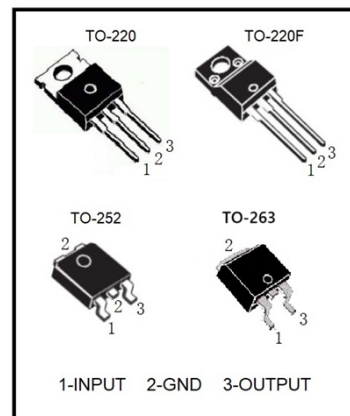


## Positive-Voltage Regulators 7805

### FEATURES

- Output current to 1.5 A
- Output voltages of 5V
- Thermal overload protection
- Short circuit protection
- Output Transistor Operating Area Protection
- Package: TO-220, TO-220F, TO-263 and TO-252



### DESCRIPTION

The 78 series of three-terminal positive regulators is available in TO-220, TO-220F, TO-263 and TO-252 packages and with several fixed output voltages, making it useful in a wide range of applications. Each type employs internal current limiting, thermal shutdown and safe area protection, resulting it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1.5A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltage and currents.

### ABSOLUTE MAXIMUM RATINGS

| Parameter             | Symbol    | Value              | Unit |
|-----------------------|-----------|--------------------|------|
| Input voltage         | $V_I$     | 35                 | V    |
| Output current        | $I_O$     | Internally limited | A    |
| Power dissipation     | $P_D$     | Internally limited | W    |
| Storage Temperature   | $T_{STG}$ | -65~ 150           | °C   |
| Operating Temperature | $T_{OP}$  | -40~+125           |      |

Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

### THERMAL DATA

| Parameter                           | Symbol     | TO-220 | TO-220F | TO-263 | TO-252 | UNIT |
|-------------------------------------|------------|--------|---------|--------|--------|------|
| Thermal resistance junction-case    | $R_{thJC}$ | 5.5    | 6       | 5      | 8      | °C/W |
| Thermal resistance junction-ambient | $R_{thJA}$ | 65     | 67      | 62     | 100    | °C/W |

## ELECTRICAL CHARACTERISTICS

### 7805

( $V_I=10V$ ,  $I_O=500mA$ ,  $C_I = 0.33 \mu F$ ,  $C_O = 0.1 \mu F$ ,  $T_J=-40$ to $125^{\circ}C$ , unless otherwise noted.)

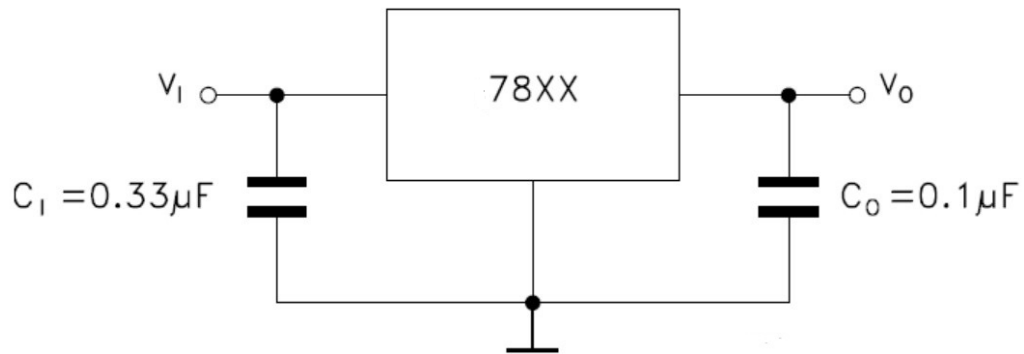
| Parameter                           | Symbol                | Test Conditions                         | $T_J$         | Min  | Typ  | Max  | Unit            |
|-------------------------------------|-----------------------|-----------------------------------------|---------------|------|------|------|-----------------|
| Output voltage                      | $V_O$                 |                                         | $25^{\circ}C$ | 4.80 | 5    | 5.20 | V               |
|                                     |                       | $I_O=5mA$ to $1A$ ,<br>$V_I=7$ to $20V$ |               | 4.75 | 5    | 5.25 |                 |
| Line Regulation <sup>(1)</sup>      | Regline               | $V_I=7$ to $25V$                        | $25^{\circ}C$ |      |      | 100  | mV              |
|                                     |                       | $V_I=8$ to $12V$                        |               |      |      | 50   |                 |
| Load Regulation <sup>(1)</sup>      | Regload               | $I_O=5mA$ to $1.5A$                     | $25^{\circ}C$ |      |      | 100  | mV              |
|                                     |                       | $I_O=250$ to $750mA$                    |               |      |      | 50   |                 |
| Quiescent Current                   | $I_Q$                 |                                         | $25^{\circ}C$ |      |      | 8    | mA              |
| Quiescent current change            | $\Delta I_Q$          | $I_O=5mA$ to $1A$                       |               |      |      | 0.5  |                 |
|                                     |                       | $V_I=7$ to $25V$                        |               |      |      | 1.3  |                 |
| Output Voltage Drift <sup>(2)</sup> | $\Delta V_O/\Delta T$ | $I_O = 5 mA$                            |               |      | -0.8 |      | mV/ $^{\circ}C$ |
| Output noise voltage                | $V_N$                 | $f=10Hz$ to $100kHz$                    | $25^{\circ}C$ |      | 42   |      | $\mu V$         |
| Ripple Rejection <sup>(2)</sup>     | RR                    | $V_I=8$ to $18V$ , $f = 120Hz$          |               | 62   |      |      | dB              |
| Dropout voltage                     | $V_{DROP}$            | $I_O=1A$                                | $25^{\circ}C$ |      | 2    |      | V               |
| Output Resistance <sup>(2)</sup>    | $R_O$                 | $f = 1 kHz$                             |               |      | 15   |      | m $\Omega$      |
| Short-Circuit Current               | $I_{SC}$              | $V_I = 35 V$                            | $25^{\circ}C$ |      | 230  |      | mA              |
| Peak Current                        | $I_{PK}$              |                                         | $25^{\circ}C$ |      | 2.2  |      | A               |

