

## 500mA High PSRR, Linear Regulator, w. Output Discharge

### DESCRIPTION

BL8568 series is a group of positive voltage output, low power consumption, low dropout voltage regulator.

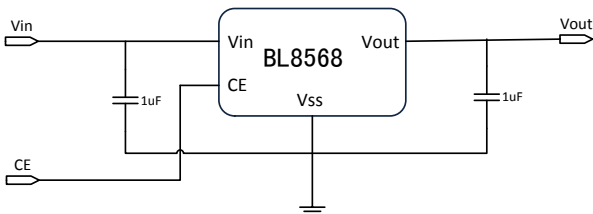
BL8568 can provide output value in the range of 1.0V~4.5V every 0.1V step. It also can be customized on command. BL8568 can also work under a wide input voltage ranging from 2.0V to 6V.

BL8568 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

BL8568 has excellent load and line transient response and good temperature characteristics, which can assure the stability of chip and power system. And it uses trimming technique to guarantee output voltage accuracy within  $\pm 2\%$ .

BL8568 is available in SOT-23-3, SOT-23-5, SC-70-5 and DFN1x1-4 packages which is lead free.

### TYPICAL APPLICATION



**NOTE:** Input capacitor ( $C_{in}=1\mu F$ ) and Output capacitor ( $C_{out}=1\mu F$ ) are recommended in all application circuit.

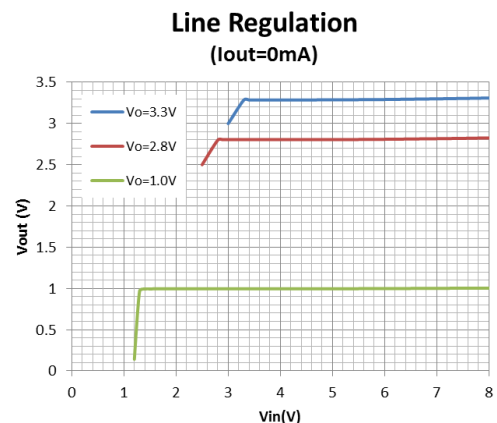
### FEATURES

- Output voltage range: 1.0V~4.5V (customized on command every 0.1V step)
- Low power consumption: 35uA (Typ.)
- Low output noise (47uVRMS)
- Shutdown mode: 0.1uA
- Low dropout voltage: 300mV@300mA (Typ.)
- High ripple rejection: 70dB@1KHz (Typ.)
- Low temperature coefficient:  $\pm 100\text{ppm}/^\circ\text{C}$
- Excellent line regulation: 0.05%/V
- Build-in 1.5K discharge resistor when CE low
- Highly accurate:  $\pm 2\%$
- Output current limit
- Fold-back output short circuit protection

### APPLICATIONS

- Power source for cellular phones and various kind of PCSs
- Battery Powered equipment
- Power Management of MP3, PDA, DSC, Mouse, PS2 Games
- Voltage Reference
- Regulation after Switching Power

### ELECTRICAL CHARACTERISTICS



## ORDERING INFORMATION

BL8568 1 2 3 4

| Code  | Description   |
|---|---|
| <span style="border: 1px solid black; padding: 0 2px;">1</span> | Temperature&Rohs:<br>C:-40~85°C ,Pb Free Rohs Std.                        |
| <span style="border: 1px solid black; padding: 0 2px;">2</span> | Package type:<br>A5:SC-70-5<br>B3:SOT-23-3<br>B5A:SOT-23-5<br>KE:DFN1x1-4 |
| <span style="border: 1px solid black; padding: 0 2px;">3</span> | Packing type:<br>TR:Tape&Reel (Standard)                                  |
| <span style="border: 1px solid black; padding: 0 2px;">4</span> | Output voltage:<br>e.g. 15=1.5V<br>18=1.8V<br>44=4.4V                     |

