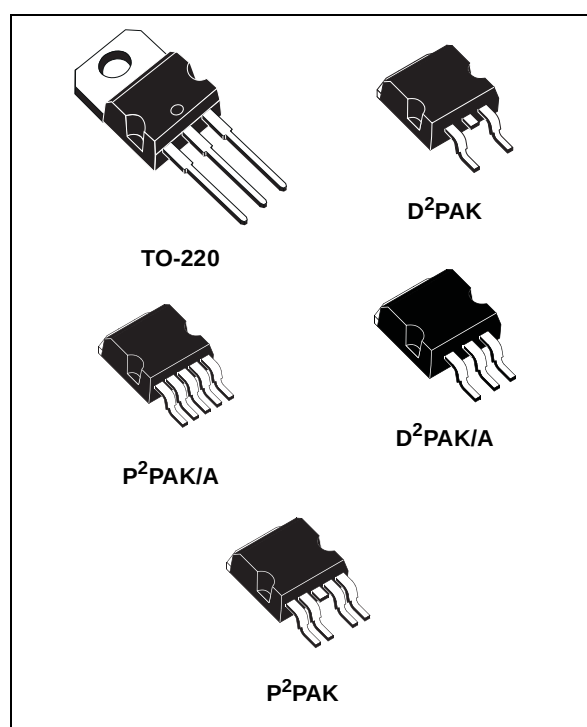


## 3A, VERY LOW DROP VOLTAGE REGULATORS

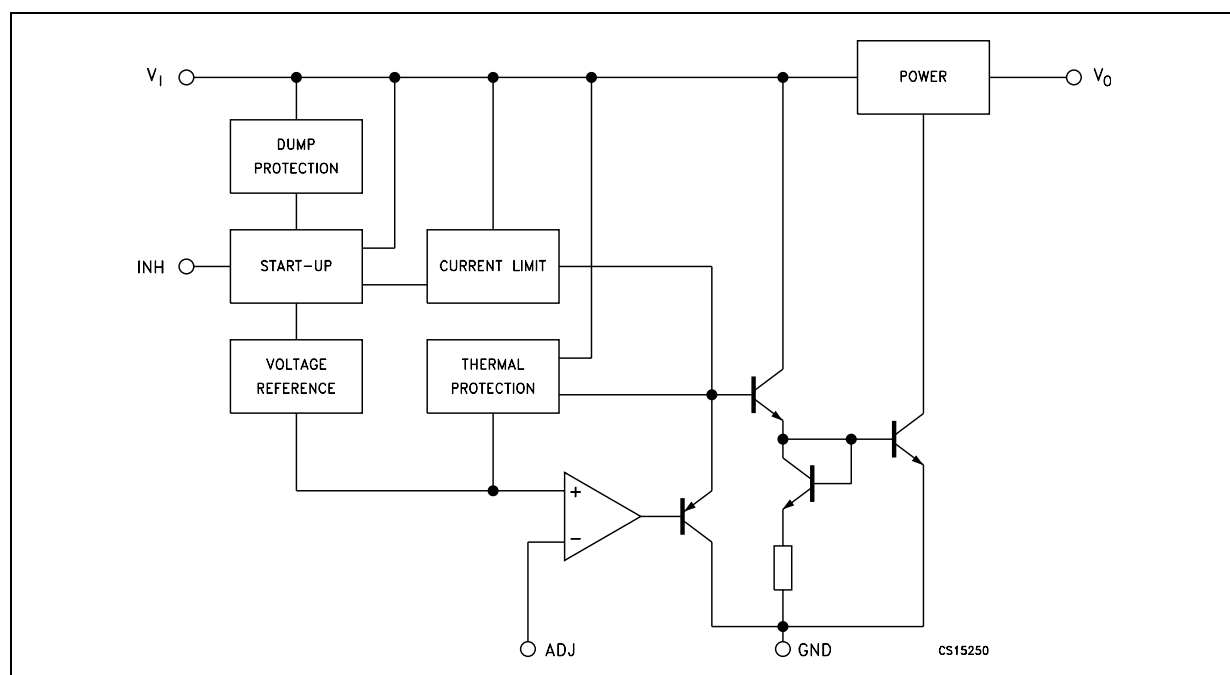
- VERY LOW DROPOUT VOLTAGE (TYP. 0.4 AT 3A)
- GUARANTEED OUTPUT CURRENT UP TO 3A
- FIXED VOLTAGE WITH  $\pm 1\%$  TOLERANCE AT 25°C
- INTERNAL CURRENT AND THERMAL LIMIT
- LOGIC CONTROLLED ELECTRONIC SHUTDOWN AVAILABLE IN PPAK

### DESCRIPTION

The LD29300 is a high current, high accuracy, low-dropout voltage regulator series. These regulators feature 400mV dropout voltage and very low ground current. Designed for high current loads, these devices are also used in lower current, extremely low dropout-critical systems, where their tiny dropout voltage and ground current values are important attributes. Typical applications are in Power supply switching post regulation, Series power supply for monitors, Series power supply for VCRs and TVs, Computer Systems and Battery powered systems.

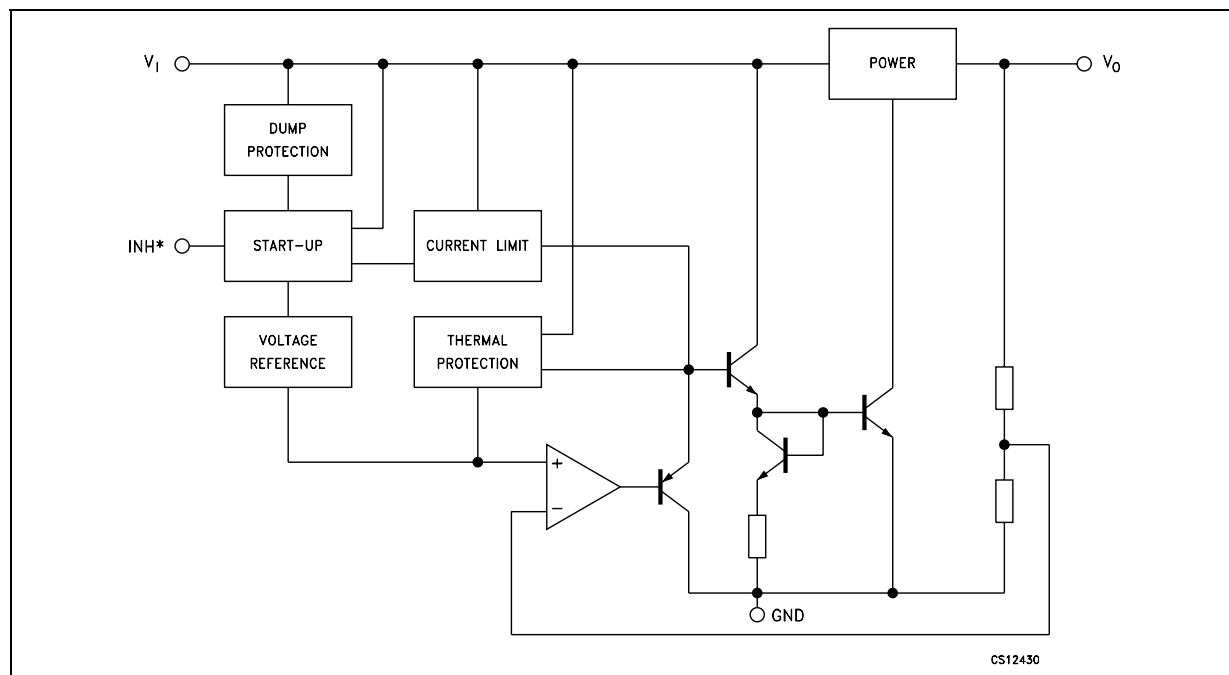


### SCHEMATIC DIAGRAM FOR ADJUSTABLE VERSION



## LD29300 SERIES

### SCHEMATIC DIAGRAM FOR FIXED VERSION



\* Only for version with inhibit function.

### ORDERING CODES

| TO-220     | D <sup>2</sup> PAK (*) | D <sup>2</sup> PAK/A (*) | P <sup>2</sup> PAK (*) (#) | P <sup>2</sup> PAK/A (*) | OUTPUT VOLTAGE |
|------------|------------------------|--------------------------|----------------------------|--------------------------|----------------|
| LD29300V15 | LD29300D2T15           | LD29300D2M15             | LD29300P2T15               | LD29300P2M15             | 1.5 V          |
| LD29300V18 | LD29300D2T18           | LD29300D2M18             | LD29300P2T18               | LD29300P2M18             | 1.8 V          |
| LD29300V25 | LD29300D2T25           | LD29300D2M25             | LD29300P2T25               | LD29300P2M25             | 2.5 V          |
| LD29300V33 | LD29300D2T33           | LD29300D2M33             | LD29300P2T33               | LD29300P2M33             | 3.3 V          |
| LD29300V50 | LD29300D2T50           | LD29300D2M50             | LD29300P2T50               | LD29300P2M50             | 5.0 V          |
| LD29300V80 | LD29300D2T80           | LD29300D2M80             | LD29300P2T80               | LD29300P2M80             | 8.0 V          |
| LD29300V90 | LD29300D2T90           | LD29300D2M90             | LD29300P2T90               | LD29300P2M90             | 9.0 V          |
|            |                        |                          | LD29300P2T                 | LD29300P2M               | ADJ            |

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

(#) Available on request.

