

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

## TA79L05F,TA79L06F,TA79L08F,TA79L09F,TA79L10F, TA79L12F,TA79L15F,TA79L18F,TA79L20F,TA79L24F

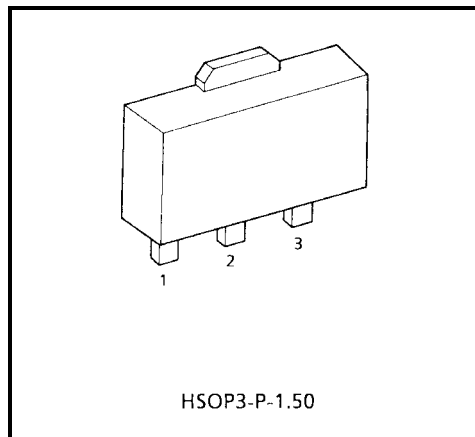
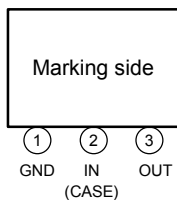
Three-Terminal Negative Voltage Regulators

-5 V, -6 V, -8 V, -9 V, -10 V, -12 V, -15 V, -18 V, -20 V, -24 V

### Features

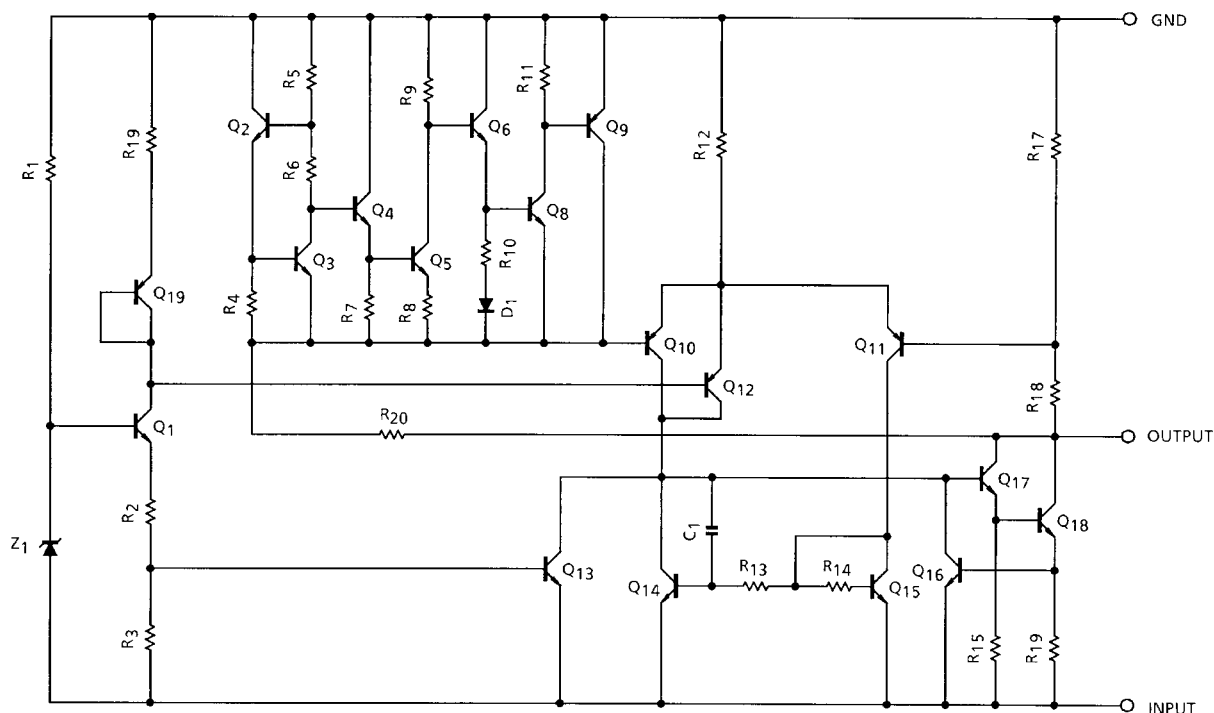
- Best suited to a power supply for TTL and C<sup>2</sup>MOS.
- Built-in over current protective circuit.
- Built-in thermal protective circuit.
- Maximum output current of 150 mA ( $T_j = 25^\circ\text{C}$ ).
- Packaged in Power Mini. (SOT-89).

### Pin Assignment



Weight: 0.05 g (Typ.)

### Equivalent Circuit



**Maximum Ratings (Ta = 25°C)**

| Characteristics       |             | Symbol               | Rating  | Unit |
|-----------------------|-------------|----------------------|---------|------|
| Input voltage         | TA79L05F    | V <sub>IN</sub>      | -35     | V    |
|                       | TA79L06F    |                      |         |      |
|                       | TA79L08F    |                      |         |      |
|                       | TA79L09F    |                      |         |      |
|                       | TA79L10F    |                      |         |      |
|                       | TA79L12F    |                      |         |      |
|                       | TA79L15F    |                      |         |      |
|                       | TA79L18F    |                      |         |      |
|                       | TA79L20F    |                      | -40     |      |
|                       | TA79L24F    |                      |         |      |
| Power dissipation     | (Ta = 25°C) | P <sub>D</sub>       | 500     | mW   |
| Operating temperature |             | T <sub>opr</sub>     | -30~85  | °C   |
| Storage temperature   |             | T <sub>stg</sub>     | -55~150 | °C   |
| Junction temperature  |             | T <sub>j</sub>       | 150     | °C   |
| Thermal resistance    |             | R <sub>th(j-a)</sub> | 250     | °C/W |

| Type No. | Marking |
|----------|---------|
| TA79L05F | AJ      |
| TA79L06F | BJ      |
| TA79L08F | CJ      |
| TA79L09F | DJ      |
| TA79L10F | EJ      |
| TA79L12F | FJ      |
| TA79L15F | GJ      |
| TA79L18F | HJ      |
| TA79L20F | IJ      |
| TA79L24F | JJ      |

