



# SC85XX LDO High Voltage Regulator

## 1. SC85XX General Description

### 1.1 Description

SC85xx series a low-power high-voltage regulator manufactured by CMOS process. The maximum input voltage is 40V and the output voltage range is 3.0V~5.0V. It has the characteristics of high precision output voltage, very low power supply current and very low drop voltage.

### 1.2 Features

- Low power consumption:3uA(Typ)
- Low drop voltage:60mV(Typ)
- Low temperature coefficient:1mV/°C(Typ)
- High input voltage:up to 40V
- High precision output voltage: tolerance of 3%
- Package form:SOT23-3,SOT89-3,TO92

### 1.3 Device Information

PART NUMBER	INPUT VOLTAGE (MAX)(V)	OUTPUT (V)	PACKAGE
SC8530	40	3.0	SOT23 SOT89 TO92
SC8533	40	3.3	
SC8536	40	3.6	
SC8544	40	4.4	
SC8550	40	5.0	

### 1.4 Applications

- Battery power supply equipment
- Audio/video equipment
- Various communication equipment
- Security monitoring equipment

## 2. SC85XX Package Form and Pin Function Definition

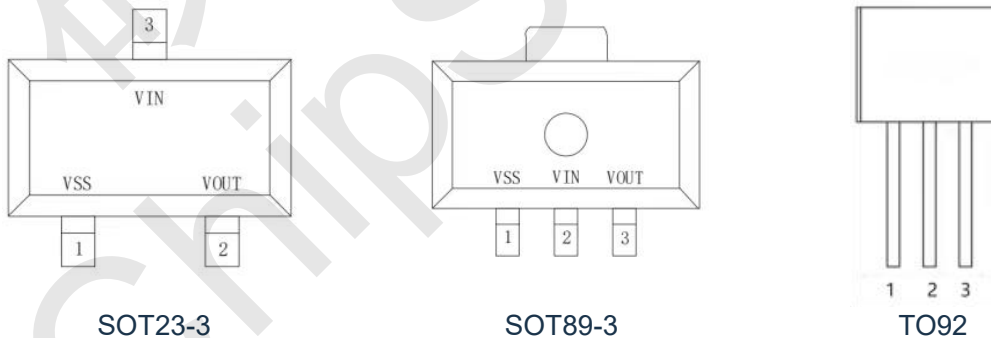


Figure 2.1 Top View

PIN No.			NAME	I/O	FUNCTION
SOT23-3	SOT89-3	TO92			
1	1	1	GND		Ground
3	2	2	VIN		Supply Voltage
2	3	3	VOUT	O	Output



## 3. SC85XX System Diagram

### 3.1 Principle Block Diagram

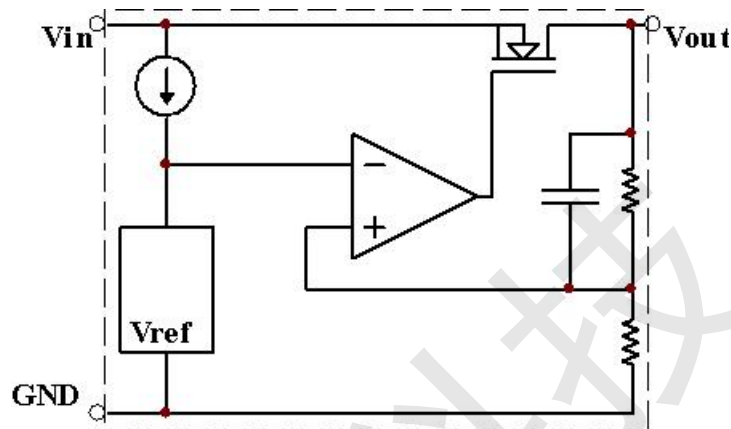


Figure 3.1 SC85xx Principle Block Diagram

## 4. SC85XX Specifications

### 4.1 Absolute Maximum Ratings

Symbol	Parameter	MIN	MAX	Unit
$V_{IN}$	Supply Voltage Range	-0.5	50	V
$P_D$	Power Dissipation(SOT23-3)		300	mW
	Power Dissipation(SOT89-3)		400	mW
	Power Dissipation(TO92)		700	mW
$T_J$	Junction Temperature		125	°C
$T_{OP}$	Operating Temperature	-40	85	°C

Absolute maximum ratings are those values beyond which the device could be permanently damaged, These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions.

