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**90V, 25 mA Simple Temperature-Compensated Constant-Current LED Driver IC**

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**Features**

- 5V to 90V Operating Voltage Range
- 25 mA  $\pm 10\%$  at 5V to 90V
- 0.01%/°C Typical Temperature Coefficient
- Two-Terminal Device with no External Components
- Can be Paralleled for Higher Current

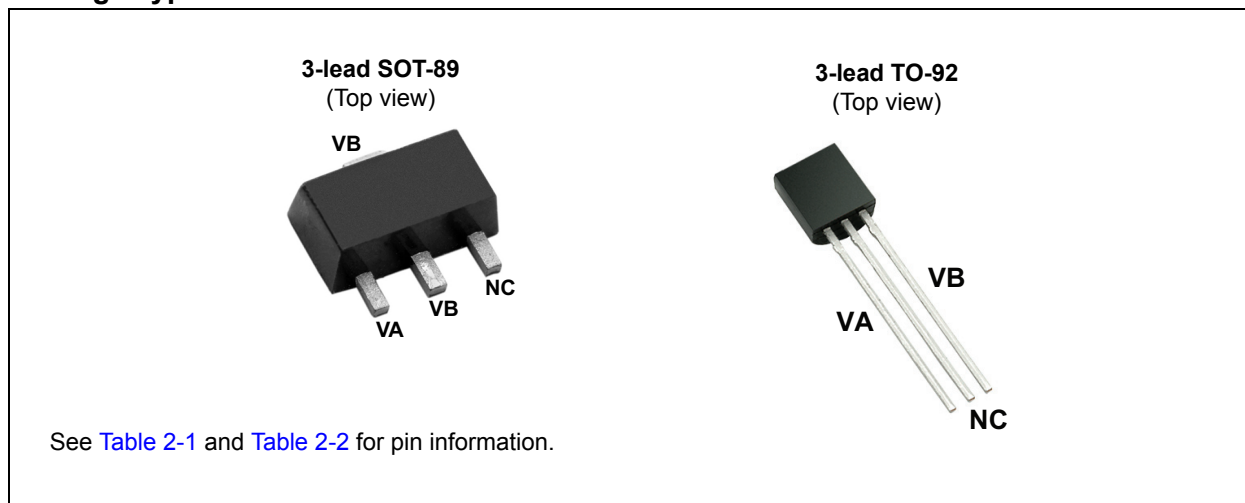
**Applications**

- LED Channel Lighting
- Industrial Lamp Indicators
- Accent Lighting

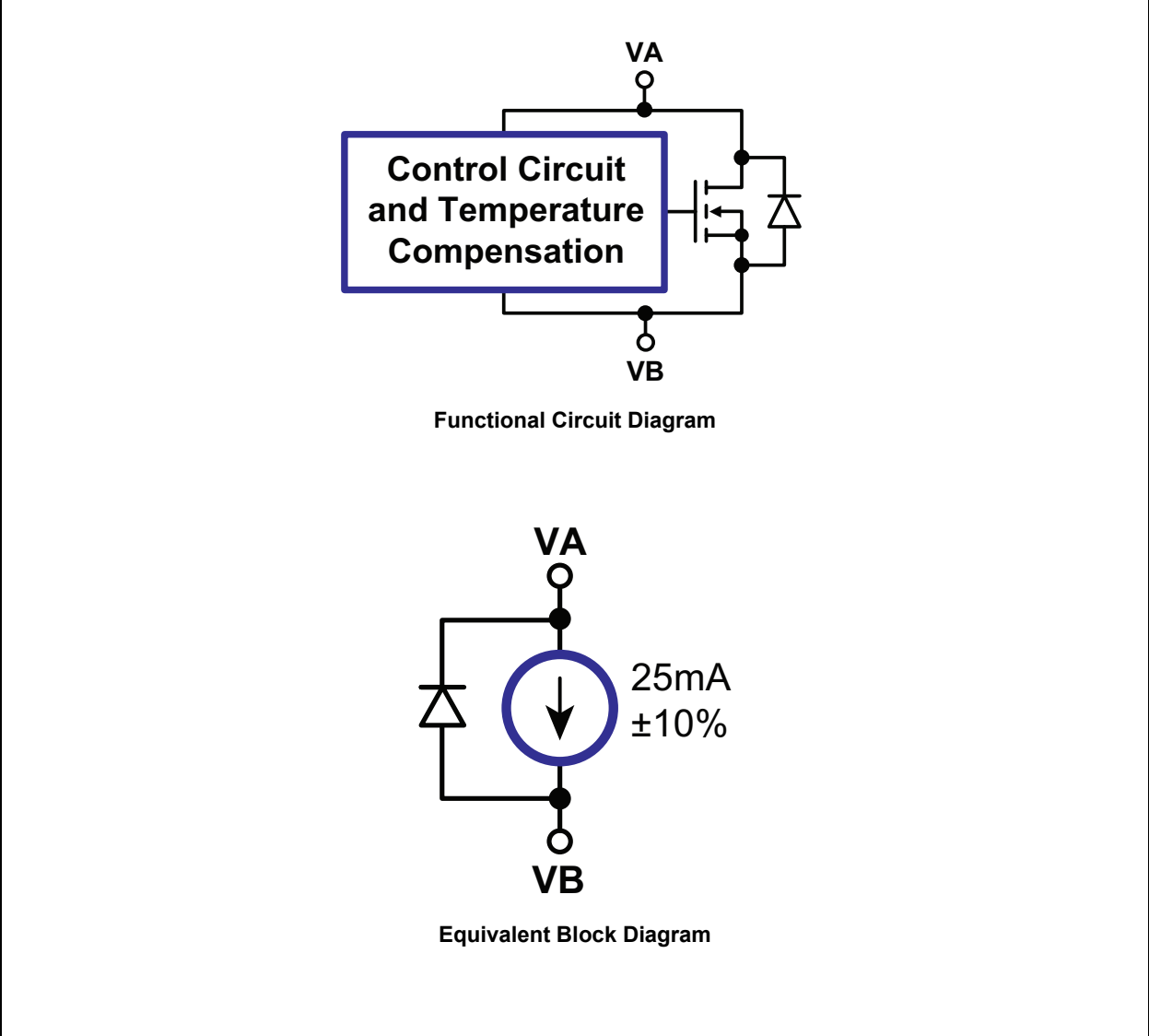