**TA79L05F**
**Electrical Characteristics**

(Unless otherwise specified,  $V_{IN} = -10\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

| Characteristics                                   | Symbol                | Test Circuit | Test Condition                                                         |                                                                        | Min   | Typ. | Max   | Unit              |
|---------------------------------------------------|-----------------------|--------------|------------------------------------------------------------------------|------------------------------------------------------------------------|-------|------|-------|-------------------|
| Output voltage                                    | V <sub>OUT</sub>      | 1            | T <sub>j</sub> = 25°C                                                  |                                                                        | -5.2  | -5.0 | -4.8  | V                 |
| Line regulation                                   | Reg.line              | 1            | T <sub>j</sub> = 25°C                                                  | -20 V ≤ V <sub>IN</sub> ≤ -7.0 V                                       | —     | 55   | 150   | mV                |
|                                                   |                       |              |                                                                        | -20 V ≤ V <sub>IN</sub> ≤ -8.0 V                                       | —     | 45   | 100   |                   |
| Load regulation                                   | Reg.load              | 1            | T <sub>j</sub> = 25°C                                                  | 1.0 mA ≤ I <sub>OUT</sub> ≤ 100 mA                                     | —     | 11   | 100   | mV                |
|                                                   |                       |              |                                                                        | 1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA                                      | —     | 5.0  | 50    |                   |
| Output voltage                                    | V <sub>OUT</sub>      | 1            | T <sub>j</sub> = 25°C                                                  | -20 V ≤ V <sub>IN</sub> ≤ -7.0 V,<br>1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA | -5.25 | —    | -4.75 | V                 |
|                                                   |                       |              |                                                                        | 1.0 mA ≤ I <sub>OUT</sub> ≤ 70 mA                                      | -5.25 | —    | -4.75 |                   |
| Quiescent current                                 | I <sub>B</sub>        | 1            | T <sub>j</sub> = 25°C                                                  |                                                                        | —     | 3.1  | 6.0   | mA                |
|                                                   |                       |              | T <sub>j</sub> = 125°C                                                 |                                                                        | —     | —    | 5.5   |                   |
| Quiescent current change                          | ΔI <sub>B</sub>       | 1            | T <sub>j</sub> = 25°C                                                  | -20 V ≤ V <sub>IN</sub> ≤ -8.0 V                                       | —     | —    | 1.5   | mA                |
|                                                   | ΔI <sub>BO</sub>      | 1            |                                                                        | 1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA                                      | —     | —    | 0.1   |                   |
| Output noise voltage                              | V <sub>NO</sub>       | 2            | T <sub>a</sub> = 25°C, 10 Hz ≤ f ≤ 100 kHz                             |                                                                        | —     | 40   | —     | μV <sub>rms</sub> |
| Long term stability                               | ΔV <sub>OUT</sub> /Δt | 1            | —                                                                      |                                                                        | —     | 12   | —     | mV/kh             |
| Ripple rejection ratio                            | R.R.                  | 3            | -18 V ≤ V <sub>IN</sub> ≤ -8.0 V,<br>T <sub>j</sub> = 25°C, f = 120 Hz |                                                                        | 41    | 49   | —     | dB                |
| Dropout voltage                                   | V <sub>D</sub>        | 1            | T <sub>j</sub> = 25°C                                                  |                                                                        | —     | 1.7  | —     | V                 |
| Average temperature coefficient of output voltage | T <sub>CVO</sub>      | 1            | I <sub>OUT</sub> = 5 mA                                                |                                                                        | —     | 0.6  | —     | mV/°C             |

**TA79L06F**
**Electrical Characteristics**

(Unless otherwise specified,  $V_{IN} = -11\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

| Characteristics                                   | Symbol                | Test Circuit | Test Condition                                                         |                                                                        | Min   | Typ. | Max   | Unit              |
|---------------------------------------------------|-----------------------|--------------|------------------------------------------------------------------------|------------------------------------------------------------------------|-------|------|-------|-------------------|
| Output voltage                                    | V <sub>OUT</sub>      | 1            | T <sub>j</sub> = 25°C                                                  |                                                                        | -6.24 | -6.0 | -5.76 | V                 |
| Line regulation                                   | Reg-line              | 1            | T <sub>j</sub> = 25°C                                                  | -21 V ≤ V <sub>IN</sub> ≤ -8.1 V                                       | —     | 50   | 150   | mV                |
|                                                   |                       |              |                                                                        | -21 V ≤ V <sub>IN</sub> ≤ -9.0 V                                       | —     | 45   | 110   |                   |
| Load regulation                                   | Reg-load              | 1            | T <sub>j</sub> = 25°C                                                  | 1.0 mA ≤ I <sub>OUT</sub> ≤ 100 mA                                     | —     | 12   | 120   | mV                |
|                                                   |                       |              |                                                                        | 1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA                                      | —     | 5.5  | 60    |                   |
| Output voltage                                    | V <sub>OUT</sub>      | 1            | T <sub>j</sub> = 25°C                                                  | -21 V ≤ V <sub>IN</sub> ≤ -8.1 V,<br>1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA | -6.3  | —    | -5.7  | V                 |
|                                                   |                       |              |                                                                        | 1.0 mA ≤ I <sub>OUT</sub> ≤ 70 mA                                      | -6.3  | —    | -5.7  |                   |
| Quiescent current                                 | I <sub>B</sub>        | 1            | T <sub>j</sub> = 25°C                                                  |                                                                        | —     | 3.1  | 6.0   | mA                |
|                                                   |                       |              | T <sub>j</sub> = 125°C                                                 |                                                                        | —     | —    | 5.5   |                   |
| Quiescent current change                          | ΔI <sub>B</sub>       | 1            | T <sub>j</sub> = 25°C                                                  | -20 V ≤ V <sub>IN</sub> ≤ -9.0 V                                       | —     | —    | 1.5   | mA                |
|                                                   | ΔI <sub>BO</sub>      | 1            |                                                                        | 1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA                                      | —     | —    | 0.1   |                   |
| Output noise voltage                              | V <sub>NO</sub>       | 2            | T <sub>a</sub> = 25°C, 10 Hz ≤ f ≤ 100 kHz                             |                                                                        | —     | 40   | —     | μV <sub>rms</sub> |
| Long term stability                               | ΔV <sub>OUT</sub> /Δt | 1            | —                                                                      |                                                                        | —     | 14   | —     | mV/kh             |
| Ripple rejection ratio                            | R.R.                  | 3            | -19 V ≤ V <sub>IN</sub> ≤ -9.0 V,<br>T <sub>j</sub> = 25°C, f = 120 Hz |                                                                        | 39    | 47   | —     | dB                |
| Dropout voltage                                   | V <sub>D</sub>        | 1            | T <sub>j</sub> = 25°C                                                  |                                                                        | —     | 1.7  | —     | V                 |
| Average temperature coefficient of output voltage | T <sub>CVO</sub>      | 1            | I <sub>OUT</sub> = 5 mA                                                |                                                                        | —     | 0.7  | —     | mV/°C             |