### 4.2 Electrical Characteristics

#### 4.2.1 DC Specifications

( $T_a=25^\circ\text{C}$ , voltages are referenced to GND, unless otherwise specified)

Symbol	Parameter	Test Condition	MIN	TYP	MAX	Unit
<b>SC8530Z</b>						
$V_{OUT}$	Output Voltage	$V_{IN}=5V, I_{OUT}=1mA$	2.91	3	3.09	V
$I_{OUT}$	Output Current	$V_{IN}=V_{OUT}+1V$	--	150	--	mA
$\Delta V_{OUT}$	Load Regulation	$V_{IN}=5V, 1mA \leq I_{OUT} \leq 30mA$	--	10	100	mV
$V_{DIF}$	Drop Voltage	$I_{OUT} = 10mA$	--	60	--	mV
ISS	Quiescent Current	$V_{IN}=40V, \text{No Load}$	--	3	5	uA
$\Delta V_{OUT}/(\Delta V_{IN} * V_{OUT})$	Line Regulation	$4V \leq V_{IN} \leq 40V, I_{OUT}=1mA$	--	0.1	--	%/V
$V_{IN}$	Input Voltage	--	--	--	40	V
$\Delta V_{OUT} / \Delta T_a$	Temperature Coefficient	$V_{IN}=5V, I_{OUT}=10mA$ $-20^\circ\text{C} \leq T_a \leq 70^\circ\text{C}$	--	$\pm 1$	--	mV/°C



