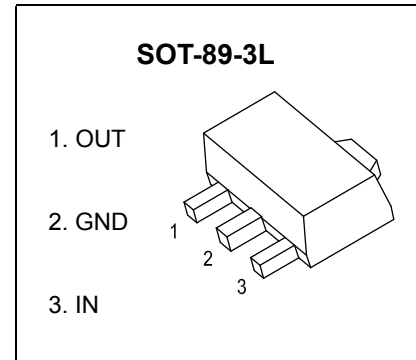


**VC78L09** Three-terminal positive voltage regulator

**FEATURES**

- Maximum output current  
 $I_{OM}$ : 0.1A
- Output voltage  
 $V_O$ : 9V
- Continuous total dissipation  
 $P_D$ : 0.6 W ( $T_a = 25^\circ\text{C}$ )



**ABSOLUTE MAXIMUM RATINGS** (Operating temperature range applies unless otherwise specified)

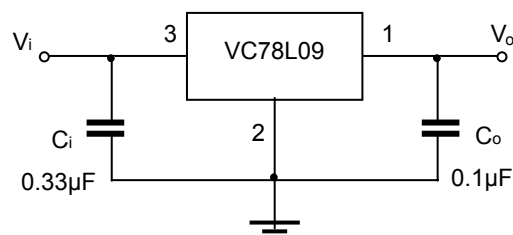
| Parameter                                   | Symbol          | Value    | Unit               |
|---------------------------------------------|-----------------|----------|--------------------|
| Input Voltage                               | $V_i$           | 30       | V                  |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 166.7    | $^\circ\text{C/W}$ |
| Operating Junction Temperature Range        | $T_{OPR}$       | -25~+125 | $^\circ\text{C}$   |
| Storage Temperature Range                   | $T_{STG}$       | -65~+150 | $^\circ\text{C}$   |

**ELECTRICAL CHARACTERISTICS AT SPECIFIED VIRTUAL JUNCTION TEMPERATURE** ( $V_i=16\text{V}, I_o=40\text{mA}, C_i=0.33\mu\text{F}, C_o=0.1\mu\text{F}$ , unless otherwise specified)

| Parameter                | Symbol       | Test conditions                                                   | Min  | Typ | Max  | Unit              |
|--------------------------|--------------|-------------------------------------------------------------------|------|-----|------|-------------------|
| Output voltage           | $V_O$        | $25^\circ\text{C}$                                                | 8.64 | 9.0 | 9.36 | V                 |
|                          |              | $12\text{V} \leq V_i \leq 24\text{V}, I_o=1\text{mA}-40\text{mA}$ | 8.55 | 9.0 | 9.45 | V                 |
|                          |              | $I_o=1\text{mA}-70\text{mA}$                                      | 8.55 | 9.0 | 9.45 | V                 |
| Load Regulation          | $\Delta V_O$ | $I_o=1\text{mA}-100\text{mA}$                                     |      | 19  | 90   | mV                |
|                          |              | $I_o=1\text{mA}-40\text{mA}$                                      |      | 11  | 40   | mV                |
| Line regulation          | $\Delta V_O$ | $12\text{V} \leq V_i \leq 24\text{V}$                             |      | 45  | 175  | mV                |
|                          |              | $13\text{V} \leq V_i \leq 24\text{V}$                             |      | 40  | 125  | mV                |
| Quiescent Current        | $I_q$        | $25^\circ\text{C}$                                                |      | 4.1 | 6.0  | mA                |
| Quiescent Current Change | $\Delta I_q$ | $13\text{V} \leq V_i \leq 24\text{V}$                             |      |     | 1.5  | mA                |
|                          | $\Delta I_q$ | $1\text{mA} \leq I_o \leq 40\text{mA}$                            |      |     | 0.1  | mA                |
| Output Noise Voltage     | $V_N$        | $10\text{Hz} \leq f \leq 100\text{KHz}$                           | 58   |     |      | $\mu\text{V}/V_O$ |
| Ripple Rejection         | RR           | $15\text{V} \leq V_i \leq 25\text{V}, f=120\text{Hz}$             |      | 45  |      | dB                |
| Dropout Voltage          | $V_d$        | $25^\circ\text{C}$                                                |      | 1.7 |      | V                 |

\* Pulse test.

