HT75xx-2
100mA Low Power LDO

Features

- Low power consumption
- Low voltage drop
- Low temperature coefficient
- High input voltage (up to 24V)
- High output current : 100mA
- Output voltage accuracy: tolerance ±1%
- TO92, SOT89 and SOT23-5 packages

Applications

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

General Description

The HT75xx-2 series is a set of three-terminal low power high voltage implemented in CMOS technology. They can deliver 100mA output current and allow an input voltage as high as 24V. They are available with several fixed output voltages ranging from 2.1V to 12.0V. 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.

Selection Table

Part No.	Output Voltage	Package	Marking
HT7521-2	2.1V	TO92 SOT89 SOT23-5	75xx-2 (for TO92) 75xx-2# (for SOT89) 75xx-2+ (for SOT89) 5xx2# (for SOT23-5-A) 5xx2+ (for SOT23-5-A)
HT7523-2	2.3V		
HT7525-2	2.5V		
HT7527-2	2.7V		
HT7530-2	3.0V		
HT7533-2	3.3V		
HT7536-2	3.6V		
HT7540-2	4.0V		
HT7544-2	4.4V		
HT7550-2	5.0V		
HT7560-2	6.0V		
HT7570-2	7.0V		
HT7580-2	8.0V		
HT7590-2	9.0V		
HT75A0-2	10.0V		
HT75C0-2	12.0V		
HT7541-2	4.15V	SOT23-5	541B+ (for SOT23-5-B)

Note: ″xx″ stands for output voltages.

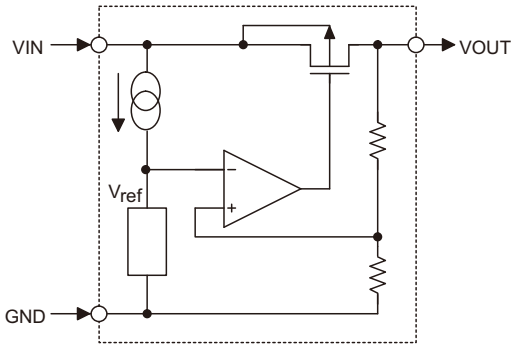
Both lead free and green compound devices are available. Note the symbol marks below:

″#″ stands for lead free devices.

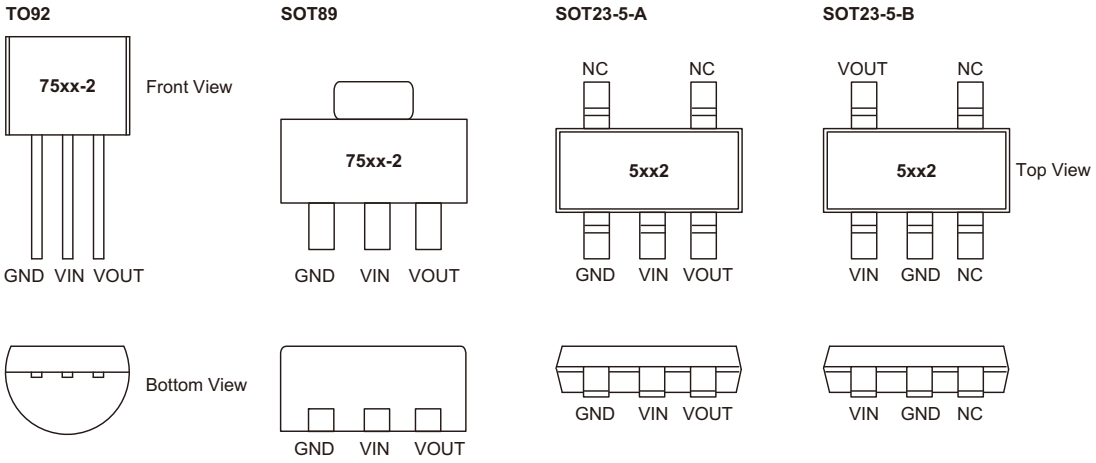
″+″ stands for green compound devices, which are Lead-free and Halogen-free.

For the TO92 package, the symbol mark will be at the end of the date code. Whereas for the SOT89 and SOT23-5, the symbol mask will be located at the end of IC marking.

