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SPC-F005.DWG

## REVISIONS

DOC. NO. SPC-F005 \* Effective: 7/8/02 \* DCP No: 1398

| DCP # | REV | DESCRIPTION | DRAWN | DATE   | CHECKD | DATE   | APPRVD | DATE   |
|-------|-----|-------------|-------|--------|--------|--------|--------|--------|
| 1262  | A   | RELEASED    | HO    | 2/4/03 | JWM    | 2/5/03 | DJC    | 2/5/03 |
|       |     |             |       |        |        |        |        |        |

### Description:

The 78L15 is a positive 3-terminal voltage regulator in a TO-92 type package. With adequate heat sinking this device can deliver up to 100mA output current. Current limiting is included to limit peak output current to a safe value. Safe area protection for the output transistors is provided to limit internal power dissipation. If internal power dissipation becomes too high for the heat sinking provided, the thermal shutdown circuit takes over preventing the IC from overheating. When used as a zener diode/resistor combination replacement, this device usually results in an effective output impedance improvement of two orders of magnitude, and lower quiescent current. Typical applications include use in logic systems, instrumentation, Hi-Fi, and other solid state electronic equipment. Although designed primarily as a fixed voltage regulator, this device can be used with external components to obtain adjustment voltages and currents.

### Features:

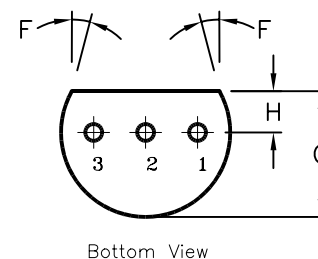
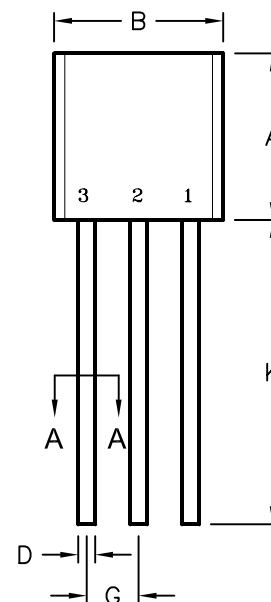
- Output Voltage Tolerances of  $\pm 5\%$  Over the Temperature Range
- Output Current of 100mA
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limiting
- Output Transistor Safe-Area Compensation

### Absolute Maximum Ratings:

- Input Voltage,  $V_{IN} = 35V$
- Internal Power Dissipation (Note 1),  $P_D =$  Internally Limited
- Operating Junction Temperature Range,  $T_{opr} = 0^\circ C$  to  $+70^\circ C$
- Maximum Junction Temperature,  $T_J = +125^\circ C$
- Storage Temperature Range,  $T_{stg} = -55^\circ C$  to  $+150^\circ C$
- Lead Temperature (During soldering, 10sec.),  $T_L = +230^\circ C$

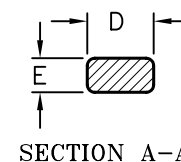
Note 1. Thermal resistance is typical  $+60^\circ C/W$  junction-to-case,  $+232^\circ C/W$  junction-to-ambient, and  $+88^\circ C/W$  junction-to-ambient at 400ft min of air. The maximum junction temperature shall not exceed  $+125^\circ C$  on electrical parameters.

TO-92

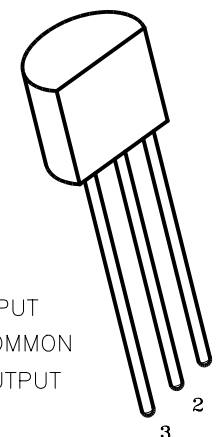


Bottom View

| DIM. | MIN.  | MAX. |
|------|-------|------|
| A    | 4.32  | 5.33 |
| B    | 4.45  | 5.20 |
| C    | 3.18  | 4.19 |
| D    | 0.41  | 0.55 |
| E    | 0.35  | 0.50 |
| F    | 5*    |      |
| G    | 1.14  | 1.40 |
| H    | 1.14  | 1.53 |
| K    | 12.70 | —    |



SECTION A-A



1 INPUT  
2 COMMON  
3 OUTPUT

DISCLAIMER:  
ALL STATEMENTS AND TECHNICAL INFORMATION CONTAINED HEREIN ARE BASED UPON INFORMATION AND/OR TESTS WE BELIEVE TO BE ACCURATE AND RELIABLE. SINCE CONDITIONS OF USE ARE BEYOND OUR CONTROL, THE USER SHALL DETERMINE THE SUITABILITY OF THE PRODUCT FOR THE INTENDED USE AND ASSUME ALL RISK AND LIABILITY WHATSOEVER IN CONNECTION THEREWITH.