## MARKING DESCRIPTON

$\bar{F}$ : Product Code

X: Output Voltage Code (for SC70-5, SOT23-3, SOT23-5)

| Vout | Code      | Vout | Code      | Vout | Code      |
|------|-----------|------|-----------|------|-----------|
| 1.0V | 0         | 2.3V | $\bar{3}$ | 3.6V | $\bar{6}$ |
| 1.1V | 1         | 2.4V | $\bar{4}$ | 3.7V | $\bar{7}$ |
| 1.2V | 2         | 2.5V | $\bar{5}$ | 3.8V | $\bar{8}$ |
| 1.3V | 3         | 2.6V | $\bar{6}$ | 3.9V | $\bar{9}$ |
| 1.4V | 4         | 2.7V | $\bar{7}$ | 4.0V | $\bar{0}$ |
| 1.5V | 5         | 2.8V | $\bar{8}$ | 4.1V | $\bar{1}$ |
| 1.6V | 6         | 2.9V | $\bar{9}$ | 4.2V | $\bar{2}$ |
| 1.7V | 7         | 3.0V | $\bar{0}$ | 4.3V | $\bar{3}$ |
| 1.8V | 8         | 3.1V | $\bar{1}$ | 4.4V | $\bar{4}$ |
| 1.9V | 9         | 3.2V | $\bar{2}$ | 4.5V | $\bar{5}$ |
| 2.0V | $\bar{0}$ | 3.3V | $\bar{3}$ |      |           |
| 2.1V | $\bar{1}$ | 3.4V | $\bar{4}$ |      |           |
| 2.2V | $\bar{2}$ | 3.5V | $\bar{5}$ |      |           |

XX: Output Voltage (for DFN1X1-4). "18" stands for 1.8V, "28" stands for 2.8V, and "28" stands for 2.85V.

Z: The Year of manufacturing, "1" stands for year 2011, "2" stands for year 2012, and "8" stands for year 2018.

Z: The week of manufacturing. "A" stands for week 1, "Z" stands for week 26, "A" stands for week 27, "Z" stands for week 52.

## PIN CONFIGURATION

|                          |                      |
|--------------------------|----------------------|
| Product Classification   | BL8568CA5TR□ □       |
| $\bar{F}$ : Product Code |                      |
| X: Output Voltage        |                      |
| ZZ: Date Code            |                      |
| Product Classification   | BL8568CB3TR□ □       |
| F: Product Code          |                      |
| X: Output Voltage        |                      |
| ZZ: Date Code            |                      |
| Product Classification   | BL8568CB5ATR□ □      |
| $\bar{F}$ : Product Code |                      |
| X: Output Voltage        |                      |
| ZZ: Date Code            |                      |
| Product Classification   | BL8568CKETR□ □       |
| XX: Output Voltage       |                      |
| Vss                      | Ground Pin           |
| Vin                      | Supply Voltage Input |
| Vout                     | Output Voltage       |
| CE                       | Chip Enable          |
| NC                       | No Connection        |

## ABSOLUTE MAXIMUM RATING

| Parameter                          |          | Value        |
|------------------------------------|----------|--------------|
| Max Input Voltage                  |          | 8V           |
| Operating Junction Temperature(Tj) |          | 125°C        |
| Output Current                     |          | 500mA        |
| Ambient Temperature(Ta)            |          | -40°C –85°C  |
| Power Dissipation                  | SC70-5   | 250mW        |
|                                    | SOT-23-3 | 250mW        |
|                                    | SOT-23-5 | 250mW        |
|                                    | DFN1x1-4 | 600mW        |
| Storage Temperature(Ts)            |          | -40°C -150°C |
| Lead Temperature & Time            |          | 260°C,10S    |

### Note:

Heat Sink Area of PCB for DFN1x1-4 is recommended at least 2.5mmx4mm.

Exceed these limits to damage to the device.

Exposure to absolute maximum rating conditions may affect device reliability.

## RECOMMENDED WORK CONDITIONS

| Item                 | Min | Recommended | Max. | Unit |
|----------------------|-----|-------------|------|------|
| Input Voltage Range  | 2   |             | 6    | V    |
| Ambient Temperature* | -40 |             | 85   | °C   |

\*The operation ambient temperature range is verified on several test samples. Not a test condition for volume production whose test is only performed under 25°C.

