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L88M05T

Monolithic Linear IC

17V, 5V / 0.5A Low Dropout Voltage Regulator

Overview

The L88M05T is low dropout voltage regulator IC 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

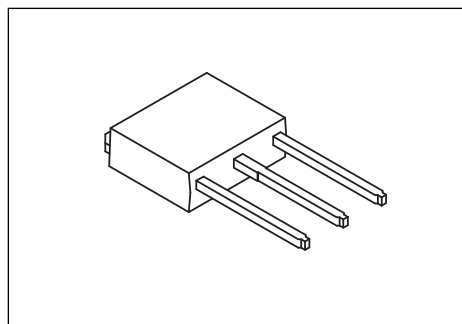
- Output voltage : 5V
- 500 mA output current
- Low minimum input-output voltage differential (0.4V typ) enables to save energy and miniaturize transformer size.
- Set size can be miniaturized with compact TP-3H power package.
- Surface mounting on board permits allowable power dissipation to be raised.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

Specifications

Maximum Ratings at $T_a = 25^\circ\text{C}$

| Parameter | Symbol | Conditions | Ratings | Unit |
|--|----------------------|--|-------------|---------------------------|
| Input voltage | $V_{IN \text{ max}}$ | | 18 | V |
| Allowable power dissipation | $P_d \text{ max}$ | $T_a \leq 25^\circ\text{C}$, no heat sink | 1 | W |
| | | $T_c = 25^\circ\text{C}$, with infinite heat sink | 6.25 | W |
| Thermal resistance (junction-atmosphere) | θ_{j-a} | | 125 | $^\circ\text{C}/\text{W}$ |
| Thermal resistance (junction-to-case) | θ_{j-c} | | 20 | $^\circ\text{C}/\text{W}$ |
| Operating temperature | T_{opr} | | -20 to +85 | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | | -55 to +150 | $^\circ\text{C}$ |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



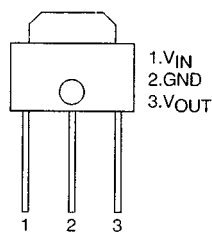
TP3H

ORDERING INFORMATION

See detailed ordering and shipping information on page 8 of this data sheet.

L88M00T Series

Pin Assignment



Top view

Operating Conditions at $T_a = 25\text{ }^\circ\text{C}$

| Parameter | Symbol | Conditions | Ratings | Unit |
|----------------|-----------|------------|-----------|------|
| Input voltage | V_{IN} | | 5.8 to 17 | V |
| Output current | I_{OUT} | | 0 to 500 | mA |

Operating Characteristics at $T_j = 25\text{ }^\circ\text{C}$, $V_{IN} = 8\text{ V}$, $I_O = 500\text{ mA}$, $C_{OUT} = 100\text{ }\mu\text{F}$, $C_{IN} = 1\text{ }\mu\text{F}$, see specified Test Circuit.

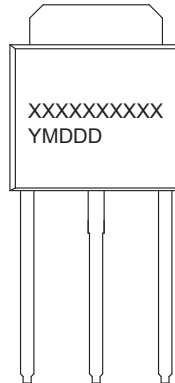
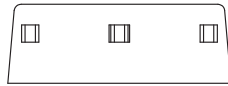
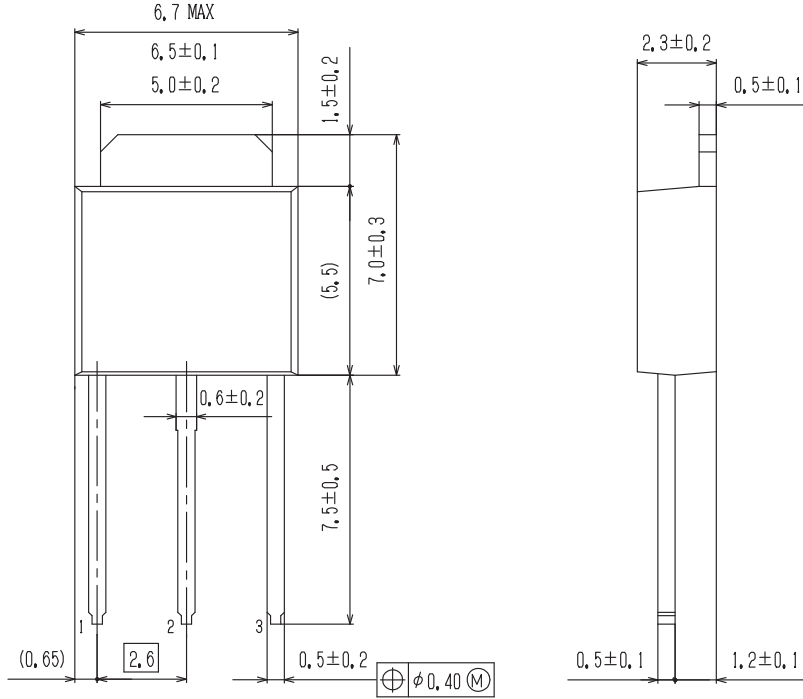
| Parameter | Symbol | Conditions | min | typ | max | Unit |
|---|-----------------------------|--|------|-----------|------|----------------------|
| Output voltage | V_{OUT} | | 4.85 | 5.0 | 5.15 | V |
| Dropout voltage | V_{DROP1} | | | 0.4 | 0.6 | V |
| | V_{DROP2} | $I_O = 150\text{ mA}$ | | 0.2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

