HT72XX Series
300mA TinyPower™ LDO

Features

- Output voltage ranges: Fixed range of 1.8V, 2.5V, 2.7V, 3.0V, 3.3V, 5.0V type.
- Highly accuracy: ±2%
- Low voltage drop: 240mV (typ.), V_{OUT}=5.0V at 300mA
- Maximum Input Voltage: 8V
- Guaranteed output current: 300mA
- Low quiescent current: 4μA (typ.)
- Current limiting
- Over-temperature shutdown
- SOT23, SOT23-5, SOT89, TO92 Packages

Applications

- Portable electronics
- Wireless devices
- Cordless phones
- PC peripherals
- Battery powered devices
- Electronic scales

General Description

The HT72XX series of positive, linear regulators features low quiescent current (4μA typ.) with low dropout voltage, making them ideal for battery applications. The space-saving SOT23 package is attractive for "Pocket" and "Hand Held" applications. The devices are capable of supplying 300mA of output current continuously.

They are available with several fixed output voltages ranging from 1.8V to 5.0V. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain variable voltages and currents.

These rugged devices have Thermal Shutdown and Current Limiting to prevent device failure under the "Worst" of operating conditions.

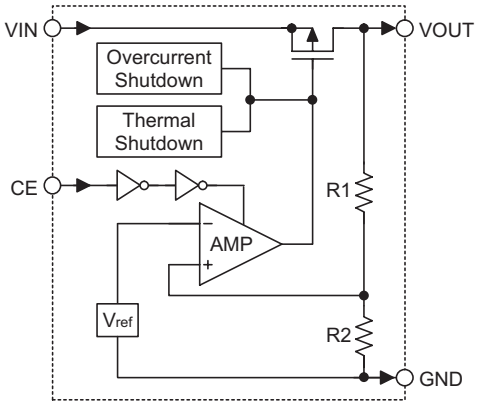
Selection Table

Part No.	Output Voltage	Tolerance	Package	Marking
HT7218	1.8V	±2%	SOT23 SOT23-5 SOT89 TO92	72XX# (for SOT23) 72XX# (for SOT23-5) HT72XX# (for SOT89) HT72XX (for TO92)
HT7225	2.5V			
HT7227	2.7V			
HT7230	3.0V			
HT7233	3.3V			
HT7250	5.0V			

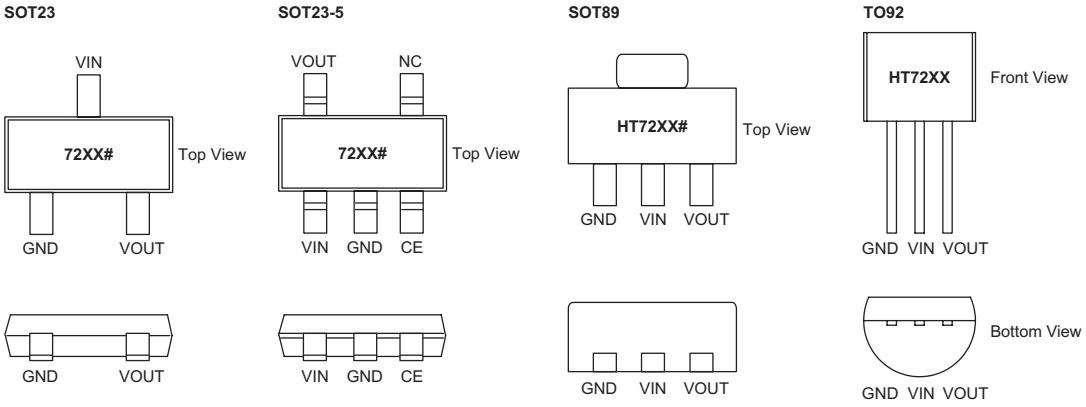
Note: "XX" stands for output voltages.

For lead free devices, TO92 package will add a "#" mark at the end of the date code, whereas SOT89 & SOT23, SOT23-5 packages will add a "#" mark at the end of the marking.

