

78LXX series Positive Voltage Regulators

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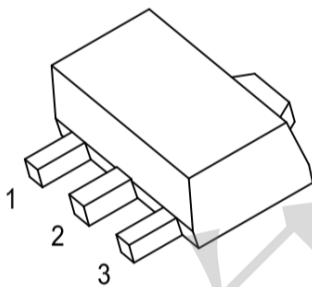
FEATURES

- Wide range of available, fixed output voltage.
(V_{OUT} : 6.0V, 9.0V, 10V)
- Low cost.
- Internal short-circuit current limiting.
- Internal thermal overload protection.
- No external components required.
- RoHS compliant with Halogen-free

1. OUT

2. GND

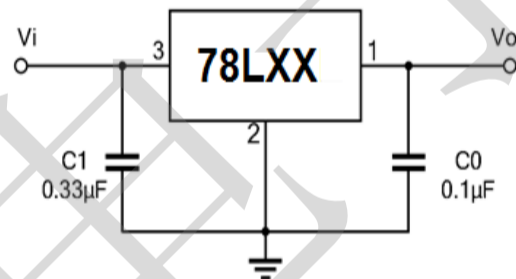
3. IN



SOT-89

APPLICATIONS

- Three-terminal positive voltage regulator.



MAXIMUM RATING operating temperature range applies unless otherwise specified

Symbol	Parameter	Value	Units
V_I	Input voltage	30	V
I_{CM}	Maximum output current	100	mA
$R_{\theta JA}$	Thermal Resistance Junction-to-Air	250	°C/W
P_D	Power dissipation ($T_A = 25^\circ\text{C}$)	500	mW
T_{OPR}	Operating Temperature Range	-40 ~ +125	°C
T_J	Junction Temperature	150	°C
T_{STG}	Storage Temperature Range	-65 ~ +150	°C

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ELECTRICAL CHARACTERISTICS

($V_{IN}=12V, I_O=40mA, 0^\circ C < T_J < 125^\circ C, C_I=0.33\mu F, C_O=0.1\mu F$, unless otherwise specified)

Parameter	Symbol	Test conditions	78L06			UNIT
			MIN	TYP	MAX	
Output voltage	V_O	$T_J=25^\circ C$ $V_I=8.5V-20V, I_O=1mA-40mA$ $V_I=8.5V, I_O=1mA-70mA$	5.75 5.7 5.7	6.0 - -	6.25 6.3 6.3	V
Load regulation	Reg_{load}	$T_J=25^\circ C, I_O=1mA-100mA$ $T_J=25^\circ C, I_O=1mA-70mA$	-	12.8 5.8	80 40	mV
Line regulation	Reg_{line}	$8.5V \leq V_I \leq 20V, T_J=25^\circ C$ $9V \leq V_I \leq 20V, T_J=25^\circ C$	-	64 54	175 125	mV
Quiescent Current	I_Q	$T_J=25^\circ C, V_{IN}=12V, I_O=40mA$ $T_J=125^\circ C, V_{IN}=12V, I_O=40mA$	- -	- 3.9	5.5 6.0	mA
Quiescent Current Change	ΔI_Q	$9V \leq V_I \leq 20V$ $1mA \leq I_O \leq 40mA$	-	-	1.5 0.1	mA
Output noise voltage	V_N	$10Hz \leq f \leq 100KHz$	-	40	-	μV
Ripple rejection	RR	$I_O=40mA, 10V \leq V_I \leq 20V, f=120Hz, T_J=25^\circ C$	40	46	-	dB
Dropout voltage	V_D	$T_J=25^\circ C, V_{IN}=12V, I_O=40mA$	-	1.7	-	V

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ELECTRICAL CHARACTERISTICS

($V_{IN}=15V, I_O=40mA, 0^{\circ}C < T_J < 125^{\circ}C, C_I=0.33\mu F, C_O=0.1\mu F$, unless otherwise specified)

Parameter	Symbol	Test conditions	78L09			UNIT
			MIN	TYP	MAX	
Output voltage	V_O	$T_J=25^{\circ}C$ $V_I=11.5V-24V, I_O=1mA-40mA$ $V_I=15V, I_O=1mA-70mA$	8.6 8.5 8.5	9.0 - -	9.4 9.5 9.5	V
Load regulation	Reg_{load}	$T_J=25^{\circ}C, I_O=1mA-100mA$ $T_J=25^{\circ}C, I_O=1mA-40mA$	-	15 8.0	90 40	mV
Line regulation	Reg_{line}	$11.5V \leq V_I \leq 24V, T_J=25^{\circ}C$ $12V \leq V_I \leq 24V, T_J=25^{\circ}C$	-	10 8	175 125	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$ $T_J=125^{\circ}C$	-	3.0 -	6.0 5.5	mA
Quiescent Current Change	ΔI_Q	$11V \leq V_I \leq 23V$ $1mA \leq I_O \leq 40mA$	-	-	1.5 0.1	mA
Output noise voltage	V_N	$T_A=25^{\circ}C, 10Hz \leq f \leq 100KHz$	-	60	-	μV
Ripple rejection	RR	$I_O=40mA, 13V \leq V_I \leq 24V, f=120Hz, T_J=25^{\circ}C$	37	57	-	dB
Dropout voltage	V_I-V_O	$T_J=25^{\circ}C, V_{IN}=15V, I_O=40mA$	-	1.7	-	V

