

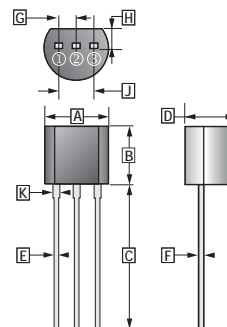
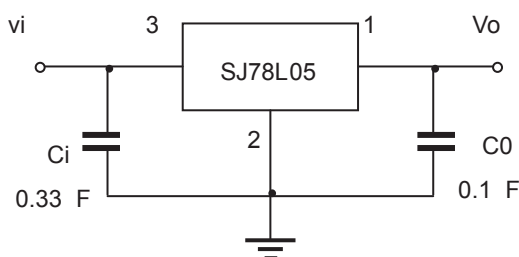
RoHS Compliant Product
A suffix of “-C” specifies halogen and lead-free

FEATURES

- Maximum output current I_O : 0.1A
- Output voltage V_O : 5V
- Continuous total dissipation P_D : 0.625W ($T_A=25^\circ\text{C}$)

TO-92

TYPICAL APPLICATION



MARKING

CJ78L05

REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.40	4.70	F	0.36	0.51
B	4.30	4.70	G	1.27 TYP.	
C	12.70	-	H	1.10	-
D	3.30	3.81	J	2.42	2.66
E	0.36	0.56	K	0.36	0.76

PINNING

1. Out
2. Ground
3. IN

ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

PARAMETER	SYMBOL	VALUE	UNITS
Input Voltage	V_I	30	V
Operating Junction and Storage Temperature Range	T_{OPR}, T_{STG}	0~125, -55~150	$^\circ\text{C}$

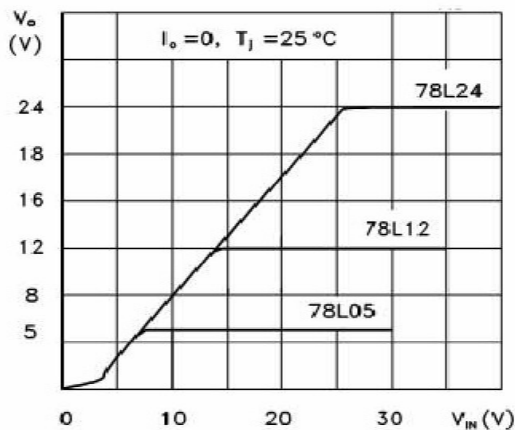
ELECTRICAL CHARACTERISTICS

(At specified virtual junction temperature, $V_I=10\text{V}$, $I_O=40\text{mA}$, $C_I=0.33\mu\text{F}$, $C_O=0.1\mu\text{F}$ unless otherwise specified)

