Ordering number: EN 1187E

Monolithic Linear IC

SANYO No.1187E

# LA5000 Series

## 2 to 5V 60mA Low Saturation Voltage Regulators

The LA5002, 5003, 5004, 5005 are voltage regulators having a small input-output voltage drop (0.2V typ.) They are especially suited for use in battery-powered low voltage equipment and commercial or industrial equipment having a large voltage regulation.

**Features**

- Small input-output voltage drop (0.2V/$I_{OUT}$=20mA typ.)
- Minimum number of external parts required
- Highly resistant against load short
- Radio noise (radiation) control pin

**Maximum Ratings** at Ta=25°C

| | | | | unit |
|---|---|---|---|---|
| Input Supply Voltage | $V_{IN}$ max | | 12 | V |
| Output Current | $I_{OUT}$ max | | 60 | mA |
| Allowable Power Dissipation | Pd max | Ta=80°C | 560 | mW |
| Operating Temperature | Topr | | −20 to +80 | °C |
| Storage Temperature | Tstg | | −30 to +125 | °C |

**Electrical Characteristics** at Ta=25°C, $C_{OUT}$=10μF, $I_{OUT}$=20mA, $V_{IN}$=3V[LA5002], $V_{IN}$=4V [5003], $V_{IN}$=5V [LA5004], $V_{IN}$=6V [LA5005]

| | | | min | typ | max | unit |
|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | LA5002 | 1.85 | 2.0 | 2.15 | V |
| | | LA5003 | 2.8 | 3.0 | 3.2 | V |
| | | LA5004 | 3.75 | 4.0 | 4.25 | V |
| | | LA5005 | 4.75 | 5.0 | 5.25 | V |
| Line Regulation | $V_O$ line | LA5002: 2.5V<$V_{IN}$<8V | | | 50 | mV |
| | | LA5003: 3.5V<$V_{IN}$<9V | | | 50 | mV |
| | | LA5004: 4.5V<$V_{IN}$<10V | | | 50 | mV |
| | | LA5005: 5.5V<$V_{IN}$<11V | | | 50 | mV |
| Load Regulation | $V_O$ load | 1mA<$I_{OUT}$<40mA | | | 20 | mV |
| | | 1mA<$I_{OUT}$<50mA | | | 25 | mV |
| Quiescent Current | $I_{CCO}$ | LA5002 | | 1.2 | 2.0 | mA |
| | | LA5003 | | 1.4 | 2.0 | mA |
| | | LA5004 | | 1.5 | 2.3 | mA |
| | | LA5005 | | 1.7 | 2.5 | mA |

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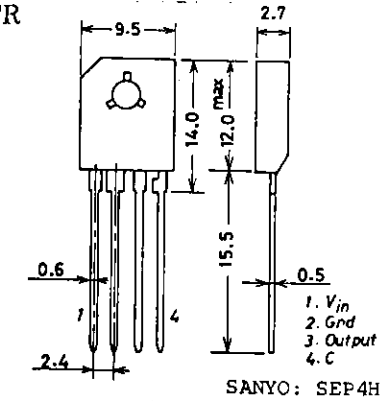
**Package Dimensions** 3027A-S4HTR
(unit: mm)




SANYO: SEP4H

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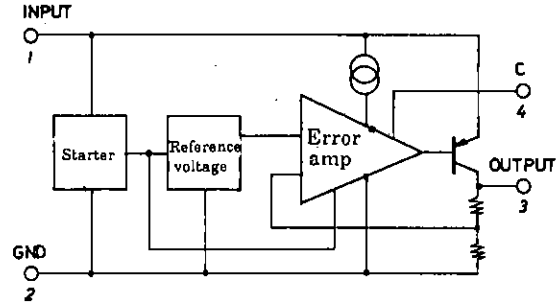
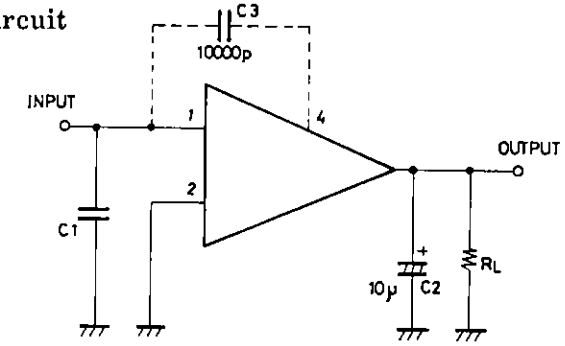
| | | | min | typ | max | unit |
|---|---|---|---|---|---|---|
| Ripple Voltage | $R_r$ | LA5002,LA5004,LA5005: f=120Hz | 40 | | | dB |
| | | LA5003: f=120Hz | 43 | | | dB |
| Input/Output Voltage Drop | $V_{drop}$ | | | 0.2 | 0.3 | V |
| Coefficient of Output Voltage | $K\Delta v_o/\Delta T$ | | −1 | | +1 | mV/°C |
| | $V_N$ | 10Hz<f<100kHz | | 30 | | μV |

