

RoHS Compliant Product

A suffix of "-C" specifies halogen or lead -free

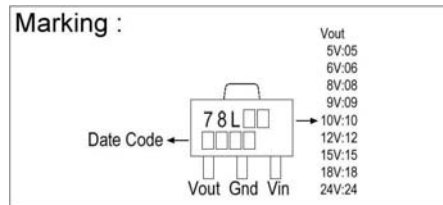
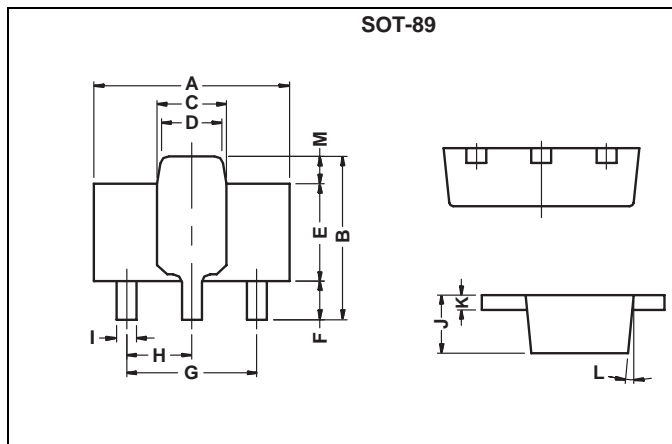
## DESCRIPTION

The SM78LXX series of positive regulators are available in the SOT-89 package and with 5V, 6V, 8V, 9V, 10V, 12V, 15V, 18V and 24V fixed output voltages, making it useful in a wide range of applications. These regulators can provide local on-card regulation, eliminating the distribution problems associated with single point regulation. Each type employs internal current limiting, thermal shut-down and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 100mA output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents. SM78LXX is characterized for operation from 0°C to +125°C.

## FEATURES

- Internal Short-Circuit Current Limiting
- Internal Thermal Overload Protection
- No External Components Required

## PACKAGE DIMENSIONS



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.40	4.60	G	3.00	REF.
B	4.05	4.25	H	1.50	REF.
C	1.50	1.70	I	0.40	0.52
D	1.30	1.50	J	1.40	1.60
E	2.40	2.60	K	0.35	0.41
F	0.89	1.20	L	5° TYP.	
			M	0.70 REF.	

## MAXIMUM RATINGS

Parameter	Ratings	Units
Input Voltage	SM78L05 ~ 10	30
	SM78L12 ~ 18	35
	SM78L24	40
Output Current	100	mA
Operating Junction Temperature Range	0 ~ 125	°C
Storage Temperature Range	-55 ~ 150	
Power Dissipation	350*	mW

\*When tested in free air condition, without heat sinking.

### SM78L05 ELECTRICAL CHARACTERISTICS

(Refer to the test circuits,  $T_j=0\sim 125\text{ }^\circ\text{C}$ ,  $I_o=40\text{mA}$ ,  $V_{IN}=10\text{V}$ ,  $C_{IN}=0.33\text{ }\mu\text{F}$ ,  $C_o=0.1\text{ }\mu\text{F}$  unless otherwise specified) (Note 1)

