

3.3 to 12 V, 0.5 A Low Dropout Voltage Regulator

Overview

The L88M00T Series are low dropout voltage regulator ICs with output current of 0.5 A. Because they can operate with a low input-output voltage difference, they contribute to smaller and more efficient set power supplies, and are optimum for audio-visual and office automation equipment.

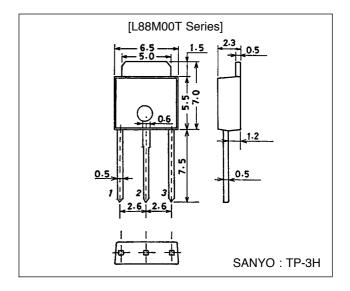
Functions and Features

- Output voltage = L88M33T: 3.3 V L88M05T: 5 V = L88M09T: 9 V L88M12T: 12 V
- 500 mA output current
- Low minimum input-output voltage differential (0.4 V typ) enables to save energy and miniaturize transformer size.
- Set size can be miniaturized with compact TP-3H power package.
- Surface mounting on board permits allowable power dissipation to be raised.
- Enhanced mount flexibility with range of formed products.

Package Dimensions

unit: mm

3103-TP-3H



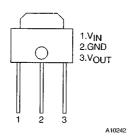
Specifications

Maximum Ratings at Ta = 25°C (common to L88M00T series)

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage	V _{IN} max		18	V
Allowable power dissipation	Pd max	Ta ≦ 25°C, no heat sink	1	W
		Tc = 25°C, with infinite heat sink	6.25	W
Thermal resistance (junction-atmosphere)	θј-а		125	°C/W
Thermal resistance (junction-to-case)	θј-с		20	°C/W
Operating temperature	Topr		-20 to +85	°C
Storage temperature	Tstg		-55 to +150	°C

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Pin Assignment



Top view

[L88M33T] Operating Conditions at Ta = 25 °C

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage	V _{IN}		4 to 17	٧
Output current	l _{OUT}		0 to 500	mA

Operating Characteristics at Tj = 25 °C, V_{IN} = 6.3 V, I_{O} = 500 mA, C_{OUT} = 100 μ F, C_{IN} = 1 μ F, see specified Test Circuit.

Parameter	Symbol	Conditions	min	typ	max	Unit
Output voltage	V _{OUT}		3.2	3.3	3.4	V
Dronout voltage	V _{DBØP1}			0.4	0.6	V
Dropout voltage	V _{DROP2}	I _O = 150 mA		0.2	0.3	V
Line regulation	ΔV_{OLN}	4 V ≦ V _{IN} ≦ 17 V		10	50	mV
Load regulation	ΔV_{OLD}	$5 \text{ mA} \leq I_{OUT} \leq 500 \text{ mA}$		24	80	mV
Peak output current	I _{OP}		600	900		mA
Output short-circuit current	losc			100	300	mA
Quiescent current	I _{Q1}	I _{OUT} = 0	/	1.9	5.0	mA
Quiescent current	I_{Q2}			24	50	mA
Output noise voltage	V_{NO}	10 Hz ≦ f ≦ 100 kHz		30		μVrms
Temperature coefficient of output voltage	ΔV _{OUT} /ΔTj	Tj = 25 to 125 °C		±0.4		mV/°C
Ripple rejection	Rrej	$f = 120 \text{ Hz}, 4.3 \text{ V} \le V_{IN} \le 17 \text{ V}$		65		₫B

[L88M05T] Operating Conditions at Ta = 25 °C

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage	V _{IN}		5.8 to 17	V
Output current	lout		0 to 500	mA

Operating Characteristics at Tj = 25 °C, V_{IN} = 8 V, I_O = 500 mA, C_{OUT} = 100 μ F, C_{IN} = 1 μ F, see specified Test Circuit.

