MK/TR		78L06	REEL	2500/reel
LM78L08MK/TR		78L08	REEL	2500/reel
LM78L09MK/TR		78L09	REEL	2500/reel
LM78L10MK/TR		78L10	REEL	2500/reel
LM78L12MK/TR		78L12	REEL	2500/reel
LM78L15MK/TR		78L15	REEL	2500/reel
LM78L18MK/TR		78L18	REEL	2500/reel
LM78L20MK/TR		78L20	REEL	2500/reel
LM78L24MK/TR		78L24	REEL	2500/reel
LM78L33MK/TR		78L33	REEL	2500/reel

DEVICE	Package Type	MARKING	Packing	Packing Qty
LM78L05Z	TO-92	78L05	BAG	1000/bag
LM78L06Z		78L06	BAG	1000/bag
LM78L08Z		78L08	BAG	1000/bag
LM78L09Z		78L09	BAG	1000/bag
LM78L10Z		78L10	BAG	1000/bag
LM78L12Z		78L12	BAG	1000/bag
LM78L15Z		78L15	BAG	1000/bag
LM78L18Z		78L18	BAG	1000/bag
LM78L20Z		78L20	BAG	1000/bag
LM78L24Z		78L24	BAG	1000/bag
LM78L33Z		78L33	BAG	1000/bag
LM78L05M/TR		SOP8L	78L05	REEL
LM78L06M/TR	78L06		REEL	2500/reel
LM78L08M/TR	78L08		REEL	2500/reel
LM78L09M/TR	78L09		REEL	2500/reel
LM78L10M/TR	78L10		REEL	2500/reel
LM78L12M/TR	78L12		REEL	2500/reel
LM78L15M/TR	78L15		REEL	2500/reel
LM78L18M/TR	78L18		REEL	2500/reel
LM78L20M/TR	78L20		REEL	2500/reel
LM78L24M/TR	78L24		REEL	2500/reel
LM78L33M/TR	78L33		REEL	2500/reel

**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter <sup>2</sup>		Value	Unit
$V_I$	DC Input Voltage	$V_O = 5$ to $9$ V	30	V
		$V_O = 12$ to $15$ V	35	
		$V_O = 18$ to $33$ V	40	
$I_O$	Output Current		100	mA
$P_{tot}$	Power Dissipation		Internally Limited (*)	
$T_{stg}$	Storage Temperature Range		-40 to 150	°C
$T_{op}$	Operating Junction Temperature Range	for L78LxxC	0 to 125	°C
		for L78LxxI	-40 to 125	

**ELECTRICAL CHARACTERISTICS OF LM78L05**

(refer to the test circuits,  $V_I = 10V$ ,  $I_O = 40\text{ mA}$ ,  $C_I = 0.33\ \mu\text{F}$ ,  $C_O = 0.1\ \mu\text{F}$ ,  
 $T_J = 0\text{ to }125^\circ\text{C}$  for LM78L05C,  $T_J = -40\text{ to }125^\circ\text{C}$  for LM78L05I, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage	$T_J = 25^\circ\text{C}$	4.8	5	5.2	V
$V_O$	Output Voltage	$I_O = 1\text{ to }40\text{ mA}$ $V_I = 7\text{ to }20\text{ V}$	4.75		5.25	V
		$I_O = 1\text{ to }70\text{ mA}$ $V_I = 10\text{ V}$	4.75		5.25	
$\Delta V_O$	Line Regulation	$V_I = 7\text{ to }20\text{ V}$ $T_J = 25^\circ\text{C}$			150	mV
		$V_I = 8\text{ to }20\text{ V}$ $T_J = 25^\circ\text{C}$			100	
$\Delta V_O$	Load Regulation	$I_O = 1\text{ to }100\text{ mA}$ $T_J = 25^\circ\text{C}$			60	mV
		$I_O = 1\text{ to }40\text{ mA}$ $T_J = 25^\circ\text{C}$			30	
$I_d$	Quiescent Current	$T_J = 25^\circ\text{C}$			6	mA
		$T_J = 125^\circ\text{C}$			5.5	
$\Delta I_d$	Quiescent Current Change	$I_O = 1\text{ to }40\text{ mA}$			0.1	mA
		$V_I = 8\text{ to }20\text{ V}$			1.5	
eN	Output Noise Voltage	$B = 10\text{Hz to }100\text{kHz}$ $T_J = 25^\circ\text{C}$		40		$\mu\text{V}$
SVR	Supply Voltage Rejection	$V_I = 8\text{ to }18\text{ V}$ $f = 120\text{Hz}$ $I_O = 40\text{ mA}$ $T_J = 25^\circ\text{C}$	41	49		dB
$V_d$	Dropout Voltage			1.7		V