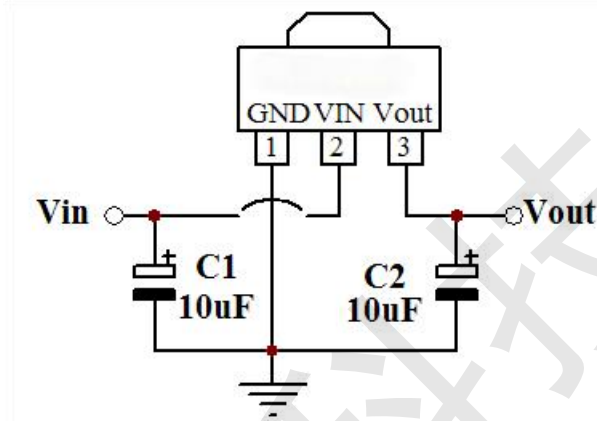
<b>SC8533Z</b>						
$V_{OUT}$	Output Voltage	$V_{IN}=5V, I_{OUT}=1mA$	3.201	3.3	3.339	V
$I_{OUT}$	Output Current	$V_{IN}=V_{OUT}+1V$	--	150	--	mA
$\Delta V_{OUT}$	Load Regulation	$V_{IN}=5V, 1mA \leq I_{OUT} \leq 30mA$	--	10	100	mV
$V_{DIF}$	Drop Voltage	$I_{OUT} = 10mA$	--	60	--	mV
ISS	Quiescent Current	$V_{IN}=40V, No Load$	--	3	5	uA
$\Delta V_{OUT}/(\Delta V_{IN} * V_{OUT})$	Line Regulation	$4.3V \leq V_{IN} \leq 40V, I_{OUT}=1mA$	--	0.1	--	%/V
$V_{IN}$	Input Voltage	--	--	--	40	V
$\Delta V_{OUT} / \Delta T_a$	Temperature Coefficient	$V_{IN}=5V, I_{OUT}=10mA$ $-20^{\circ}C \leq T_a \leq 70^{\circ}C$	--	$\pm 1$	--	mV/°C
<b>SC8536Z</b>						
$V_{OUT}$	Output Voltage	$V_{IN}=5V, I_{OUT}=1mA$	3.49	3.6	3.71	V
$I_{OUT}$	Output Current	$V_{IN}=V_{OUT}+1V$	--	150	--	mA
$\Delta V_{OUT}$	Load Regulation	$V_{IN}=5V, 1mA \leq I_{OUT} \leq 30mA$	--	10	100	mV
$V_{DIF}$	Drop Voltage	$I_{OUT} = 10mA$	--	60	--	mV
ISS	Quiescent Current	$V_{IN}=40V, No Load$	--	3	5	uA
$\Delta V_{OUT}/(\Delta V_{IN} * V_{OUT})$	Line Regulation	$4.6V \leq V_{IN} \leq 40V, I_{OUT}=1mA$	--	0.1	--	%/V
$V_{IN}$	Input Voltage	--	--	--	40	V
$\Delta V_{OUT} / \Delta T_a$	Temperature Coefficient	$V_{IN}=5V, I_{OUT}=10mA$ $-20^{\circ}C \leq T_a \leq 70^{\circ}C$	--	$\pm 1$	--	mV/°C
<b>SC8544Z</b>						
$V_{OUT}$	Output Voltage	$V_{IN}=6.5V, I_{OUT}=1mA$	4.27	4.4	4.53	V
$I_{OUT}$	Output Current	$V_{IN}=V_{OUT}+1V$	--	150	--	mA
$\Delta V_{OUT}$	Load Regulation	$V_{IN}=6.5V, 1mA \leq I_{OUT} \leq 30mA$	--	10	100	mV
$V_{DIF}$	Drop Voltage	$I_{OUT} = 10mA$	--	60	--	mV
ISS	Quiescent Current	$V_{IN}=40V, No Load$	--	3.5	5	uA
$\Delta V_{OUT}/(\Delta V_{IN} * V_{OUT})$	Line Regulation	$5.4V \leq V_{IN} \leq 40V, I_{OUT}=1mA$	--	0.1	--	%/V
$V_{IN}$	Input Voltage	--	--	--	40	V
$\Delta V_{OUT} / \Delta T_a$	Temperature Coefficient	$V_{IN}=6.5V, I_{OUT}=10mA$ $-20^{\circ}C \leq T_a \leq 70^{\circ}C$	--	$\pm 1$	--	mV/°C
<b>SC8550Z</b>						
$V_{OUT}$	Output Voltage	$V_{IN}=6.5V, I_{OUT}=1mA$	4.85	5	5.15	V
$I_{OUT}$	Output Current	$V_{IN}=V_{OUT}+1V$	--	150	--	mA
$\Delta V_{OUT}$	Load Regulation	$V_{IN}=6.5V, 1mA \leq I_{OUT} \leq 30mA$	--	10	100	mV
$V_{DIF}$	Drop Voltage	$I_{OUT} = 10mA$	--	60	--	mV
ISS	Quiescent Current	$V_{IN}=40V, No Load$	--	4	5	uA
$\Delta V_{OUT}/(\Delta V_{IN} * V_{OUT})$	Line Regulation	$6V \leq V_{IN} \leq 40V, I_{OUT}=1mA$	--	0.1	--	%/V
$V_{IN}$	Input Voltage	--	--	--	40	V
$\Delta V_{OUT} / \Delta T_a$	Temperature Coefficient	$V_{IN}=6.5V, I_{OUT}=10mA$ $-20^{\circ}C \leq T_a \leq 70^{\circ}C$	--	$\pm 1$	--	mV/°C

Note:  $V_{DIF} = V_{IN2} - V_{OUT2}, V_{IN2} = V_{IN} @ (V_{OUT} = V_{OUT2}), V_{OUT2} = V_{OUT1} * 98\%, V_{OUT1} = V_{OUT} @ (V_{IN1} = V_{OUT} + 2V, Load = I_{OUT})$

