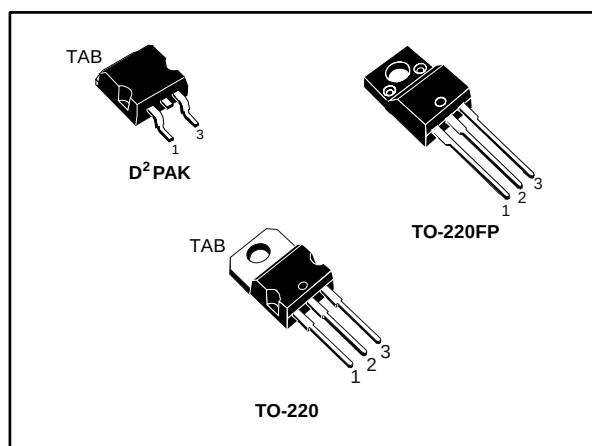


## Negative voltage regulators

Datasheet - production data



### Description

The L79 series of three-terminal negative regulators is available in TO-220, TO-220FP and D<sup>2</sup>PAK packages and several fixed output voltages, making it useful in a wide range of applications.

These regulators can provide local on-card regulation, eliminating the distribution problems associated with single point regulation; furthermore, having the same voltage option as the L78 positive standard series, they are particularly suited for split power supplies. If adequate heat sinking is provided, they can deliver over 1.5 A output current.

Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.

### Features

- Output current up to 1.5 A
- Output voltages: -5, -8, -12, and -15 V
- Thermal overload protection
- Short-circuit protection
- Output transition SOA protection
- Output tolerance 2% (AC version) or 4% (C version) at 25 °C

Table 1: Device summary

| Order codes              |                        |                    |          | Output voltages |
|--------------------------|------------------------|--------------------|----------|-----------------|
| TO-220<br>(single gauge) | TO-220<br>(dual gauge) | D <sup>2</sup> PAK | TO-220FP |                 |
| L7905ACV                 | L7905ACV-DG            | L7905ACD2T-TR      |          | -5 V            |
| L7905CV                  | L7905CV-DG             | L7905CD2T-TR       | L7905CP  | -5 V            |
| L7908CV                  | L7908CV-DG             |                    |          | -8 V            |
| L7912ACV                 | L7912ACV-DG            |                    |          | -12 V           |
| L7912CV                  | L7912CV-DG             | L7912CD2T-TR       | L7912CP  | -12 V           |
| L7915ACV                 | L7915ACV-DG            |                    |          | -15 V           |
| L7915CV                  | L7915CV-DG             |                    | L7915CP  | -15 V           |

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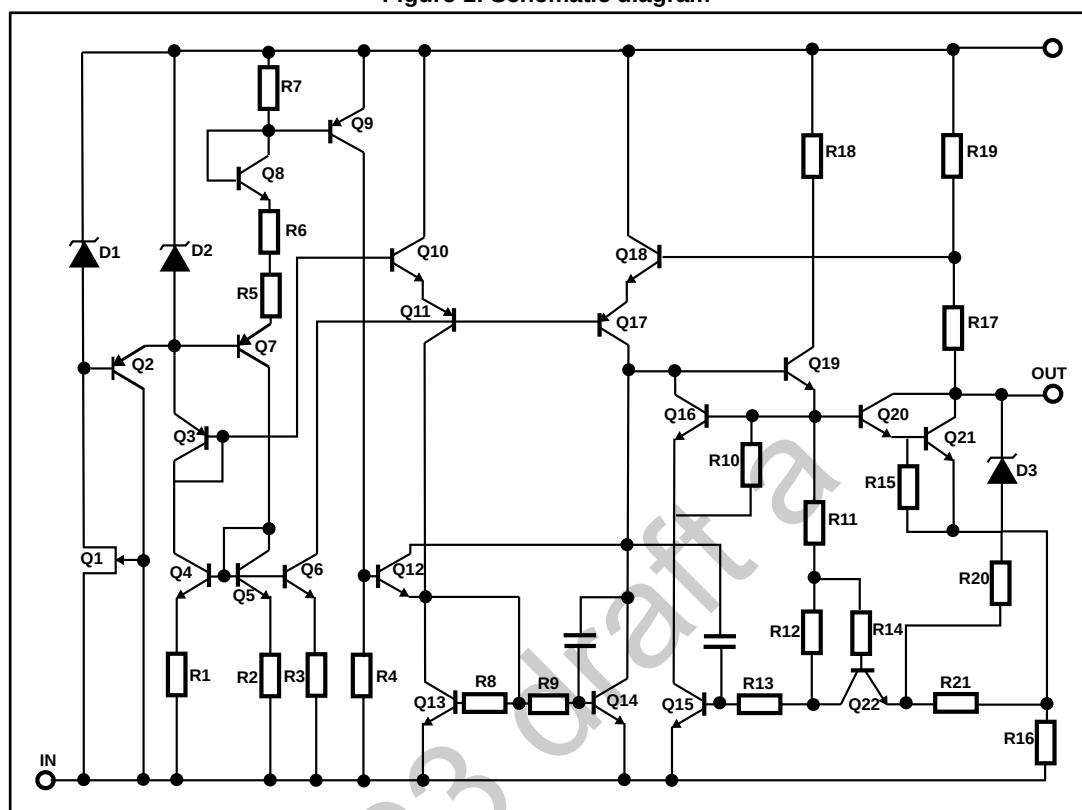
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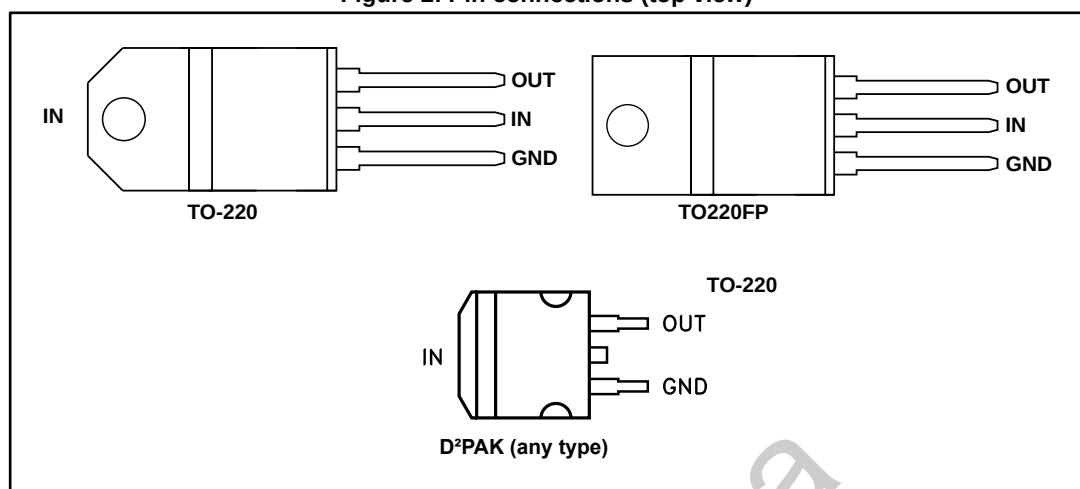
## 1 Diagram

**Figure 1: Schematic diagram**



## 2 Pin configuration

Figure 2: Pin connections (top view)



### 3 Maximum ratings

Table 2: Absolute maximum ratings

| Symbol    | Parameter                            |             | Value              | Unit |
|-----------|--------------------------------------|-------------|--------------------|------|
| $V_I$     | DC input voltage                     |             | -35                | V    |
| $I_O$     | Output current                       |             | Internally limited |      |
| $P_D$     | Power dissipation                    |             | Internally limited |      |
| $T_{STG}$ | Storage temperature range            |             | -65 to 150         | °C   |
| $T_{OP}$  | Operating junction temperature range | for L79xxC  | 0 to 150           | °C   |
|           |                                      | for L79xxAC | 0 to 125           |      |



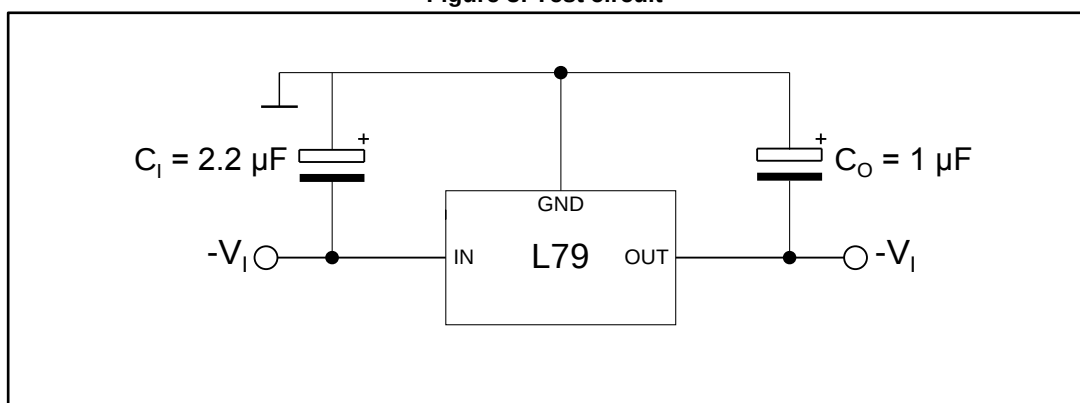
Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