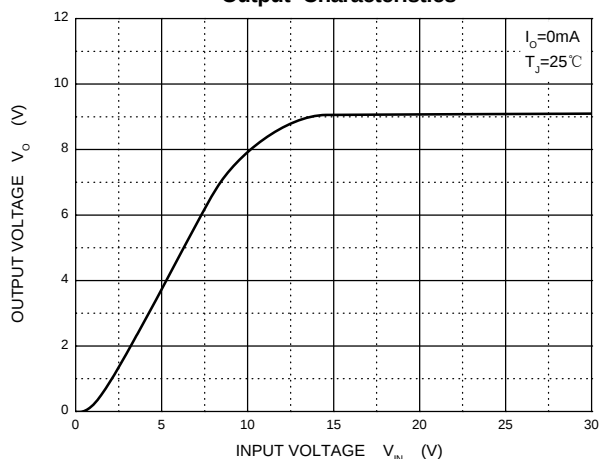
**TYPICAL APPLICATION**



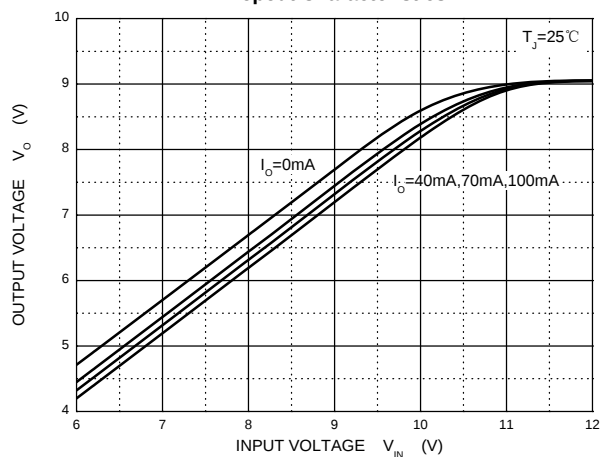
Note : Bypass capacitors are recommended for optimum stability and transient response and should be located as close as possible to the regulators.

