芯伯乐®
XINBOLE

Product Specification

XBLW LM4040

Precision Low-Power Shunt Voltage Reference

WEB | www.xinboleic.com

Description

The LM4040 is a family of bandgap circuits designed to achieve precision micro-power voltage references of 2.5V, 3.0V, 3.3V, 4.096V, and 5.0V. The devices are available in 0.1% A-grade,0.2% B-grade, 0.5% C-grade, and 1% D-grade initial tolerances.

They are available in small outline SOT23-3L/SC70-5/TO-92 surface mount packages, which are ideal for applications where space is at a premium.

Excellent performance is maintained over the 20μA to 15mA operating current range with a typical temperature coefficient of only 20ppm/°C. The device is designed to be highly tolerant of capacitive loads, which maintains excellent stability.

This device offers a pin for pin compatible alternative to the LM4040 voltage reference.

Features

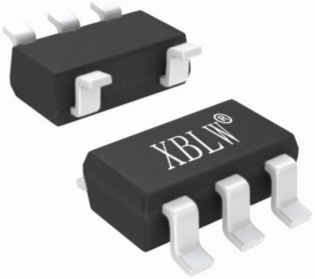
- Small Package: SOT23-3L,SC70-5,TO-92
  - No Output Capacitor Required
- Output Voltage Tolerance
  - LM4040A: ±0.1% at +25°C
  - LM4040B: ±0.2% at +25°C
  - LM4040C : ±0.5% at +25°C
  - LM4040D: ±1% at +25°C
- Low Output Noise
- (10Hz to 10kHz) 45μVRMS
- Wide Operating Current Range 60μA to 15mA
- Extended Temperature Range -40°C to +125°C
- Low Temperature Coefficient 100 ppm/°C (max)

SOT-23-3L

Applications

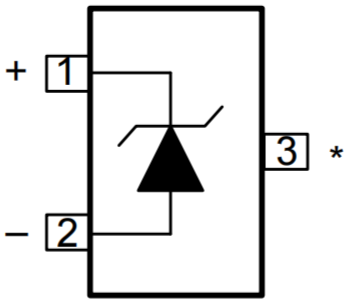
- Battery Powered Equipment
- Precision Power Supplies
- Portable Instrumentation
- Portable Communications Devices
- Notebook and Palmtop Computers
- Data Acquisition Systems

T0-92



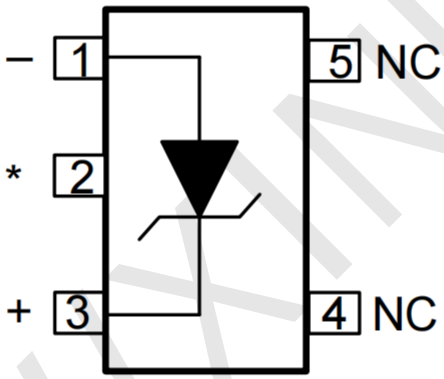
SC70-5

Pin Assignments

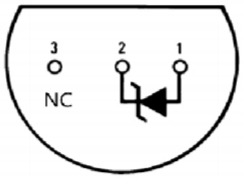


* Pin 3 must be left floating or connected to pin 2
SOT23-3L

(Top View)



* Pin 2 must be left floating or connected to pin 1
SC70-5



* Pin 3 must be left floating or connected to pin 1

TO92

Ordering Information SOT23-3L

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW LM4040AIM3X-2.5	SOT-23-3L	R2A	Tape	3000Pcs/Reel
XBLW LM4040BIM3X-2.5	SOT-23-3L	R2B	Tape	3000Pcs/Reel
XBLW LM4040CIM3X-2.5	SOT-23-3L	R2C	Tape	3000Pcs/Reel
XBLW LM4040DIM3X-2.5	SOT-23-3L	R2D	Tape	3000Pcs/Reel
XBLW LM4040AIM3X-3.0	SOT-23-3L	RKA	Tape	3000Pcs/Reel
XBLW LM4040BIM3X-3.0	SOT-23-3L	RKB	Tape	3000Pcs/Reel
XBLW LM4040CIM3X-3.0	SOT-23-3L	RKC	Tape	3000Pcs/Reel
XBLW LM4040DIM3X-3.0	SOT-23-3L	RKD	Tape	3000Pcs/Reel
XBLW LM4040AIM3X-3.3	SOT-23-3L	R3A	Tape	3000Pcs/Reel
XBLW LM4040BIM3X-3.3	SOT-23-3L	R3B	Tape	3000Pcs/Reel
XBLW LM4040CIM3X-3.3	SOT-23-3L	R3C	Tape	3000Pcs/Reel
XBLW LM4040DIM3X-3.3	SOT-23-3L	R3D	Tape	3000Pcs/Reel
XBLW LM4040AIM3X-4.1	SOT-23-3L	R4A	Tape	3000Pcs/Reel
XBLW LM4040BIM3X-4.1	SOT-23-3L	R4B	Tape	3000Pcs/Reel
XBLW LM4040CIM3X-4.1	SOT-23-3L	R4C	Tape	3000Pcs/Reel
XBLW LM4040DIM3X-4.1	SOT-23-3L	R4D	Tape	3000Pcs/Reel
XBLW LM4040AIM3X-5.0	SOT-23-3L	R5A	Tape	3000Pcs/Reel
XBLW LM4040BIM3X-5.0	SOT-23-3L	R5B	Tape	3000Pcs/Reel
XBLW LM4040CIM3X-5.0	SOT-23-3L	R5C	Tape	3000Pcs/Reel
XBLW LM4040DIM3X-5.0	SOT-23-3L	R5D	Tape	3000Pcs/Reel

Note: The seal will be updated according to the batch. If you have any questions, please consult the sales staff.

.