Parameter	Symbol	Conditions	min	typ	max	Unit
Output voltage	V _{OUT}		4.85	5.0	5.15	V
Dropout voltage	V _{DROP1}			0.4	0.6	V
	V _{DROP2}	I _O = 150 mA		0.2	0.3	V
Line regulation	ΔV_{OLN}	5.8 V ≦ V _{IN} ≦ 17 V		10	50	mV
Load regulation	ΔV_{OLD}	$5 \text{ mA} \leq I_{OUT} \leq 500 \text{ mA}$		30	100	mV
Peak output current	l _{OP}		600	900		mA
Output short-circuit current	losc			100	300	mA
Quiescent current	I _{Q1}	I _{OUT} = 0		2.0	5.0	mA
Quiescent current	I _{Q2}			24	50	mA
Output noise voltage	V _{NO}	10 Hz ≦ f ≦ 100 kHz		40		μVrms
Temperature coefficient of output voltage	ΔV _{OUT} /ΔTj	Tj = 25 to 125 °C		±0.5		mV/°C
Ripple rejection	Rrej	$f = 120 \text{ Hz}, 6 \text{ V} \le \text{V}_{IN} \le 17 \text{ V}$		65		dB

[L88M09T]

Operating Conditions at Ta = 25 °C

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage	V _{IN}		9.9 to 17	/ v
Output current	lout		0 to 500	mA

Operating Characteristics at Tj = 25 °C, V_{IN} = 12 V, I_{O} = 500 mA, C_{OUT} = 100 μ F, C_{IN} = 1 μ F, see specified Test Circuit.

Parameter	Symbol	Conditions	min	typ	max	Unit
Output voltage	V _{OUT}	,	8.73	9.0	9.27	V
Duanaut valtana	V _{DROP1}			0.4	0.6	V
Dropout voltage	V _{DROP2}	I _O = 150 mA		0.2	0.3	V
Line regulation	ΔV_{OLN}	9.9 V ≤ V _{IN} ≤ 17 V		10	50	mV
Load regulation	ΔV_{OLD}	5 mA ≤ I _{OUT} ≤ 500 mA		54	180	mV
Peak output current	l _{OP}		600	900		mA
Output short-circuit current	losc			100	300	mA
Quiescent current	l _{Q1}	I _{OUT} = 0		2.3	5.0	mA
Quiescent current	1 _{Q2}			24	50	mA
Output noise voltage	VNO	10 Hz ≦ f ∕≦ 100 kHz		40		μVrms
Temperature coefficient of output voltage	ΔV _{OUΤ} /Δ\τί	Tj =25 to 125 °C		±0.9		mV/°C
Ripple rejection	Rrej	$f = 120 \text{ Hz}, 10 \text{ V} \le \text{V}_{IN} \le 17 \text{ V}$		59		dB

[L88M12T]

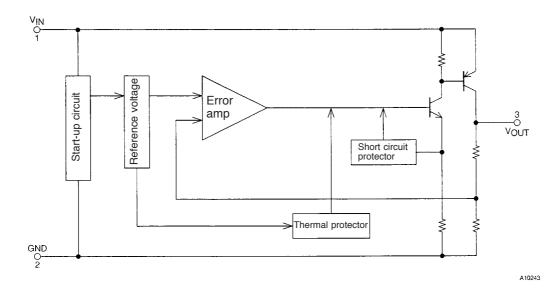
Operating Conditions at Ta = 25 °C

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage	V _{IN}		13 to 17	V
Output current	Лоит		0 to 500	mA

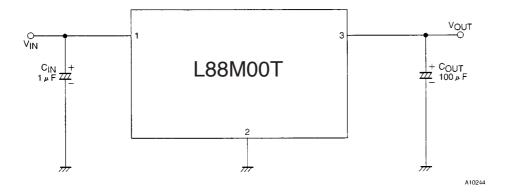
Operating Characteristics at $T_{\rm j}$ = 25 °C, $V_{\rm IN}$ = 15 V, $I_{\rm O}$ = 500 mA, $C_{\rm OUT}$ = 100 μ F, $C_{\rm IN}$ = 1 μ F, see specified Test Circuit.

