TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

# TA79005SB, TA79006SB, TA79007SB, TA79008SB, TA79009SB, TA79010SB, TA79012SB, TA79015SB, TA79018SB, TA79020SB, TA79024SB

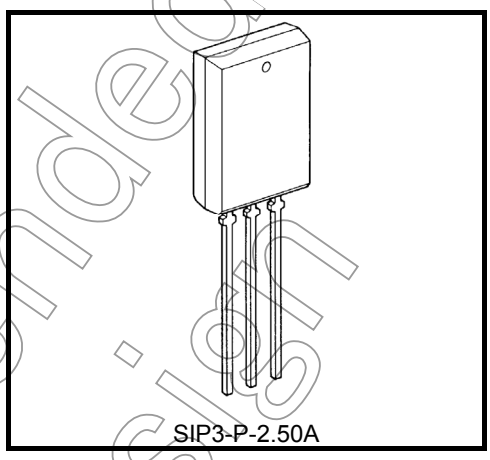
Output Current of 1A, Three-Terminal Negative Voltage Regulators

−5 V, −6 V, −7 V, −8 V, −9 V, −10 V, −12 V, −15 V, −18 V, −20 V, −24 V



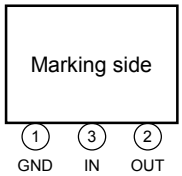
## Features

- Suitable for CMOS, TTL, and the and the power supply of other digital ICs
- Internal overheating protection
- Internal overcurrent protection
- Maximum output current of 1 A
- Package in the plastic case TPL ($P_D$ = 1.8 W)

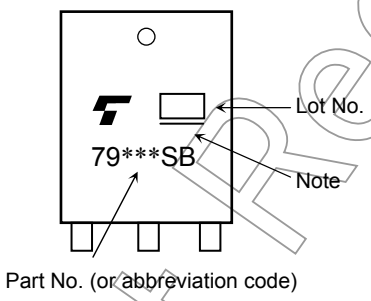



Weight: 1.5 g (typ.)

## Pin Assignment




## Marking

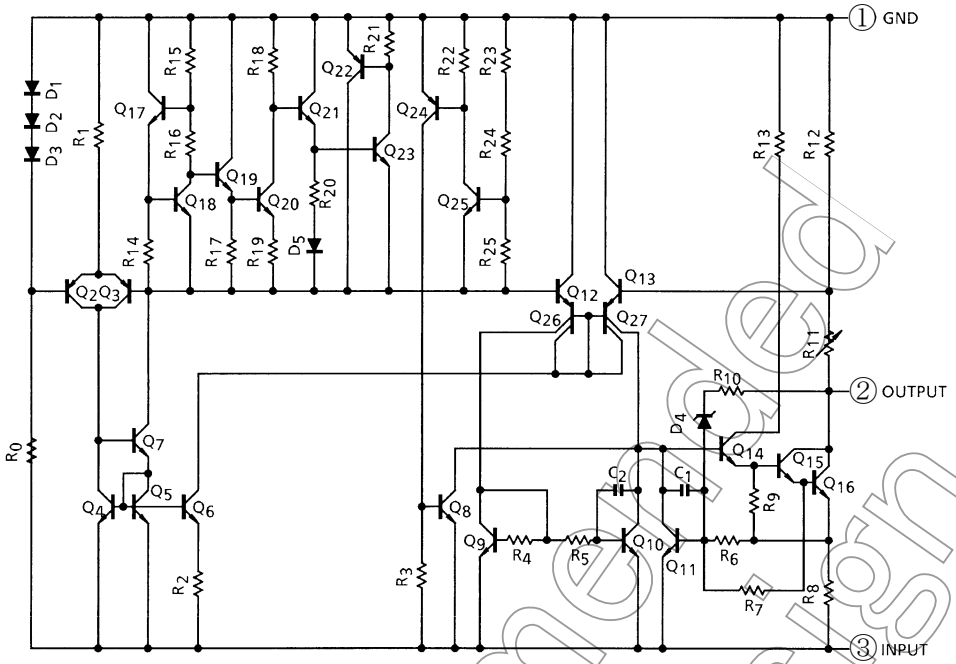



Note: A line under a Lot No. identifies the indication of product Labels.
Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

The product(s) in this document (“Product”) contain functions intended to protect the Product from temporary small overloads such as minor short-term overcurrent or overheating. The protective functions do not necessarily protect Product under all circumstances. When incorporating Product into your system, please design the system (1) to avoid such overloads upon the Product, and (2) to shut down or otherwise relieve the Product of such overload conditions immediately upon occurrence. For details, please refer to the notes appearing below in this document and other documents referenced in this document.

## Equivalent Circuit




## Absolute Maximum Ratings (Ta = 25°C)

| Characteristics | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Input voltage | TA79005SB | $V_{IN}$ | −35 | V |
| | TA79006SB | | | |
| | TA79007SB | | | |
| | TA79008SB | | | |
| | TA79009SB | | | |
| | TA79010SB | | | |
| | TA79012SB | | | |
| | TA79015SB | | | |
| | TA79018SB | | −40 | |
| | TA79020SB | | | |
| | TA79024SB | | | |
| Output current | | $I_{OUT}$ | 1 | A |
| Power dissipation | (Ta = 25°C) | $P_D$ | 1.8 | W |
| Operating temperature | | $T_{opr}$ | −30 to 85 | °C |
| Storage temperature | | $T_{stg}$ | −55 to 150 | °C |
| Junction temperature | | $T_j$ | 150 | °C |
| Thermal resistance | | $R_{th\ (j-a)}$ | 69.4 | °C/W |