Table 3: Thermal data

| Symbol     | Parameter                           | D <sup>2</sup> PAK | TO-220 | TO-220FP | Unit |
|------------|-------------------------------------|--------------------|--------|----------|------|
| $R_{thJC}$ | Thermal resistance junction-case    | 3                  | 5      | 5        | °C/W |
| $R_{thJA}$ | Thermal resistance junction-ambient | 62.5               | 50     | 60       | °C/W |

## 4 Test circuit

Figure 3: Test circuit





## 5 Electrical characteristics

Refer to the test circuits,  $T_J = 0$  to  $125^\circ\text{C}$ ,  $V_I = -10\text{ V}$ ,  $I_O = 500\text{ mA}$ ,  $C_I = 2.2\text{ }\mu\text{F}$ ,  $C_O = 1\text{ }\mu\text{F}$  unless otherwise specified.

Table 4: Electrical characteristics of L7905AC

| Symbol                | Parameter                  | Test conditions                                                                                     | Min. | Typ. | Max. | Unit                 |
|-----------------------|----------------------------|-----------------------------------------------------------------------------------------------------|------|------|------|----------------------|
| $V_O$                 | Output voltage             | $T_J = 25^\circ\text{C}$                                                                            | -4.9 | -5   | -5.1 | V                    |
| $V_O$                 | Output voltage             | $I_O = -5\text{ mA to } -1\text{ A}$ , $P_O \leq 15\text{ W}$<br>$V_I = -8\text{ to } -20\text{ V}$ | -4.8 | -5   | -5.2 | V                    |
| $\Delta V_O^{(1)}$    | Line regulation            | $V_I = -7\text{ to } -25\text{ V}$ , $T_J = 25^\circ\text{C}$                                       |      |      | 100  | mV                   |
|                       |                            | $V_I = -8\text{ to } -12\text{ V}$ , $T_J = 25^\circ\text{C}$                                       |      |      | 50   |                      |
| $\Delta V_O^{(1)}$    | Load regulation            | $I_O = 5\text{ mA to } 1.5\text{ A}$ , $T_J = 25^\circ\text{C}$                                     |      |      | 100  | mV                   |
|                       |                            | $I_O = 250\text{ to } 750\text{ mA}$ , $T_J = 25^\circ\text{C}$                                     |      |      | 50   |                      |
| $I_d$                 | Quiescent current          | $T_J = 25^\circ\text{C}$                                                                            |      |      | 3    | mA                   |
| $\Delta I_d$          | Quiescent current change   | $I_O = 5\text{ mA to } 1\text{ A}$                                                                  |      |      | 0.5  | mA                   |
|                       |                            | $V_I = -8\text{ to } -25\text{ V}$                                                                  |      |      | 1.3  |                      |
| $\Delta V_O/\Delta T$ | Output voltage drift       | $I_O = 5\text{ mA}$                                                                                 |      | -0.4 |      | mV/ $^\circ\text{C}$ |
| eN                    | Output noise voltage       | $B = 10\text{ Hz to } 100\text{ kHz}$ , $T_J = 25^\circ\text{C}$                                    |      | 100  |      | $\mu\text{V}$        |
| SVR                   | Supply voltage rejection   | $\Delta V_I = 10\text{ V}$ , $f = 120\text{ Hz}$                                                    | 54   | 60   |      | dB                   |
| $V_d$                 | Dropout voltage            | $I_O = 1\text{ A}$ , $T_J = 25^\circ\text{C}$ , $\Delta V_O = 100\text{ mV}$                        |      | 1.4  |      | V                    |
| Isc                   | Short circuit current      |                                                                                                     |      | 1.8  |      | A                    |
| Iscp                  | Short circuit peak current | $T_J = 25^\circ\text{C}$                                                                            |      | 1.8  |      | A                    |

### Notes:

<sup>(1)</sup>Load and line regulation are specified at constant junction temperature. Changes in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

Refer to the test circuits,  $T_J = 0$  to  $125^\circ\text{C}$ ,  $V_I = -10\text{ V}$ ,  $I_O = 500\text{ mA}$ ,  $C_I = 2.2\text{ }\mu\text{F}$ ,  $C_O = 1\text{ }\mu\text{F}$  unless otherwise specified.

Table 5: Electrical characteristics of L7905C

| Symbol             | Parameter         | Test conditions                                                                                     | Min.  | Typ. | Max.  | Unit |
|--------------------|-------------------|-----------------------------------------------------------------------------------------------------|-------|------|-------|------|
| $V_O$              | Output voltage    | $T_J = 25^\circ\text{C}$                                                                            | -4.8  | -5   | -5.2  | V    |
| $V_O$              | Output voltage    | $I_O = -5\text{ mA to } -1\text{ A}$ , $P_O \leq 15\text{ W}$<br>$V_I = -8\text{ to } -20\text{ V}$ | -4.75 | -5   | -5.25 | V    |
| $\Delta V_O^{(1)}$ | Line regulation   | $V_I = -7\text{ to } -25\text{ V}$ , $T_J = 25^\circ\text{C}$                                       |       |      | 100   | mV   |
|                    |                   | $V_I = -8\text{ to } -12\text{ V}$ , $T_J = 25^\circ\text{C}$                                       |       |      | 50    |      |
| $\Delta V_O^{(1)}$ | Load regulation   | $I_O = 5\text{ mA to } 1.5\text{ A}$ , $T_J = 25^\circ\text{C}$                                     |       |      | 100   | mV   |
|                    |                   | $I_O = 250\text{ to } 750\text{ mA}$ , $T_J = 25^\circ\text{C}$                                     |       |      | 50    |      |
| $I_d$              | Quiescent current | $T_J = 25^\circ\text{C}$                                                                            |       |      | 3     | mA   |

| Symbol                | Parameter                | Test conditions                                                          | Min. | Typ. | Max. | Unit          |
|-----------------------|--------------------------|--------------------------------------------------------------------------|------|------|------|---------------|
| $\Delta I_d$          | Quiescent current change | $I_o = 5 \text{ mA to } 1 \text{ A}$                                     |      |      | 0.5  | mA            |
|                       |                          | $V_i = -8 \text{ to } -25 \text{ V}$                                     |      |      | 1.3  |               |
| $\Delta V_o/\Delta T$ | Output voltage drift     | $I_o = 5 \text{ mA}$                                                     |      | -0.4 |      | mV/°C         |
| eN                    | Output noise voltage     | $B = 10 \text{ Hz to } 100 \text{ kHz}, T_J = 25^\circ\text{C}$          |      | 100  |      | $\mu\text{V}$ |
| SVR                   | Supply voltage rejection | $\Delta V_i = 10 \text{ V}, f = 120 \text{ Hz}$                          | 54   | 60   |      | dB            |
| $V_d$                 | Dropout voltage          | $I_o = 1 \text{ A}, T_J = 25^\circ\text{C}, \Delta V_o = 100 \text{ mV}$ |      | 1.4  |      | V             |
| $I_{sc}$              | Short circuit current    |                                                                          |      | 1.8  |      | A             |

**Notes:**

<sup>(1)</sup>Load and line regulation are specified at constant junction temperature. Changes in  $V_o$  due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

Refer to the test circuits,  $T_J = 0 \text{ to } 125^\circ\text{C}$ ,  $V_i = -14 \text{ V}$ ,  $I_o = 500 \text{ mA}$ ,  $C_i = 2.2 \mu\text{F}$ ,  $C_o = 1 \mu\text{F}$  unless otherwise specified.