Block Diagram



Pin Assignment



Pin Description

Pin No.				Pin Name	Description
SOT23	SOT23-5	SOT89	TO92		
—	3	—	—	CE	Chip enable pin, high enable
2	5	3	3	VOUT	Output pin
3	1	2	2	VIN	Input pin
1	2	1	1	GND	Ground pin
—	4	—	—	NC	No connection

Absolute Maximum Ratings*

Maximum Supply Voltage ..... up to 8.5V

Operating Temperature .....–40°C to 85°C

Storage Temperature .....–50°C to 125°C

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

"*" Absolute maximum ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but do not guarantee specific performance limits. The guaranteed specifications apply only for the test conditions listed.

Thermal Information

Symbol	Parameter	Package	Max.	Unit
θ_{JA}	Thermal Resistance (Junction to Ambient) (Assume no ambient airflow, no heat sink)	SOT23	667	°C/W
		SOT23-5	500	°C/W
		SOT89	200	°C/W
		TO92	200	°C/W
P_D	Power Dissipation	SOT23	0.15	W
		SOT23-5	0.20	W
		SOT89	0.50	W
		TO92	0.50	W

Note: P_D is measured at Ta= 25°C

Electrical Characteristics

T_j=25°C, V_{IN}=V_{OUT}+1.0V, I_O=1mA, unless otherwise specified

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_{IN}	Input Voltage	—		—	—	8	V
ΔV_{OUT}	Output Voltage Tolerance	—		–2	—	2	%
I_{SS}	Quiescent Current	I_O=0mA, V_{CE}=V_{IN}		—	4	7	μA
ΔV_{LOAD}	Load Regulation (Note1)	1mA≤I_{OUT}≤300mA		—	0.004	0.008	%/mA
V_{DROP}	Dropout Voltage (Note2)	ΔV_{OUT}=2% I_{OUT}=300mA	V_O≤1.8V	—	800	1200	mV
			2.5V≤V_O≤2.7V	—	350	400	
			3.0V≤V_O≤5.0V	—	240	300	
ΔV_{LINE}	Line Regulation	V_{OUT}+1.0V≤V_{IN}≤8.0V		—	0.2	0.3	%/V
I_{LIM}	Current Limit (Note3)	ΔV_{OUT}=10%		300	—	—	mA
V_{IH}	CE Input High Threshold	V_{OUT}+1V≤V_{IN}≤8V		2.0	—	—	V
V_{IL}	CE Input Low Threshold	V_{OUT}+1V≤V_{IN}≤8V		—	—	0.8	V
I_{SD}	Shutdown Current	CE input voltage≤0.8V		—	0.5	1	μA
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	–40°C<Ta<85°C		—	±0.8	—	mV/°C

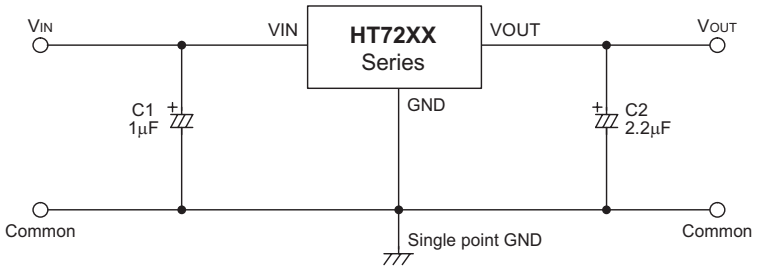
Note: 1. Load regulation is measured at a constant junction temperature, using pulse testing with a low ON time and is guaranteed up to the maximum power dissipation. Power dissipation is determined by the input/output differential voltage and the output current. Guaranteed maximum power dissipation will not be available over the full input/output range. The maximum allowable power dissipation at any ambient temperature is $P_D = (T_{J(MAX)} - Ta) / \theta_{JA}$.

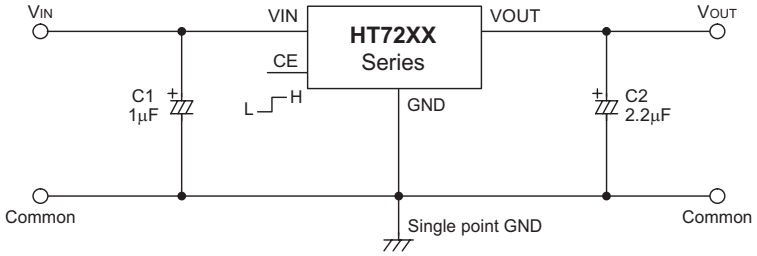
2. Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+1V with a fixed load.