**TA79L08F**
**Electrical Characteristics**

(Unless otherwise specified,  $V_{IN} = -14\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

| Characteristics                                   | Symbol                | Test Circuit | Test Condition                                                        |                                                                         | Min  | Typ. | Max  | Unit              |
|---------------------------------------------------|-----------------------|--------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|------|------|------|-------------------|
| Output voltage                                    | V <sub>OUT</sub>      | 1            | T <sub>j</sub> = 25°C                                                 |                                                                         | -8.3 | -8.0 | -7.7 | V                 |
| Line regulation                                   | Reg.line              | 1            | T <sub>j</sub> = 25°C                                                 | -23 V ≤ V <sub>IN</sub> ≤ -10.5 V                                       | —    | 20   | 175  | mV                |
|                                                   |                       |              |                                                                       | -23 V ≤ V <sub>IN</sub> ≤ -11 V                                         | —    | 12   | 125  |                   |
| Load regulation                                   | Reg.load              | 1            | T <sub>j</sub> = 25°C                                                 | 1.0 mA ≤ I <sub>OUT</sub> ≤ 100 mA                                      | —    | 15   | 155  | mV                |
|                                                   |                       |              |                                                                       | 1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA                                       | —    | 7.0  | 75   |                   |
| Output voltage                                    | V <sub>OUT</sub>      | 1            | T <sub>j</sub> = 25°C                                                 | -23 V ≤ V <sub>IN</sub> ≤ -10.5 V,<br>1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA | -8.4 | —    | -7.6 | V                 |
|                                                   |                       |              |                                                                       | 1.0 mA ≤ I <sub>OUT</sub> ≤ 70 mA                                       | -8.4 | —    | -7.6 |                   |
| Quiescent current                                 | I <sub>B</sub>        | 1            | T <sub>j</sub> = 25°C                                                 |                                                                         | —    | 3.1  | 6.5  | mA                |
|                                                   |                       |              | T <sub>j</sub> = 125°C                                                |                                                                         | —    | —    | 6.0  |                   |
| Quiescent current change                          | ΔI <sub>BI</sub>      | 1            | T <sub>j</sub> = 25°C                                                 | -23 V ≤ V <sub>IN</sub> ≤ -11 V                                         | —    | —    | 1.5  | mA                |
|                                                   | ΔI <sub>BO</sub>      | 1            |                                                                       | 1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA                                       | —    | —    | 0.1  |                   |
| Output noise voltage                              | V <sub>NO</sub>       | 2            | T <sub>a</sub> = 25°C, 10 Hz ≤ f ≤ 100 kHz                            |                                                                         | —    | 60   | —    | μV <sub>rms</sub> |
| Long term stability                               | ΔV <sub>OUT</sub> /Δt | 1            | —                                                                     |                                                                         | —    | 20   | —    | mV/kh             |
| Ripple rejection ratio                            | R.R.                  | 3            | -23 V ≤ V <sub>IN</sub> ≤ -12 V,<br>T <sub>j</sub> = 25°C, f = 120 Hz |                                                                         | 37   | 45   | —    | dB                |
| Dropout voltage                                   | V <sub>D</sub>        | 1            | T <sub>j</sub> = 25°C                                                 |                                                                         | —    | 1.7  | —    | V                 |
| Average temperature coefficient of output voltage | T <sub>CVO</sub>      | 1            | I <sub>OUT</sub> = 5 mA                                               |                                                                         | —    | 0.8  | —    | mV/°C             |

**TA79L09F**
**Electrical Characteristics**

(Unless otherwise specified,  $V_{IN} = -15\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

| Characteristics                                   | Symbol                | Test Circuit | Test Condition                                                        |                                                                         | Min   | Typ. | Max   | Unit              |
|---------------------------------------------------|-----------------------|--------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|-------|------|-------|-------------------|
| Output voltage                                    | V <sub>OUT</sub>      | 1            | T <sub>j</sub> = 25°C                                                 |                                                                         | -9.36 | -9.0 | -8.64 | V                 |
| Line regulation                                   | Reg.line              | 1            | T <sub>j</sub> = 25°C                                                 | -24 V ≤ V <sub>IN</sub> ≤ -11.4 V                                       | —     | 80   | 200   | mV                |
|                                                   |                       |              |                                                                       | -24 V ≤ V <sub>IN</sub> ≤ -12 V                                         | —     | 20   | 160   |                   |
| Load regulation                                   | Reg.load              | 1            | T <sub>j</sub> = 25°C                                                 | 1.0 mA ≤ I <sub>OUT</sub> ≤ 100 mA                                      | —     | 17   | 175   | mV                |
|                                                   |                       |              |                                                                       | 1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA                                       | —     | 8.0  | 80    |                   |
| Output voltage                                    | V <sub>OUT</sub>      | 1            | T <sub>j</sub> = 25°C                                                 | -24 V ≤ V <sub>IN</sub> ≤ -11.4 V,<br>1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA | -9.45 | —    | -8.55 | V                 |
|                                                   |                       |              |                                                                       | 1.0 mA ≤ I <sub>OUT</sub> ≤ 70 mA                                       | -9.45 | —    | -8.55 |                   |
| Quiescent current                                 | I <sub>B</sub>        | 1            | T <sub>j</sub> = 25°C                                                 |                                                                         | —     | 3.2  | 6.5   | mA                |
|                                                   |                       |              | T <sub>j</sub> = 125°C                                                |                                                                         | —     | —    | 6.0   |                   |
| Quiescent current change                          | ΔI <sub>BI</sub>      | 1            | T <sub>j</sub> = 25°C                                                 | -24 V ≤ V <sub>IN</sub> ≤ -12 V                                         | —     | —    | 1.5   | mA                |
|                                                   | ΔI <sub>BO</sub>      | 1            |                                                                       | 1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA                                       | —     | —    | 0.1   |                   |
| Output noise voltage                              | V <sub>NO</sub>       | 2            | T <sub>a</sub> = 25°C, 10 Hz ≤ f ≤ 100 kHz                            |                                                                         | —     | 65   | —     | μV <sub>rms</sub> |
| Long term stability                               | ΔV <sub>OUT</sub> /Δt | 1            | —                                                                     |                                                                         | —     | 21   | —     | mV/kh             |
| Ripple rejection ratio                            | R.R.                  | 3            | -24 V ≤ V <sub>IN</sub> ≤ -12 V,<br>T <sub>j</sub> = 25°C, f = 120 Hz |                                                                         | 36    | 44   | —     | dB                |
| Dropout voltage                                   | V <sub>D</sub>        | 1            | T <sub>j</sub> = 25°C                                                 |                                                                         | —     | 1.7  | —     | V                 |
| Average temperature coefficient of output voltage | T <sub>CVO</sub>      | 1            | I <sub>OUT</sub> = 5 mA                                               |                                                                         | —     | 0.85 | —     | mV/°C             |