**Table 6: Electrical characteristics of L7908C**

| Symbol                | Parameter                | Test conditions                                                                                      | Min. | Typ. | Max. | Unit          |
|-----------------------|--------------------------|------------------------------------------------------------------------------------------------------|------|------|------|---------------|
| $V_o$                 | Output voltage           | $T_J = 25^\circ\text{C}$                                                                             | -7.7 | -8   | -8.3 | V             |
| $V_o$                 | Output voltage           | $I_o = -5 \text{ mA to } -1 \text{ A}, P_o \leq 15 \text{ W}, V_i = -11.5 \text{ to } -23 \text{ V}$ | -7.6 | -8   | -8.4 | V             |
| $\Delta V_o^{(1)}$    | Line regulation          | $V_i = -10.5 \text{ to } -25 \text{ V}, T_J = 25^\circ\text{C}$                                      |      |      | 160  | mV            |
|                       |                          | $V_i = -11 \text{ to } -17 \text{ V}, T_J = 25^\circ\text{C}$                                        |      |      | 80   |               |
| $\Delta V_o^{(1)}$    | Load regulation          | $I_o = 5 \text{ mA to } 1.5 \text{ A}, T_J = 25^\circ\text{C}$                                       |      |      | 160  | mV            |
|                       |                          | $I_o = 250 \text{ to } 750 \text{ mA}, T_J = 25^\circ\text{C}$                                       |      |      | 80   |               |
| $I_d$                 | Quiescent current        | $T_J = 25^\circ\text{C}$                                                                             |      |      | 3    | mA            |
| $\Delta I_d$          | Quiescent current change | $I_o = 5 \text{ mA to } 1 \text{ A}$                                                                 |      |      | 0.5  | mA            |
|                       |                          | $V_i = -11.5 \text{ to } -25 \text{ V}$                                                              |      |      | 1    |               |
| $\Delta V_o/\Delta T$ | Output voltage drift     | $I_o = 5 \text{ mA}$                                                                                 |      | -0.6 |      | mV/°C         |
| eN                    | Output noise voltage     | $B = 10 \text{ Hz to } 100 \text{ kHz}, T_J = 25^\circ\text{C}$                                      |      | 175  |      | $\mu\text{V}$ |
| SVR                   | Supply voltage rejection | $\Delta V_i = 10 \text{ V}, f = 120 \text{ Hz}$                                                      | 54   | 60   |      | dB            |
| $V_d$                 | Dropout voltage          | $I_o = 1 \text{ A}, T_J = 25^\circ\text{C}, \Delta V_o = 100 \text{ mV}$                             |      | 1.1  |      | V             |
| $I_{sc}$              | Short circuit current    |                                                                                                      |      | 1.5  |      | A             |

**Notes:**

<sup>(1)</sup>Load and line regulation are specified at constant junction temperature. Changes in  $V_o$  due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

Refer to the test circuits,  $T_J = 0$  to  $125^\circ\text{C}$ ,  $V_I = -19\text{ V}$ ,  $I_O = 500\text{ mA}$ ,  $C_I = 2.2\text{ }\mu\text{F}$ ,  $C_O = 1\text{ }\mu\text{F}$  unless otherwise specified.

Table 7: Electrical characteristics of L7912AC

| Symbol                | Parameter                  | Test conditions                                                                                        | Min.   | Typ. | Max.   | Unit                 |
|-----------------------|----------------------------|--------------------------------------------------------------------------------------------------------|--------|------|--------|----------------------|
| $V_O$                 | Output voltage             | $T_J = 25^\circ\text{C}$                                                                               | -11.75 | -12  | -12.25 | V                    |
| $V_O$                 | Output voltage             | $I_O = -5\text{ mA to } -1\text{ A}$ , $P_O \leq 15\text{ W}$<br>$V_I = -15.5\text{ to } -27\text{ V}$ | -11.5  | -12  | -12.5  | V                    |
| $\Delta V_O^{(1)}$    | Line regulation            | $V_I = -14.5\text{ to } -30\text{ V}$ , $T_J = 25^\circ\text{C}$                                       |        |      | 240    | mV                   |
|                       |                            | $V_I = -16\text{ to } -22\text{ V}$ , $T_J = 25^\circ\text{C}$                                         |        |      | 120    |                      |
| $\Delta V_O^{(1)}$    | Load regulation            | $I_O = 5\text{ mA to } 1.5\text{ A}$ , $T_J = 25^\circ\text{C}$                                        |        |      | 240    | mV                   |
|                       |                            | $I_O = 250\text{ to } 750\text{ mA}$ , $T_J = 25^\circ\text{C}$                                        |        |      | 120    |                      |
| $I_d$                 | Quiescent current          | $T_J = 25^\circ\text{C}$                                                                               |        |      | 3      | mA                   |
| $\Delta I_d$          | Quiescent current change   | $I_O = 5\text{ mA to } 1\text{ A}$                                                                     |        |      | 0.5    | mA                   |
|                       |                            | $V_I = -15\text{ to } -30\text{ V}$                                                                    |        |      | 1      |                      |
| $\Delta V_O/\Delta T$ | Output voltage drift       | $I_O = 5\text{ mA}$                                                                                    |        | -0.8 |        | mV/ $^\circ\text{C}$ |
| eN                    | Output noise voltage       | $B = 10\text{ Hz to } 100\text{ kHz}$ , $T_J = 25^\circ\text{C}$                                       |        | 200  |        | $\mu\text{V}$        |
| SVR                   | Supply voltage rejection   | $\Delta V_I = 10\text{ V}$ , $f = 120\text{ Hz}$                                                       | 54     | 60   |        | dB                   |
| $V_d$                 | Dropout voltage            | $I_O = 1\text{ A}$ , $T_J = 25^\circ\text{C}$ , $\Delta V_O = 100\text{ mV}$                           |        | 1.1  |        | V                    |
| $I_{sc}$              | Short circuit current      |                                                                                                        |        | 1.0  |        | A                    |
| $I_{scp}$             | Short circuit peak current | $T_J = 25^\circ\text{C}$ , $V_I = -10\text{ V}$                                                        |        | 1.8  |        | A                    |

**Notes:**

<sup>(1)</sup>Load and line regulation are specified at constant junction temperature. Changes in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

Refer to the test circuits,  $T_J = 0$  to  $125^\circ\text{C}$ ,  $V_I = -19\text{ V}$ ,  $I_O = 500\text{ mA}$ ,  $C_I = 2.2\text{ }\mu\text{F}$ ,  $C_O = 1\text{ }\mu\text{F}$  unless otherwise specified.

Table 8: Electrical characteristics of L7912C

| Symbol             | Parameter         | Test conditions                                                                                        | Min.  | Typ. | Max.  | Unit |
|--------------------|-------------------|--------------------------------------------------------------------------------------------------------|-------|------|-------|------|
| $V_O$              | Output voltage    | $T_J = 25^\circ\text{C}$                                                                               | -11.5 | -12  | -12.5 | V    |
| $V_O$              | Output voltage    | $I_O = -5\text{ mA to } -1\text{ A}$ , $P_O \leq 15\text{ W}$<br>$V_I = -15.5\text{ to } -27\text{ V}$ | -11.4 | -12  | -12.6 | V    |
| $\Delta V_O^{(1)}$ | Line regulation   | $V_I = -14.5\text{ to } -30\text{ V}$ , $T_J = 25^\circ\text{C}$                                       |       |      | 240   | mV   |
|                    |                   | $V_I = -16\text{ to } -22\text{ V}$ , $T_J = 25^\circ\text{C}$                                         |       |      | 120   |      |
| $\Delta V_O^{(1)}$ | Load regulation   | $I_O = 5\text{ mA to } 1.5\text{ A}$ , $T_J = 25^\circ\text{C}$                                        |       |      | 240   | mV   |
|                    |                   | $I_O = 250\text{ to } 750\text{ mA}$ , $T_J = 25^\circ\text{C}$                                        |       |      | 120   |      |
| $I_d$              | Quiescent current | $T_J = 25^\circ\text{C}$                                                                               |       |      | 3     | mA   |

| Symbol                | Parameter                | Test conditions                                                          | Min. | Typ. | Max. | Unit          |
|-----------------------|--------------------------|--------------------------------------------------------------------------|------|------|------|---------------|
| $\Delta I_d$          | Quiescent current change | $I_o = 5 \text{ mA to } 1 \text{ A}$                                     |      |      | 0.5  | mA            |
|                       |                          | $V_i = -15 \text{ to } -30 \text{ V}$                                    |      |      | 1    |               |
| $\Delta V_o/\Delta T$ | Output voltage drift     | $I_o = 5 \text{ mA}$                                                     |      | -0.8 |      | mV/°C         |
| eN                    | Output noise voltage     | $B = 10 \text{ Hz to } 100 \text{ kHz}, T_J = 25^\circ\text{C}$          |      | 200  |      | $\mu\text{V}$ |
| SVR                   | Supply voltage rejection | $\Delta V_i = 10 \text{ V}, f = 120\text{Hz}$                            | 54   | 60   |      | dB            |
| $V_d$                 | Dropout voltage          | $I_o = 1 \text{ A}, T_J = 25^\circ\text{C}, \Delta V_o = 100 \text{ mV}$ |      | 1.1  |      | V             |
| $I_{sc}$              | Short circuit current    |                                                                          |      | 1.0  |      | A             |

**Notes:**

<sup>(1)</sup>Load and line regulation are specified at constant junction temperature. Changes in  $V_o$  due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

Refer to the test circuits,  $T_J = 0 \text{ to } 125^\circ\text{C}$ ,  $V_i = -23 \text{ V}$ ,  $I_o = 500 \text{ mA}$ ,  $C_i = 2.2 \mu\text{F}$ ,  $C_o = 1 \mu\text{F}$  unless otherwise specified.

