

Simple 90V, 20mA, Temperature Compensated Constant Current LED Driver IC

Features

- ▶ 5.0 to 90V operating range (V_{A-B})
- ▶ 20mA $\pm 10\%$ at 5.0 - 90V
- ▶ 0.01%/°C typical temperature coefficient
- ▶ Available in TO-243AA (SOT-89), TO-252 (D-PAK), & TO-92 packages
- ▶ Can be paralleled for higher current

Applications

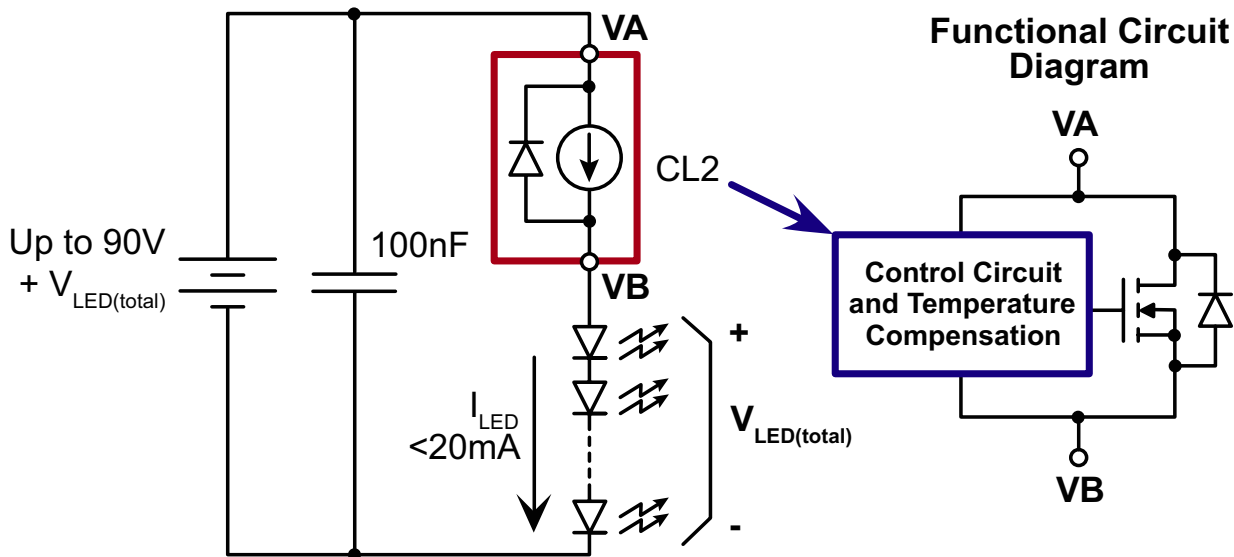
- ▶ LED driver
- ▶ Industrial lamp indicators
- ▶ Signage
- ▶ Accent lighting
- ▶ Automotive
- ▶ Constant current source
- ▶ Constant current sink

General Description

The Supertex CL2 is a high voltage, temperature compensated, constant current source. The device is trimmed to provide a constant current of 20mA $\pm 10\%$ at an input voltage of 5.0 - 90V. The device can be used as a two terminal constant current source or constant current sink.

A typical application for the CL2 is to drive LEDs with a constant current of 20mA. Multiple CL2s can also be used in parallel to provide higher currents such as 40mA, 60mA or 80mA. The device is available in TO-243AA (SOT-89), TO-252 (D-PAK), and TO-92 packages.

Typical Application Circuit



Ordering Information

| Part Number | Package Options | Packing |
|--------------|-------------------|-----------|
| CL2K4-G | TO-252 (D-PAK) | 2000/Reel |
| CL2N3-G | TO-92 | 1000/Bag |
| CL2N3-G P002 | TO-92 | 2000/Reel |
| CL2N3-G P003 | TO-92 | 2000/Reel |
| CL2N3-G P005 | TO-92 | 2000/Reel |
| CL2N3-G P013 | TO-92 | 2000/Reel |
| CL2N3-G P014 | TO-92 | 2000/Reel |
| CL2N8-G | TO-243AA (SOT-89) | 2000/Reel |

-G indicates package is RoHS compliant ('Green')
 Refer to 'P0xx' Tape & Reel Specs for P002, P003, P005, P013, and P014 TO-92 Taping Specifications and Winding Styles

Absolute Maximum Ratings

| Parameter | Value |
|---------------------------------------|-----------------|
| Operating voltage, V_{A-B} | 100V |
| Operating junction temperature, T_j | -40°C to +125°C |
| Storage temperature, T_s | -55°C to +150°C |

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied. Continuous operation of the device at the absolute rating level may affect device reliability. All voltages are referenced to device ground.