**General Description**

The CL25 is a high-voltage, temperature-compensated, constant-current source. This device is trimmed to provide a constant current of 25 mA  $\pm 10\%$  at an input voltage of 5V to 90V. No external components are required. The device can be used as a two-terminal constant-current source or constant-current sink.

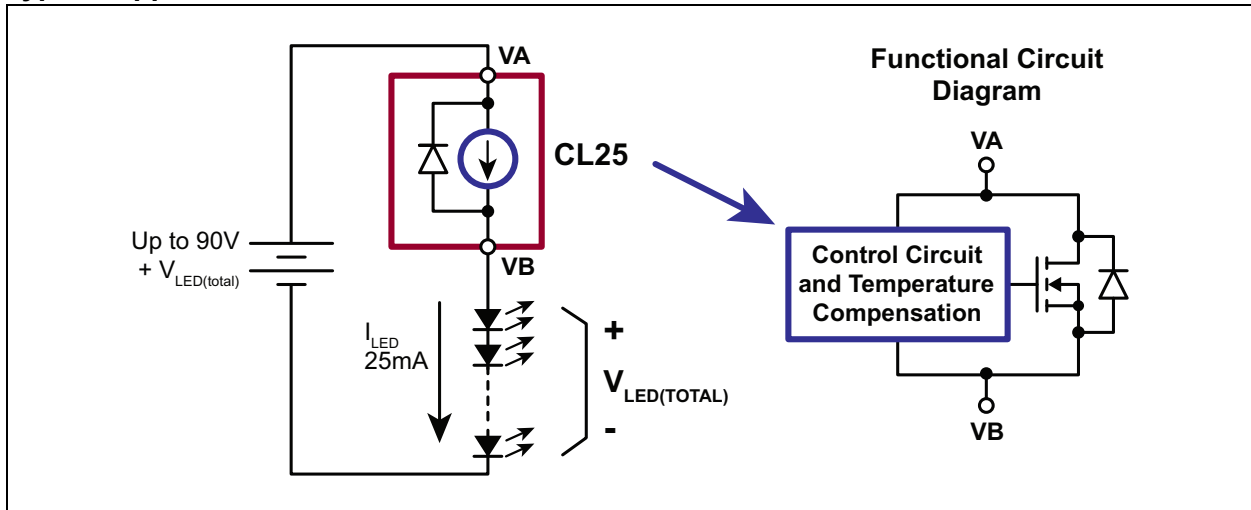
A typical application for the CL25 is to drive LEDs with a constant current of 25 mA. Multiple CL25 devices can also be used in parallel to provide higher currents, such as 50 mA, 75 mA and 100 mA. The device is available in TO-92 and SOT-89 packages.