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

## TA79005SB
## Electrical Characteristics
**(Unless otherwise specified, $V_{IN}$ = −10 V, $I_{OUT}$ = 500 mA, 0°C ≤ $T_j$ ≤ 125°C, $C_{IN}$ = 0.33 μF, $C_{OUT}$ = 0.1 μF)**

| Characteristics | | Symbol | Test Circuit | Test Condition | | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | | −5.2 | −5.0 | −4.8 | V |
| Line regulation | | Reg·line | 1 | $T_j$ = 25°C | −12 V ≤ $V_{IN}$ ≤ −8 V | — | 7 | 50 | mV |
| | | | | | −25 V ≤ $V_{IN}$ ≤ −7 V | — | 35 | 100 | |
| Load regulation | | Reg·load | 1 | $T_j$ = 25°C | 5 mA ≤ $I_{OUT}$ ≤ 1.5 A | — | 11 | 100 | mV |
| | | | | | 250 mA ≤ $I_{OUT}$ ≤ 750 mA | — | 4 | 50 | |
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | −20 V ≤ $V_{IN}$ ≤ −7 V, 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | −5.25 | — | −4.75 | V |
| Quiescent current | | $I_B$ | 1 | $T_j$ = 25°C | | — | 4.3 | 8.0 | mA |
| Quiescent current change | Line | $\Delta I_B$ | 1 | $T_j$ = 25°C | −25 V ≤ $V_{IN}$ ≤ −7 V | — | — | 1.3 | mA |
| | Load | | 1 | | 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | — | — | 0.5 | |
| Output noise voltage | | $V_{NO}$ | 2 | Ta = 25°C, $I_{OUT}$ = 20 mA, 10 Hz ≤ f ≤ 100 kHz | | — | 40 | — | $\mu V_{rms}$ |
| Ripple rejection | | R.R. | 3 | f = 120 Hz, $I_{OUT}$ = 20 mA, $T_j$ = 25°C | | 63 | 70 | — | dB |
| Short circuit current limit | | $I_{SC}$ | 1 | $T_j$ = 25°C | | — | 1.9 | — | A |
| Dropout voltage | | $V_D$ | 1 | $T_j$ = 25°C, $I_{OUT}$ = 1.0 A | | — | 2.0 | — | V |
| Average temperature coefficient of output voltage | | $T_{CVO}$ | 1 | $I_{OUT}$ = 5.0 mA | | — | 0.6 | — | mV/°C |

## TA79006SB
## Electrical Characteristics
**(Unless otherwise specified, $V_{IN}$ = −11 V, $I_{OUT}$ = 500 mA, 0°C ≤ $T_j$ ≤ 125°C, $C_{IN}$ = 0.33 μF, $C_{OUT}$ = 0.1 μF)**

| Characteristics | | Symbol | Test Circuit | Test Condition | | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | | −6.25 | −6.0 | −5.75 | V |
| Line regulation | | Reg·line | 1 | $T_j$ = 25°C | −13 V ≤ $V_{IN}$ ≤ −9 V | — | 9 | 60 | mV |
| | | | | | −25 V ≤ $V_{IN}$ ≤ −8 V | — | 43 | 120 | |
| Load regulation | | Reg·load | 1 | $T_j$ = 25°C | 5 mA ≤ $I_{OUT}$ ≤ 1.5 A | — | 13 | 120 | mV |
| | | | | | 250 mA ≤ $I_{OUT}$ ≤ 750 mA | — | 5 | 60 | |
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | −21 V ≤ $V_{IN}$ ≤ −8 V, 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | −6.3 | — | −5.7 | V |
| Quiescent current | | $I_B$ | 1 | $T_j$ = 25°C | | — | 4.3 | 8.0 | mA |
| Quiescent current change | Line | $\Delta I_B$ | 1 | $T_j$ = 25°C | −25 V ≤ $V_{IN}$ ≤ −8 V | — | — | 1.3 | mA |
| | Load | | 1 | | 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | — | — | 0.5 | |
| Output noise voltage | | $V_{NO}$ | 2 | Ta = 25°C, $I_{OUT}$ = 20 mA, 10 Hz ≤ f ≤ 100 kHz | | — | 45 | — | $\mu V_{rms}$ |
| Ripple rejection | | R.R. | 3 | f = 120 Hz, $I_{OUT}$ = 20 mA, $T_j$ = 25°C | | 61 | 68 | — | dB |
| Short circuit current limit | | $I_{SC}$ | 1 | $T_j$ = 25°C | | — | 1.9 | — | A |
| Dropout voltage | | $V_D$ | 1 | $T_j$ = 25°C, $I_{OUT}$ = 1.0 A | | — | 2.0 | — | V |
| Average temperature coefficient of output voltage | | $T_{CVO}$ | 1 | $I_{OUT}$ = 5.0 mA | | — | 0.7 | — | mV/°C |

## TA79007SB
## Electrical Characteristics
**(Unless otherwise specified, $V_{IN}$ = −12 V, $I_{OUT}$ = 500 mA, 0°C ≤ $T_j$ ≤ 125°C, $C_{IN}$ = 0.33 μF, $C_{OUT}$ = 0.1 μF)**

| Characteristics | | Symbol | Test Circuit | Test Condition | | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | | −7.28 | −7.0 | −6.72 | V |
| Line regulation | | Reg·line | 1 | $T_j$ = 25°C | −15 V ≤ $V_{IN}$ ≤ −10 V | — | 10 | 70 | mV |
| | | | | | −25 V ≤ $V_{IN}$ ≤ −9 V | — | 45 | 140 | |
| Load regulation | | Reg·load | 1 | $T_j$ = 25°C | 5 mA ≤ $I_{OUT}$ ≤ 1.5 A | — | 20 | 140 | mV |
| | | | | | 250 mA ≤ $I_{OUT}$ ≤ 750 mA | — | 7 | 70 | |
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | −22 V ≤ $V_{IN}$ ≤ −9 V, 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | −7.35 | — | −6.65 | V |
| Quiescent current | | $I_B$ | 1 | $T_j$ = 25°C | | — | 4.3 | 8.0 | mA |
| Quiescent current change | Line | $\Delta I_B$ | 1 | $T_j$ = 25°C | −25 V ≤ $V_{IN}$ ≤ −9 V | — | — | 1.0 | mA |
| | Load | | 1 | | 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | — | — | 0.5 | |
| Output noise voltage | | $V_{NO}$ | 2 | Ta = 25°C, $I_{OUT}$ = 20 mA, 10 Hz ≤ f ≤ 100 kHz | | — | 49 | — | $\mu V_{rms}$ |
| Ripple rejection | | R.R. | 3 | f = 120 Hz, $I_{OUT}$ = 20 mA, $T_j$ = 25°C | | 60 | 67 | — | dB |
| Short circuit current limit | | $I_{SC}$ | 1 | $T_j$ = 25°C | | — | 1.9 | — | A |
| Dropout voltage | | $V_D$ | 1 | $T_j$ = 25°C, $I_{OUT}$ = 1.0 A | | — | 2.0 | — | V |
| Average temperature coefficient of output voltage | | $T_{CVO}$ | 1 | $I_{OUT}$ = 5.0 mA | | — | 0.9 | — | mV/°C |

