

HT75xx High Voltage Regulator

1. General Description

1.1 Description

The HT75xx series is a set of three-terminal low power high voltage regulators implemented in CMOS technology. They allow input voltages as high as 40V. They are available with several fixed output voltages ranging from 3.0V to 5.0V. CMOS technology ensures low voltage drop and low quiescent current.

Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain variable voltages and currents.

1.2 Features

- High input voltage (up to 40V)
- Ultra low quiescent current: 3.0 μ A (typ.)
- Low voltage drop
- Output voltage accuracy: tolerance $\pm 3\%$
- Package form: SOT23, SOT89, TO92

1.3 Device Information

PART NUMBER	INPUT VOLTAGE (MAX)(V)	OUTPUT (V)	PACKAGE
HT7530	40	3.0	SOT23 SOT89 TO92
HT7533	40	3.3	
HT7536	40	3.6	
HT7540	40	4.0	
HT7544	40	4.4	
HT7550	40	5.0	

1.4 Applications

- Battery-powered equipment
- Communication equipment
- Audio/Video equipment

2. Package Form and Pin Function Definition

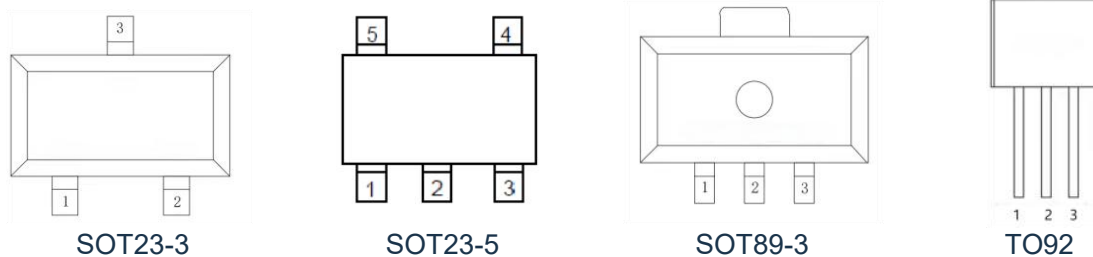


Figure 2.1 Top View

PIN No.				NAME	I/O	FUNCTION
SOT23-3	SOT23-5	SOT89-3	TO92			
1	1	1	1	GND	-	Ground
3	2	2	2	VIN	-	Supply Voltage
2	3	3	3	VOUT	O	Output
-	4,5	-	-	NC	-	Not Connect

3. System Diagram

3.1 Functional Block Diagram

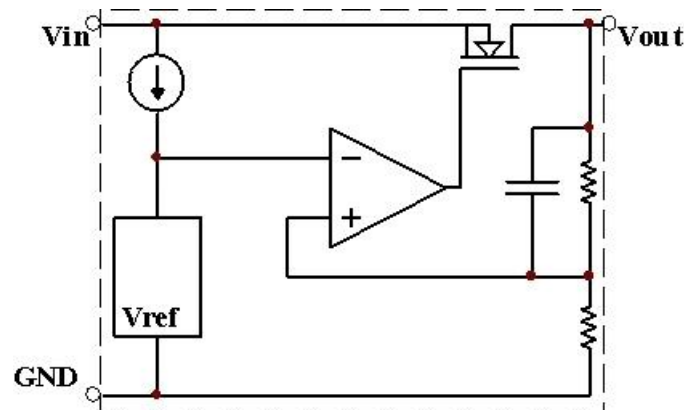


Figure 3.1 HT75xx Functional Block Diagram

4. Specifications

4.1 Absolute Maximum Ratings

Symbol	Parameter	MIN	MAX	Unit
V_{IN}	Supply Voltage Range	-0.5	48	V
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