**ELECTRICAL CHARACTERISTICS OF LM78L06**

(refer to the test circuits,  $V_I = 12V$ ,  $I_O = 40\text{ mA}$ ,  $C_I = 0.33\ \mu\text{F}$ ,  $C_O = 0.1\ \mu\text{F}$ ,  
 $T_J = 0\text{ to }125^\circ\text{C}$  for LM78L06C,  $T_J = -40\text{ to }125^\circ\text{C}$  for LM78L06I, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage	$T_J = 25^\circ\text{C}$	5.76	6	6.24	V
$V_O$	Output Voltage	$I_O = 1\text{ to }40\text{ mA}$ $V_I = 8.5\text{ to }20\text{ V}$	5.7		6.3	V
		$I_O = 1\text{ to }70\text{ mA}$ $V_I = 12\text{ V}$	5.7		6.3	
$\Delta V_O$	Line Regulation	$V_I = 8.5\text{ to }20\text{ V}$ $T_J = 25^\circ\text{C}$			150	mV
		$V_I = 9\text{ to }20\text{ V}$ $T_J = 25^\circ\text{C}$			100	
$\Delta V_O$	Load Regulation	$I_O = 1\text{ to }100\text{ mA}$ $T_J = 25^\circ\text{C}$			60	mV
		$I_O = 1\text{ to }40\text{ mA}$ $T_J = 25^\circ\text{C}$			30	
$I_d$	Quiescent Current	$T_J = 25^\circ\text{C}$			6	mA
		$T_J = 125^\circ\text{C}$			5.5	
$\Delta I_d$	Quiescent Current Change	$I_O = 1\text{ to }40\text{ mA}$			0.1	mA
		$V_I = 9\text{ to }20\text{ V}$			1.5	
eN	Output Noise Voltage	$B = 10\text{Hz to }100\text{kHz}$ $T_J = 25^\circ\text{C}$		50		$\mu\text{V}$
SVR	Supply Voltage Rejection	$V_I = 9\text{ to }20\text{ V}$ $f = 120\text{Hz}$ $I_O = 40\text{ mA}$ $T_J = 25^\circ\text{C}$	39	46		dB
$V_d$	Dropout Voltage			1.7		V

**ELECTRICAL CHARACTERISTICS OF LM78L08**

(refer to the test circuits,  $V_I = 14V$ ,  $I_O = 40\text{ mA}$ ,  $C_I = 0.33\ \mu\text{F}$ ,  $C_O = 0.1\ \mu\text{F}$ ,  
 $T_J = 0\text{ to }125^\circ\text{C}$  for LM78L08C,  $T_J = -40\text{ to }125^\circ\text{C}$  for LM78L08I, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage	$T_J = 25^\circ\text{C}$	7.68	8	8.32	V
$V_O$	Output Voltage	$I_O = 1\text{ to }40\text{ mA}$ $V_I = 10.5\text{ to }23\text{ V}$	7.6		8.4	V
		$I_O = 1\text{ to }70\text{ mA}$ $V_I = 14\text{ V}$	7.6		8.4	
$\Delta V_O$	Line Regulation	$V_I = 10.5\text{ to }23\text{ V}$ $T_J = 25^\circ\text{C}$			175	mV
		$V_I = 11\text{ to }23\text{ V}$ $T_J = 25^\circ\text{C}$			125	
$\Delta V_O$	Load Regulation	$I_O = 1\text{ to }100\text{ mA}$ $T_J = 25^\circ\text{C}$			80	mV
		$I_O = 1\text{ to }40\text{ mA}$ $T_J = 25^\circ\text{C}$			40	
$I_d$	Quiescent Current	$T_J = 25^\circ\text{C}$			6	mA
		$T_J = 125^\circ\text{C}$			5.5	
$\Delta I_d$	Quiescent Current Change	$I_O = 1\text{ to }40\text{ mA}$			0.1	mA
		$V_I = 11\text{ to }23\text{ V}$			1.5	
eN	Output Noise Voltage	$B = 10\text{Hz to }100\text{kHz}$ $T_J = 25^\circ\text{C}$		60		$\mu\text{V}$
SVR	Supply Voltage Rejection	$V_I = 12\text{ to }23\text{ V}$ $f = 120\text{Hz}$ $I_O = 40\text{ mA}$ $T_J = 25^\circ\text{C}$	37	45		dB
$V_d$	Dropout Voltage			1.7		V