Ordering Information SC70-5*

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW LM4040AIZ-2.5	SC70-5	R2A	Tape	3000Pcs/Reel
XBLW LM4040BIZ-2.5	SC70-5	R2B	Tape	3000Pcs/Reel
XBLW LM4040CIZ-2.5	SC70-5	R2C	Tape	3000Pcs/Reel
XBLW LM4040DIZ-2.5	SC70-5	R2D	Tape	3000Pcs/Reel
XBLW LM4040AIZ-3.0	SC70-5	RKA	Tape	3000Pcs/Reel
XBLW LM4040BIZ-3.0	SC70-5	RKB	Tape	3000Pcs/Reel
XBLW LM4040CIZ-3.0	SC70-5	RKC	Tape	3000Pcs/Reel
XBLW LM4040DIZ-3.0	SC70-5	RKD	Tape	3000Pcs/Reel
XBLW LM4040AIZ-3.3	SC70-5	R3A	Tape	3000Pcs/Reel
XBLW LM4040BIZ-3.3	SC70-5	R3B	Tape	3000Pcs/Reel
XBLW LM4040CIZ-3.3	SC70-5	R3C	Tape	3000Pcs/Reel
XBLW LM4040DIZ-3.3	SC70-5	R3D	Tape	3000Pcs/Reel
XBLW LM4040AIZ-4.1	SC70-5	R4A	Tape	3000Pcs/Reel
XBLW LM4040BIZ-4.1	SC70-5	R4B	Tape	3000Pcs/Reel
XBLW LM4040CIZ-4.1	SC70-5	R4C	Tape	3000Pcs/Reel
XBLW LM4040DIZ-4.1	SC70-5	R4D	Tape	3000Pcs/Reel
XBLW LM4040AIZ-5.0	SC70-5	R5A	Tape	3000Pcs/Reel
XBLW LM4040BIZ-5.0	SC70-5	R5B	Tape	3000Pcs/Reel
XBLW LM4040CIZ-5.0	SC70-5	R5C	Tape	3000Pcs/Reel
XBLW LM4040DIZ-5.0	SC70-5	R5D	Tape	3000Pcs/Reel

Note: The seal will be updated according to the batch. If you have any questions, please consult the sales staff.
*Note: Production according to customer orders, please consult sales personnel.

Ordering Information TO-92*

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW LM4040AIZ-2.5	TO-92	4040A IZ2.5	Bag	2000Pcs/Bag
XBLW LM4040BIZ-2.5	TO-92	4040B IZ2.5	Bag	2000Pcs/Bag
XBLW LM4040CIZ-2.5	TO-92	4040C IZ2.5	Bag	2000Pcs/Bag
XBLW LM4040DIZ-2.5	TO-92	4040D IZ2.5	Bag	2000Pcs/Bag
XBLW LM4040AIZ-3.0	TO-92	4040A IZ3.0	Bag	2000Pcs/Bag
XBLW LM4040BIZ-3.0	TO-92	4040B IZ3.0	Bag	2000Pcs/Bag
XBLW LM4040CIZ-3.0	TO-92	4040C IZ3.0	Bag	2000Pcs/Bag
XBLW LM4040DIZ-3.0	TO-92	4040D IZ3.0	Bag	2000Pcs/Bag
XBLW LM4040AIZ-3.3	TO-92	4040A IZ3.3	Bag	2000Pcs/Bag
XBLW LM4040BIZ-3.3	TO-92	4040B IZ3.3	Bag	2000Pcs/Bag
XBLW LM4040CIZ-3.3	TO-92	4040C IZ3.3	Bag	2000Pcs/Bag
XBLW LM4040DIZ-3.3	TO-92	4040D IZ3.3	Bag	2000Pcs/Bag
XBLW LM4040AIZ-4.1	TO-92	4040A IZ4.1	Bag	2000Pcs/Bag
XBLW LM4040BIZ-4.1	TO-92	4040B IZ4.1	Bag	2000Pcs/Bag
XBLW LM4040CIZ-4.1	TO-92	4040C IZ4.1	Bag	2000Pcs/Bag
XBLW LM4040DIZ-4.1	TO-92	4040D IZ4.1	Bag	2000Pcs/Bag
XBLW LM4040AIZ-5.0	TO-92	4040A IZ5.0	Bag	2000Pcs/Bag
XBLW LM4040BIZ-5.0	TO-92	4040B IZ5.0	Bag	2000Pcs/Bag
XBLW LM4040CIZ-5.0	TO-92	4040C IZ5.0	Bag	2000Pcs/Bag
XBLW LM4040DIZ-5.0	TO-92	4040D IZ5.0	Bag	2000Pcs/Bag

Note: The seal will be updated according to the batch. If you have any questions, please consult the sales staff.
*Note: Production according to customer orders, please consult sales personnel.

Absolute Maximum Ratings (Voltages to Anode Unless Otherwise Stated)

Parameter	Rating	Unit
Continuous Reverse Current	20	mA
Continuous Forward Current	10	mA
Operating Junction Temperature	-40 to +150	°C
Storage Temperature	-55 to +150	°C
Human Body Model	4	KV
Machine Model	0.4	KV

Caution: Stresses greater than the *Absolute Maximum Ratings* specified above, may cause permanent damage to the device. These are stress ratings only; functional operation of the device at conditions between maximum recommended operating conditions and absolute maximum ratings is not implied. Device reliability may be affected by exposure to absolute maximum rating conditions for extended periods of time.

(Semiconductor devices are ESD sensitive and may be damaged by exposure to ESD events. Suitable ESD precautions should be taken when handling and transporting these devices.)

Unless otherwise stated voltages specified are relative to the Anode pin.

Recommended Operating Conditions

Parameter	Min	Max	Unit
Reverse Current	0.06	15	mA
Operating Ambient Temperature Range	-40	+125	°C

Electrical Characteristics (continued) (Test conditions: TA = +25°C, unless otherwise specified.)

LM4040-25

Symbol	Parameter	Conditions		Typ	LM4040				Unit
		—	TA		A Limits	B Limits	C Limits	D Limits	
V_{REF}	Reverse Breakdown Voltage	I_R = 100μA	+25°C	2.5	—	—	—	—	V
	Reverse Breakdown Voltage Tolerance	I_R = 100μA	+25°C	—	±2.5	±5	±12	±25	mV
			-40 to +85°C		±19	±21	±29	±49	
			-40 to +125°C		±28	±30	±38	±63	
I_{RMIN}	Minimum Operating Current	—	+25°C	45	60	60	60	65	μA
			-40 to +85°C	—	65	65	65	70	
			-40 to +125°C		68	68	68	73	
$\Delta V_R/\Delta T$	Average Reverse Breakdown Voltage Temperature Coefficient	I_R = 10mA	-40 to +125°C	±20	±100	±100	±100	±150	ppm/°C
		I_R = 1mA		±15					
		I_R = 100μA		±15					
$\Delta V_R/\Delta I_R$	Reverse Breakdown Change with Current	$I_{RMIN} \le I_R \le$ 1mA	+25°C	0.3	0.8	0.8	0.8	1.0	mV
			-40 to +85°C	—	1.0	1.0	1.0	1.2	
			-40 to +125°C		1.0	1.0	1.0	1.2	
		1mA ≤ I_R ≤ 15mA	+25°C	2.5	6.0	6.0	6.0	8.0	
			-40 to +85°C	—	8.0	8.0	8.0	10.0	
			-40 to +125°C		8.0	8.0	8.0	10.0	
Z_R	Dynamic Output Impedance	I_R= 1mA, f = 120Hz I_{AC} = 0.1IR		0.3	0.8	0.9	0.9	1.1	Ω
e_n	Noise Voltage	I_R = 100μA 10Hz < f < 10kHz		35	—	—	—	—	μV_{RMS}
V_R	Long Term Stability (Non-Cumulative)	t = 1000Hrs, I_R= 100μA		120	—	—	—	—	ppm
V_{HYST}	Thermal Hysteresis	ΔT = -40°C to +125°C		0.08	—	—	—	—	%

Electrical Characteristics (continued) (Test conditions: TA = +25°C, unless otherwise specified.)