## ELECTRICAL CHARACTERISTICS

(Test Conditions: Cin=1uF,Cout=1uF,TA=25°C, unless otherwise specified. )

BL8568, For Arbitrary Output Voltage

| Symbol   | Parameter                 |           | Conditions                        | Min           | Typ  | Max           | Units |
|--|---------------------------|-----------|-----------------------------------|---------------|------|---------------|-------|
| Vin  | Input Voltage             |           |                                   | 2             |      | 6             | V     |
| Vout   | Output Voltage            | Vout>1.5V | Vin=Set Vout+1V<br>1mA≤Iout≤30mA  | Vout<br>x0.98 | Vout | Vout<br>X1.02 | V     |
|  |                           | Vout≤1.5V |                                   | Vout<br>-0.03 |      | Vout<br>+0.03 |       |
| Iout (Max.)  | Maximun Output Current    |           | Vin-Vout=1V                       | 500           |      |               | mA    |
| Vdrop <sup>1</sup>                                   | Dropout Voltage,Vout≥2.8V |           | Iout=100mA                        |               | 100  | 150           | mV    |
|  |                           |           | Iout=300mA                        |               | 300  | 400           | mV    |
| $\frac{\Delta V_{out}}{\Delta V_{in} \cdot V_{out}}$ | Line Regulation           |           | Iout=40mA<br>2.8V≤Vin≤6V          |               | 0.05 | 0.2           | %/V   |
| $\Delta V_{out} / \Delta I_{out}$                    | Load Regulation           |           | Vin=Set Vout+1V<br>1mA≤Iout≤300mA |               | 50   | 80            | mV    |
| Iss  | Supply Current            |           | Vin=Set Vout+1V                   |               | 35   | 80            | uA    |
| Istandby   | Supply Current (Srandby)  |           | Vin=Set Vout+1V<br>Vce=Vss        |               | 0.1  | 1.0           | uA    |

# BL8568

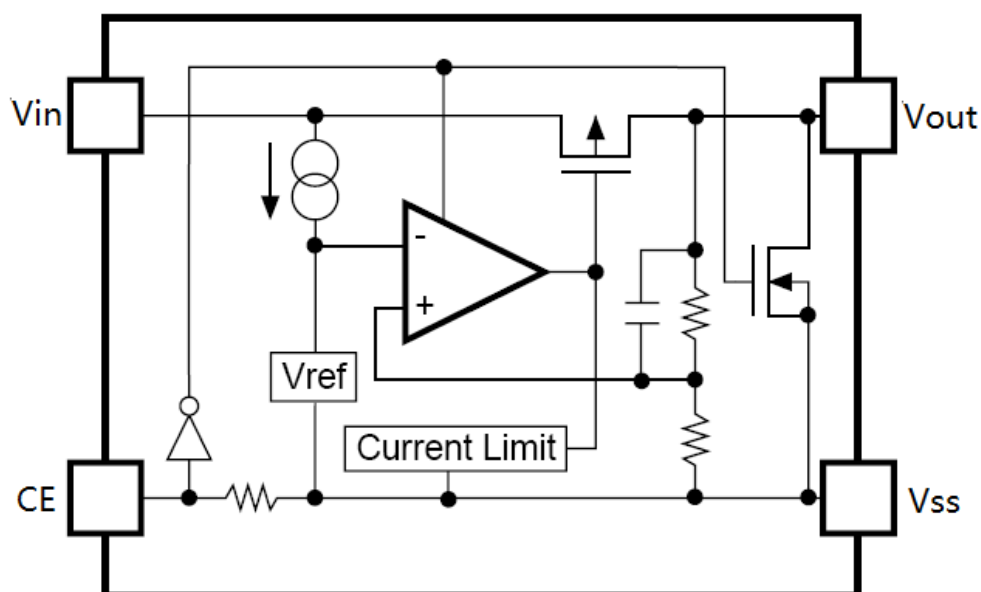
| $\frac{\Delta V_{out}}{\Delta T \cdot V_{out}}$ | Output Voltage Temperature Coefficient | $I_{out}=30mA$                            |     | $\pm 100$ |      | ppm/°C |
|---|--|---|-----|-----------|------|--------|
| PSRR  | Ripple Rejection                       | F=1KHz, Ripple=0.5Vp-p<br>Vin=Set Vout+1V |     | 70        |      | dB     |
| Ilim  | Current Limit                          |   | 500 |           |      | mA     |
| Vceh  | CE Input Voltage "H"                   |   | 1.5 |           | Vin  | V      |
| Vcel  | CE Input Voltage "L"                   |   | 0   |           | 0.25 | V      |
| en  | Output Noise                           | BW=10Hz~100kHz                            |     | 47        |      | uVrms  |
| Rdischarge                                      | Discharge Resistor                     | CE=0, Vout=3.0V                           |     | 1.5K      |      | ohm    |
| Rcepd   | CE pin pull down resistor              | CE=Vin=5V                                 |     | 5M        |      | ohm    |

## NOTE:

$V_{drop} = V_{in1} - (V_{out2} * 0.98)$   $V_{out2}$  is the output voltage when  $V_{in} = V_{out1} + 1.0V$  and  $I_{out} = 300mA$ .