### ABSOLUTE MAXIMUM RATINGS

| Symbol           | Parameter                            | Value              | Unit |
|------------------|--------------------------------------|--------------------|------|
| V <sub>I</sub>   | DC Input Voltage                     | 30 (*)             | V    |
| I <sub>O</sub>   | Output Current                       | Internally Limited | mA   |
| P <sub>D</sub>   | Power Dissipation                    | Internally Limited | mW   |
| T <sub>stg</sub> | Storage Temperature Range            | -55 to 150         | °C   |
| T <sub>op</sub>  | Operating Junction Temperature Range | -40 to 125         | °C   |

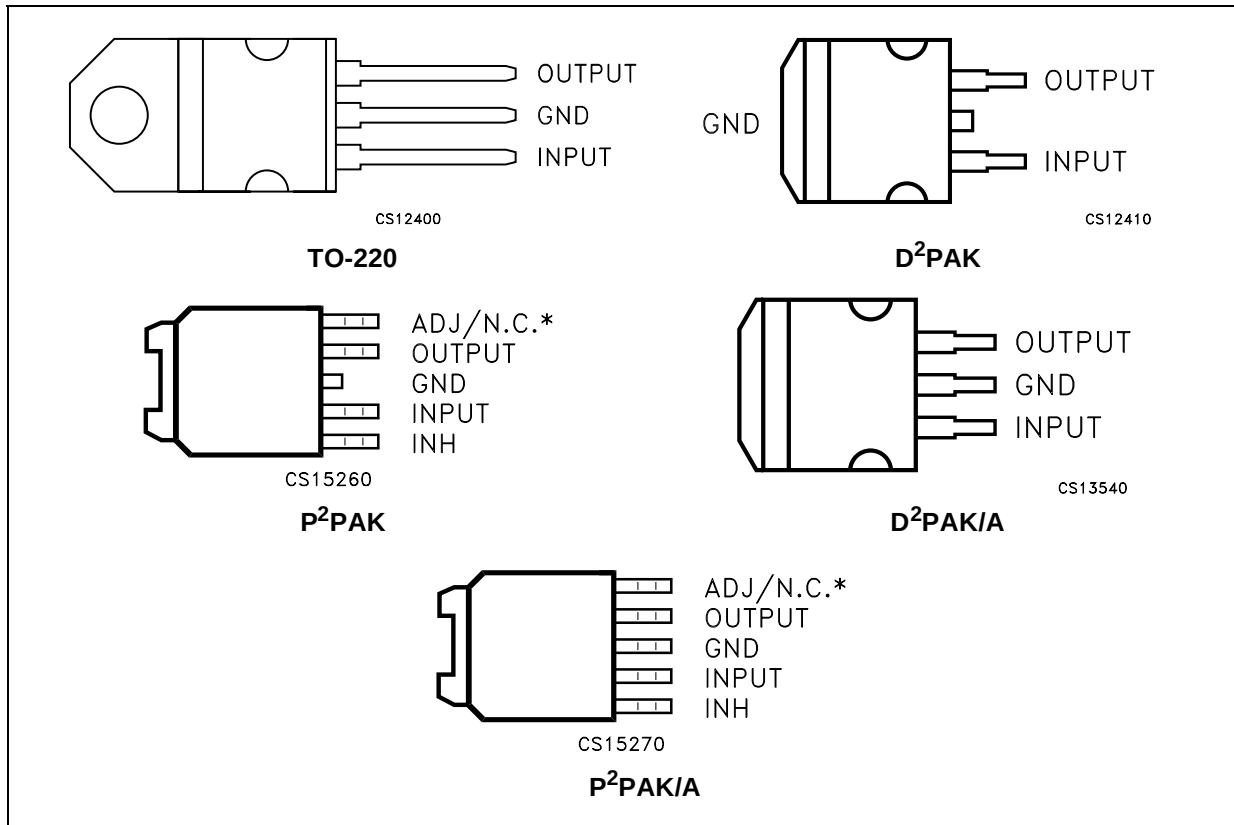
(\*) Above 14V the device is automatically in shut-down.

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

## THERMAL DATA

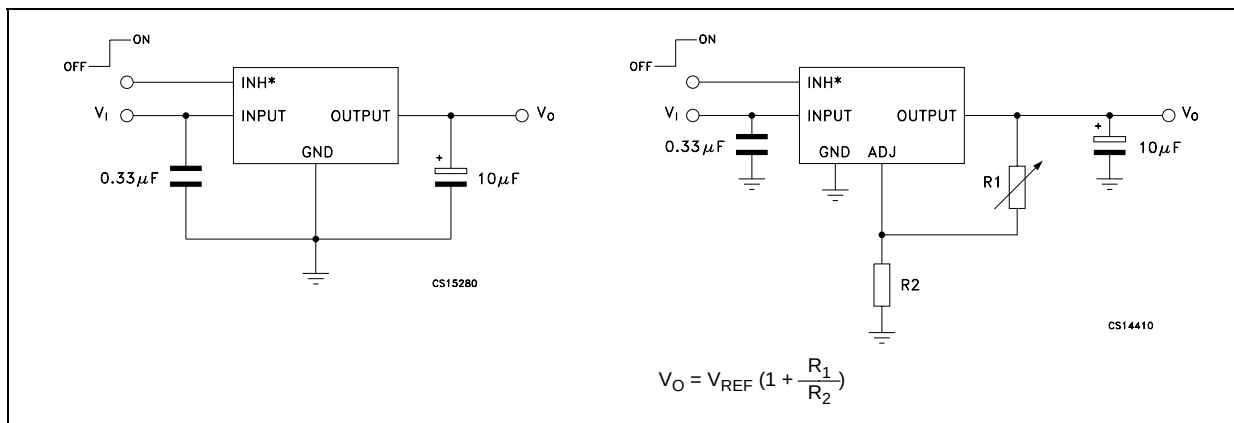
| Symbol                | Parameter                           | TO-220 | D <sup>2</sup> PAK-P <sup>2</sup> PAK<br>D <sup>2</sup> PAK/A-P <sup>2</sup> PAK/A | Unit |
|-----------------------|-------------------------------------|--------|------------------------------------------------------------------------------------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case    | 3      | 3                                                                                  | °C/W |
| R <sub>thj-amb</sub>  | Thermal Resistance Junction-ambient | 50     | 60                                                                                 | °C/W |

## CONNECTION DIAGRAM (top view)



\* Not connected for fixed version.

## APPLICATION CIRCUIT



\* Only for version with inhibit function.

## LD29300 SERIES

### ELECTRICAL CHARACTERISTICS OF LD29300#15

( $I_O = 10\text{mA}$ ,  $T_J = 25^\circ\text{C}$ ,  $V_I = 3.5\text{V}$ ,  $V_{INH} = 2\text{V}$  (Note 2),  $C_I = 330\text{nF}$ ,  $C_O = 10\mu\text{F}$ , unless otherwise specified)

| Symbol       | Parameter                       | Test Conditions                                                                                     | Min.          | Typ. | Max.          | Unit                       |
|--------------|---------------------------------|-----------------------------------------------------------------------------------------------------|---------------|------|---------------|----------------------------|
| $V_I$        | Minimum Operating Input Voltage | $I_O = 10\text{mA}$ to $3\text{A}$<br>$T_J = -40$ to $125^\circ\text{C}$                            | 2.5           |      |               | V                          |
| $V_O$        | Output Voltage                  | $I_O = 10\text{mA}$ to $3\text{A}$ , $V_I = 3$ to $7\text{V}$<br>$T_J = -40$ to $125^\circ\text{C}$ | 1.485<br>1.47 | 1.5  | 1.515<br>1.53 | V                          |
| $\Delta V_O$ | Load Regulation                 | $I_O = 10\text{mA}$ to $3\text{A}$                                                                  |               | 0.2  | 1.0           | %                          |
| $\Delta V_O$ | Line Regulation                 | $V_I = 3$ to $13\text{V}$                                                                           |               | 0.06 | 0.5           | %                          |
| SVR          | Supply Voltage Rejection        | $f = 120\text{Hz}$ , $V_I = 3.5 \pm 1\text{V}$ , $I_O = 1.5\text{A}$<br>(Note 1)                    | 65            | 75   |               | dB                         |
| $I_q$        | Quiescent Current               | $I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$                                            |               | 20   | 50            | mA                         |
|              |                                 | $I_O = 3\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$                                              |               | 45   | 100           |                            |
|              |                                 | $V_I = 13\text{V}$ , $V_{INH} = \text{GND}$ , $T_J = -40$ to $125^\circ\text{C}$                    |               | 130  | 180           | $\mu\text{A}$              |
| $I_{sc}$     | Short Circuit Current           | $V_I - V_O = 5.5\text{V}$                                                                           |               | 4.5  |               | A                          |
| $V_{IL}$     | Control Input Logic Low         | OFF MODE, (NOTE 2) $T_J = -40$ to $125^\circ\text{C}$                                               |               |      | 0.8           | V                          |
| $V_{IH}$     | Control Input Logic High        | ON MODE, (NOTE 2) $T_J = -40$ to $125^\circ\text{C}$                                                | 2             |      |               | V                          |
| $I_{INH}$    | Control Input Current           | $T_J = -40$ to $125^\circ\text{C}$ , $V_{INH} = 13\text{V}$                                         |               | 5    | 10            | $\mu\text{A}$              |
| eN           | Output Noise Voltage            | $B_P = 10\text{Hz}$ to $100\text{KHz}$ , $I_O = 100\text{mA}$                                       |               | 60   |               | $\mu\text{V}_{\text{RMS}}$ |

NOTE 1: Guaranteed by design.

NOTE 2: Only for version with Inhibit function.