3. Current limit is measured by pulsing for a short time.

Application Circuits

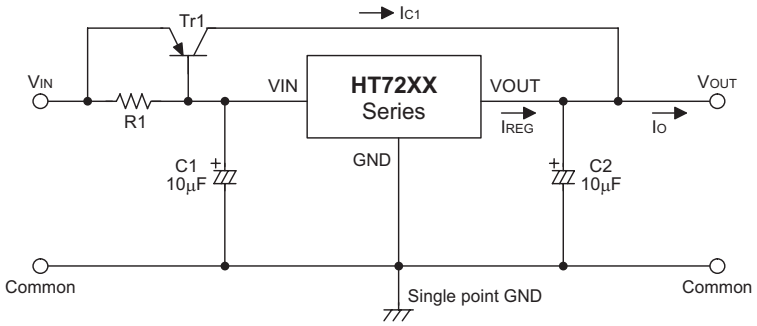
Basic Circuits





Typical Application Circuits

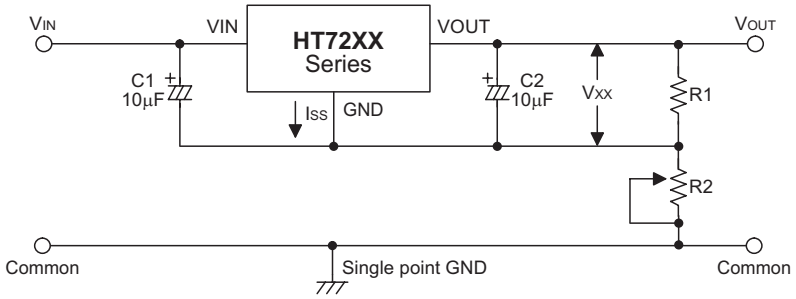
- High output current positive voltage regulator