Block Diagram



Pin Assignment



Absolute Maximum Ratings

Supply Voltage .....–0.3V to 26V

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.

Thermal Information

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

Note: P_D is measured at Ta= 25°C

Pin Descriptions

Pin No.	Pin Name	Pin Description
1	GND	Ground pin
2	VIN	Input pin
3	VOUT	Output pin

Electrical Characteristics

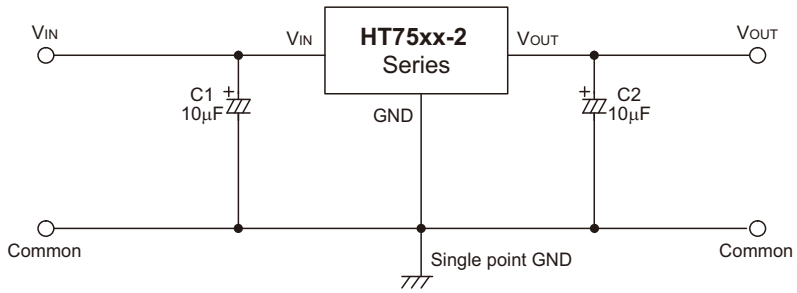
V_{IN} =V_{OUT}+2V, C_{IN}=C_O=10μF Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		Conditions					
V_{IN}	Input Voltage	—		—	—	24	V
V_{OUT}	Output Voltage Tolerance	I_{OUT}=10mA		-1%		+1%	V
I_{OUT}	Output Current	2.1V≤V_{OUT}≤4.4V		70	100	—	mA
		V_{OUT}=5.0V		100	150	—	mA
		6.0V≤V_{OUT}≤12.0V		150	—	—	mA
ΔV_{OUT}	Load Regulation	2.1V≤V_{OUT}≤3.6V 1mA≤I_{OUT}≤50mA		—	10	45	mV
		4.0V≤V_{OUT}≤4.4V 1mA≤I_{OUT}≤50mA		—	13	65	mV
		5.0V≤V_{OUT}≤12.0V 1mA≤I_{OUT}≤70mA		—	17	80	mV
V_{DIF}	Voltage Drop (Note)	I_{OUT}=10mA, ΔV_{OUT}=2%	2.1V≤V_{OUT}≤2.4V	—	0.46	0.95	V
			2.5V≤V_{OUT}≤2.7V		0.32	0.68	V
			3.0V≤V_{OUT}≤3.3V		0.23	0.41	V
			V_{OUT}=3.6V		0.19	0.35	V
			4.0V≤V_{OUT}≤4.4V		0.16	0.30	V
			V_{OUT}=5.0V		0.12	0.25	V
			6.0V≤V_{OUT}≤12.0V		0.11	0.23	V
I_{SS}	Quiescent Current	No load		—	2.5	5.0	μA
ΔV_{LINE}	Line Regulation	V_{IN}=V_{OUT}+1V≤V_{IN}≤24V, I_{OUT}=1mA		—	0.1	0.2	%/V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	I_{OUT}=10mA -40°C<Ta<85°C	2.1V≤V_{OUT}≤12.0V	—	100	—	ppm/°C

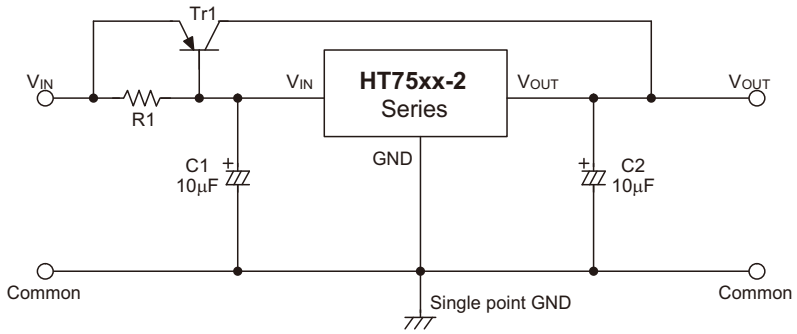
Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT} + 2V with a fixed load.