### ELECTRICAL CHARACTERISTICS OF LD29300#18

( $I_O = 10\text{mA}$ ,  $T_J = 25^\circ\text{C}$ ,  $V_I = 3.8\text{V}$ ,  $V_{INH} = 2\text{V}$  (Note 3),  $C_I = 330\text{nF}$ ,  $C_O = 10\mu\text{F}$ , unless otherwise specified)

| Symbol            | Parameter                | Test Conditions                                                                                       | Min.           | Typ. | Max.           | Unit                       |
|-------------------|--------------------------|-------------------------------------------------------------------------------------------------------|----------------|------|----------------|----------------------------|
| $V_O$             | Output Voltage           | $I_O = 10\text{mA}$ to $3\text{A}$ , $V_I = 3$ to $7.3\text{V}$<br>$T_J = -40$ to $125^\circ\text{C}$ | 1.782<br>1.764 | 1.8  | 1.818<br>1.836 | V                          |
| $\Delta V_O$      | Load Regulation          | $I_O = 10\text{mA}$ to $3\text{A}$                                                                    |                | 0.2  | 1.0            | %                          |
| $\Delta V_O$      | Line Regulation          | $V_I = 3$ to $13\text{V}$                                                                             |                | 0.06 | 0.5            | %                          |
| SVR               | Supply Voltage Rejection | $f = 120\text{Hz}$ , $V_I = 3.8 \pm 1\text{V}$ , $I_O = 1.5\text{A}$<br>(Note 1)                      | 62             | 72   |                | dB                         |
| $V_{\text{DROP}}$ | Dropout Voltage          | $I_O = 500\text{mA}$ , $T_J = -40$ to $125^\circ\text{C}$ (Note 2)                                    |                | 0.1  |                | V                          |
|                   |                          | $I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ (Note 2)                                     |                | 0.2  |                |                            |
|                   |                          | $I_O = 3\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ (Note 2)                                       |                | 0.4  | 0.7            |                            |
| $I_q$             | Quiescent Current        | $I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$                                              |                | 20   | 50             | mA                         |
|                   |                          | $I_O = 3\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$                                                |                | 45   | 100            |                            |
|                   |                          | $V_I = 13\text{V}$ , $V_{INH} = \text{GND}$ , $T_J = -40$ to $125^\circ\text{C}$                      |                | 130  | 180            | $\mu\text{A}$              |
| $I_{sc}$          | Short Circuit Current    | $V_I - V_O = 5.5\text{V}$                                                                             |                | 4.5  |                | A                          |
| $V_{IL}$          | Control Input Logic Low  | OFF MODE, (NOTE 3) $T_J = -40$ to $125^\circ\text{C}$                                                 |                |      | 0.8            | V                          |
| $V_{IH}$          | Control Input Logic High | ON MODE, (NOTE 3) $T_J = -40$ to $125^\circ\text{C}$                                                  | 2              |      |                | V                          |
| $I_{INH}$         | Control Input Current    | $T_J = -40$ to $125^\circ\text{C}$ , $V_{INH} = 13\text{V}$                                           |                | 5    | 10             | $\mu\text{A}$              |
| eN                | Output Noise Voltage     | $B_P = 10\text{Hz}$ to $100\text{KHz}$ , $I_O = 100\text{mA}$                                         |                | 60   |                | $\mu\text{V}_{\text{RMS}}$ |

NOTE 1: Guaranteed by design.

NOTE 2: Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with  $V_O + 1\text{V}$  applied to  $V_I$ .

NOTE 3: Only for version with Inhibit function.

**ELECTRICAL CHARACTERISTICS OF LD29300#25**(I<sub>O</sub> = 10mA, T<sub>J</sub> = 25°C, V<sub>I</sub> = 4.5V, V<sub>INH</sub> = 2V (Note 3), C<sub>I</sub> = 330nF, C<sub>O</sub> = 10μF, unless otherwise specified)

| Symbol            | Parameter                | Test Conditions                                                                          | Min.          | Typ. | Max.          | Unit              |
|-------------------|--------------------------|------------------------------------------------------------------------------------------|---------------|------|---------------|-------------------|
| V <sub>O</sub>    | Output Voltage           | I <sub>O</sub> = 10mA to 3A, V <sub>I</sub> = 3.5 to 8V<br>T <sub>J</sub> = -40 to 125°C | 2.475<br>2.45 | 2.5  | 2.525<br>2.55 | V                 |
| ΔV <sub>O</sub>   | Load Regulation          | I <sub>O</sub> = 10mA to 3A                                                              |               | 0.2  | 1.0           | %                 |
| ΔV <sub>O</sub>   | Line Regulation          | V <sub>I</sub> = 3.5 to 13V                                                              |               | 0.06 | 0.5           | %                 |
| SVR               | Supply Voltage Rejection | f = 120 Hz, V <sub>I</sub> = 4.5 ± 1V, I <sub>O</sub> = 1.5A<br>(Note 1)                 | 55            | 70   |               | dB                |
| V <sub>DROP</sub> | Dropout Voltage          | I <sub>O</sub> = 500mA, T <sub>J</sub> = -40 to 125°C (Note 2)                           |               | 0.1  |               | V                 |
|                   |                          | I <sub>O</sub> = 1.5A, T <sub>J</sub> = -40 to 125°C (Note 2)                            |               | 0.2  |               |                   |
|                   |                          | I <sub>O</sub> = 3A, T <sub>J</sub> = -40 to 125°C (Note 2)                              |               | 0.4  | 0.7           |                   |
| I <sub>q</sub>    | Quiescent Current        | I <sub>O</sub> = 1.5A, T <sub>J</sub> = -40 to 125°C                                     |               | 20   | 50            | mA                |
|                   |                          | I <sub>O</sub> = 3A, T <sub>J</sub> = -40 to 125°C                                       |               | 45   | 100           |                   |
|                   |                          | V <sub>I</sub> = 13V, V <sub>INH</sub> = GND T <sub>J</sub> = -40 to 125°C               |               | 130  | 180           | μA                |
| I <sub>sc</sub>   | Short Circuit Current    | V <sub>I</sub> - V <sub>O</sub> = 5.5V                                                   |               | 4.5  |               | A                 |
| V <sub>IL</sub>   | Control Input Logic Low  | OFF MODE, (NOTE 3) T <sub>J</sub> = -40 to 125°C                                         |               |      | 0.8           | V                 |
| V <sub>IH</sub>   | Control Input Logic High | ON MODE, (NOTE 3) T <sub>J</sub> = -40 to 125°C                                          | 2             |      |               | V                 |
| I <sub>INH</sub>  | Control Input Current    | T <sub>J</sub> = -40 to 125°C V <sub>INH</sub> = 13V                                     |               | 5    | 10            | μA                |
| eN                | Output Noise Voltage     | B <sub>P</sub> = 10Hz to 100KHz I <sub>O</sub> = 100mA                                   |               | 100  |               | μV <sub>RMS</sub> |

NOTE 1: Guaranteed by design.

NOTE 2: Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with V<sub>O</sub>+1V applied to V<sub>I</sub>.

NOTE 3: Only for version with Inhibit function.

**ELECTRICAL CHARACTERISTICS OF LD29300#33**(I<sub>O</sub> = 10mA, T<sub>J</sub> = 25°C, V<sub>I</sub> = 5.3V, V<sub>INH</sub> = 2V (Note 3), C<sub>I</sub> = 330nF, C<sub>O</sub> = 10μF, unless otherwise specified)

| Symbol            | Parameter                | Test Conditions                                                                            | Min.           | Typ. | Max.           | Unit              |
|-------------------|--------------------------|--------------------------------------------------------------------------------------------|----------------|------|----------------|-------------------|
| V <sub>O</sub>    | Output Voltage           | I <sub>O</sub> = 10mA to 3A, V <sub>I</sub> = 4.3 to 8.8V<br>T <sub>J</sub> = -40 to 125°C | 3.267<br>3.234 | 3.3  | 3.333<br>3.366 | V                 |
| ΔV <sub>O</sub>   | Load Regulation          | I <sub>O</sub> = 10mA to 3A                                                                |                | 0.2  | 1.0            | %                 |
| ΔV <sub>O</sub>   | Line Regulation          | V <sub>I</sub> = 4.3 to 13V                                                                |                | 0.06 | 0.5            | %                 |
| SVR               | Supply Voltage Rejection | f = 120 Hz, V <sub>I</sub> = 5.3 ± 1V, I <sub>O</sub> = 1.5A<br>(Note 1)                   | 52             | 67   |                | dB                |
| V <sub>DROP</sub> | Dropout Voltage          | I <sub>O</sub> = 500mA, T <sub>J</sub> = -40 to 125°C (Note 2)                             |                | 0.1  |                | V                 |
|                   |                          | I <sub>O</sub> = 1.5A, T <sub>J</sub> = -40 to 125°C (Note 2)                              |                | 0.2  |                |                   |
|                   |                          | I <sub>O</sub> = 3A, T <sub>J</sub> = -40 to 125°C (Note 2)                                |                | 0.4  | 0.7            |                   |
| I <sub>q</sub>    | Quiescent Current        | I <sub>O</sub> = 1.5A, T <sub>J</sub> = -40 to 125°C                                       |                | 20   | 50             | mA                |
|                   |                          | I <sub>O</sub> = 3A, T <sub>J</sub> = -40 to 125°C                                         |                | 45   | 100            |                   |
|                   |                          | V <sub>I</sub> = 13V, V <sub>INH</sub> = GND T <sub>J</sub> = -40 to 125°C                 |                | 130  | 180            | μA                |
| I <sub>sc</sub>   | Short Circuit Current    | V <sub>I</sub> - V <sub>O</sub> = 5.5V                                                     |                | 4.5  |                | A                 |
| V <sub>IL</sub>   | Control Input Logic Low  | OFF MODE, (NOTE 3) T <sub>J</sub> = -40 to 125°C                                           |                |      | 0.8            | V                 |
| V <sub>IH</sub>   | Control Input Logic High | ON MODE, (NOTE 3) T <sub>J</sub> = -40 to 125°C                                            | 2              |      |                | V                 |
| I <sub>INH</sub>  | Control Input Current    | T <sub>J</sub> = -40 to 125°C V <sub>INH</sub> = 13V                                       |                | 5    | 10             | μA                |
| eN                | Output Noise Voltage     | B <sub>P</sub> = 10Hz to 100KHz I <sub>O</sub> = 100mA                                     |                | 132  |                | μV <sub>RMS</sub> |

NOTE 1: Guaranteed by design.