$V_{in1}$  is the input voltage at which the output voltage becomes 98% of  $V_{out1}$  after gradually decreasing the input voltage.

## BLOCK DIAGRAM



## EXPLANATION

BL8568 series is a group of positive voltage output, low noise, low power consumption, low dropout voltage regulator.

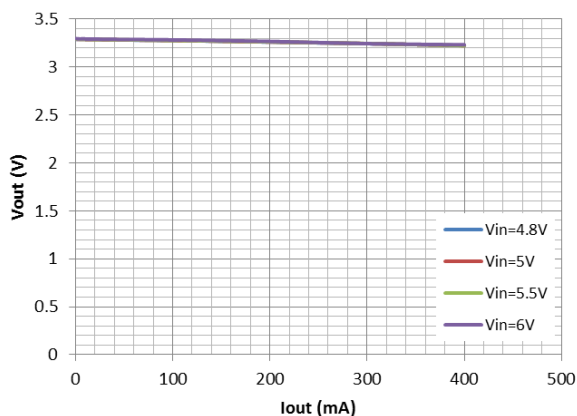
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BL8568 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

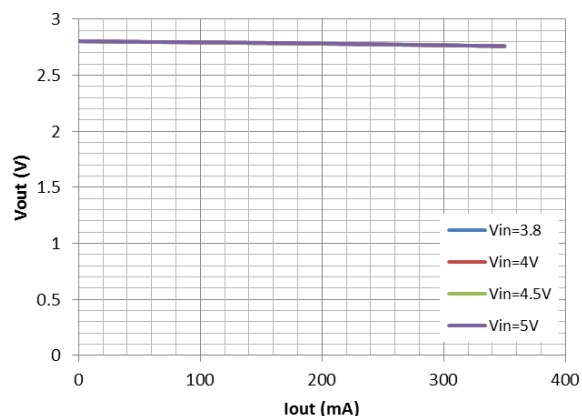
BL8568 has excellent load and line transient response and good temperature characteristics, which can assure the stability of chip and power system. And it uses trimming technique to guarantee output voltage accuracy within  $\pm 2\%$ .

## TYPICAL PERFORMANCE CHARACTERISTICS ( $T=25^{\circ}C$ )

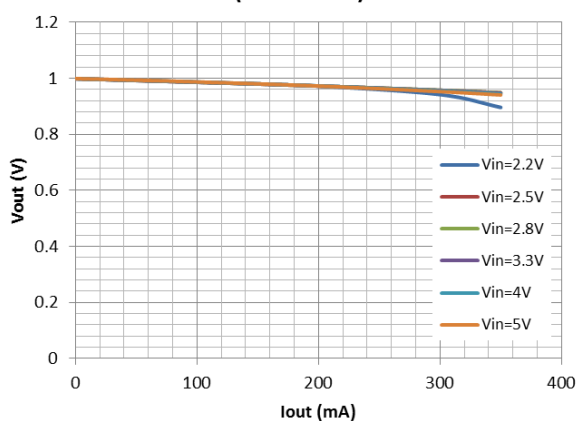
**Load Regulation**  
( $V_{out}=3.3V$ )



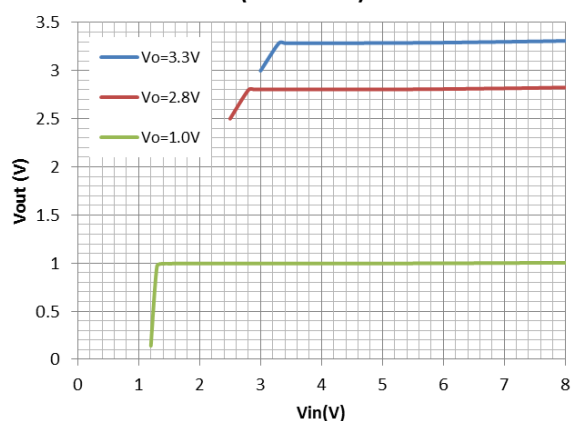
**Load Regulation**  
( $V_{out}=2.8V$ )