## Equivalent Circuit Block Diagram




## Sample Application Circuit

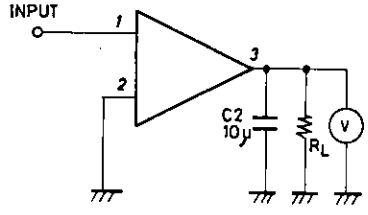
Unit (capacitance: F)



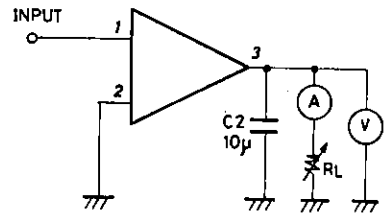

Note: Capacitor C3 is not required unless radio noise is a problem.

## Test Circuits

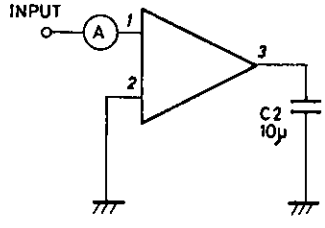
• $V_{OUT}$, Line Reg.



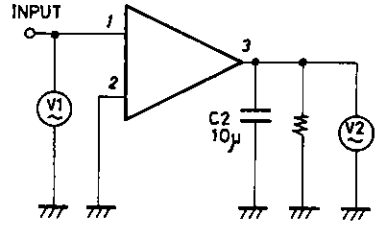

• Load Reg.




• ICC



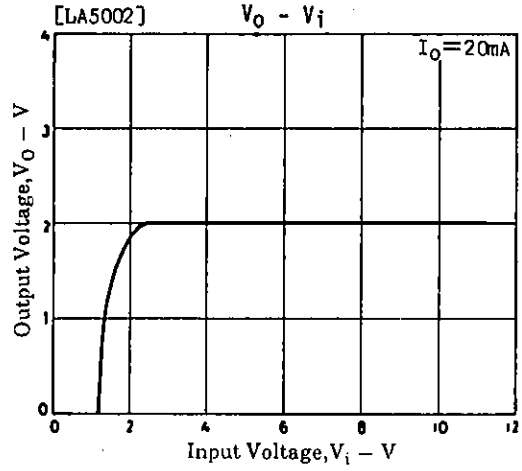

• Ripple Rej.



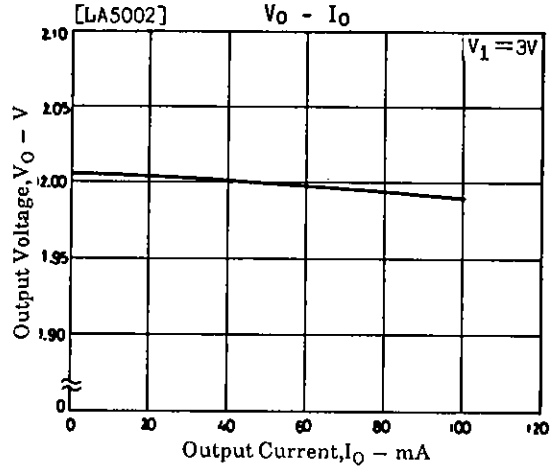

Ripple Rej = $\frac{V1}{V2}$

Unit (capacitance: F)

