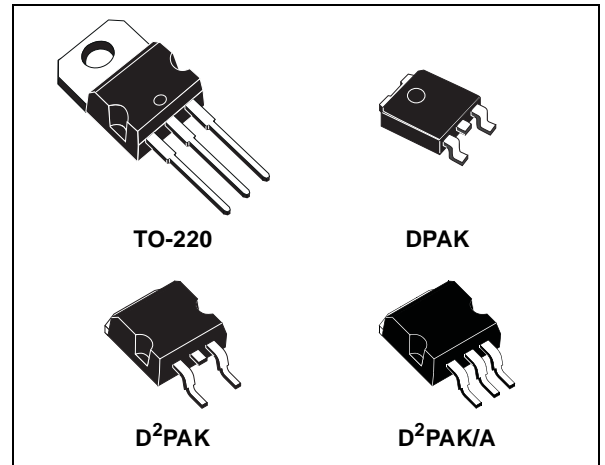


1.5A LOW DROP POSITIVE VOLTAGE REGULATOR ADJUSTABLE AND FIXED

- TYPICAL DROPOUT 1.3V AT 1.5A
- THREE TERMINAL ADJUSTABLE OR FIXED OUTPUT VOLTAGE 1.5V, 1.8V, 2.5V, 2.85V, 3.3V, 3.6V, 5V, 8V, 9V, 12V.
- GUARANTEED OUTPUT CURRENT UP TO 1.5A
- OUTPUT TOLERANCE $\pm 1\%$ AT 25°C AND $\pm 2\%$ IN FULL TEMPERATURE RANGE
- INTERNAL POWER AND THERMAL LIMIT
- WIDE OPERATING TEMPERATURE RANGE -40°C TO 125°C
- PACKAGE AVAILABLE: TO-220, D²PAK, D²PAK/A, DPAK
- PINOUT COMPATIBILITY WITH STANDARD ADJUSTABLE VREG



DESCRIPTION

The LD1086 is a LOW DROP Voltage Regulator able to provide up to 1.5A of Output Current. Dropout is guaranteed at a maximum of 1.2V at the maximum output current, decreasing at lower loads. The LD1086 is pin to pin compatible with the older 3-terminal adjustable regulators, but has better performances in term of drop and output tolerance.

A 2.85V output version is suitable for SCSI-2 active termination. Unlike PNP regulators, where a part of the output current is wasted as quiescent current, the LD1086 quiescent current flows into the load, so increase efficiency. Only a 10 μ F minimum capacitor is need for stability. The device is supplied in TO-220, D²PAK, D²PAK/A and DPAK. On chip trimming allows the regulator to reach a very tight output voltage tolerance, within $\pm 1\%$ at 25°C.

Table 1: Order Codes

| TO-220 | D ² PAK (*) | D ² PAK/A (*) | DPAK (*) | OUTPUT VOLTAGE |
|-----------|------------------------|--------------------------|------------|----------------|
| LD1086V15 | LD1086D2T15 | LD1086D2M15 | LD1086DT15 | 1.5 V |
| LD1086V18 | LD1086D2T18 | LD1086D2M18 | LD1086DT18 | 1.8 V |
| LD1086V25 | LD1086D2T25 | LD1086D2M25 | LD1086DT25 | 2.5 V |
| LD1086V28 | LD1086D2T28 | LD1086D2M28 | LD1086DT28 | 2.85 V |
| LD1086V33 | LD1086D2T33 | LD1086D2M33 | LD1086DT33 | 3.3 V |
| LD1086V36 | LD1086D2T36 | LD1086D2M36 | LD1086DT36 | 3.6 V |
| LD1086V50 | LD1086D2T50 | LD1086D2M50 | LD1086DT50 | 5.0 V |
| LD1086V80 | LD1086D2T80 | LD1086D2M80 | LD1086DT80 | 8.0 V |
| LD1086V90 | LD1086D2T90 | LD1086D2M90 | LD1086DT90 | 9.0 V |
| LD1086V12 | LD1086D2T12 | LD1086D2M12 | LD1086DT12 | 12.0 V |
| LD1086V | LD1086D2T | LD1086D2M | LD1086DT | ADJ |

(*) Available in Tape & Reel with the suffix "TR".

Figure 1: Pin Connection (top view)

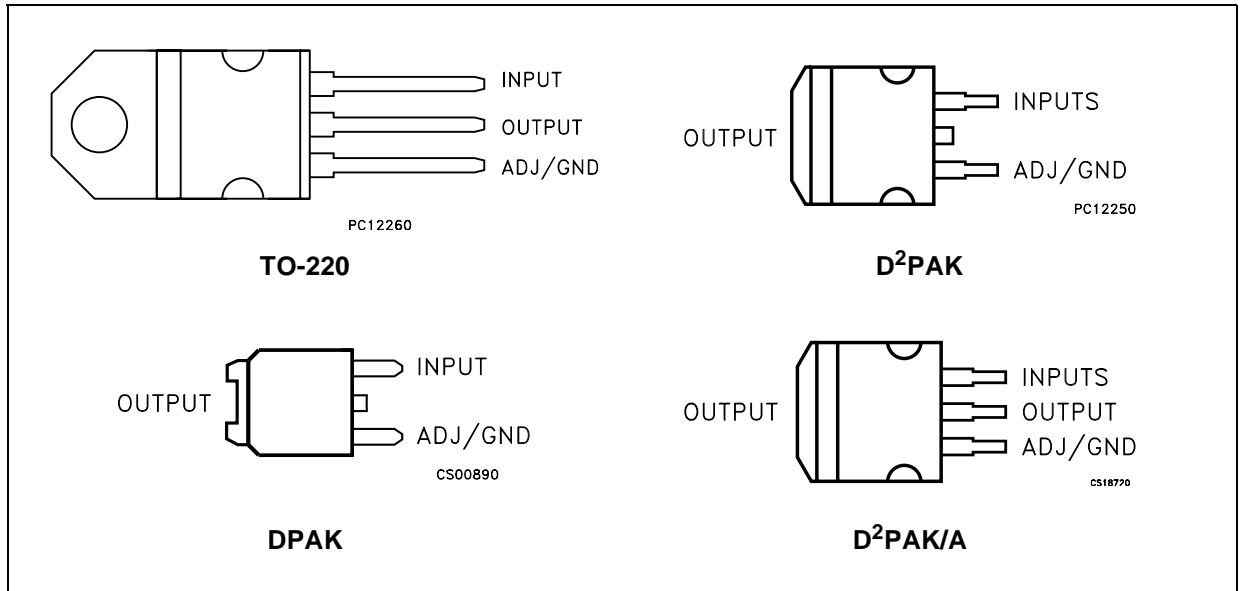


Table 2: Absolute Maximum Ratings

| Symbol | Parameter | Value | Unit |
|------------------|--------------------------------------|--------------------|------|
| V _I | DC Input Voltage | 30 | V |
| I _O | Output Current | Internally Limited | mA |
| P _D | Power Dissipation | Internally Limited | mW |
| T _{stg} | Storage Temperature Range | -55 to +150 | °C |
| T _{op} | Operating Junction Temperature Range | -40 to +125 | °C |

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

Table 3: Thermal Data

| Symbol | Parameter | TO-220 | D ² PAK | DPAK | Unit |
|-----------------------|-------------------------------------|--------|--------------------|------|------|
| R _{thj-case} | Thermal Resistance Junction-case | 3 | 3 | 8 | °C/W |
| R _{thj-amb} | Thermal Resistance Junction-ambient | 50 | 62.5 | | °C/W |