**TA79L10F**
**Electrical Characteristics**

(Unless otherwise specified,  $V_{IN} = -16\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

| Characteristics                                   | Symbol                | Test Circuit | Test Condition                                                        |                                                                         | Min   | Typ.  | Max  | Unit              |
|---------------------------------------------------|-----------------------|--------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|-------|-------|------|-------------------|
| Output voltage                                    | V <sub>OUT</sub>      | 1            | T <sub>j</sub> = 25°C                                                 |                                                                         | -10.4 | -10.0 | -9.6 | V                 |
| Line regulation                                   | Reg.line              | 1            | T <sub>j</sub> = 25°C                                                 | -25 V ≤ V <sub>IN</sub> ≤ -12.5 V                                       | —     | 80    | 230  | mV                |
|                                                   |                       |              |                                                                       | -25 V ≤ V <sub>IN</sub> ≤ -13 V                                         | —     | 30    | 170  |                   |
| Load regulation                                   | Reg.load              | 1            | T <sub>j</sub> = 25°C                                                 | 1.0 mA ≤ I <sub>OUT</sub> ≤ 100 mA                                      | —     | 18    | 190  | mV                |
|                                                   |                       |              |                                                                       | 1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA                                       | —     | 8.5   | 90   |                   |
| Output voltage                                    | V <sub>OUT</sub>      | 1            | T <sub>j</sub> = 25°C                                                 | -25 V ≤ V <sub>IN</sub> ≤ -12.5 V,<br>1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA | -10.5 | —     | -9.5 | V                 |
|                                                   |                       |              |                                                                       | 1.0 mA ≤ I <sub>OUT</sub> ≤ 70 mA                                       | -10.5 | —     | -9.5 |                   |
| Quiescent current                                 | I <sub>B</sub>        | 1            | T <sub>j</sub> = 25°C                                                 |                                                                         | —     | 3.2   | 6.5  | mA                |
|                                                   |                       |              | T <sub>j</sub> = 125°C                                                |                                                                         | —     | —     | 6.0  |                   |
| Quiescent current change                          | ΔI <sub>B</sub>       | 1            | T <sub>j</sub> = 25°C                                                 | -25 V ≤ V <sub>IN</sub> ≤ -13 V                                         | —     | —     | 1.5  | mA                |
|                                                   | ΔI <sub>BO</sub>      | 1            |                                                                       | 1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA                                       | —     | —     | 0.1  |                   |
| Output noise voltage                              | V <sub>NO</sub>       | 2            | T <sub>a</sub> = 25°C, 10 Hz ≤ f ≤ 100 kHz                            |                                                                         | —     | 70    | —    | μV <sub>rms</sub> |
| Long term stability                               | ΔV <sub>OUT</sub> /Δt | 1            | —                                                                     |                                                                         | —     | 22    | —    | mV/kh             |
| Ripple rejection ratio                            | R.R.                  | 3            | -24 V ≤ V <sub>IN</sub> ≤ -13 V,<br>T <sub>j</sub> = 25°C, f = 120 Hz |                                                                         | 36    | 43    | —    | dB                |
| Dropout voltage                                   | V <sub>D</sub>        | 1            | T <sub>j</sub> = 25°C                                                 |                                                                         | —     | 1.7   | —    | V                 |
| Average temperature coefficient of output voltage | T <sub>CVO</sub>      | 1            | I <sub>OUT</sub> = 5 mA                                               |                                                                         | —     | 0.9   | —    | mV/°C             |

**TA79L12F**
**Electrical Characteristics**

(Unless otherwise specified,  $V_{IN} = -19\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