LM4040-30

Symbol	Parameter	Conditions		Typ	LM4040				Unit
		—	TA		A Limits	B Limits	C Limits	D Limits	
V_{REF}	Reverse Breakdown Voltage	I_R = 100μA	+25°C	3.0	—	—	—	—	V
	Reverse Breakdown Voltage Tolerance	I_R = 100μA	+25°C	—	±3	±6	±15	±30	mV
			-40 to +85°C		±22	±26	±34	±59	
			-40 to +125°C		±35	±37	±45	±75	
I_{RMIN}	Minimum Operating Current	—	+25°C	47	62	62	62	67	μA
			-40 to +85°C	—	67	67	67	72	
			-40 to +125°C		70	70	70	75	
$\Delta V_R/\Delta T$	Average Reverse Breakdown Voltage Temperature Coefficient	I_R = 10mA	-40 to +125°C	±20	±100	±100	±100	±150	ppm/°C
		I_R = 1mA		±15					
		I_R = 100μA		±15					
$\Delta V_R/\Delta I_R$	Reverse Breakdown Change with Current	$I_{RMIN} \le I_R \le$ 1mA	+25°C	0.4	0.8	0.8	0.8	1.0	mV
			-40 to +85°C	—	1.1	1.1	1.1	1.3	
			-40 to +125°		1.1	1.1	1.1	1.3	
		1mA ≤ I_R ≤ 15mA	C	2.7	6.0	6.0	6.0	8.0	
			-40 to +85°C	—	9.0	9.0	9.0	11.0	
			-40 to +125°C		9.0	9.0	9.0	11.0	
Z_R	Dynamic Output Impedance	I_R= 1mA, f = 120Hz I_{AC} = 0. 1IR		0.4	0.9	0.9	0.9	1.2	Ω
e_n	Noise Voltage	I_R = 100μA 10Hz < f < 10kHz		35	—	—	—	—	μV_{RMS}
V_R	Long Term Stability (Non-Cumulative)	t = 1000Hrs, I_R= 100μA		120	—	—	—	—	ppm
V_{HYST}	Thermal Hysteresis	ΔT = -40°C to +125°C		0.08	—	—	—	—	%

Electrical Characteristics (cont.) (@TA = +25°C, unless otherwise specified.)

LM4040-33

Symbol	Parameter	Conditions		Typ	LM4040				Units
		-	TA		A Limits	B Limits	C Limits	D Limits	
V_{REF}	Reverse Breakdown Voltage	I_R = 100μA	+25°C	3.3	—	—	—	—	V
	Reverse Breakdown Voltage Tolerance	I_R = 100μA	+25°C	—	±3.3	±6.6	±16.5	±33	mV
			-40 to +85°C		±26	±28	±38	±65	
			-40 to +125°C		±38	±40	±50	±83	
I_{RMIN}	Minimum Operating Current	—	+25°C	47	62	62	62	67	μA
			-40 to +85°C	—	67	67	67	72	
			-40 to +125°C		70	70	70	75	
$\Delta V_R/\Delta T$	Average Reverse Breakdown Voltage Temperature Coefficiet	I_R= 10mA	-40 to +125°C	±20	±100	±100	±100	±150	ppm/°C
		I_R = 1mA		±15					
		I_R = 100μA		±15					
$\Delta V_R/\Delta I_R$	Reverse Breakdown Change With Current	I_{RMIN} I_R< 1mA	+25°C	0.4	0.8	0.8	0.8	1	mV
			-40 to +85°C	—	1.1	1.1	1.1	1.3	
			-40 to +125°C		1.1	1.1	1.1	1.3	
		1mA < I_R < 15mA	+25°C	2.7	6	6	6	8	
			-40 to +85°C	—	9.0	9.0	9	11	
			-40 to +125°C		9.0	9.0	9	11	
Z_R	Dynamic Output Impedance	I_R= 1mA, f = 120Hz, I_{AC} = 0. 1IR		0.4	0.9	0.9	0.9	1.2	Ω
e_n	Noise Voltage	I_R= 100μA, 10Hz < f < 10kHz		35	—	—	—	—	μV RMS
V_R	Long Term Stability (Non-Cumulative)	t = 1000Hrs, I_R = 100μA		120	—	—	—	—	ppm
V_{HYST}	Thermal Hysteresis	ΔT = -40°C to = +125°C		0.08	—	—	—	—	%

Electrical Characteristics (cont.) (@TA = +25°C, unless otherwise specified.)

LM4040-41

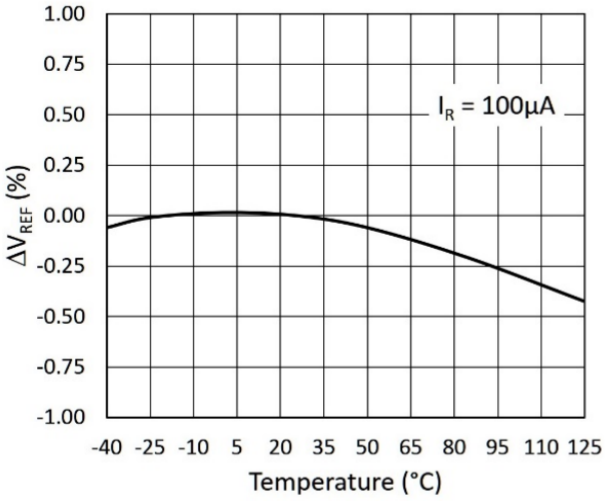
Symbol	Parameter	Conditions		Typ	LM4040				Units
			TA		A Limits	B Limits	C Limits	D Limits	
V_{REF}	Reverse Breakdown Voltage	I_R= 100μA	+25°C	4.096	—	—	—	—	V
	Reverse Breakdown Voltage Tolerance	I_R= 100μA	+25°C	—	±4.1	±8.2	±20	±41	mV
			-40 to +85°C		±33	±35	±47	±81	
			-40 to +125°C		±47	±49	±60	±102	
I_{RMIN}	Minimum Operating Current	—	+25°C	50	83	83	83	83	μA
			-40 to +85°C	—	88	88	88	88	
			-40 to +125°C		88	88	88	88	
$\Delta V_R/\Delta T$	Average Reverse Breakdown Voltage Temperature Coefficient	I_R= 10mA	-40 to +125°C	±30	±100	±100	±100	±150	ppm/°C
		I_R = 1mA		±20					
		I_R= 100μA		±20					
$\Delta V_R/\Delta I_R$	Reverse Breakdown Change With Current	I_{RMIN} I_R< 1mA	+25°C	0.5	0.9	0.9	0.9	1.2	mV
			-40 to +85°C	—	1.2	1.2	1.2	1.5	
			-40 to +125°C		1.2	1.2	1.2	1.5	
		1mA < I_R < 15mA	+25°C	3	7	7	7	9	
			-40 to +85°C	—	10	10	10	13	
			-40 to +125°C		10	10	10	13	
Z_R	Dynamic Output Impedance	I_R = 1mA, f = 120Hz I_{AC} = 0. 1IR		0.5	1	1	1	1.3	Ω
e_n	Noise Voltage	I_R = 100μA, 10Hz < f < 10kHz		64	—	—	—	—	μV RMS
V_R	Long Term Stability (Non-Cumulative)	t = 1000Hrs, I_R = 100μA		120	—	—	—	—	ppm
V_{HYST}	Thermal Hysteresis	ΔT = -40°C to = +125°C		0.08	80	80			%