**Package Types**

## Functional Block Diagram



## Typical Application Circuit



# CL25

## 1.0 ELECTRICAL CHARACTERISTICS

### Absolute Maximum Ratings†

Operating Voltage, $V_{A-B}$ .....	100V
Junction Temperature, $T_J$ .....	-40°C to +135°C
Storage Temperature, $T_S$ .....	-55°C to +150°C
Power Dissipation (at $T_A = 25^\circ\text{C}$ ):	
3-lead SOT-89 .....	1.3W
3-lead TO-92 .....	0.6W

† **Notice:** Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only, and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not intended. Exposure to maximum rating conditions for extended periods may affect device reliability.

### DC ELECTRICAL CHARACTERISTICS

**Electrical Specifications:**  $T_A = 25^\circ\text{C}$  unless otherwise specified.

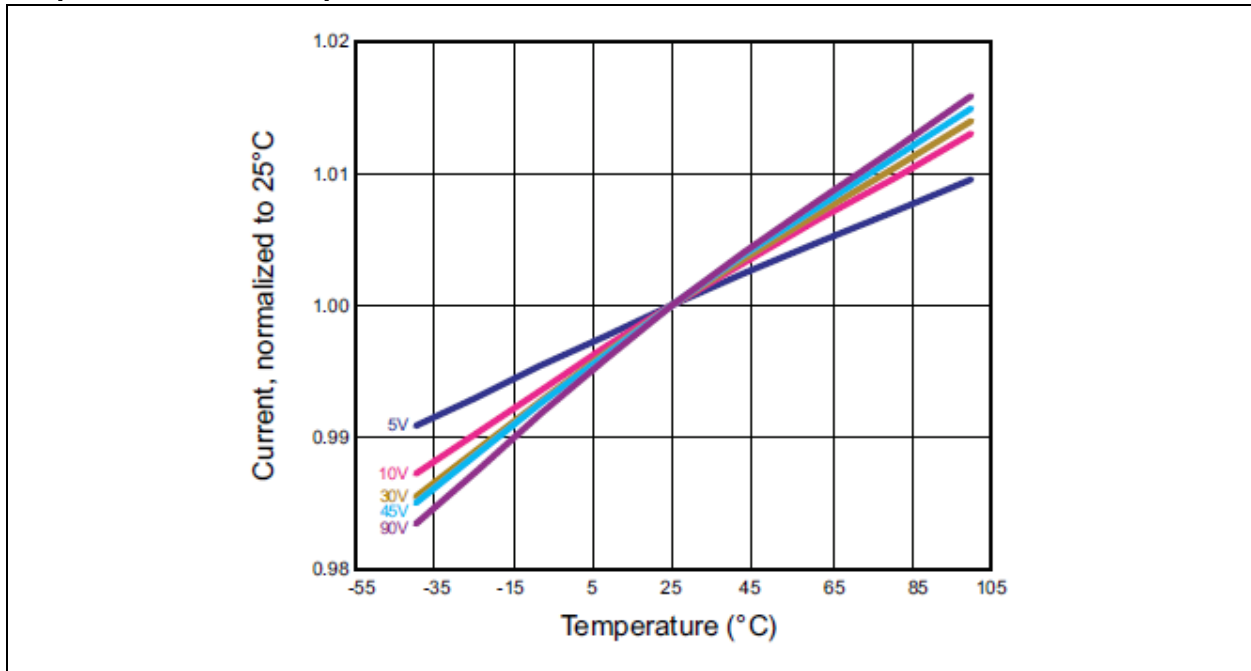
Parameter	Sym.	Min.	Typ.	Max.	Unit	Conditions
Operating Voltage	$V_{A-B}$	5	—	90	V	
Current Regulation	$I_{A-B}$	22.5	25	27.5	mA	$V_{A-B} = 5\text{V}–90\text{V}$
$I_{A-B}$ Temperature Coefficient	$\Delta I_{A-B}/\Delta T$	—	0.01	—	%/°C	$V_{A-B} = 45\text{V}$ , $T_J = -40^\circ\text{C}$ to $+100^\circ\text{C}$
Operating Junction Temperature	$T_J$	-40	—	+125	°C	
Dynamic Resistance	$R_{A-B}$	—	300	—	kΩ	