**ELECTRICAL CHARACTERISTICS OF LM78L09**

 (refer to the test circuits,  $V_I = 15V$ ,  $I_O = 40\text{ mA}$ ,  $C_I = 0.33\text{ }\mu\text{F}$ ,  $C_O = 0.1\text{ }\mu\text{F}$ ,  
 $T_J = 0\text{ to }125^\circ\text{C}$  for L78L09C,  $T_J = -40\text{ to }125^\circ\text{C}$  for L78L09I, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage	$T_J = 25^\circ\text{C}$	8.64	9	9.36	V
$V_O$	Output Voltage	$I_O = 1\text{ to }40\text{ mA}$ $V_I = 11.5\text{ to }23\text{ V}$	8.55		9.45	V
		$I_O = 1\text{ to }70\text{ mA}$ $V_I = 15\text{ V}$	8.55		9.45	
$\Delta V_O$	Line Regulation	$V_I = 11.5\text{ to }23\text{ V}$ $T_J = 25^\circ\text{C}$			225	mV
		$V_I = 12\text{ to }23\text{ V}$ $T_J = 25^\circ\text{C}$			150	
$\Delta V_O$	Load Regulation	$I_O = 1\text{ to }100\text{ mA}$ $T_J = 25^\circ\text{C}$			80	mV
		$I_O = 1\text{ to }40\text{ mA}$ $T_J = 25^\circ\text{C}$			40	
$I_d$	Quiescent Current	$T_J = 25^\circ\text{C}$			6	mA
		$T_J = 125^\circ\text{C}$			5.5	
$\Delta I_d$	Quiescent Current Change	$I_O = 1\text{ to }40\text{ mA}$			0.1	mA
		$V_I = 12\text{ to }23\text{ V}$			1.5	
eN	Output Noise Voltage	$B = 10\text{Hz to }100\text{KHz}$ $T_J = 25^\circ\text{C}$		70		$\mu\text{V}$
SVR	Supply Voltage Rejection	$V_I = 12\text{ to }23\text{ V}$ $f = 120\text{Hz}$ $I_O = 40\text{ mA}$ $T_J = 25^\circ\text{C}$	37	44		dB
$V_d$	Dropout Voltage			1.7		V

**ELECTRICAL CHARACTERISTICS OF LM78L10**

 (refer to the test circuits,  $V_I = 16V$ ,  $I_O = 40\text{ mA}$ ,  $C_I = 0.33\text{ }\mu\text{F}$ ,  $C_O = 0.1\text{ }\mu\text{F}$ ,  
 $T_J = 0\text{ to }125^\circ\text{C}$  for LM78L10C,  $T_J = -40\text{ to }125^\circ\text{C}$  for LM78L10I, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage	$T_J = 25^\circ\text{C}$	9.6	10	10.4	V
$V_O$	Output Voltage	$I_O = 1\text{ to }40\text{ mA}$ $V_I = 12.5\text{ to }23\text{ V}$	9.5		10.5	V
		$I_O = 1\text{ to }70\text{ mA}$ $V_I = 16\text{ V}$	9.5		10.5	
$\Delta V_O$	Line Regulation	$V_I = 12.5\text{ to }23\text{ V}$ $T_J = 25^\circ\text{C}$			230	mV
		$V_I = 13\text{ to }23\text{ V}$ $T_J = 25^\circ\text{C}$			170	
$\Delta V_O$	Load Regulation	$I_O = 1\text{ to }100\text{ mA}$ $T_J = 25^\circ\text{C}$			80	mV
		$I_O = 1\text{ to }40\text{ mA}$ $T_J = 25^\circ\text{C}$			40	
$I_d$	Quiescent Current	$T_J = 25^\circ\text{C}$			6	mA
		$T_J = 125^\circ\text{C}$			5.5	
$\Delta I_d$	Quiescent Current Change	$I_O = 1\text{ to }40\text{ mA}$			0.1	mA
		$V_I = 13\text{ to }23\text{ V}$			1.5	
eN	Output Noise Voltage	$B = 10\text{Hz to }100\text{KHz}$ $T_J = 25^\circ\text{C}$		60		$\mu\text{V}$
SVR	Supply Voltage Rejection	$V_I = 14\text{ to }23\text{ V}$ $f = 120\text{Hz}$ $I_O = 40\text{ mA}$ $T_J = 25^\circ\text{C}$	37	45		dB
$V_d$	Dropout Voltage			1.7		V