L88M05T

Package Dimensions

unit : mm

IPAK / TP3H
CASE 369AF
ISSUE A

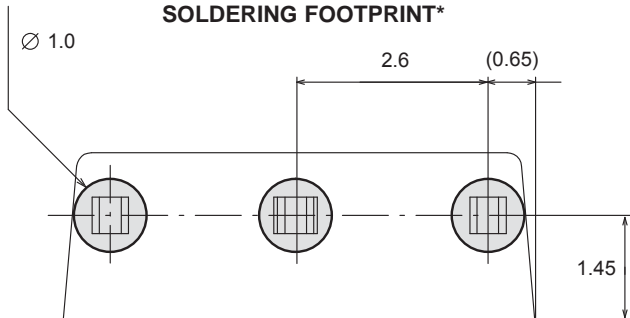


GENERIC MARKING DIAGRAM*

XXXXXX = Specific Device Code
 Y = Year
 M = Month
 DDD = Additional Traceability Data

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present.

SOLDERING FOOTPRINT*



(Unit: mm)

| |
|--------------|
| Package name |
| TP3H |

○ Through Hole Area

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

NOTE: The measurements are not to guarantee but for reference only.

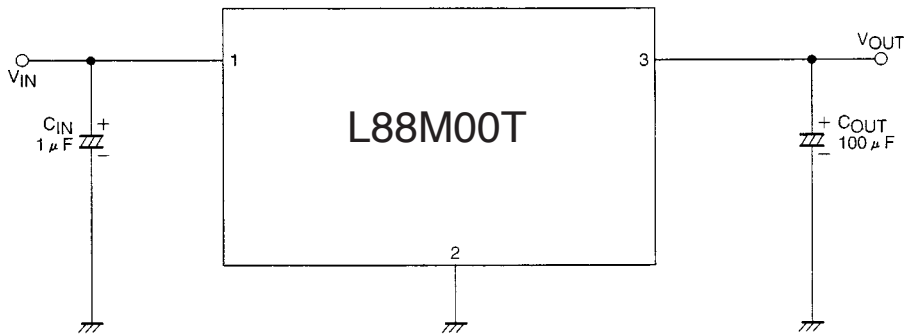
L88M00T Series

Equivalent Circuit Block Diagram (Common to L88M00T Series)



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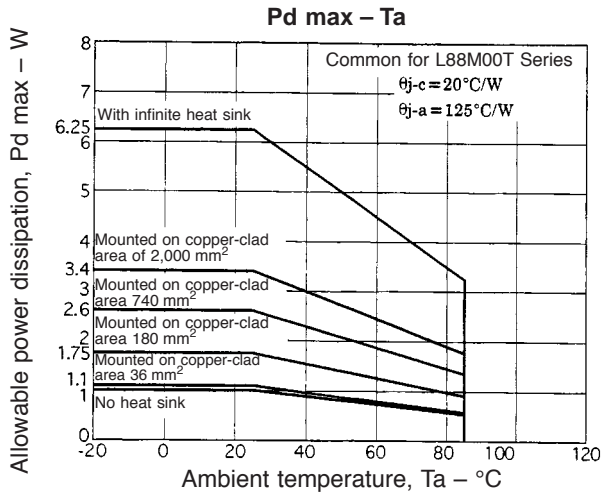
Test Circuit (Common to L88M00T Series)