Figure 2: Application Circuits

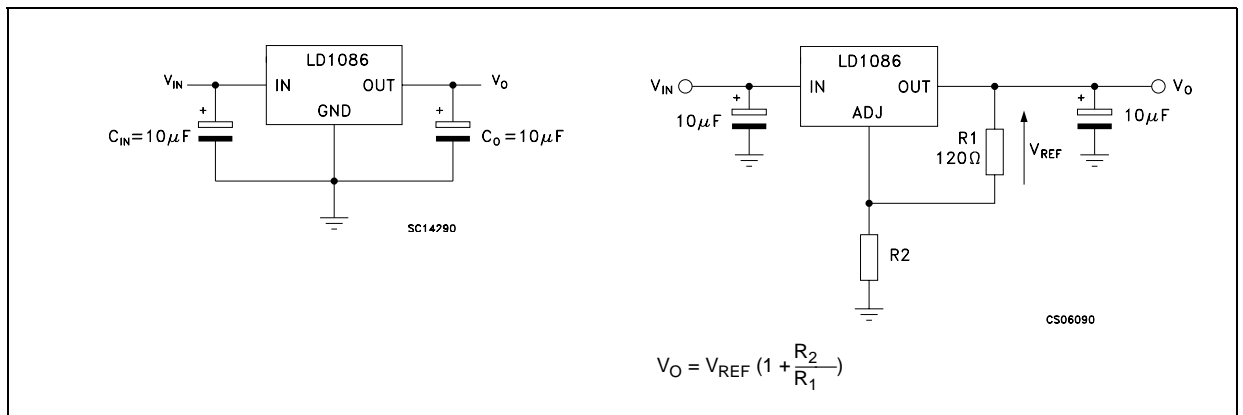


Figure 3: Schematic Diagram

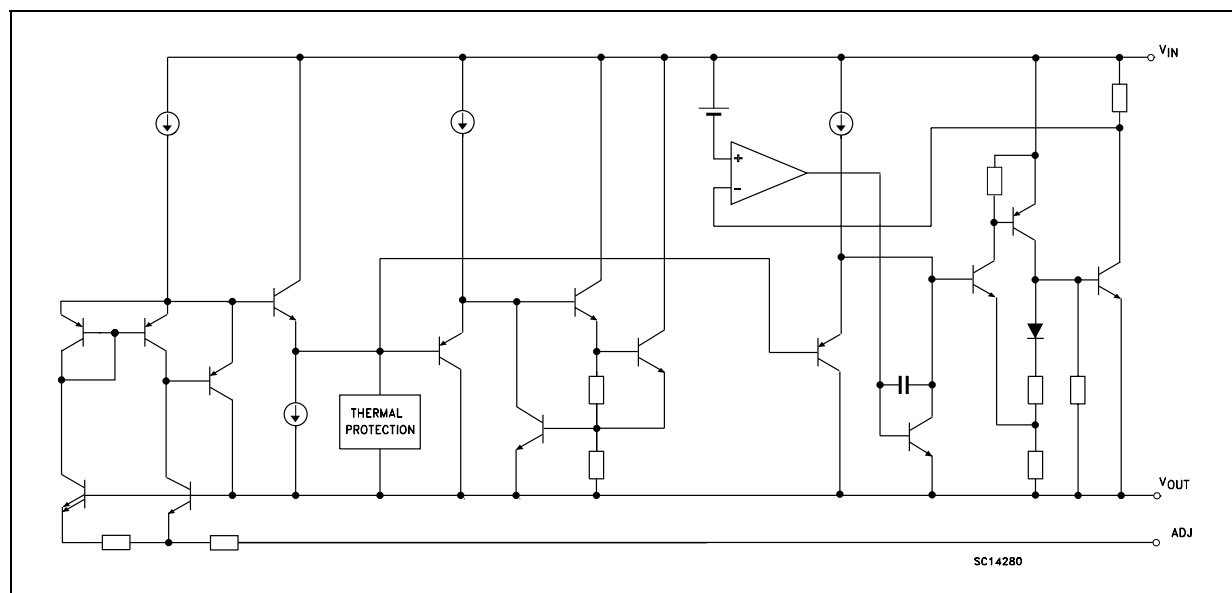


Table 4: Electrical Characteristics Of LD1086#15 ($V_I = 4.5V$, $C_I = C_O = 10\mu F$, $T_A = -40$ to $125^\circ C$, unless otherwise specified.)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------|--|---|-------|-------|-------|------|
| V_O | Output Voltage (note 1) | $I_O = 0$ mA $T_J = 25^\circ C$ | 1.485 | 1.5 | 1.515 | V |
| | | $I_O = 0$ to 1.5A $V_I = 3.4$ to 30V | 1.47 | 1.5 | 1.53 | V |
| ΔV_O | Line Regulation | $I_O = 0$ mA $V_I = 3.1$ to 18V $T_J = 25^\circ C$ | | 0.2 | 4 | mV |
| | | $I_O = 0$ mA $V_I = 3.1$ to 15V | | 0.4 | 4 | mV |
| ΔV_O | Load Regulation | $I_O = 0$ to 1.5A $T_J = 25^\circ C$ | | 0.5 | 8 | mV |
| | | $I_O = 0$ to 1.5A | | 1 | 16 | mV |
| V_d | Dropout Voltage | $I_O = 1.5$ A | | 1.3 | 1.5 | V |
| I_q | Quiescent Current | $V_I \leq 30$ V | | 5 | 10 | mA |
| I_{sc} | Short Circuit Current | $V_I - V_O = 5$ V | 1.5 | 2 | | A |
| | | $V_I - V_O = 25$ V | 0.05 | 0.02 | | A |
| | Thermal Regulation | $T_A = 25^\circ C$, 30ms pulse | | 0.01 | 0.04 | %/W |
| SVR | Supply Voltage Rejection | $f = 120$ Hz, $C_O = 25$ μF , $I_O = 1.5$ A $V_I = 6.5 \pm 3$ V | 60 | 82 | | dB |
| eN | RMS Output Noise Voltage (% of V_O) | $T_A = 25^\circ C$ $f = 10$ Hz to 10KHz | | 0.003 | | % |
| S | Temperature Stability | | | 0.5 | | % |
| S | Long Term Stability | $T_A = 125^\circ C$ 1000Hrs | | 0.5 | | % |

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

Table 5: Electrical Characteristics Of LD1086#18 ($V_I=4.8V$, $C_I = C_O=10\mu F$, $T_A = -40$ to $125^\circ C$, unless otherwise specified.)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------|--|--|-------|-------|-------|------|
| V_O | Output Voltage (note 1) | $I_O = 0 \text{ mA}$ $T_J = 25^\circ C$ | 1.782 | 1.8 | 1.818 | V |
| | | $I_O = 0$ to $1.5A$ $V_I = 3.4$ to $30V$ | 1.764 | 1.8 | 1.836 | V |
| ΔV_O | Line Regulation | $I_O = 0 \text{ mA}$ $V_I = 3.4$ to $18V$ $T_J = 25^\circ C$ | | 0.2 | 4 | mV |
| | | $I_O = 0 \text{ mA}$ $V_I = 3.4$ to $15V$ | | 0.4 | 4 | mV |
| ΔV_O | Load Regulation | $I_O = 0$ to $1.5A$ $T_J = 25^\circ C$ | | 0.5 | 8 | mV |
| | | $I_O = 0$ to $1.5A$ | | 1 | 16 | mV |
| V_d | Dropout Voltage | $I_O = 1.5A$ | | 1.3 | 1.5 | V |
| I_q | Quiescent Current | $V_I \leq 30V$ | | 5 | 10 | mA |
| I_{sc} | Short Circuit Current | $V_I - V_O = 5V$ | 1.5 | 2 | | A |
| | | $V_I - V_O = 25V$ | 0.05 | 0.02 | | A |
| | Thermal Regulation | $T_A = 25^\circ C$, 30ms pulse | | 0.01 | 0.04 | %/W |
| SVR | Supply Voltage Rejection | $f = 120 \text{ Hz}$, $C_O = 25 \mu F$, $I_O = 1.5A$ $V_I = 6.8 \pm 3V$ | 60 | 82 | | dB |
| eN | RMS Output Noise Voltage (% of V_O) | $T_A = 25^\circ C$ $f = 10\text{Hz}$ to 10KHz | | 0.003 | | % |
| S | Temperature Stability | | | 0.5 | | % |
| S | Long Term Stability | $T_A = 125^\circ C$ 1000Hrs | | 0.5 | | % |

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

Table 6: Electrical Characteristics Of LD1086#25 ($V_I=5.5V$, $C_I = C_O=10\mu F$, $T_A = -40$ to $125^\circ C$, unless otherwise specified.)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------|--|--|-------|-------|-------|------|
| V_O | Output Voltage (note 1) | $I_O = 0 \text{ mA}$ $T_J = 25^\circ C$ | 2.475 | 2.5 | 2.525 | V |
| | | $I_O = 0$ to $1.5A$ $V_I = 4.1$ to $30V$ | 2.45 | 2.5 | 2.55 | V |
| ΔV_O | Line Regulation | $I_O = 0 \text{ mA}$ $V_I = 4.1$ to $18V$ $T_J = 25^\circ C$ | | 0.2 | 4 | mV |
| | | $I_O = 0 \text{ mA}$ $V_I = 4.1$ to $18V$ | | 0.4 | 4 | mV |
| ΔV_O | Load Regulation | $I_O = 0$ to $1.5A$ $T_J = 25^\circ C$ | | 0.5 | 8 | mV |
| | | $I_O = 0$ to $1.5A$ | | 1 | 16 | mV |
| V_d | Dropout Voltage | $I_O = 1.5A$ | | 1.3 | 1.5 | V |
| I_q | Quiescent Current | $V_I \leq 30V$ | | 5 | 10 | mA |
| I_{sc} | Short Circuit Current | $V_I - V_O = 5V$ | 1.5 | 2 | | A |
| | | $V_I - V_O = 25V$ | 0.05 | 0.2 | | A |
| | Thermal Regulation | $T_A = 25^\circ C$, 30ms pulse | | 0.008 | 0.04 | %/W |
| SVR | Supply Voltage Rejection | $f = 120 \text{ Hz}$, $C_O = 25 \mu F$, $I_O = 1.5A$ $V_I = 7.5 \pm 3V$ | 60 | 81 | | dB |
| eN | RMS Output Noise Voltage (% of V_O) | $T_A = 25^\circ C$ $f = 10\text{Hz}$ to 10KHz | | 0.003 | | % |
| S | Temperature Stability | | | 0.5 | | % |
| S | Long Term Stability | $T_A = 125^\circ C$ 1000Hrs | | 0.5 | | % |

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

Table 7: Electrical Characteristics Of LD1086#285 ($V_I=5.85V$, $C_I = C_O=10\mu F$, $T_A = -40$ to $125^\circ C$, unless otherwise specified.)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------|--|---|-------|-------|-------|------|
| V_O | Output Voltage (note 1) | $I_O = 0 \text{ mA}$ $T_J = 25^\circ C$ | 2.821 | 2.85 | 2.879 | V |
| | | $I_O = 0$ to $1.5A$ $V_I = 4.5$ to $30V$ | 2.793 | 2.85 | 2.907 | V |
| ΔV_O | Line Regulation | $I_O = 0 \text{ mA}$ $V_I = 4.5$ to $18V$ $T_J = 25^\circ C$ | | 0.2 | 6 | mV |
| | | $I_O = 0 \text{ mA}$ $V_I = 4.5$ to $18V$ | | 0.5 | 6 | mV |
| ΔV_O | Load Regulation | $I_O = 0$ to $1.5A$ $T_J = 25^\circ C$ | | 1 | 12 | mV |
| | | $I_O = 0$ to $1.5A$ | | 2 | 20 | mV |
| V_d | Dropout Voltage | $I_O = 1.5A$ | | 1.3 | 1.5 | V |
| I_q | Quiescent Current | $V_I \leq 30V$ | | 5 | 10 | mA |
| I_{sc} | Short Circuit Current | $V_I - V_O = 5V$ | 1.5 | 2 | | A |
| | | $V_I - V_O = 25V$ | 0.05 | 0.2 | | A |
| | Thermal Regulation | $T_A = 25^\circ C$, 30ms pulse | | 0.01 | 0.04 | %/W |
| SVR | Supply Voltage Rejection | $f = 120 \text{ Hz}$, $C_O = 25 \mu F$, $I_O = 1.5A$ $V_I = 7.85 \pm 3V$ | 60 | 80 | | dB |
| eN | RMS Output Noise Voltage (% of V_O) | $T_A = 25^\circ C$ $f = 10\text{Hz}$ to 10KHz | | 0.003 | | % |
| S | Temperature Stability | | | 0.5 | | % |
| S | Long Term Stability | $T_A = 125^\circ C$ 1000Hrs | | 0.5 | | % |