### TEMPERATURE SPECIFICATIONS

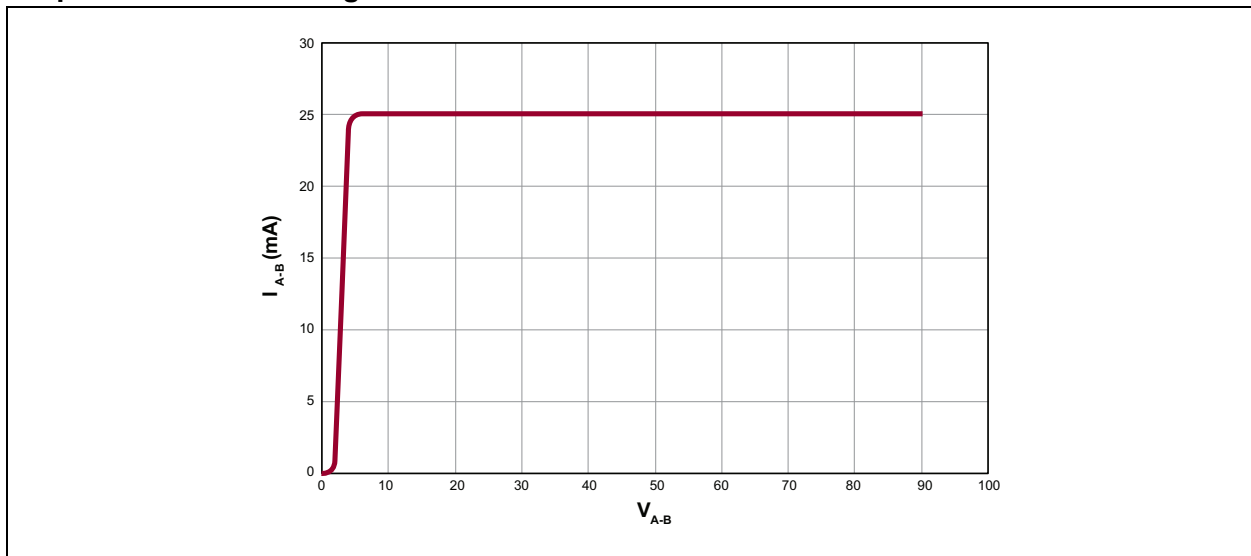
Parameter	Sym.	Min.	Typ.	Max.	Unit	Conditions
<b>TEMPERATURE RANGE</b>						
Operating Junction Temperature	$T_J$	-40	—	+125	°C	
Maximum Junction Temperature	$T_{J(ABS\text{MAX})}$	—	—	+135	°C	
Storage Temperature	$T_S$	-55	—	+150	°C	
<b>PACKAGE THERMAL RESISTANCE</b>						
3-lead SOT-89	$\theta_{JA}$	—	133	—	°C/W	<a href="#">Note 1</a>
3-lead TO-92	$\theta_{JA}$	—	132	—	°C/W	