| Characteristics                                   | Symbol                    | Test Circuit | Test Condition                                                                                   | Min   | Typ.  | Max   | Unit                 |
|---------------------------------------------------|---------------------------|--------------|--------------------------------------------------------------------------------------------------|-------|-------|-------|----------------------|
| Output voltage                                    | $V_{OUT}$                 | 1            | $T_j = 25^\circ\text{C}$                                                                         | -12.5 | -12.0 | -11.5 | V                    |
| Line regulation                                   | Reg.line                  | 1            | $T_j = 25^\circ\text{C}$                                                                         | —     | 120   | 250   | mV                   |
|                                                   |                           |              | $T_j = 25^\circ\text{C}$                                                                         | —     | 100   | 200   |                      |
| Load regulation                                   | Reg.load                  | 1            | $T_j = 25^\circ\text{C}$                                                                         | —     | 20    | 225   | mV                   |
|                                                   |                           |              | $T_j = 25^\circ\text{C}$                                                                         | —     | 10    | 105   |                      |
| Output voltage                                    | $V_{OUT}$                 | 1            | $T_j = 25^\circ\text{C}$                                                                         | -12.6 | —     | -11.4 | V                    |
|                                                   |                           |              | $T_j = 25^\circ\text{C}$                                                                         | -12.6 | —     | -11.4 |                      |
| Quiescent current                                 | $I_B$                     | 1            | $T_j = 25^\circ\text{C}$                                                                         | —     | 3.2   | 6.5   | mA                   |
|                                                   |                           |              | $T_j = 125^\circ\text{C}$                                                                        | —     | —     | 6.0   |                      |
| Quiescent current change                          | $\Delta I_{BI}$           | 1            | $T_j = 25^\circ\text{C}$                                                                         | —     | —     | 1.5   | mA                   |
|                                                   | $\Delta I_{BO}$           | 1            | $T_j = 25^\circ\text{C}$                                                                         | —     | —     | 0.1   |                      |
| Output noise voltage                              | $V_{NO}$                  | 2            | $T_a = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$                             | —     | 80    | —     | $\mu\text{V}_{rms}$  |
| Long term stability                               | $\Delta V_{OUT}/\Delta t$ | 1            | —                                                                                                | —     | 24    | —     | mV/kh                |
| Ripple rejection ratio                            | R.R.                      | 3            | $-25\text{ V} \leq V_{IN} \leq -15\text{ V}$ ,<br>$T_j = 25^\circ\text{C}$ , $f = 120\text{ Hz}$ | 37    | 42    | —     | dB                   |
| Dropout voltage                                   | $V_D$                     | 1            | $T_j = 25^\circ\text{C}$                                                                         | —     | 1.7   | —     | V                    |
| Average temperature coefficient of output voltage | $T_{CVO}$                 | 1            | $I_{OUT} = 5\text{ mA}$                                                                          | —     | 1.0   | —     | mV/ $^\circ\text{C}$ |



**TA79L15F**
**Electrical Characteristics**

(Unless otherwise specified,  $V_{IN} = -23\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

| Characteristics                                   | Symbol                    | Test Circuit | Test Condition                                                                                       | Min    | Typ.  | Max    | Unit                 |
|---------------------------------------------------|---------------------------|--------------|------------------------------------------------------------------------------------------------------|--------|-------|--------|----------------------|
| Output voltage                                    | $V_{OUT}$                 | 1            | $T_j = 25^\circ\text{C}$                                                                             | -15.6  | -15.0 | -14.4  | V                    |
| Line regulation                                   | Reg.line                  | 1            | $T_j = 25^\circ\text{C}$                                                                             | —      | 130   | 300    | mV                   |
|                                                   |                           |              | $T_j = 25^\circ\text{C}$                                                                             | —      | 110   | 250    |                      |
| Load regulation                                   | Reg.load                  | 1            | $T_j = 25^\circ\text{C}$                                                                             | —      | 25    | 280    | mV                   |
|                                                   |                           |              | $T_j = 25^\circ\text{C}$                                                                             | —      | 12    | 130    |                      |
| Output voltage                                    | $V_{OUT}$                 | 1            | $T_j = 25^\circ\text{C}$                                                                             | -15.75 | —     | -14.25 | V                    |
|                                                   |                           |              | $T_j = 25^\circ\text{C}$                                                                             | -15.75 | —     | -14.25 |                      |
| Quiescent current                                 | $I_B$                     | 1            | $T_j = 25^\circ\text{C}$                                                                             | —      | 3.3   | 6.5    | mA                   |
|                                                   |                           |              | $T_j = 125^\circ\text{C}$                                                                            | —      | —     | 6.0    |                      |
| Quiescent current change                          | $\Delta I_{BI}$           | 1            | $T_j = 25^\circ\text{C}$                                                                             | —      | —     | 1.5    | mA                   |
|                                                   | $\Delta I_{BO}$           | 1            | $T_j = 25^\circ\text{C}$                                                                             | —      | —     | 0.1    |                      |
| Output noise voltage                              | $V_{NO}$                  | 2            | $T_a = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$                                 | —      | 90    | —      | $\mu\text{V}_{rms}$  |
| Long term stability                               | $\Delta V_{OUT}/\Delta t$ | 1            | —                                                                                                    | —      | 30    | —      | mV/kh                |
| Ripple rejection ratio                            | R.R.                      | 3            | $-28.5\text{ V} \leq V_{IN} \leq -18.5\text{ V}$ ,<br>$T_j = 25^\circ\text{C}$ , $f = 120\text{ Hz}$ | 34     | 39    | —      | dB                   |
| Dropout voltage                                   | $V_D$                     | 1            | $T_j = 25^\circ\text{C}$                                                                             | —      | 1.7   | —      | V                    |
| Average temperature coefficient of output voltage | $T_{CVO}$                 | 1            | $I_{OUT} = 5\text{ mA}$                                                                              | —      | 1.3   | —      | mV/ $^\circ\text{C}$ |

**TA79L18F**
**Electrical Characteristics**

(Unless otherwise specified,  $V_{IN} = -27\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