Application Circuits

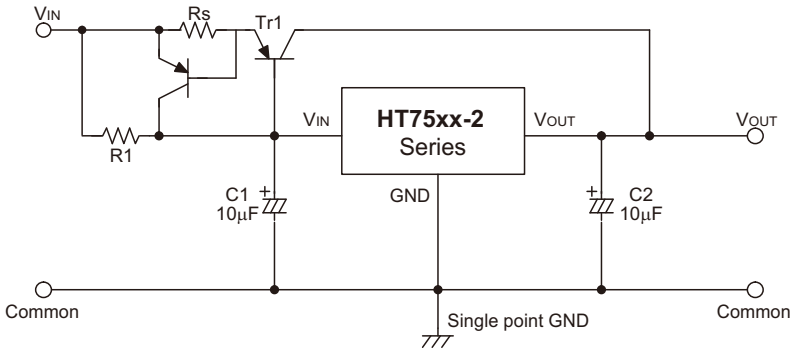
Basic Circuit



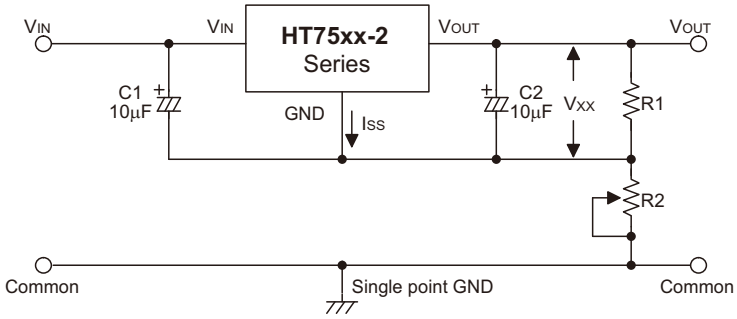
High Output Current Positive Voltage Regulator



Short-Circuit Protection for Tr1

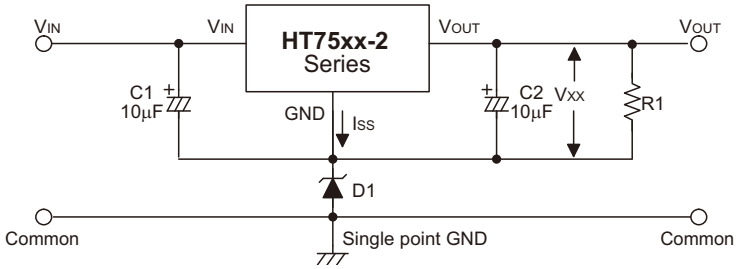


Circuit for Increasing Output Voltage



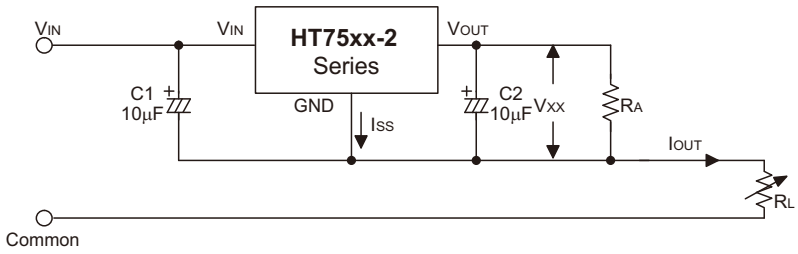
$$V_{OUT} = V_{XX} \left(1 + \frac{R2}{R1}\right) + I_{SS} R2$$