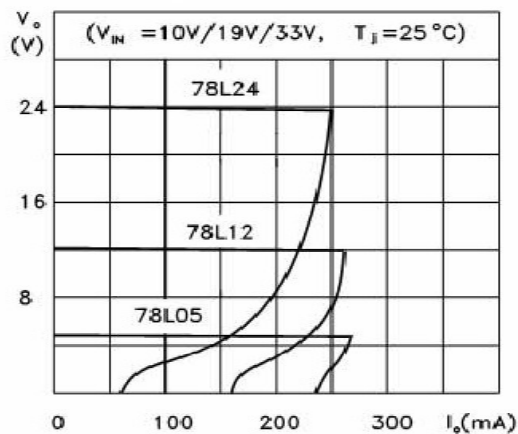
PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION
Output Voltage	V_O	4.8	5.0	5.2	V	$T_J=25^\circ\text{C}$,
		4.75	5.0	5.25	V	$7\text{V} \leq V_I \leq 20\text{V}$, $I_O=1\text{mA} \sim 40\text{mA}$, $T_J=0 \sim 125^\circ\text{C}$
		4.75	5.0	5.25	V	$I_O=1\text{mA} \sim 70\text{mA}$, $T_J=0 \sim 125^\circ\text{C}$
Load Regulation	ΔV_O	-	15	60	mV	$I_O=1\text{mA} \sim 100\text{mA}$, $T_J=25^\circ\text{C}$
		-	8	30	mV	$I_O=1\text{mA} \sim 40\text{mA}$, $T_J=25^\circ\text{C}$
Line Regulation	ΔV_O	-	32	150	mV	$7\text{V} \leq V_I \leq 20\text{V}$
		-	26	100	mV	$8\text{V} \leq V_I \leq 20\text{V}$, $T_J=25^\circ\text{C}$
Quiescent Current	I_Q	-	3.8	6	mA	$T_J=25^\circ\text{C}$
Quiescent Current Change	ΔI_Q	-	-	1.5	mA	$8\text{V} \leq V_I \leq 20\text{V}$, $T_J=0 \sim 125^\circ\text{C}$
	ΔI_Q	-	-	0.1	mA	$1\text{mA} \leq V_I \leq 40\text{mA}$, $T_J=0 \sim 125^\circ\text{C}$
Output Noise Voltage	V_N	-	42	-	μV	$10\text{Hz} \leq f \leq 100\text{KHz}$, $T_J=25^\circ\text{C}$
Ripple Rejection	RR	41	49	-	dB	$8\text{V} \leq V_I \leq 20\text{V}$, $f=120\text{Hz}$, $T_J=0 \sim 125^\circ\text{C}$
Drop Out Voltage	V_D	-	1.7	-	C	$T_J=25^\circ\text{C}$