Typical Thermal Characteristics

| Package | Power Dissipation @ $T_A = 25^\circ\text{C}$ (W) | θ_{ja} (°C/W) |
|----------|--|-------------------------|
| TO-252 | 2.0* | 81* |
| TO-92 | 0.6 | 132 |
| TO-243AA | 1.3* | 133* |

* Mounted on FR4 board; 25mm x 25mm x 1.57mm

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise specified)

| Sym | Parameter | Min | Typ | Max | Units | Conditions |
|---------------------------|-----------------------------------|------|------|-----|-------|---|
| V_{A-B} | Operating voltage | 5.0 | - | 90 | V | --- |
| I_{A-B} | Current regulation | 18.0 | 20 | 22 | mA | $V_{A-B} = 5.0\text{V} - 90\text{V}$ |
| $\Delta I_{A-B}/\Delta T$ | I_{A-B} temperature coefficient | - | 0.01 | - | %/°C | $V_{A-B} = 45\text{V}, T_j = -40^\circ\text{C}$ to $+100^\circ\text{C}$ |
| T_j | Operating junction temperature | -40 | - | 125 | °C | --- |
| R_{A-B} | Dynamic resistance | - | 300 | - | kΩ | --- |



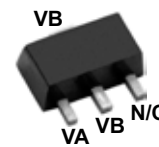
Pin Configurations



TO-252 (D-PAK) (K4)

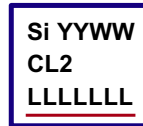


TO-92 (N3)



TO-243AA (SOT-89) (N8)

Product Marking



YY = Year Sealed
 WW = Week Sealed
 L = Lot Number
 _____ = "Green" Packaging

TO-252 (D-PAK) (K4)

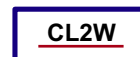
Package may or may not include the following marks: Si or



YY = Year Sealed
 WW = Week Sealed
 _____ = "Green" Packaging

TO-92 (N3)

Package may or may not include the following marks: Si or

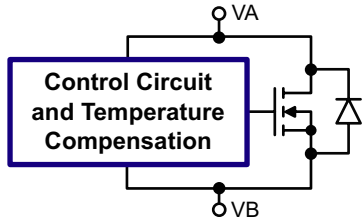


W = Code for week sealed
 _____ = "Green" Packaging

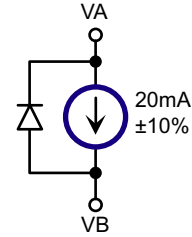
TO-243AA (SOT-89) (N8)