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

Symbol	Parameter	Test Condition	MIN	TYP	MAX	Unit
HT7530						
V_{OUT}	Output Voltage	$V_{IN}=5\text{V}$, $I_{OUT}=1\text{mA}$	2.91	3.0	3.09	V
I_{OUT}	Output Current	$V_{IN}=4.1\text{V}$, $V_{OUT}\geq 2.7\text{V}$	150	--	--	mA
ΔV_{OUT}	Load Regulation	$V_{IN}=4.1\text{V}$, $1\text{mA}\leq I_{OUT}\leq 50\text{mA}$	--	10	100	mV
V_{DIF}	Drop Voltage	$I_{OUT}=10\text{mA}$	--	50	--	mV
I_{SS}	Quiescent Current	$V_{IN}=40\text{V}$, No Load	--	3	5	uA
$\Delta V_{OUT}/(\Delta V_{IN} * V_{OUT})$	Line Regulation	$4.1\text{V}\leq V_{IN}\leq 40\text{V}$, $I_{OUT}=1\text{mA}$	--	0.05	--	%/V
V_{IN}	Input Voltage	--	--	--	40	V
$\Delta V_{OUT} / \Delta T_a$	Temperature Coefficient	$V_{IN}=6\text{V}$, $I_{OUT}=1\text{mA}$ $-40^{\circ}\text{C}\leq T_a\leq 85^{\circ}\text{C}$	--	± 1.2	--	mV/°C