TYPICAL APPLICATION

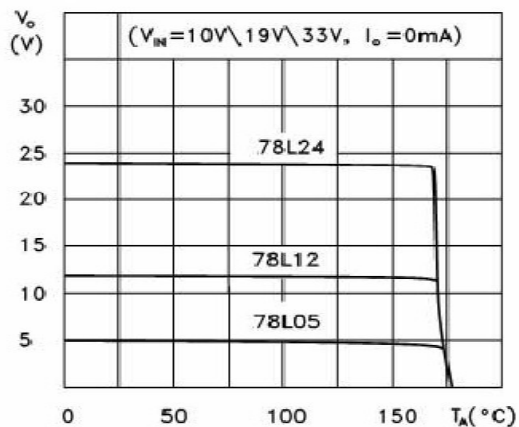
Output Characteristics



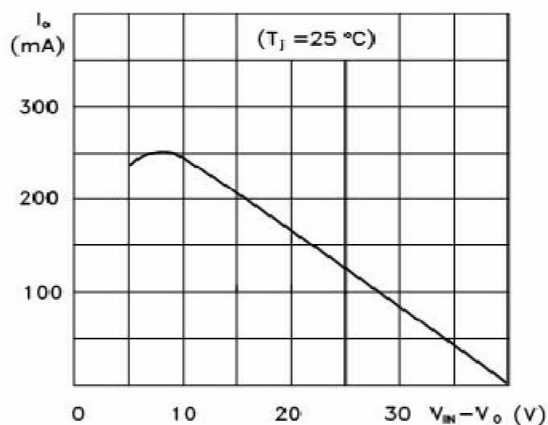
Load Characteristics



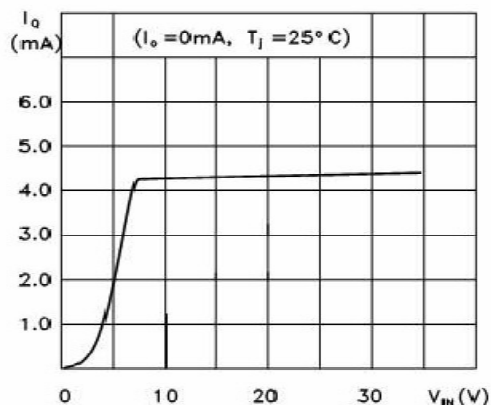
Thermal Shutdown



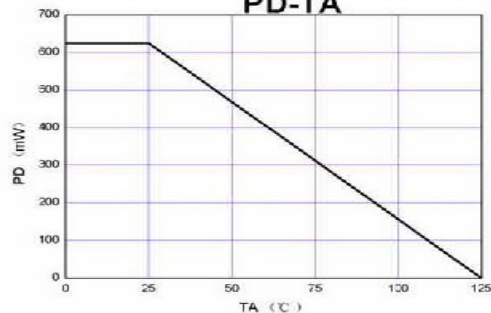
Short Circuit Output Current



Quiescent Current vs Input Voltage



PD-TA



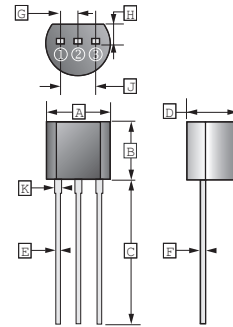
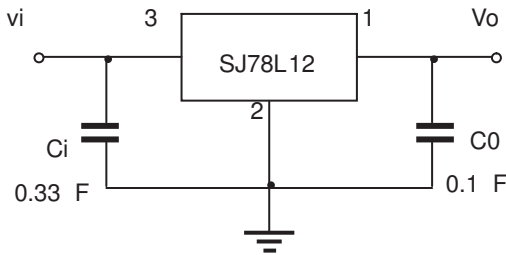
RoHS Compliant Product
A suffix of "-C" specifies halogen and lead-free

FEATURES

- Maximum output current I_o : 0.1A
- Output voltage V_o : 12V
- Continuous total dissipation P_D : 0.625W

TO-92

TYPICAL APPLICATION



MARKING

CJ78L12

REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.40	4.70	F	0.36	0.51
B	4.30	4.70	G	1.27 TYP.	
C	12.70	-	H	1.10	-
D	3.30	3.81	J	2.42	2.66
E	0.36	0.56	K	0.36	0.76

PINNING

1. Out
2. Ground
3. IN

ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

PARAMETER	SYMBOL	VALUE	UNITS
Input Voltage	V_i	35	V
Operating Junction and Storage Temperature Range	T_{OPR}, T_{STG}	0~125, -55~150	°C

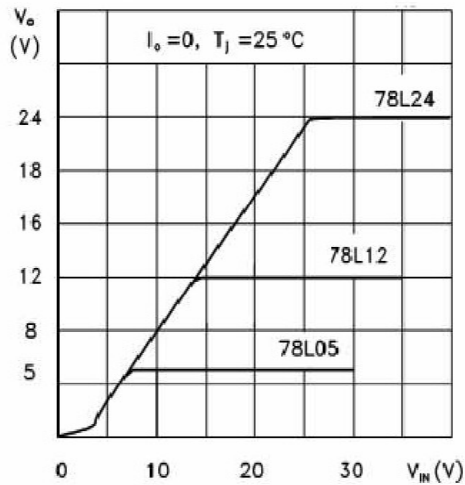
ELECTRICAL CHARACTERISTICS

(At specified virtual junction temperature, $V_i=19V$, $I_o=40mA$, $C_i=0.33\mu F$, $C_o=0.1\mu F$ unless otherwise specified)