Circuit for Increasing Output Voltage



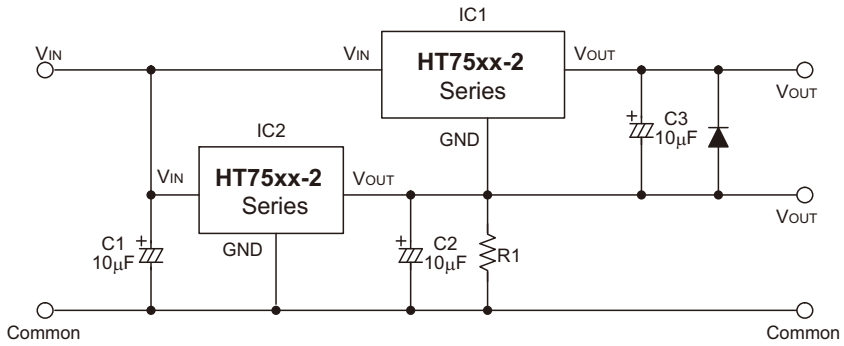
$$V_{OUT} = V_{XX} + V_{D1}$$

Constant Current Regulator



$$I_{OUT} = \frac{V_{XX}}{R_A} + I_{SS}$$

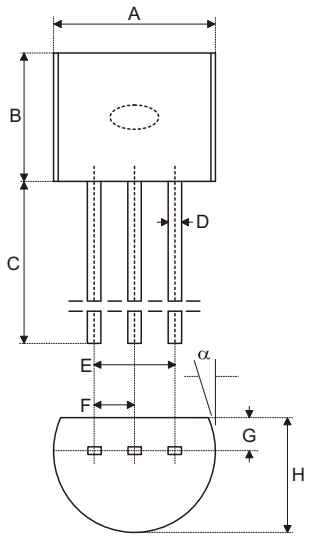
Dual Supply



Package Information

Note that the package information provided here is for consultation purposes only. As this information may be updated at regular intervals users are reminded to consult the Holtek website (http://www.holtek.com.tw/english/literature/package.pdf) for the latest version of the package information.

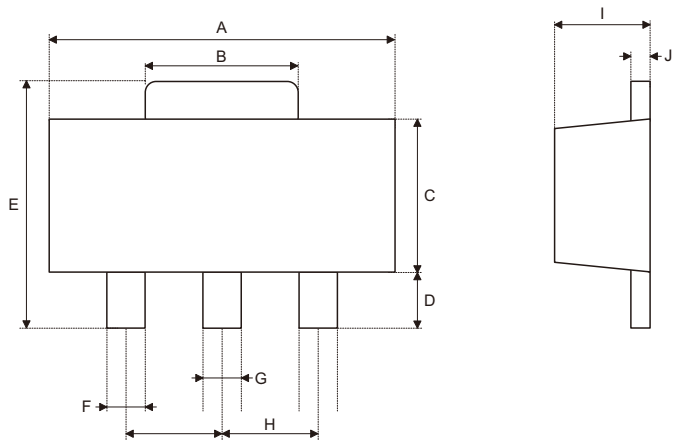
3-pin TO92 Outline Dimensions



Symbol	Dimensions in inch		
	Min.	Nom.	Max.
A	0.170	—	0.200
B	0.170	—	0.200
C	0.500	—	—
D	0.011	—	0.020
E	0.090	—	0.110
F	0.045	—	0.055
G	0.045	—	0.065
H	0.130	—	0.160
α	0°	—	10°

Symbol	Dimensions in mm		
	Min.	Nom.	Max.
A	4.32	—	5.08
B	4.32	—	5.08
C	12.70	—	—
D	0.28	—	0.51
E	2.29	—	2.79
F	1.14	—	1.40
G	1.14	—	1.65
H	3.30	—	4.06
α	0°	—	10°

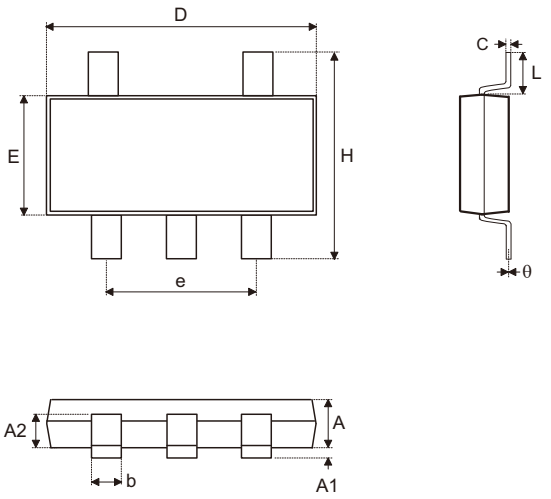
3-pin SOT89 Outline Dimensions



Symbol	Dimensions in inch		
	Min.	Nom.	Max.
A	0.173	—	0.181
B	0.059	—	0.072
C	0.090	—	0.102
D	0.035	—	0.047
E	0.155	—	0.167
F	0.014	—	0.019
G	0.017	—	0.022
H	—	0.059	—
I	55	—	63
J	14	—	17