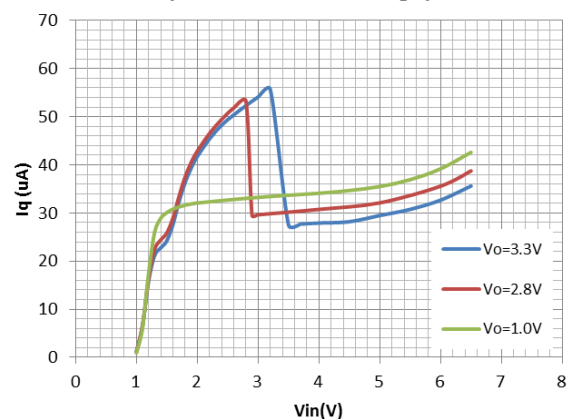
**Load Regulation**  
( $V_{out}=1.0V$ )



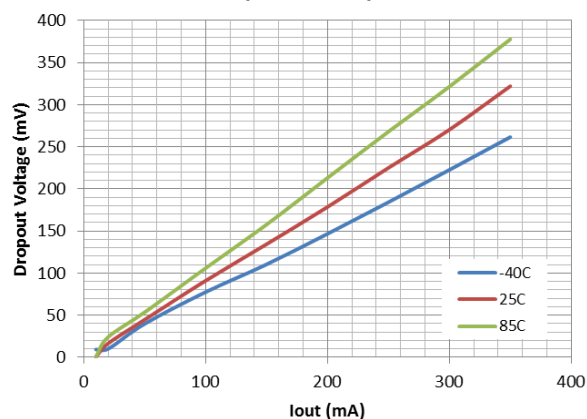
**Line Regulation**  
( $I_{out}=0mA$ )



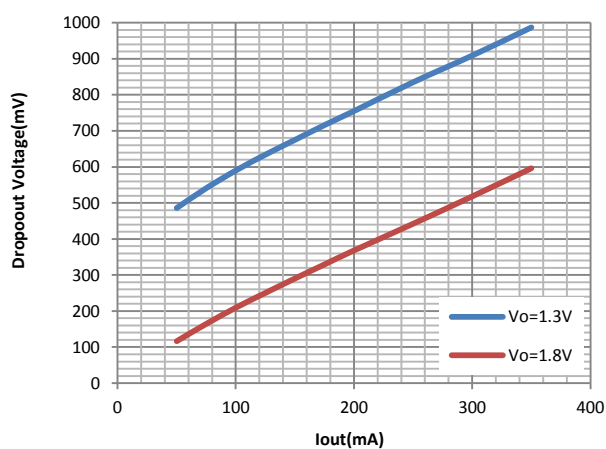
**Quiescent Current**  
( $I_{out}=0mA$  and  $CE=high$ )



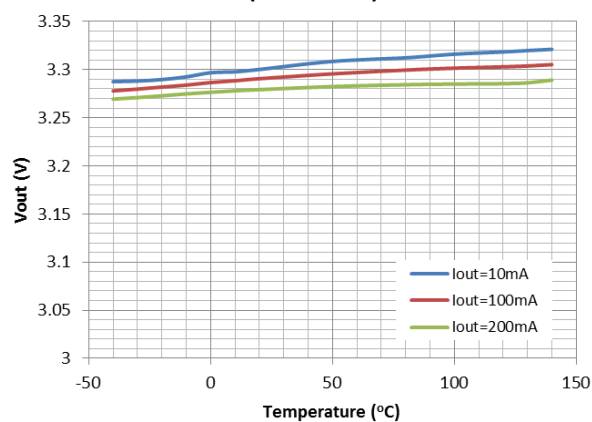
**Dropout Voltage**  
( $V_{out}=3.3V$ )



