

## 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

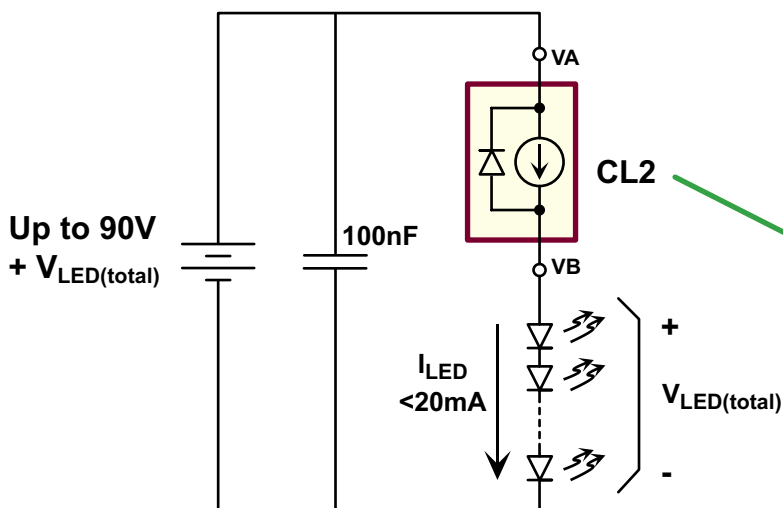
- ▶ LED driver
- ▶ Industrial lamp indicators
- ▶ Signage
- ▶ Accent lighting
- ▶ Automotive
- ▶ Constant current source
- ▶ Constant current sink

### General Description

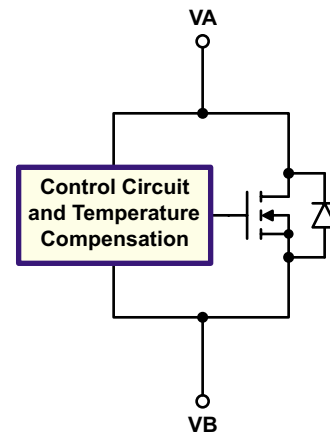
The Supertex CL2 is a high voltage, temperature compensated, constant current source. The device is trimmed to provide a constant current of 20mA  $\pm$ 10% at an input voltage of 5.0 - 90V. The device can be used as a two terminal constant current source or constant current sink.

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



### Functional Circuit Diagram



**Ordering Information**

Device	Package Options		
	TO-252 (D-PAK)	TO-92	TO-243AA (SOT-89)
CL2	CL2K4-G	CL2N3-G	CL2N8-G

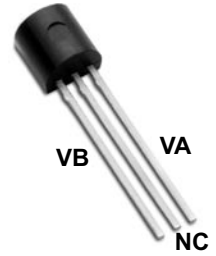
-G indicates package is RoHS compliant ('Green')



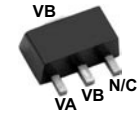
**Pin Configurations**



TO-252 (D-PAK) (K4)



TO-92 (N3)



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

**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

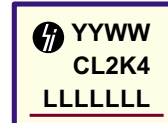
Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied. Continuous operation of the device at the absolute rating level may affect device reliability. All voltages are referenced to device ground.

**Thermal Characteristics**

Package	Power Dissipation @ $T_A = 25^\circ\text{C}$ (w)	$\theta_{JC}$ (°C/W)	$\theta_{JA}$ (°C/W)
TO-252	2.0*	6.0	50*
TO-92	0.6	125	170
TO-243AA	1.3*	15	78*

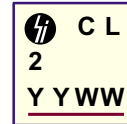
\* Mounted on FR4 board; 25mm x 25mm x 1.57mm

**Product Marking**



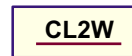
YY = Year Sealed  
 WW = Week Sealed  
 L = Lot Number  
 \_\_\_\_\_ = "Green" Packaging

TO-252 (D-PAK) (K4)



YY = Year Sealed  
 WW = Week Sealed  
 \_\_\_\_\_ = "Green" Packaging

TO-92 (N3)



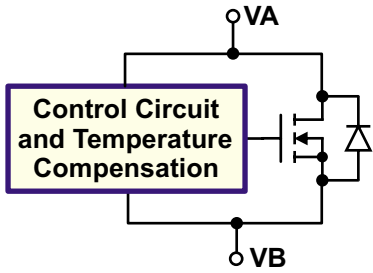
W = Code for week sealed  
 \_\_\_\_\_ = "Green" Packaging