Package may or may not include the following marks: Si or

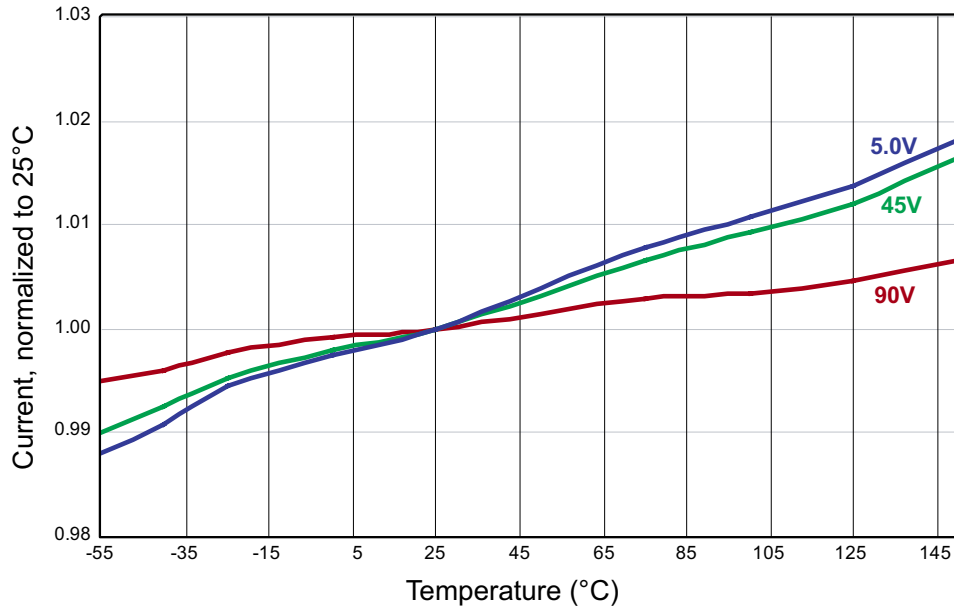
Functional Circuit Diagram



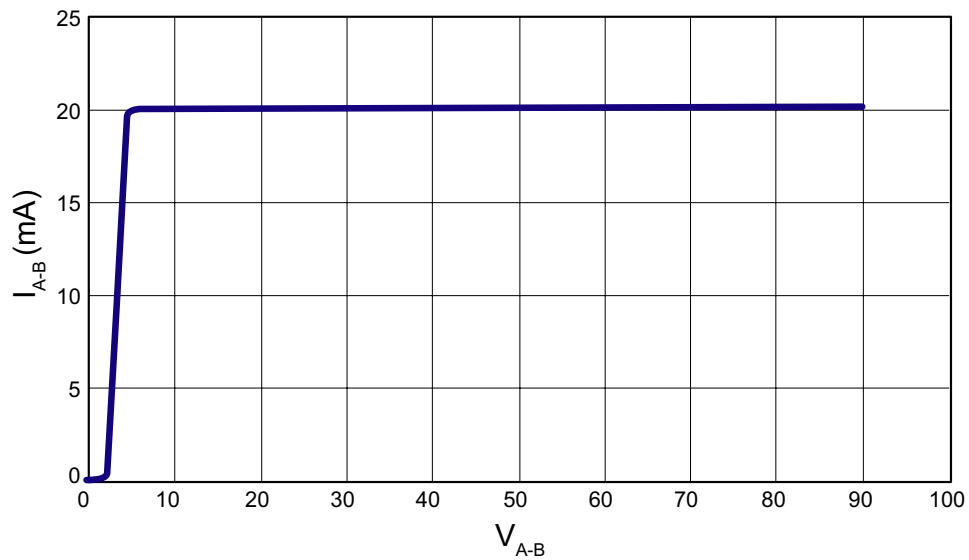
Equivalent Block Diagram



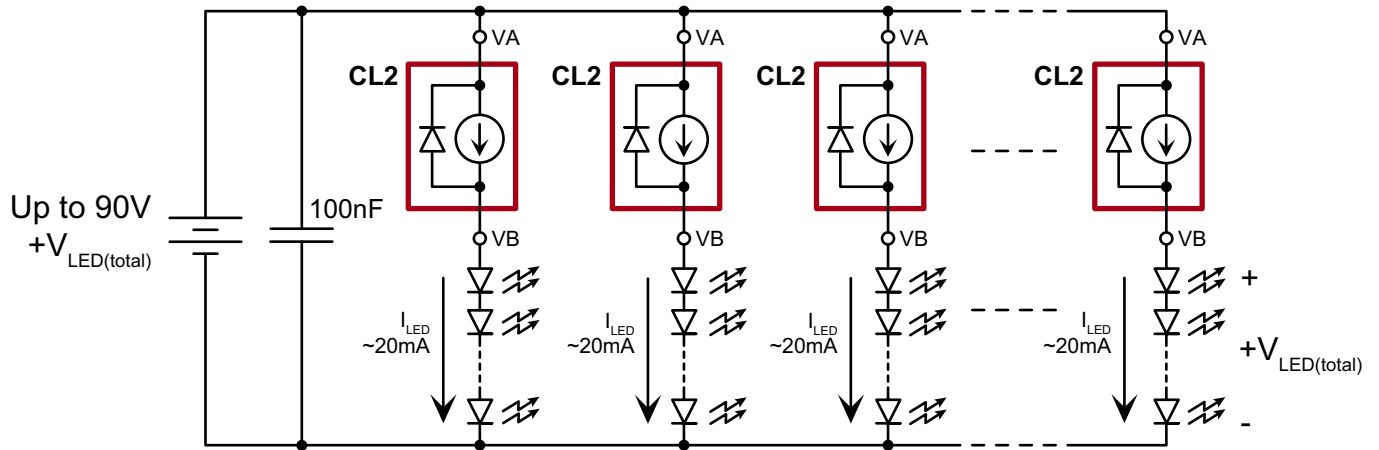