NOTE 2: Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with V<sub>O</sub>+1V applied to V<sub>I</sub>.

NOTE 3: Only for version with Inhibit function.

## LD29300 SERIES

### ELECTRICAL CHARACTERISTICS OF LD29300#50

( $I_O = 10\text{mA}$ ,  $T_J = 25^\circ\text{C}$ ,  $V_I = 7\text{V}$ ,  $V_{INH} = 2\text{V}$  (Note 3),  $C_I = 330\text{nF}$ ,  $C_O = 10\mu\text{F}$ , unless otherwise specified)

| Symbol       | Parameter                | Test Conditions                                                                                        | Min.        | Typ. | Max.        | Unit                |
|--------------|--------------------------|--------------------------------------------------------------------------------------------------------|-------------|------|-------------|---------------------|
| $V_O$        | Output Voltage           | $I_O = 10\text{mA}$ to $3\text{A}$ , $V_I = 6$ to $10.5\text{V}$<br>$T_J = -40$ to $125^\circ\text{C}$ | 4.95<br>4.9 | 5    | 5.05<br>5.1 | V                   |
| $\Delta V_O$ | Load Regulation          | $I_O = 10\text{mA}$ to $3\text{A}$                                                                     |             | 0.2  | 1.0         | %                   |
| $\Delta V_O$ | Line Regulation          | $V_I = 6$ to $13\text{V}$                                                                              |             | 0.06 | 0.5         | %                   |
| SVR          | Supply Voltage Rejection | $f = 120\text{Hz}$ , $V_I = 7 \pm 1\text{V}$ , $I_O = 1.5\text{A}$<br>(Note 1)                         | 49          | 64   |             | dB                  |
| $V_{DROP}$   | Dropout Voltage          | $I_O = 500\text{mA}$ , $T_J = -40$ to $125^\circ\text{C}$ (Note 2)                                     |             | 0.1  |             | V                   |
|              |                          | $I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ (Note 2)                                      |             | 0.2  |             |                     |
|              |                          | $I_O = 3\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ (Note 2)                                        |             | 0.4  | 0.7         |                     |
| $I_q$        | Quiescent Current        | $I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$                                               |             | 20   | 50          | mA                  |
|              |                          | $I_O = 3\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$                                                 |             | 45   | 100         |                     |
|              |                          | $V_I = 13\text{V}$ , $V_{INH} = \text{GND}$ , $T_J = -40$ to $125^\circ\text{C}$                       |             | 130  | 180         |                     |
| $I_{SC}$     | Short Circuit Current    | $V_I - V_O = 5.5\text{V}$                                                                              |             | 4.5  |             | A                   |
| $V_{IL}$     | Control Input Logic Low  | OFF MODE, (NOTE 3) $T_J = -40$ to $125^\circ\text{C}$                                                  |             |      | 0.8         | V                   |
| $V_{IH}$     | Control Input Logic High | ON MODE, (NOTE 3) $T_J = -40$ to $125^\circ\text{C}$                                                   | 2           |      |             | V                   |
| $I_{INH}$    | Control Input Current    | $T_J = -40$ to $125^\circ\text{C}$ , $V_{INH} = 13\text{V}$                                            |             | 5    | 10          | $\mu\text{A}$       |
| eN           | Output Noise Voltage     | $B_P = 10\text{Hz}$ to $100\text{KHz}$ , $I_O = 100\text{mA}$                                          |             | 200  |             | $\mu\text{V}_{RMS}$ |

NOTE 1: Guaranteed by design.

NOTE 2: Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with  $V_O + 1\text{V}$  applied to  $V_I$ .

NOTE 3: Only for version with Inhibit function.

### ELECTRICAL CHARACTERISTICS OF LD29300#80

( $I_O = 10\text{mA}$ ,  $T_J = 25^\circ\text{C}$ ,  $V_I = 10\text{V}$ ,  $V_{INH} = 2\text{V}$  (Note 3),  $C_I = 330\text{nF}$ ,  $C_O = 10\mu\text{F}$ , unless otherwise specified)

| Symbol       | Parameter                | Test Conditions                                                                                      | Min.         | Typ. | Max.         | Unit                |
|--------------|--------------------------|------------------------------------------------------------------------------------------------------|--------------|------|--------------|---------------------|
| $V_O$        | Output Voltage           | $I_O = 10\text{mA}$ to $3\text{A}$ , $V_I = 9$ to $13\text{V}$<br>$T_J = -40$ to $125^\circ\text{C}$ | 7.92<br>7.84 | 8    | 8.08<br>8.16 | V                   |
| $\Delta V_O$ | Load Regulation          | $I_O = 10\text{mA}$ to $3\text{A}$                                                                   |              | 0.2  | 1.0          | %                   |
| $\Delta V_O$ | Line Regulation          | $V_I = 9$ to $13\text{V}$                                                                            |              | 0.06 | 0.5          | %                   |
| SVR          | Supply Voltage Rejection | $f = 120\text{Hz}$ , $V_I = 9 \pm 1\text{V}$ , $I_O = 1.5\text{A}$<br>(Note 1)                       | 45           | 59   |              | dB                  |
| $V_{DROP}$   | Dropout Voltage          | $I_O = 500\text{mA}$ , $T_J = -40$ to $125^\circ\text{C}$ (Note 2)                                   |              | 0.1  |              | V                   |
|              |                          | $I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ (Note 2)                                    |              | 0.2  |              |                     |
|              |                          | $I_O = 3\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ (Note 2)                                      |              | 0.4  | 0.7          |                     |
| $I_q$        | Quiescent Current        | $I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$                                             |              | 20   | 50           | mA                  |
|              |                          | $I_O = 3\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$                                               |              | 45   | 100          |                     |
|              |                          | $V_I = 13\text{V}$ , $V_{INH} = \text{GND}$ , $T_J = -40$ to $125^\circ\text{C}$                     |              | 130  | 180          |                     |
| $I_{SC}$     | Short Circuit Current    | $V_I - V_O = 5.5\text{V}$                                                                            |              | 4.5  |              | A                   |
| $V_{IL}$     | Control Input Logic Low  | OFF MODE, (NOTE 3) $T_J = -40$ to $125^\circ\text{C}$                                                |              |      | 0.8          | V                   |
| $V_{IH}$     | Control Input Logic High | ON MODE, (NOTE 3) $T_J = -40$ to $125^\circ\text{C}$                                                 | 2            |      |              | V                   |
| $I_{INH}$    | Control Input Current    | $T_J = -40$ to $125^\circ\text{C}$ , $V_{INH} = 13\text{V}$                                          |              | 5    | 10           | $\mu\text{A}$       |
| eN           | Output Noise Voltage     | $B_P = 10\text{Hz}$ to $100\text{KHz}$ , $I_O = 100\text{mA}$                                        |              | 320  |              | $\mu\text{V}_{RMS}$ |

NOTE 1: Guaranteed by design.

NOTE 2: Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with  $V_O + 1\text{V}$  applied to  $V_I$ .

NOTE 3: Only for version with Inhibit function.

**ELECTRICAL CHARACTERISTICS OF LD29300#90**(I<sub>O</sub> = 10mA, T<sub>J</sub> = 25°C, V<sub>I</sub> = 11V, V<sub>INH</sub> = 2V (Note 3), C<sub>I</sub> = 330nF, C<sub>O</sub> = 10μF, unless otherwise specified)

| Symbol            | Parameter                | Test Conditions                                                                          | Min.         | Typ. | Max.         | Unit              |
|-------------------|--------------------------|------------------------------------------------------------------------------------------|--------------|------|--------------|-------------------|
| V <sub>O</sub>    | Output Voltage           | I <sub>O</sub> = 10mA to 3A, V <sub>I</sub> = 10 to 13V<br>T <sub>J</sub> = -40 to 125°C | 8.91<br>8.82 | 9    | 9.09<br>9.18 | V                 |
| ΔV <sub>O</sub>   | Load Regulation          | I <sub>O</sub> = 10mA to 3A                                                              |              | 0.2  | 1.0          | %                 |
| ΔV <sub>O</sub>   | Line Regulation          | V <sub>I</sub> = 10 to 13V                                                               |              | 0.06 | 0.5          | %                 |
| SVR               | Supply Voltage Rejection | f = 120 Hz, V <sub>I</sub> = 11 ± 1V, I <sub>O</sub> = 1.5A<br>(Note 1)                  | 45           | 58   |              | dB                |
| V <sub>DROP</sub> | Dropout Voltage          | I <sub>O</sub> = 500mA, T <sub>J</sub> = -40 to 125°C (Note 2)                           |              | 0.1  |              | V                 |
|                   |                          | I <sub>O</sub> = 1.5A, T <sub>J</sub> = -40 to 125°C (Note 2)                            |              | 0.2  |              |                   |
|                   |                          | I <sub>O</sub> = 3A, T <sub>J</sub> = -40 to 125°C (Note 2)                              |              | 0.4  | 0.7          |                   |
| I <sub>q</sub>    | Quiescent Current        | I <sub>O</sub> = 1.5A, T <sub>J</sub> = -40 to 125°C                                     |              | 20   | 50           | mA                |
|                   |                          | I <sub>O</sub> = 3A, T <sub>J</sub> = -40 to 125°C                                       |              | 50   | 100          |                   |
|                   |                          | V <sub>I</sub> = 13V, V <sub>INH</sub> = GND, T <sub>J</sub> = -40 to 125°C              |              | 130  | 180          |                   |
| I <sub>SC</sub>   | Short Circuit Current    | V <sub>I</sub> - V <sub>O</sub> = 5.5V                                                   |              | 4.5  |              | A                 |
| V <sub>IL</sub>   | Control Input Logic Low  | OFF MODE, (NOTE 3) T <sub>J</sub> = -40 to 125°C                                         |              |      | 0.8          | V                 |
| V <sub>IH</sub>   | Control Input Logic High | ON MODE, (NOTE 3) T <sub>J</sub> = -40 to 125°C                                          | 2            |      |              | V                 |
| I <sub>INH</sub>  | Control Input Current    | T <sub>J</sub> = -40 to 125°C V <sub>INH</sub> = 13V                                     |              | 5    | 10           | μA                |
| eN                | Output Noise Voltage     | B <sub>P</sub> = 10Hz to 100KHz I <sub>O</sub> = 100mA                                   |              | 360  |              | μV <sub>RMS</sub> |