Parameter /	Symbol	Conditions	min	typ	max	Unit
Output voltage	V _{OUT}		11.64	12.0	12.36	V
Dropout voltage	V _{DROP1}			0.4	0.6	V
Dropout voltage	V _{DROP2}	I _O = 150 mA		0.2	0.3	V
Line regulation	ΔV_{OLN}	13 V ≦ V _{IN} ≦ 17 V		10	50	mV
Load regulation	ΔV_{OLD}	$5 \text{ mA} \leq I_{OUT} \leq 500 \text{ mA}$		₹ 0	240	mV
Peak output current	I _{OP}		600	900		mA
Output short-circuit current	losc			100	300	mA
Quiescent current	I _{Q1}	I _{OUT} = 0		2.6	5.0	mA
Quiescent/current	I _{Q2}			24	500	mA
Output noise voltage	V _{NO}	10 Hz ≦ f ≦ 100 kHz		40	`	<i>Ų</i> Vrms
Temperature coefficient of output voltage	ΔV _{OUT} /ΔTj	Tj = 25 to 125 °C		±1.2		mV/°C
Ripple rejection	Rrej	$f = 120 \text{ Hz}, 13 \text{ V} \le \text{V}_{1N} \le 17 \text{ V}$		58		dB∕

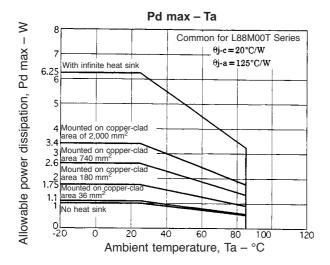
Equivalent Circuit Block Diagram (Common to L88M00T Series)



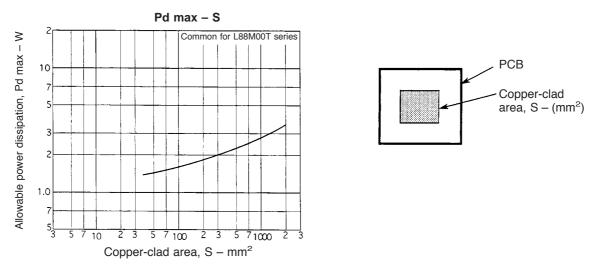
Test Circuit (Common to L88M00T Series)



- Notes: 1. To ensure operational stability, C_{IN} and C_{OUT} should be placed as close to the IC as possible. 2. Because the output capacitor C_{OUT} is set at over 100 μ F to prevent oscillation at low temperatures, a capacitor that exhibits little change in capacity with temperature variations should be used (such as a tantalum capacitor).
 - 3. When V_{IN} is minus (-) and GND is plus (+) (reversed connection), excessive current flow will occur.