| Characteristics                                   | Symbol                | Test Circuit | Test Condition                                                        |                                                                         | Min   | Typ.  | Max   | Unit              |
|---------------------------------------------------|-----------------------|--------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|-------|-------|-------|-------------------|
| Output voltage                                    | V <sub>OUT</sub>      | 1            | T <sub>j</sub> = 25°C                                                 |                                                                         | -18.7 | -18.0 | -17.3 | V                 |
| Line regulation                                   | Reg.line              | 1            | T <sub>j</sub> = 25°C                                                 | -33 V ≤ V <sub>IN</sub> ≤ -20.7 V                                       | —     | 32    | 325   | mV                |
|                                                   |                       |              |                                                                       | -33 V ≤ V <sub>IN</sub> ≤ -21 V                                         | —     | 27    | 275   |                   |
| Load regulation                                   | Reg.load              | 1            | T <sub>j</sub> = 25°C                                                 | 1.0 mA ≤ I <sub>OUT</sub> ≤ 100 mA                                      | —     | 30    | 335   | mV                |
|                                                   |                       |              |                                                                       | 1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA                                       | —     | 15    | 155   |                   |
| Output voltage                                    | V <sub>OUT</sub>      | 1            | T <sub>j</sub> = 25°C                                                 | -33 V ≤ V <sub>IN</sub> ≤ -20.9 V,<br>1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA | -18.9 | —     | -17.1 | V                 |
|                                                   |                       |              |                                                                       | 1.0 mA ≤ I <sub>OUT</sub> ≤ 70 mA                                       | -18.9 | —     | -17.1 |                   |
| Quiescent current                                 | I <sub>B</sub>        | 1            | T <sub>j</sub> = 25°C                                                 |                                                                         | —     | 3.3   | 6.5   | mA                |
|                                                   |                       |              | T <sub>j</sub> = 125°C                                                |                                                                         | —     | —     | 6.0   |                   |
| Quiescent current change                          | ΔI <sub>B</sub>       | 1            | T <sub>j</sub> = 25°C                                                 | -33 V ≤ V <sub>IN</sub> ≤ -21 V                                         | —     | —     | 1.5   | mA                |
|                                                   | ΔI <sub>BO</sub>      | 1            |                                                                       | 1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA                                       | —     | —     | 0.1   |                   |
| Output noise voltage                              | V <sub>NO</sub>       | 2            | T <sub>a</sub> = 25°C, 10 Hz ≤ f ≤ 100 kHz                            |                                                                         | —     | 150   | —     | μV <sub>rms</sub> |
| Long term stability                               | ΔV <sub>OUT</sub> /Δt | 1            | —                                                                     |                                                                         | —     | 45    | —     | mV/kh             |
| Ripple rejection ratio                            | R.R.                  | 3            | -33 V ≤ V <sub>IN</sub> ≤ -23 V,<br>T <sub>j</sub> = 25°C, f = 120 Hz |                                                                         | 33    | 48    | —     | dB                |
| Dropout voltage                                   | V <sub>D</sub>        | 1            | T <sub>j</sub> = 25°C                                                 |                                                                         | —     | 1.7   | —     | V                 |
| Average temperature coefficient of output voltage | T <sub>CVO</sub>      | 1            | I <sub>OUT</sub> = 5 mA                                               |                                                                         | —     | 1.5   | —     | mV/°C             |

**TA79L20F**
**Electrical Characteristics**

(Unless otherwise specified,  $V_{IN} = -29\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

| Characteristics                                   | Symbol                | Test Circuit | Test Condition                                                        |                                                                         | Min   | Typ.  | Max   | Unit              |
|---------------------------------------------------|-----------------------|--------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|-------|-------|-------|-------------------|
| Output voltage                                    | V <sub>OUT</sub>      | 1            | T <sub>j</sub> = 25°C                                                 |                                                                         | -20.8 | -20.0 | -19.2 | V                 |
| Line regulation                                   | Reg.line              | 1            | T <sub>j</sub> = 25°C                                                 | -35 V ≤ V <sub>IN</sub> ≤ -23.5 V                                       | —     | 33    | 330   | mV                |
|                                                   |                       |              |                                                                       | -35 V ≤ V <sub>IN</sub> ≤ -24 V                                         | —     | 28    | 285   |                   |
| Load regulation                                   | Reg.load              | 1            | T <sub>j</sub> = 25°C                                                 | 1.0 mA ≤ I <sub>OUT</sub> ≤ 100 mA                                      | —     | 33    | 370   | mV                |
|                                                   |                       |              |                                                                       | 1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA                                       | —     | 17    | 170   |                   |
| Output voltage                                    | V <sub>OUT</sub>      | 1            | T <sub>j</sub> = 25°C                                                 | -35 V ≤ V <sub>IN</sub> ≤ -23.5 V,<br>1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA | -21.0 | —     | -19.0 | V                 |
|                                                   |                       |              |                                                                       | 1.0 mA ≤ I <sub>OUT</sub> ≤ 70 mA                                       | -21.0 | —     | -19.0 |                   |
| Quiescent current                                 | I <sub>B</sub>        | 1            | T <sub>j</sub> = 25°C                                                 |                                                                         | —     | 3.3   | 6.5   | mA                |
|                                                   |                       |              | T <sub>j</sub> = 125°C                                                |                                                                         | —     | —     | 6.0   |                   |
| Quiescent current change                          | ΔI <sub>B</sub>       | 1            | T <sub>j</sub> = 25°C                                                 | -35 V ≤ V <sub>IN</sub> ≤ -24 V                                         | —     | —     | 1.5   | mA                |
|                                                   | ΔI <sub>BO</sub>      | 1            |                                                                       | 1.0 mA ≤ I <sub>OUT</sub> ≤ 40 mA                                       | —     | —     | 0.1   |                   |
| Output noise voltage                              | V <sub>NO</sub>       | 2            | T <sub>a</sub> = 25°C, 10 Hz ≤ f ≤ 100 kHz                            |                                                                         | —     | 170   | —     | μV <sub>rms</sub> |
| Long term stability                               | ΔV <sub>OUT</sub> /Δt | 1            | —                                                                     |                                                                         | —     | 49    | —     | mV/kh             |
| Ripple rejection ratio                            | R.R.                  | 3            | -35 V ≤ V <sub>IN</sub> ≤ -27 V,<br>T <sub>j</sub> = 25°C, f = 120 Hz |                                                                         | 31    | 37    | —     | dB                |
| Dropout voltage                                   | V <sub>D</sub>        | 1            | T <sub>j</sub> = 25°C                                                 |                                                                         | —     | 1.7   | —     | V                 |
| Average temperature coefficient of output voltage | T <sub>CVO</sub>      | 1            | I <sub>OUT</sub> = 5 mA                                               |                                                                         | —     | 1.7   | —     | mV/°C             |

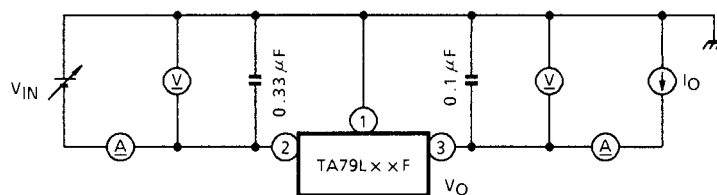
**TA79L24F**
**Electrical Characteristics**