**ELECTRICAL CHARACTERISTICS OF LM78L12**

 (refer to the test circuits,  $V_I = 19V$ ,  $I_O = 40\text{ mA}$ ,  $C_I = 0.33\text{ }\mu\text{F}$ ,  $C_O = 0.1\text{ }\mu\text{F}$ ,  
 $T_J = 0\text{ to }125^\circ\text{C}$  for LM78L12C,  $T_J = -40\text{ to }125^\circ\text{C}$  for LM78L12I, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage	$T_J = 25^\circ\text{C}$	11.5	12	12.5	V
$V_O$	Output Voltage	$I_O = 1\text{ to }40\text{ mA}$ $V_I = 14.5\text{ to }27\text{ V}$	11.4		12.6	V
		$I_O = 1\text{ to }70\text{ mA}$ $V_I = 19\text{ V}$	11.4		12.6	
$\Delta V_O$	Line Regulation	$V_I = 14.5\text{ to }27\text{ V}$ $T_J = 25^\circ\text{C}$			250	mV
		$V_I = 16\text{ to }27\text{ V}$ $T_J = 25^\circ\text{C}$			200	
$\Delta V_O$	Load Regulation	$I_O = 1\text{ to }100\text{ mA}$ $T_J = 25^\circ\text{C}$			100	mV
		$I_O = 1\text{ to }40\text{ mA}$ $T_J = 25^\circ\text{C}$			50	
$I_d$	Quiescent Current	$T_J = 25^\circ\text{C}$			6.5	mA
		$T_J = 125^\circ\text{C}$			6	
$\Delta I_d$	Quiescent Current Change	$I_O = 1\text{ to }40\text{ mA}$			0.1	mA
		$V_I = 16\text{ to }27\text{ V}$			1.5	
eN	Output Noise Voltage	$B = 10\text{Hz to }100\text{KHz}$ $T_J = 25^\circ\text{C}$		80		$\mu\text{V}$
SVR	Supply Voltage Rejection	$V_I = 15\text{ to }25\text{ V}$ $f = 120\text{Hz}$ $I_O = 40\text{ mA}$ $T_J = 25^\circ\text{C}$	37	42		dB
$V_d$	Dropout Voltage			1.7		V

**ELECTRICAL CHARACTERISTICS OF LM78L15**

(refer to the test circuits,  $V_I = 19V$ ,  $I_O = 40\text{ mA}$ ,  $C_I = 0.33\text{ }\mu\text{F}$ ,  $C_O = 0.1\text{ }\mu\text{F}$ ,  
 $T_J = 0\text{ to }125^\circ\text{C}$  for LM78L15C,  $T_J = -40\text{ to }125^\circ\text{C}$  for LM78L15I, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage	$T_J = 25^\circ\text{C}$	14.4	15	15.6	V
$V_O$	Output Voltage	$I_O = 1\text{ to }40\text{ mA}$ $V_I = 17.5\text{ to }30\text{ V}$	14.25		15.75	V
		$I_O = 1\text{ to }70\text{ mA}$ $V_I = 23\text{ V}$	14.25		15.75	
$\Delta V_O$	Line Regulation	$V_I = 17.5\text{ to }30\text{ V}$ $T_J = 25^\circ\text{C}$			300	mV
		$V_I = 20\text{ to }30\text{ V}$ $T_J = 25^\circ\text{C}$			250	
$\Delta V_O$	Load Regulation	$I_O = 1\text{ to }100\text{ mA}$ $T_J = 25^\circ\text{C}$			150	mV
		$I_O = 1\text{ to }40\text{ mA}$ $T_J = 25^\circ\text{C}$			75	
$I_d$	Quiescent Current	$T_J = 25^\circ\text{C}$			6.5	mA
		$T_J = 125^\circ\text{C}$			6	
$\Delta I_d$	Quiescent Current Change	$I_O = 1\text{ to }40\text{ mA}$			0.1	mA
		$V_I = 20\text{ to }30\text{ V}$			1.5	
eN	Output Noise Voltage	$B = 10\text{Hz to }100\text{KHz}$ $T_J = 25^\circ\text{C}$		90		$\mu\text{V}$
SVR	Supply Voltage Rejection	$V_I = 18.5\text{ to }28.5\text{ V}$ $f = 120\text{Hz}$ $I_O = 40\text{ mA}$ $T_J = 25^\circ\text{C}$	34	39		dB
$V_d$	Dropout Voltage			1.7		V