## TA79008SB
## Electrical Characteristics
**(Unless otherwise specified, $V_{IN}$ = −14 V, $I_{OUT}$ = 500 mA, 0°C ≤ $T_j$ ≤ 125°C, $C_{IN}$ = 0.33 μF, $C_{OUT}$ = 0.1 μF)**

| Characteristics | | Symbol | Test Circuit | Test Condition | | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | | −8.3 | −8.0 | −7.7 | V |
| Line regulation | | Reg·line | 1 | $T_j$ = 25°C | −17 V ≤ $V_{IN}$ ≤ −11 V | — | 11 | 80 | mV |
| | | | | | −25 V ≤ $V_{IN}$ ≤ −10.5 V | — | 47 | 160 | |
| Load regulation | | Reg·load | 1 | $T_j$ = 25°C | 5 mA ≤ $I_{OUT}$ ≤ 1.5 A | — | 26 | 160 | mV |
| | | | | | 250 mA ≤ $I_{OUT}$ ≤ 750 mA | — | 9 | 80 | |
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | −23 V ≤ $V_{IN}$ ≤ −10.5 V, 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | −8.4 | — | −7.6 | V |
| Quiescent current | | $I_B$ | 1 | $T_j$ = 25°C | | — | 4.3 | 8.0 | mA |
| Quiescent current change | Line | $\Delta I_B$ | 1 | $T_j$ = 25°C | −25 V ≤ $V_{IN}$ ≤ −10.5 V | — | — | 1.0 | mA |
| | Load | | 1 | | 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | — | — | 0.5 | |
| Output noise voltage | | $V_{NO}$ | 2 | Ta = 25°C, $I_{OUT}$ = 20 mA, 10 Hz ≤ f ≤ 100 kHz | | — | 52 | — | $\mu V_{rms}$ |
| Ripple rejection | | R.R. | 3 | f = 120 Hz, $I_{OUT}$ = 20 mA, $T_j$ = 25°C | | 59 | 66 | — | dB |
| Short circuit current limit | | $I_{SC}$ | 1 | $T_j$ = 25°C | | — | 1.9 | — | A |
| Dropout voltage | | $V_D$ | 1 | $T_j$ = 25°C, $I_{OUT}$ = 1.0 A | | — | 2.0 | — | V |
| Average temperature coefficient of output voltage | | $T_{CVO}$ | 1 | $I_{OUT}$ = 5.0 mA | | — | 1.0 | — | mV/°C |

## TA79009SB
## Electrical Characteristics
**(Unless otherwise specified, $V_{IN}$ = −15 V, $I_{OUT}$ = 500 mA, 0°C ≤ $T_j$ ≤ 125°C, $C_{IN}$ = 0.33 μF, $C_{OUT}$ = 0.1 μF)**

| Characteristics | | Symbol | Test Circuit | Test Condition | | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | | −9.3 | −9.0 | −8.7 | V |
| Line regulation | | Reg·line | 1 | $T_j$ = 25°C | −19 V ≤ $V_{IN}$ ≤ −13 V | — | 11 | 82 | mV |
| | | | | | −26 V ≤ $V_{IN}$ ≤ −11.5 V | — | 48 | 162 | |
| Load regulation | | Reg·load | 1 | $T_j$ = 25°C | 5 mA ≤ $I_{OUT}$ ≤ 1.5 A | — | 33 | 162 | mV |
| | | | | | 250 mA ≤ $I_{OUT}$ ≤ 750 mA | — | 11 | 82 | |
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | −24 V ≤ $V_{IN}$ ≤ −11.5 V, 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | −9.4 | — | −8.6 | V |
| Quiescent current | | $I_B$ | 1 | $T_j$ = 25°C | | — | 4.3 | 8.0 | mA |
| Quiescent current change | Line | $\Delta I_B$ | 1 | $T_j$ = 25°C | −26.5 V ≤ $V_{IN}$ ≤ −13 V | — | — | 1.0 | mA |
| | Load | | 1 | | 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | — | — | 0.5 | |
| Output noise voltage | | $V_{NO}$ | 2 | Ta = 25°C, $I_{OUT}$ = 20 mA, 10 Hz ≤ f ≤ 100 kHz | | — | 60 | — | $\mu V_{rms}$ |
| Ripple rejection | | R.R. | 3 | f = 120 Hz, $I_{OUT}$ = 20 mA, $T_j$ = 25°C | | 57 | 64 | — | dB |
| Short circuit current limit | | $I_{SC}$ | 1 | $T_j$ = 25°C | | — | 1.9 | — | A |
| Dropout voltage | | $V_D$ | 1 | $T_j$ = 25°C, $I_{OUT}$ = 1.0 A | | — | 2.0 | — | V |
| Average temperature coefficient of output voltage | | $T_{CVO}$ | 1 | $I_{OUT}$ = 5.0 mA | | — | 1.1 | — | mV/°C |

