

Features

- High input voltage (up to 24V)
- Low power consumption
- Low voltage drop
- Low temperature coefficient
- TO-92 & SOT-89 packages

Applications

- Battery-powered equipment
- Communication equipment
- Audio/video equipment

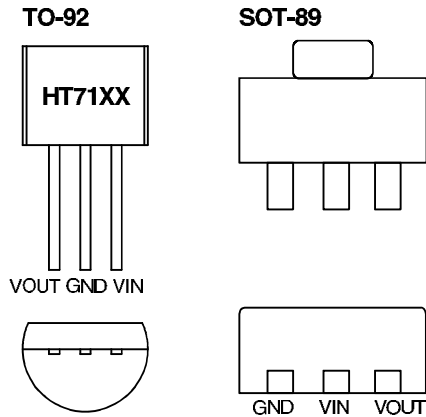
General Description

The HT71XX series is a set of three-terminal low power high voltage regulators implemented in CMOS technology. They allow input voltages as high as 24V. They are available with several fixed output voltages ranging from 1.5V to 15V. The advantages of CMOS technology give low

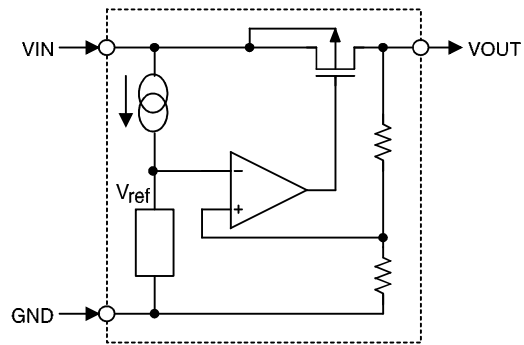
voltage dropout and low quiescent current.

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

Pin Assignment



Block Diagram



Selection Guide

Item	Output Voltage	Tolerance
HT7130	3.0V	±2.4%, ±5%
HT7133	3.3V	±2.4%, ±5%
HT7145	4.5V	±2.4%, ±5%
HT7150	5.0V	±2.4%, ±5%
HT7170	7.0V	±2.4%, ±5%
HT7190	9.0V	±2.4%, ±5%
HT71C0	12V	±2.4%, ±5%

Note: Selectable regulation voltage range from 2.4V to 9V in 0.1V increments. If custom first order 100K piece. (semi-custom part 3)

Absolute Maximum Ratings*

Supply Voltage -0.3V to 28V Operating Temperature 0°C to 70°C
 Storage Temperature -50°C to 125°C Power Dissipation 200mW

*Note: Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only. Functional operation of this device at these or any other conditions above those indicated in the operational sections of this specification is not implied and exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Electrical Characteristics
HT71XX series (HT7130, +3.0V output type)

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage	5V	I _{OUT} =10mA	2.85	3.0	3.15	V
I _{OUT}	Output Current	5V	—	20	30	—	mA
ΔV _{OUT}	Load Regulation	5V	1mA ≤ I _{OUT} ≤ 20mA	—	60	100	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	5V	No load	—	4	6.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	4V ≤ V _{IN} ≤ 24V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5V	I _{OUT} =10mA 0°C < Ta < 70°C	—	±0.45	—	mV/°C

HT71XX series (HT7133, +3.3V output type)

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage	5.5V	I _{OUT} =10mA	3.135	3.3	3.465	V
I _{OUT}	Output Current	5.5V	—	20	30	—	mA
ΔV _{OUT}	Load Regulation	5.5V	1mA ≤ I _{OUT} ≤ 30mA	—	60	100	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	5.5V	No load	—	4	6	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	4.5V ≤ V _{IN} ≤ 24V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5.5V	I _{OUT} =10mA 0°C < Ta < 70°C	—	±0.5	—	mV/°C

HT71XX series (HT7145, +4.5V output type)