**ELECTRICAL CHARACTERISTICS OF LM78L18**

(refer to the test circuits,  $V_I = 27V$ ,  $I_O = 40\text{ mA}$ ,  $C_I = 0.33\text{ }\mu\text{F}$ ,  $C_O = 0.1\text{ }\mu\text{F}$ ,  
 $T_J = 0\text{ to }125^\circ\text{C}$  for LM78L18C,  $T_J = -40\text{ to }125^\circ\text{C}$  for LM78L18I, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage	$T_J = 25^\circ\text{C}$	17.3	18	18.7	V
$V_O$	Output Voltage	$I_O = 1\text{ to }40\text{ mA}$ $V_I = 22\text{ to }33\text{ V}$	17.1		18.9	V
		$I_O = 1\text{ to }70\text{ mA}$ $V_I = 27\text{ V}$	17.1		18.9	
$\Delta V_O$	Line Regulation	$V_I = 21\text{ to }33\text{ V}$ $T_J = 25^\circ\text{C}$			320	mV
		$V_I = 22\text{ to }33\text{ V}$ $T_J = 25^\circ\text{C}$			270	
$\Delta V_O$	Load Regulation	$I_O = 1\text{ to }100\text{ mA}$ $T_J = 25^\circ\text{C}$			170	mV
		$I_O = 1\text{ to }40\text{ mA}$ $T_J = 25^\circ\text{C}$			85	
$I_d$	Quiescent Current	$T_J = 25^\circ\text{C}$			6.5	mA
		$T_J = 125^\circ\text{C}$			6	
$\Delta I_d$	Quiescent Current Change	$I_O = 1\text{ to }40\text{ mA}$			0.1	mA
		$V_I = 23\text{ to }33\text{ V}$			1.5	
eN	Output Noise Voltage	$B = 10\text{Hz to }100\text{KHz}$ $T_J = 25^\circ\text{C}$		120		$\mu\text{V}$
SVR	Supply Voltage Rejection	$V_I = 23\text{ to }33\text{ V}$ $f = 120\text{Hz}$ $I_O = 40\text{ mA}$ $T_J = 25^\circ\text{C}$	33	38		dB
$V_d$	Dropout Voltage			1.7		V

**ELECTRICAL CHARACTERISTICS OF LM78L20**

(refer to the test circuits,  $V_I = 29V$ ,  $I_O = 40\text{ mA}$ ,  $C_I = 0.33\text{ }\mu\text{F}$ ,  $C_O = 0.1\text{ }\mu\text{F}$ ,  
 $T_J = 0\text{ to }125^\circ\text{C}$  for LM78L20C,  $T_J = -40\text{ to }125^\circ\text{C}$  for LM78L20I, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage	$T_J = 25^\circ\text{C}$	19.2	20	20.8	V
$V_O$	Output Voltage	$I_O = 1\text{ to }40\text{ mA}$ $V_I = 24\text{ to }33\text{ V}$	19		21	V
		$I_O = 1\text{ to }70\text{ mA}$ $V_I = 29\text{ V}$	19		21	
$\Delta V_O$	Line Regulation	$V_I = 22.5\text{ to }34\text{ V}$ $T_J = 25^\circ\text{C}$			330	mV
		$V_I = 24\text{ to }34\text{ V}$ $T_J = 25^\circ\text{C}$			280	
$\Delta V_O$	Load Regulation	$I_O = 1\text{ to }100\text{ mA}$ $T_J = 25^\circ\text{C}$			180	mV
		$I_O = 1\text{ to }40\text{ mA}$ $T_J = 25^\circ\text{C}$			90	
$I_d$	Quiescent Current	$T_J = 25^\circ\text{C}$			6.5	mA
		$T_J = 125^\circ\text{C}$			6	
$\Delta I_d$	Quiescent Current Change	$I_O = 1\text{ to }40\text{ mA}$			0.1	mA
		$V_I = 25\text{ to }33\text{ V}$			1.5	
eN	Output Noise Voltage	$B = 10\text{Hz to }100\text{KHz}$ $T_J = 25^\circ\text{C}$		120		$\mu\text{V}$
SVR	Supply Voltage Rejection	$V_I = 25\text{ to }35\text{ V}$ $f = 120\text{Hz}$ $I_O = 40\text{ mA}$ $T_J = 25^\circ\text{C}$	32	38		dB
$V_d$	Dropout Voltage			1.7		V