Symbol		Test Conditions	Min	Typ	Max	Units
$V_o$	A-Rank (3%)	$V_{IN}=10\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$ $7\text{V} \leq V_{IN} \leq 20\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	4.85	5.0	5.15	V
	B-Rank (5%)	$7\text{V} \leq V_{IN} \leq V_{max}$ , $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)	4.75	-	5.25	
$\Delta V_o$ (Line Regulation)		$7\text{V} \leq V_{IN} \leq 20\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	18	75	mV
		$8\text{V} \leq V_{IN} \leq 20\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	10	54	
$\Delta V_o$ (Load Regulation)		$V_{IN}=10\text{V}$ , $1\text{mA} \leq I_o \leq 100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	20	60	mV
		$V_{IN}=10\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	5	30	
$I_q$		$V_{IN}=10\text{V}$ , $I_o=0\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	3.0	5.0	mA
$\Delta I_q$		$V_{IN}=10\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	-	-	0.1	mA
		$8\text{V} \leq V_{IN} \leq 20\text{V}$ , $I_o=40\text{mA}$	-	-	1.0	
$V_N$		$10\text{Hz} \leq f \leq 100\text{KHz}$	-	40	-	$\mu\text{V}$
$RR$		$8\text{V} \leq V_{IN} \leq 20\text{V}$ , $f=120\text{Hz}$ , $T_j=25\text{ }^\circ\text{C}$ , $I_o=40\text{mA}$	47	62	-	dB
$V_D$		$I_o=100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	1.7	-	V
$\Delta V_o/\Delta T_j$		$I_o=5\text{mA}$ , $0\text{ }^\circ\text{C} \leq T_j \leq 125\text{ }^\circ\text{C}$	-	-0.65	-	$\text{mV}/\text{ }^\circ\text{C}$

### SM78L06 ELECTRICAL CHARACTERISTICS

(Refer to the test circuits,  $T_j=0\sim 125\text{ }^\circ\text{C}$ ,  $I_o=40\text{mA}$ ,  $V_{IN}=12\text{V}$ ,  $C_{IN}=0.33\text{ }\mu\text{F}$ ,  $C_o=0.1\text{ }\mu\text{F}$  unless otherwise specified) (Note 1)

Symbol		Test Conditions	Min	Typ	Max	Units
$V_o$	A-Rank (3%)	$V_{IN}=12\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$ $8.5\text{V} \leq V_{IN} \leq 20\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	5.82	6.0	6.18	V
	B-Rank (5%)	$8.5\text{V} \leq V_{IN} \leq V_{max}$ , $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)	5.70	-	6.30	
$\Delta V_o$ (Line Regulation)		$8.5\text{V} \leq V_{IN} \leq 20\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	64	175	mV
		$9\text{V} \leq V_{IN} \leq 20\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	54	125	
$\Delta V_o$ (Load Regulation)		$V_{IN}=12\text{V}$ , $1\text{mA} \leq I_o \leq 100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	12.8	80	mV
		$V_{IN}=12\text{V}$ , $1\text{mA} \leq I_o \leq 70\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	5.8	40	
$I_q$		$V_{IN}=12\text{V}$ , $I_o=0\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	3.9	6.0	mA
$\Delta I_q$		$V_{IN}=12\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	-	-	0.1	mA
		$9\text{V} \leq V_{IN} \leq 20\text{V}$ , $I_o=40\text{mA}$	-	-	1.5	
$V_N$		$10\text{Hz} \leq f \leq 100\text{KHz}$	-	49	-	$\mu\text{V}$
$RR$		$10\text{V} \leq V_{IN} \leq 20\text{V}$ , $I_o=40\text{mA}$ , $f=120\text{Hz}$ , $T_j=25\text{ }^\circ\text{C}$	40	46	-	dB
$V_D$		$I_o=100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	1.7	-	V
$\Delta V_o/\Delta T_j$		$I_o=5\text{mA}$ , $0\text{ }^\circ\text{C} \leq T_j \leq 125\text{ }^\circ\text{C}$	-	0.75	-	$\text{mV}/\text{ }^\circ\text{C}$

### SM78L08 ELECTRICAL CHARACTERISTICS

(Refer to the test circuits,  $T_j=0\sim 125\text{ }^\circ\text{C}$ ,  $I_o=40\text{mA}$ ,  $V_{IN}=14\text{V}$ ,  $C_{IN}=0.33\text{ }\mu\text{F}$ ,  $C_o=0.1\text{ }\mu\text{F}$  unless otherwise specified) (Note 1)