Temperature Characteristics



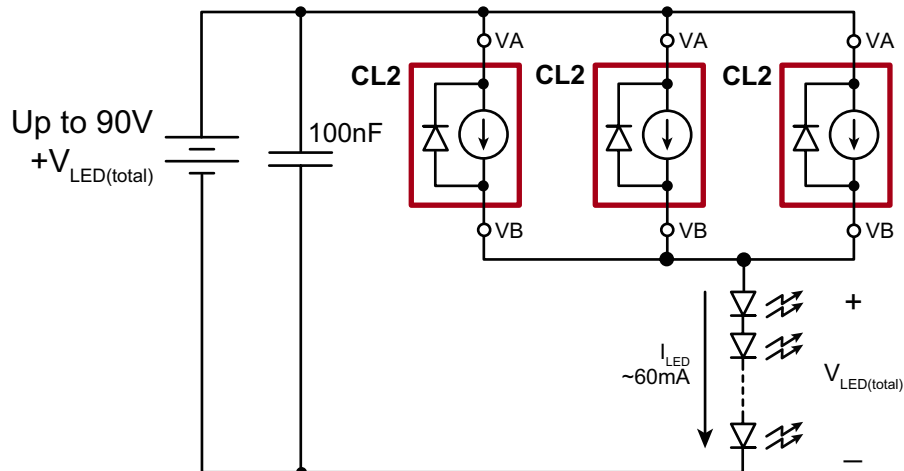
Output Current vs Voltage



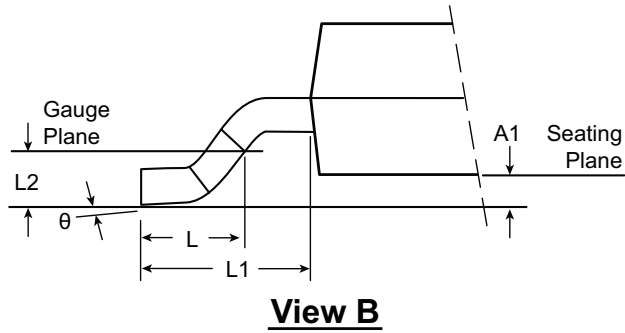
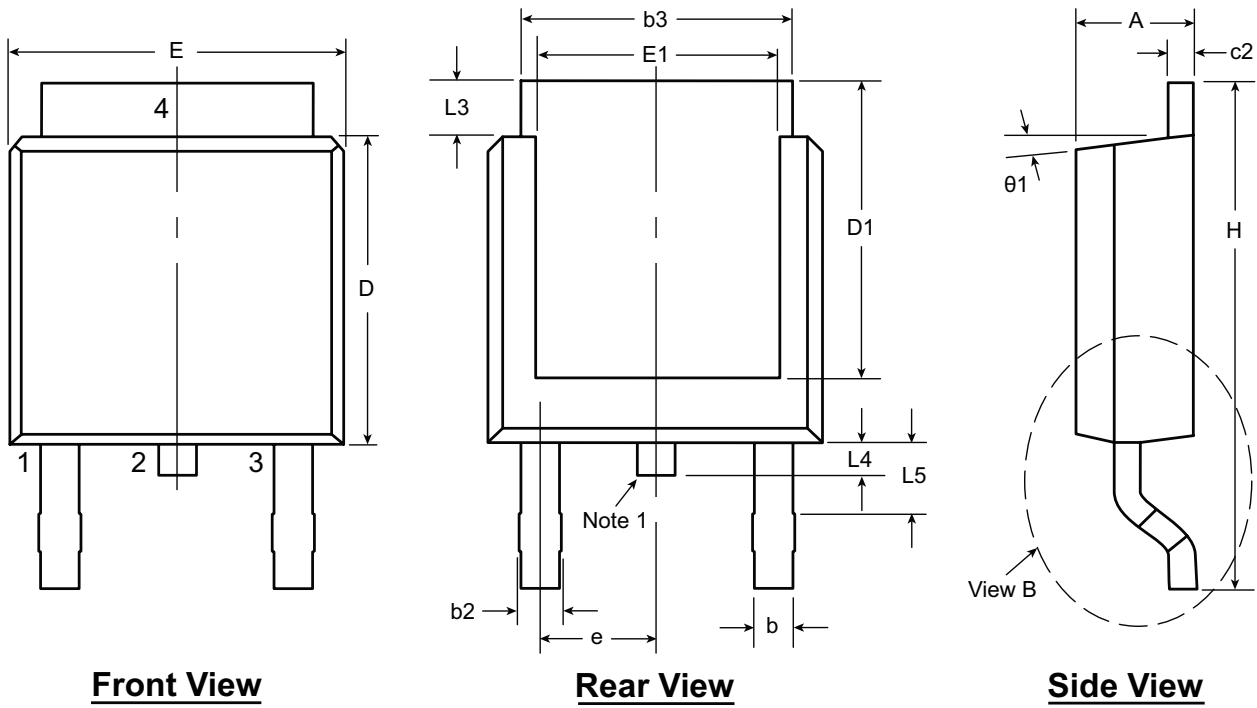
CL2 for Multiple LED Strings