Electrical Characteristics (cont.) (Test conditions: TA = +25°C, unless otherwise specified.)

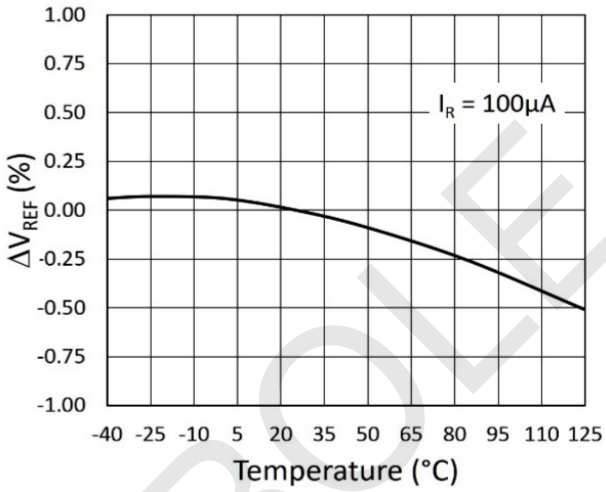
LM4040-50

Symbol	Parameter	Conditions		Typ	LM4040				Units
		—	TA		A Limits	B Limits	C Limits	D Limits	
V_{REF}	Reverse Breakdown Voltage	I_R = 100μA	+25°C	5.0	—	—	—	—	V
	Reverse Breakdown Voltage Tolerance	I_R = 100μA	+25°C	—	±5	±10	±25	±50	mV
			-40 to +85°C		±41	±43	±58	±99	
			-40 to +125°C		±58	±60	±75	±125	
I_{RMIN}	Minimum Operating Current	—	+25°C	54	74	74	74	79	μA
			-40 to +85°C	—	80	80	80	85	
			-40 to +125°C		83	83	83	88	
$\Delta V_R/\Delta T$	Average Reverse Breakdown Voltage Temperature Coefficient	I_R = 10mA	-40 to +125°C	±30	±100	±100	±100	±150	ppm/°C
		I_R = 1mA		±20					
		I_R = 100μA		±20					
$\Delta V_R/\Delta I_R$	Reverse Breakdown Change with Current	$I_{RMIN} \le I_R \le$ 1mA	+25°C	0.5	1.0	1.0	1.0	1.3	mV
			-40 to +85°C	—	1.4	1.4	1.4	1.8	
			-40 to +125°C		1.4	1.4	1.4	1.8	
		1mA ≤ I_R ≤ 15mA	+25°C	3.5	8.0	8.0	8.0	10.0	
			-40 to +85°C	—	12.0	12.0	12.0	15.0	
			-40 to +125°C		12.0	12.0	12.0	15.0	
Z_R	Dynamic Output Impedance	I_R = 1mA, f = 120Hz I_{AC} = 0.1IR		0.5	1.1	1.1	1.1	1.5	Ω
en	Noise Voltage	I_R = 100μA 10Hz < f < 10kHz		80	—	—	—	—	μV_{RMS}
VR	Long Term Stability (Non-Cumulative)	t = 1000Hrs, I_R = 100μA		120	—	—	—	—	ppm
VHYST	Thermal Hysteresis	ΔT = -40°C to +125°C		0.08	—	—	—	—	%

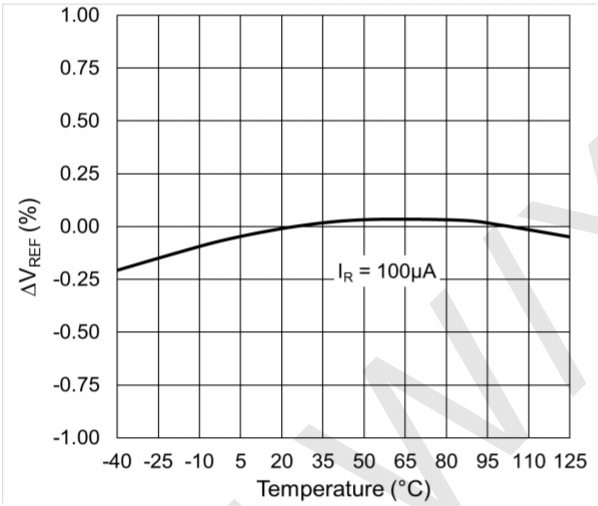
Typical Characteristics – Reference Voltage Temperature Coefficient at 100μA