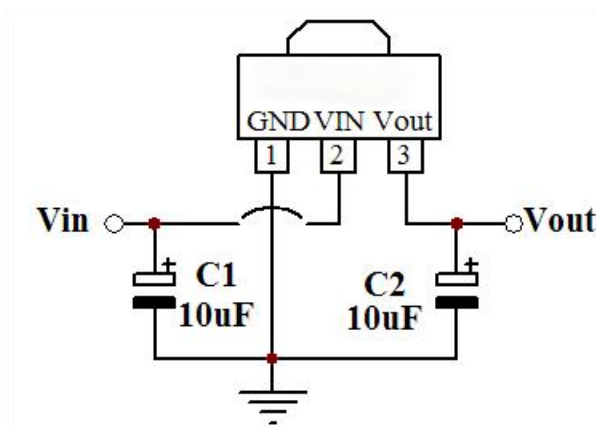


Symbol	Parameter	Test Condition	MIN	TYP	MAX	Unit
HT7533						
V_{OUT}	Output Voltage	$V_{IN}=5V, I_{OUT}=1mA$	3.201	3.3	3.399	V
I_{OUT}	Output Current	$V_{IN}=4.4V, V_{OUT} \geq 2.97V$	150	--	--	mA
ΔV_{OUT}	Load Regulation	$V_{IN}=4.4V, 1mA \leq I_{OUT} \leq 50mA$	--	10	100	mV
V_{DIF}	Drop Voltage	$I_{OUT}=10mA$	--	50	--	mV
I_{SS}	Quiescent Current	$V_{IN}=40V$, No Load	--	3	5	uA
$\Delta V_{OUT}/(\Delta V_{IN} * V_{OUT})$	Line Regulation	$4.4V \leq V_{IN} \leq 40V, I_{OUT}=1mA$	--	0.05	--	%/V
V_{IN}	Input Voltage	--	--	--	40	V
$\Delta V_{OUT} / \Delta T_a$	Temperature Coefficient	$V_{IN}=6V, I_{OUT}=1mA$ $-40^\circ C \leq T_a \leq 85^\circ C$	--	± 1.2	--	mV/°C
HT7536						
V_{OUT}	Output Voltage	$V_{IN}=5V, I_{OUT}=1mA$	3.492	3.6	3.708	V
I_{OUT}	Output Current	$V_{IN}=4.7V, V_{OUT} \geq 3.24V$	150	--	--	mA
ΔV_{OUT}	Load Regulation	$V_{IN}=4.7V, 1mA \leq I_{OUT} \leq 50mA$	--	10	100	mV
V_{DIF}	Drop Voltage	$I_{OUT}=10mA$	--	50	--	mV
I_{SS}	Quiescent Current	$V_{IN}=40V$, No Load	--	3	5	uA
$\Delta V_{OUT}/(\Delta V_{IN} * V_{OUT})$	Line Regulation	$4.7V \leq V_{IN} \leq 40V, I_{OUT}=1mA$	--	0.05	--	%/V
V_{IN}	Input Voltage	--	--	--	40	V
$\Delta V_{OUT} / \Delta T_a$	Temperature Coefficient	$V_{IN}=6V, I_{OUT}=1mA$ $-40^\circ C \leq T_a \leq 85^\circ C$	--	$\pm 1..5$	--	mV/°C
HT7540						
V_{OUT}	Output Voltage	$V_{IN}=6.5V, I_{OUT}=1mA$	3.88	4.0	4.12	V
I_{OUT}	Output Current	$V_{IN}=5.1V, V_{OUT} \geq 3.6V$	150	--	--	mA
ΔV_{OUT}	Load Regulation	$V_{IN}=5.1V, 1mA \leq I_{OUT} \leq 50mA$	--	10	100	mV
V_{DIF}	Drop Voltage	$I_{OUT}=10mA$	--	50	--	mV
I_{SS}	Quiescent Current	$V_{IN}=40V$, No Load	--	2	5	uA
$\Delta V_{OUT}/(\Delta V_{IN} * V_{OUT})$	Line Regulation	$5.1V \leq V_{IN} \leq 40V, I_{OUT}=1mA$	--	0.05	--	%/V
V_{IN}	Input Voltage	--	--	--	40	V
$\Delta V_{OUT} / \Delta T_a$	Temperature Coefficient	$V_{IN}=6V, I_{OUT}=1mA$ $-40^\circ C \leq T_a \leq 85^\circ C$	--	± 1.5	--	mV/°C
HT7544						
V_{OUT}	Output Voltage	$V_{IN}=6.5V, I_{OUT}=1mA$	4.268	4.4	4.532	V
I_{OUT}	Output Current	$V_{IN}=5.5V, V_{OUT} \geq 3.96V$	150	--	--	mA
ΔV_{OUT}	Load Regulation	$V_{IN}=5.5V, 1mA \leq I_{OUT} \leq 50mA$	--	10	100	mV
V_{DIF}	Drop Voltage	$I_{OUT}=10mA$	--	50	--	mV
I_{SS}	Quiescent Current	$V_{IN}=40V$, No Load	--	2	5	uA
$\Delta V_{OUT}/(\Delta V_{IN} * V_{OUT})$	Line Regulation	$5.5V \leq V_{IN} \leq 40V, I_{OUT}=1mA$	--	0.05	--	%/V
V_{IN}	Input Voltage	--	--	--	40	V
$\Delta V_{OUT} / \Delta T_a$	Temperature Coefficient	$V_{IN}=6V, I_{OUT}=1mA$ $-40^\circ C \leq T_a \leq 85^\circ C$	--	± 1.8	--	mV/°C

Symbol	Parameter	Test Condition	MIN	TYP	MAX	Unit
HT7550						
V_{OUT}	Output Voltage	$V_{IN}=6.5V, I_{OUT}=1mA$	4.85	5.0	5.15	V
I_{OUT}	Output Current	$V_{IN}=6.1V, V_{OUT} \geq 4.5V$	150	--	--	mA
ΔV_{OUT}	Load Regulation	$V_{IN}=6.1V, 1mA \leq I_{OUT} \leq 50mA$	--	10	100	mV
V_{DIF}	Drop Voltage	$I_{OUT}=10mA$	--	50	--	mV
I_{SS}	Quiescent Current	$V_{IN}=40V, \text{No Load}$	--	2	5	uA
$\Delta V_{OUT}/(\Delta V_{IN} * V_{OUT})$	Line Regulation	$6V \leq V_{IN} \leq 40V, I_{OUT}=1mA$	--	0.05	--	%/V
V_{IN}	Input Voltage	--	--	--	40	V
$\Delta V_{OUT} / \Delta T_a$	Temperature Coefficient	$V_{IN}=6V, I_{OUT}=1mA$ $-40^{\circ}C \leq T_a \leq 85^{\circ}C$	--	± 1.8	--	mV/ $^{\circ}C$