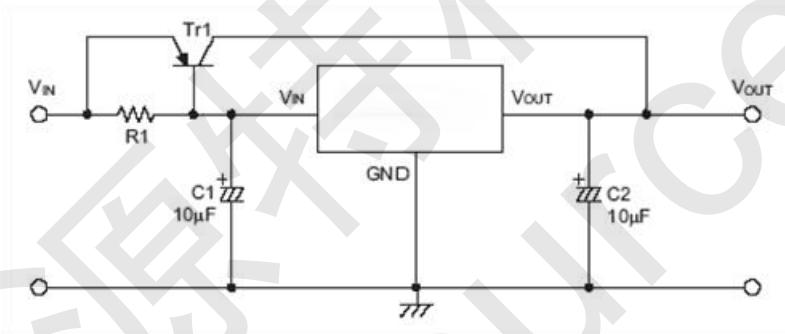


## 5. SC85XX Applications Information

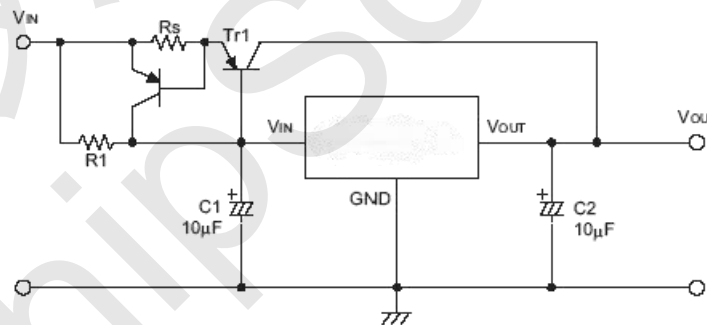
### 5.1 Basic Circuit



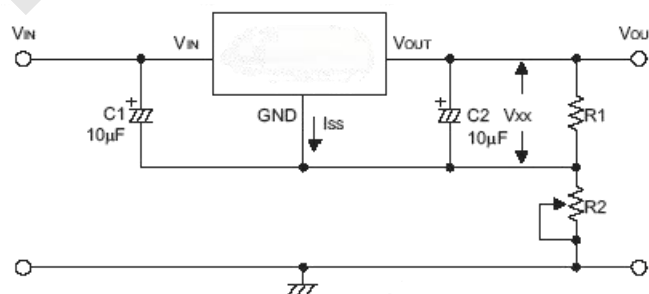
### 5.2 High Output Current Regulator



### 5.3 Short Circuit Protection Circuit



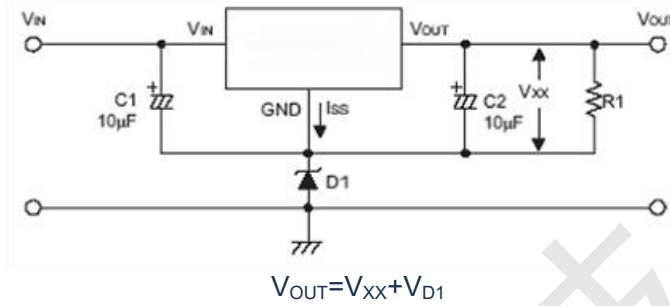
### 5.4 Circuit for Increasing Output Voltage(1)



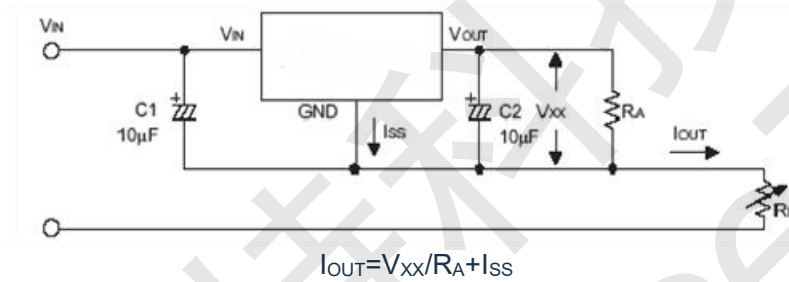
$$V_{OUT} = V_{XX}(1 + R2/R1) + I_{SS} * R2$$



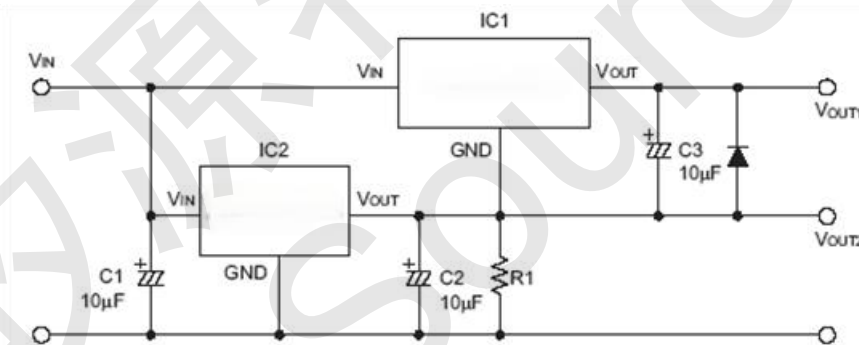
## 5.5 Circuit for Increasing Output Voltage(2)