$$R_1 = \frac{V_{BE1}}{I_{REG} - \frac{I_{C1}}{(1+\beta)}},$$

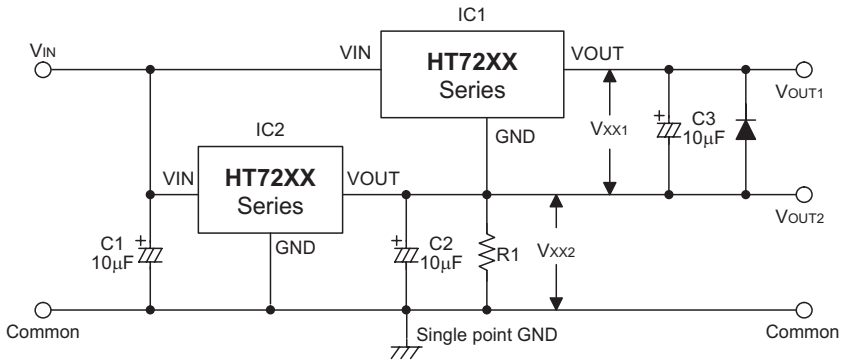
$$I_O = I_{C1} + I_{REG}$$

- Increased Output voltage Circuit



$$V_{OUT} = V_{XX} \ (1+\frac{R2}{R1}) + I_{SS} \ R2$$

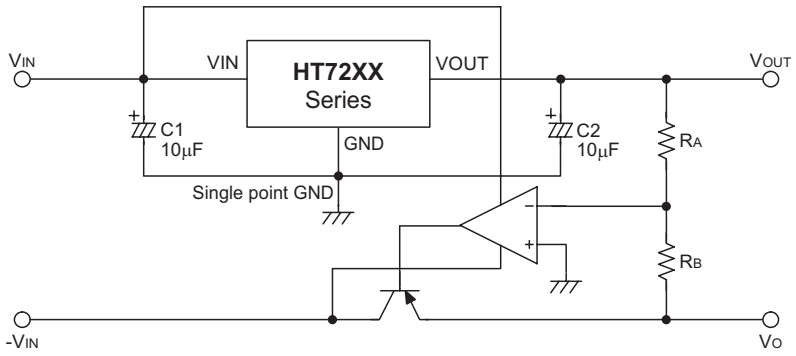
- Dual Supply Circuit



$$V_{OUT1} = V_{XX2} + V_{XX1}$$

$$V_{OUT2} = V_{XX2}$$

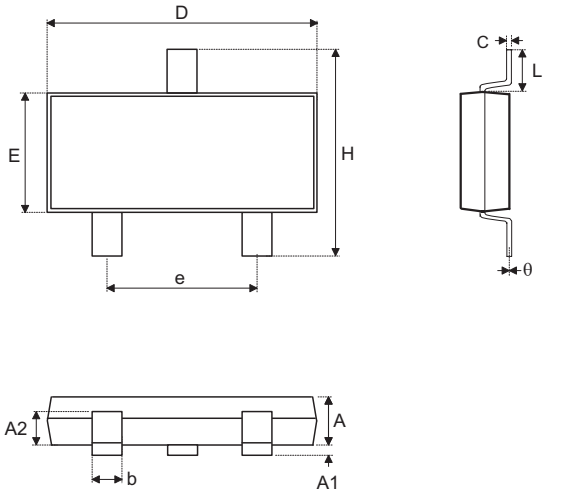
- Tracking Voltage Regulator



$$-V_O = V_{OUT} \times \frac{R_B}{R_A}$$

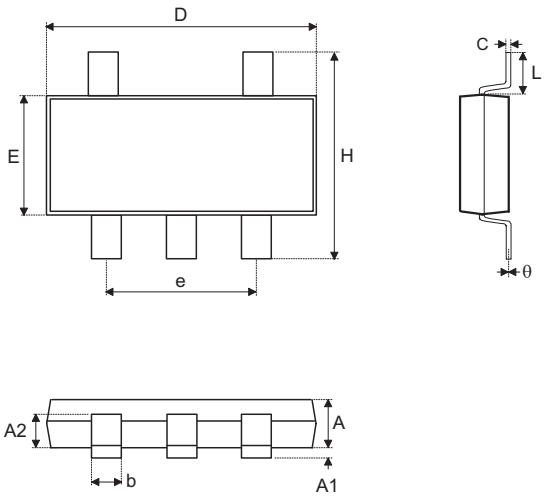
Package Information

3-pin SOT23 Outline Dimensions



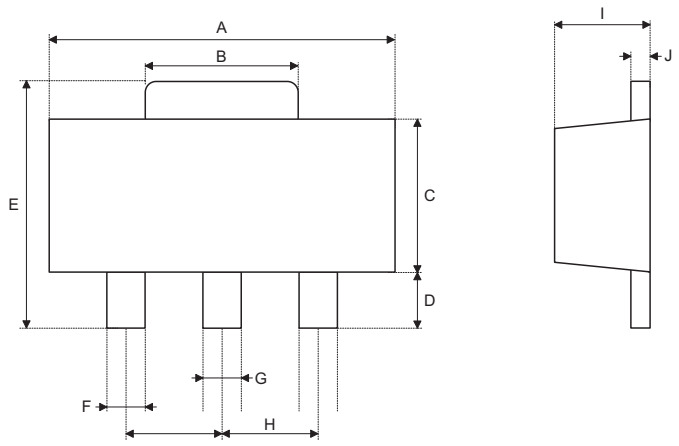
Symbol	Dimensions in mm		
	Min.	Nom.	Max.
A	1.0	—	1.3
A1	—	—	0.1
A2	0.7	—	0.9
b	0.35	—	0.5
C	0.10	—	0.25
D	2.7	—	3.1
E	1.4	—	1.8
e	—	1.9	—
H	2.6	—	3.0
L	0.37	—	—
θ	1°	—	9°