### TOLERANCES:

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE FOR REFERENCE PURPOSES ONLY.

### DRAWN BY:

HISHAM ODISH

### CHECKED BY:

JEFF MCVICKER

### APPROVED BY:

DANIEL CAREY

### DATE:

2/4/03

### DATE:

2/5/03

### DATE:

2/5/03

### DRAWING TITLE:

TRANSISTOR, VOLTAGE REGULATOR, TO-92, POSITIVE

### SIZE DWG. NO.

A

78L15

### ELECTRONIC FILE

35C0951.DWG

### REV

A

### SCALE:

NTS

### U.O.M.: MILLIMETERS

### SHEET:

1 OF 2

**Electrical Characteristics:**

( $V_{OUT} = 15V$ ,  $V_{IN} = 23V$ ,  $I_O = 40mA$ ,  $C_{IN} = 0.33\mu F$ ,  $C_{OUT} = 0.1\mu F$ , Note 2 unless otherwise specified)

| Parameter                                          | Symbol       | Test Conditions                                         | Min   | Typ | Max   | Units   |
|----------------------------------------------------|--------------|---------------------------------------------------------|-------|-----|-------|---------|
| Output Voltage, Note 4                             | $V_O$        | $T_J = +25^\circ C$                                     | 14.4  | 15  | 15.6  | V       |
|                                                    |              | $1mA \leq I_O \leq 70mA$ , $17.5V \leq V_{IN} \leq 30V$ | 14.25 | 15  | 15.75 | V       |
| Line Regulation<br>( $T_J = +25^\circ C$ )         | $Reg_{line}$ | $17.5V \leq V_{IN} \leq 30V$                            | —     | 37  | 250   | mV      |
|                                                    |              | $20V \leq V_{IN} \leq 30V$                              | —     | 25  | 140   | mV      |
| Load Regulation<br>( $T_J = +25^\circ C$ )         | $Reg_{load}$ | $1mA \leq I_O \leq 100mA$                               | —     | 35  | 150   | mV      |
|                                                    |              | $1mA \leq I_O \leq 40mA$                                | —     | 12  | 75    | mV      |
| Quiescent Current                                  | $I_B$        | $T_J = +25^\circ C$                                     | —     | 3.1 | 5     | mA      |
|                                                    |              | $T_J = +125^\circ C$                                    | —     | —   | 4.7   | mA      |
| Quiescent Current Change                           | $I_B$        | With line, $20V \leq V_{IN} \leq 30V$                   | —     | —   | 1     | mA      |
|                                                    |              | With load, $1mA \leq I_O \leq 40mA$                     | —     | —   | 0.1   | mA      |
| Output Noise Voltage                               | $V_N$        | $T_J = +25^\circ C$ , $f = 10Hz$ to $10kHz$ , Note 3    | —     | 90  | —     | $\mu V$ |
| Ripple Rejection                                   | RR           | $18.5V \leq V_{IN} \leq 28.5V$ , $f = 120Hz$            | 37    | 51  | —     | dB      |
| Input Voltage Required to Maintain Line Regulation | $TCV_O$      | $T_J = +25^\circ C$                                     | 17.5  | —   | —     | V       |

Note 2. The maximum steady state usable output current and input voltage are very dependent on the heat sinking and/or lead length of the package. The data above represents pulse test conditions with junction temperatures as indicated at the initiation of the test.

Note 3. Recommended minimum load capacitance of  $0.01\mu F$  to limit high frequency noise bandwidth.

Note 4. The temperature coefficient of  $V_{OUT}$  is typically within  $\pm 0.01\% V_O/^\circ C$ .