## 5.6 Current Regulating Circuit



## 5.7 Dual Output Circuit



Note: "XX" Represents the output voltage

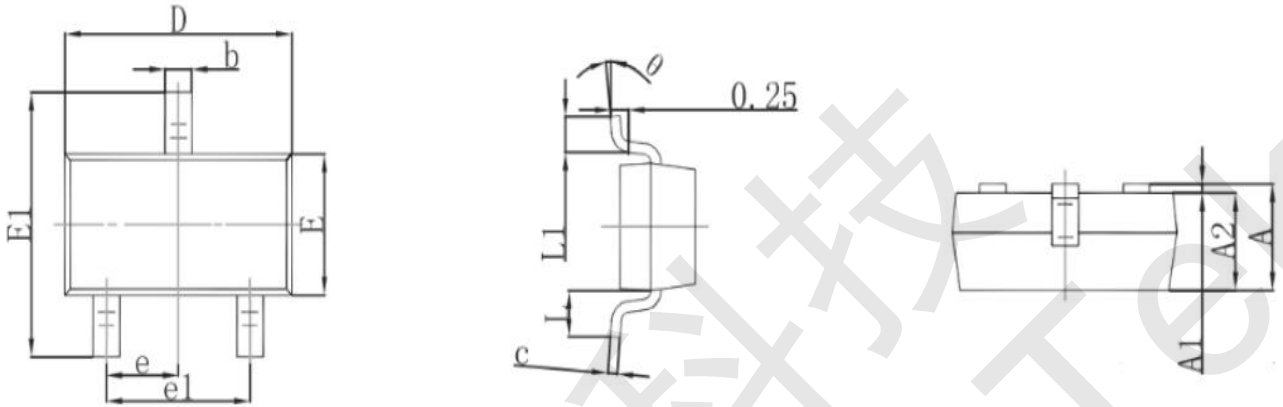
## 6. SC85XX Ordering Information

Orderable Device	Package Type	Pins	Packing	Package Qty
SC85xxST03ARCQ	SOT23	3	Tape & Reel	3000
SC85xxGT03ARAQ	SOT89	3	Tape & Reel	1000
SC85xxKW03ABAQ	TO92	3	Bag	1000