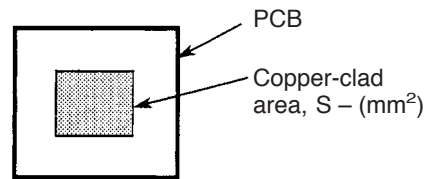
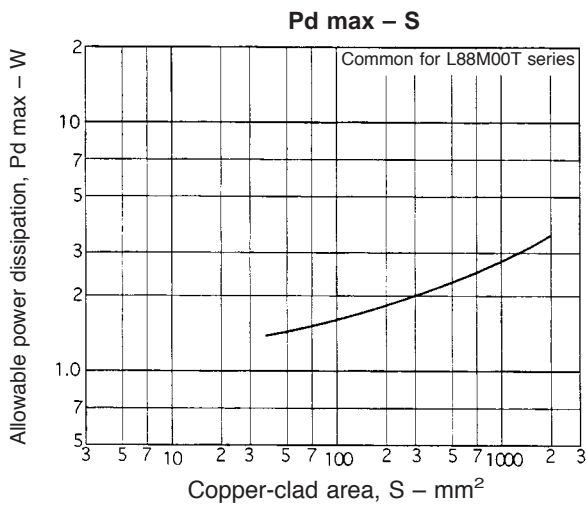
A10244

- 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 $100 \mu\text{F}$ 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.

L88M00T Series

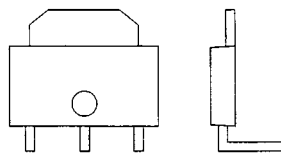


- 1) The allowable power dissipation is 1.0 W ($T_a = 25^{\circ}\text{C}$) with no fin attached, but when mounted on a hybrid IC board or printed circuit board, high allowable power dissipation is achieved, despite the compact package. The graph below depicts the relationship between the copper-clad area and allowable power dissipation when mounted on a glass epoxy board ($50 \times 50 \times 0.8 \text{ mm}^3$) with a copper thickness of $18 \mu\text{m}$.



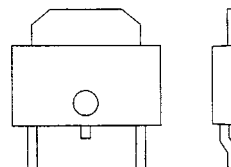
- 2) Pd is the value for when the solder on the surface of the IC heat sink has melted completely and the surface mount is horizontal.
 3) Please be advised that the flow solder application system (full-heat method) cannot be recommended.