## Dropout Voltage

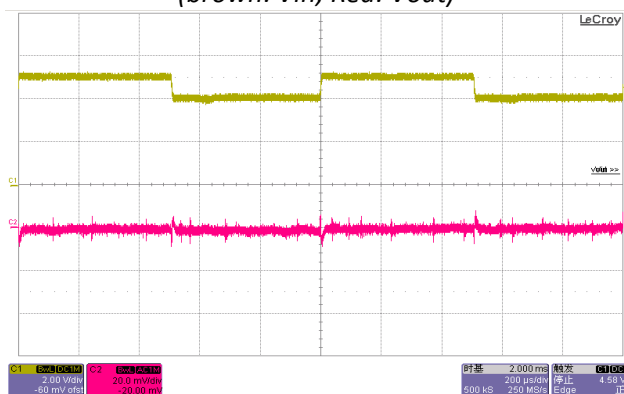


## Vout Temperature Coefficient (Vout=3.3V)



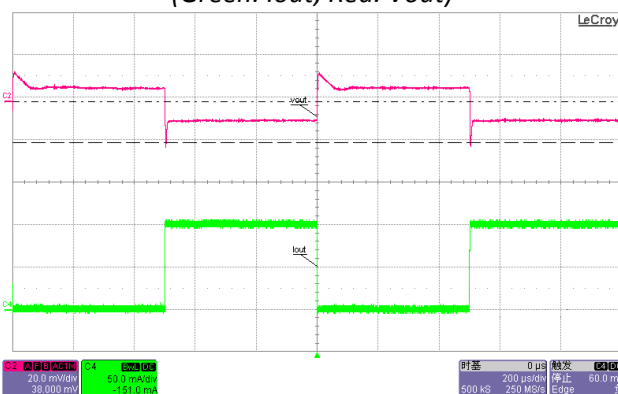
## Line Transient Response

Vout=3.3V, Iout=20mA  
(brown: Vin; Red: Vout)

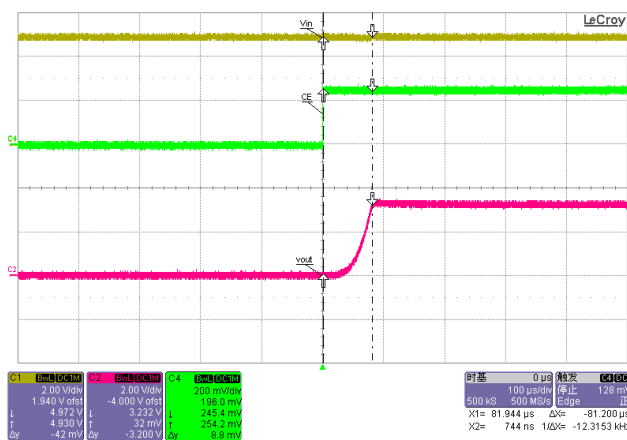


## Load Transient Response

Vin=5V, Vout=3.3V, Iout=1-100mA  
(Green: Iout; Red: Vout)



## CE Chip Enable Response



## PACKAGE OUTLINE

| Package   | SC70-5 | Devices per reel | 3000Pcs | Unit | mm |
|---|--------|------------------|---------|------|----|
| Package dimension:  |        |                  |         |      |    |
| <p>Technical drawing of the SC70-5 package. The top view shows a rectangular body with a width of <math>2.025 \pm 0.025</math> mm and a height of <math>2.125 \pm 0.325</math> mm. The distance between the two pairs of pins is <math>0.275 \pm 0.125</math> mm. The height of the pins is <math>1.25 \pm 0.1</math> mm. The side view shows a lead height of <math>0.17 \pm 0.09</math> mm and a lead thickness of <math>0.335 \pm 0.125</math> mm. The end view shows a width of <math>0.95 \pm 0.15</math> mm and a pin thickness of <math>0.1</math> mm. The distance between the two pairs of pins in the end view is <math>0.65</math> mm.</p> |        |                  |         |      |    |

| Package   | SOT-23-5 | Devices per reel | 3000Pcs | Unit | mm |
|---|----------|------------------|---------|------|----|
| Package Dimension:  |          |                  |         |      |    |
| <p>Technical drawing of the SOT-23-5 package. The top view shows a rectangular body with a width of <math>2.9 \pm 0.2</math> mm and a height of <math>1.6 \pm 0.1</math> mm. The distance between the two pairs of pins is <math>1.9 \pm 0.2</math> mm, with individual pin spacing of <math>(0.95)</math> mm. The height of the pins is <math>1.1 \pm 0.2</math> mm. The side view shows a lead height of <math>0.8 \pm 0.1</math> mm and a lead thickness of <math>0.15 \pm 0.05</math> mm. The end view shows a width of <math>0.4 \pm 0.1</math> mm and a pin thickness of <math>0.2</math> MIN. The distance between the two pairs of pins in the end view is <math>0</math> to <math>0.1</math> mm.</p> |          |                  |         |      |    |