**ELECTRICAL CHARACTERISTICS OF LM78L24**

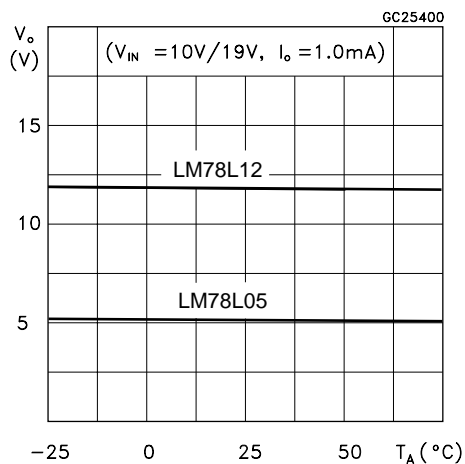
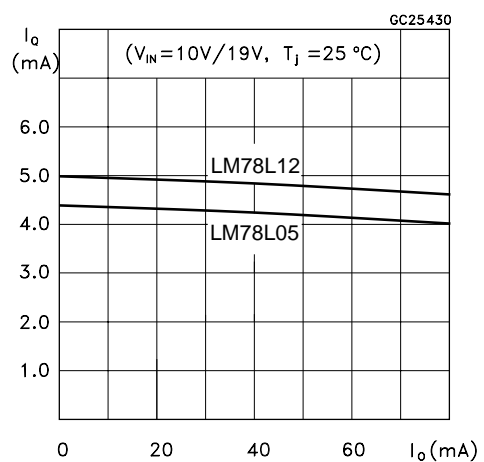
 (refer to the test circuits,  $V_I = 27V$ ,  $I_O = 40\text{ mA}$ ,  $C_I = 0.33\ \mu\text{F}$ ,  $C_O = 0.1\ \mu\text{F}$ ,  
 $T_J = 0\text{ to }125^\circ\text{C}$  for LM78L24C,  $T_J = -40\text{ to }125^\circ\text{C}$  for LM78L24I, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage	$T_J = 25^\circ\text{C}$	23	24	25	V
$V_O$	Output Voltage	$I_O = 1\text{ to }40\text{ mA}$ $V_I = 27\text{ to }38\text{ V}$	22.8		25.2	V
		$I_O = 1\text{ to }70\text{ mA}$ $V_I = 33\text{ V}$	22.8		25.2	
$\Delta V_O$	Line Regulation	$V_I = 27\text{ to }38\text{ V}$ $T_J = 25^\circ\text{C}$			350	mV
		$V_I = 28\text{ to }38\text{ V}$ $T_J = 25^\circ\text{C}$			300	
$\Delta V_O$	Load Regulation	$I_O = 1\text{ to }100\text{ mA}$ $T_J = 25^\circ\text{C}$			200	mV
		$I_O = 1\text{ to }40\text{ mA}$ $T_J = 25^\circ\text{C}$			100	
$I_d$	Quiescent Current	$T_J = 25^\circ\text{C}$			6.5	mA
		$T_J = 125^\circ\text{C}$			6	
$\Delta I_d$	Quiescent Current Change	$I_O = 1\text{ to }40\text{ mA}$			0.1	mA
		$V_I = 28\text{ to }38\text{ V}$			1.5	
eN	Output Noise Voltage	$B = 10\text{Hz to }100\text{KHz}$ $T_J = 25^\circ\text{C}$		200		$\mu\text{V}$
SVR	Supply Voltage Rejection	$V_I = 23\text{ to }33\text{ V}$ $f = 120\text{Hz}$ $I_O = 40\text{ mA}$ $T_J = 25^\circ\text{C}$	31	37		dB
$V_d$	Dropout Voltage			1.7		V

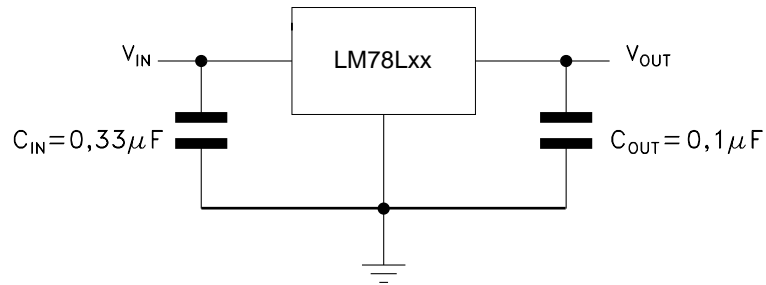
**ELECTRICAL CHARACTERISTICS OF LM78L33**