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

Table 8: Electrical Characteristics Of LD1086#33 ($V_I=6.3V$, $C_I = C_O=10\mu F$, $T_A = -40$ to $125^\circ C$, unless otherwise specified.)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------|--|--|-------|-------|-------|------|
| V_O | Output Voltage (note 1) | $I_O = 0 \text{ mA}$ $T_J = 25^\circ C$ | 3.267 | 3.3 | 3.333 | V |
| | | $I_O = 0$ to $1.5A$ $V_I = 4.9$ to $30V$ | 3.234 | 3.3 | 3.366 | V |
| ΔV_O | Line Regulation | $I_O = 0 \text{ mA}$ $V_I = 4.9$ to $18V$ $T_J = 25^\circ C$ | | 0.5 | 6 | mV |
| | | $I_O = 0 \text{ mA}$ $V_I = 4.9$ to $18V$ | | 1 | 6 | mV |
| ΔV_O | Load Regulation | $I_O = 0$ to $1.5A$ $T_J = 25^\circ C$ | | 1 | 10 | mV |
| | | $I_O = 0$ to $1.5A$ | | 7 | 25 | mV |
| V_d | Dropout Voltage | $I_O = 1.5A$ | | 1.3 | 1.5 | V |
| I_q | Quiescent Current | $V_I \leq 30V$ | | 5 | 10 | mA |
| I_{sc} | Short Circuit Current | $V_I - V_O = 5V$ | 1.5 | 2 | | A |
| | | $V_I - V_O = 25V$ | 0.05 | 0.2 | | A |
| | Thermal Regulation | $T_A = 25^\circ C$, 30ms pulse | | 0.008 | 0.04 | %/W |
| SVR | Supply Voltage Rejection | $f = 120 \text{ Hz}$, $C_O = 25 \mu F$, $I_O = 1.5A$ $V_I = 8.3 \pm 3V$ | 60 | 79 | | dB |
| eN | RMS Output Noise Voltage (% of V_O) | $T_A = 25^\circ C$ $f = 10\text{Hz}$ to 10KHz | | 0.003 | | % |
| S | Temperature Stability | | | 0.5 | | % |
| S | Long Term Stability | $T_A = 125^\circ C$ 1000Hrs | | 0.5 | | % |

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

Table 9: Electrical Characteristics Of LD1086#36 ($V_I=6.6V$, $C_I = C_O = 10\mu F$, $T_A = -40$ to $125^\circ C$, unless otherwise specified.)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------|--|--|-------|-------|-------|------|
| V_O | Output Voltage (note 1) | $I_O = 0 \text{ mA}$ $T_J = 25^\circ C$ | 3.564 | 3.6 | 3.636 | V |
| | | $I_O = 0$ to $1.5A$ $V_I = 5.2$ to $30V$ | 3.528 | 3.6 | 3.672 | V |
| ΔV_O | Line Regulation | $I_O = 0 \text{ mA}$ $V_I = 5.2$ to $18V$ $T_J = 25^\circ C$ | | 0.5 | 10 | mV |
| | | $I_O = 0 \text{ mA}$ $V_I = 5.2$ to $18V$ | | 1 | 10 | mV |
| ΔV_O | Load Regulation | $I_O = 0$ to $1.5A$ $T_J = 25^\circ C$ | | 3 | 15 | mV |
| | | $I_O = 0$ to $1.5A$ | | 7 | 25 | mV |
| V_d | Dropout Voltage | $I_O = 1.5A$ | | 1.3 | 1.5 | V |
| I_q | Quiescent Current | $V_I \leq 30V$ | | 5 | 10 | mA |
| I_{sc} | Short Circuit Current | $V_I - V_O = 5V$ | 1.5 | 2 | | A |
| | | $V_I - V_O = 25V$ | 0.05 | 0.2 | | A |
| | Thermal Regulation | $T_A = 25^\circ C$, 30ms pulse | | 0.01 | 0.04 | %/W |
| SVR | Supply Voltage Rejection | $f = 120 \text{ Hz}$, $C_O = 25 \mu F$, $I_O = 1.5A$ $V_I = 8.6 \pm 3V$ | 60 | 78 | | dB |
| eN | RMS Output Noise Voltage (% of V_O) | $T_A = 25^\circ C$ $f = 10\text{Hz}$ to 10KHz | | 0.003 | | % |
| S | Temperature Stability | | | 0.5 | | % |
| S | Long Term Stability | $T_A = 125^\circ C$ 1000Hrs | | 0.5 | | % |

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

Table 10: Electrical Characteristics Of LD1086#50 ($V_I=8V$, $C_I = C_O = 10\mu F$, $T_A = -40$ to $125^\circ C$, unless otherwise specified.)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------|--|---|------|-------|------|------|
| V_O | Output Voltage (note 1) | $I_O = 0 \text{ mA}$ $T_J = 25^\circ C$ | 4.95 | 5 | 5.05 | V |
| | | $I_O = 0$ to $1.5A$ $V_I = 6.6$ to $30V$ | 4.9 | 5 | 5.1 | V |
| ΔV_O | Line Regulation | $I_O = 0 \text{ mA}$ $V_I = 6.6$ to $20V$ $T_J = 25^\circ C$ | | 0.5 | 10 | mV |
| | | $I_O = 0 \text{ mA}$ $V_I = 6.6$ to $20V$ | | 1 | 10 | mV |
| ΔV_O | Load Regulation | $I_O = 0$ to $1.5A$ $T_J = 25^\circ C$ | | 5 | 20 | mV |
| | | $I_O = 0$ to $1.5A$ | | 10 | 35 | mV |
| V_d | Dropout Voltage | $I_O = 1.5A$ | | 1.3 | 1.5 | V |
| I_q | Quiescent Current | $V_I \leq 30V$ | | 5 | 10 | mA |
| I_{sc} | Short Circuit Current | $V_I - V_O = 5V$ | 1.5 | 2 | | A |
| | | $V_I - V_O = 25V$ | 0.05 | 0.2 | | A |
| | Thermal Regulation | $T_A = 25^\circ C$, 30ms pulse | | 0.01 | 0.04 | %/W |
| SVR | Supply Voltage Rejection | $f = 120 \text{ Hz}$, $C_O = 25 \mu F$, $I_O = 1.5A$ $V_I = 10 \pm 3V$ | 60 | 75 | | dB |
| eN | RMS Output Noise Voltage (% of V_O) | $T_A = 25^\circ C$ $f = 10\text{Hz}$ to 10KHz | | 0.003 | | % |
| S | Temperature Stability | | | 0.5 | | % |
| S | Long Term Stability | $T_A = 125^\circ C$ 1000Hrs | | 0.5 | | % |

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

Table 11: Electrical Characteristics Of LD1086#80 ($V_I=11V$, $C_I = C_O=10\mu F$, $T_A = -40$ to $125^\circ C$, unless otherwise specified.)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------|--|---|------|-------|------|------|
| V_O | Output Voltage (note 1) | $I_O = 0 \text{ mA}$ $T_J = 25^\circ C$ | 7.92 | 8 | 8.08 | V |
| | | $I_O = 0$ to $1.5A$ $V_I = 9.8$ to $30V$ | 7.84 | 8 | 8.16 | V |
| ΔV_O | Line Regulation | $I_O = 0 \text{ mA}$ $V_I = 9.8$ to $20V$ $T_J = 25^\circ C$ | | 1 | 18 | mV |
| | | $I_O = 0 \text{ mA}$ $V_I = 9.8$ to $20V$ | | 2 | 18 | mV |
| ΔV_O | Load Regulation | $I_O = 0$ to $1.5A$ $T_J = 25^\circ C$ | | 8 | 30 | mV |
| | | $I_O = 0$ to $1.5A$ | | 12 | 60 | mV |
| V_d | Dropout Voltage | $I_O = 1.5A$ | | 1.3 | 1.5 | V |
| I_q | Quiescent Current | $V_I \leq 30V$ | | 5 | 10 | mA |
| I_{sc} | Short Circuit Current | $V_I - V_O = 5V$ | 1.5 | 2 | | A |
| | | $V_I - V_O = 25V$ | 0.04 | 0.2 | | A |
| | Thermal Regulation | $T_A = 25^\circ C$, 30ms pulse | | 0.01 | 0.04 | %/W |
| SVR | Supply Voltage Rejection | $f = 120 \text{ Hz}$, $C_O = 25 \mu F$, $I_O = 1.5A$ $V_I = 13 \pm 3V$ | 54 | 71 | | dB |
| eN | RMS Output Noise Voltage (% of V_O) | $T_A = 25^\circ C$ $f = 10\text{Hz}$ to 10KHz | | 0.003 | | % |
| S | Temperature Stability | | | 0.5 | | % |
| S | Long Term Stability | $T_A = 125^\circ C$ 1000Hrs | | 0.5 | | % |

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

Table 12: Electrical Characteristics Of LD1086#90 ($V_I=12V$, $C_I = C_O=10\mu F$, $T_A = -40$ to $125^\circ C$, unless otherwise specified.)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------|--|---|------|-------|------|------|
| V_O | Output Voltage (note 1) | $I_O = 0 \text{ mA}$ $T_J = 25^\circ C$ | 8.91 | 9 | 9.09 | V |
| | | $I_O = 0$ to $1.5A$ $V_I = 11$ to $30V$ | 8.82 | 9 | 9.18 | V |
| ΔV_O | Line Regulation | $I_O = 0 \text{ mA}$ $V_I = 11$ to $20V$ $T_J = 25^\circ C$ | | 1 | 20 | mV |
| | | $I_O = 0 \text{ mA}$ $V_I = 11$ to $20V$ | | 2 | 20 | mV |
| ΔV_O | Load Regulation | $I_O = 0$ to $1.5A$ $T_J = 25^\circ C$ | | 8 | 30 | mV |
| | | $I_O = 0$ to $1.5A$ | | 12 | 60 | mV |
| V_d | Dropout Voltage | $I_O = 1.5A$ | | 1.3 | 1.5 | V |
| I_q | Quiescent Current | $V_I \leq 30V$ | | 5 | 10 | mA |
| I_{sc} | Short Circuit Current | $V_I - V_O = 5V$ | 1.5 | 2 | | A |
| | | $V_I - V_O = 25V$ | 0.05 | 0.2 | | A |
| | Thermal Regulation | $T_A = 25^\circ C$, 30ms pulse | | 0.01 | 0.04 | %/W |
| SVR | Supply Voltage Rejection | $f = 120 \text{ Hz}$, $C_O = 25 \mu F$, $I_O = 1.5A$ $V_I = 14 \pm 3V$ | 54 | 70 | | dB |
| eN | RMS Output Noise Voltage (% of V_O) | $T_A = 25^\circ C$ $f = 10\text{Hz}$ to 10KHz | | 0.003 | | % |
| S | Temperature Stability | | | 0.5 | | % |
| S | Long Term Stability | $T_A = 125^\circ C$ 1000Hrs | | 0.5 | | % |