NOTE 1: Guaranteed by design.

NOTE 2: Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with V<sub>O</sub>+1V applied to V<sub>I</sub>.

NOTE 3: Only for version with Inhibit function.

**ELECTRICAL CHARACTERISTICS OF LD29300#ADJ**(I<sub>O</sub> = 10mA, T<sub>J</sub> = 25°C, V<sub>I</sub> = 3.23 V, V<sub>INH</sub> = 2V (Note 3), C<sub>I</sub> = 330nF, C<sub>O</sub> = 10μF adjust pin tied to output)

| Symbol           | Parameter                       | Test Conditions                                                                                     | Min.       | Typ. | Max.       | Unit              |
|------------------|---------------------------------|-----------------------------------------------------------------------------------------------------|------------|------|------------|-------------------|
| V <sub>I</sub>   | Minimum Operating Input Voltage | I <sub>O</sub> = 10mA to 3A<br>T <sub>J</sub> = -40 to 125°C                                        | 2.5        |      |            | V                 |
| ΔV <sub>O</sub>  | Load Regulation                 | I <sub>O</sub> = 10mA to 3A                                                                         |            | 0.2  | 1.0        | %                 |
| ΔV <sub>O</sub>  | Line Regulation                 | V <sub>I</sub> = 2.5 V to 13V                                                                       |            | 0.06 | 0.5        | %                 |
| V <sub>REF</sub> | Reference Voltage               | I <sub>O</sub> = 10mA to 3A, V <sub>I</sub> = 2.5 to 4.5V<br>T <sub>J</sub> = -40 to 125°C (Note 2) | -1%<br>-2% | 1.23 | +1%<br>+2% | V                 |
| SVR              | Supply Voltage Rejection        | f = 120 Hz, V <sub>I</sub> = 3.23 ± 1V, I <sub>O</sub> = 1.5A<br>(Note 1)                           | 65         | 75   |            | dB                |
| I <sub>q</sub>   | Quiescent Current               | I <sub>O</sub> = 1.5A, T <sub>J</sub> = -40 to 125°C                                                |            | 20   | 50         | mA                |
|                  |                                 | I <sub>O</sub> = 3A, T <sub>J</sub> = -40 to 125°C                                                  |            | 45   | 100        |                   |
|                  |                                 | V <sub>I</sub> = 13V, V <sub>INH</sub> = GND, T <sub>J</sub> = -40 to 125°C                         |            | 130  | 180        |                   |
| I <sub>ADJ</sub> | Adjust Pin Current              | T <sub>J</sub> = -40 to 125°C (Note 1)                                                              |            |      | 1          | μA                |
| I <sub>SC</sub>  | Short Circuit Current           | V <sub>I</sub> - V <sub>O</sub> = 5.5V                                                              |            | 4.5  |            | A                 |
| V <sub>IL</sub>  | Control Input Logic Low         | OFF MODE, (NOTE 3) T <sub>J</sub> = -40 to 125°C                                                    |            |      | 0.8        | V                 |
| V <sub>IH</sub>  | Control Input Logic High        | ON MODE, (NOTE 3) T <sub>J</sub> = -40 to 125°C                                                     | 2          |      |            | V                 |
| I <sub>INH</sub> | Control Input Current           | T <sub>J</sub> = -40 to 125°C V <sub>INH</sub> = 13V                                                |            | 5    | 10         | μA                |
| eN               | Output Noise Voltage            | B <sub>P</sub> = 10Hz to 100KHz I <sub>O</sub> = 100mA                                              |            | 50   |            | μV <sub>RMS</sub> |

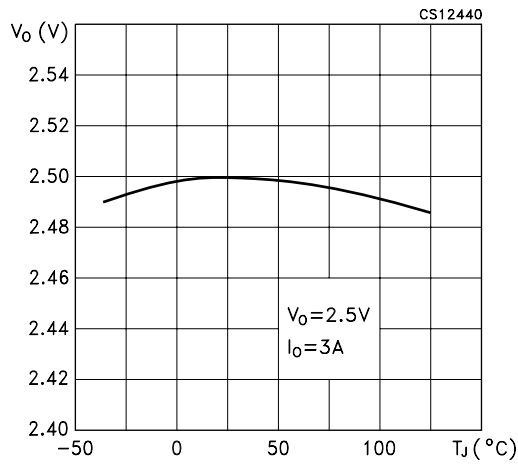
NOTE 1: Guaranteed by design.

NOTE 2: Reference Voltage is measured between output and GND pin, with ADJ PIN tied to V<sub>OUT</sub>.

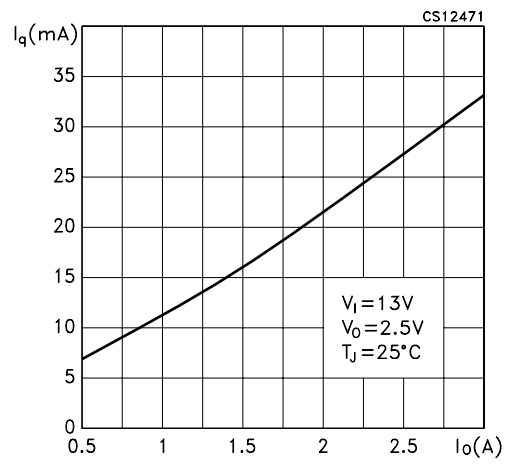
NOTE 3: Only for version with Inhibit function.

**TYPICAL CHARACTERISTICS** ( $C_I = 330\text{nF}$ ,  $C_O = 10\mu\text{F}$ )

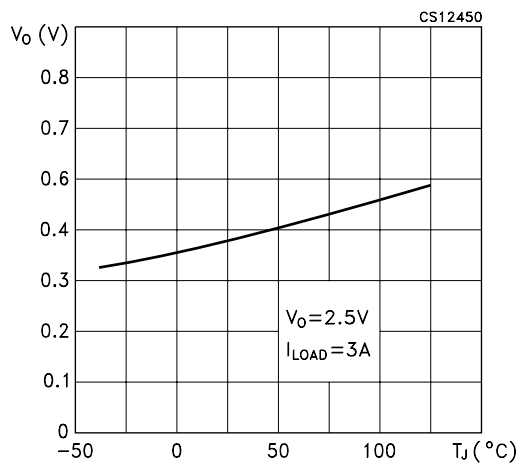
**Figure 1 : Output Voltage vs Temperature**



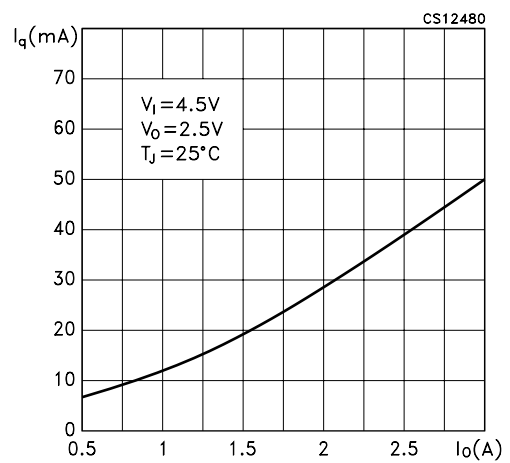
**Figure 4 : Quiescent Current vs Output Current**



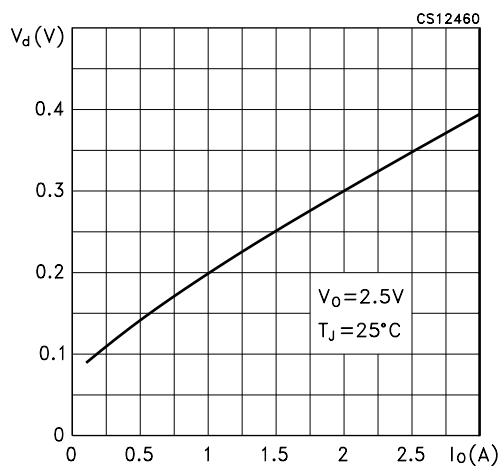
**Figure 2 : Dropout Voltage vs Temperature**