(Unless otherwise specified,  $V_{IN} = -33\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ )

| Characteristics                                   | Symbol                    | Test Circuit | Test Condition                                                                                   | Min   | Typ.  | Max   | Unit                 |
|---------------------------------------------------|---------------------------|--------------|--------------------------------------------------------------------------------------------------|-------|-------|-------|----------------------|
| Output voltage                                    | $V_{OUT}$                 | 1            | $T_j = 25^\circ\text{C}$                                                                         | -25.0 | -24.0 | -23.0 | V                    |
| Line regulation                                   | Reg.line                  | 1            | $T_j = 25^\circ\text{C}$                                                                         | —     | 35    | 350   | mV                   |
|                                                   |                           |              | $-38\text{ V} \leq V_{IN} \leq -27\text{ V}$                                                     | —     | 30    | 300   |                      |
| Load regulation                                   | Reg.load                  | 1            | $T_j = 25^\circ\text{C}$                                                                         | —     | 40    | 440   | mV                   |
|                                                   |                           |              | $1.0\text{ mA} \leq I_{OUT} \leq 100\text{ mA}$                                                  | —     | 20    | 200   |                      |
| Output voltage                                    | $V_{OUT}$                 | 1            | $T_j = 25^\circ\text{C}$                                                                         | -25.2 | —     | -22.8 | V                    |
|                                                   |                           |              | $-38\text{ V} \leq V_{IN} \leq -27\text{ V}$ ,<br>$1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$ | -25.2 | —     | -22.8 |                      |
| Quiescent current                                 | $I_B$                     | 1            | $T_j = 25^\circ\text{C}$                                                                         | —     | 3.5   | 6.5   | mA                   |
|                                                   |                           |              | $T_j = 125^\circ\text{C}$                                                                        | —     | —     | 6.0   |                      |
| Quiescent current change                          | $\Delta I_B$              | 1            | $T_j = 25^\circ\text{C}$                                                                         | —     | —     | 1.5   | mA                   |
|                                                   | $\Delta I_{BO}$           | 1            | $1.0\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$                                                   | —     | —     | 0.1   |                      |
| Output noise voltage                              | $V_{NO}$                  | 2            | $T_a = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$                             | —     | 200   | —     | $\mu\text{V}_{rms}$  |
| Long term stability                               | $\Delta V_{OUT}/\Delta t$ | 1            | —                                                                                                | —     | 56    | —     | mV/kh                |
| Ripple rejection ratio                            | R.R.                      | 3            | $-35\text{ V} \leq V_{IN} \leq -29\text{ V}$ ,<br>$T_j = 25^\circ\text{C}$ , $f = 120\text{ Hz}$ | 31    | 47    | —     | dB                   |
| Dropout voltage                                   | $V_D$                     | 1            | $T_j = 25^\circ\text{C}$                                                                         | —     | 1.7   | —     | V                    |
| Average temperature coefficient of output voltage | $T_{CVO}$                 | 1            | $I_{OUT} = 5\text{ mA}$                                                                          | —     | 2.0   | —     | mV/ $^\circ\text{C}$ |

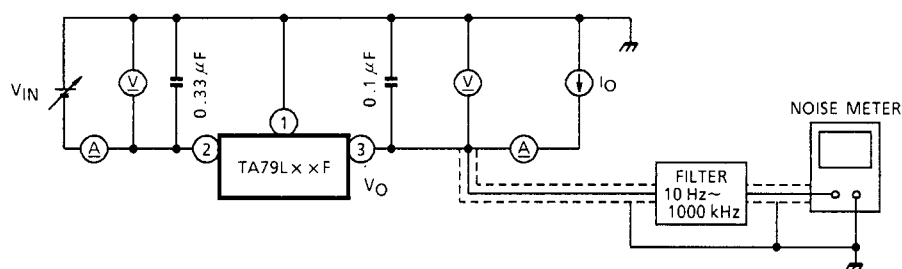
## Test Circuit 1

$V_{OUT}$ , Reg-line, Reg-load,  $I_B$ ,  $\Delta I_B$ ,  $\Delta V_{OUT}/\Delta t$ ,  $V_D$ ,  $T_{CVO}$



