DESCRIPTION

The LEADCHIP A8290 is a high-voltage adjustable current source with accurate temperature compensation. The device is designed to provide a constant current source determined by an external sense resistor R_{SENSE}. The current is adjustable from 10mA to 20mA with less than 10% error while input changes from 5V to 90V. With an external resistor (R1 in Figure 1) between VA and IS pin, the heat in the IC can be significantly reduced while keeping the summation of IC and R1 current to be constant. This is extremely useful in the area that power lines are not very stable. A typical application for the A8290 is to drive LEDs with a constant current varies from 10-20mA. They can also be used in parallel to provide higher current according to the bias.

The A8290 is available in TO-92 Package.

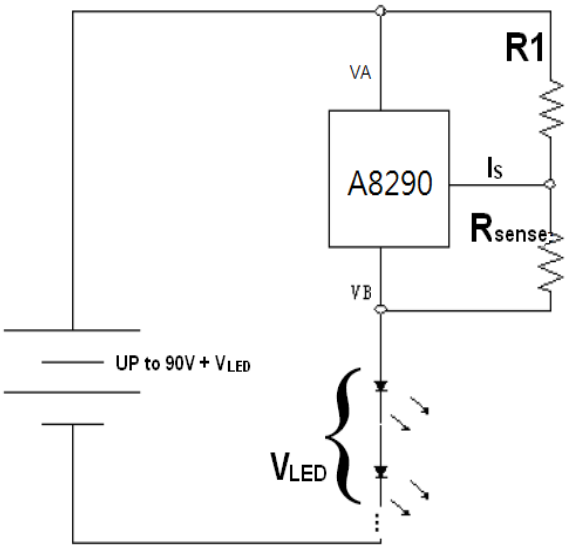
FEATURES

- Wide operation range: from 5V to 90V(V_{A-B})
- I_{LED} can be programmed from 10mA to 20mA via changing R_{SENSE}
- Power dissipation can be adjusted
- Easy to use, only 3 pins and very little external components are needed
- Can be paralleled for higher current
- Temperature compensated
- Available in TO-92 packages

APPLICATIONS

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

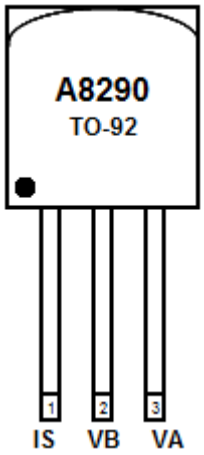
TYPICAL APPLICATION



ORDERING INFORMATION

Package Type	Part Number	
TO-92	Z	A8290ZI
		A8290ZVI
Note	I : A : Ammo Package B : Bulk Package V: Halogen free Package	
AiT provides all RoHS products Suffix " V " means Halogen free Package		

PIN DESCRIPTION



TOP VIEW

Pin #	Symbol
1	IS
2	VB
3	VA

ABSOLUTE MAXIMUM RATINGS

V_{A-B}, Max Supply Voltage	90 V
θ_{JA}, Thermal resistance	170 ℃/W
T_J, Maximum Junction temperature	150 ℃
T_{ST}, Storage temperature	-55℃ to150 ℃

Stresses above may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

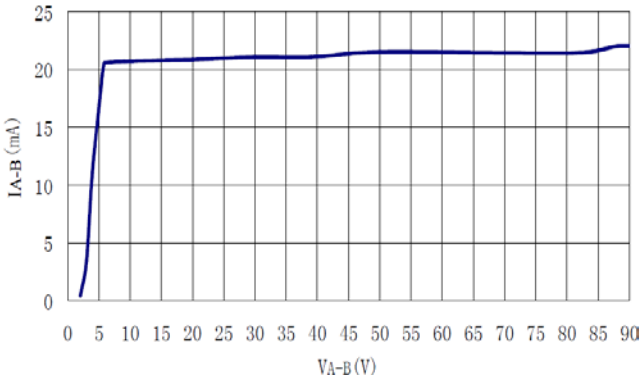
Parameter	Symbol	Conditions	Min	Typ.	Max	Units
Operating Input Voltage	V_{A-B}	N/A	5		90	V
Current regulation	I_{A-B}	V_{A-B}=5-90V,I_{SET}=20mA	-10		+10	%
Current sense voltage	V_{IS}			0.6		V
Operating junction temperature	T_J		-45		125	℃

TYPICAL PERFORMANCE CHARACTERISTICS

All test done at I_{SET} = 20mA, unless otherwise specified.