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

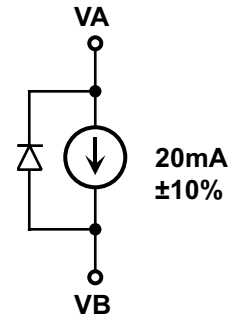
**Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

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	$V_{A-B} = 45\text{V}, T_J = -40^\circ\text{C} \text{ to } +100^\circ\text{C}$
$T_J$	Operating junction temperature	-40	-	125	°C	---
$R_{A-B}$	Dynamic resistance	-	300k	-	$\Omega$	---

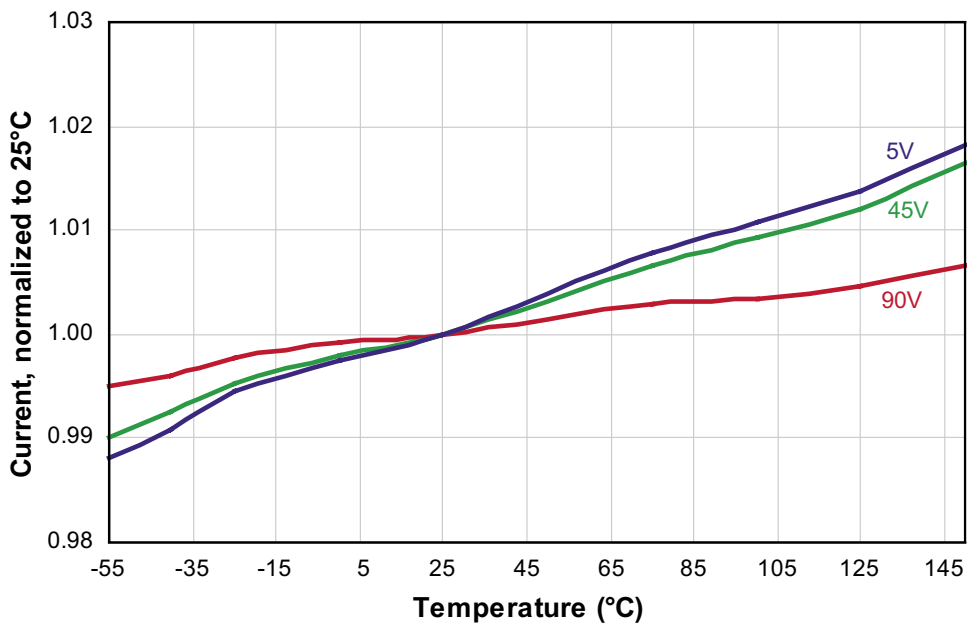
Functional Circuit Diagram



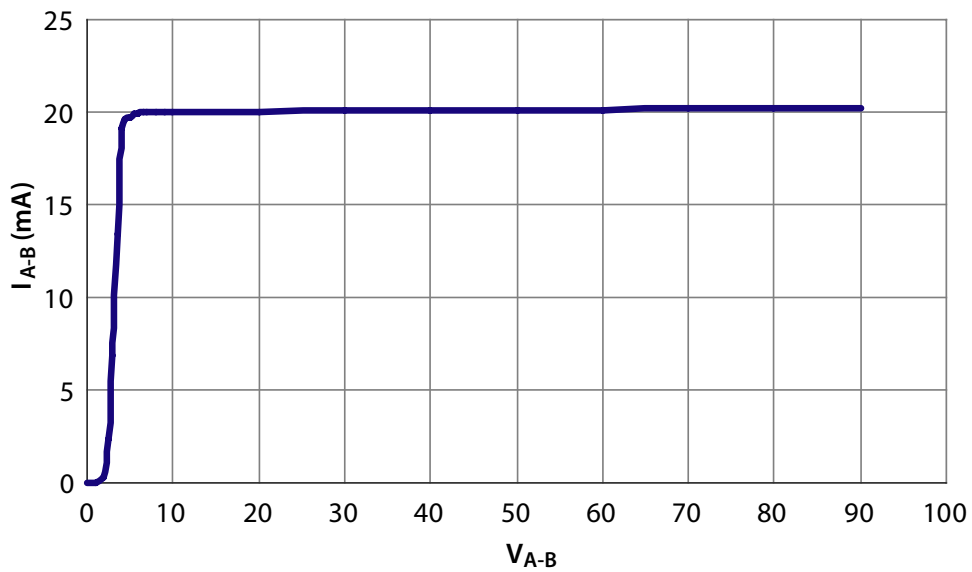
Equivalent Block Diagram