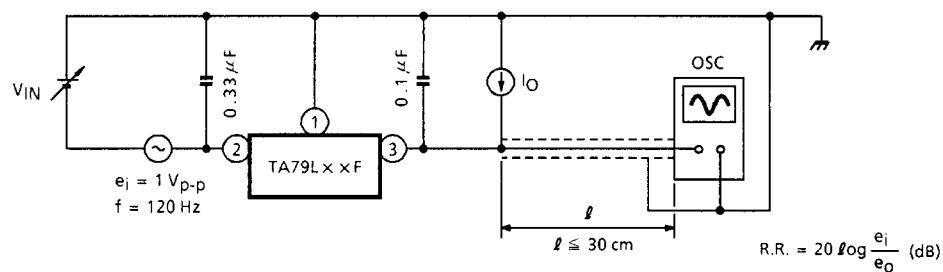
## Test Circuit 2

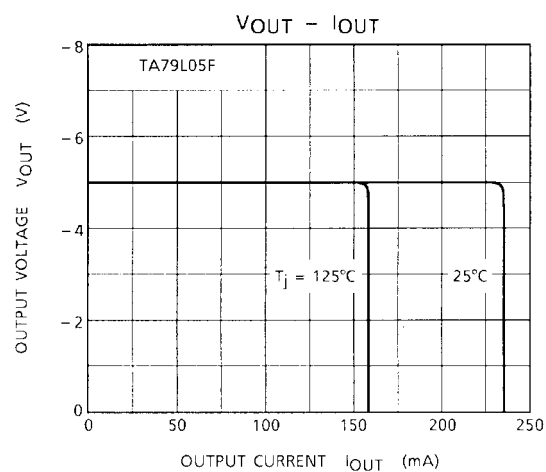
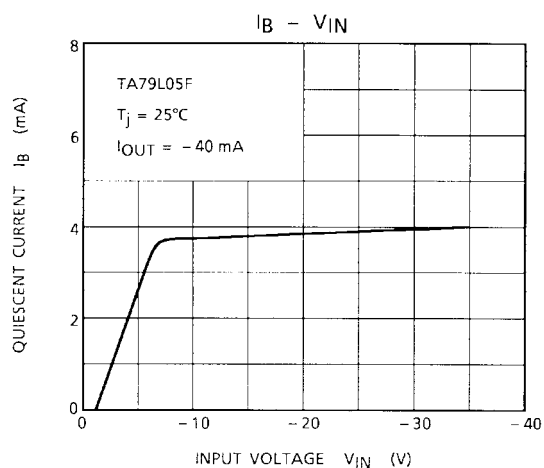
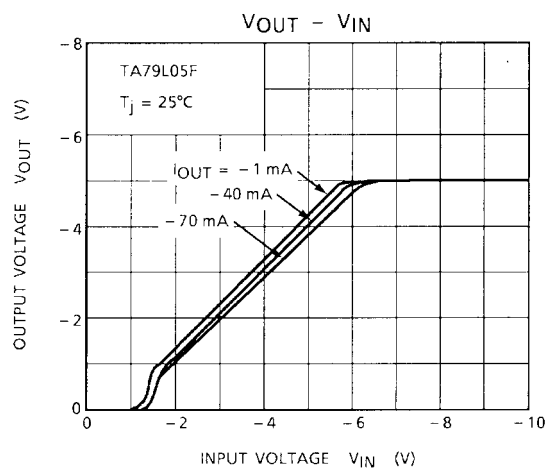
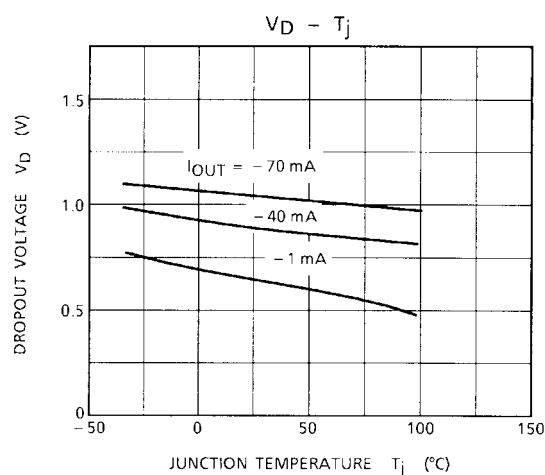
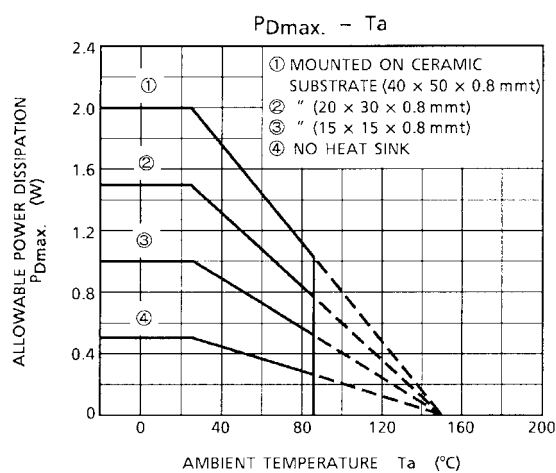
$V_{NO}$



## Test Circuit 3

R.R.

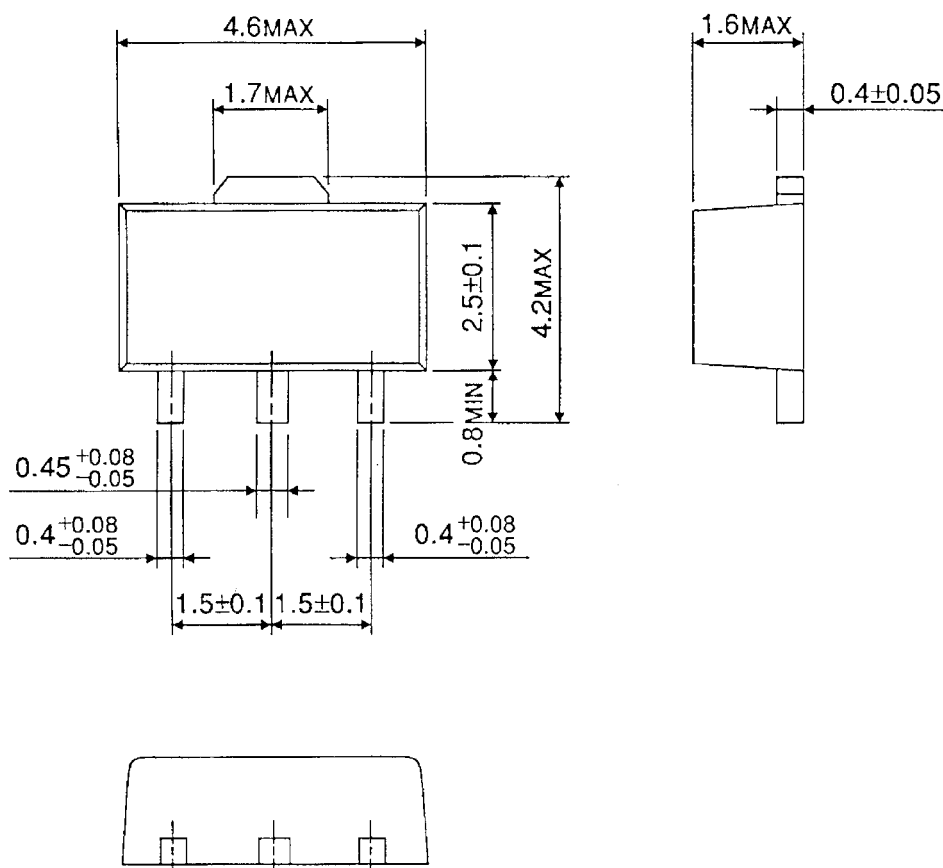




## Package Dimensions

HSOP3-P-1.50

Unit : mm



Weight : 0.05 g (Typ.)

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000707EBA

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