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ELECTRICAL CHARACTERISTICS

($V_{IN}=16V, I_O=40mA, C_{IN}=0.33\mu F, C_O=0.1\mu F, T_J = 0$ to $125^\circ C$, unless otherwise specified)

Parameter	Symbol	Test conditions	78L10			UNIT
			MIN	TYP	MAX	
Output voltage	V_O	$T_J=25^\circ C$	9.6	10	10.4	V
Load regulation(Note1)	ΔReg_{load}	$I_O = 1$ to $100mA, T_J = 25^\circ C$	-	17	90	mV
		$I_O = 1$ to $40mA, T_J = 25^\circ C$	-	9	45	mV
Line regulation(Note1)	ΔReg_{line}	$V_i = 12.5$ to $25V, T_J = 25^\circ C$	-	100	210	mV
		$V_i = 13$ to $25V, T_J = 25^\circ C$	-	90	160	mV
Quiescent Current	I_Q	$T_J = 25^\circ C$	-	2.0	3.0	mA
Quiescent Current Change	ΔI_Q	$V_i = 13$ to $25V, T_J = 25^\circ C$	-	-	1.0	mA
Output Noise Voltage	V_N	$10Hz \leq f \leq 100KHz$	-	70	-	μV
Ripple Rejection	RR	$V_i = 13$ to $23V, I_O = 40mA, f = 120Hz$	42	52	-	dB
Dropout Voltage	V_D	$T_J=25^\circ C, V_{IN}=16V, I_O=40mA$	-	1.7	-	V
Dropout voltage	$V_i - V_O$	$I_O = 5mA, T_J = 0$ to $125^\circ C$	-	0.9	-	$mV/^\circ C$

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TYPICAL CHARACTERISTICS @ $T_a=25^\circ\text{C}$ unless otherwise specified