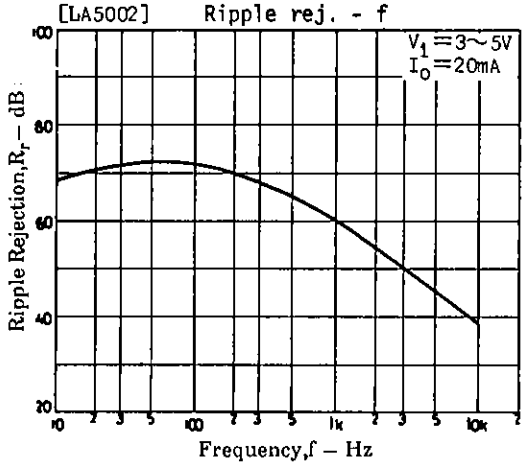
[LA5002] $V_O$ - $V_i$



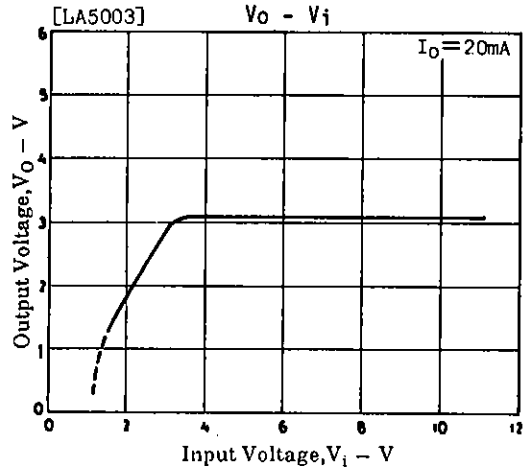

[LA5002] $V_O$ - $I_O$



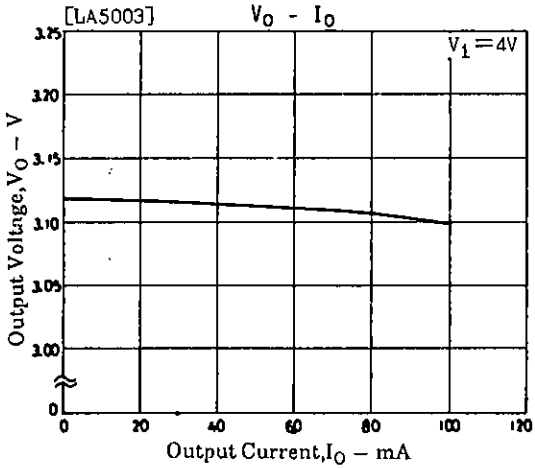

[LA5002] Ripple rej. - f



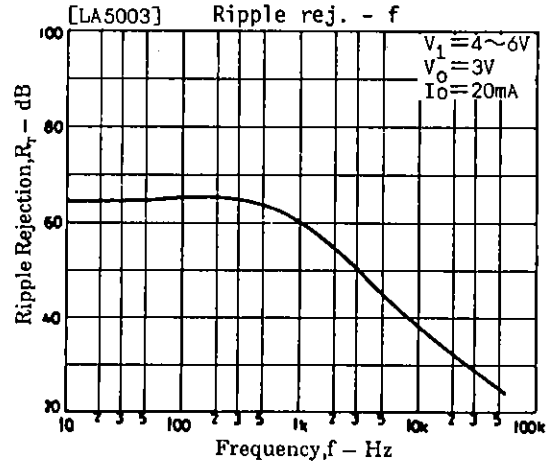

[LA5003] $V_O$ - $V_i$



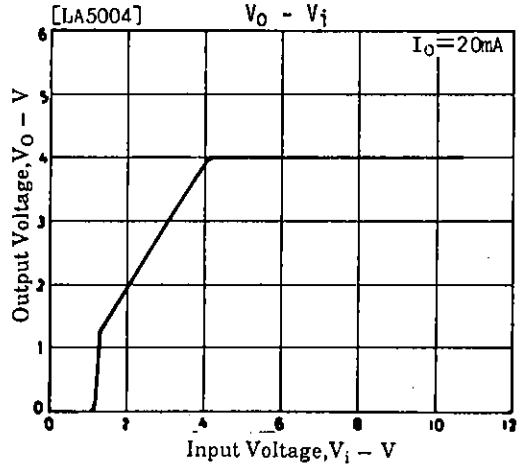

[LA5003] $V_O$ - $I_O$




[LA5003] Ripple rej. - f




[LA5004] $V_O$ - $V_i$




[LA5004] $V_O$ - $I_O$