**Note 1:** Mounted on a 25 mm x 25 mm x 1.57 mm FR4 board

## Output Current vs. Temperature



## Output Current vs. Voltage



# CL25

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## 2.0 PIN DESCRIPTION

The details on the pins of CL25 3-lead SOT-89 and 3-lead TO-92 packages are listed in [Table 2-1](#) and [Table 2-2](#). Refer to [Package Types](#) for the location of pins.

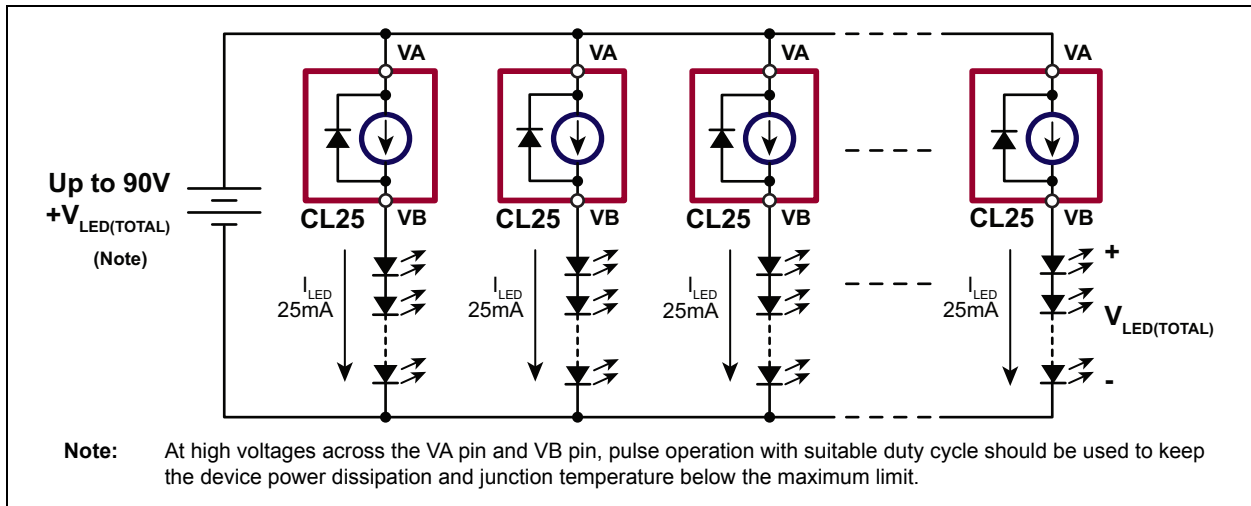
**TABLE 2-1: 3-LEAD SOT-89 PIN FUNCTION TABLE**

Pin Number	Pin Name	Description
1	VA	Supply voltage and constant-current sink
2	VB	Constant-current source
3	NC	No connection
4	VB	Constant-current source