## TA79010SB
## Electrical Characteristics
**(Unless otherwise specified, $V_{IN}$ = −16 V, $I_{OUT}$ = 500 mA, 0°C ≤ $T_j$ ≤ 125°C, $C_{IN}$ = 0.33 μF, $C_{OUT}$ = 0.1 μF)**

| Characteristics | | Symbol | Test Circuit | Test Condition | | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | | −10.4 | −10.0 | −9.6 | V |
| Line regulation | | Reg·line | 1 | $T_j$ = 25°C | −20 V ≤ $V_{IN}$ ≤ −14 V | — | 12 | 90 | mV |
| | | | | | −27 V ≤ $V_{IN}$ ≤ −12.5 V | — | 50 | 180 | |
| Load regulation | | Reg·load | 1 | $T_j$ = 25°C | 5 mA ≤ $I_{OUT}$ ≤ 1.5 A | — | 40 | 180 | mV |
| | | | | | 250 mA ≤ $I_{OUT}$ ≤ 750 mA | — | 13 | 90 | |
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | −25 V ≤ $V_{IN}$ ≤ −12.5 V, 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | −10.5 | — | −9.5 | V |
| Quiescent current | | $I_B$ | 1 | $T_j$ = 25°C | | — | 4.4 | 8.0 | mA |
| Quiescent current change | Line | $\Delta I_B$ | 1 | $T_j$ = 25°C | −27.5 V ≤ $V_{IN}$ ≤ −14 V | — | — | 1.0 | mA |
| | Load | | 1 | | 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | — | — | 0.5 | |
| Output noise voltage | | $V_{NO}$ | 2 | Ta = 25°C, $I_{OUT}$ = 20 mA, 10 Hz ≤ f ≤ 100 kHz | | — | 65 | — | $\mu V_{rms}$ |
| Ripple rejection | | R.R. | 3 | f = 120 Hz, $I_{OUT}$ = 20 mA, $T_j$ = 25°C | | 57 | 63 | — | dB |
| Short circuit current limit | | $I_{SC}$ | 1 | $T_j$ = 25°C | | — | 1.9 | — | A |
| Dropout voltage | | $V_D$ | 1 | $T_j$ = 25°C, $I_{OUT}$ = 1.0 A | | — | 2.0 | — | V |
| Average temperature coefficient of output voltage | | $T_{CVO}$ | 1 | $I_{OUT}$ = 5.0 mA | | — | 1.3 | — | mV/°C |

## TA79012SB
## Electrical Characteristics
**(Unless otherwise specified, $V_{IN}$ = −19 V, $I_{OUT}$ = 500 mA, 0°C ≤ $T_j$ ≤ 125°C, $C_{IN}$ = 0.33 μF, $C_{OUT}$ = 0.1 μF)**

| Characteristics | | Symbol | Test Circuit | Test Condition | | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | | −12.5 | −12.0 | −11.5 | V |
| Line regulation | | Reg·line | 1 | $T_j$ = 25°C | −22 V ≤ $V_{IN}$ ≤ −16 V | — | 13 | 120 | mV |
| | | | | | −30 V ≤ $V_{IN}$ ≤ −14.5 V | — | 55 | 240 | |
| Load regulation | | Reg·load | 1 | $T_j$ = 25°C | 5 mA ≤ $I_{OUT}$ ≤ 1.5 A | — | 46 | 240 | mV |
| | | | | | 250 mA ≤ $I_{OUT}$ ≤ 750 mA | — | 17 | 120 | |
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | −27 V ≤ $V_{IN}$ ≤ −14.5 V, 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | −12.6 | — | −11.4 | V |
| Quiescent current | | $I_B$ | 1 | $T_j$ = 25°C | | — | 4.4 | 8.0 | mA |
| Quiescent current change | Line | $\Delta I_B$ | 1 | $T_j$ = 25°C | −30 V ≤ $V_{IN}$ ≤ −14.5 V | — | — | 1.0 | mA |
| | Load | | 1 | | 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | — | — | 0.5 | |
| Output noise voltage | | $V_{NO}$ | 2 | Ta = 25°C, $I_{OUT}$ = 20 mA, 10 Hz ≤ f ≤ 100 kHz | | — | 75 | — | $\mu V_{rms}$ |
| Ripple rejection | | R.R. | 3 | f = 120 Hz, $I_{OUT}$ = 20 mA, $T_j$ = 25°C | | 54 | 61 | — | dB |
| Short circuit current limit | | $I_{SC}$ | 1 | $T_j$ = 25°C | | — | 1.9 | — | A |
| Dropout voltage | | $V_D$ | 1 | $T_j$ = 25°C, $I_{OUT}$ = 1.0 A | | — | 2.0 | — | V |
| Average temperature coefficient of output voltage | | $T_{CVO}$ | 1 | $I_{OUT}$ = 5.0 mA | | — | 1.6 | — | mV/°C |

## TA79015SB
## Electrical Characteristics
**(Unless otherwise specified, $V_{IN}$ = −23 V, $I_{OUT}$ = 500 mA, 0°C ≤ $T_j$ ≤ 125°C, $C_{IN}$ = 0.33 μF, $C_{OUT}$ = 0.1 μF)**