Lead Formings



LR forming

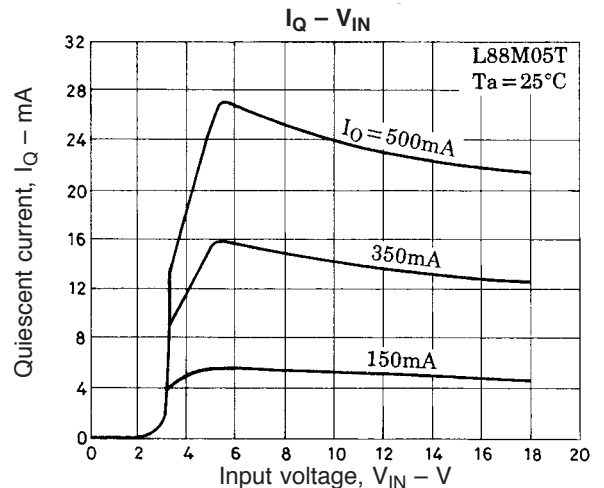
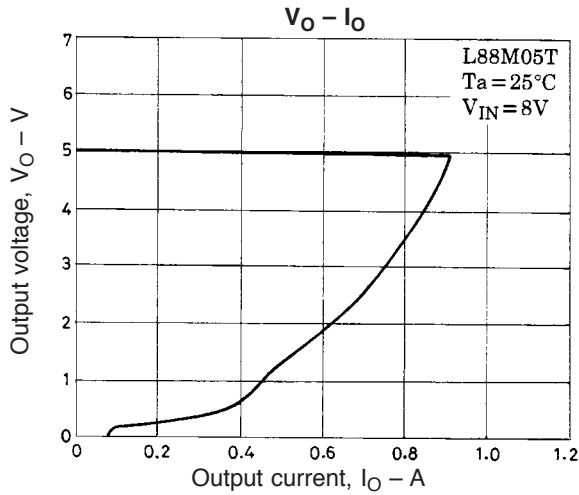
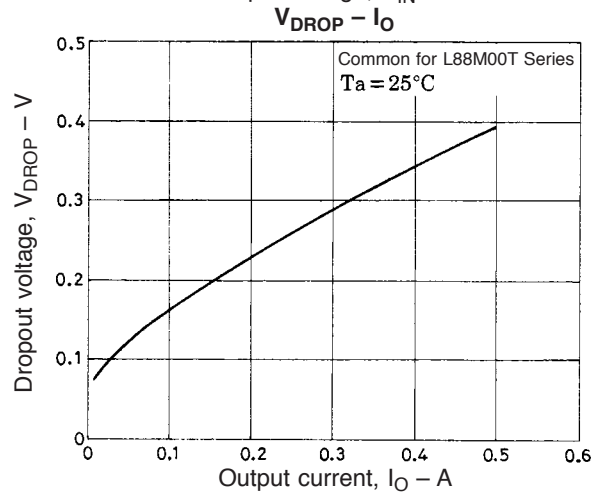
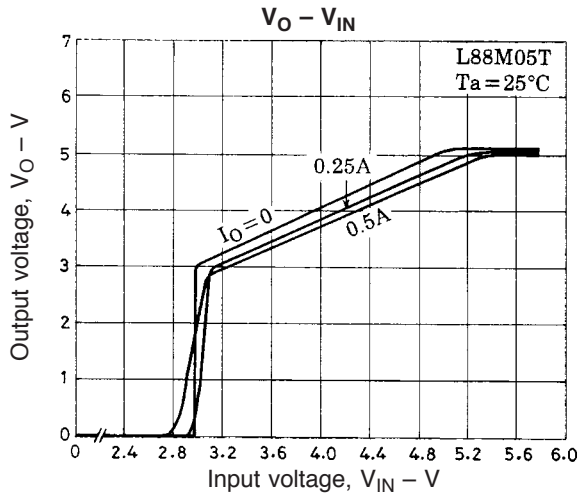
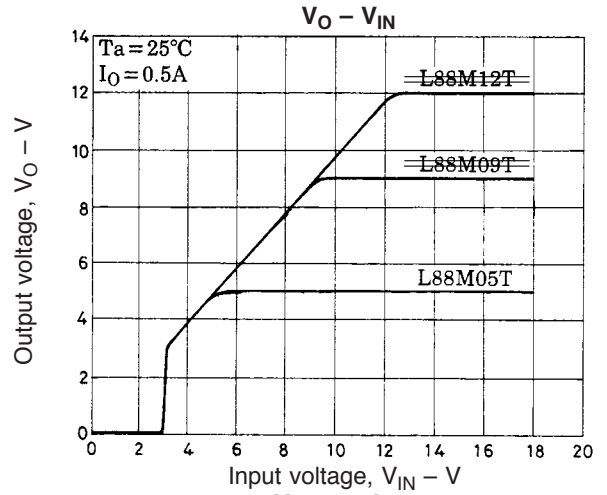
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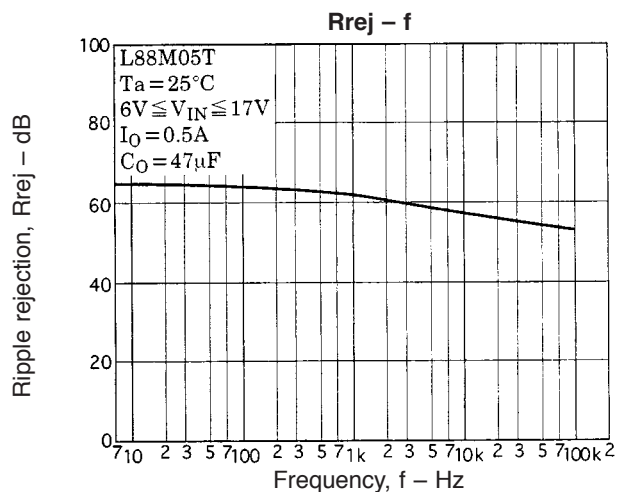
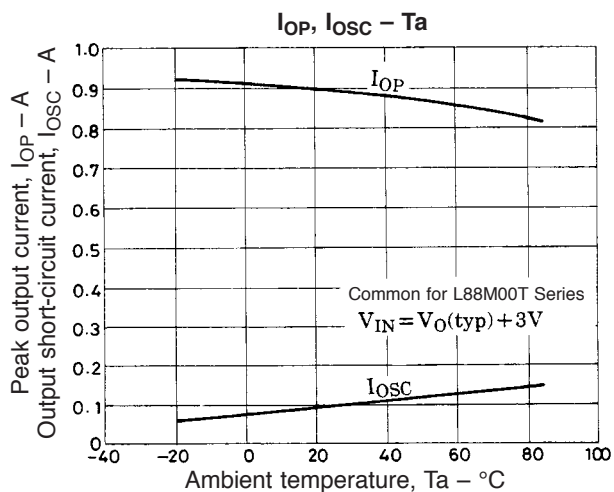
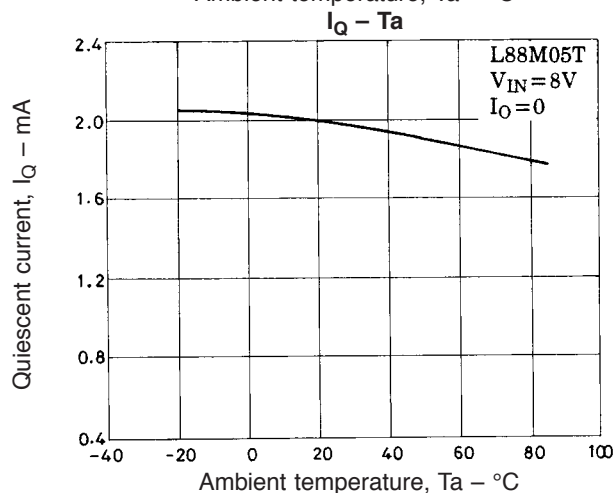
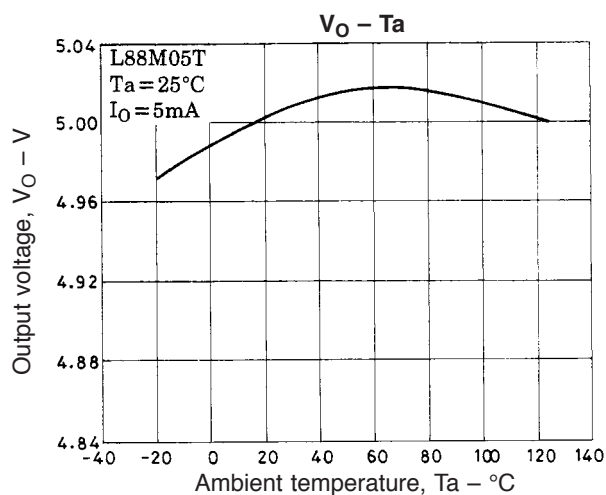
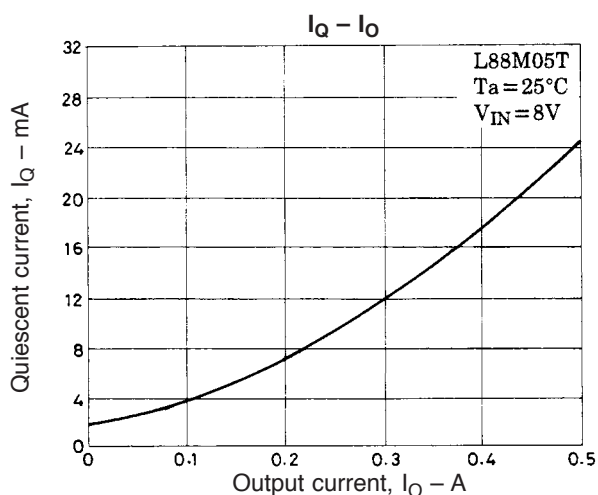
FA forming

A10246

L88M00T Series



L88M00T Series



L88M05T



ORDERING INFORMATION

| Device | Package | Shipping (Qty / Packing) |
|---------------|-------------------|--------------------------|
| L88M05T-E | TP3H (Pb-Free) | 500 / Bulk Bag |
| L88M05TL-FA-E | TP3H (Pb-Free) | 500 / Bulk Bag |
| L88M05TLL-E | TP3H (Pb-Free) | 500 / Bulk Bag |
| L88M05TL-LR-E | TP3H (Pb-Free) | 500 / Bulk Bag |
| L88M05TL-TL-E | TP3H (Pb-Free) | 700 / Tape & Reel |
| L88M05T-TL-E | TP3H (Pb-Free) | 700 / Tape & Reel |

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