Symbol		Test Conditions	Min	Typ	Max	Units
$V_o$	A-Rank (3%)	$V_{IN}=14\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$ $10.5\text{V} \leq V_{IN} \leq 23\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	7.76	8.0	8.24	V
	B-Rank (5%)	$10.5\text{V} \leq V_{IN} \leq V_{max}$ , $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)	7.60	-	8.40	
$\Delta V_o$ (Line Regulation)		$10.5\text{V} \leq V_{IN} \leq 23\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	10	175	mV
		$11\text{V} \leq V_{IN} \leq 23\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	8	125	
$\Delta V_o$ (Load Regulation)		$V_{IN}=14\text{V}$ , $1\text{mA} \leq I_o \leq 100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	15	80	mV
		$V_{IN}=14\text{V}$ , $1\text{mA} \leq I_o \leq 70\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	8	40	
$I_q$		$V_{IN}=14\text{V}$ , $I_o=0\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	2.0	5.5	mA
$\Delta I_q$		$V_{IN}=14\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	-	-	0.1	mA
		$11\text{V} \leq V_{IN} \leq 23\text{V}$ , $I_o=40\text{mA}$	-	-	1.5	
$V_N$		$10\text{Hz} \leq f \leq 100\text{KHz}$	-	49	-	$\mu\text{V}$
$RR$		$11\text{V} \leq V_{IN} \leq 21\text{V}$ , $I_o=40\text{mA}$ , $f=120\text{Hz}$ , $T_j=25\text{ }^\circ\text{C}$	39	45	-	dB
$V_D$		$I_o=100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	1.7	-	V
$\Delta V_o/\Delta T_j$		$I_o=5\text{mA}$ , $0\text{ }^\circ\text{C} \leq T_j \leq 125\text{ }^\circ\text{C}$	-	0.75	-	$\text{mV}/\text{ }^\circ\text{C}$

### SM78L09 ELECTRICAL CHARACTERISTICS

(Refer to the test circuits,  $T_j=0\sim 125\text{ }^\circ\text{C}$ ,  $I_o=40\text{mA}$ ,  $V_{IN}=15\text{V}$ ,  $C_{IN}=0.33\text{ }\mu\text{F}$ ,  $C_o=0.1\text{ }\mu\text{F}$  unless otherwise specified) (Note 1)

Symbol		Test Conditions	Min	Typ	Max	Units
$V_o$	A-Rank (3%)	$V_{IN}=15\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$ $11.5\text{V} \leq V_{IN} \leq 24\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	8.73	9.0	9.27	V
	B-Rank (5%)	$11.5\text{V} \leq V_{IN} \leq V_{max}$ , $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)	8.55	-	9.45	
$\Delta V_o$ (Line Regulation)		$11.5\text{V} \leq V_{IN} \leq 24\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	90	200	mV
		$13\text{V} \leq V_{IN} \leq 24\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	100	150	
$\Delta V_o$ (Load Regulation)		$V_{IN}=15\text{V}$ , $1\text{mA} \leq I_o \leq 100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	20	90	mV
		$V_{IN}=15\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	10	45	
$I_q$		$V_{IN}=15\text{V}$ , $I_o=0\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	2.0	6.0	mA
$\Delta I_q$		$V_{IN}=15\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	-	-	0.1	mA
		$13\text{V} \leq V_{IN} \leq 24\text{V}$ , $I_o=40\text{mA}$	-	-	1.5	
$V_N$		$10\text{Hz} \leq f \leq 100\text{KHz}$	-	49	-	$\mu\text{V}$
$RR$		$12\text{V} \leq V_{IN} \leq 23\text{V}$ , $I_o=40\text{mA}$ , $f=120\text{Hz}$ , $T_j=25\text{ }^\circ\text{C}$	38	44	-	dB
$V_D$		$I_o=100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	1.7	-	V
$\Delta V_o/\Delta T_j$		$I_o=5\text{mA}$ , $0\text{ }^\circ\text{C} \leq T_j \leq 125\text{ }^\circ\text{C}$	-	0.75	-	mV/ $^\circ\text{C}$