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

Table 13: Electrical Characteristics Of LD1086#12 ($V_I=15V$, $C_I = C_O=10\mu F$, $T_A = -40$ to $125^\circ C$, unless otherwise specified.)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------|--|---|-------|-------|-------|------|
| V_O | Output Voltage (note 1) | $I_O = 0\text{ mA}$ $T_J = 25^\circ C$ | 11.88 | 12 | 12.12 | V |
| | | $I_O = 0$ to $1.5A$ $V_I = 13.8$ to $30V$ | 11.76 | 12 | 12.24 | V |
| ΔV_O | Line Regulation | $I_O = 0\text{ mA}$ $V_I = 13.8$ to $25V$ $T_J = 25^\circ C$ | | 1 | 25 | mV |
| | | $I_O = 0\text{ mA}$ $V_I = 13.8$ to $25V$ | | 2 | 25 | mV |
| ΔV_O | Load Regulation | $I_O = 0$ to $1.5A$ $T_J = 25^\circ C$ | | 12 | 36 | mV |
| | | $I_O = 0$ to $1.5A$ | | 24 | 72 | mV |
| V_d | Dropout Voltage | $I_O = 1.5A$ | | 1.3 | 1.5 | V |
| I_q | Quiescent Current | $V_I \leq 30V$ | | 5 | 10 | mA |
| I_{sc} | Short Circuit Current | $V_I - V_O = 5V$ | 1.5 | 2 | | A |
| | | $V_I - V_O = 25V$ | 0.05 | 0.2 | | A |
| | Thermal Regulation | $T_A = 25^\circ C$, 30ms pulse | | 0.01 | 0.04 | %/W |
| SVR | Supply Voltage Rejection | $f = 120\text{ Hz}$, $C_O = 25\ \mu F$, $I_O = 1.5A$ $V_I = 17 \pm 3V$ | 54 | 66 | | dB |
| eN | RMS Output Noise Voltage (% of V_O) | $T_A = 25^\circ C$ $f = 10\text{Hz}$ to 10KHz | | 0.003 | | % |
| S | Temperature Stability | | | 0.5 | | % |
| S | Long Term Stability | $T_A = 125^\circ C$ 1000Hrs | | 0.5 | | % |

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

Table 14: Electrical Characteristics Of LD1086# ($V_I=4.25V$, $C_I = C_O=10\mu F$, $T_A = -40$ to $125^\circ C$, unless otherwise specified.)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---------------------|--|---|-------|-------|-------|---------|
| V_O | Output Voltage (note 1) | $I_O = 10\text{ mA}$ $T_J = 25^\circ C$ | 1.237 | 1.25 | 1.263 | V |
| | | $I_O = 10\text{ mA}$ to $1.5A$ $V_I = 2.85$ to $30V$ | 1.225 | 1.25 | 1.275 | V |
| ΔV_O | Line Regulation | $I_O = 10\text{ mA}$ $V_I = 2.8$ to $16.5V$ $T_J = 25^\circ C$ | | 0.015 | 0.2 | % |
| | | $I_O = 10\text{ mA}$ $V_I = 2.8$ to $16.5V$ | | 0.035 | 0.2 | % |
| ΔV_O | Load Regulation | $I_O = 10\text{ mA}$ to $1.5A$ $T_J = 25^\circ C$ | | 0.1 | 0.3 | % |
| | | $I_O = 0$ to $1.5A$ | | 0.2 | 0.4 | % |
| V_d | Dropout Voltage | $I_O = 1.5A$ | | 1.3 | 1.5 | V |
| $I_{O(\text{min})}$ | Minimum Load Current | $V_I = 30V$ | | 3 | 10 | mA |
| I_{sc} | Short Circuit Current | $V_I - V_O = 5V$ | 1.5 | 2.3 | | A |
| | | $V_I - V_O = 25V$ | 0.05 | 0.2 | | A |
| | Thermal Regulation | $T_A = 25^\circ C$, 30ms pulse | | 0.01 | 0.04 | %/W |
| SVR | Supply Voltage Rejection | $f = 120\text{ Hz}$, $C_O = 25\ \mu F$, $C_{ADJ} = 25\ \mu F$, $I_O = 1.5A$ $V_I = 6.25 \pm 3V$ | 60 | 88 | | dB |
| I_{ADJ} | Adjust Pin Current | $V_I = 4.25V$ $I_O = 10\text{ mA}$ | | 40 | 120 | μA |
| ΔI_{ADJ} | Adjust Pin Current Change | $I_O = 10\text{ mA}$ to $1.5A$ $V_I = 2.8$ to $16.5V$ (note 1) | | 0.2 | 5 | μA |
| eN | RMS Output Noise Voltage (% of V_O) | $T_A = 25^\circ C$ $f = 10\text{Hz}$ to 10KHz | | 0.003 | | % |
| S | Temperature Stability | | | 0.5 | | % |
| S | Long Term Stability | $T_A = 125^\circ C$ 1000Hrs | | 0.5 | | % |

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

TYPICAL CHARACTERISTICS (unless otherwise specified $T_j = 25^\circ\text{C}$, $C_I=C_O=10\mu\text{F}$)

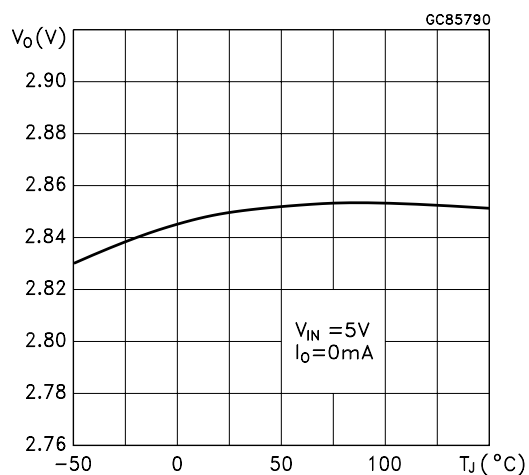
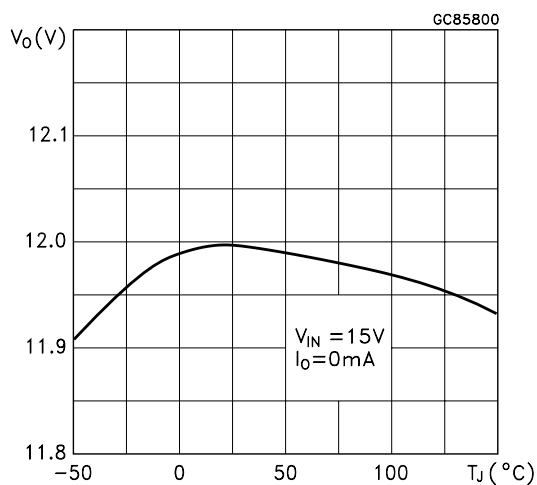
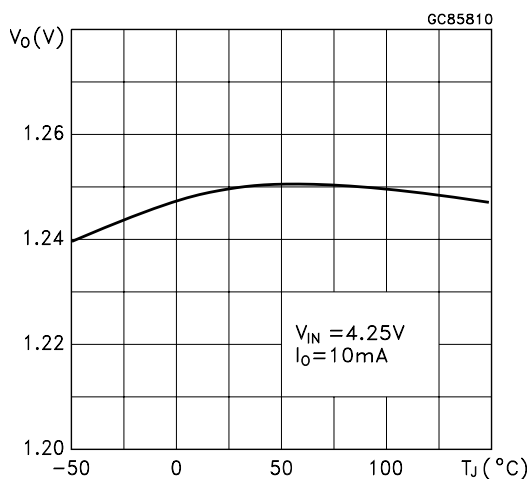
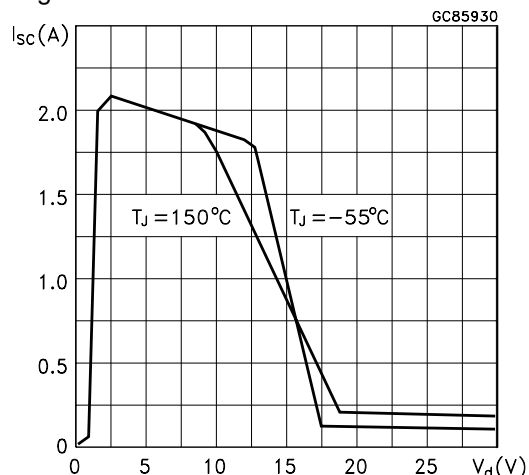
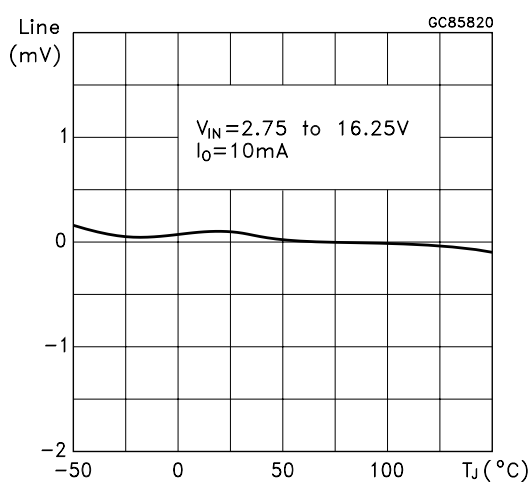
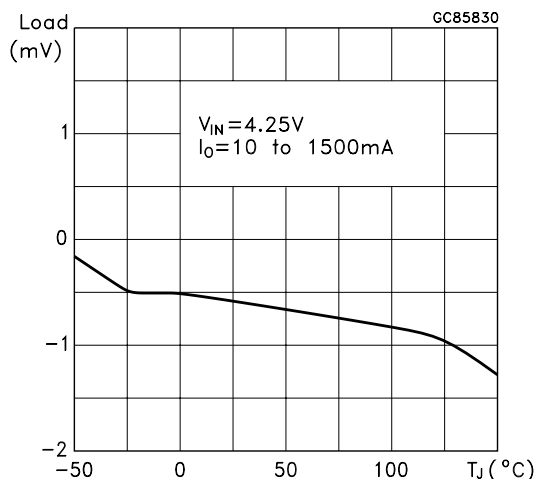
Figure 4: Output Voltage vs Temperature