## 7. SC85XX Package Information

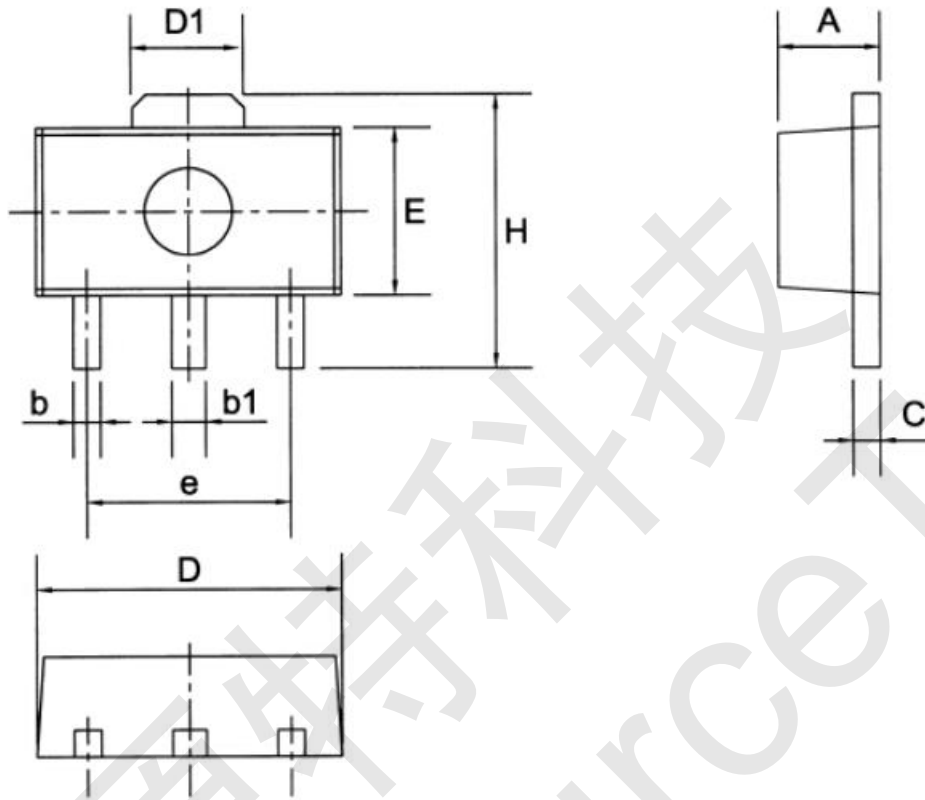
### 7.1 SOT23-3



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°



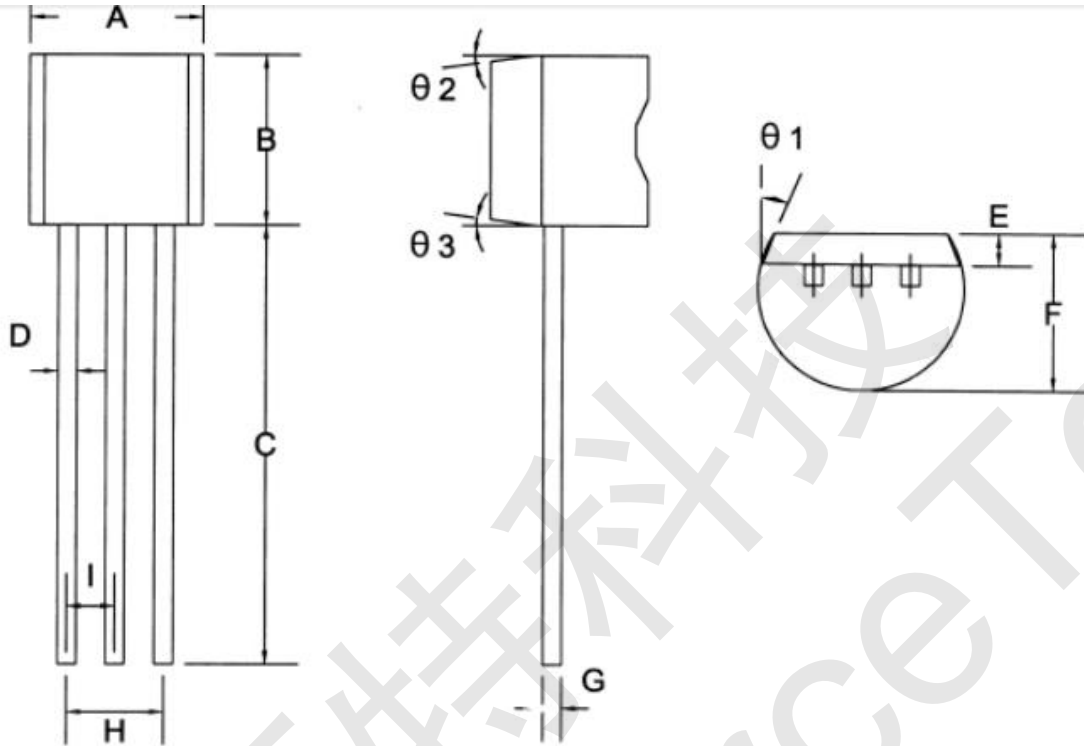
## 7.2 SOT89-3



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min	Nom	Max	Min	Nom	Max
A	1.30	1.50	1.70	0.051	0.059	0.067
b	0.25	0.40	0.55	0.010	0.016	0.022
b1	0.40	0.50	0.60	0.016	0.020	0.024
C	0.30	0.40	0.50	0.012	0.016	0.020
D	4.30	4.50	4.70	0.169	0.177	0.185
D1	1.45	1.65	1.85	0.057	0.065	0.073
E	2.30	2.50	2.70	0.091	0.098	0.106
e	2.90	3.00	3.10	0.114	0.118	0.122
H	3.90	4.10	4.30	0.154	0.161	0.169



### 7.3 TO92



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min	Nom	Max	Min	Nom	Max
A	4.33	4.58	4.83	0.170	0.180	0.190
B	4.33	4.58	4.83	0.170	0.180	0.190
C	14.07	14.47	14.87	0.554	0.570	0.585
D	0.34	0.44	0.54	0.013	0.017	0.021
E	0.92	1.02	1.12	0.036	0.040	0.044
F	3.36	3.56	3.76	0.132	0.140	0.148
G	0.34	0.44	0.54	0.013	0.017	0.021
H	2.42	2.54	2.66	0.095	0.100	0.105
I	1.15	1.27	1.39	0.045	0.050	0.055
θ 1	—	5°	—	—	5°	—
θ 2	—	2°	—	—	2°	—
θ 3	—	2°	—	—	2°	—