| Characteristics | | Symbol | Test Circuit | Test Condition | | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | | −15.6 | −15.0 | −14.4 | V |
| Line regulation | | Reg·line | 1 | $T_j$ = 25°C | −26 V ≤ $V_{IN}$ ≤ −20 V | — | 14 | 150 | mV |
| | | | | | −30 V ≤ $V_{IN}$ ≤ −17.5 V | — | 57 | 300 | |
| Load regulation | | Reg·load | 1 | $T_j$ = 25°C | 5 mA ≤ $I_{OUT}$ ≤ 1.5 A | — | 68 | 300 | mV |
| | | | | | 250 mA ≤ $I_{OUT}$ ≤ 750 mA | — | 25 | 150 | |
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | −30 V ≤ $V_{IN}$ ≤ −17.5 V, 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | −15.75 | — | −14.25 | V |
| Quiescent current | | $I_B$ | 1 | $T_j$ = 25°C | | — | 4.4 | 8.0 | mA |
| Quiescent current change | Line | $\Delta I_B$ | 1 | $T_j$ = 25°C | −30 V ≤ $V_{IN}$ ≤ −17.5 V | — | — | 1.0 | mA |
| | Load | | 1 | | 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | — | — | 0.5 | |
| Output noise voltage | | $V_{NO}$ | 2 | Ta = 25°C, $I_{OUT}$ = 20 mA, 10 Hz ≤ f ≤ 100 kHz | | — | 90 | — | $\mu V_{rms}$ |
| Ripple rejection | | R.R. | 3 | f = 120 Hz, $I_{OUT}$ = 20 mA, $T_j$ = 25°C | | 53 | 60 | — | dB |
| Short circuit current limit | | $I_{SC}$ | 1 | $T_j$ = 25°C | | — | 1.9 | — | A |
| Dropout voltage | | $V_D$ | 1 | $T_j$ = 25°C, $I_{OUT}$ = 1.0 A | | — | 2.0 | — | V |
| Average temperature coefficient of output voltage | | $T_{CVO}$ | 1 | $I_{OUT}$ = 5.0 mA | | — | 2.0 | — | mV/°C |

## TA79018SB
## Electrical Characteristics
**(Unless otherwise specified, $V_{IN}$ = −27 V, $I_{OUT}$ = 500 mA, 0°C ≤ $T_j$ ≤ 125°C, $C_{IN}$ = 0.33 μF, $C_{OUT}$ = 0.1 μF)**

| Characteristics | | Symbol | Test Circuit | Test Condition | | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | | −18.7 | −18.0 | −17.3 | V |
| Line regulation | | Reg·line | 1 | $T_j$ = 25°C | −30 V ≤ $V_{IN}$ ≤ −24 V | — | 25 | 180 | mV |
| | | | | | −33 V ≤ $V_{IN}$ ≤ −21 V | — | 80 | 360 | |
| Load regulation | | Reg·load | 1 | $T_j$ = 25°C | 5 mA ≤ $I_{OUT}$ ≤ 1.5 A | — | 110 | 360 | mV |
| | | | | | 250 mA ≤ $I_{OUT}$ ≤ 750 mA | — | 55 | 180 | |
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | −33 V ≤ $V_{IN}$ ≤ −21 V, 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | −18.85 | — | −17.15 | V |
| Quiescent current | | $I_B$ | 1 | $T_j$ = 25°C | | — | 4.5 | 8.0 | mA |
| Quiescent current change | Line | $\Delta I_B$ | 1 | $T_j$ = 25°C | −33 V ≤ $V_{IN}$ ≤ −21 V | — | — | 1.0 | mA |
| | Load | | 1 | | 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | — | — | 0.5 | |
| Output noise voltage | | $V_{NO}$ | 2 | Ta = 25°C, $I_{OUT}$ = 20 mA, 10 Hz ≤ f ≤ 100 kHz | | — | 110 | — | $\mu V_{rms}$ |
| Ripple rejection | | R.R. | 3 | f = 120 Hz, $I_{OUT}$ = 20 mA, $T_j$ = 25°C | | 52 | 59 | — | dB |
| Short circuit current limit | | $I_{SC}$ | 1 | $T_j$ = 25°C | | — | 1.9 | — | A |
| Dropout voltage | | $V_D$ | 1 | $T_j$ = 25°C, $I_{OUT}$ = 1.0 A | | — | 2.0 | — | V |
| Average temperature coefficient of output voltage | | $T_{CVO}$ | 1 | $I_{OUT}$ = 5.0 mA | | — | 2.5 | — | mV/°C |

## TA79020SB
## Electrical Characteristics
**(Unless otherwise specified, $V_{IN}$ = −30 V, $I_{OUT}$ = 500 mA, 0°C ≤ $T_j$ ≤ 125°C, $C_{IN}$ = 0.33 μF, $C_{OUT}$ = 0.1 μF)**

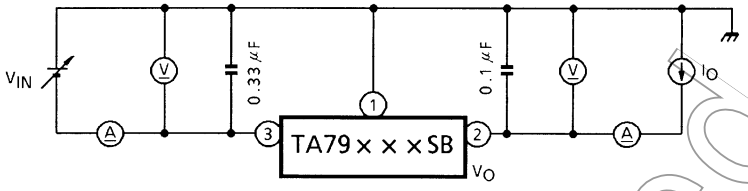
| Characteristics | | Symbol | Test Circuit | Test Condition | | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | | −20.8 | −20.0 | −19.2 | V |
| Line regulation | | Reg·line | 1 | $T_j$ = 25°C | −32 V ≤ $V_{IN}$ ≤ −26 V | — | 28 | 180 | mV |
| | | | | | −35 V ≤ $V_{IN}$ ≤ −24 V | — | 104 | 360 | |
| Load regulation | | Reg·load | 1 | $T_j$ = 25°C | 5 mA ≤ $I_{OUT}$ ≤ 1.5 A | — | 130 | 360 | mV |
| | | | | | 250 mA ≤ $I_{OUT}$ ≤ 750 mA | — | 70 | 180 | |
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | −35 V ≤ $V_{IN}$ ≤ −24 V, 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | −21.0 | — | −19.0 | V |
| Quiescent current | | $I_B$ | 1 | $T_j$ = 25°C | | — | 4.6 | 8.0 | mA |
| Quiescent current change | Line | $\Delta I_B$ | 1 | $T_j$ = 25°C | −36.5 V ≤ $V_{IN}$ ≤ −25 V | — | — | 1.0 | mA |
| | Load | | 1 | | 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | — | — | 0.5 | |
| Output noise voltage | | $V_{NO}$ | 2 | Ta = 25°C, $I_{OUT}$ = 20 mA, 10 Hz ≤ f ≤ 100 kHz | | — | 140 | — | $\mu V_{rms}$ |
| Ripple rejection | | R.R. | 3 | f = 120 Hz, $I_{OUT}$ = 20 mA, $T_j$ = 25°C | | 50 | 57 | — | dB |
| Short circuit current limit | | $I_{SC}$ | 1 | $T_j$ = 25°C | | — | 1.9 | — | A |
| Dropout voltage | | $V_D$ | 1 | $T_j$ = 25°C, $I_{OUT}$ = 1.0 A | | — | 2.0 | — | V |
| Average temperature coefficient of output voltage | | $T_{CVO}$ | 1 | $I_{OUT}$ = 5.0 mA | | — | 3.0 | — | mV/°C |