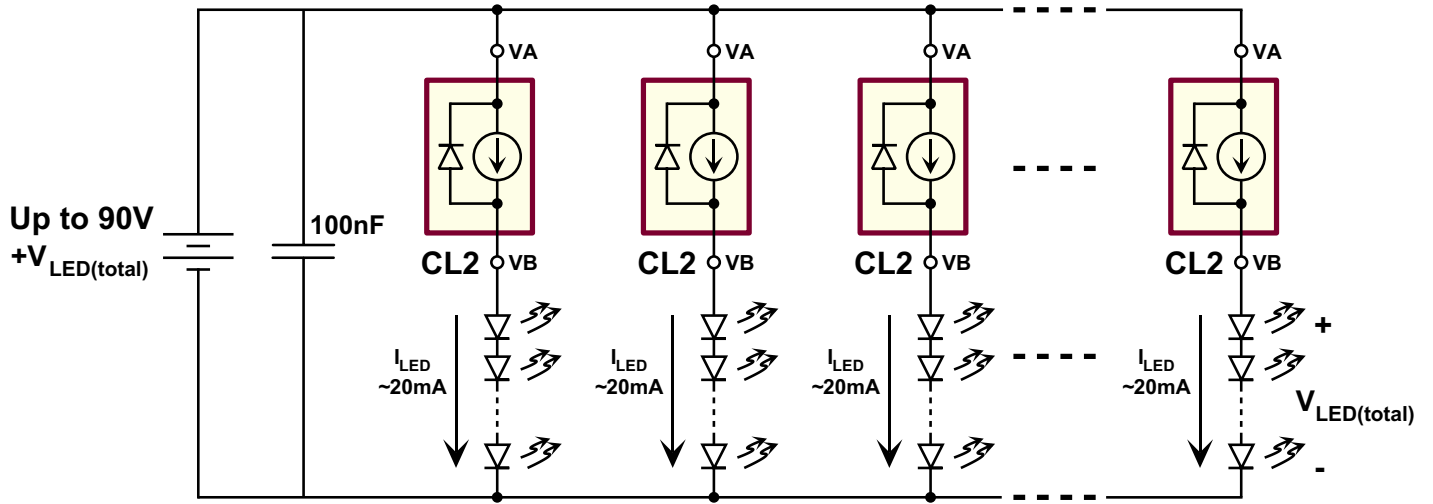
Temperature Characteristics



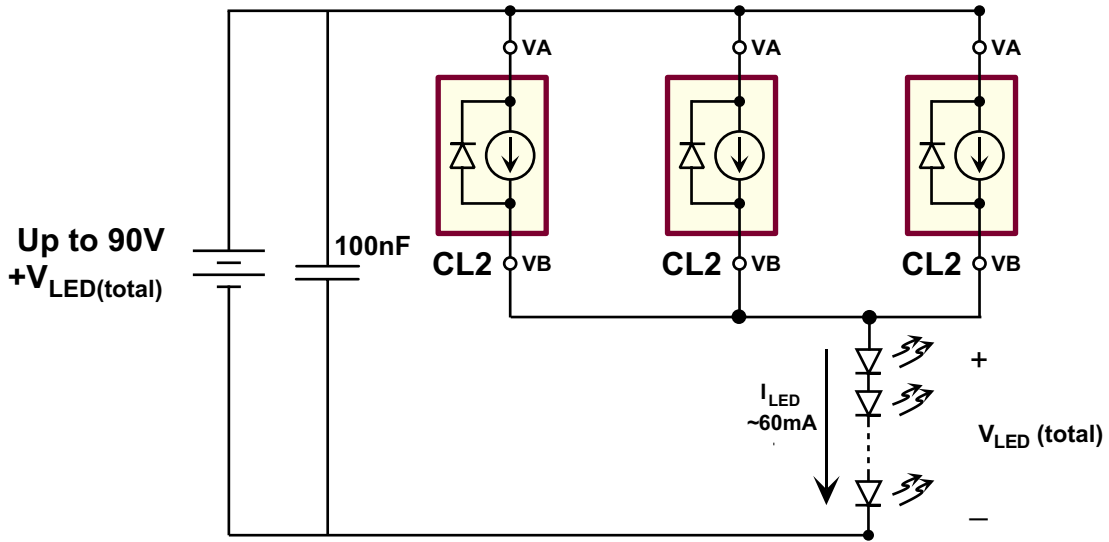
Output Current vs Voltage



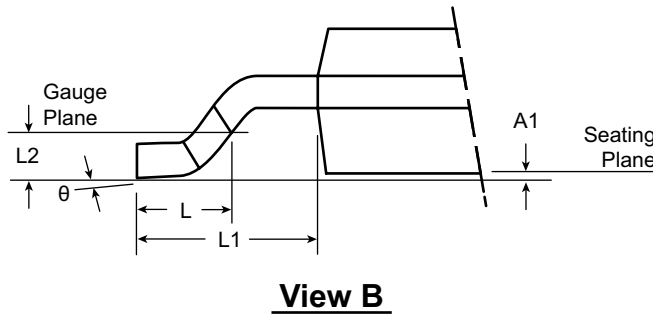
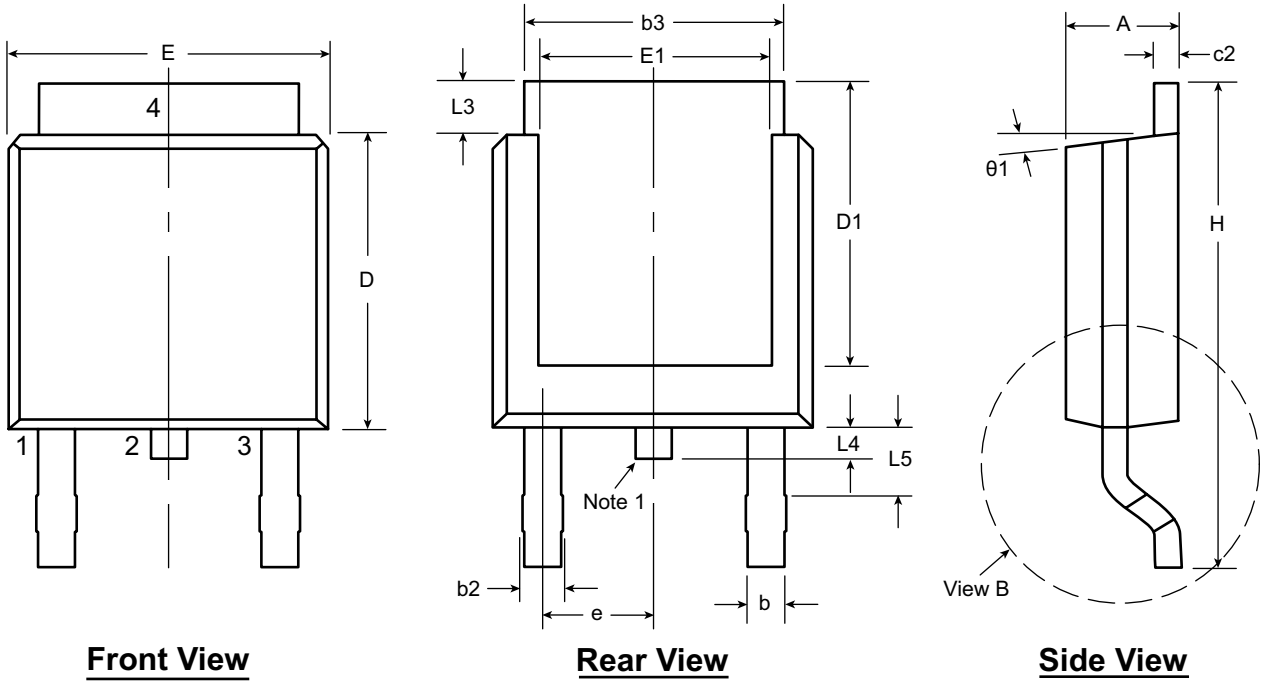
CL2 for Multiple LED Strings