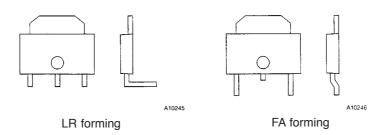


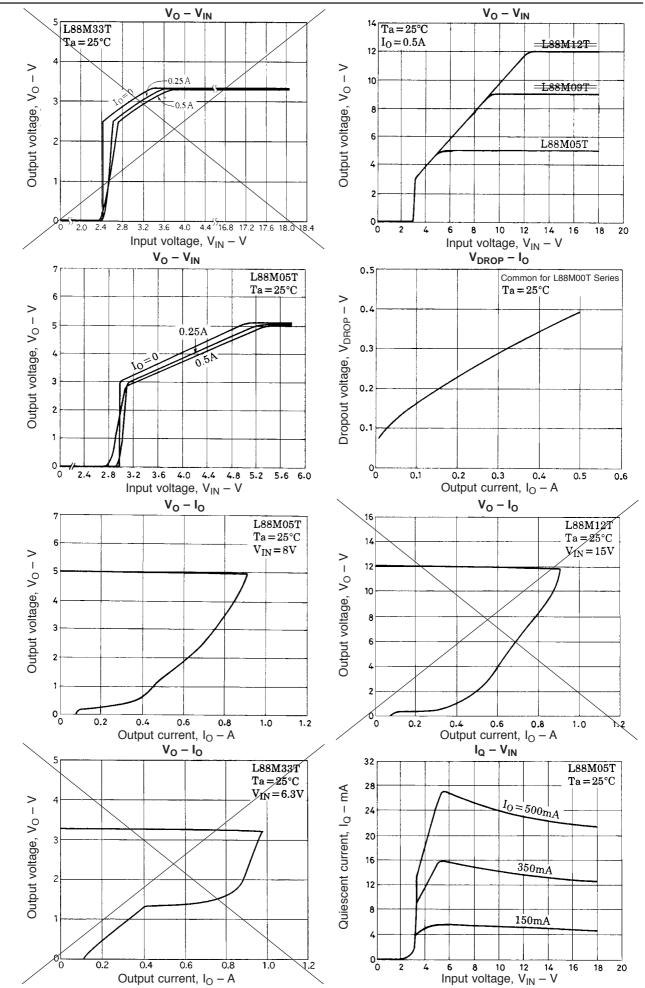
1) The allowable power dissipation is 1.0 W (Ta = 25° C) with no fin attached, but when mounted on a hybrid IC board or printed circuit board, high allowable power dissipation is achieved, despite the compact package. The graph below depicts the relationship between the copper-clad area and allowable power dissipation when mounted on a glass epoxy board ($50 \times 5.0 \times 0.8$ tmm³) with a copper thickness of 18 μ m.

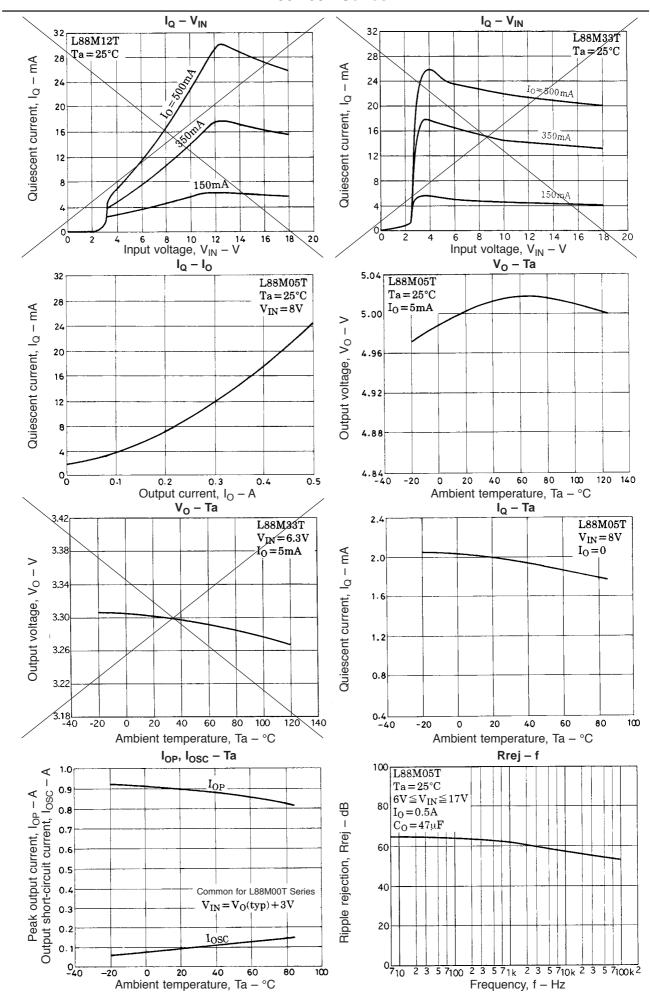


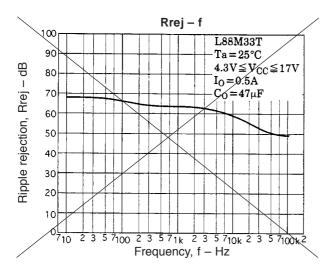
- 2) Pd is the value for when the solder on the surface of the IC heat sink has melted completely and the surface mount is horizontal.
- 3) Please be advised that the flow solder application system (full-heat method) cannot be recommended.

Lead Formings









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