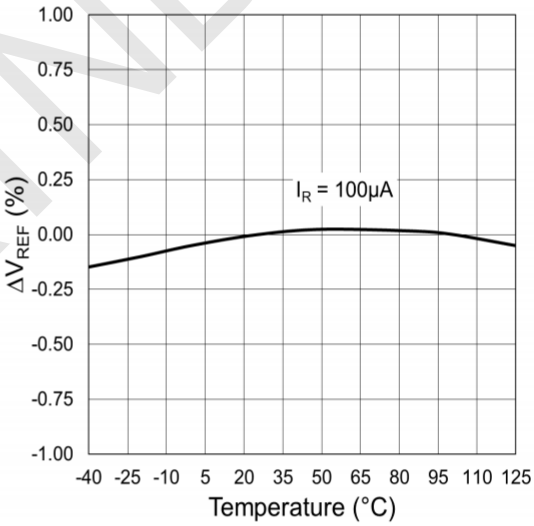
LM4040-25



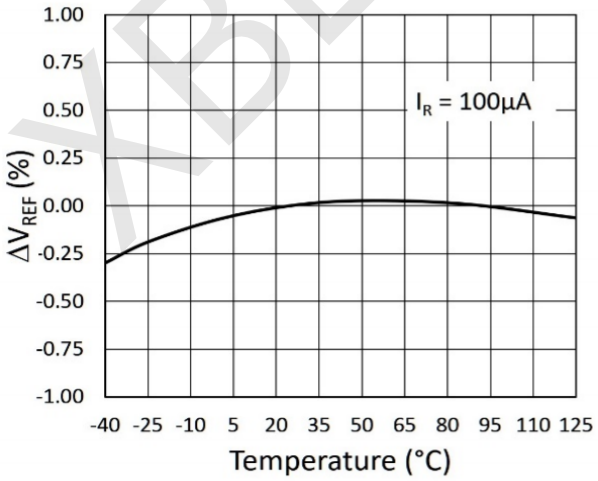
LM4040-30



LM4040-33

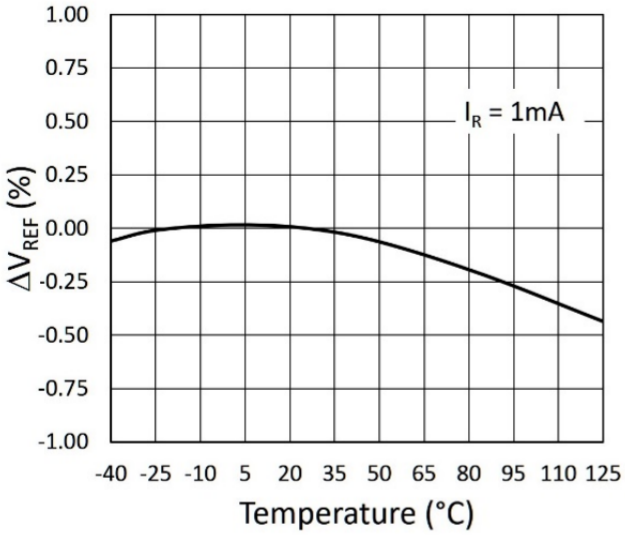


LM4040-41

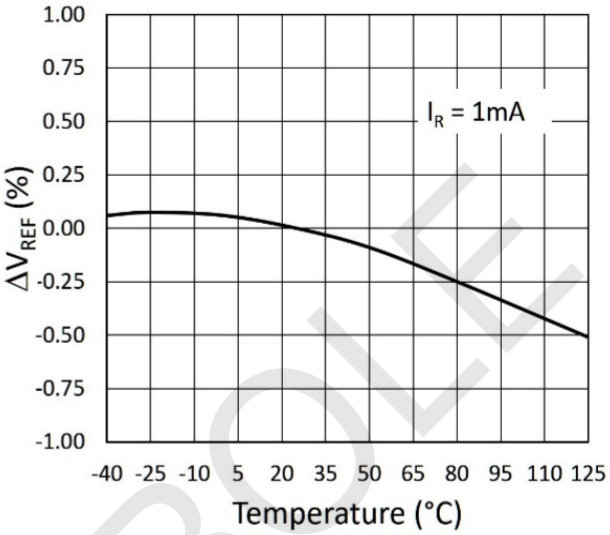


LM4040-50

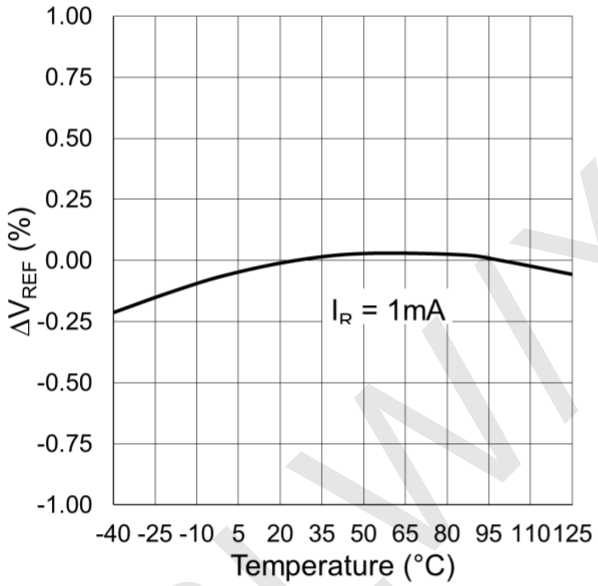
Typical Characteristics – Reference Voltage Temperature Coefficient at 1mA