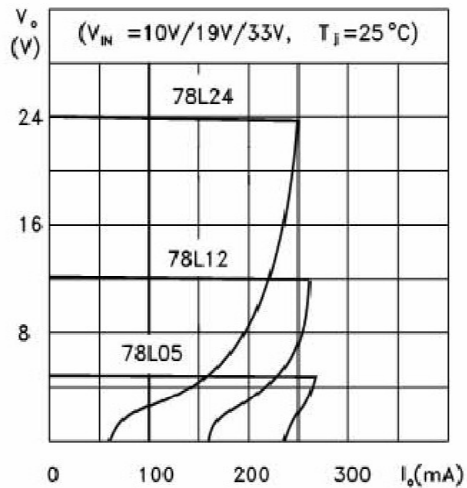
PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION
Output Voltage	V_o	11.5	12	12.5	V	$T_j=25\text{ }^\circ\text{C}$,
		11.4	12	12.6	V	$14V \leq V_i \leq 27V$, $I_o=1mA \sim 40mA$, $T_j=0 \sim 125\text{ }^\circ\text{C}$
		11.4	12	12.6	V	$I_o=1mA \sim 70mA$, $T_j=0 \sim 125\text{ }^\circ\text{C}$
Load Regulation	ΔV_o	-	22	100	mV	$I_o=1mA \sim 100mA$, $T_j=25\text{ }^\circ\text{C}$
		-	13	50	mV	$I_o=1mA \sim 40mA$, $T_j=25\text{ }^\circ\text{C}$
Line Regulation	ΔV_o	-	55	250	mV	$14.5V \leq V_i \leq 27V$, $T_j=25\text{ }^\circ\text{C}$
		-	49	200	mV	$16V \leq V_i \leq 27V$, $T_j=25\text{ }^\circ\text{C}$
Quiescent Current	I_q	-	4.3	6.5	mA	$T_j=25\text{ }^\circ\text{C}$
Quiescent Current Change	ΔI_q	-	-	1.5	mA	$16V \leq V_i \leq 27V$, $T_j=0 \sim 125\text{ }^\circ\text{C}$
		-	-	0.1	mA	$1mA \leq V_i \leq 40mA$, $T_j=0 \sim 125\text{ }^\circ\text{C}$
Output Noise Voltage	V_N	-	70	-	μV	$10Hz \leq f \leq 100KHz$, $T_j=25\text{ }^\circ\text{C}$
Ripple Rejection	RR	37	42	-	dB	$15V \leq V_i \leq 25V$, $f=120Hz$, $T_j=0 \sim 125\text{ }^\circ\text{C}$
Drop Out Voltage	V_D	-	1.7	-	C	$T_j=25\text{ }^\circ\text{C}$