5-pin SOT23-5 Outline Dimensions



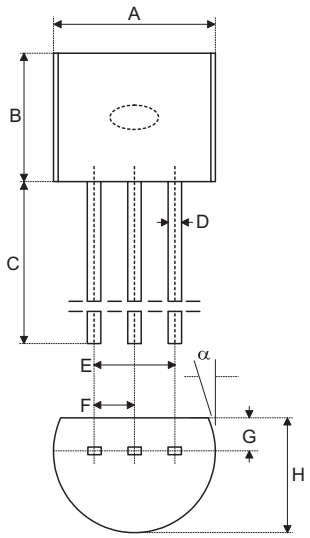
Symbol	Dimensions in mm		
	Min.	Nom.	Max.
A	1.00	—	1.30
A1	—	—	0.10
A2	0.70	—	0.90
b	0.35	—	0.50
C	0.10	—	0.25
D	2.70	—	3.10
E	1.40	—	1.80
e	—	1.90	—
H	2.6	—	3.0
L	0.37	—	—
θ	1°	—	9°

3-pin SOT89 Outline Dimensions



Symbol	Dimensions in mil		
	Min.	Nom.	Max.
A	173	—	181
B	59	—	72
C	90	—	102
D	35	—	47
E	155	—	167
F	14	—	19
G	17	—	22
H	—	59	—
I	55	—	63
J	14	—	17

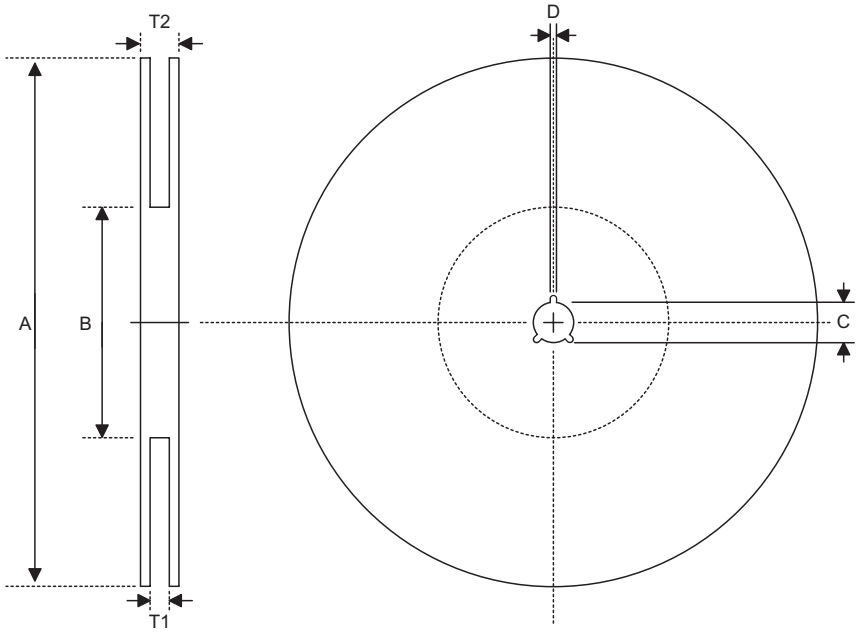
3-pin TO92 Outline Dimensions



Symbol	Dimensions in mil		
	Min.	Nom.	Max.
A	170	—	200
B	170	—	200
C	500	—	—
D	11	—	20
E	90	—	110
F	45	—	55
G	45	—	65
H	130	—	160
I	8	—	18
α	4°	—	6°

