

MSKSEMI

SEMICONDUCTOR



ESD



TVS



TSS



MOV



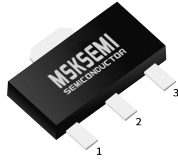
GDT



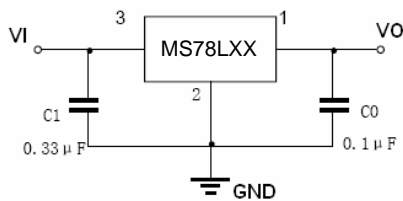
PLED

Product data sheet

www.msksemi.com



SOT-89



FEATURES

- Wide range of available, fixed output voltage.
- Low cost.
- Internal short-circuit current limiting.
- Internal thermal overload protection.
- No external components required.
- Complementary negative regulators offered (79LXX series).

APPLICATIONS

- Three-terminal positive voltage regulator.

MAXIMUM RATING operating temperature range applies unless otherwise specified

Symbol	Parameter	Value	Units
V_I	Input voltage(3.3V-9V) (10V-15V) (18V-24V)	30 35 40	V
I_{CM}	Maximum output current	100	mA
P_D	Power dissipation	500	mW
T_{OPR}	Operating junction temperature	-40 to +125	°C
T_j, T_{stg}	Storage temperature range	-40 to +150	°C

ELECTRICAL CHARACTERISTICS

 ● **MS78L33** ($V_{IN}=10V, I_O=40mA, 0^\circ C < T < 125^\circ C, C_I=0.33\mu F, C_O=0.1\mu F$, unless otherwise specified)

Parameter	Symbol	Test conditions	MS78L33			UNIT
			MIN	TYP	MAX	
Output voltage	V_O	$T_j=25^\circ C$ $5.3V \leq V_i \leq 20V, I_O=1mA-40mA$ $V_1=8.3V, I_O=1mA-70mA$	3.168 3.135 3.135	3.3	3.432 3.465 3.465	V
Load regulation	Reg_{load}	$T_j=25^\circ C, I_O=1mA-100mA$ $T_j=25^\circ C, I_O=1mA-40mA$			60 30	mV
Line regulation	Reg_{line}	$5.3V \leq V_i \leq 20V, T_j=25^\circ C$ $6.3V \leq V_i \leq 20V, T_j=25^\circ C$			150 100	mV
Input Bias Current	I_{IB}	$T_j=25^\circ C$ $T_j=125^\circ C$			6.0 5.5	mA
Input Bias Current Change	ΔI_{IB}	$6.3V \leq V_i \leq 20V$ $1mA \leq I_O \leq 40mA$			1.5 0.1	mA
Output noise voltage	V_N	$10Hz \leq f \leq 100KHz$		40		μV
Ripple rejection	RR	$I_O=40mA, 6.3V \leq V_i \leq 16.3V$ $f=120Hz, T_j=25^\circ C$	41	49		dB
Dropout voltage	V_I-V_O	$T_j=25^\circ C$		1.7		V

ELECTRICAL CHARACTERISTICS

 ● **MS78L05** ($V_{IN}=10V, I_O=40mA, 0^\circ C < T < 125^\circ C, C_I=0.33\mu F, C_O=0.1\mu F$, unless otherwise specified)

Parameter	Symbol	Test conditions	78L05			UNIT
			MIN	TYP	MAX	
Output voltage	V_O	$T_j=25^\circ C$ $7V \leq V_i \leq 20V, I_O=1mA-40mA$ $V_1=10V, I_O=1mA-70mA$	4.8 4.75 4.75	5.0	5.2 5.25 5.25	V
Load regulation	Reg_{load}	$T_j=25^\circ C, I_O=1mA-100mA$ $T_j=25^\circ C, I_O=1mA-40mA$		11 5	60 30	mV
Line regulation	Reg_{line}	$7V \leq V_i \leq 20V, T_j=25^\circ C$ $8V \leq V_i \leq 20V, T_j=25^\circ C$		55 45	150 100	mV
Input Bias Current	I_{IB}	$T_j=25^\circ C$ $T_j=125^\circ C$		3.8	6.0 5.5	mA
Input Bias Current Change	ΔI_{IB}	$8V \leq V_i \leq 20V$ $1mA \leq I_O \leq 40mA$			1.5 0.1	mA
Output noise voltage	V_N	$10Hz \leq f \leq 100KHz$		40		μV
Ripple rejection	RR	$I_O=40mA, 8V \leq V_i \leq 18V, f=120Hz$ $T_j=25^\circ C$	41	49		dB
Dropout voltage	V_I-V_O	$T_j=25^\circ C$		1.7		V