TYPICAL APPLICATION

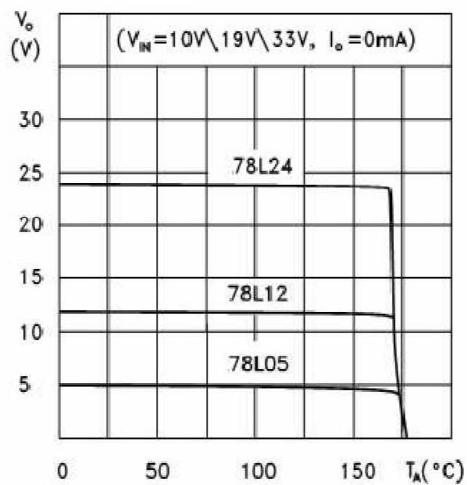
Output Characteristics



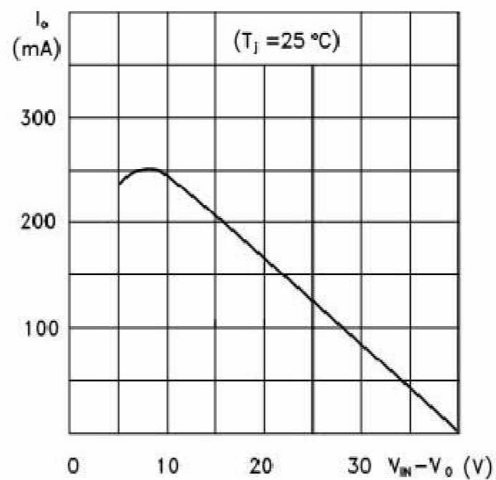
Load Characteristics



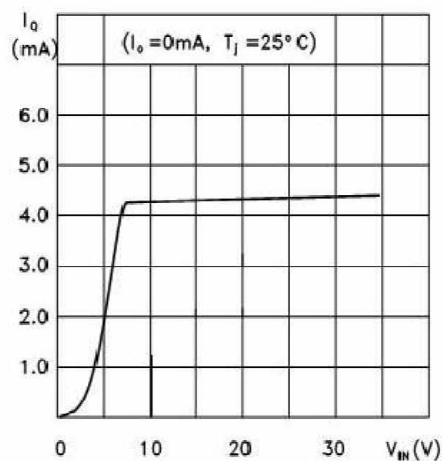
Thermal Shutdown



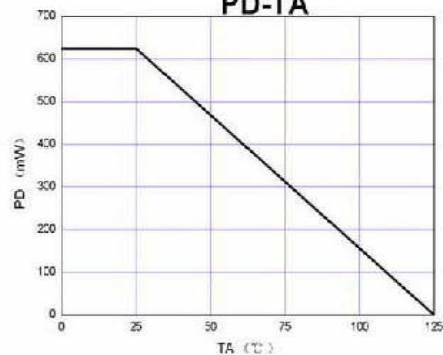
Short Circuit Output Current



Quiescent Current vs Input Voltage



PD-TA

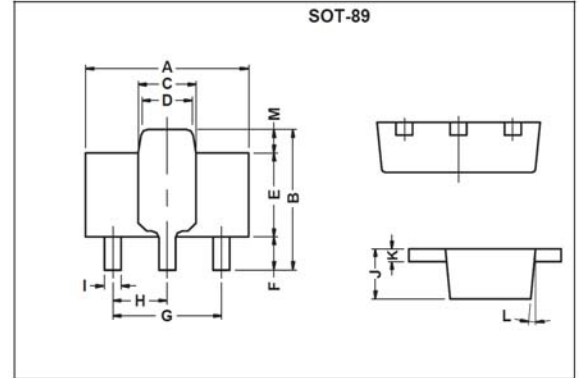


RoHS Compliant Product

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

DESCRIPTION

The SM78LXX-B 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.

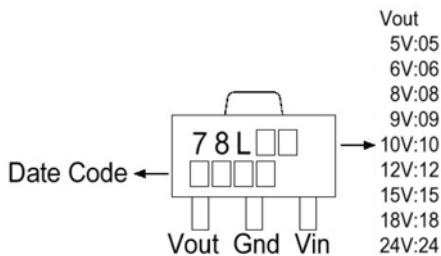


REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.40	4.60	G	3.00	REF.
B	4.05	4.25	H	1.50	REF.
C	1.50	1.70	I	0.40	0.52
D	1.30	1.50	J	1.40	1.60
E	2.40	2.60	K	0.35	0.41
F	0.89	1.20	L	5° TYP.	
			M	0.70 REF.	

FEATURES

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

MARKING



PACKAGE INFORMATION

Package	MPQ	LeaderSize
SOT-89	1K	7' inch

MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit	
Input Voltage	5V ~ 10V	V_{IN}	30	V
	12V ~ 18V	V_{IN}	35	V
	24V	V_{IN}	40	V
Output Current	I_o	100	mA	
Operating Junction Temperature Range	T_J	0 ~ 125	°C	
Storage Temperature Range	T_{stg}	-55 ~ 150		
Power Dissipation	P_D	350 *		

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

SM78L05-B ELECTRICAL CHARACTERISTICS

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

Symbol		Test Conditions	Min	Typ	Max	Unit
V_o	B-Rank (5%)	$V_{IN}=10\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	4.75	5.0	5.25	V
		$7\text{V} \leq V_{IN} \leq 20\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$ $7\text{V} \leq V_{IN} \leq V_{max}$, $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)				
ΔV_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	
ΔV_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
ΔI_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	-	μV
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	-	mV/ $^\circ\text{C}$

SM78L06-B ELECTRICAL CHARACTERISTICS

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

Symbol		Test Conditions	Min	Typ	Max	Unit
V_o	B-Rank (5%)	$V_{IN}=12\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	5.70	6.0	6.30	V
		$8.5\text{V} \leq V_{IN} \leq 20\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$ $8.5\text{V} \leq V_{IN} \leq V_{max}$, $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)				
ΔV_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	
ΔV_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
ΔI_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	-	μV
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	-	mV/ $^\circ\text{C}$

SM78L08-B ELECTRICAL CHARACTERISTICS

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

Symbol		Test Conditions	Min	Typ	Max	Unit
V_o	B-Rank (5%)	$V_{IN}=14\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	7.60	8.0	8.40	V
		$10.5\text{V} \leq V_{IN} \leq 23\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$ $10.5\text{V} \leq V_{IN} \leq V_{max}$, $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)				
ΔV_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	
ΔV_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
ΔI_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	-	μV
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	-	mV/ $^\circ\text{C}$