Symbol	Dimensions in mm		
	Min.	Nom.	Max.
A	4.39	—	4.60
B	1.50	—	1.83
C	2.29	—	2.59
D	0.89	—	1.19
E	3.94	—	4.24
F	0.36	—	0.48
G	0.43	—	0.56
H	—	1.50	—
I	1.40	—	1.60
J	0.36	—	0.43

5-pin SOT23-5 Outline Dimensions

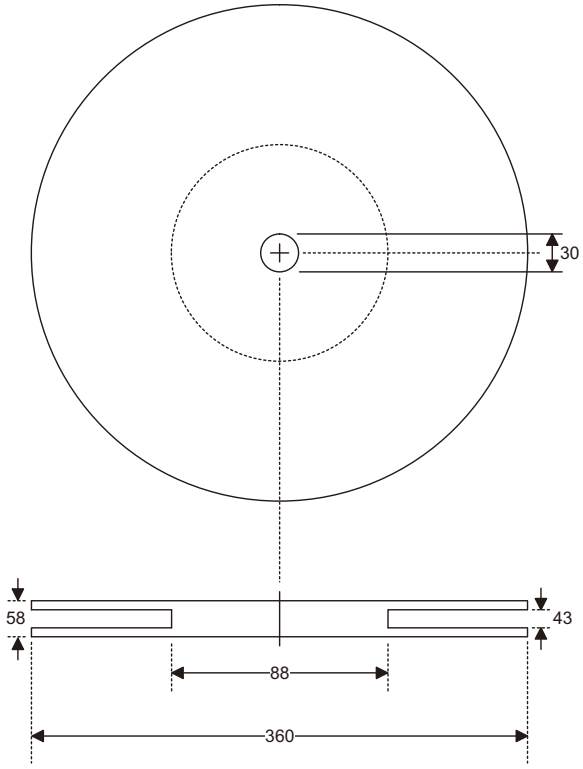


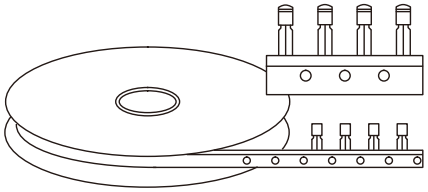
Symbol	Dimensions in inch		
	Min.	Nom.	Max.
A	0.039	—	0.051
A1	—	—	0.004
A2	0.028	—	0.035
b	0.014	—	0.020
C	0.004	—	0.010
D	0.106	—	0.122
E	0.055	—	0.071
e	—	0.075	—
H	0.102	—	0.118
L	0.015	—	—
θ	0°	—	9°

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	2.60	—	3.0
L	0.37	—	—
θ	0°	—	9°

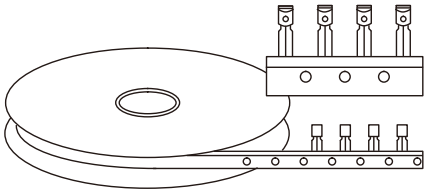
Product Tape and Reel Specifications

TO92 Reel Dimensions (Unit: mm)