### SM78L10 ELECTRICAL CHARACTERISTICS

(Refer to the test circuits,  $T_j=0\sim 125\text{ }^\circ\text{C}$ ,  $I_o=40\text{mA}$ ,  $V_{IN}=17\text{V}$ ,  $C_{IN}=0.33\text{ }\mu\text{F}$ ,  $C_o=0.1\text{ }\mu\text{F}$  unless otherwise specified) (Note 1)

Symbol		Test Conditions	Min	Typ	Max	Units
$V_o$	A-Rank (3%)	$V_{IN}=17\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$ $13\text{V} \leq V_{IN} \leq 25\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	9.70	10.0	10.30	V
	B-Rank (5%)	$13\text{V} \leq V_{IN} \leq V_{max}$ , $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)	9.50	-	10.50	
$\Delta V_o$ (Line Regulation)		$13\text{V} \leq V_{IN} \leq 25\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	51	175	mV
		$14\text{V} \leq V_{IN} \leq 25\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	42	125	
$\Delta V_o$ (Load Regulation)		$V_{IN}=17\text{V}$ , $1\text{mA} \leq I_o \leq 100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	20	90	mV
		$V_{IN}=17\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	11	40	
$I_q$		$V_{IN}=17\text{V}$ , $I_o=0\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	4.2	6.0	mA
$\Delta I_q$		$V_{IN}=17\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	-	-	0.1	mA
		$14\text{V} \leq V_{IN} \leq 25\text{V}$ , $I_o=40\text{mA}$	-	-	1.5	
$V_N$		$10\text{Hz} \leq f \leq 100\text{KHz}$	-	62	-	$\mu\text{V}$
$RR$		$15\text{V} \leq V_{IN} \leq 25\text{V}$ , $I_o=40\text{mA}$ , $f=120\text{Hz}$ , $T_j=25\text{ }^\circ\text{C}$	37	44	-	dB
$V_D$		$I_o=100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	1.7	-	V

### SM78L12 ELECTRICAL CHARACTERISTICS

(Refer to the test circuits,  $T_j=0\sim 125\text{ }^\circ\text{C}$ ,  $I_o=40\text{mA}$ ,  $V_{IN}=19\text{V}$ ,  $C_{IN}=0.33\text{ }\mu\text{F}$ ,  $C_o=0.1\text{ }\mu\text{F}$  unless otherwise specified) (Note 1)

Symbol		Test Conditions	Min	Typ	Max	Units
$V_o$	A-Rank (3%)	$V_{IN}=19\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$ $14.5\text{V} \leq V_{IN} \leq 27\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	11.64	12.0	12.36	V
	B-Rank (5%)	$14.5\text{V} \leq V_{IN} \leq V_{max}$ , $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)	11.40	-	12.60	
$\Delta V_o$ (Line Regulation)		$14.5\text{V} \leq V_{IN} \leq 27\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	25	300	mV
		$16\text{V} \leq V_{IN} \leq 27\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	20	250	
$\Delta V_o$ (Load Regulation)		$V_{IN}=19\text{V}$ , $1\text{mA} \leq I_o \leq 100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	25	150	mV
		$V_{IN}=19\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	12	75	
$I_q$		$V_{IN}=19\text{V}$ , $I_o=0\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	2.0	6.0	mA
$\Delta I_q$		$V_{IN}=19\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	-	-	0.1	mA
		$16\text{V} \leq V_{IN} \leq 27\text{V}$ , $I_o=40\text{mA}$	-	-	1.5	
$V_N$		$10\text{Hz} \leq f \leq 100\text{KHz}$	-	80	-	$\mu\text{V}$
$RR$		$15\text{V} \leq V_{IN} \leq 25\text{V}$ , $I_o=40\text{mA}$ , $f=120\text{Hz}$ , $T_j=25\text{ }^\circ\text{C}$	37	65	-	dB
$V_D$		$I_o=100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	1.7	-	V
$\Delta V_o/\Delta T_j$		$I_o=5\text{mA}$ , $0\text{ }^\circ\text{C} \leq T_j \leq 125\text{ }^\circ\text{C}$	-	-1.0	-	mV/ $^\circ\text{C}$