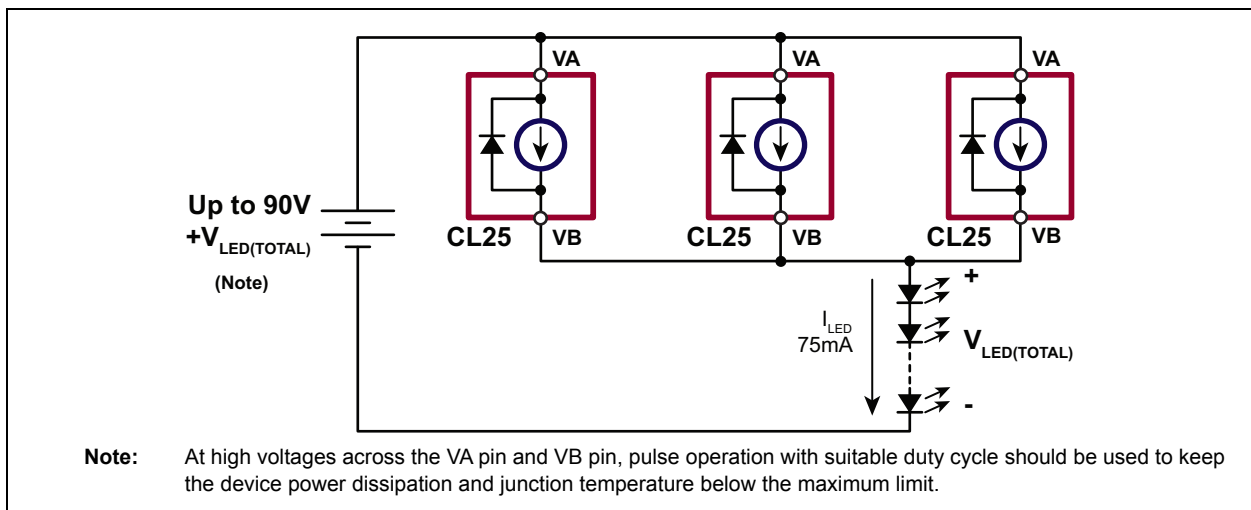
**TABLE 2-2: 3-LEAD TO-92 PIN FUNCTION TABLE**

Pin Number	Pin Name	Description
1	VA	Supply voltage and constant-current sink
2	NC	No connection
3	VB	Constant-current source