Product Tape and Reel Specifications

Reel Dimensions



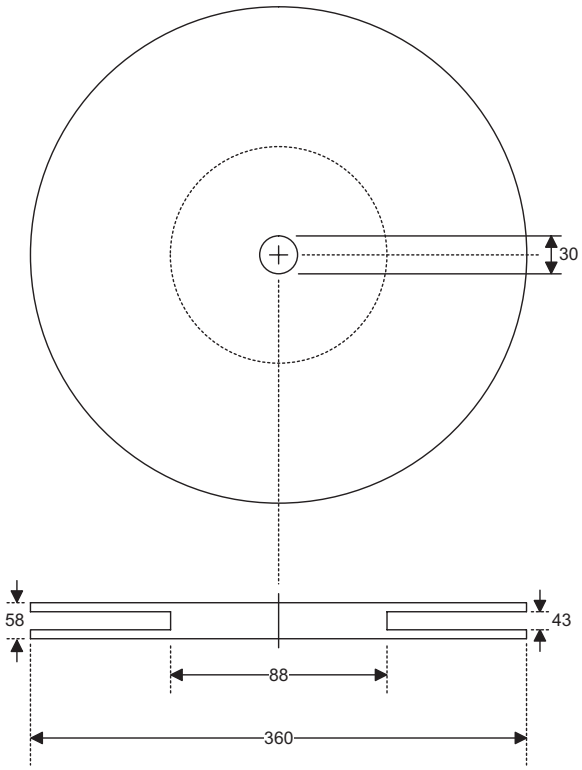
SOT23, SOT23-5

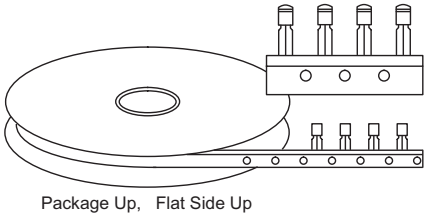
Symbol	Description	Dimensions in mm
A	Reel Outer Diameter	178.0±1.0
B	Reel Inner Diameter	62.0±1.0
C	Spindle Hole Diameter	13.0±0.2
D	Key Slit Width	2.50±0.25
T1	Space Between Flange	$8.4^{+1.5/-0.0}$
T2	Reel Thickness	$11.4^{+1.5/-0.0}$

SOT89

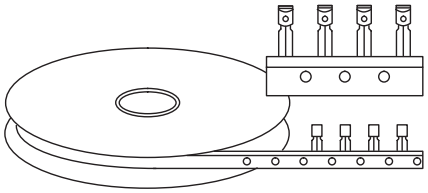
Symbol	Description	Dimensions in mm
A	Reel Outer Diameter	180.0±1.0
B	Reel Inner Diameter	62.0±1.5
C	Spindle Hole Diameter	$12.75^{+0.15/-0.00}$
D	Key Slit Width	1.90±0.15
T1	Space Between Flange	$12.4^{+0.2/-0.00}$
T2	Reel Thickness	$17.0^{+0.0/-0.4}$

3-pin TO92 Reel Dimensions (Unit: mm)