**Table 9: Electrical characteristics of L7915AC**

| Symbol                | Parameter                  | Test conditions                                                                                          | Min.  | Typ. | Max.  | Unit          |
|-----------------------|----------------------------|----------------------------------------------------------------------------------------------------------|-------|------|-------|---------------|
| $V_o$                 | Output voltage             | $T_J = 25^\circ\text{C}$                                                                                 | -14.7 | -15  | -15.3 | V             |
| $V_o$                 | Output voltage             | $I_o = -5 \text{ mA to } -1 \text{ A}, P_o \leq 15 \text{ W}$<br>$V_i = -18.5 \text{ to } -30 \text{ V}$ | -14.4 | -15  | -15.6 | V             |
| $\Delta V_o^{(1)}$    | Line regulation            | $V_i = -17.5 \text{ to } -30 \text{ V}, T_J = 25^\circ\text{C}$                                          |       |      | 300   | mV            |
|                       |                            | $V_i = -20 \text{ to } -26 \text{ V}, T_J = 25^\circ\text{C}$                                            |       |      | 150   |               |
| $\Delta V_o^{(1)}$    | Load regulation            | $I_o = 5 \text{ mA to } 1.5 \text{ A}, T_J = 25^\circ\text{C}$                                           |       |      | 300   | mV            |
|                       |                            | $I_o = 250 \text{ to } 750 \text{ mA}, T_J = 25^\circ\text{C}$                                           |       |      | 150   |               |
| $I_d$                 | Quiescent current          | $T_J = 25^\circ\text{C}$                                                                                 |       |      | 3     | mA            |
| $\Delta I_d$          | Quiescent current change   | $I_o = 5 \text{ mA to } 1 \text{ A}$                                                                     |       |      | 0.5   | mA            |
|                       |                            | $V_i = -18.5 \text{ to } -30 \text{ V}$                                                                  |       |      | 1     |               |
| $\Delta V_o/\Delta T$ | Output voltage drift       | $I_o = 5 \text{ mA}$                                                                                     |       | -0.9 |       | mV/°C         |
| eN                    | Output noise voltage       | $B = 10 \text{ Hz to } 100 \text{ kHz}, T_J = 25^\circ\text{C}$                                          |       | 250  |       | $\mu\text{V}$ |
| SVR                   | Supply voltage rejection   | $\Delta V_i = 10 \text{ V}, f = 120 \text{ Hz}$                                                          | 54    | 60   |       | dB            |
| $V_d$                 | Dropout voltage            | $I_o = 1 \text{ A}, T_J = 25^\circ\text{C}, \Delta V_o = 100 \text{ mV}$                                 |       | 1.1  |       | V             |
| $I_{sc}$              | Short circuit current      |                                                                                                          |       | 0.7  |       | A             |
| $I_{scp}$             | Short circuit peak current | $T_J = 25^\circ\text{C}, V_i = -10 \text{ V}$                                                            |       | 1.8  |       | A             |

**Notes:**

<sup>(1)</sup>Load and line regulation are specified at constant junction temperature. Changes in  $V_o$  due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

Refer to the test circuits,  $T_J = 0$  to  $125\text{ }^{\circ}\text{C}$ ,  $V_I = -23\text{ V}$ ,  $I_O = 500\text{ mA}$ ,  $C_I = 2.2\text{ }\mu\text{F}$ ,  $C_O = 1\text{ }\mu\text{F}$  unless otherwise specified.

Table 10: Electrical characteristics of L7915C

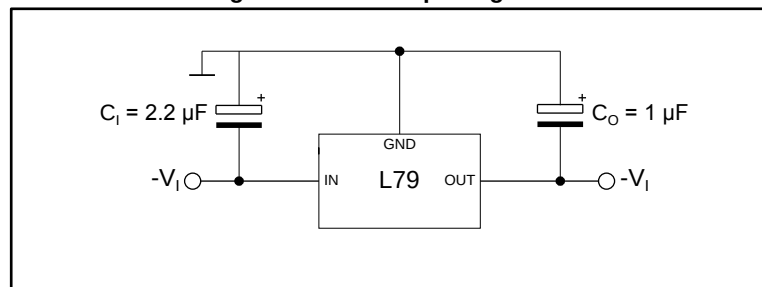
| Symbol                | Parameter                | Test conditions                                                                                        | Min.  | Typ. | Max.  | Unit                   |
|-----------------------|--------------------------|--------------------------------------------------------------------------------------------------------|-------|------|-------|------------------------|
| $V_O$                 | Output voltage           | $T_J = 25^{\circ}\text{C}$                                                                             | -14.4 | -15  | -15.6 | V                      |
| $V_O$                 | Output voltage           | $I_O = -5\text{ mA to } -1\text{ A}$ , $P_O \leq 15\text{ W}$<br>$V_I = -18.5\text{ to } -30\text{ V}$ | -14.3 | -15  | -15.7 | V                      |
| $\Delta V_O^{(1)}$    | Line regulation          | $V_I = -17.5\text{ to } -30\text{ V}$ , $T_J = 25^{\circ}\text{C}$                                     |       |      | 300   | mV                     |
|                       |                          | $V_I = -20\text{ to } -26\text{ V}$ , $T_J = 25^{\circ}\text{C}$                                       |       |      | 150   |                        |
| $\Delta V_O^{(1)}$    | Load regulation          | $I_O = 5\text{ mA to } 1.5\text{ A}$ , $T_J = 25^{\circ}\text{C}$                                      |       |      | 300   | mV                     |
|                       |                          | $I_O = 250\text{ to } 750\text{ mA}$ , $T_J = 25^{\circ}\text{C}$                                      |       |      | 150   |                        |
| $I_d$                 | Quiescent current        | $T_J = 25^{\circ}\text{C}$                                                                             |       |      | 3     | mA                     |
| $\Delta I_d$          | Quiescent current change | $I_O = 5\text{ mA to } 1\text{ A}$                                                                     |       |      | 0.5   | mA                     |
|                       |                          | $V_I = -18.5\text{ to } -30\text{ V}$                                                                  |       |      | 1     |                        |
| $\Delta V_O/\Delta T$ | Output voltage drift     | $I_O = 5\text{ mA}$                                                                                    |       | -0.9 |       | mV/ $^{\circ}\text{C}$ |
| eN                    | Output noise voltage     | $B = 10\text{ Hz to } 100\text{ kHz}$ , $T_J = 25^{\circ}\text{C}$                                     |       | 250  |       | $\mu\text{V}$          |
| SVR                   | Supply voltage rejection | $\Delta V_I = 10\text{ V}$ , $f = 120\text{ Hz}$                                                       | 54    | 60   |       | dB                     |
| $V_d$                 | Dropout voltage          | $I_O = 1\text{ A}$ , $T_J = 25^{\circ}\text{C}$ , $\Delta V_O = 100\text{ mV}$                         |       | 1.1  |       | V                      |
| $I_{sc}$              | Short circuit current    |                                                                                                        |       | 0.7  |       | A                      |

**Notes:**

<sup>(1)</sup>Load and line regulation are specified at constant junction temperature. Changes in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

## 6 Application information

Figure 4: Fixed output regulator



$C_i$  is required for stability. For value given, capacitor must be solid tantalum. If aluminium electrolytic are used, at least ten times value should be selected.  $C_o$  is required if regulator is located an appreciable distance from power supply filter. To improve transient response. If large capacitors are used, a high current diode from input to output (1N4001 or similar) should be introduced to protect the device from momentary input short circuit.

Figure 5: Split power supply ( $\pm 15\text{ V} - 1\text{ A}$ )