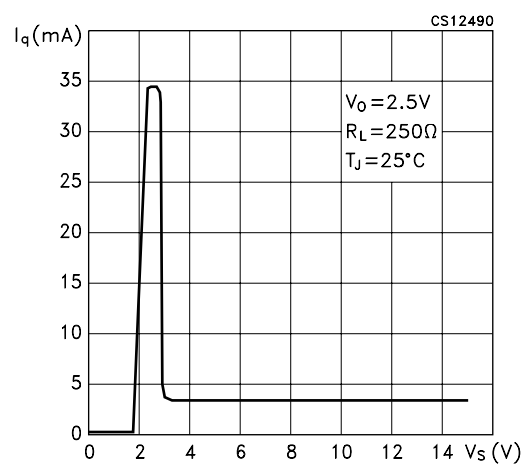
**Figure 5 : Quiescent Current vs Output Current**



**Figure 3 : Dropout Voltage vs Output Current**



**Figure 6 : Quiescent Current vs Supply Voltage**





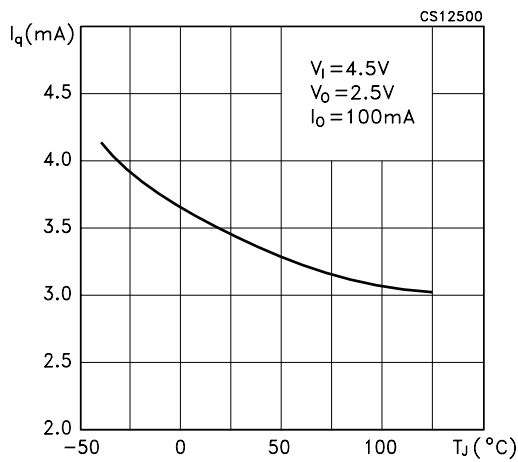
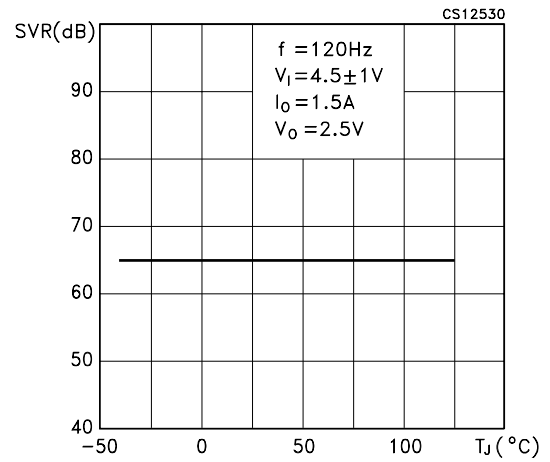
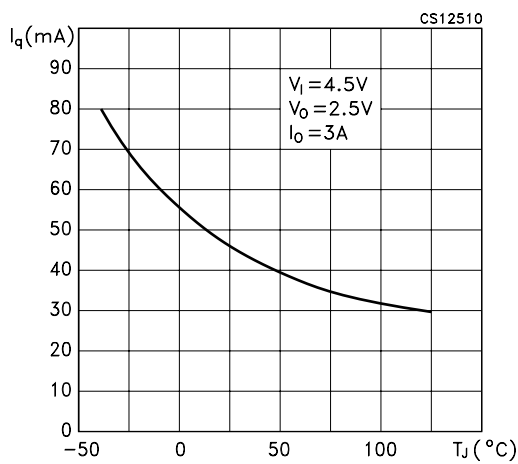
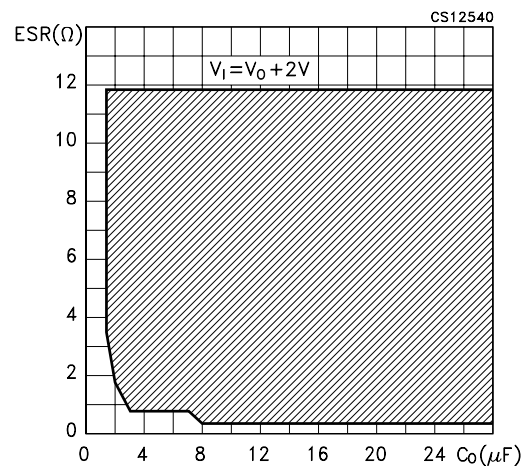
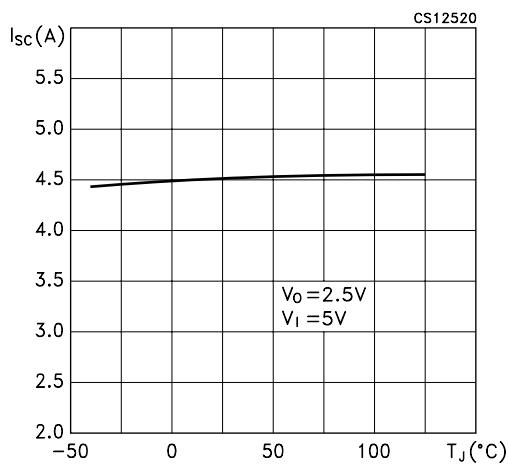
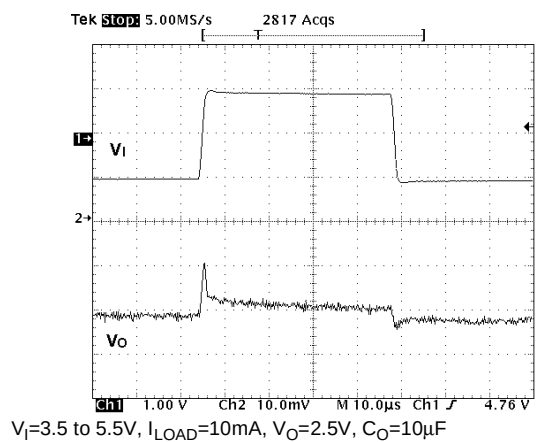
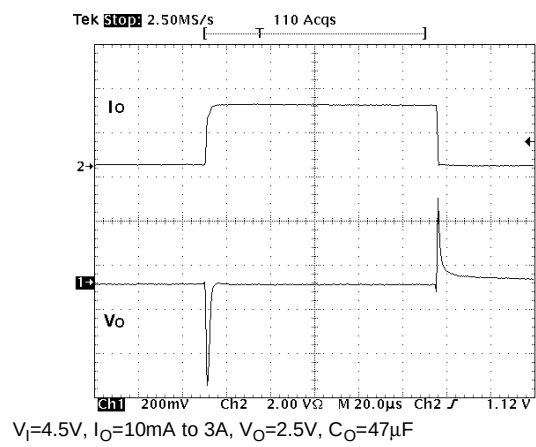
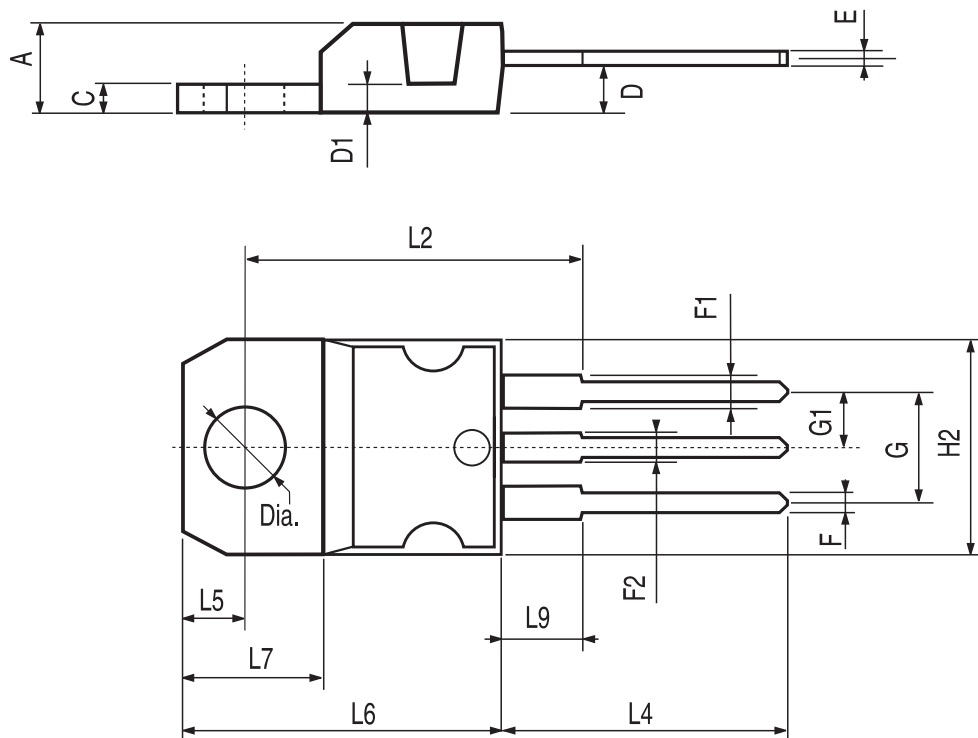
**Figure 7 : Quiescent Current vs Temperature****Figure 10 : Supply Voltage Rejection vs Temperature****Figure 8 : Quiescent Current vs Temperature****Figure 11 : Stability vs  $C_O$** **Figure 9 : Short Circuit Current vs Temperature****Figure 12 : Line Transient**