## TA79024SB
## Electrical Characteristics
**(Unless otherwise specified, $V_{IN}$ = −33 V, $I_{OUT}$ = 500 mA, 0°C ≤ $T_j$ ≤ 125°C, $C_{IN}$ = 0.33 μF, $C_{OUT}$ = 0.1 μF)**

| Characteristics | | Symbol | Test Circuit | Test Condition | | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | | −25.0 | −24.0 | −23.0 | V |
| Line regulation | | Reg·line | 1 | $T_j$ = 25°C | −36 V ≤ $V_{IN}$ ≤ −30 V | — | 31 | 240 | mV |
| | | | | | −38 V ≤ $V_{IN}$ ≤ −27 V | — | 118 | 480 | |
| Load regulation | | Reg·load | 1 | $T_j$ = 25°C | 5 mA ≤ $I_{OUT}$ ≤ 1.5 A | — | 150 | 480 | mV |
| | | | | | 250 mA ≤ $I_{OUT}$ ≤ 750 mA | — | 85 | 240 | |
| Output voltage | | $V_{OUT}$ | 1 | $T_j$ = 25°C | −38 V ≤ $V_{IN}$ ≤ −27 V, 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | −25.2 | — | −22.8 | V |
| Quiescent current | | $I_B$ | 1 | $T_j$ = 25°C | | — | 4.6 | 8.0 | mA |
| Quiescent current change | Line | $\Delta I_B$ | 1 | $T_j$ = 25°C | −38 V ≤ $V_{IN}$ ≤ −27 V | — | — | 1.0 | mA |
| | Load | | 1 | | 5 mA ≤ $I_{OUT}$ ≤ 1.0 A | — | — | 0.5 | |
| Output noise voltage | | $V_{NO}$ | 2 | Ta = 25°C, $I_{OUT}$ = 20 mA, 10 Hz ≤ f ≤ 100 kHz | | — | 170 | — | $\mu V_{rms}$ |
| Ripple rejection | | R.R. | 3 | f = 120 Hz, $I_{OUT}$ = 20 mA, $T_j$ = 25°C | | 49 | 56 | — | dB |
| Short circuit current limit | | $I_{SC}$ | 1 | $T_j$ = 25°C | | — | 1.9 | — | A |
| Dropout voltage | | $V_D$ | 1 | $T_j$ = 25°C, $I_{OUT}$ = 1.0 A | | — | 2.0 | — | V |
| Average temperature coefficient of output voltage | | $T_{CVO}$ | 1 | $I_{OUT}$ = 5.0 mA | | — | 3.5 | — | mV/°C |

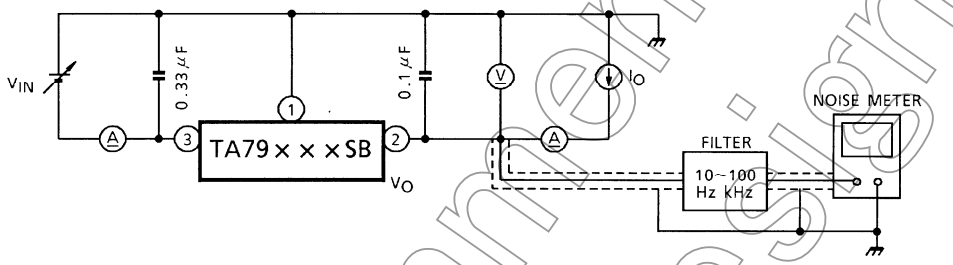
## Test Circuit 1

**$V_{OUT}$, Reg·line, Reg·load, $I_B$, $\Delta I_B$, $V_D$, $T_{CVO}$**



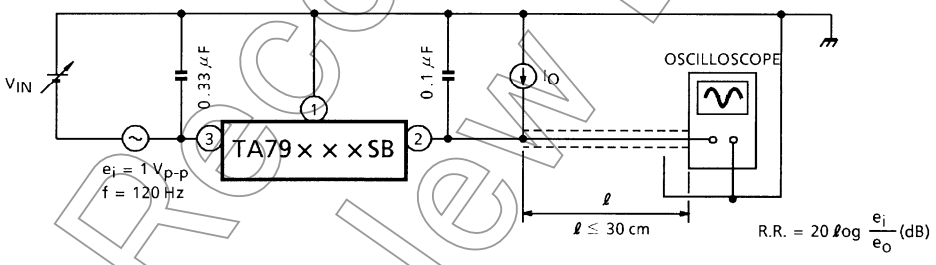

## Test Circuit 2

**$V_{NO}$**




## Test Circuit 3

**R.R.**



## Usage Precautions

- Low voltage

  Do not apply voltage to the Product that is lower than the minimum operating voltage, or the Product's protective functions will not operate properly and the Product may be permanently damaged.