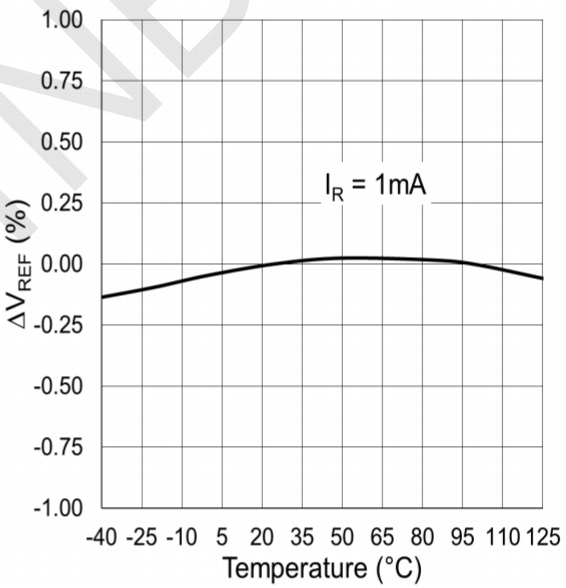
LM4040-25



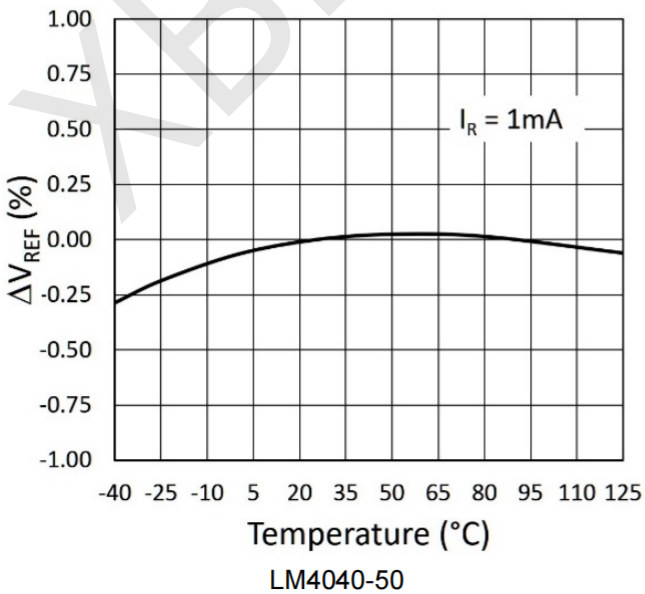
LM4040-30



LM4040-33

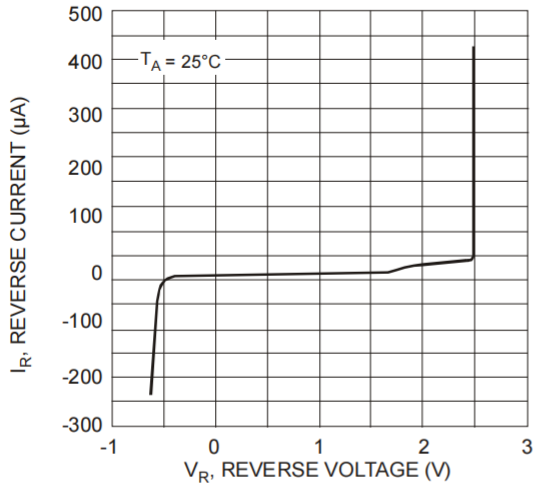


LM4040-41

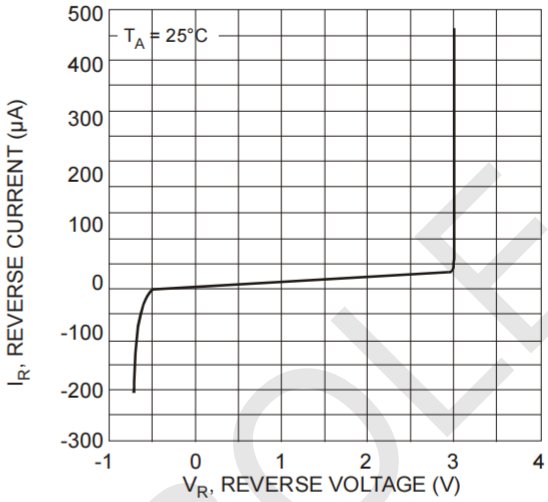


LM4040-50

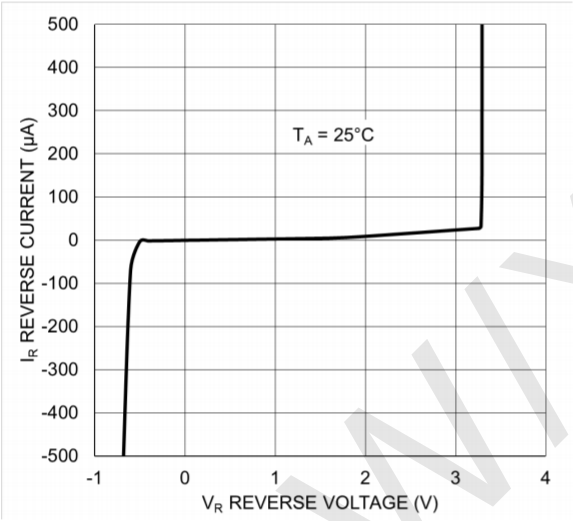
Typical Characteristics – Reverse Characteristics



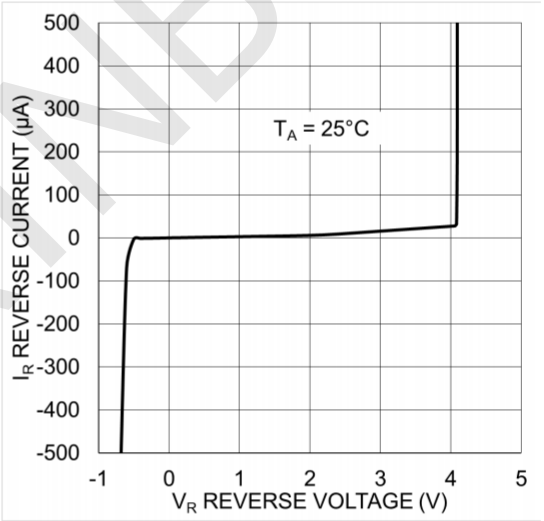
LM4040-25



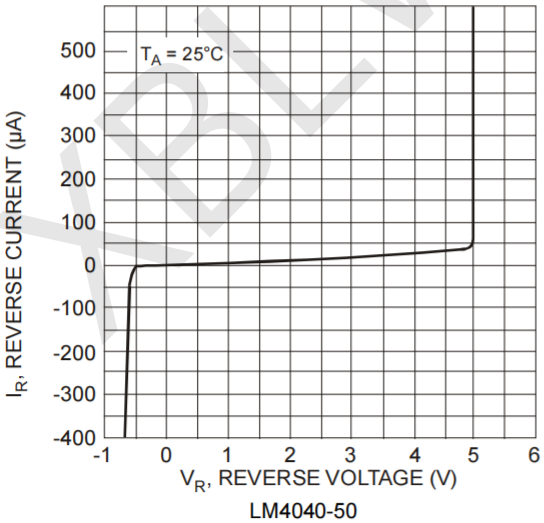
LM4040-30



LM4040-33



LM4040-41



LM4040-50

Application Information

In a conventional shunt regulator application (Figure 1), an external series resistor (R_S) is connected between the supply voltage, V_S, and the LM4040.

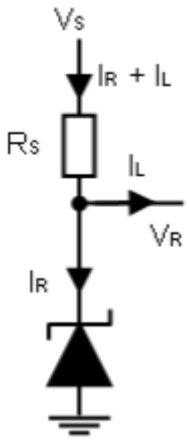


Figure 1

R_S determines the current that flows through the load (I_L) and the LM4040 (I_R). Because load current and supply voltage can vary, R_S should be small enough to supply at least the minimum acceptable I_R to the LM4040 even when the supply voltage is at its minimum and the load current is at its maximum value. When the supply voltage is at its maximum and I_L is at its minimum, R_S should be large enough so that the current flowing through the LM4040 is less than 15mA.

RS is determined by the supply voltage, (V_S), the load and operating current, (I_L and I_R), and the LM4040's reverse breakdown voltage, V_R.