#### Notes:

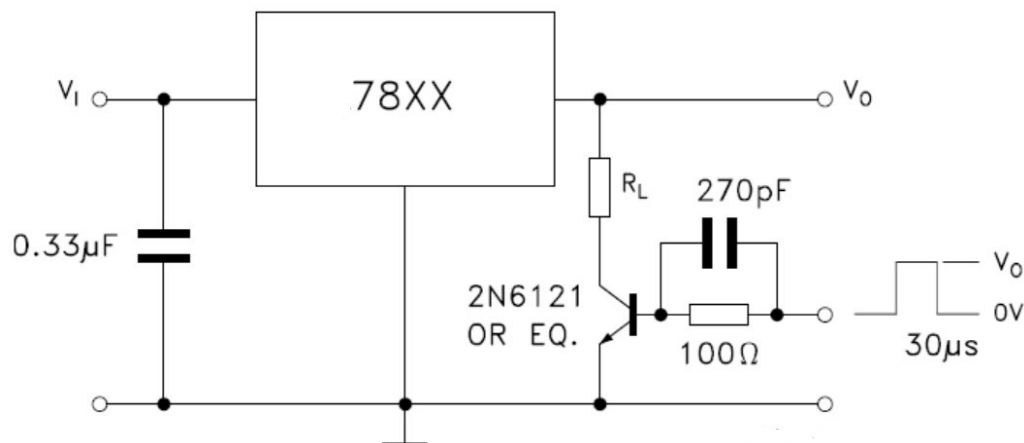
1. Load and line regulation are specified at constant junction temperature. Changes in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty is used.
2. These parameters, although guaranteed, are not 100% tested in production.