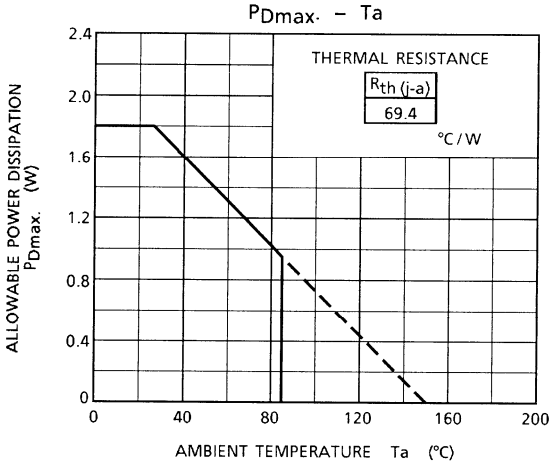
- Overcurrent Protection

  The overcurrent protection circuits in the Product are designed to temporarily protect Product from minor overcurrent of brief duration. When the overcurrent protective function in the Product activates, immediately cease application of overcurrent to Product. Improper usage of Product, such as application of current to Product exceeding the absolute maximum ratings, could cause the overcurrent protection circuit not to operate properly and/or damage Product permanently even before the protection circuit starts to operate.

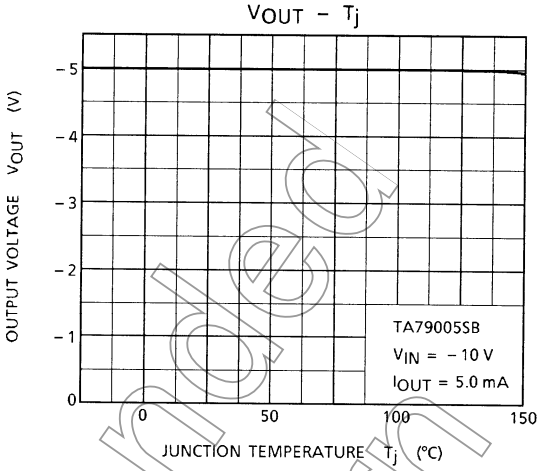
- Overheating Protection

  The thermal shutdown circuits in the Product are designed to temporarily protect Product from minor overheating of brief duration. When the overheating protective function in the Product activates, immediately correct the overheating situation. Improper usage of Product, such as the application of heat to Product exceeding the absolute maximum ratings, could cause the overheating protection circuit not to operate properly and/or damage Product permanently even before the protection circuit starts to operate.