Note: $V_{DIF} = V_{IN2} - V_{OUT2}, V_{IN2} = V_{IN} @ (V_{OUT} = V_{OUT2}), V_{OUT2} = V_{OUT1} * 98\%, V_{OUT1} = V_{OUT} @ (V_{IN1} = V_{OUT} + 1V, Load = I_{OUT})$

5. Typical Application

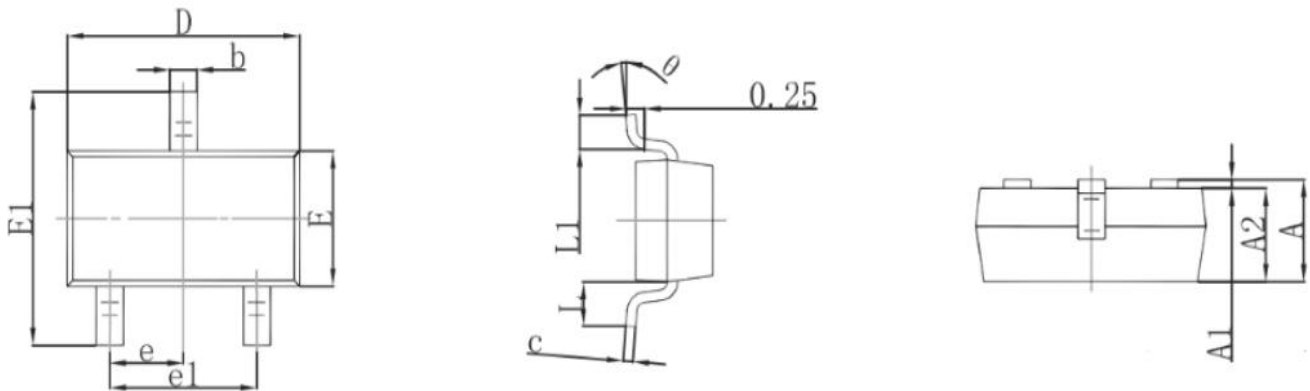


6. Ordering Information

Orderable Device	Package Type	Pins	Packing	Package Qty
HT75xxST03ARCQ	SOT23	3	Tape & Reel	3000
HT75xxLT05ARCQ	SOT23	5	Tape & Reel	3000
HT75xxGT03ARAQ	SOT89	3	Tape & Reel	1000
HT75xxKW03ABAQ	TO92	3	Bag	1000