## Typical Characteristics

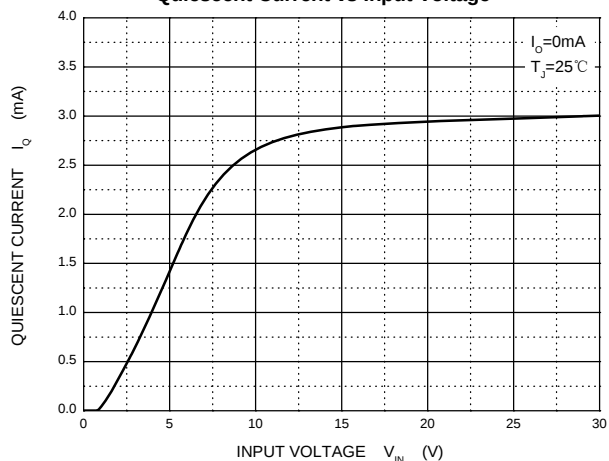
Output Characteristics



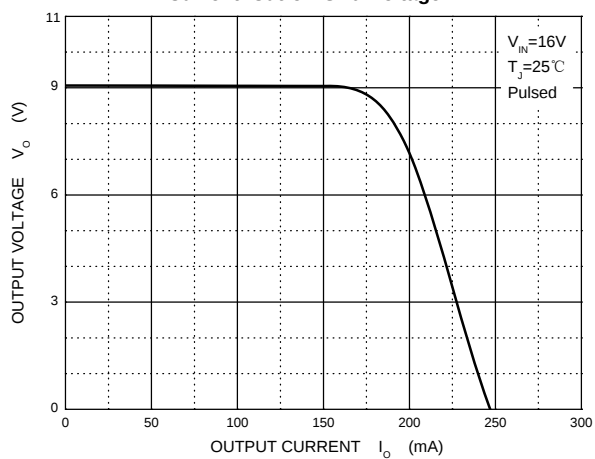
Dropout Characteristics



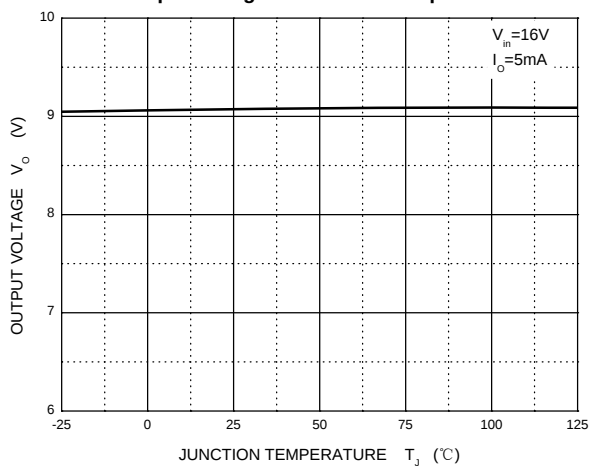
Quiescent Current vs Input Voltage



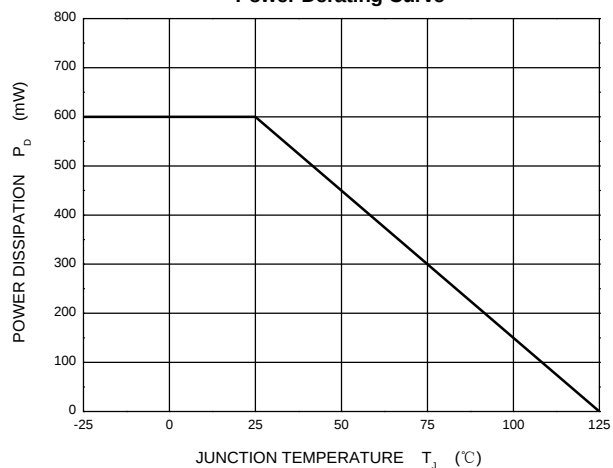
Current Cut-off Grid Voltage



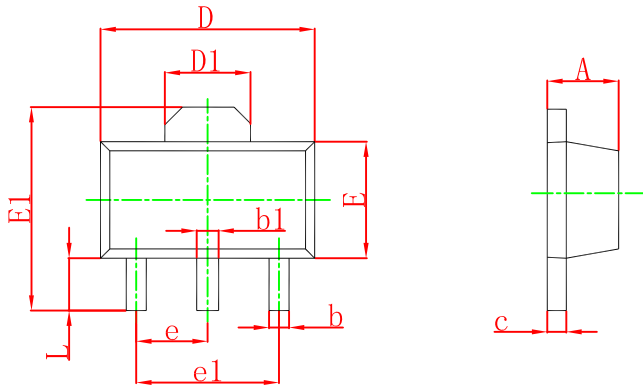
Output Voltage vs Junction Temperature



Power Derating Curve

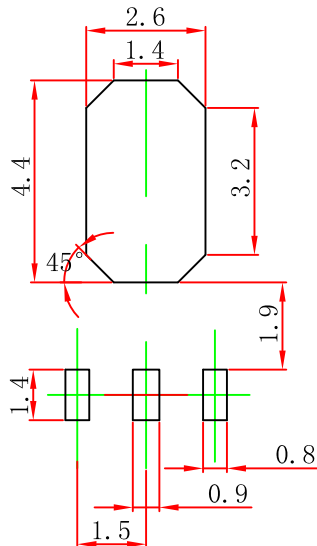


## SOT-89-3L Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.400                     | 1.600 | 0.055                | 0.063 |
| b      | 0.320                     | 0.520 | 0.013                | 0.020 |
| b1     | 0.400                     | 0.580 | 0.016                | 0.023 |
| c      | 0.350                     | 0.440 | 0.014                | 0.017 |
| D      | 4.400                     | 4.600 | 0.173                | 0.181 |
| D1     | 1.550 REF.                |       | 0.061 REF.           |       |
| E      | 2.300                     | 2.600 | 0.091                | 0.102 |
| E1     | 3.940                     | 4.250 | 0.155                | 0.167 |
| e      | 1.500 TYP.                |       | 0.060 TYP.           |       |
| e1     | 3.000 TYP.                |       | 0.118 TYP.           |       |
| L      | 0.900                     | 1.200 | 0.035                | 0.047 |