### SM78L15 ELECTRICAL CHARACTERISTICS

(Refer to the test circuits,  $T_j=0\sim 125\text{ }^\circ\text{C}$ ,  $I_o=40\text{mA}$ ,  $V_{IN}=23\text{V}$ ,  $C_{IN}=0.33\text{ }\mu\text{F}$ ,  $C_o=0.1\text{ }\mu\text{F}$  unless otherwise specified) (Note 1)

Symbol		Test Conditions	Min	Typ	Max	Units
$V_o$	A-Rank (3%)	$V_{IN}=23\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$ $17.5\text{V} \leq V_{IN} \leq 30\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	14.55	15.0	15.45	V
	B-Rank (5%)	$17.5\text{V} \leq V_{IN} \leq V_{max}$ , $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)	14.25	-	15.75	
$\Delta V_o$ (Line Regulation)		$17.5\text{V} \leq V_{IN} \leq 30\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	25	150	mV
		$20\text{V} \leq V_{IN} \leq 30\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	15	75	
$\Delta V_o$ (Load Regulation)		$V_{IN}=23\text{V}$ , $1\text{mA} \leq I_o \leq 100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	20	150	mV
		$V_{IN}=23\text{V}$ , $1\text{mA} \leq I_o \leq 70\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	25	150	
$I_q$		$V_{IN}=23\text{V}$ , $I_o=0\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	2.2	6.5	mA
$\Delta I_q$		$V_{IN}=23\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	-	-	0.1	mA
		$20\text{V} \leq V_{IN} \leq 30\text{V}$ , $I_o=40\text{mA}$	-	-	1.5	
$V_N$		$10\text{Hz} \leq f \leq 100\text{KHz}$	-	90	-	$\mu\text{V}$
RR		$18.5\text{V} \leq V_{IN} \leq 28.5\text{V}$ , $I_o=40\text{mA}$ , $f=120\text{Hz}$ , $T_j=25\text{ }^\circ\text{C}$	34	63	-	dB
$V_D$		$I_o=100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	1.7	-	V
$\Delta V_o/\Delta T_j$		$I_o=5\text{mA}$ , $0\text{ }^\circ\text{C} \leq T_j \leq 125\text{ }^\circ\text{C}$	-	-1.3	-	$\text{mV}/\text{ }^\circ\text{C}$

### SM78L18 ELECTRICAL CHARACTERISTICS

(Refer to the test circuits,  $T_j=0\sim 125\text{ }^\circ\text{C}$ ,  $I_o=40\text{mA}$ ,  $V_{IN}=27\text{V}$ ,  $C_{IN}=0.33\text{ }\mu\text{F}$ ,  $C_o=0.1\text{ }\mu\text{F}$  unless otherwise specified) (Note 1)