Figure 1. Dropout Characteristics

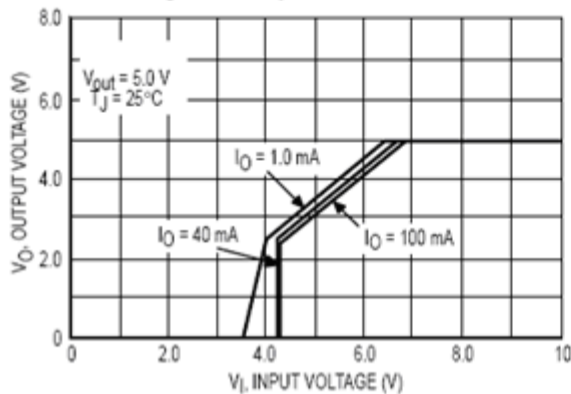


Figure 2. Dropout Voltage versus Junction Temperature

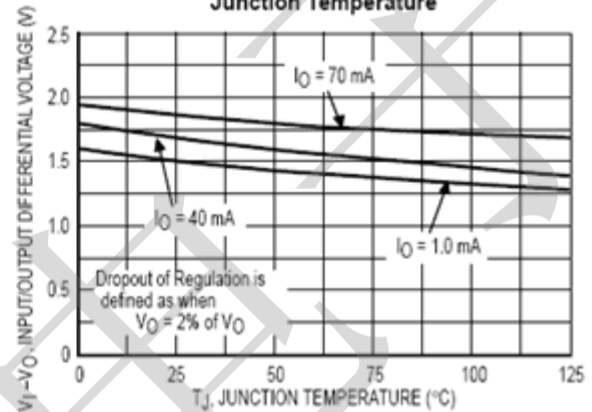


Figure 3. Input Bias Current versus Ambient Temperature

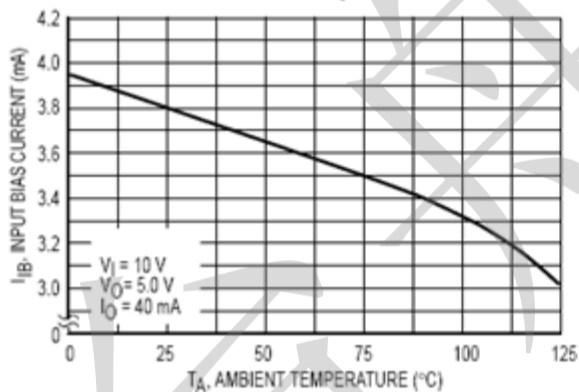


Figure 4. Input Bias Current versus Input Voltage

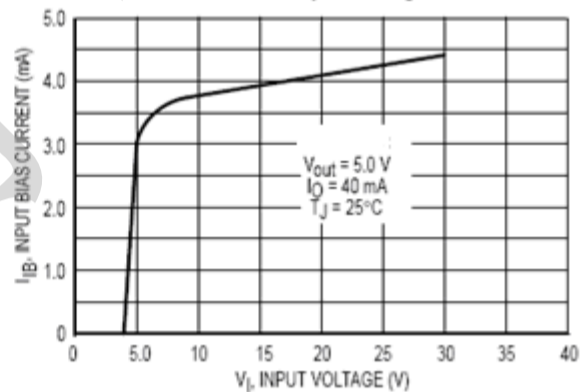
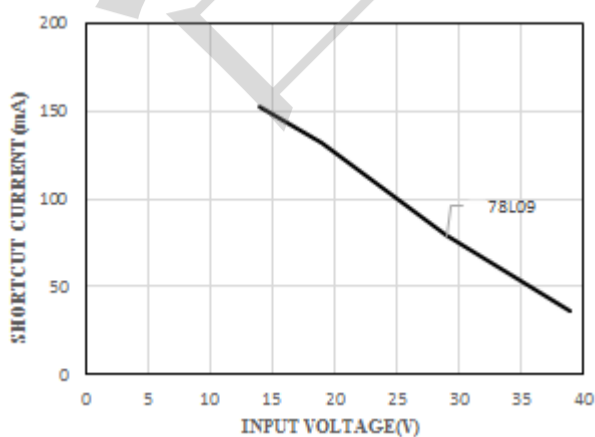
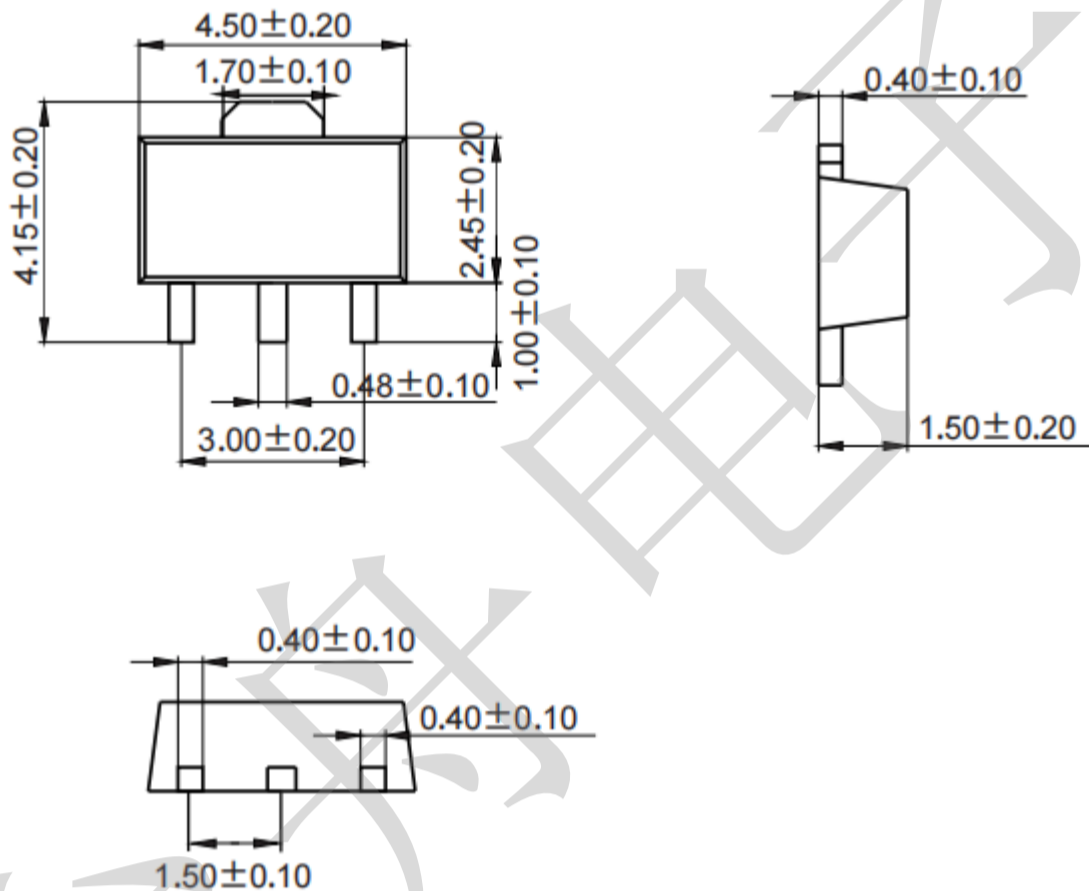


Figure 5. Shortcut Current vs. Input Voltage



Package Outline Dimensions (unit:mm)

SOT-89



Mounting Pad Layout (unit: mm)