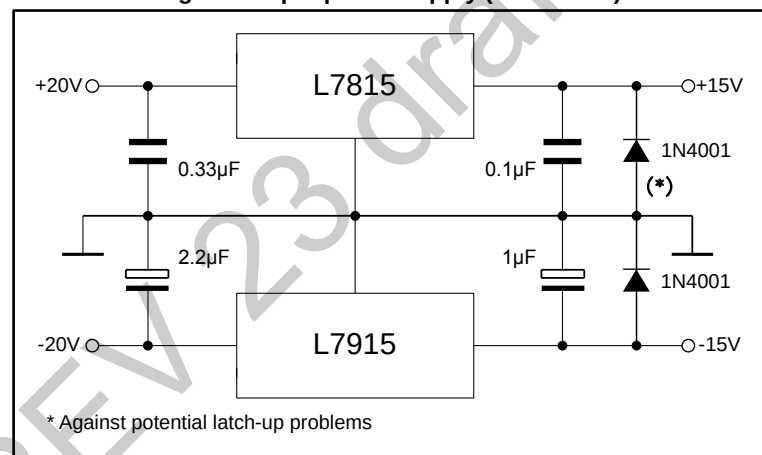


Figure 6: Circuit for increasing output voltage

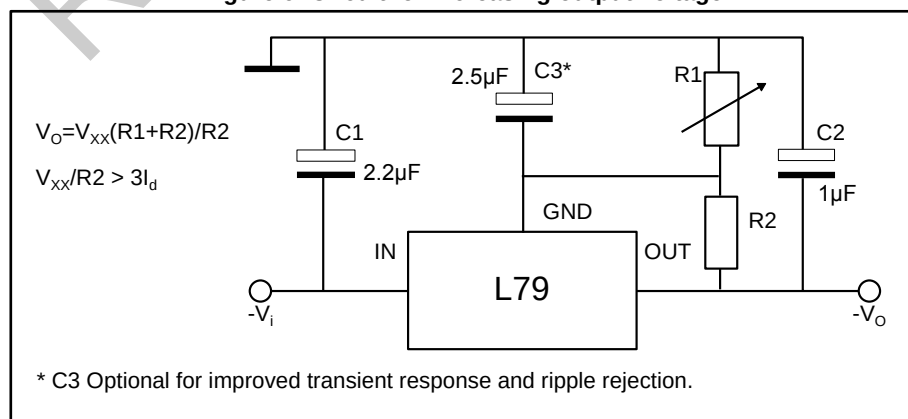
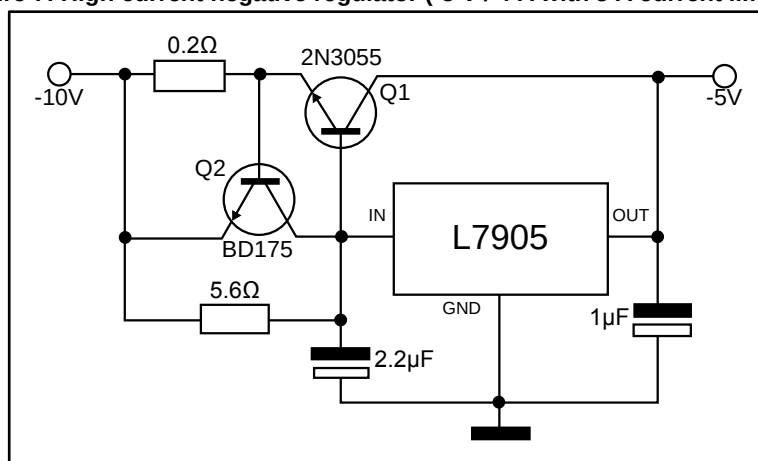


Figure 7: High current negative regulator (-5 V / 4 A with 5 A current limiting)



## 7 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance.

ECOPACK® specifications, grade definitions and product status are available at:

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### 7.1 TO-220 (single gauge) package information

Figure 8: TO-220 (single gauge) package outline

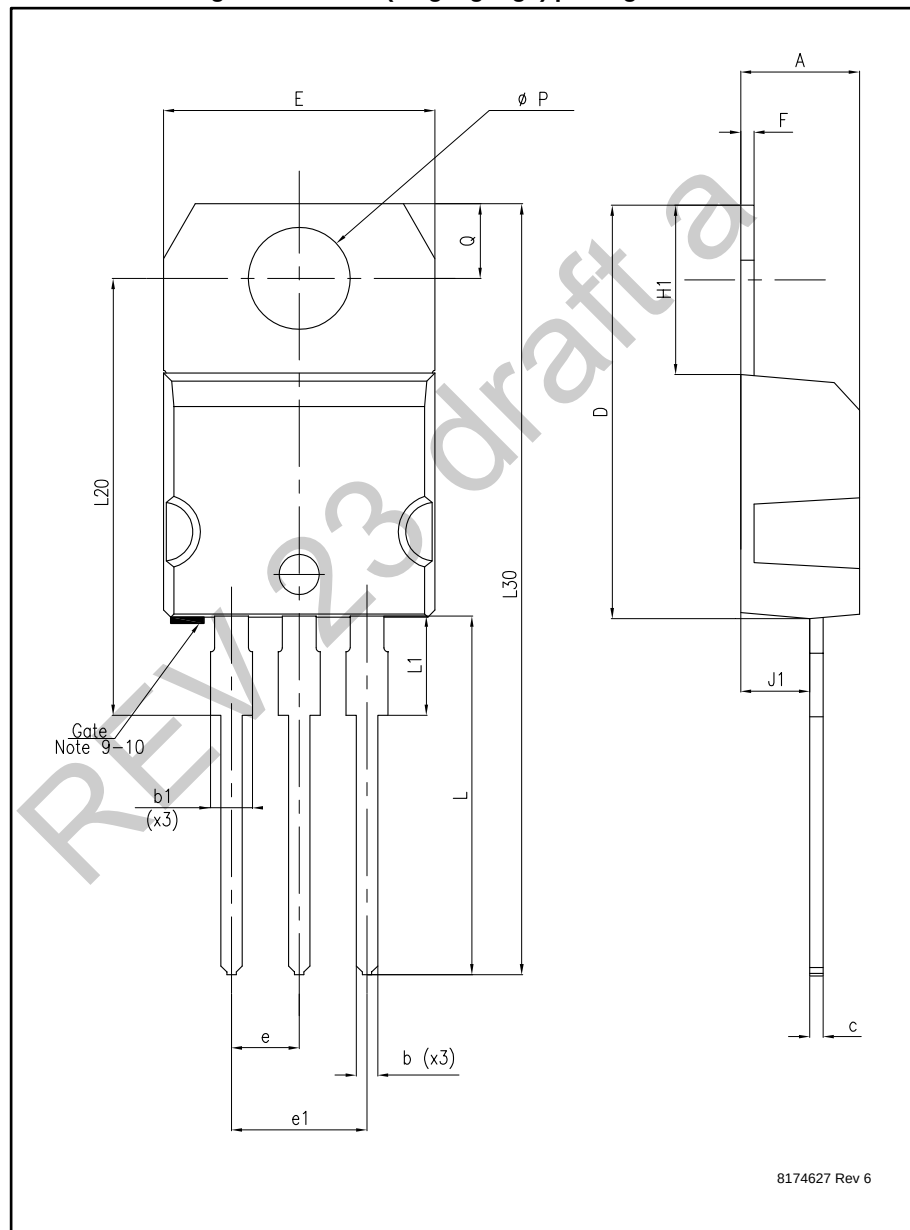




Table 11: TO-220 (single gauge) package mechanical data

| Dim. | mm    |       |       |
|------|-------|-------|-------|
|      | Min.  | Typ.  | Max.  |
| A    | 4.40  |       | 4.60  |
| b    | 0.61  |       | 0.88  |
| b1   | 1.14  |       | 1.70  |
| c    | 0.48  |       | 0.70  |
| D    | 15.25 |       | 15.75 |
| E    | 10.00 |       | 10.40 |
| e    | 2.40  |       | 2.70  |
| e1   | 4.95  |       | 5.15  |
| F    | 0.51  |       | 0.60  |
| H1   | 6.20  |       | 6.60  |
| J1   | 2.40  |       | 2.72  |
| L    | 13.00 |       | 14.00 |
| L1   | 3.50  |       | 3.93  |
| L20  |       | 16.40 |       |
| L30  |       | 28.90 |       |
| ΦP   | 3.75  |       | 3.85  |
| Q    | 2.65  |       | 2.95  |