ELECTRICAL CHARACTERISTICS

-
- MS78L06**
- (
- $V_{IN}=12V, I_O=40mA, 0^\circ C < T_J < 125^\circ C, C_I=0.33\mu F, C_O=0.1\mu F$
- , unless otherwise specified)

Parameter	Symbol	Test conditions	MS78L06			UNIT
			MIN	TYP	MAX	
Output voltage	V_O	$T_J=25^\circ C$ $V_1=8.5V-20V, I_O=1mA-40mA$ $V_1=8.5V, I_O=1mA-70mA$	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
Input Bias Current	I_{IB}	$T_J=25^\circ C, V_{IN}=12V, I_O=40mA$ $T_J=125^\circ C, V_{IN}=12V, I_O=40mA$		3.9	5.5 6.0	mA
Input Bias Current Change	ΔI_{IB}	$9V \leq V_i \leq 20V$ $1mA \leq I_O \leq 40mA$			1.5 0.1	mA
Output noise voltage	V_N	$10Hz \leq f \leq 100KHz$		40		$\mu V/V_O$
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	$T_J=25^\circ C$		1.7		V

ELECTRICAL CHARACTERISTICS

-
- MS78L08**
- (
- $V_i=14V, I_O=40mA, 0^\circ C < T_J < 125^\circ C, C_I=0.33\mu F, C_O=0.1\mu F$
- , unless otherwise specified)

Parameter	Symbol	Test conditions	MS78L08			UNIT
			MIN	TYP	MAX	
Output voltage	V_O	$T_J=25^\circ C$ $10.5V \leq V_i \leq 23V, I_O=1mA-40mA$ $V_1=14V, I_O=1mA-70mA$	7.7 7.6 7.6	8.0	8.3 8.4 8.4	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	80 40	mV
Line regulation	Reg_{line}	$10.5V \leq V_i \leq 23V, T_J=25^\circ C$ $11V \leq V_i \leq 23V, T_J=25^\circ C$		20 12	175 125	mV
Input Bias Current	I_{IB}	$T_J=25^\circ C$ $T_J=125^\circ C$		3	6.0 5.5	mA
Input Bias Current Change	ΔI_{IB}	$11V \leq V_i \leq 23V$ $1mA \leq I_O \leq 40mA$			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	$I_O=40mA, 12V \leq V_i \leq 23V, f=120Hz,$ $T_J=25^\circ C$	37	57		dB
Dropout voltage	V_i-V_O	$T_J=25^\circ C$		1.7		V

ELECTRICAL CHARACTERISTICS

 ● **MS78L09** ($V_I=15V, I_O=40mA, 0^\circ C < T_J < 125^\circ C, C_I=0.33\mu F, C_O=0.1\mu F$, unless otherwise specified)

Parameter	Symbol	Test conditions	MS78L09			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}	$11.5V \leq V_I \leq 24V, T_J=25^\circ C$ $12V \leq V_I \leq 24V, T_J=25^\circ C$		20 12	175 125	mV
Input Bias Current	I_{IB}	$T_J=25^\circ C$ $T_J=125^\circ C$		3.0	6.0 5.5	mA
Input Bias Current Change	ΔI_{IB}	$11V \leq V_I \leq 23V$ $1mA \leq I_O \leq 40mA$			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	$T_J=25^\circ C$		1.7		V

ELECTRICAL CHARACTERISTICS

 ● **MS78L10** ($V_{IN}=16V, I_O=40mA, C_{IN}=0.33\mu F, C_O=0.1\mu F, T_J=0$ to $125^\circ C$, unless otherwise specified)

Parameter	Symbol	Test conditions	MS78L10			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
Input Bias Current	I_{IB}	$T_J = 25^\circ C$	-	2.0	3.0	mA
Input Bias Current Change	ΔI_{IB}	$V_I = 13$ 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	$T_J=25^\circ C$	-	1.7	-	V
Dropout voltage	V_I-V_O	$I_O = 5mA, T_J = 0$ to $125^\circ C$	-	0.9	-	$mV/^\circ C$

ELECTRICAL CHARACTERISTICS

 ● **MS78L12** ($V_i=19V, I_o=40mA, 0^\circ C < T_j < 125^\circ C, C_i=0.33\mu F, C_o=0.1\mu f$, unless otherwise specified)