Symbol		Test Conditions	Min	Typ	Max	Units
$V_o$	A-Rank (3%)	$V_{IN}=27\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$ $21\text{V} \leq V_{IN} \leq 33\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	17.46	18.0	18.54	V
	B-Rank (5%)	$21\text{V} \leq V_{IN} \leq V_{max}$ , $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)	17.10	-	18.9	
$\Delta V_o$ (Line Regulation)		$21\text{V} \leq V_{IN} \leq 33\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	145	300	mV
		$22\text{V} \leq V_{IN} \leq 33\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	135	250	
$\Delta V_o$ (Load Regulation)		$V_{IN}=27\text{V}$ , $1\text{mA} \leq I_o \leq 100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	30	170	mV
		$V_{IN}=27\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	15	85	
$I_q$		$V_{IN}=27\text{V}$ , $I_o=0\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	2.0	6.0	mA
$\Delta I_q$		$V_{IN}=27\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	-	-	0.1	mA
		$21\text{V} \leq V_{IN} \leq 33\text{V}$ , $I_o=40\text{mA}$	-	-	1.5	
$V_N$		$10\text{Hz} \leq f \leq 100\text{KHz}$	-	150	-	$\mu\text{V}$
RR		$23\text{V} \leq V_{IN} \leq 33\text{V}$ , $I_o=40\text{mA}$ , $f=120\text{Hz}$ , $T_j=25\text{ }^\circ\text{C}$	34	48	-	dB
$V_D$		$I_o=100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	1.7	-	V
$\Delta V_o/\Delta T_j$		$I_o=5\text{mA}$ , $0\text{ }^\circ\text{C} \leq T_j \leq 125\text{ }^\circ\text{C}$	-	-1.8	-	$\text{mV}/\text{ }^\circ\text{C}$

### SM78L24 ELECTRICAL CHARACTERISTICS

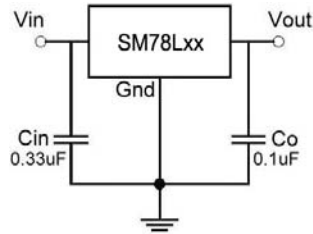
(Refer to the test circuits,  $T_j=0\sim 125\text{ }^\circ\text{C}$ ,  $I_o=40\text{mA}$ ,  $V_{IN}=33\text{V}$ ,  $C_{IN}=0.33\text{ }\mu\text{F}$ ,  $C_o=0.1\text{ }\mu\text{F}$  unless otherwise specified) (Note 1)

Symbol		Test Conditions	Min	Typ	Max	Units
$V_o$	A-Rank (3%)	$V_{IN}=33\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$ $27\text{V} \leq V_{IN} \leq 38\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	23.28	24.0	24.72	V
	B-Rank (5%)	$27\text{V} \leq V_{IN} \leq V_{max}$ , $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)	22.80	-	25.20	
$\Delta V_o$ (Line Regulation)		$27\text{V} \leq V_{IN} \leq 38\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	160	300	mV
		$28\text{V} \leq V_{IN} \leq 38\text{V}$ , $I_o=40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	150	250	
$\Delta V_o$ (Load Regulation)		$V_{IN}=33\text{V}$ , $1\text{mA} \leq I_o \leq 100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	40	200	mV
		$V_{IN}=33\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	20	100	
$I_q$		$V_{IN}=33\text{V}$ , $I_o=0\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	2.2	6.0	mA
$\Delta I_q$		$V_{IN}=33\text{V}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$	-	-	0.1	mA
		$27\text{V} \leq V_{IN} \leq 38\text{V}$ , $I_o=40\text{mA}$	-	-	1.5	
$V_N$		$10\text{Hz} \leq f \leq 100\text{KHz}$	-	200	-	$\mu\text{V}$
RR		$27\text{V} \leq V_{IN} \leq 38\text{V}$ , $I_o=40\text{mA}$ , $f=120\text{Hz}$ , $T_j=25\text{ }^\circ\text{C}$	34	45	-	dB
$V_D$		$I_o=100\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	-	1.7	-	V
$\Delta V_o/\Delta T_j$		$I_o=5\text{mA}$ , $0\text{ }^\circ\text{C} \leq T_j \leq 125\text{ }^\circ\text{C}$	-	-2.0	-	$\text{mV}/\text{ }^\circ\text{C}$

Note1: The Maximum steady state usable output current is dependent on input voltage, heat sinking, lead length of the package and copper of PCB. The data above represent pulse test conditions with junction temperatures specified at the initiation of test.

Note2: Power dissipation < 0.5W

**TYPICAL APPLICATION**



**CHARACTERISTICS CURVE**