## 7.2 TO-220 (dual gauge) package information

Figure 9: TO-220 type A package outline

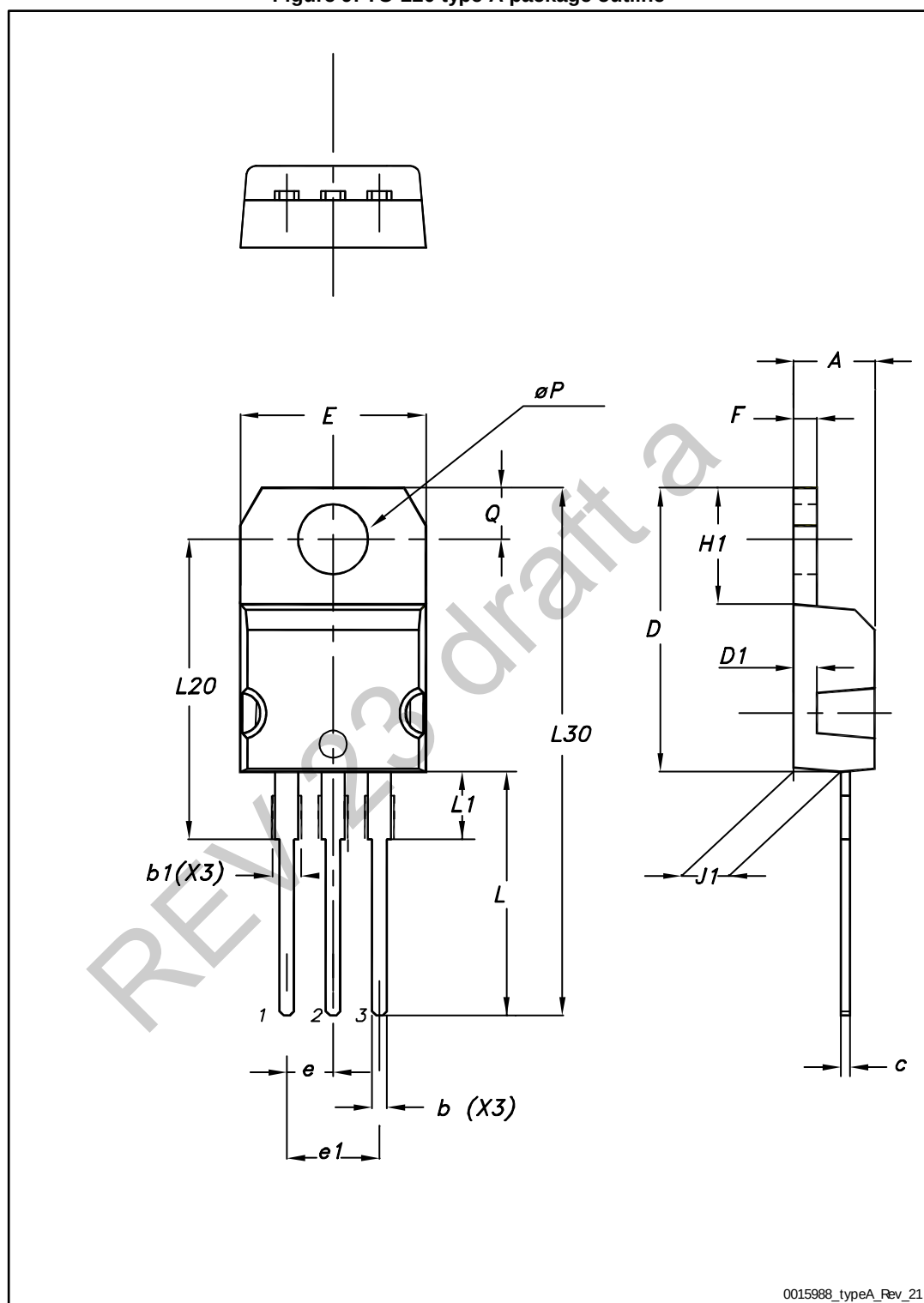


Table 12: TO-220 type A package mechanical data

| Dim. | mm    |       |       |
|------|-------|-------|-------|
|      | Min.  | Typ.  | Max.  |
| A    | 4.40  |       | 4.60  |
| b    | 0.61  |       | 0.88  |
| b1   | 1.14  |       | 1.55  |
| c    | 0.48  |       | 0.70  |
| D    | 15.25 |       | 15.75 |
| D1   |       | 1.27  |       |
| E    | 10.00 |       | 10.40 |
| e    | 2.40  |       | 2.70  |
| e1   | 4.95  |       | 5.15  |
| F    | 1.23  |       | 1.32  |
| H1   | 6.20  |       | 6.60  |
| J1   | 2.40  |       | 2.72  |
| L    | 13.00 |       | 14.00 |
| L1   | 3.50  |       | 3.93  |
| L20  |       | 16.40 |       |
| L30  |       | 28.90 |       |
| øP   | 3.75  |       | 3.85  |
| Q    | 2.65  |       | 2.95  |

### 7.3 TO-220FP package information

**Figure 10: TO-220FP package outline**

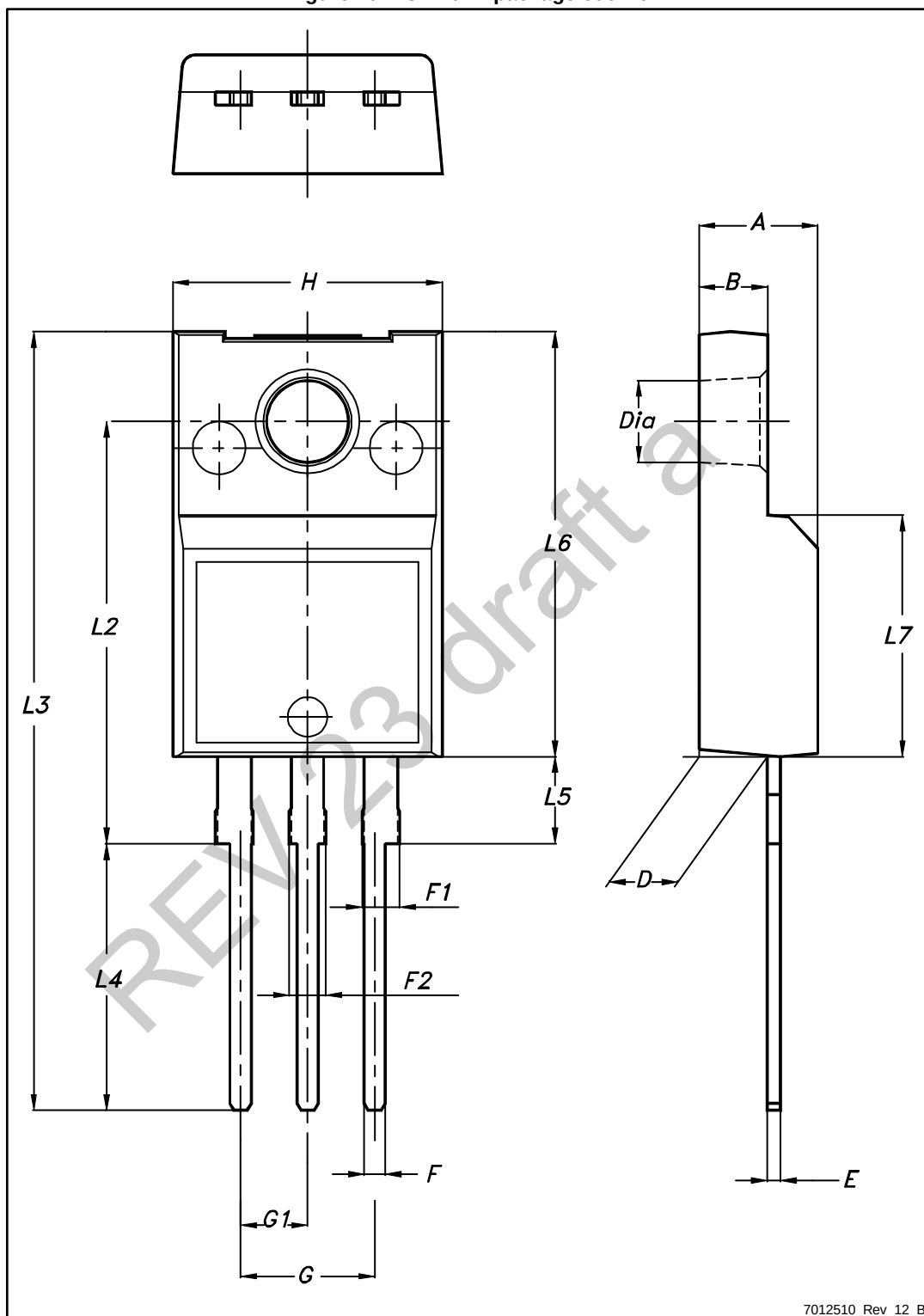
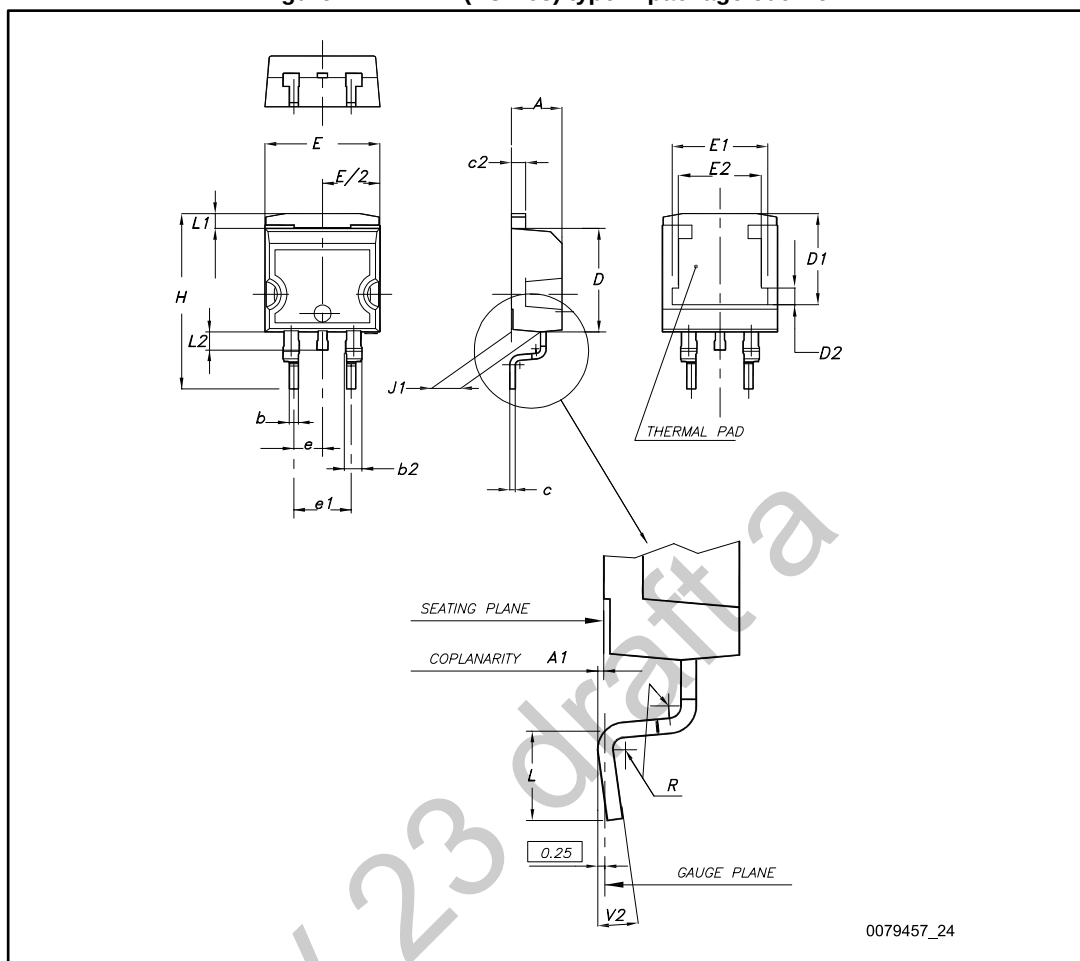