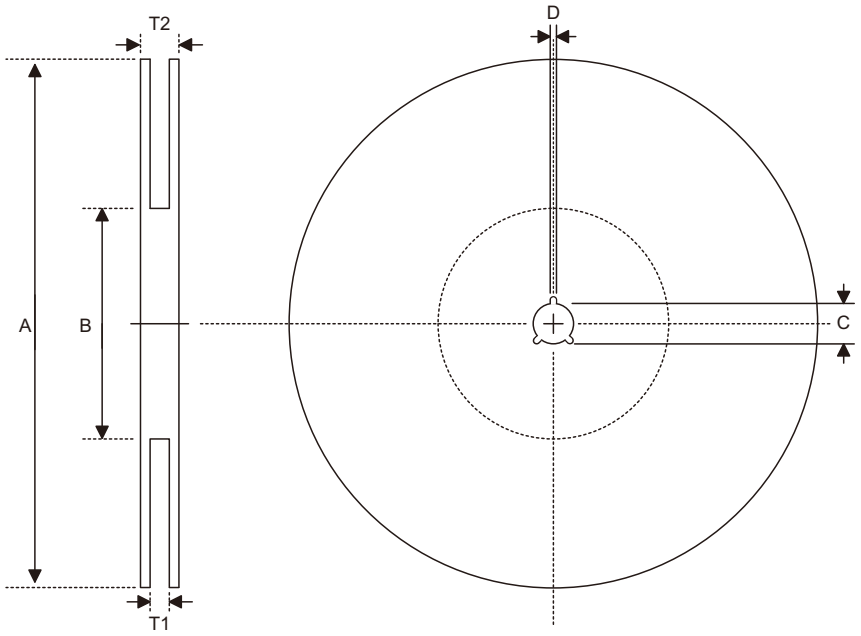


Package Up, Flat Side Up



Package Up, Flat Side Down

Reel Dimensions



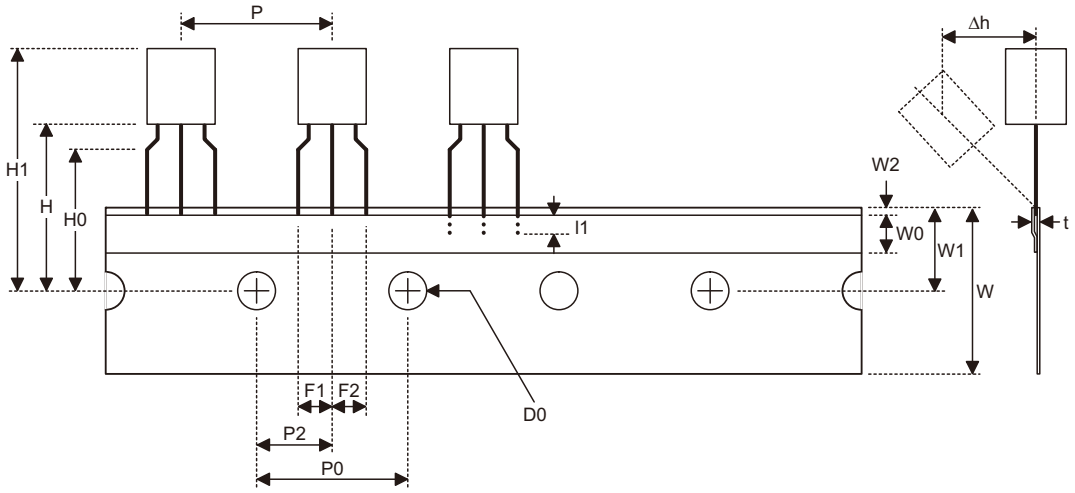
SOT89-3

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/-0.0
T2	Reel Thickness	17.0 +0.0/-0.4

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

Carrier Tape Dimensions



TO92

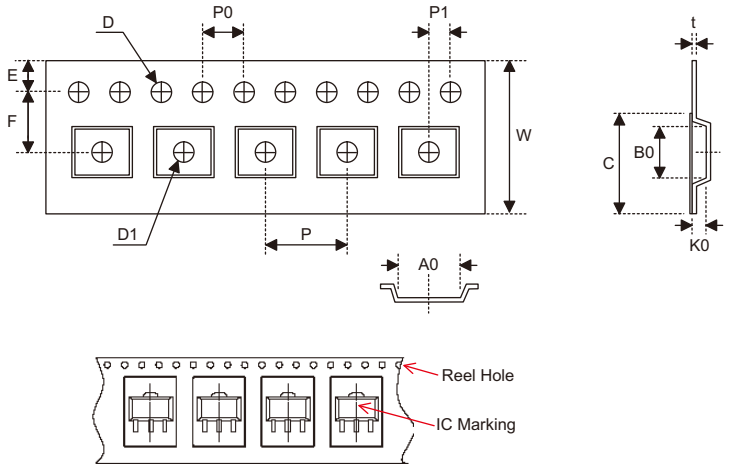
Symbol	Description	Dimensions in mm
I1	Taped Lead Length	(2.5)
P	Component Pitch	12.7±1.0
P_0	Perforation Pitch	12.7±0.3
P_2	Component to Perforation (Length Direction)	6.35±0.40
F_1	Lead Spread	$2.5^{+0.4/-0.1}$
F_2	Lead Spread	$2.5^{+0.4/-0.1}$
Δh	Component Alignment	0.0±0.1
W	Carrier Tape Width	$18.0^{+1.0/-0.5}$
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

Carrier Tape Dimensions



SOT89-3

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

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

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