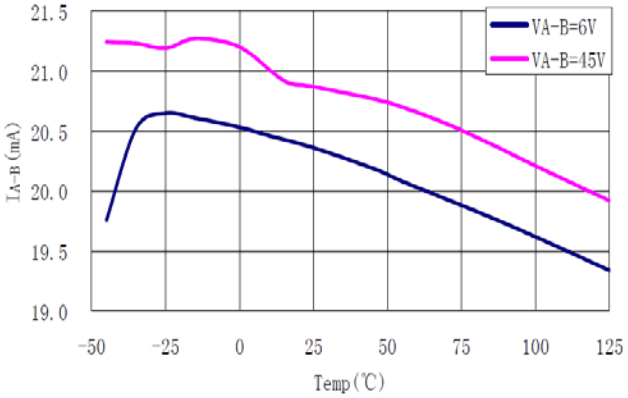
1. Output current vs. V_{A-B}

   V_{A-B} vs. Output Current



2. Temperature characteristics

   I_{A-B} vs. Temperature



TEST CIRCUIT

Figure1. Typical application circuit

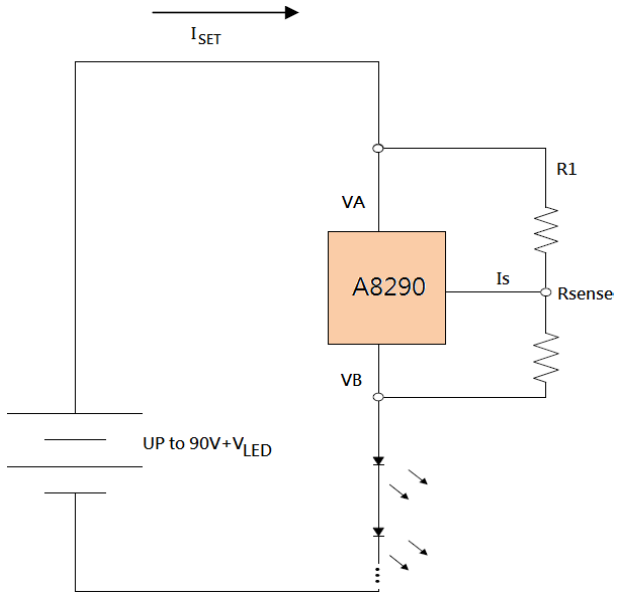


Figure2. For large current use

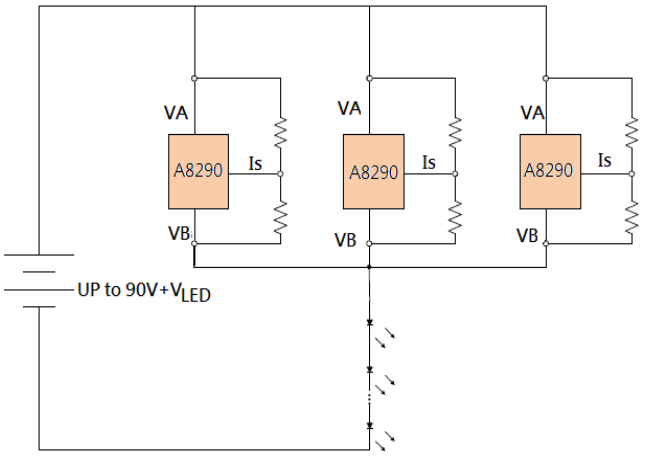


Figure3. For high input voltage use

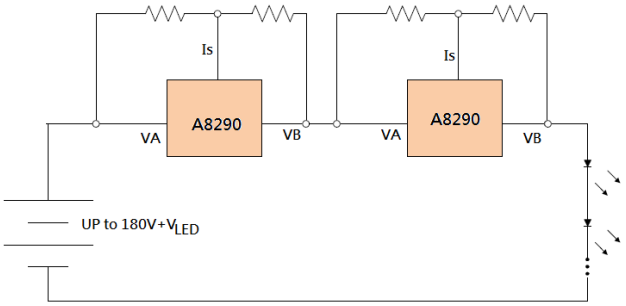