Table 13: TO-220FP package mechanical data

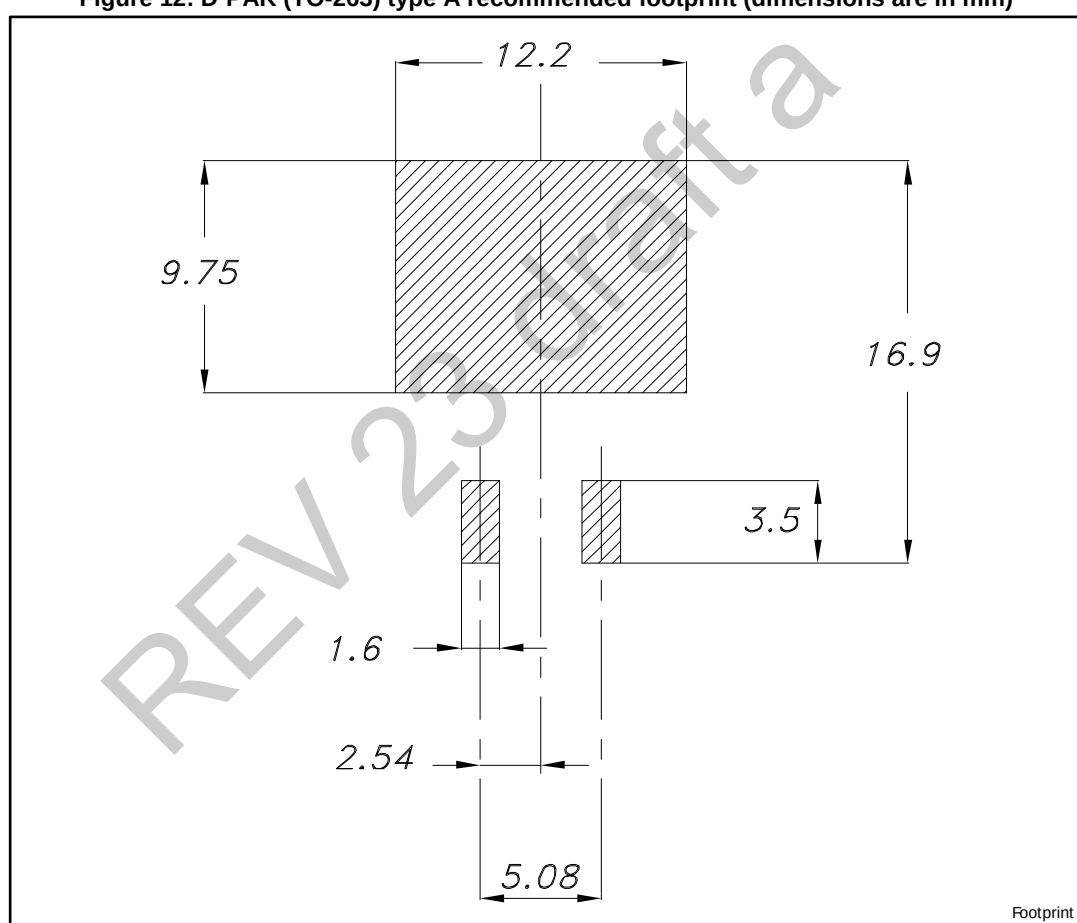
| Dim. | mm   |      |      |
|------|------|------|------|
|      | Min. | Typ. | Max. |
| A    | 4.4  |      | 4.6  |
| B    | 2.5  |      | 2.7  |
| D    | 2.5  |      | 2.75 |
| E    | 0.45 |      | 0.7  |
| F    | 0.75 |      | 1    |
| F1   | 1.15 |      | 1.70 |
| F2   | 1.15 |      | 1.70 |
| G    | 4.95 |      | 5.2  |
| G1   | 2.4  |      | 2.7  |
| H    | 10   |      | 10.4 |
| L2   |      | 16   |      |
| L3   | 28.6 |      | 30.6 |
| L4   | 9.8  |      | 10.6 |
| L5   | 2.9  |      | 3.6  |
| L6   | 15.9 |      | 16.4 |
| L7   | 9    |      | 9.3  |
| Dia  | 3    |      | 3.2  |

## 7.4 D<sup>2</sup>PAK (TO-263) type A package information

Figure 11: D<sup>2</sup>PAK (TO-263) type A package outlineTable 14: D<sup>2</sup>PAK (TO-263) type A package mechanical data

| Dim. | mm    |      |       |
|------|-------|------|-------|
|      | Min.  | Typ. | Max.  |
| A    | 4.40  |      | 4.60  |
| A1   | 0.03  |      | 0.23  |
| b    | 0.70  |      | 0.93  |
| b2   | 1.14  |      | 1.70  |
| c    | 0.45  |      | 0.60  |
| c2   | 1.23  |      | 1.36  |
| D    | 8.95  |      | 9.35  |
| D1   | 7.50  | 7.75 | 8.00  |
| D2   | 1.10  | 1.30 | 1.50  |
| E    | 10.00 |      | 10.40 |
| E1   | 8.50  | 8.70 | 8.90  |
| E2   | 6.85  | 7.05 | 7.25  |

| Dim. | mm    |      |       |
|------|-------|------|-------|
|      | Min.  | Typ. | Max.  |
| e    |       | 2.54 |       |
| e1   | 4.88  |      | 5.28  |
| H    | 15.00 |      | 15.85 |
| J1   | 2.49  |      | 2.69  |
| L    | 2.29  |      | 2.79  |
| L1   | 1.27  |      | 1.40  |
| L2   | 1.30  |      | 1.75  |
| R    |       | 0.40 |       |
| V2   | 0°    |      | 8°    |

Figure 12: D<sup>2</sup>PAK (TO-263) type A recommended footprint (dimensions are in mm)