## TEST CIRCUITS

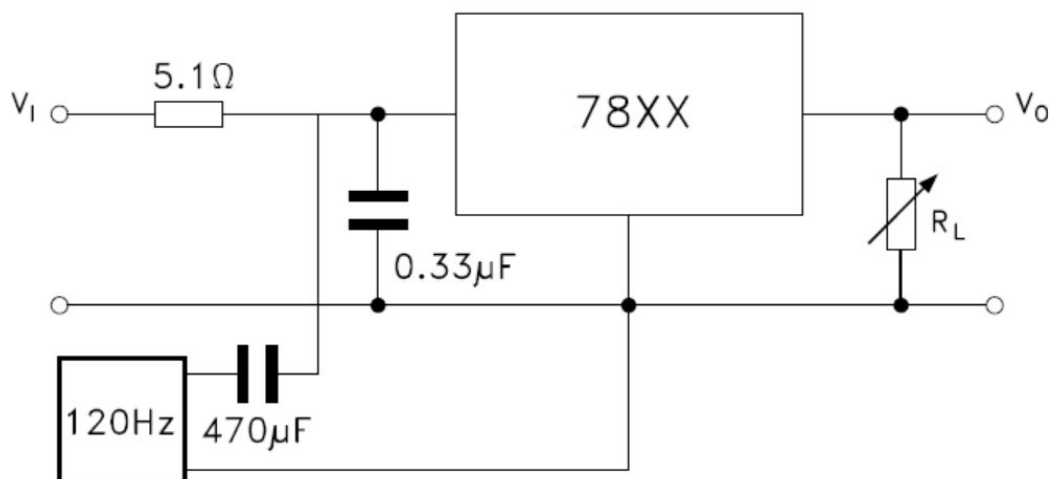
### DC parameter



### Load regulation

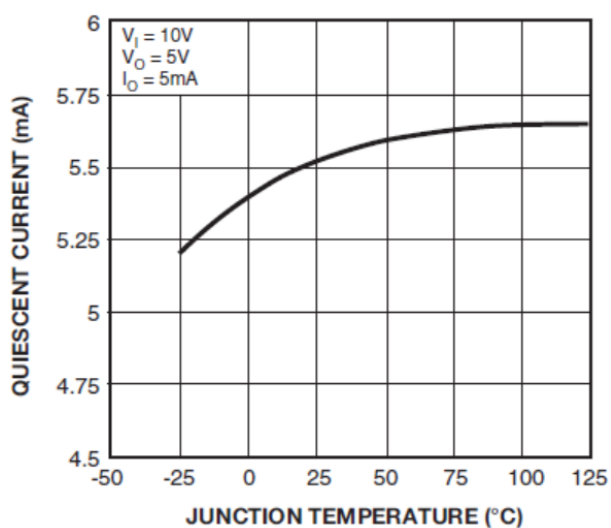


### Ripple rejection

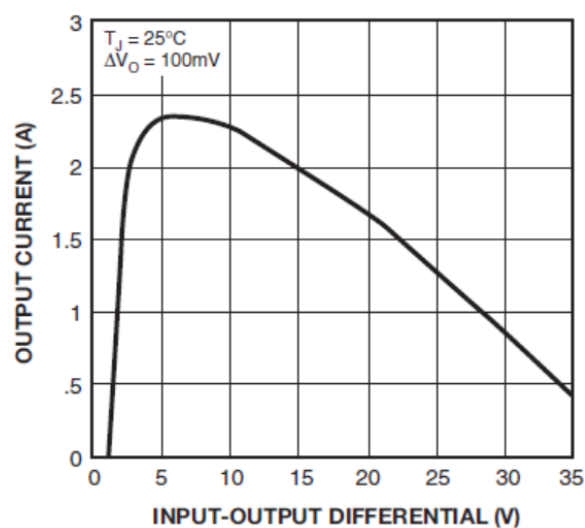


## TYPICAL PERFORMANCE CHARACTERISTICS

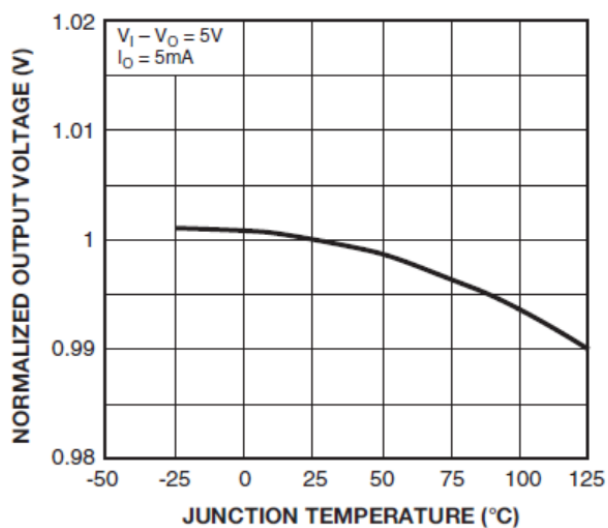
### Quiescent Current



### Peak Output Current



### Output Voltage



### Quiescent Current