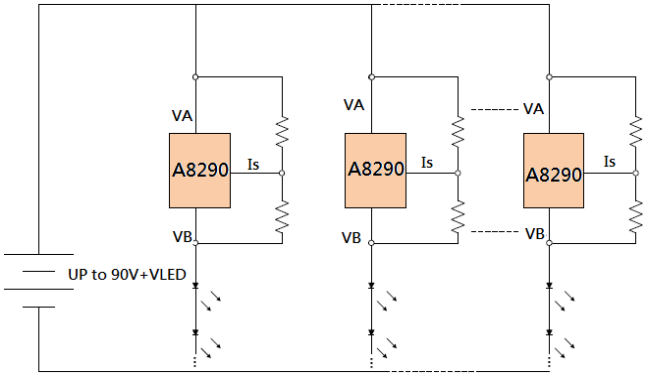
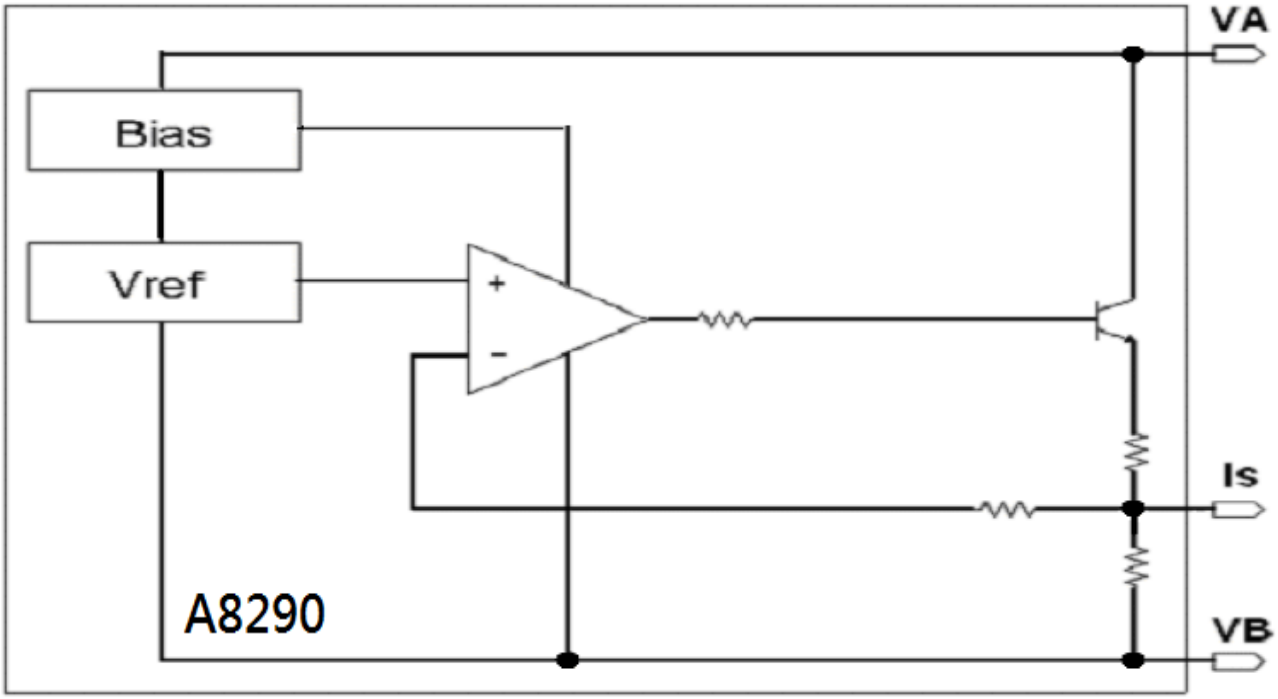


Figure4. For multiple LED strings use



BLOCK DIAGRAM



DETAILED INFORMATION

The A8290 is a high voltage integrated constant current driver. It can operate in a wide range from 5V to 90V, and the output current can be programmed just by change the sense resistor.
This module provides a precise regulated output current, the typical application is showed in figure 1.