Figure 5: Output Voltage vs Temperature

Figure 6: Output Voltage vs Temperature

Figure 7: Short Circuit Current vs Dropout Voltage

Figure 8: Line Regulation vs Temperature

Figure 9: Load Regulation vs Temperature


Figure 10: Dropout Voltage vs Temperature

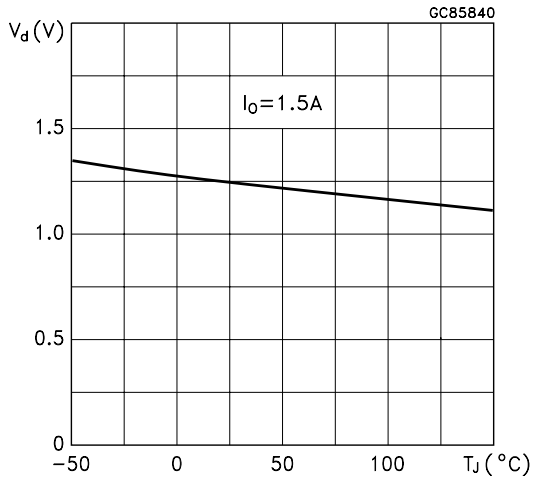


Figure 11: Dropout Voltage vs Output Current

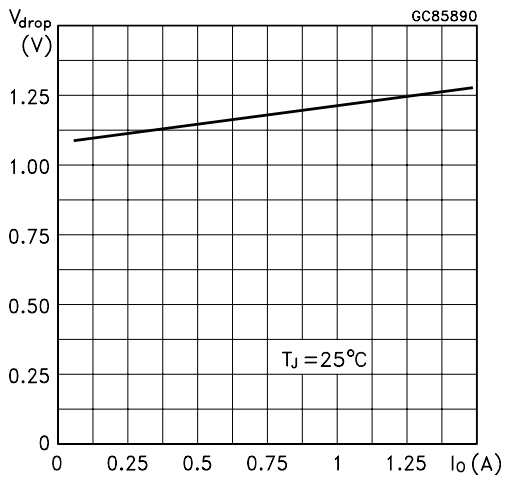


Figure 12: Adjust Pin Current vs Input Voltage

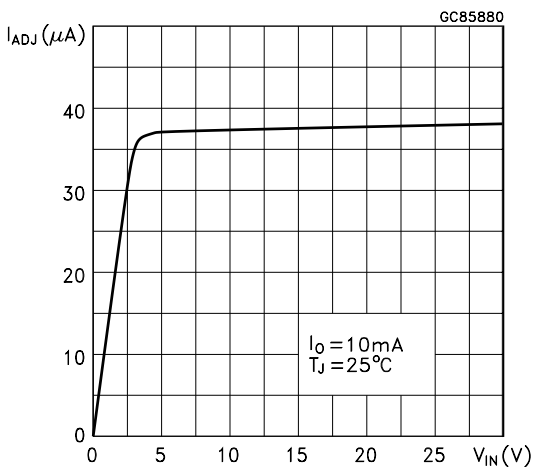


Figure 13: Adjust Pin Current vs Temperature

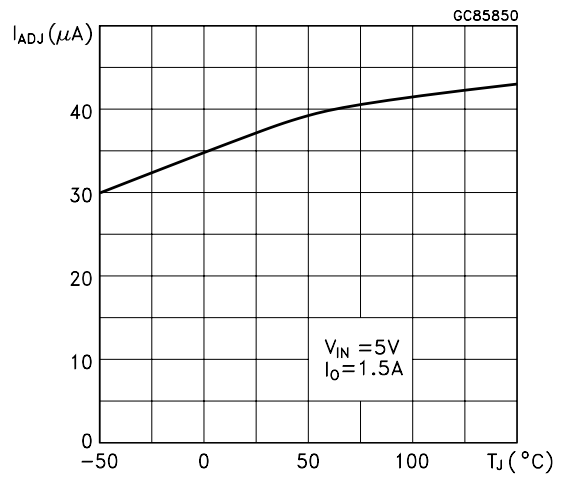


Figure 14: Adjust Pin Current vs Output Current

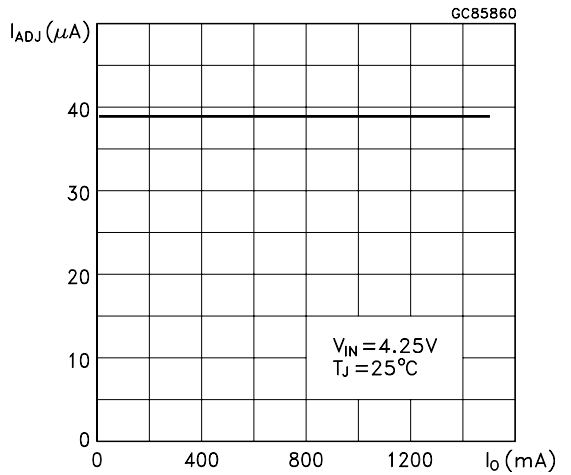


Figure 15: Quiescent Current vs Output Current

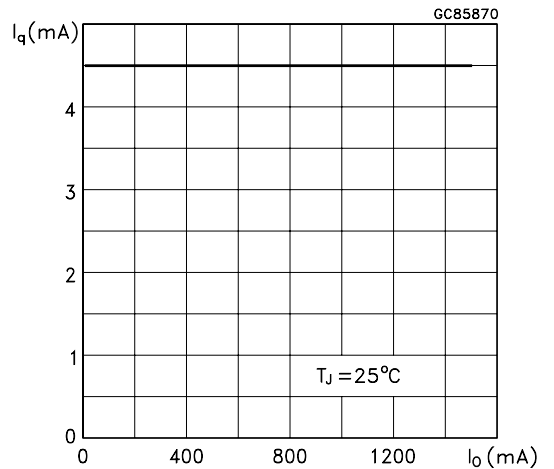


Figure 16: Quiescent Current vs Input Voltage

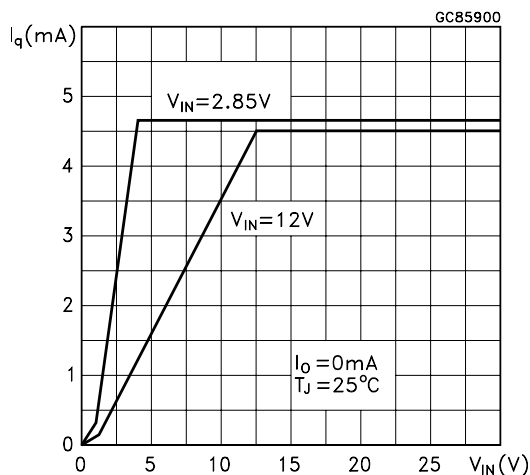


Figure 19: Supply Voltage Rejection vs Temperature

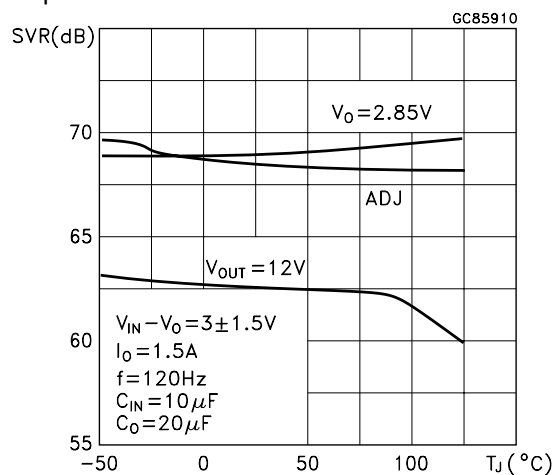