## SOT-89-3L Suggested Pad Layout

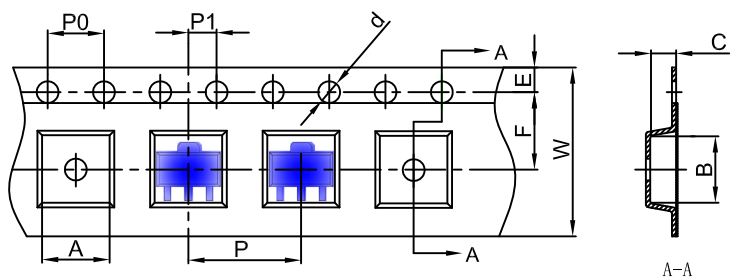


Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.

SOT-89-3L Tape and Reel

SOT-89-3L Embossed Carrier Tape



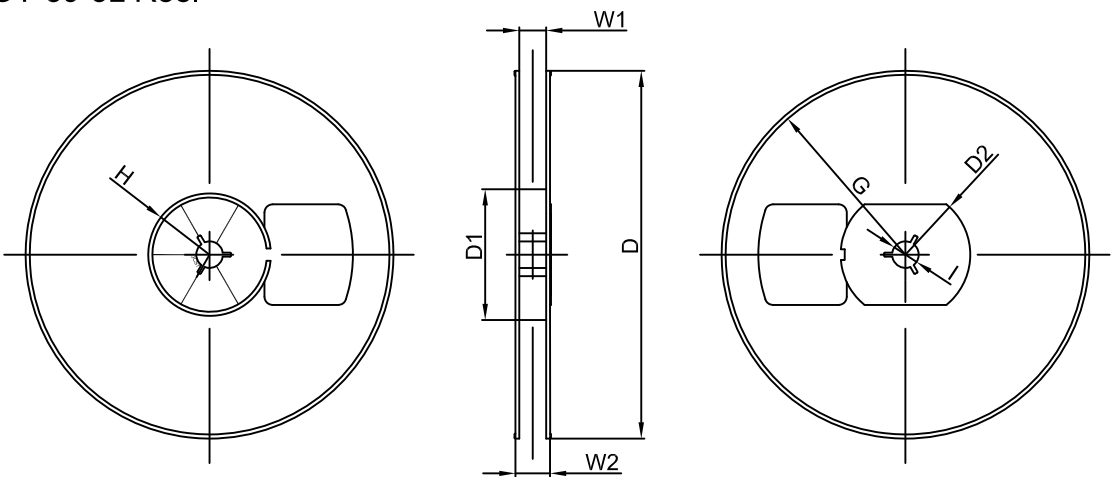
Packaging Description:  
SOT-89-3L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 1,000 units per 7" or 18.0 cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

| Dimensions are in millimeter |      |      |      |       |      |      |      |      |      |       |
|------------------------------|------|------|------|-------|------|------|------|------|------|-------|
| Pkg type                     | A    | B    | C    | d     | E    | F    | P0   | P    | P1   | W     |
| SOT-89-3L                    | 4.85 | 4.45 | 1.85 | Ø1.50 | 1.75 | 5.50 | 4.00 | 8.00 | 2.00 | 12.00 |

SOT-89-3L Tape Leader and Trailer



SOT-89-3L Reel



| Dimensions are in millimeter |         |       |        |        |        |        |       |       |
|------------------------------|---------|-------|--------|--------|--------|--------|-------|-------|
| Reel Option                  | D       | D1    | D2     | G      | H      | I      | W1    | W2    |
| 7"Dia                        | Ø180.00 | 60.00 | R32.00 | R86.50 | R30.00 | Ø13.00 | 13.20 | 16.50 |

| REEL     | Reel Size | Box        | Box Size(mm) | Carton     | Carton Size(mm) | G.W.(kg) |
|----------|-----------|------------|--------------|------------|-----------------|----------|
| 1000 pcs | 7 inch    | 10,000 pcs | 203×203×195  | 40,000 pcs | 438×438×220     |          |