 (refer to the test circuits,  $V_I = 36\text{ V}$ ,  $I_O = 40\text{ mA}$ ,  $C_I = 0.33\ \mu\text{F}$ ,  $C_O = 0.1\ \mu\text{F}$ ,  
 $T_J = 0\text{ to }125^\circ\text{C}$  for LM78L33C,  $T_J = -40\text{ to }125^\circ\text{C}$  for LM78L33I, unless otherwise specified)

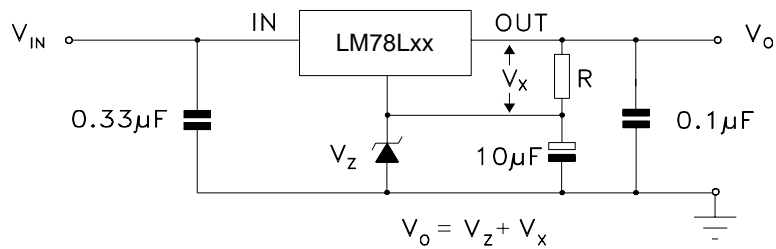
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage	$T_J = 25^\circ\text{C}$	31.68	33	34.32	V
$V_O$	Output Voltage	$I_O = 1\text{ to }40\text{ mA}$ $V_I = 36\text{ to }40\text{ V}$	31.35		34.65	V
		$I_O = 1\text{ to }70\text{ mA}$ $V_I = 38\text{ V}$	31.35		34.65	
$\Delta V_O$	Line Regulation	$V_I = 36\text{ to }40\text{ V}$ $T_J = 25^\circ\text{C}$			150	mV
		$V_I = 37\text{ to }40\text{ V}$ $T_J = 25^\circ\text{C}$			100	
$\Delta V_O$	Load Regulation	$I_O = 1\text{ to }100\text{ mA}$ $T_J = 25^\circ\text{C}$			60	mV
		$I_O = 1\text{ to }40\text{ mA}$ $T_J = 25^\circ\text{C}$			30	
$I_d$	Quiescent Current	$T_J = 25^\circ\text{C}$			6	mA
		$T_J = 125^\circ\text{C}$			5.5	
$\Delta I_d$	Quiescent Current Change	$I_O = 1\text{ to }40\text{ mA}$			0.1	mA
		$V_I = 36\text{ to }40\text{ V}$			1.5	
eN	Output Noise Voltage	$B = 10\text{Hz to }100\text{KHz}$ $T_J = 25^\circ\text{C}$		120		$\mu\text{V}$
SVR	Supply Voltage Rejection	$V_I = 36\text{ to }40\text{ V}$ $f = 120\text{Hz}$ $I_O = 40\text{ mA}$ $T_J = 25^\circ\text{C}$	41	49		dB
$V_d$	Dropout Voltage			1.7		V