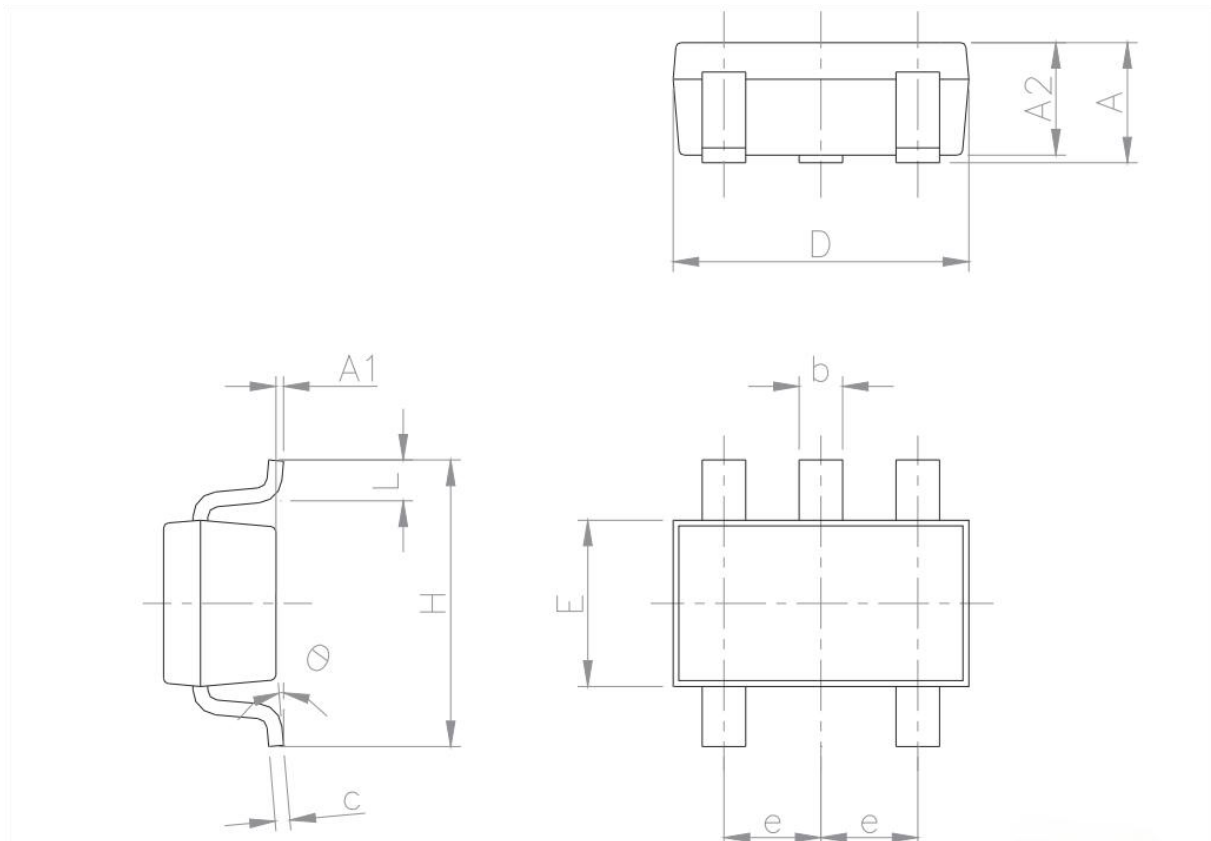
7. Package Information

7.1 SOT23-3



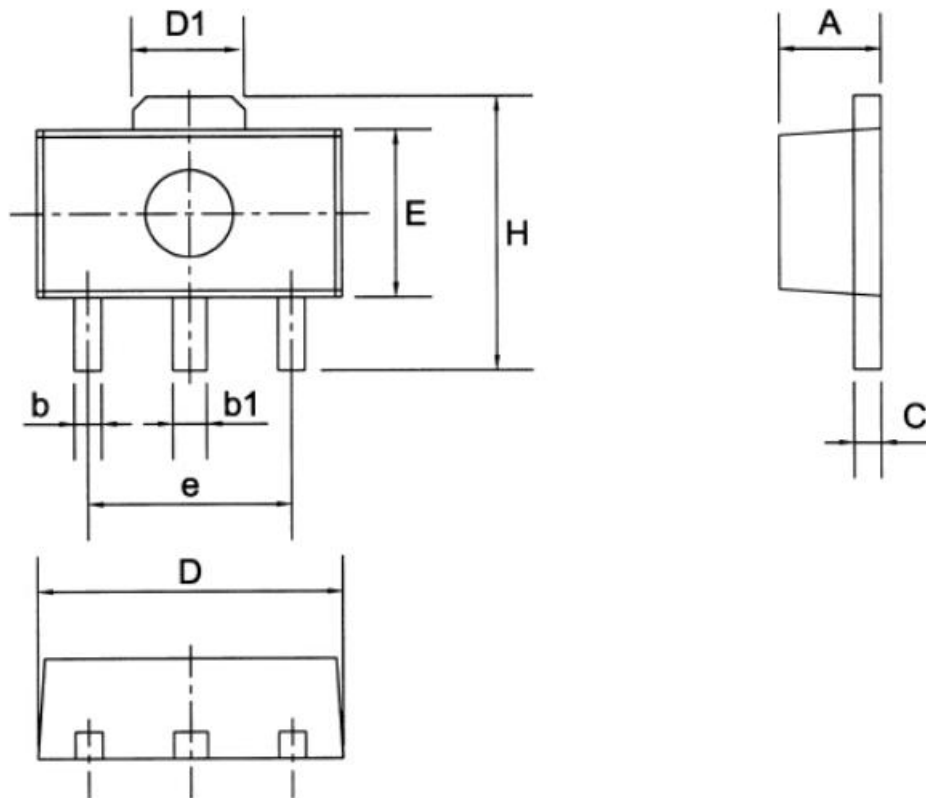
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 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 SOT23-5