Figure 17: Supply Voltage Rejection vs Output Current

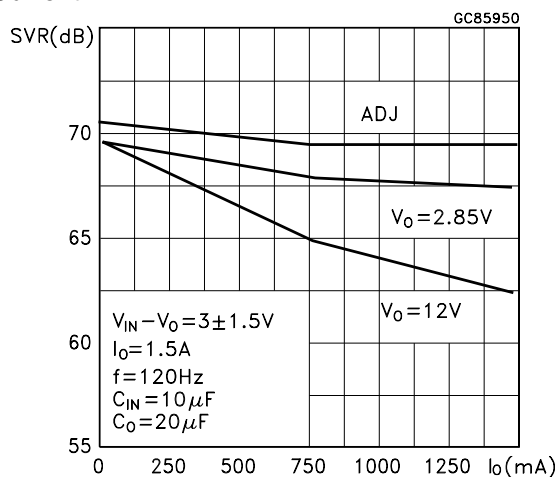


Figure 20: Minimum Load Current vs Temperature

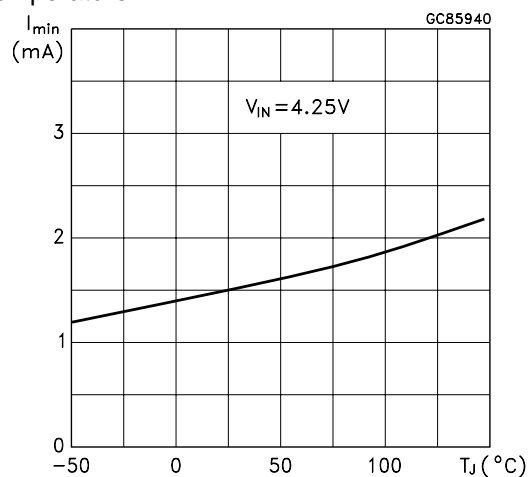


Figure 18: Supply Voltage Rejection vs Frequency

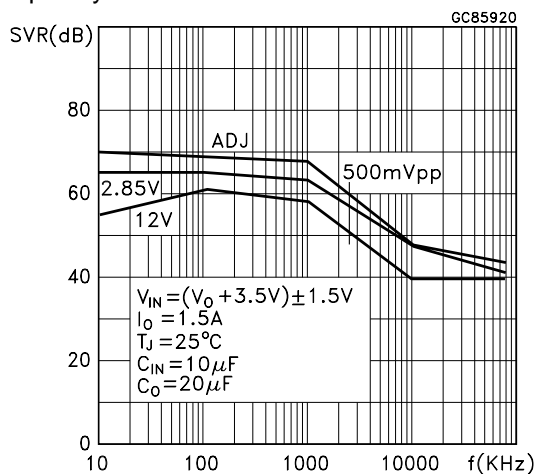


Figure 21: Stability for Adjustable

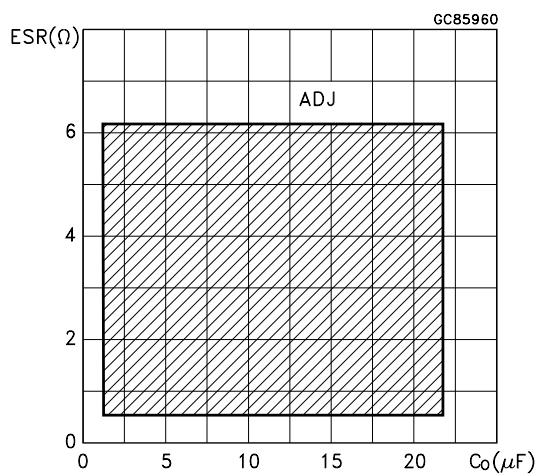


Figure 22: Stability for 2.85V

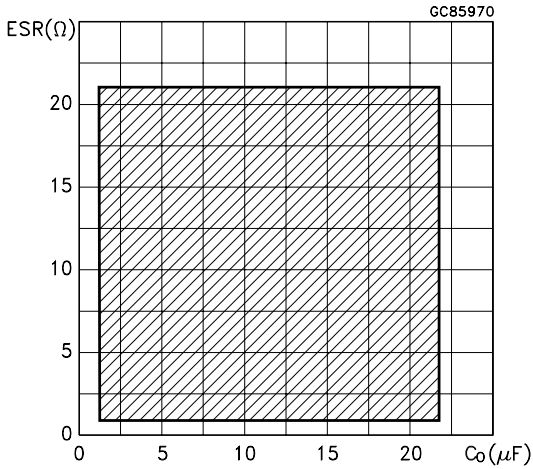


Figure 23: Stability for 12V

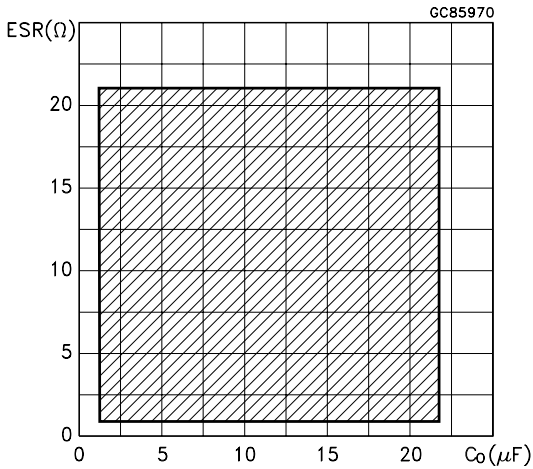


Figure 24: Line Transient

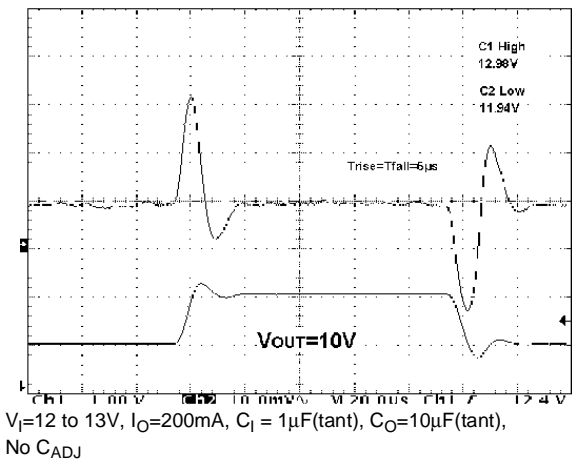


Figure 25: Line Transient

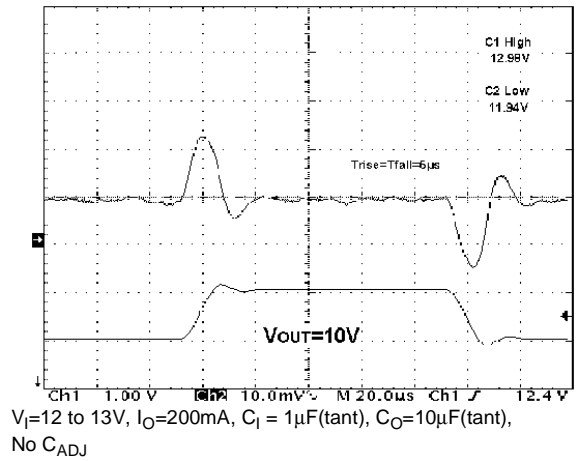


Figure 26: Line Transient

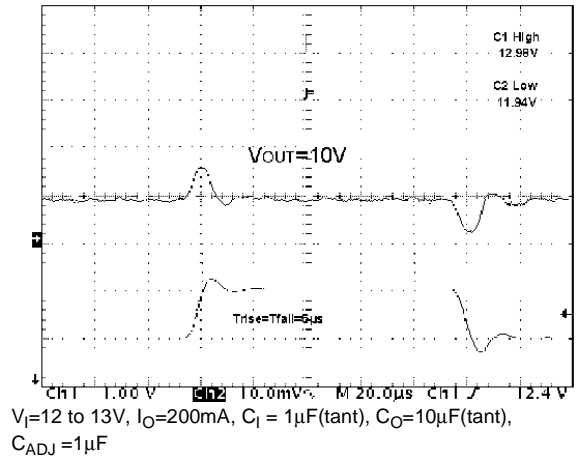


Figure 27: Load Transient

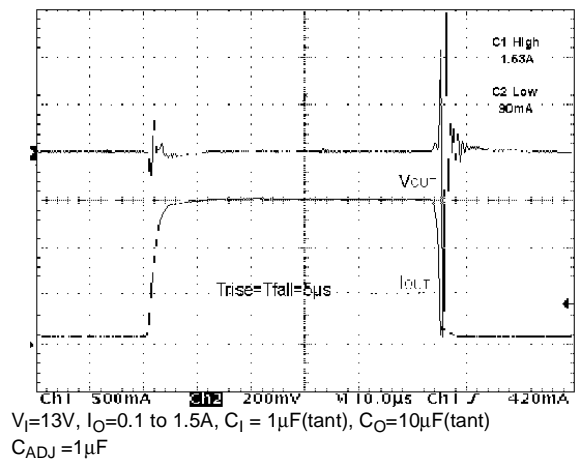
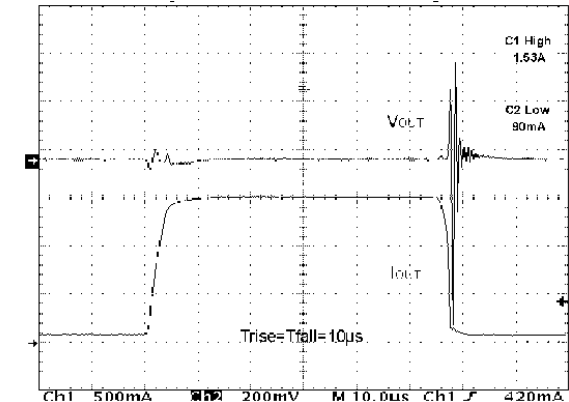
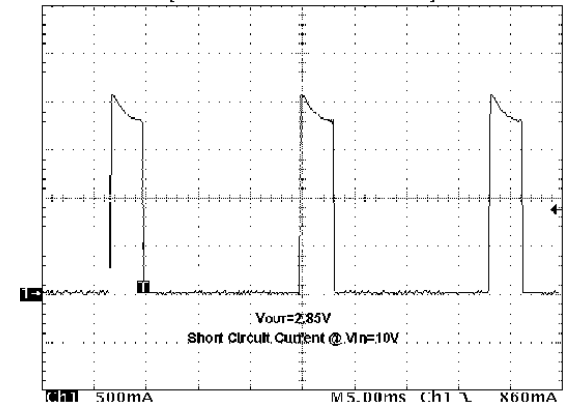


Figure 28: Load Transient



$V_I=13V$, $I_O=0.1$ to $1.5A$, $C_1 = 1\mu F$ (tant), $C_O=10\mu F$ (tant)
 $C_{ADJ}=1\mu F$