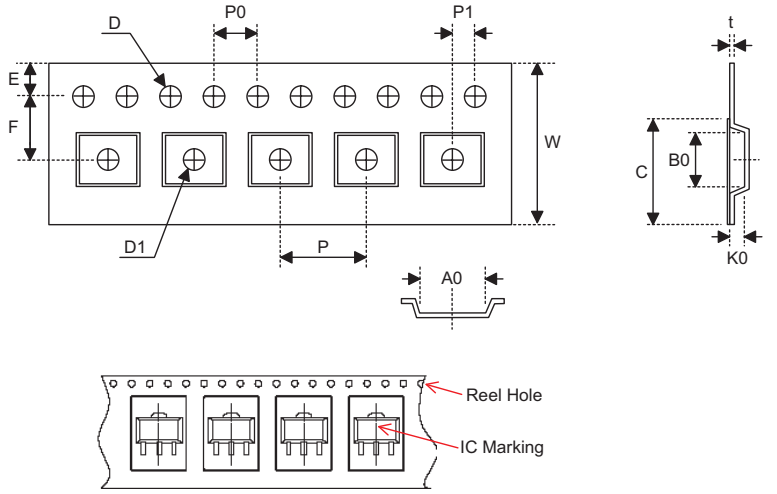


Package Up, Flat Side Up



Package Up, Flat Side Down

Carrier Tape Dimensions



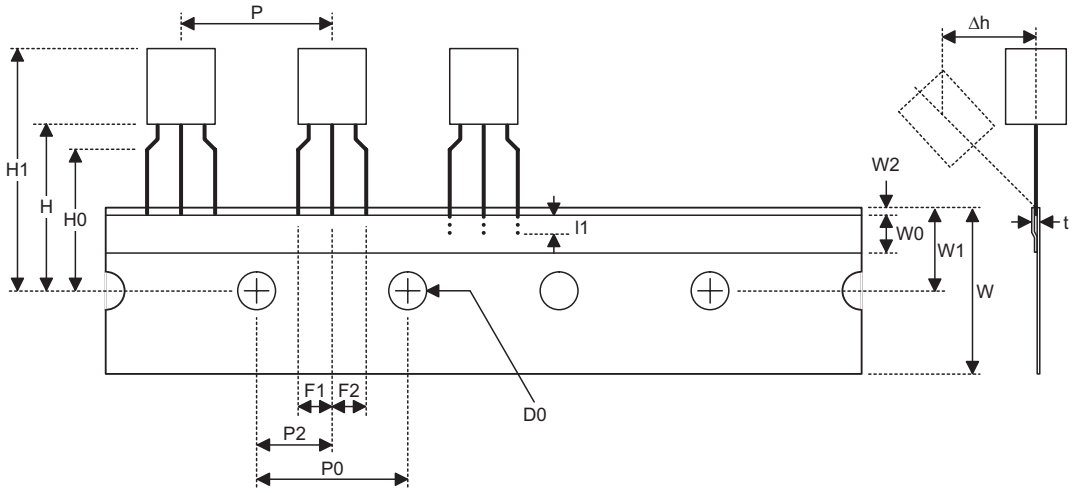
SOT23, SOT23-5

Symbol	Description	Dimensions in mm
W	Carrier Tape Width	8.0±0.3
P	Cavity Pitch	4.0±0.1
E	Perforation Position	1.75±0.10
F	Cavity to Perforation (Width Direction)	3.50±0.05
D	Perforation Diameter	$1.5^{+0.1/-0.0}$
D1	Cavity Hole Diameter	$1.5^{+0.1/-0.0}$
P0	Perforation Pitch	4.0±0.1
P1	Cavity to Perforation (Length Direction)	2.00±0.05
A0	Cavity Length	3.15±0.10
B0	Cavity Width	3.2±0.1
K0	Cavity Depth	1.4±0.1
t	Carrier Tape Thickness	0.20±0.03
C	Cover Tape Width	5.3±0.1

SOT89

Symbol	Description	Dimensions in mm
W	Carrier Tape Width	$12.0^{+0.3/-0.1}$
P	Cavity Pitch	8.0±0.1
E	Perforation Position	1.75±0.10
F	Cavity to Perforation (Width Direction)	5.50±0.05
D	Perforation Diameter	$1.5^{+0.1/-0.0}$
D1	Cavity Hole Diameter	$1.5^{+0.1/-0.0}$
P0	Perforation Pitch	4.0±0.1
P1	Cavity to Perforation (Length Direction)	2.0±0.1
A0	Cavity Length	4.8±0.1
B0	Cavity Width	4.5±0.1
K0	Cavity Depth	1.8±0.1
t	Carrier Tape Thickness	0.300±0.013
C	Cover Tape Width	9.3±0.1

3-pin TO92 Carrier Tape Dimensions



TO92

Symbol	Description	Dimensions in mm
I1	Taped Lead Length	(2.5)
P	Component Pitch	12.7±1.0
P_0	Perforation Pitch	12.7±0.3
P_2	Component to Perforation (Length Direction)	6.35±0.40
F_1	Lead Spread	$2.5^{+0.4/-0.1}$
F_2	Lead Spread	$2.5^{+0.4/-0.1}$
Δh	Component Alignment	0.0±0.1
W	Carrier Tape Width	$18.0^{+1.0/-0.5}$
W_0	Hold-down Tape Width	6.0±0.5
W_1	Perforation Position	9.0±0.5
W_2	Hold-down Tape Position	(0.5)
H_0	Lead Clinch Height	16.0±0.5
H_1	Component Height	Less than 24.7
D_0	Perforation Diameter	4.0±0.2
t	Taped Lead Thickness	0.7±0.2
H	Component Base Height	19.0±0.5

Note: Thickness less than 0.38±0.05mm~0.5mm

P0 Accumulated pitch tolerance: ±1mm/20pitches.

( ) Bracketed figures are for consultation only

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