SM78L09-B ELECTRICAL CHARACTERISTICS

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

Symbol		Test Conditions	Min	Typ	Max	Unit
V_o	B-Rank (5%)	$V_{IN}=15\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $11.5\text{V} \leq V_{IN} \leq 24\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$ $11.5\text{V} \leq V_{IN} \leq V_{max}$, $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)	8.55	9.0	9.45	V
ΔV_o (Line Regulation)		$11.5\text{V} \leq V_{IN} \leq 24\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $13\text{V} \leq V_{IN} \leq 24\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	90 100	200 150	mV
ΔV_o (Load Regulation)		$V_{IN}=15\text{V}$, $1\text{mA} \leq I_o \leq 100\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $V_{IN}=15\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	20 10	90 45	mV
I_q		$V_{IN}=15\text{V}$, $I_o=0\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	2.0	6.0	mA
ΔI_q		$V_{IN}=15\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$ $13\text{V} \leq V_{IN} \leq 24\text{V}$, $I_o=40\text{mA}$	-	-	0.1 1.5	mA
V_N		$10\text{Hz} \leq f \leq 100\text{KHz}$	-	49	-	μV
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	-	$\text{mV}/\text{ }^\circ\text{C}$

SM78L10-B ELECTRICAL CHARACTERISTICS

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

Symbol		Test Conditions	Min	Typ	Max	Unit
V_o	B-Rank (5%)	$V_{IN}=17\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $13\text{V} \leq V_{IN} \leq 25\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$ $13\text{V} \leq V_{IN} \leq V_{max}$, $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)	9.50	10.0	10.50	V
ΔV_o (Line Regulation)		$13\text{V} \leq V_{IN} \leq 25\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $14\text{V} \leq V_{IN} \leq 25\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	51 42	175 125	mV
ΔV_o (Load Regulation)		$V_{IN}=17\text{V}$, $1\text{mA} \leq I_o \leq 100\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $V_{IN}=17\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	20 11	90 40	mV
I_q		$V_{IN}=17\text{V}$, $I_o=0\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	4.2	6.0	mA
ΔI_q		$V_{IN}=17\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$ $14\text{V} \leq V_{IN} \leq 25\text{V}$, $I_o=40\text{mA}$	-	-	0.1 1.5	mA
V_N		$10\text{Hz} \leq f \leq 100\text{KHz}$	-	62	-	μV
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-B ELECTRICAL CHARACTERISTICS

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

Symbol		Test Conditions	Min	Typ	Max	Unit
V_o	B-Rank (5%)	$V_{IN}=19\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $14.5\text{V} \leq V_{IN} \leq 27\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$ $14.5\text{V} \leq V_{IN} \leq V_{max}$, $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)	11.40	12.0	12.60	V
ΔV_o (Line Regulation)		$14.5\text{V} \leq V_{IN} \leq 27\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $16\text{V} \leq V_{IN} \leq 27\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	25 20	300 250	mV
ΔV_o (Load Regulation)		$V_{IN}=19\text{V}$, $1\text{mA} \leq I_o \leq 100\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $V_{IN}=19\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	25 12	150 75	mV
I_q		$V_{IN}=19\text{V}$, $I_o=0\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	2.0	6.0	mA
ΔI_q		$V_{IN}=19\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$ $16\text{V} \leq V_{IN} \leq 27\text{V}$, $I_o=40\text{mA}$	-	-	0.1 1.5	mA
V_N		$10\text{Hz} \leq f \leq 100\text{KHz}$	-	80	-	μV
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	-	$\text{mV}/\text{ }^\circ\text{C}$