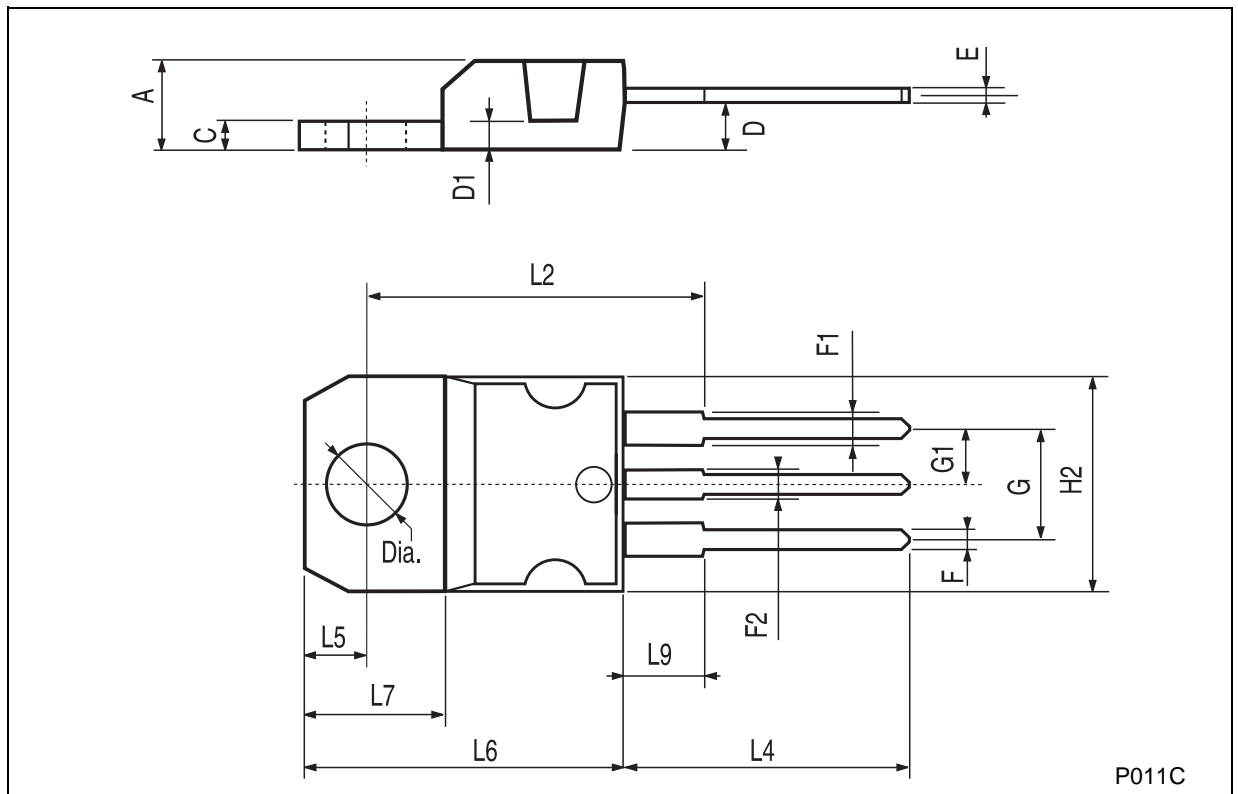
Figure 29: Thermal Protection



$V_O=2.85V$

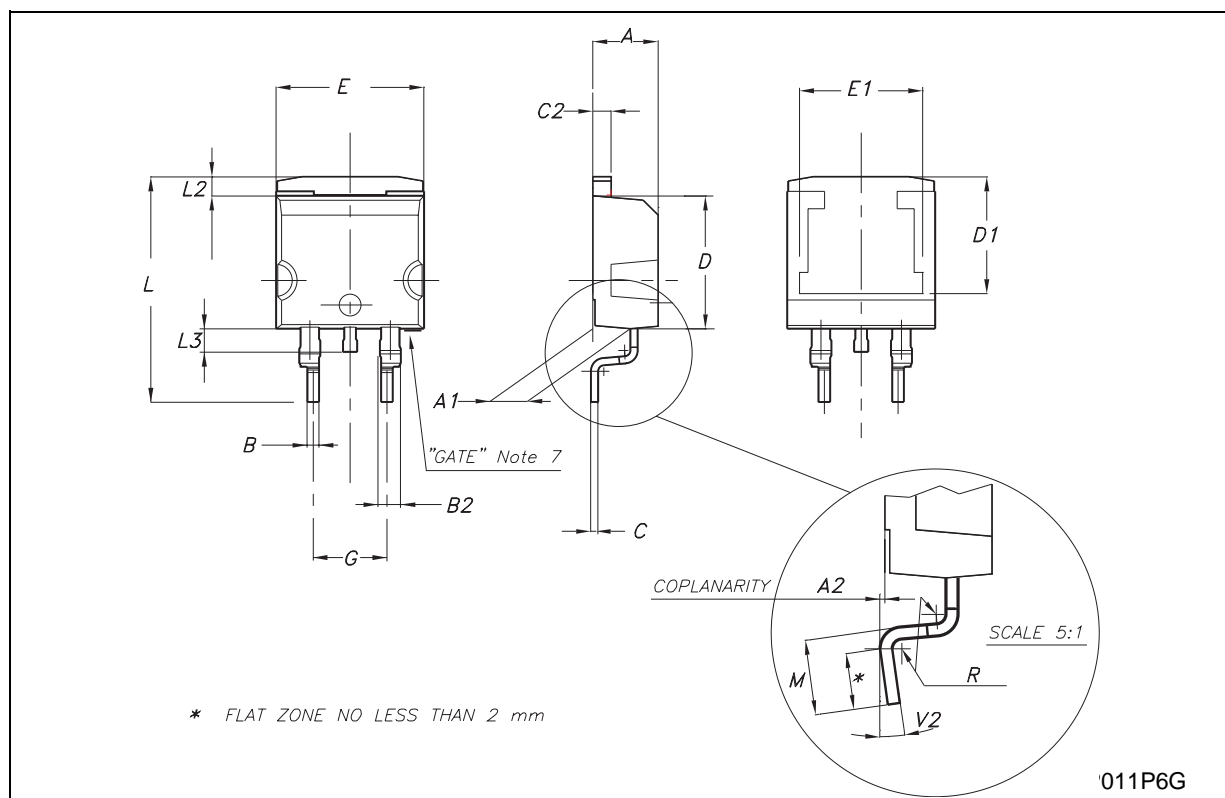
TO-220 MECHANICAL DATA

| DIM. | mm. | | | inch | | |
|------|-------|------|-------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| C | 1.23 | | 1.32 | 0.048 | | 0.051 |
| D | 2.40 | | 2.72 | 0.094 | | 0.107 |
| D1 | | 1.27 | | | 0.050 | |
| E | 0.49 | | 0.70 | 0.019 | | 0.027 |
| F | 0.61 | | 0.88 | 0.024 | | 0.034 |
| F1 | 1.14 | | 1.70 | 0.044 | | 0.067 |
| F2 | 1.14 | | 1.70 | 0.044 | | 0.067 |
| G | 4.95 | | 5.15 | 0.194 | | 0.203 |
| G1 | 2.4 | | 2.7 | 0.094 | | 0.106 |
| H2 | 10.0 | | 10.40 | 0.393 | | 0.409 |
| L2 | | 16.4 | | | 0.645 | |
| L4 | 13.0 | | 14.0 | 0.511 | | 0.551 |
| L5 | 2.65 | | 2.95 | 0.104 | | 0.116 |
| L6 | 15.25 | | 15.75 | 0.600 | | 0.620 |
| L7 | 6.2 | | 6.6 | 0.244 | | 0.260 |
| L9 | 3.5 | | 3.93 | 0.137 | | 0.154 |
| DIA. | 3.75 | | 3.85 | 0.147 | | 0.151 |



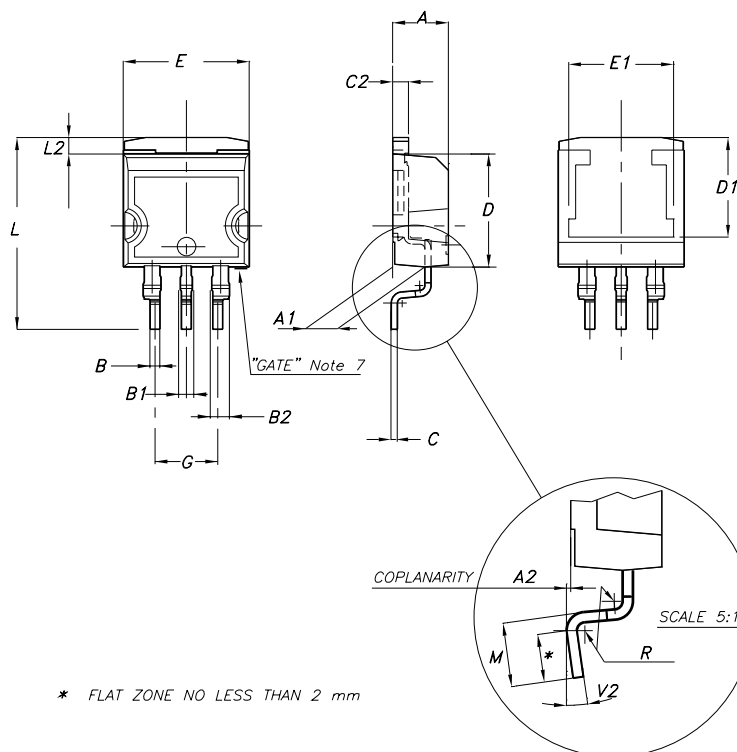
D²PAK MECHANICAL DATA

| DIM. | mm. | | | inch | | |
|------|------|-----|-------|-------|-------|-------|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| A | 4.4 | | 4.6 | 0.173 | | 0.181 |
| A1 | 2.49 | | 2.69 | 0.098 | | 0.106 |
| A2 | 0.03 | | 0.23 | 0.001 | | 0.009 |
| B | 0.7 | | 0.93 | 0.027 | | 0.036 |
| B2 | 1.14 | | 1.7 | 0.044 | | 0.067 |
| C | 0.45 | | 0.6 | 0.017 | | 0.023 |
| C2 | 1.23 | | 1.36 | 0.048 | | 0.053 |
| D | 8.95 | | 9.35 | 0.352 | | 0.368 |
| D1 | | 8 | | | 0.315 | |
| E | 10 | | 10.4 | 0.393 | | 0.409 |
| E1 | | 8.5 | | | 0.335 | |
| G | 4.88 | | 5.28 | 0.192 | | 0.208 |
| L | 15 | | 15.85 | 0.590 | | 0.624 |
| L2 | 1.27 | | 1.4 | 0.050 | | 0.055 |
| L3 | 1.4 | | 1.75 | 0.055 | | 0.068 |
| M | 2.4 | | 3.2 | 0.094 | | 0.126 |
| R | | 0.4 | | | 0.016 | |
| V2 | 0° | | 8° | 0° | | 8° |



D²PAK/A MECHANICAL DATA

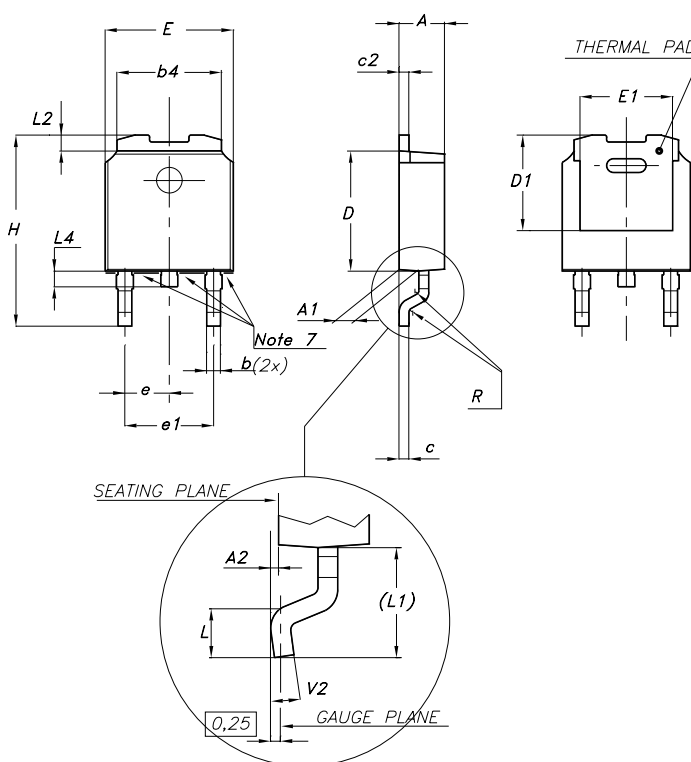
| DIM. | mm. | | | inch | | |
|------|------|------|-------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| A1 | 2.49 | | 2.69 | 0.098 | | 0.106 |
| A2 | 0.03 | | 0.23 | 0.001 | | 0.009 |
| B | 0.7 | | 0.93 | 0.028 | | 0.037 |
| B1 | 0.8 | | 1.3 | 0.031 | | 0.051 |
| B2 | 1.14 | | 1.7 | 0.045 | | 0.067 |
| C | 0.45 | | 0.60 | 0.018 | | 0.024 |
| C2 | 1.23 | | 1.36 | 0.048 | | 0.054 |
| D | 8.95 | | 9.35 | 0.352 | | 0.368 |
| D1 | | 8 | | | 0.315 | |
| E | 10 | | 10.4 | 0.394 | | 0.409 |
| E1 | | 8.5 | | | 0.335 | |
| G | 4.88 | | 5.28 | 0.192 | | 0.208 |
| L | 15 | | 15.85 | 0.591 | | 0.624 |
| L2 | 1.27 | | 1.4 | 0.050 | | 0.055 |
| M | 2.4 | | 3.2 | 0.094 | | 0.126 |
| R | | 0.4 | | | 0.016 | |
| V2 | 0° | | 8° | 0° | | 8° |