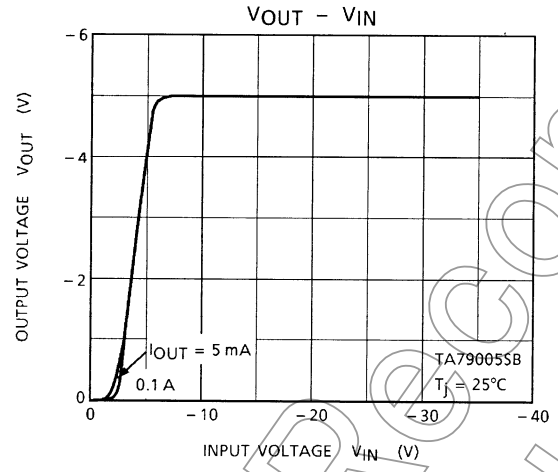
$P_{Dmax.}$ – Ta



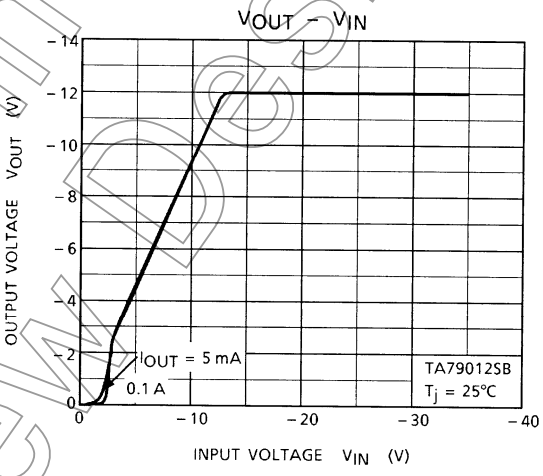

$V_{OUT}$ – $T_j$



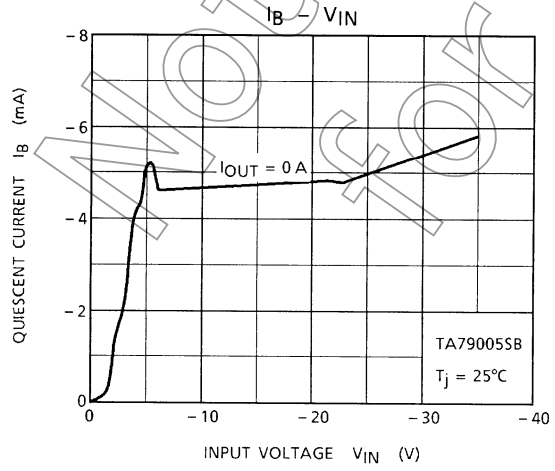

$V_{OUT}$ – $V_{IN}$



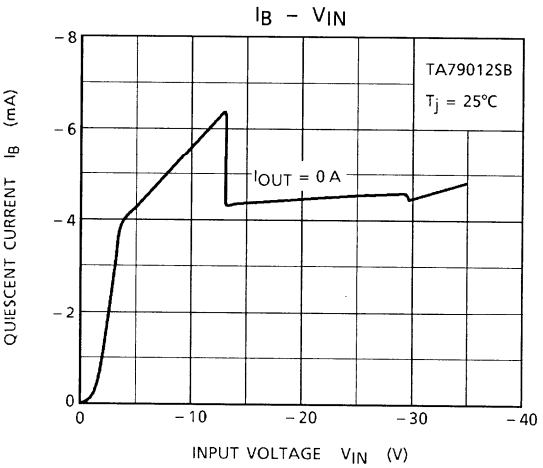

$V_{OUT}$ – $V_{IN}$



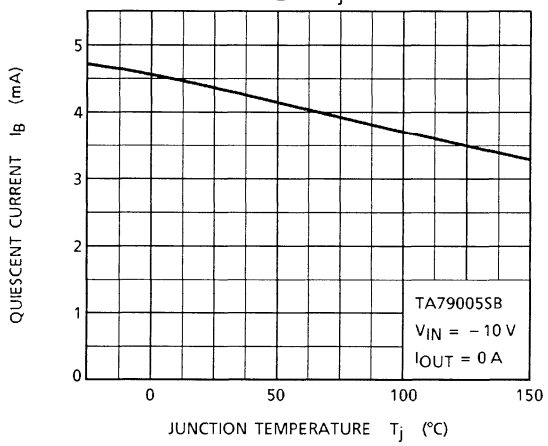

$I_B$ – $V_{IN}$



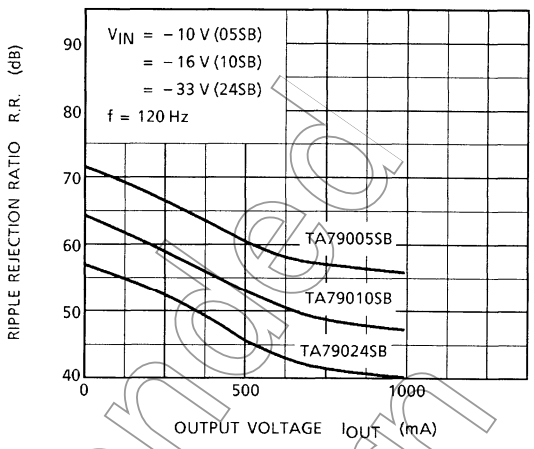

$I_B$ – $V_{IN}$



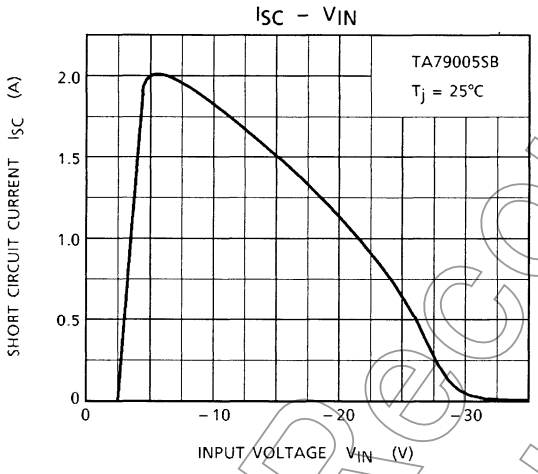
$I_B - T_j$



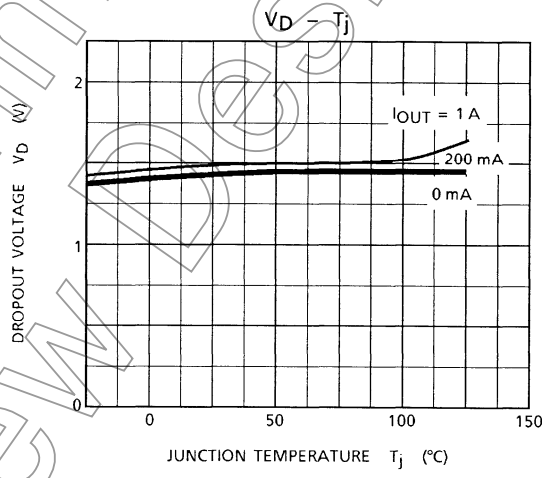

R.R. − $I_{OUT}$




$I_{SC} - V_{IN}$

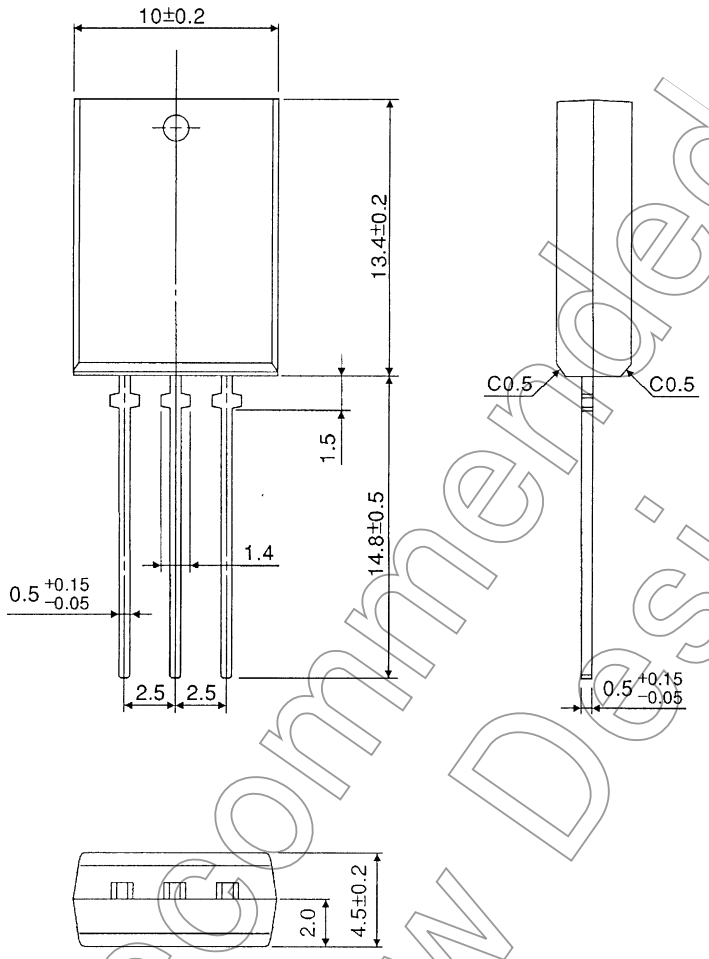



$V_D - T_j$



**Package Dimensions**

SIP3-P-2.50A Unit : mm




Weight : 1.5 g (Typ.)

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