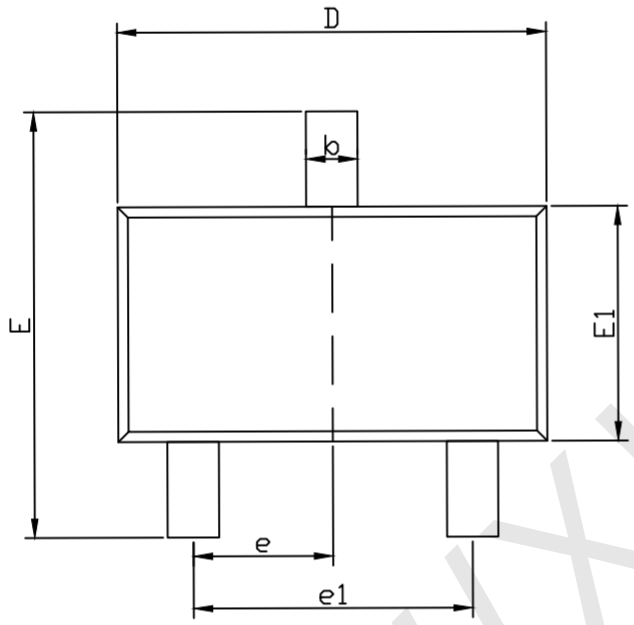
$$R_S = \frac{V_S - V_R}{I_L + I_R}$$

Printed Circuit Board Layout Considerations

The LM4040 device in the SOT23 package has the die attached to pin 3, which results in an electrical contact between pin 2 and pin 3. Therefore, pin 3 of the SOT23 package must be left floating or connected to pin 2.

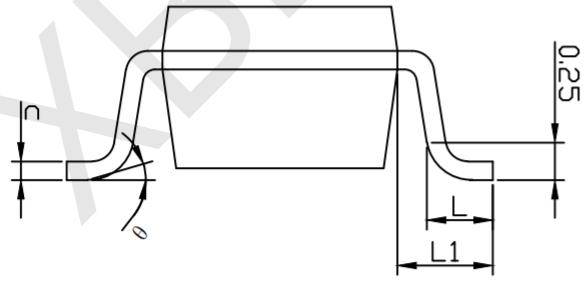
Package Information

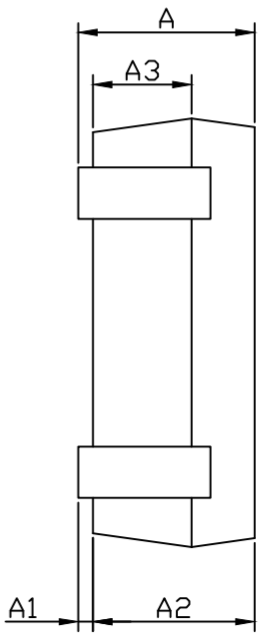
- SOT23-3L



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

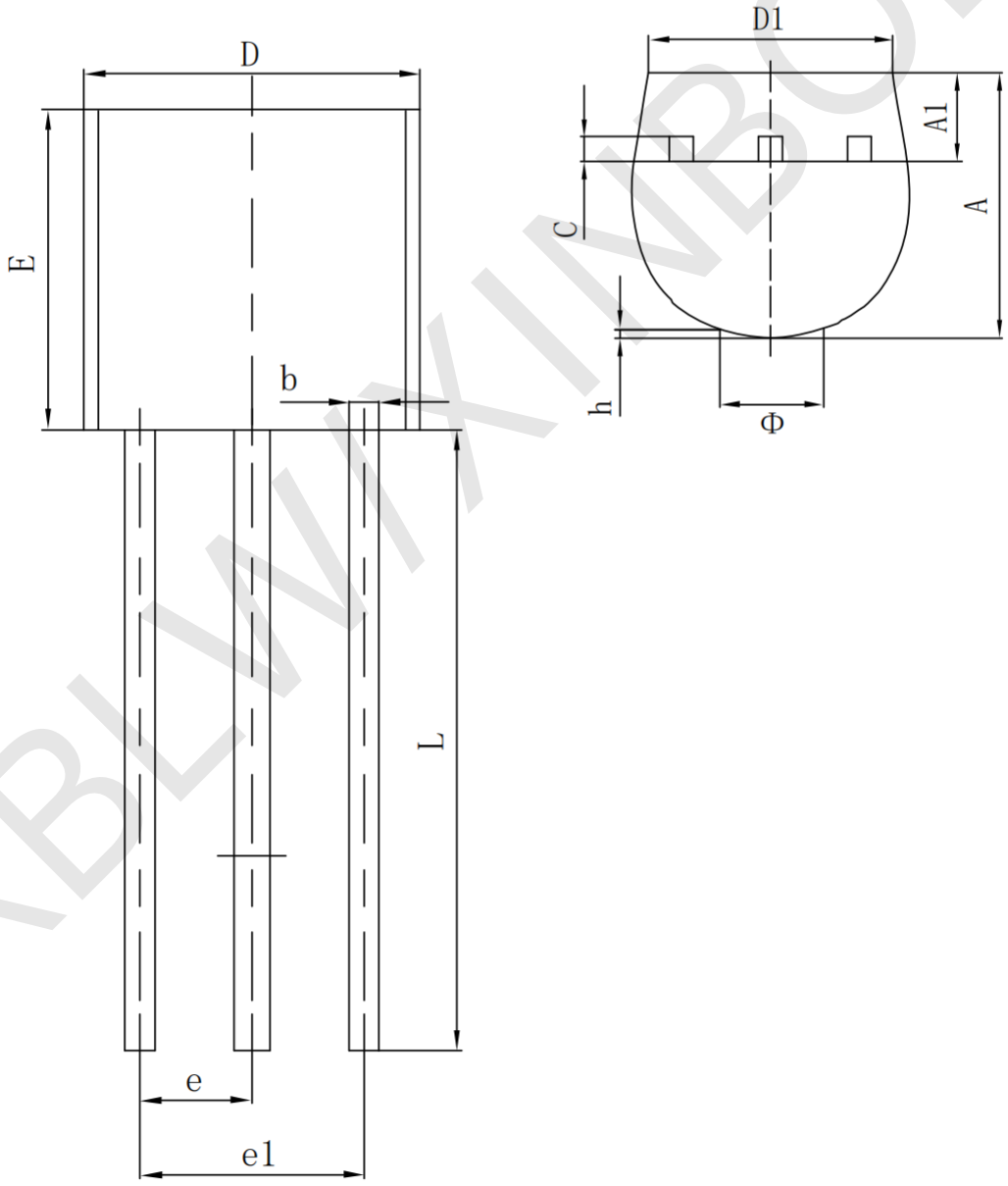
SYMBOL	MIN	NOM	MAX
A	–	–	1.25
*A1	0.01	–	0.08
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.33	–	0.41
c	0.11	–	0.20
D	2.82	2.92	3.02
*E	2.60	2.80	3.00
*E1	1.50	1.60	1.70
*e	0.90	0.95	1.00
e1	1.90BSC		
L	0.30	–	0.60
*L1	0.55	0.60	0.75
θ	0°	–	8°