Parameter	Symbol	Test conditions	MS78L12			UNIT
			MIN	TYP	MAX	
Output voltage	V_o	$T_j=25^\circ C$ $V_i=14.5V-27V, I_o=1mA-40mA$ $V_i=19V, I_o=1mA-70mA$	11.5 11.4 11.4	12	12.5 12.6 12.6	V
Load regulation	Reg_{load}	$T_j=25^\circ C, I_o=1mA-100mA$ $T_j=25^\circ C, I_o=1mA-40mA$		20 10	100 50	mV
Line regulation	Reg_{line}	$14.5V \leq V_i \leq 27V, T_j=25^\circ C$ $16V \leq V_i \leq 27V, T_j=25^\circ C$		120 100	250 200	mV
Input Bias Current	I_{IB}	$T_j=25^\circ C$ $T_j=125^\circ C$		4.2	6.5 6.0	mA
Input Bias Current Change	ΔI_{IB}	$16V \leq V_i \leq 27V$ $1mA \leq I_o \leq 40mA$			1.5 0.1	mA
Output Noise Voltage	V_N	$10Hz \leq f \leq 100KHz, T_A=25^\circ C$		80		μV
Ripple rejection	RR	$I_o=40mA, 15V \leq V_i \leq 25V, f=120Hz,$ $T_j=25^\circ C$	37	42		dB
Dropout voltage	V_i-V_o	$T_j=25^\circ C$		1.7		V

ELECTRICAL CHARACTERISTICS

 ● **MS78L15** ($V_{IS}=23V, I_o=40mA, 0^\circ C < T_j < 125^\circ C, C_i=0.33\mu F, C_o=0.1\mu f$, unless otherwise specified)

Parameter	Symbol	Test conditions	MS78L15			UNIT
			MIN	TYP	MAX	
Output voltage	V_o	$T_j=25^\circ C$ $V_i=17.5V-30V, I_o=1mA-40mA$ $V_i=23V, I_o=1mA-70mA$	14.4 14.25 14.25	15	15.6 15.75 15.75	V
Load regulation	ΔReg_{load}	$T_j=25^\circ C, I_o=1mA-100mA$ $T_j=25^\circ C, I_o=1mA-40mA$		25 12	150 75	mV
Line regulation	ΔReg_{line}	$17.5V \leq V_i \leq 30V, T_j=25^\circ C$ $20V \leq V_i \leq 30V, T_j=25^\circ C$		130 110	300 250	mV
Input Bias Current	I_{IB}	$T_j=25^\circ C$ $T_j=125^\circ C$		4.4	6.5 6.0	mA
Input Bias Current Change	ΔI_{IB}	$20V \leq V_i \leq 30V$ $1mA \leq I_o \leq 40mA$			1.5 0.1	mA
Output noise voltage	V_N	$10Hz \leq f \leq 100KHz, T_A=25^\circ C$		90		μV
Ripple rejection	RR	$I_o=40mA, 18.5V \leq V_i \leq 28.5V,$ $f=120Hz, T_j=25^\circ C$	34	39		dB
Dropout voltage	V_i-V_o	$T_j=25^\circ C$		1.7		V

ELECTRICAL CHARACTERISTICS

 ● **MS78L18** ($V_i=27V, I_o=40mA, 0^\circ C < T_j < 125^\circ C, C_i=0.33\mu F, C_o=0.1\mu f$, unless otherwise specified)