CL2 for Higher Current



3-Lead TO-252 D-PAK Package Outline (K4)

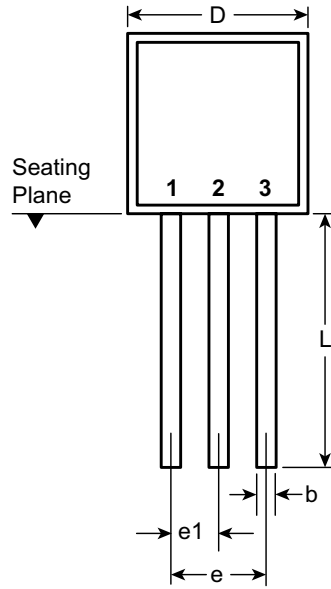


Note:
 1. Although 4 terminal locations are shown, only 3 are functional. Lead number 2 was removed.

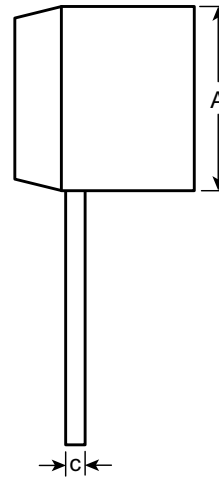
| Symbol | A | A1 | b | b2 | b3 | c2 | D | D1 | E | E1 | e | H | L | L1 | L2 | L3 | L4 | L5 | θ | θ_1 | | | | |
|--------------------|-----|------|-------|------|------|------|------|------|-------|------|-------|----------|------|------|----------|----------|------|-------|----------|------------|-----|---|---|---|
| Dimension (inches) | MIN | .086 | .000* | .025 | .030 | .195 | .018 | .235 | .205 | .250 | .170 | .090 BSC | .370 | .055 | .108 REF | .020 BSC | .035 | .025* | .045 | 0° | 0° | | | |
| | NOM | - | - | - | - | - | - | .240 | - | - | - | | - | .060 | | | - | - | - | - | - | - | - | - |
| | MAX | .094 | .005 | .035 | .045 | .215 | .035 | .245 | .217* | .265 | .182* | | .410 | .070 | | | .050 | .040 | .060 | 10° | 15° | | | |

JEDEC Registration TO-252, Variation AA, Issue E, June 2004.
 * This dimension is not specified in the JEDEC drawing.
Drawings not to scale.
 Supertex Doc. #: DSPD-3TO252K4, Version E041309.