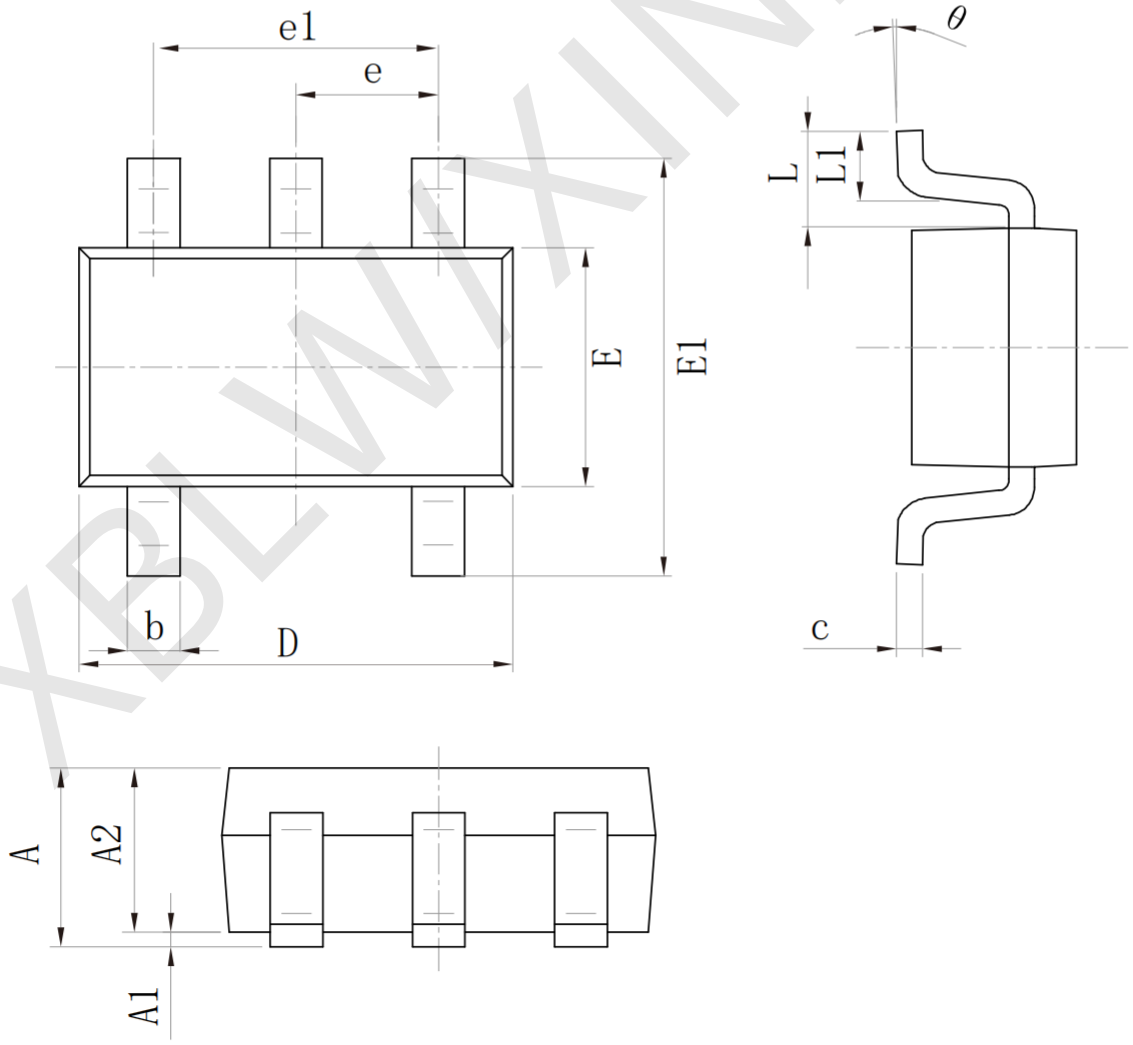
· TO-92

Size / Symbol	Dimensions In Millimeters		Size / Symbol	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
A	3.300	3.700	A	0.130	0.146
A1	1.100	1.400	A1	0.043	0.055
b	0.380	0.550	b	0.015	0.022
c	0.360	0.510	c	0.014	0.020
D	4.300	4.700	D	0.169	0.185
D1	3.430		D1	0.135	
E	4.300	4.700	E	0.169	0.185
e	1.270(TYP)		e	0.050(TYP)	
e1	2.440	2.640	e1	0.096	0.104
L	14.10	14.50	L	0.555	0.571
Φ		1.600	Φ		0.063
h	0.000	0.380	h	0.000	0.015



• SC70-5

Size / Symbol	Dimensions In Millimeters		Size / Symbol	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
A	0.800	1.100	A	0.035	0.043
A1	0.000	0.100	A1	0.000	0.004
A2	0.800	0.900	A2	0.035	0.039
b	0.150	0.350	b	0.006	0.014
C	0.080	0.150	C	0.003	0.006
D	1.850	2.150	D	0.079	0.087
E	1.100	1.400	E	0.045	0.053
E1	1.950	2.200	E1	0.085	0.096
e	0.85(typ)		e	0.026(typ)	
e1	1.200	1.400	e1	0.047	0.055
L	0.42(ref)		L	0.021(ref)	
L1	0.260	0.460	L1	0.010	0.018
θ	0°	8°	θ	0°	8°



Statement:

- XBLW reserves the right to modify the product manual without prior notice! Before placing an order, customers need to confirm whether the obtained information is the latest version and verify the completeness of the relevant information.
- Any semiconductor product may malfunction under specified conditions. When using XBLW products for system design and overall manufacturing, the buyer is responsible for complying with safety standards and taking appropriate safety measures to avoid risks that may cause personal injury or property damage.
- XBLW products have not been licensed for life support, military, and aerospace applications, and therefore XBLW is not responsible for any consequences arising from the use of this product in these areas.
- If any or all XBLW products (including technical data, services) described or contained in this document are subject to any applicable local export control laws and regulations, they may not be exported without an export license from the relevant authorities in accordance with such laws.
- The specifications of any and all XBLW products described or contained in this document specify the performance, characteristics, and functionality of said products in their standalone state, but do not guarantee the performance, characteristics, and functionality of said products installed in Customer's products or equipment. In order to verify symptoms and conditions that cannot be evaluated in a standalone device, the Customer should ultimately evaluate and test the device installed in the Customer's product device.
- XBLW documentation is only allowed to be copied without any alteration of the content and with the relevant authorization. XBLW assumes no responsibility or liability for altered documents.
- XBLW is committed to becoming the preferred semiconductor brand for customers, and XBLW will strive to provide customers with better performance and better quality products.