## 3.0 APPLICATION INFORMATION



**FIGURE 3-1:** CL25 for Multiple LED Strings.

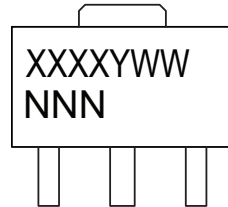


**FIGURE 3-2:** CL25 for Higher Current.

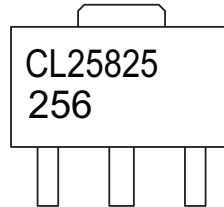
## 4.0 PACKAGING INFORMATION

### 4.1 Package Marking Information

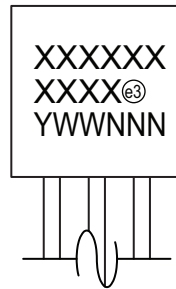
3-lead SOT-89



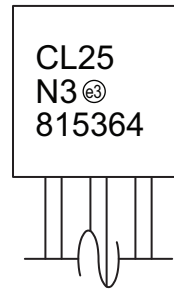
Example



3-lead TO-92



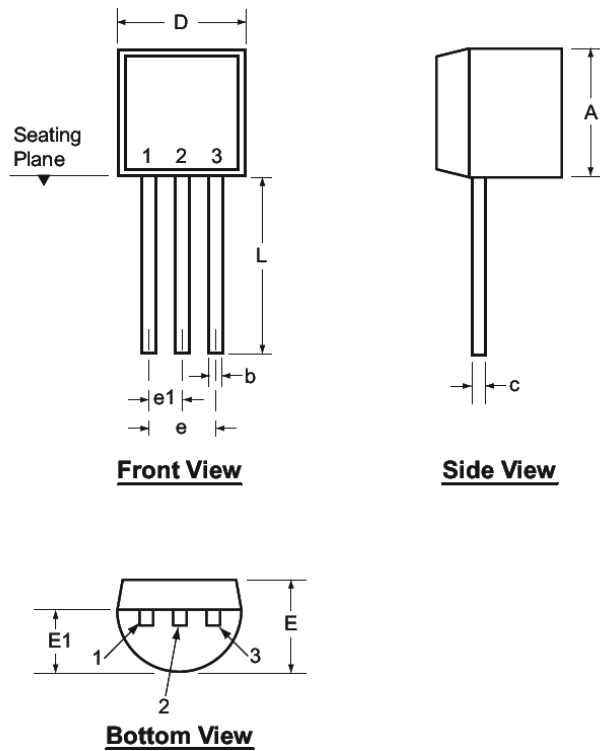
Example



<b>Legend:</b>	XX...X	Product Code or Customer-specific information
	Y	Year code (last digit of calendar year)
	YY	Year code (last 2 digits of calendar year)
	WW	Week code (week of January 1 is week '01')
	NNN	Alphanumeric traceability code
	(e3)	Pb-free JEDEC <sup>®</sup> designator for Matte Tin (Sn)
	*	This package is Pb-free. The Pb-free JEDEC designator (e3) can be found on the outer packaging for this package.
<b>Note:</b>	In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for product code or customer-specific information. Package may or not include the corporate logo.	



## 3-Lead TO-92 Package Outline (L/LL/N3)



Note: For the most current package drawings, see the Microchip Packaging Specification at [www.microchip.com/packaging](http://www.microchip.com/packaging).

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*

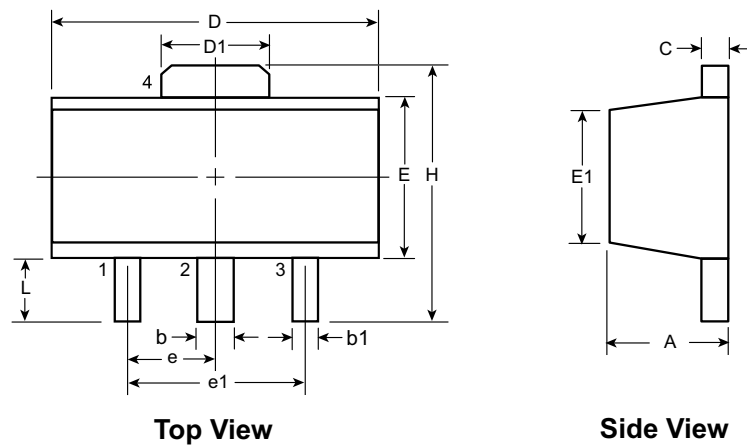
JEDEC Registration TO-92.

\* This dimension is not specified in the JEDEC drawing.

† This dimension differs from the JEDEC drawing.

Drawings not to scale.

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



Note: For the most current package drawings, see the Microchip Packaging Specification at [www.microchip.com/packaging](http://www.microchip.com/packaging).

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 <sup>†</sup>	1.50 BSC	3.00 BSC	3.94	0.73 <sup>†</sup>	
	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.

<sup>†</sup> This dimension differs from the JEDEC drawing

Drawings not to scale.

## APPENDIX A: REVISION HISTORY

### Revision A (November 2018)

- Converted Supertex Doc# DSFP-CL7 to Microchip DS20005804A
- Changed the maximum junction temperature in the Absolute Maximum Ratings from 125°C to 135°C
- Changed the package marking format
- Removed the 3-lead TO-92 N3 P002, P003, P005, P013, and P013 media types
- Made new sections to comply with the standard Microchip document format
- Made minor text changes throughout the document

# CL25

## PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

<u>PART NO.</u>				
Device	<u>XX</u> Package Options	-	<u>X</u> Environmental	-
				<u>X</u> Media Type
Device:	CL25	=	90V, 25 mA Simple Temperature-Compensated Constant-Current LED Driver IC	
Packages:	N8	=	3-lead SOT-89	
	N3	=	3-lead TO-92	
Environmental:	G	=	Lead (Pb)-free/RoHS-compliant Package	
Media Types:	(blank)	=	2000/Reel for an N8 Package	
	(blank)	=	1000/Bag for an N3 Package	

### Examples:

- a) CL25N8-G: 90V, 25 mA Simple Temperature-Compensated Constant-Current LED Driver IC, 3-lead SOT-89 Package, 2000/Reel
- b) CL25N3-G: 90V, 25 mA Simple Temperature-Compensated Constant-Current LED Driver IC, 3-lead TO-92 Package, 1000/Bag

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