**Figure 1 : 78L05/12 Output Voltage vs Ambient Temperature**

**Figure 2: 78L05/12 Quiescent Current vs Output Current**


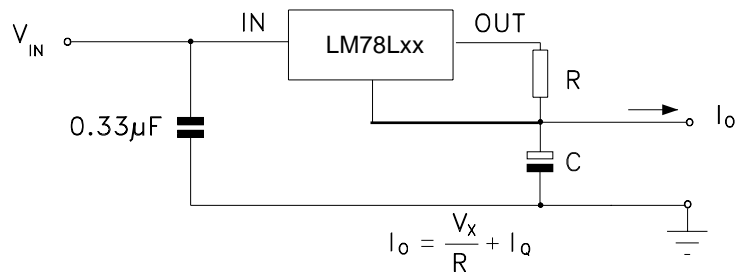
TEST CIRCUITS



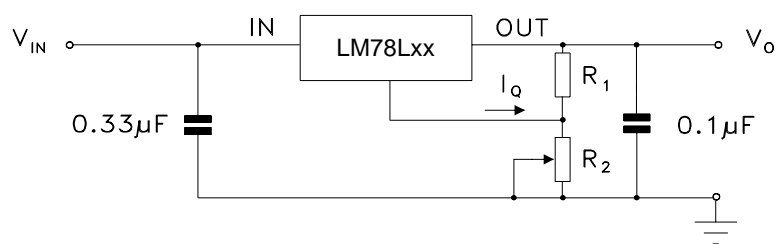
Edit Boost Circuit



Current Regulator

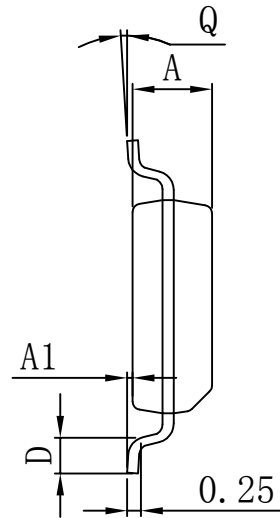
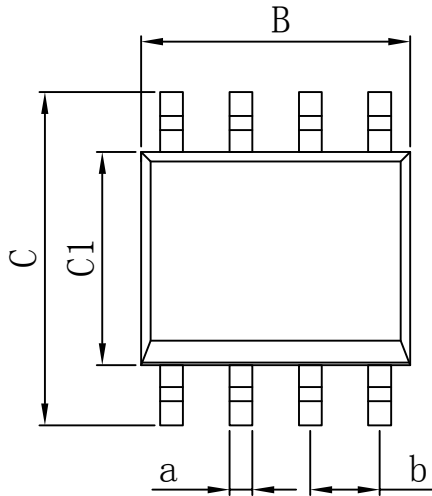


Adjustable Output Regulator



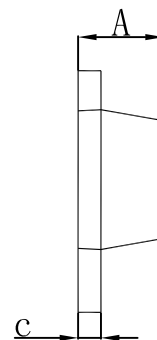
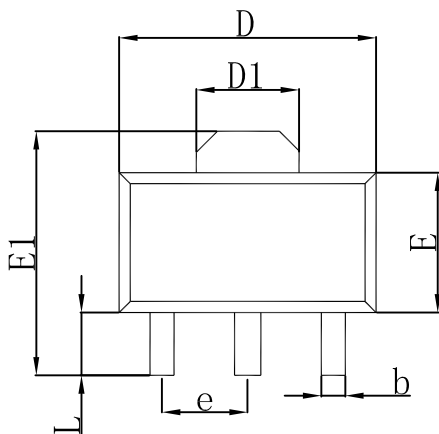
**PACKAGE**

SOP8



Dimensions In Millimeters					
Symbol :	Min :	Max :	Symbol :	Min :	Max :
A	1.225	1.570	D	0.400	0.950
A1	0.100	0.250	Q	0°	8°
B	4.800	5.100	a	0.420 TYP	
C	5.800	6.250	b	1.270 TYP	
C1	3.800	4.000			

SOT89-3L

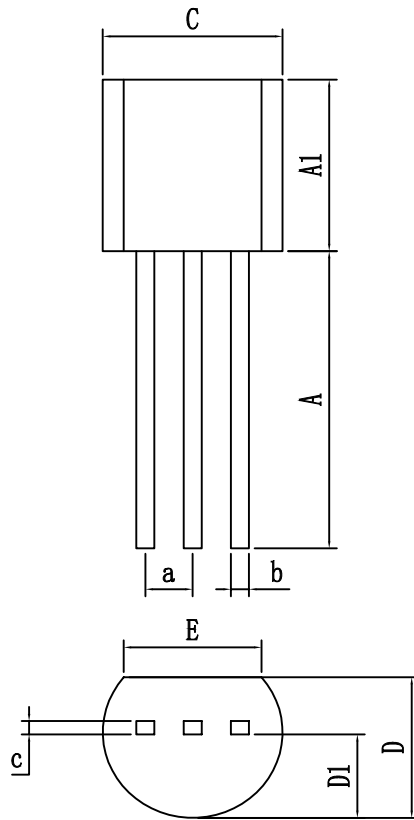


Dimensions In Millimeters					
Symbol :	Min :	Max :	Symbol :	Min :	Max :
A	1.400	1.600	c	0.350	0.440
E	2.300	2.600	D1	1.550 REF	
E1	3.940	4.250	b	0.450 TYP	
D	4.400	4.600	e	1.500 TYP	
L	0.900	1.200			



**PACKAGE**

TO-92



Dimensions In Millimeters					
Symbol :	Min :	Max :	Symbol :	Min :	Max :
A	11.200	12.700	E	3.430	3.830
A1	4.320	5.340	a	1.270 TYP	
C	4.440	5.210	b	0.485 TYP	
D	3.170	4.190	c	0.380 TYP	
D1	2.030	2.670			

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