Figure 13 : Load Transient



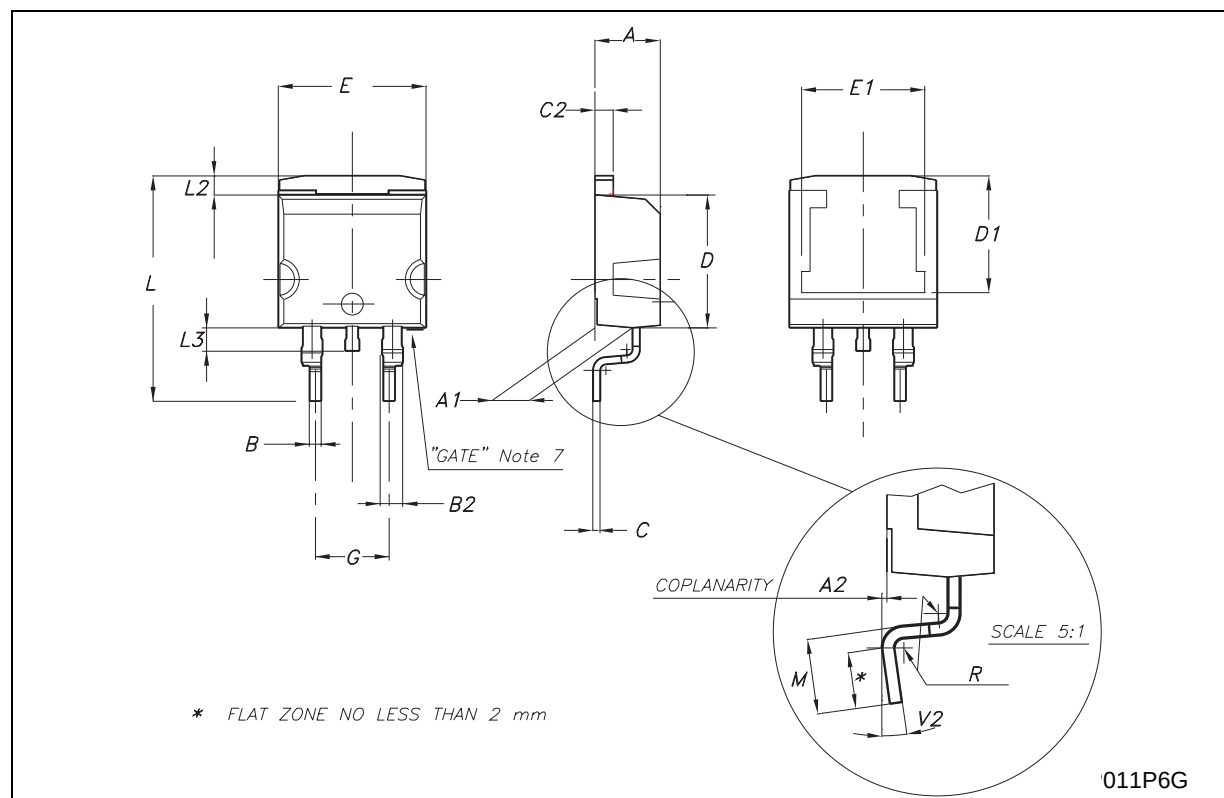
## TO-220 MECHANICAL DATA

| 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 |



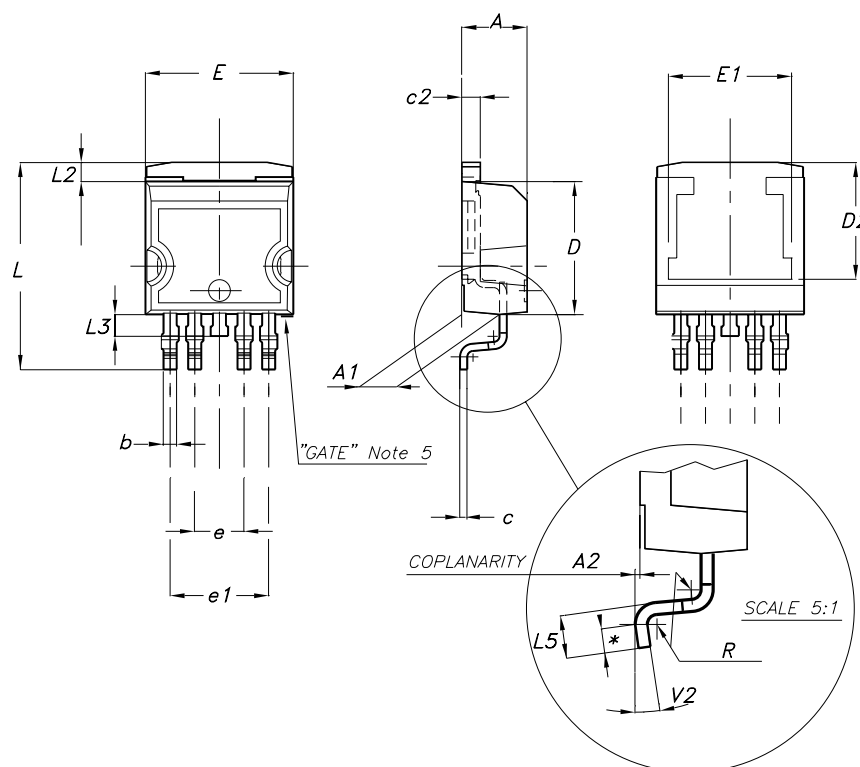
D<sup>2</sup>PAK MECHANICAL DATA

| 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°    |



P<sup>2</sup>PAK MECHANICAL DATA

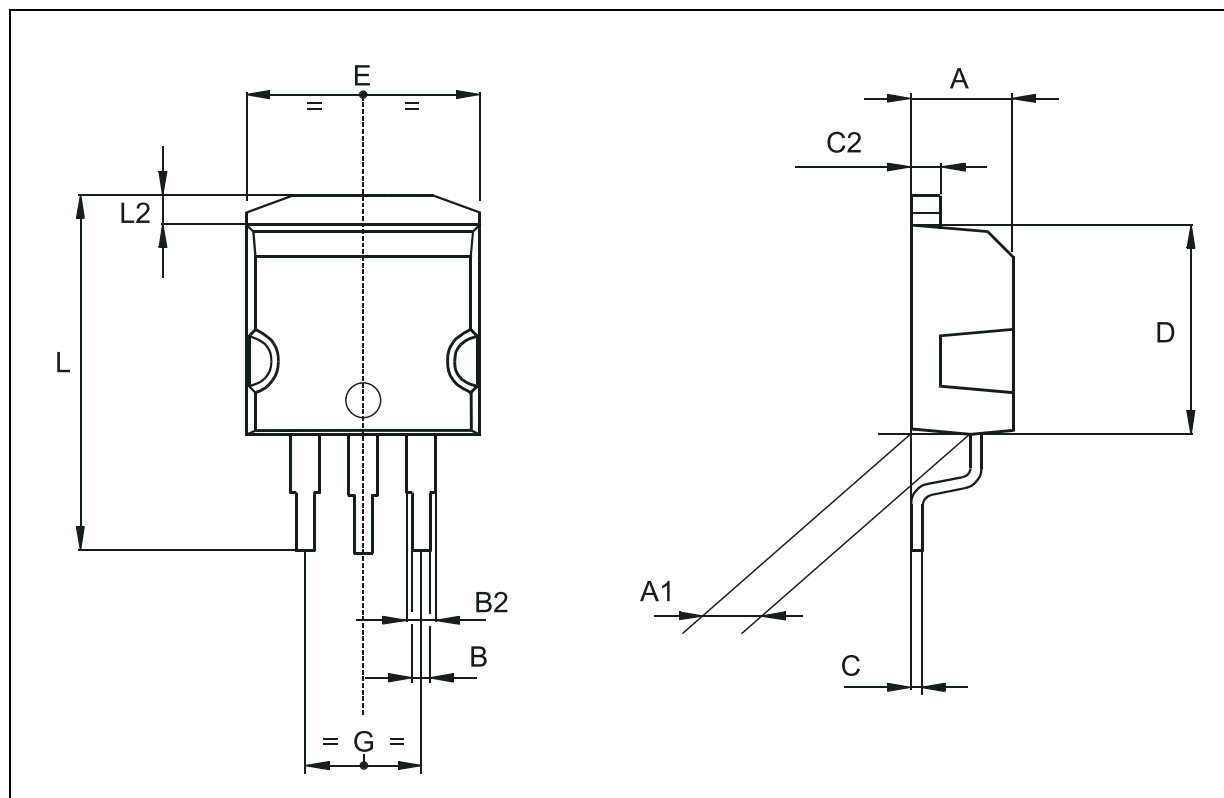
| DIM. | mm.   |      |       | inch  |       |       |
|------|-------|------|-------|-------|-------|-------|
|      | MIN.  | TYP  | MAX.  | MIN.  | TYP.  | MAX.  |
| A    | 4.30  |      | 4.80  | 0.169 |       | 0.188 |
| A1   | 2.40  |      | 2.80  | 0.094 |       | 0.110 |
| A2   | 0.03  |      | 0.23  | 0.001 |       | 0.009 |
| b    | 0.80  |      | 1.05  | 0.031 |       | 0.041 |
| c    | 0.45  |      | 0.60  | 0.017 |       | 0.023 |
| c2   | 1.17  |      | 1.37  | 0.046 |       | 0.053 |
| D    | 8.95  |      | 9.35  | 0.352 |       | 0.368 |
| D2   |       | 8    |       |       | 0.315 |       |
| E    | 10.00 |      | 10.40 | 0.393 |       | 0.409 |
| E1   |       | 8.5  |       |       | 0.334 | 0.409 |
| e    | 3.20  |      | 3.60  | 0.126 |       | 0.142 |
| e1   | 6.60  |      | 7.00  | 0.260 |       | 0.275 |
| L    | 13.70 |      | 14.50 | 0.539 |       | 0.571 |
| L2   | 1.25  |      | 1.40  | 0.049 |       | 0.055 |
| L3   | 0.90  |      | 1.70  | 0.035 |       | 0.067 |
| L5   | 1.55  |      | 2.40  | 0.061 |       | 0.094 |
| R    |       | 0.40 |       |       | 0.016 |       |
| V2   | 0°    |      | 8°    | 0°    |       | 8°    |