## 7.5 D<sup>2</sup>PAK type A packing information

Figure 13: D<sup>2</sup>PAK type A tape outline

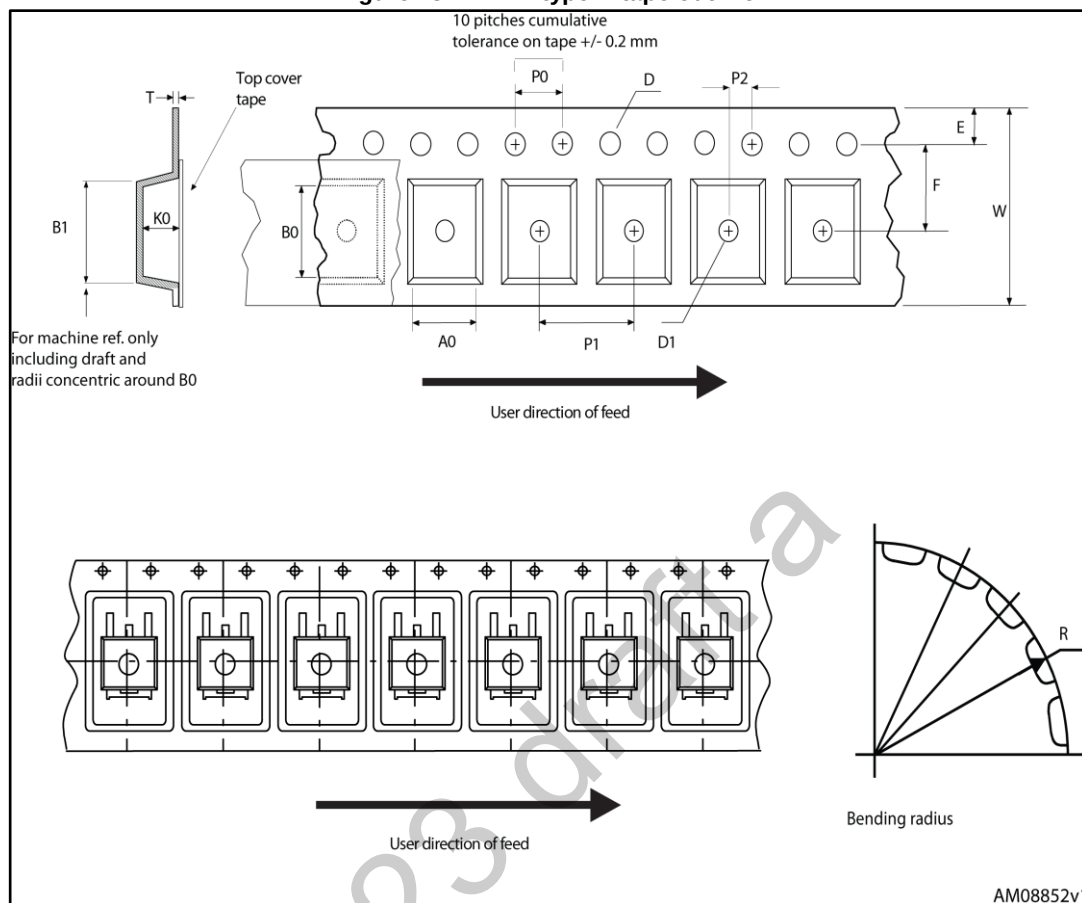
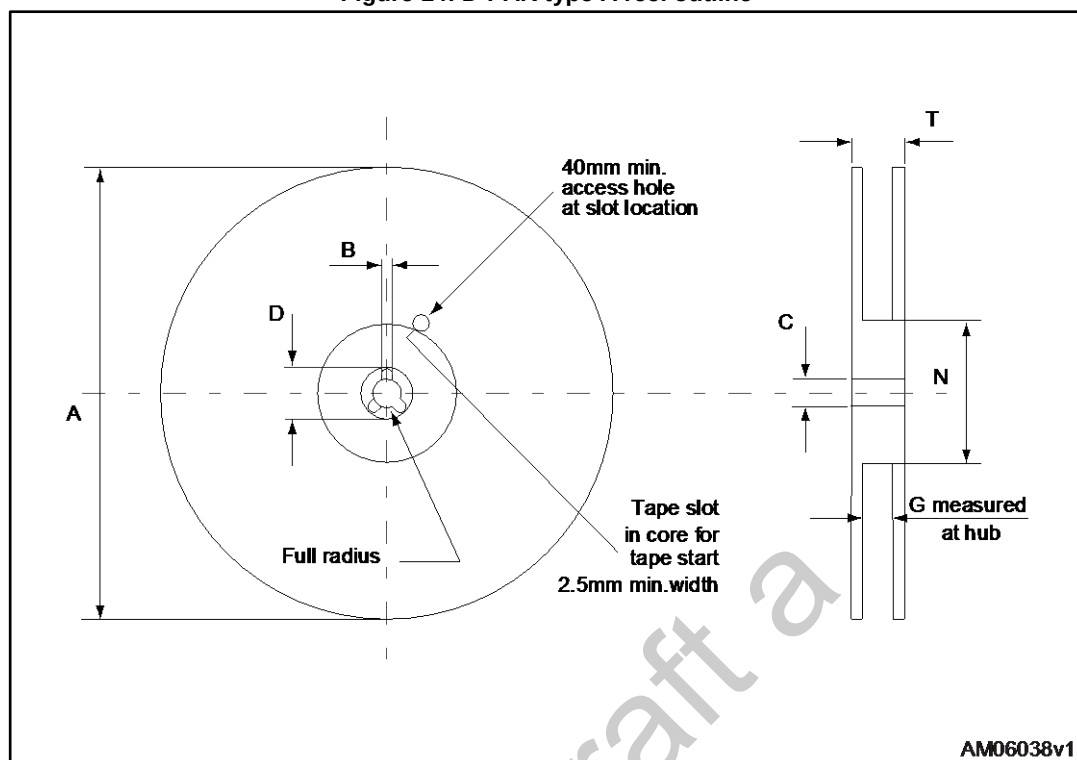




Figure 14: D<sup>2</sup>PAK type A reel outlineTable 15: D<sup>2</sup>PAK type A tape and reel mechanical data

| Tape |      |      | Reel          |      |      |
|------|------|------|---------------|------|------|
| Dim. | mm   |      | Dim.          | mm   |      |
|      | Min. | Max. |               | Min. | Max. |
| A0   | 10.5 | 10.7 | A             |      | 330  |
| B0   | 15.7 | 15.9 | B             | 1.5  |      |
| D    | 1.5  | 1.6  | C             | 12.8 | 13.2 |
| D1   | 1.59 | 1.61 | D             | 20.2 |      |
| E    | 1.65 | 1.85 | G             | 24.4 | 26.4 |
| F    | 11.4 | 11.6 | N             | 100  |      |
| K0   | 4.8  | 5.0  | T             |      | 30.4 |
| P0   | 3.9  | 4.1  |               |      |      |
| P1   | 11.9 | 12.1 | Base quantity |      | 1000 |
| P2   | 1.9  | 2.1  | Bulk quantity |      | 1000 |
| R    | 50   |      |               |      |      |
| T    | 0.25 | 0.35 |               |      |      |
| W    | 23.7 | 24.3 |               |      |      |

## 8 Revision history

**Table 16: Document revision history**

| Date        | Revision | Changes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 22-Jun-2004 | 9        | Order codes updated Table 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 31-Aug-2005 | 10       | Add new order codes (TO-220 E Type) on Table 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 19-Jan-2007 | 11       | D <sup>2</sup> PAK mechanical data updated and add footprint data.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 06-Jun-2007 | 12       | Order codes updated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 25-Oct-2007 | 13       | Modified: <i>Figure 3, Figure 4, Figure 6 and Figure 7.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 05-Dec-2007 | 14       | Modified: <i>Table 1.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 18-Feb-2008 | 15       | Modified: <i>Table 1 on page 1.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 15-Jul-2008 | 16       | Modified: <i>Table 1 on page 1.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 19-Jan-2010 | 17       | Modified: <i>Table 11 on page 14, added: Figure 8 on page 16, Figure 9 on page 17, Figure 10 and Figure 11 on page 18.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 26-May-2010 | 18       | Modified: VI parameter <i>Table 2 on page 5.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 12-Nov-2010 | 19       | Modified: R <sub>thJC</sub> value for TO-220 <i>Table 3 on page 5.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 18-Nov-2011 | 20       | Added: order codes L7905CV-DG, L7912CV-DG and L7915CV-DG <i>Table 1 on page 1.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 15-May-2012 | 21       | Added: order codes L7908CV-DG <i>Table 1 on page 1.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 04-Jun-2014 | 22       | Part numbers L79xxC and L79xxAC changed to L79.<br>Updated the features and the description in cover page.<br>Updated <i>Table 1: Device summary, Section 3: Maximum ratings, Section 4: Test circuit, Section 5: Electrical characteristics, Section 6: Application information, Section 7: Package mechanical data.</i><br>Added <i>Section 8: Packaging mechanical data.</i><br>Minor text changes.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 27-Sep-2017 | 23       | In <i>Table 4: "Electrical characteristics of L7905AC"</i> :<br>- updated I <sub>sc</sub> and I <sub>scp</sub> Typ. Values<br>In <i>Table 5: "Electrical characteristics of L7905C"</i> :<br>- updated I <sub>sc</sub> Typ. Values<br>In <i>Table 7: "Electrical characteristics of L7912AC"</i> :<br>- updated I <sub>sc</sub> Typ. Value<br>- updated I <sub>scp</sub> Test conditions and Typ. Value<br>In <i>Table 8: "Electrical characteristics of L7912AC"</i> :<br>- updated I <sub>sc</sub> Typ. Value<br>In <i>Table 9: "Electrical characteristics of L7915AC"</i> :<br>- updated I <sub>sc</sub> Typ. Value<br>- updated I <sub>scp</sub> Test conditions and Typ. Value<br>In <i>Table 10: "Electrical characteristics of L7915C"</i> :<br>- updated I <sub>sc</sub> Typ. Value<br>Updated <i>Section 7: "Package information"</i> |

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