As the A8290 is a linear power supply, with high input voltage, the power dissipation should be considered. For example, if the set current is 20mA, when the V_{A-B} is 5V, the module dissipation

$$P_D = V_{A-B} \times I_{SET} \Rightarrow P_D = 0.1W$$

If the V_{A-B} is 90V, the power dissipation is as high as 1.8W. An external resistor R1 can be added to reduce the power dissipation of the A8290. Then the power dissipation on the IC becomes

$$P_D \cong V_{A-B} \times (I_{SET} - \frac{V_{A-B} - V_{Sense}}{R_1})$$

When the ambient temperature is fixed, from thermal resistance value, the maximum power dissipation of the IC can be calculated. Say the maximum allowed temperature increase is 50°C, with TO-92 package (170°C/W thermal resistance), the maximum allowed power dissipation is 0.29W. Assume the maximum V_{A-B} is 50V, I_{SET} = 20mA, and V_{SENSE} = 0.6V. Then

$$R_1 = (V_{A-B} - V_{sense}) / (I_{SET} - \frac{P_D}{V_{A-B}}) = 3.5k\Omega$$

R1's power requirement can be calculated by

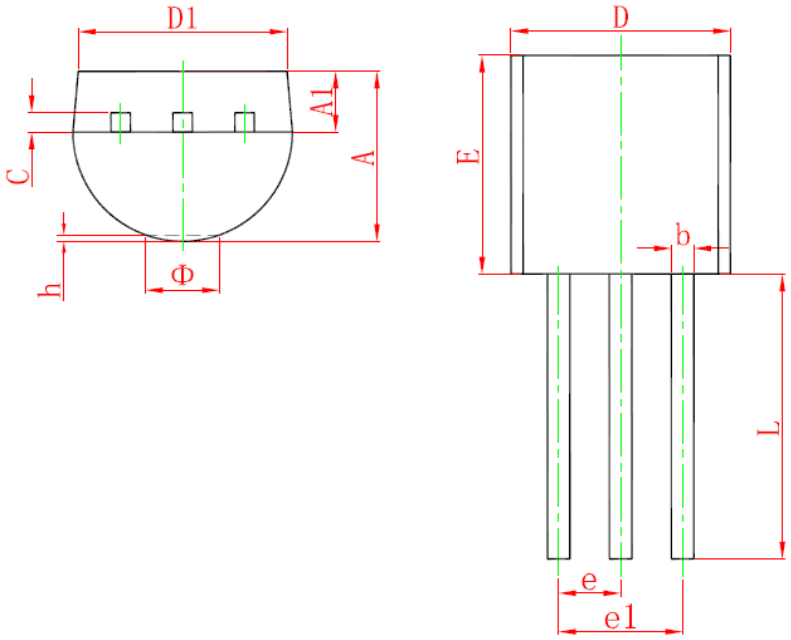
$$P_{R_1} \cong \frac{V_{A-B}^{\ 2}}{R_1} = 0.71W$$

R_{SENSE} can be calculated from sense voltage and current set:

$$R_{sense} = \frac{V_{IS}}{I_{SET}} = 30\Omega$$

PACKAGE INFORMATION

Dimension in TO-92 Package (Unit: mm)



Symbol	Min	Max
A	3.300	3.700
A1	1.100	1.400
b	0.380	0.550
c	0.360	0.510
D	4.400	4.700
D1	3.430	-
E	4.300	4.700
e	1.270 TYP	
e1	2.440	2.640
L	14.100	14.500
Φ	-	1.600
h	0.000	0.380

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