7106164/D

DPAK MECHANICAL DATA

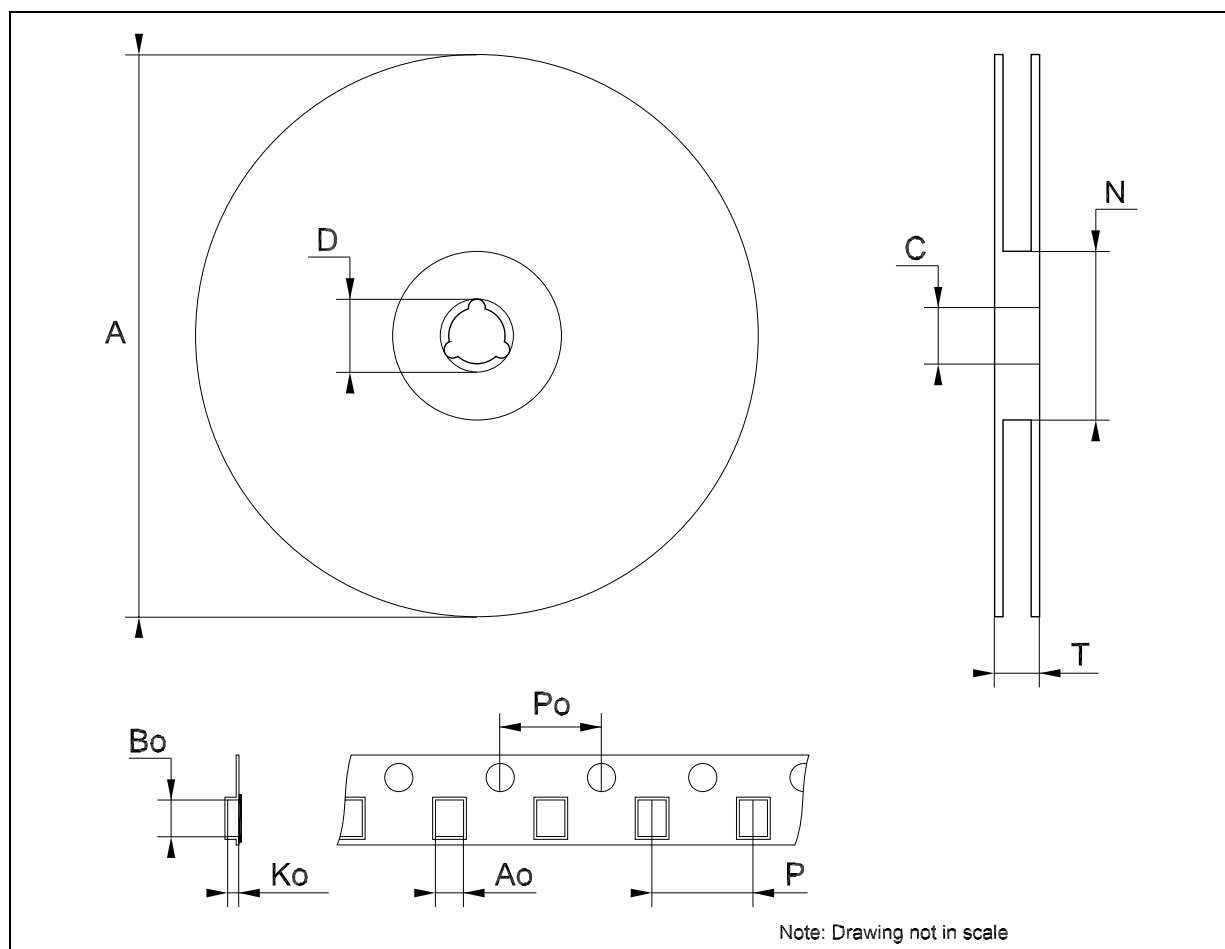
| DIM. | mm. | | | inch | | |
|------|------|------|------|-------|-------|-------|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| A | 2.2 | | 2.4 | 0.086 | | 0.094 |
| A1 | 0.9 | | 1.1 | 0.035 | | 0.043 |
| A2 | 0.03 | | 0.23 | 0.001 | | 0.009 |
| B | 0.64 | | 0.9 | 0.025 | | 0.035 |
| B2 | 5.2 | | 5.4 | 0.204 | | 0.212 |
| C | 0.45 | | 0.6 | 0.017 | | 0.023 |
| C2 | 0.48 | | 0.6 | 0.019 | | 0.023 |
| D | 6 | | 6.2 | 0.236 | | 0.244 |
| D1 | | 5.1 | | | 0.200 | |
| E | 6.4 | | 6.6 | 0.252 | | 0.260 |
| E1 | | 4.7 | | | 0.185 | |
| e | | 2.28 | | | 0.090 | |
| e1 | 4.4 | | 4.6 | 0.173 | | 0.181 |
| H | 9.35 | | 10.1 | 0.368 | | 0.397 |
| L | 1 | | | 0.039 | | |
| (L1) | | 2.8 | | | 0.110 | |
| L2 | | 0.8 | | | 0.031 | |
| L4 | 0.6 | | 1 | 0.023 | | 0.039 |



0068772-F

Tape & Reel DPAK-PPAK MECHANICAL DATA

| DIM. | mm. | | | inch | | |
|------|-------|-------|-------|-------|-------|--------|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| A | | | 330 | | | 12.992 |
| C | 12.8 | 13.0 | 13.2 | 0.504 | 0.512 | 0.519 |
| D | 20.2 | | | 0.795 | | |
| N | 60 | | | 2.362 | | |
| T | | | 22.4 | | | 0.882 |
| Ao | 6.80 | 6.90 | 7.00 | 0.268 | 0.272 | 0.276 |
| Bo | 10.40 | 10.50 | 10.60 | 0.409 | 0.413 | 0.417 |
| Ko | 2.55 | 2.65 | 2.75 | 0.100 | 0.104 | 0.105 |
| Po | 3.9 | 4.0 | 4.1 | 0.153 | 0.157 | 0.161 |
| P | 7.9 | 8.0 | 8.1 | 0.311 | 0.315 | 0.319 |



Tape & Reel D²PAK-P²PAK-D²PAK/A-P²PAK/A MECHANICAL DATA

| DIM. | mm. | | | inch | | |
|------|-------|-------|-------|-------|-------|-------|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| A | | | 180 | | | 7.086 |
| C | 12.8 | 13.0 | 13.2 | 0.504 | 0.512 | 0.519 |
| D | 20.2 | | | 0.795 | | |
| N | 60 | | | 2.362 | | |
| T | | | 14.4 | | | 0.567 |
| Ao | 10.50 | 10.6 | 10.70 | 0.413 | 0.417 | 0.421 |
| Bo | 15.70 | 15.80 | 15.90 | 0.618 | 0.622 | 0.626 |
| Ko | 4.80 | 4.90 | 5.00 | 0.189 | 0.193 | 0.197 |
| Po | 3.9 | 4.0 | 4.1 | 0.153 | 0.157 | 0.161 |
| P | 11.9 | 12.0 | 12.1 | 0.468 | 0.472 | 0.476 |

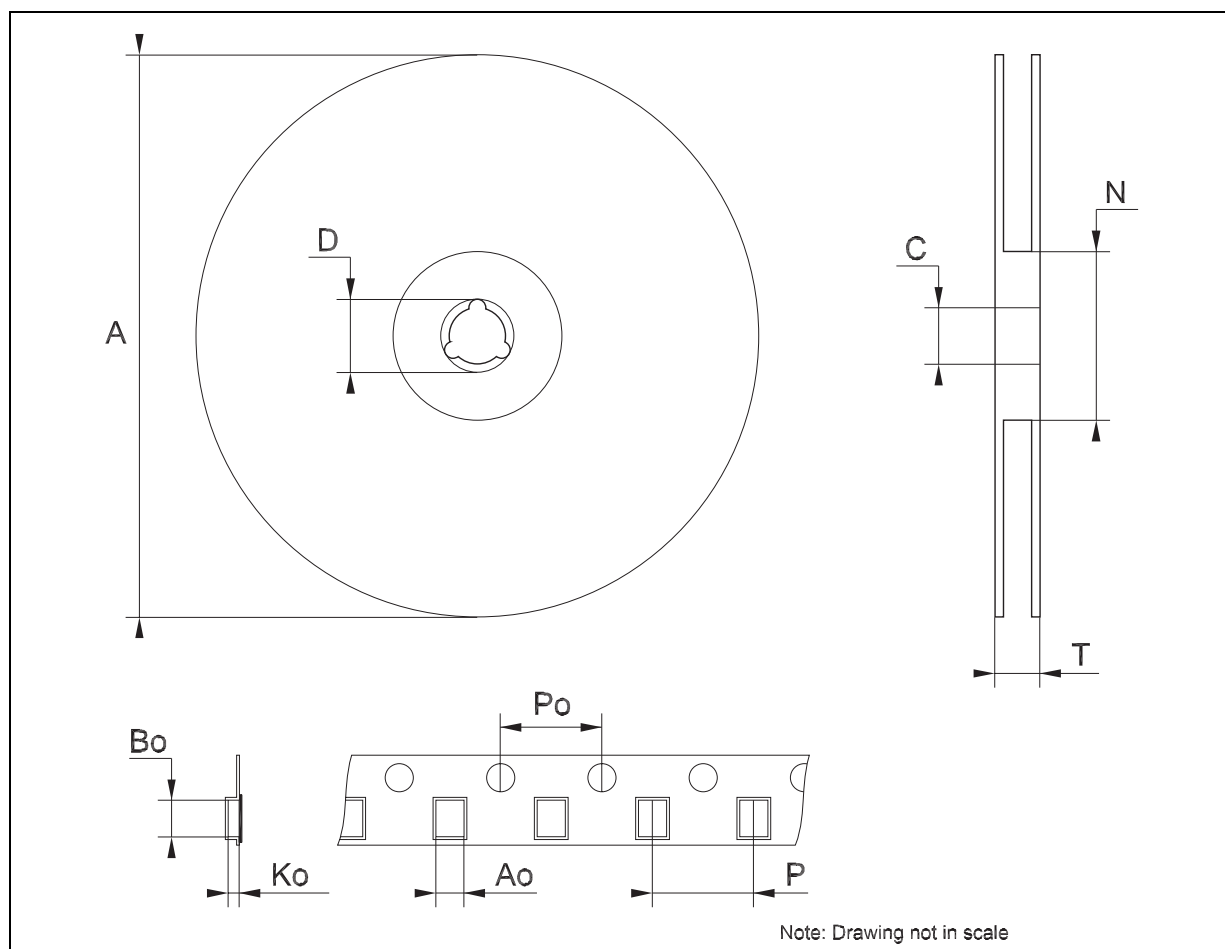


Table 15: Revision History

| Date | Revision | Description of Changes |
|-------------|-----------------|--|
| 25-Aug-2004 | 11 | Mistake Vo (typ.), table 9 - pag. 6. |
| 07-Oct-2004 | 12 | Mistake Order Codes - Table 1. |
| 08-Feb-2005 | 13 | Mistake U.M. Load Regulation - V ==> mV. |

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