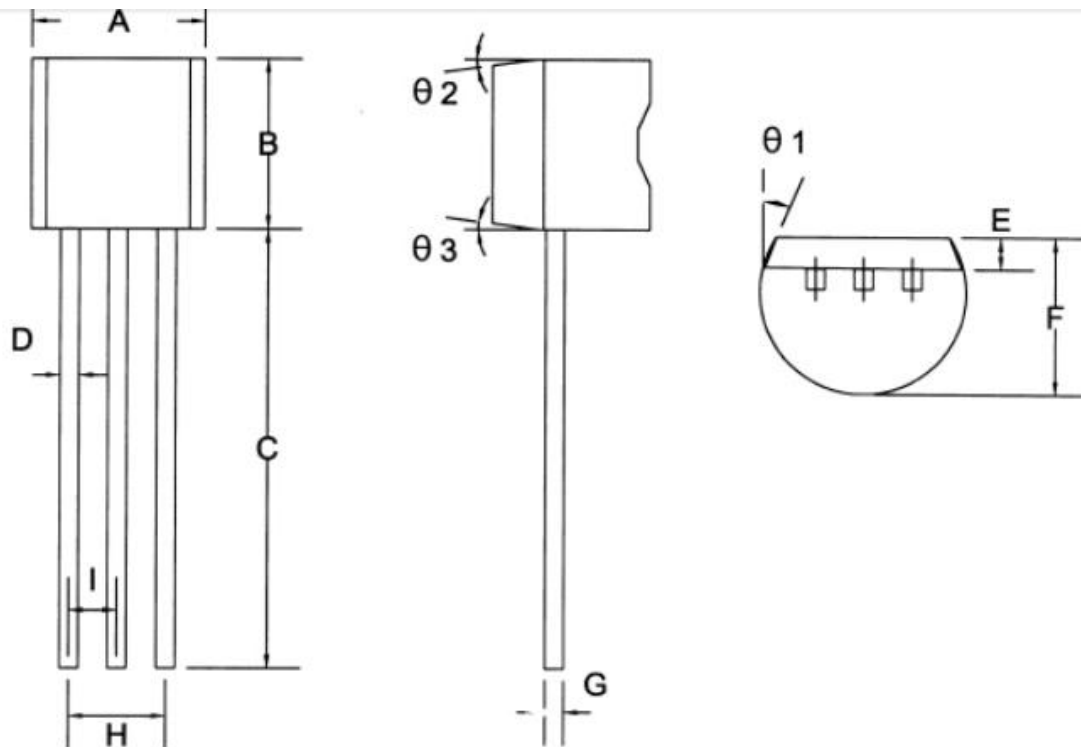
Symbol	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90	-	1.45	0.035	-	0.057
A1	-	-	0.15	-	-	0.006
A2	0.90	-	1.30	0.035	-	0.051
b	0.35	-	0.50	0.014	-	0.020
c	0.09	-	0.20	0.004	-	0.008
D	2.80	-	3.05	0.110	-	0.120
E	1.50	-	1.75	0.059	-	0.069
e	-	0.95	-	-	0.037	-
H	2.60	-	3.00	0.102	-	0.118
L	0.10	-	0.60	0.004	-	0.024
θ	0 degrees	-	10 degrees	-	-	-

7.3 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

7.4 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
θ1	—	5°	—	—	5°	—
θ2	—	2°	—	—	2°	—
θ3	—	2°	—	—	2°	—