SM78L15-B ELECTRICAL CHARACTERISTICS

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

Symbol		Test Conditions	Min	Typ	Max	Unit
V_o	B-Rank (5%)	$V_{IN}=23\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $17.5\text{V} \leq V_{IN} \leq 30\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$ $17.5\text{V} \leq V_{IN} \leq V_{max}$, $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)	14.25	15.0	15.75	V
ΔV_o (Line Regulation)		$17.5\text{V} \leq V_{IN} \leq 30\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $20\text{V} \leq V_{IN} \leq 30\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	25 15	150 75	mV
ΔV_o (Load Regulation)		$V_{IN}=23\text{V}$, $1\text{mA} \leq I_o \leq 100\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $V_{IN}=23\text{V}$, $1\text{mA} \leq I_o \leq 70\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	20 25	150 150	mV
I_q		$V_{IN}=23\text{V}$, $I_o=0\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	2.2	6.5	mA
ΔI_q		$V_{IN}=23\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$ $20\text{V} \leq V_{IN} \leq 30\text{V}$, $I_o=40\text{mA}$	-	-	0.1 1.5	mA
V_N		$10\text{Hz} \leq f \leq 100\text{KHz}$	-	90	-	μV
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-B ELECTRICAL CHARACTERISTICS

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

Symbol		Test Conditions	Min	Typ	Max	Unit
V_o	B-Rank (5%)	$V_{IN}=27\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $21\text{V} \leq V_{IN} \leq 33\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$ $21\text{V} \leq V_{IN} \leq V_{max}$, $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)	17.10	18.0	18.9	V
ΔV_o (Line Regulation)		$21\text{V} \leq V_{IN} \leq 33\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $22\text{V} \leq V_{IN} \leq 33\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	145 135	300 250	mV
ΔV_o (Load Regulation)		$V_{IN}=27\text{V}$, $1\text{mA} \leq I_o \leq 100\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $V_{IN}=27\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	30 15	170 85	mV
I_q		$V_{IN}=27\text{V}$, $I_o=0\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	2.0	6.0	mA
ΔI_q		$V_{IN}=27\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$ $21\text{V} \leq V_{IN} \leq 33\text{V}$, $I_o=40\text{mA}$	-	-	0.1 1.5	mA
V_N		$10\text{Hz} \leq f \leq 100\text{KHz}$	-	150	-	μV
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-B ELECTRICAL CHARACTERISTICS

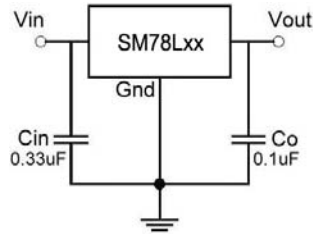
(Refer to the test circuits, $T_j=0\sim 125\text{ }^\circ\text{C}$, $I_o=40\text{mA}$, $V_{IN}=33\text{V}$, $C_{IN}=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$ unless otherwise specified) (Note 1)

Symbol		Test Conditions	Min	Typ	Max	Unit
V_o	B-Rank (5%)	$V_{IN}=33\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $27\text{V} \leq V_{IN} \leq 38\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$ $27\text{V} \leq V_{IN} \leq V_{max}$, $1\text{mA} \leq I_o \leq 70\text{mA}$ (Note 2)	22.80	24.0	25.20	V
ΔV_o (Line Regulation)		$27\text{V} \leq V_{IN} \leq 38\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $28\text{V} \leq V_{IN} \leq 38\text{V}$, $I_o=40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	160 150	300 250	mV
ΔV_o (Load Regulation)		$V_{IN}=33\text{V}$, $1\text{mA} \leq I_o \leq 100\text{mA}$, $T_j=25\text{ }^\circ\text{C}$ $V_{IN}=33\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	40 20	200 100	mV
I_q		$V_{IN}=33\text{V}$, $I_o=0\text{mA}$, $T_j=25\text{ }^\circ\text{C}$	-	2.2	6.0	mA
ΔI_q		$V_{IN}=33\text{V}$, $1\text{mA} \leq I_o \leq 40\text{mA}$ $27\text{V} \leq V_{IN} \leq 38\text{V}$, $I_o=40\text{mA}$	-	-	0.1 1.5	mA
V_N		$10\text{Hz} \leq f \leq 100\text{KHz}$	-	200	-	μV
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