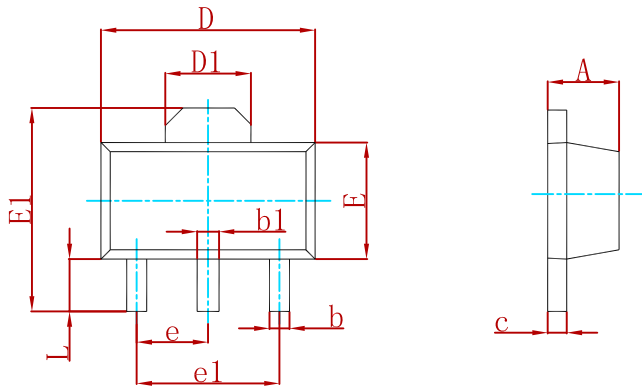
Parameter	Symbol	Test conditions	MS78L18			UNIT
			MIN	TYP	MAX	
Output voltage	V_o	$T_j=25^\circ C$ $V_i=20.7V-33V, I_o=1mA-40mA$ $V_i=27V, I_o=1mA-70mA$	17.3 17.1 17.1	18	18.7 18.9 18.9	V
Load regulation	Reg_{load}	$T_j=25^\circ C, I_o=1mA-100mA$ $T_j=25^\circ C, I_o=1mA-40mA$		30 15	170 85	mV
Line regulation	Reg_{line}	$20.7V \leq V_i \leq 33V, T_j=25^\circ C$ $21V \leq V_i \leq 33V, T_j=25^\circ C$		45 35	325 275	mV
Input Bias Current	I_{IB}	$T_j=25^\circ C$ $T_j=125^\circ C$		3.1	6.5 6.0	mA
Input Bias Current Change	ΔI_{IB}	$21V \leq V_i \leq 33V$ $1mA \leq I_o \leq 40mA$			1.5 0.1	mA
Output Noise Voltage	V_N	$10Hz \leq f \leq 100KHz, T_A=25^\circ C$		150		μV
Ripple rejection	RR	$I_o=40mA, 23V \leq V_i \leq 33V, f=120Hz,$ $T_j=25^\circ C$	33	48		dB
Dropout voltage	V_i-V_o	$T_j=25^\circ C$		1.7		V

ELECTRICAL CHARACTERISTICS

 ● **MS78L24** ($V_{IS}=33V, I_o=40mA, 0^\circ C < T_j < 125^\circ C, C_i=0.33\mu F, C_o=0.1\mu f$, unless otherwise specified)

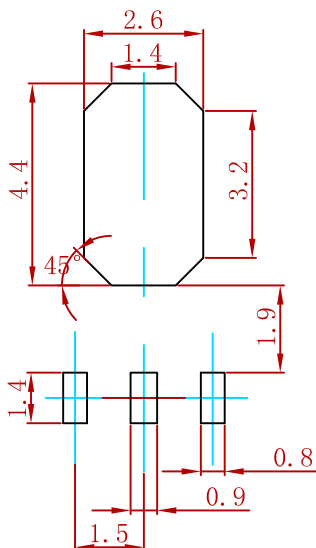
Parameter	Symbol	Test conditions	78L24			UNIT
			MIN	TYP	MAX	
Output voltage	V_o	$T_j=25^\circ C$ $V_i=27V-38V, I_o=1mA-40mA$ $V_i=27V-33V, I_o=1mA-70mA$	23 22.8 22.8	24	25 25.2 25.2	V
Load regulation	ΔReg_{load}	$T_j=25^\circ C, I_o=1mA-100mA$ $T_j=25^\circ C, I_o=1mA-40mA$		40 20	200 100	mV
Line regulation	ΔReg_{line}	$28V \leq V_i \leq 80V, T_j=25^\circ C$ $27V \leq V_i \leq 38V, T_j=25^\circ C$		50 60	300 350	mV
Input Bias Current	I_{IB}	$T_j=25^\circ C$ $T_j=125^\circ C$		3.1	6.5 6.0	mA
Input Bias Current Change	ΔI_{IB}	$28V \leq V_i \leq 38V$ $1mA \leq I_o \leq 40mA$			1.5 0.1	mA
Output noise voltage	V_N	$10Hz \leq f \leq 100KHz, T_A=25^\circ C$		200		μV
Ripple rejection	RR	$I_o=40mA, 29V \leq V_i \leq 35V,$ $f=120Hz, T_j=25^\circ C$	31	45		dB
Dropout voltage	V_i-V_o	$T_j=25^\circ C$		1.7		V

PACKAGE MECHANICAL DATA



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

Suggested Pad Layout



Note:
 1. Controlling dimension: in millimeters.
 2. General tolerance: $\pm 0.05\text{mm}$.
 3. The pad layout is for reference purposes only.

REEL SPECIFICATION

P/N	PKG	QTY
MS78XX	SOT-89	1000

Attention

- Any and all MSKSEMI Semiconductor products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your MSKSEMI Semiconductor representative nearest you before using any MSKSEMI Semiconductor products described or contained herein in such applications.
- MSKSEMI Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all MSKSEMI Semiconductor products described or contained herein.
- Specifications of any and all MSKSEMI Semiconductor products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- MSKSEMI Semiconductor strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all MSKSEMI Semiconductor products (including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of MSKSEMI Semiconductor.
- Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. MSKSEMI Semiconductor believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringement of intellectual property rights or other rights of third parties.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the MSKSEMI Semiconductor product that you intend to use.

单击下面可查看定价，库存，交付和生命周期等信息

[>>MSKSEMI\(美森科\)](#)