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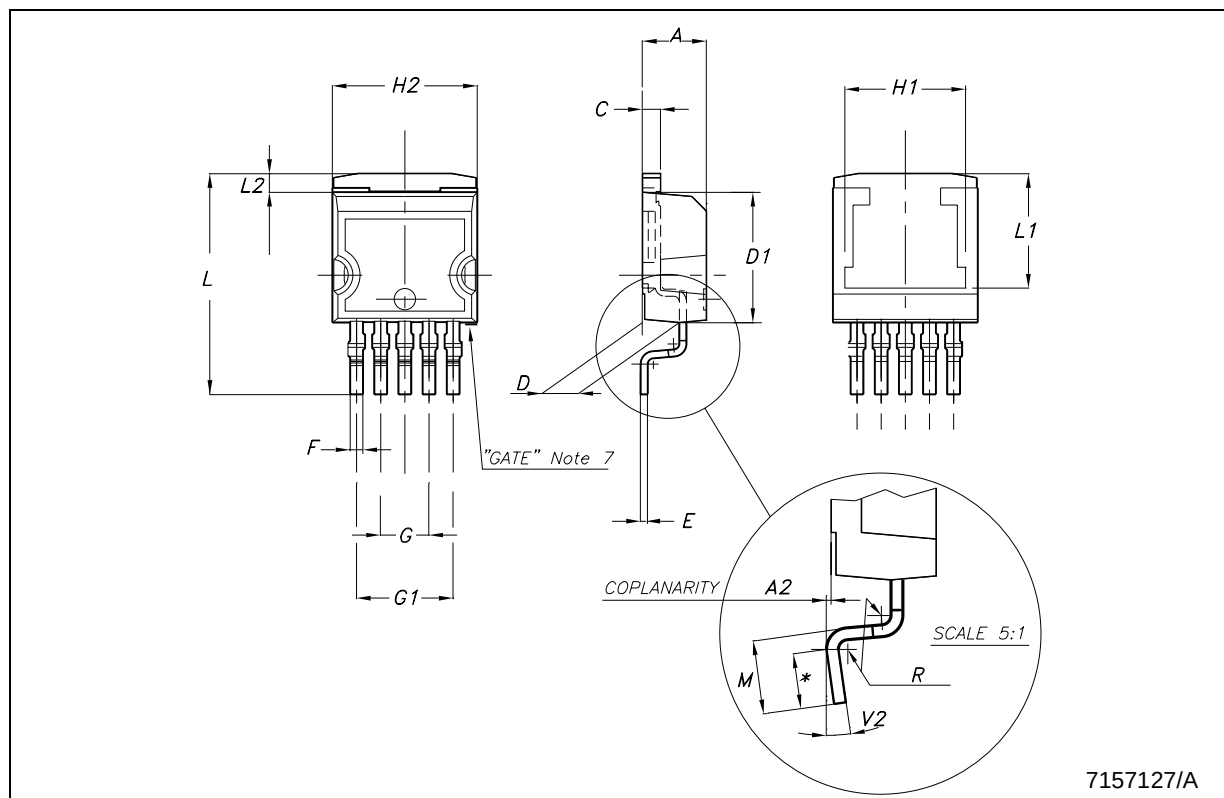
D<sup>2</sup>PAK/A MECHANICAL DATA

| 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 |
| B    | 0.7  |     | 0.93  | 0.027 |      | 0.036 |
| B2   | 1.14 |     | 1.7   | 0.044 |      | 0.067 |
| C    | 0.45 |     | 0.60  | 0.017 |      | 0.023 |
| C2   | 1.21 |     | 1.36  | 0.047 |      | 0.053 |
| D    | 8.95 |     | 9.35  | 0.352 |      | 0.368 |
| E    | 10   |     | 10.4  | 0.393 |      | 0.409 |
| G    | 4.88 |     | 5.28  | 0.192 |      | 0.208 |
| L    | 15   |     | 15.85 | 0.590 |      | 0.106 |
| L2   | 1.27 |     | 1.4   | 0.050 |      | 0.055 |



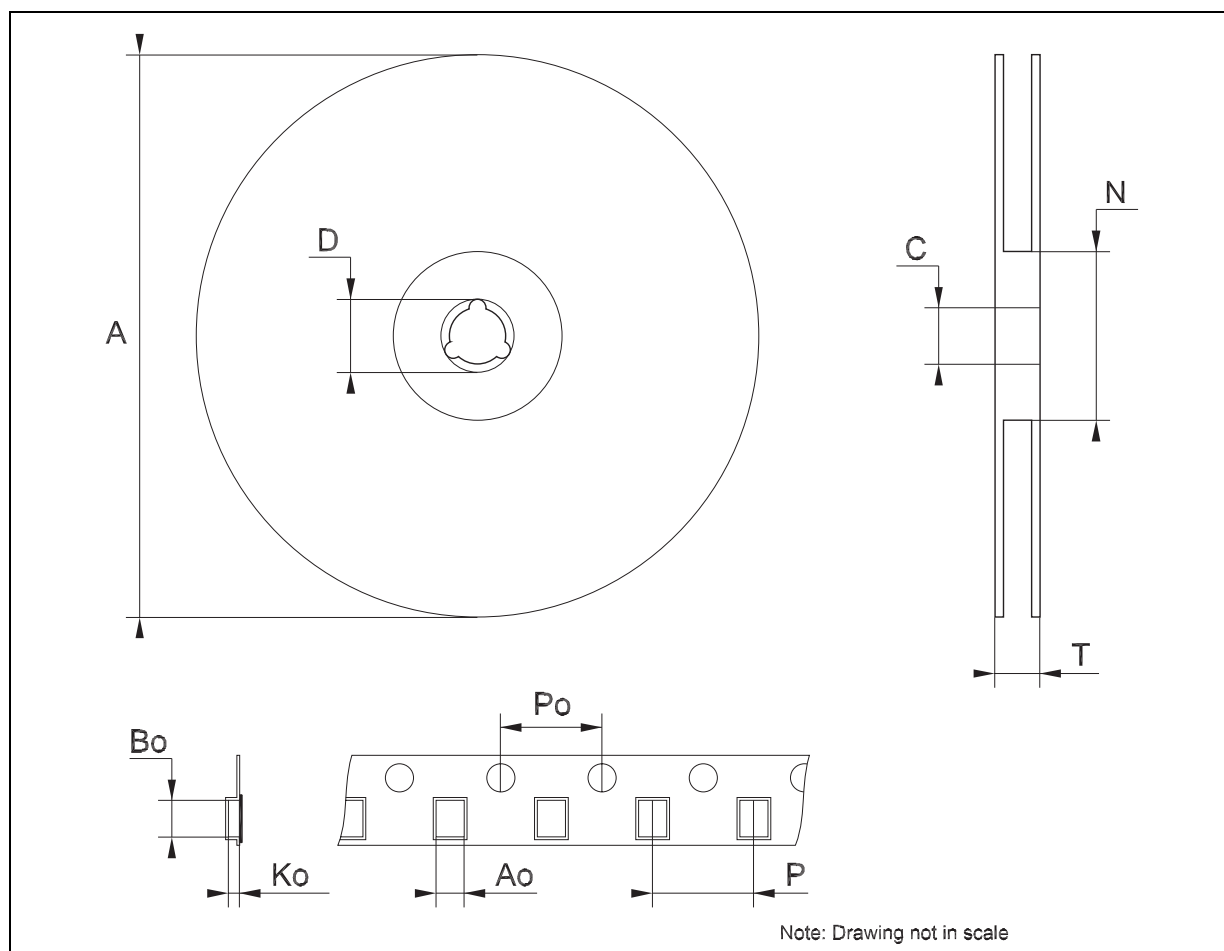
P<sup>2</sup>PAK/A MECHANICAL DATA

| DIM. | mm.   |      |       | inch  |       |       |
|------|-------|------|-------|-------|-------|-------|
|      | MIN.  | TYP  | MAX.  | MIN.  | TYP.  | MAX.  |
| A    | 4.30  |      | 4.80  | 0.169 |       | 0.188 |
| A2   | 0.03  |      | 0.23  | 0.001 |       | 0.009 |
| C    | 1.17  |      | 1.37  | 0.046 |       | 0.053 |
| D    | 2.40  |      | 2.80  | 0.094 |       | 0.110 |
| D1   | 8.95  |      | 9.35  | 0.352 |       | 0.368 |
| E    | 0.45  |      | 0.60  | 0.017 |       | 0.023 |
| F    | 0.80  |      | 1.05  | 0.031 |       | 0.041 |
| G    | 3.20  |      | 3.60  | 0.126 |       | 0.142 |
| G1   | 6.60  |      | 7.00  | 0.260 |       | 0.275 |
| H1   |       | 8.5  |       |       | 0.334 | 0.409 |
| H2   | 10.00 |      | 10.40 | 0.393 |       | 0.409 |
| L    | 15    |      | 15.85 | 0.590 |       | 0.624 |
| L1   |       | 8    |       |       | 0.315 |       |
| L2   | 1.27  |      | 1.40  | 0.050 |       | 0.055 |
| M    | 2.4   |      | 3.2   | 0.094 |       | 0.126 |
| R    |       | 0.40 |       |       | 0.016 |       |
| V2   | 0°    |      | 8°    | 0°    |       | 8°    |



Tape & Reel D<sup>2</sup>PAK-P<sup>2</sup>PAK-D<sup>2</sup>PAK/A-P<sup>2</sup>PAK/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 |





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