CL2 for Higher Current



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

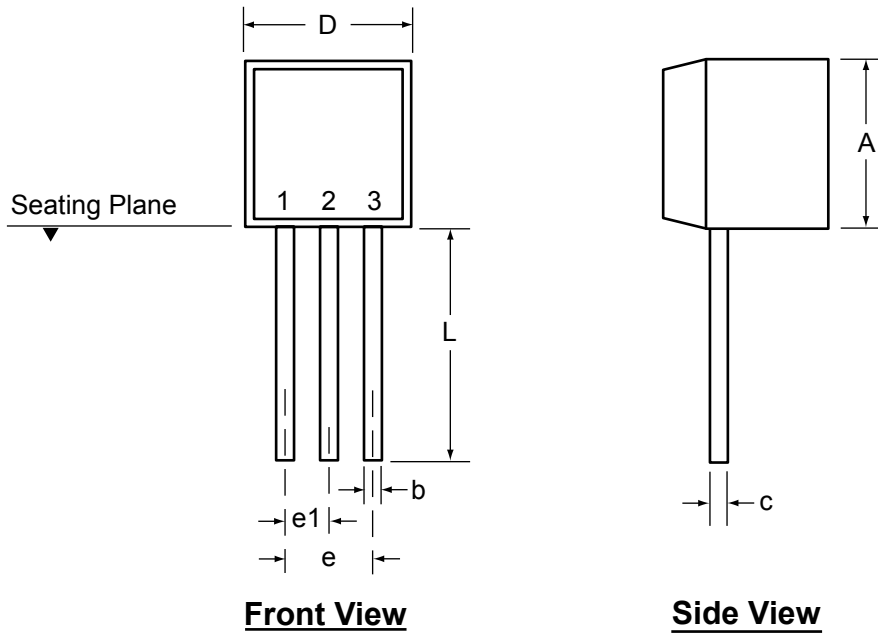


**Note:**  
 1. Although 4 terminal locations are shown, only 3 are functional. Lead number 2 was removed.

Symbol	A	A1	b	b2	b3	c2	D	D1	E	E1	e	H	L	L1	L2	L3	L4	L5	$\theta$	$\theta_1$
Dimension (inches)	MIN	.086	.000*	.025	.030	.195	.018	.235	.205	.250	.170	.370	.055	.108 REF	.020 BSC	.035	.025*	.045	0°	0°
	NOM	-	-	-	-	-	.240	-	-	-	.090 BSC	-	.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 original JEDEC drawing. The value listed is for reference only.  
**Drawings not to scale.**  
 Supertex Doc. #: DSPD-3TO252K4, Version D081408.

### 3-Lead TO-92 Package Outline (N3)



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

JEDEC Registration TO-92.

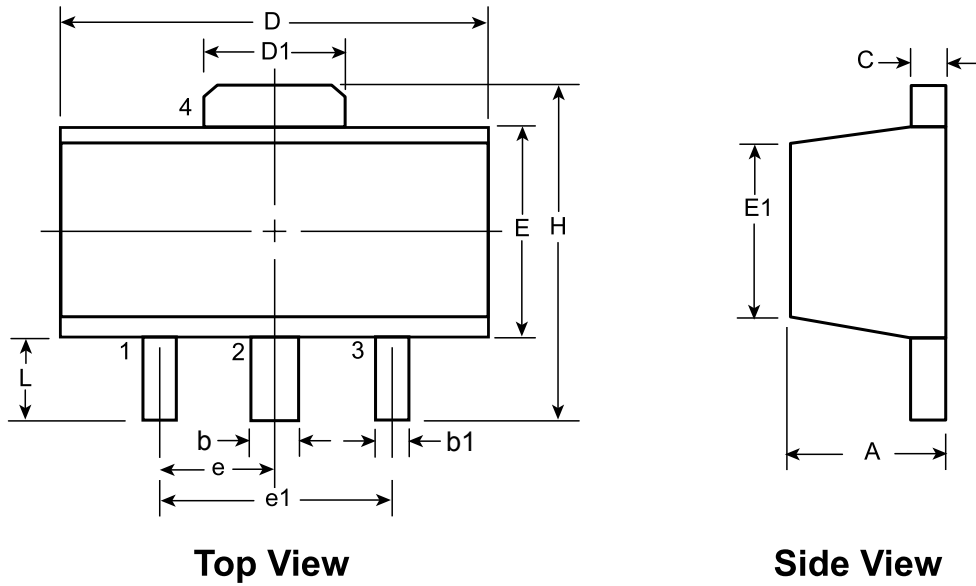
\* This dimension is not specified in the original JEDEC drawing. The value listed is for reference only.

† This dimension is a non-JEDEC dimension.

Drawings not to scale.

Supertex Doc.#: DSPD-3TO92N3, Version D080408.

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



**Top View**

**Side View**

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	2.13	1.50 BSC	3.00 BSC	3.94	0.89
	NOM	-	-	-	-	-	-	-	-			-	-
	MAX	1.60	0.56	0.48	0.44	4.60	1.83	2.60	2.29			4.25	1.20

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

Drawings not to scale.

Supertex Doc. #: DSPD-3TO243AAN8, Version D070908.

(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>.)

Supertex inc. does not recommend the use of its products in life support applications, and will not knowingly sell them for use in such applications unless it receives an adequate "product liability indemnification insurance agreement." Supertex inc. does not assume responsibility for use of devices described, and limits its liability to the replacement of the devices determined defective due to workmanship. No responsibility is assumed for possible omissions and inaccuracies. Circuitry and specifications are subject to change without notice. For the latest product specifications refer to the Supertex inc. website: <http://www.supertex.com>.