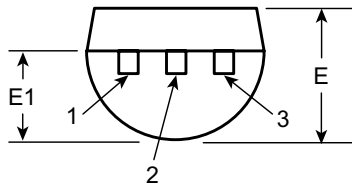
3-Lead TO-92 Package Outline (N3)



Front View



Side View



Bottom View

| Symbol | A | b | c | D | E | E1 | e | e1 | L | |
|------------------------|-----|------|-------------------|-------------------|------|------|------|------|------|-------|
| Dimensions (inches) | MIN | .170 | .014 [†] | .014 [†] | .175 | .125 | .080 | .095 | .045 | .500 |
| | NOM | - | - | - | - | - | - | - | - | - |
| | MAX | .210 | .022 [†] | .022 [†] | .205 | .165 | .105 | .105 | .055 | .610* |

JEDEC Registration TO-92.

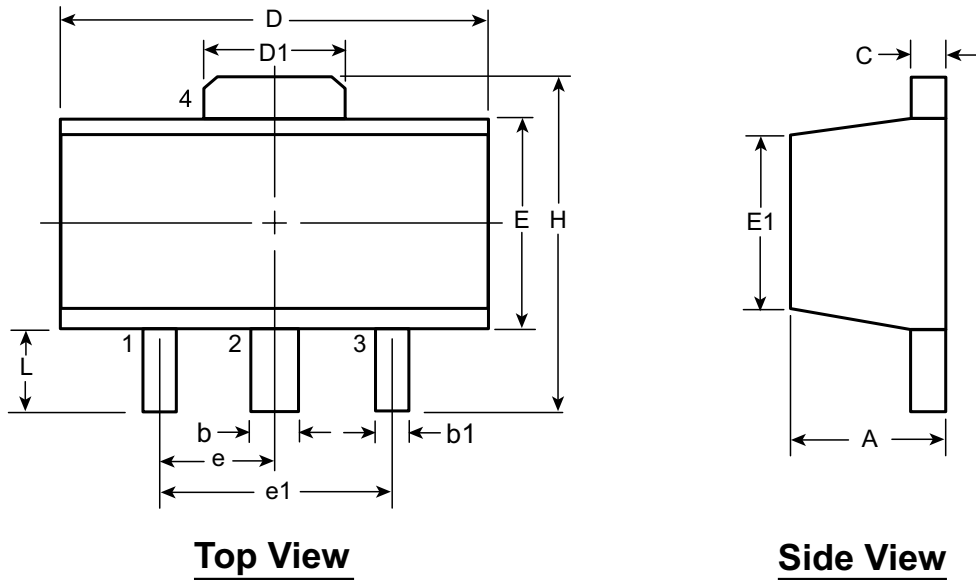
* This dimension is not specified in the JEDEC drawing.

† This dimension differs from the JEDEC drawing.

Drawings not to scale.

Supertex Doc.#: DSPD-3TO92N3, Version E041009.

3-Lead TO-243AA (SOT-89) Package Outline (N8)



| Symbol | A | b | b1 | C | D | D1 | E | E1 | e | e1 | H | L | | |
|--------------------|-----|------|------|------|------|------|------|------|-------------------|-------------|-------------|------|-------------------|------|
| Dimensions (mm) | MIN | 1.40 | 0.44 | 0.36 | 0.35 | 4.40 | 1.62 | 2.29 | 2.00 [†] | 1.50 BSC | 3.00 BSC | 3.94 | 0.73 [†] | |
| | NOM | - | - | - | - | - | - | - | - | | | - | - | - |
| | MAX | 1.60 | 0.56 | 0.48 | 0.44 | 4.60 | 1.83 | 2.60 | 2.29 | | | - | - | 4.25 |

JEDEC Registration TO-243, Variation AA, Issue C, July 1986.

[†] This dimension differs from the JEDEC drawing

Drawings not to scale.

Supertex Doc. #: DSPD-3TO243AAN8, Version F111010.

(The package drawings in this data sheet may not reflect the most current specifications. For the latest package outline information go to <http://www.supertex.com/packaging.html>.)

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