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage	6.4V	I _{OUT} =10mA	4.27	4.4	4.72	V
I _{OUT}	Output Current	6.4V	—	20	30	—	mA
ΔV _{OUT}	Load Regulation	6.4V	1mA ≤ I _{OUT} ≤ 30mA	—	60	150	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	6.4V	No load	—	4	7.5	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	5.4V ≤ V _{IN} ≤ 24V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	6.4V	I _{OUT} =10mA 0°C < Ta < 70°C	—	±0.7	—	mV/°C

HT71XX series (HT7150, +5.0V output type)

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage	7V	I _{OUT} =10mA	4.75	5.0	5.25	V
I _{OUT}	Output Current	7V	—	20	30	—	mA
ΔV _{OUT}	Load Regulation	7V	1mA≤I _{OUT} ≤30mA	—	60	100	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	7V	No load	—	5	9	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	6V≤V _{IN} ≤24V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	7V	I _{OUT} =10mA 0°C<Ta<70°C	—	±0.75	—	mV/°C

HT71XX series (HT7170, +7.0V output type)

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage	9V	I _{OUT} =10mA	6.65	7.0	7.35	V
I _{OUT}	Output Current	9V	—	20	30	—	mA
ΔV _{OUT}	Load Regulation	9V	1mA≤I _{OUT} ≤30mA	—	60	150	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	9V	No load	—	7	12.5	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	8V≤V _{IN} ≤24V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	9V	I _{OUT} =10mA 0°C<Ta<70°C	—	±1.05	—	mV/°C

HT71XX series (HT7190, +9V output type)

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage	12V	I _{OUT} =10mA	8.55	9	9.45	V
I _{OUT}	Output Current	12V	—	30	40	—	mA
ΔV _{OUT}	Load Regulation	12V	1mA ≤ I _{OUT} ≤ 30mA	—	60	150	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	12V	No load	—	9	14	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	10V ≤ V _{IN} ≤ 24V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	12V	I _{OUT} =10mA 0°C < Ta < 70°C	—	±1.35	—	mV/°C

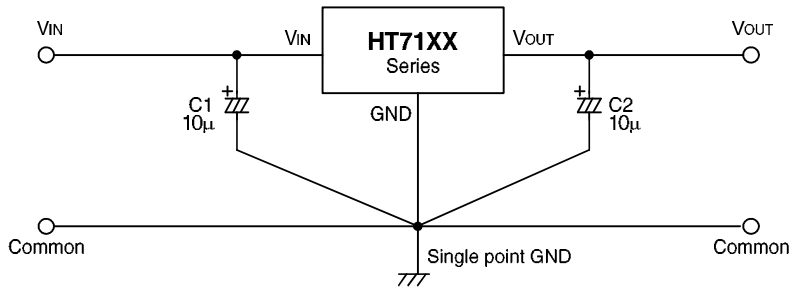
HT71XX series (HT71C0, +12V output type)

(Ta=25°C)

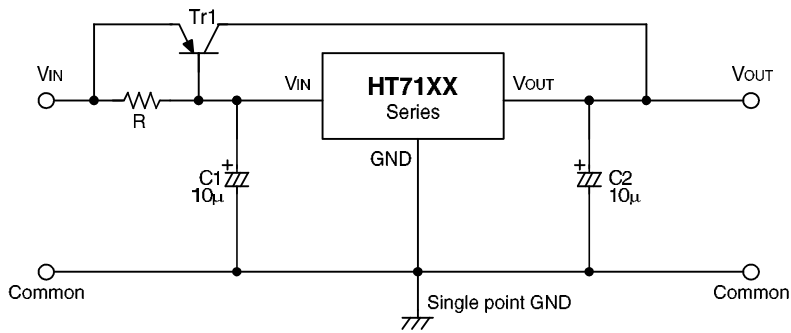
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage	15V	I _{OUT} =10mA	11.4	12	12.6	V
I _{OUT}	Output Current	15V	—	30	40	—	mA
ΔV _{OUT}	Load Regulation	15V	1mA ≤ I _{OUT} ≤ 30mA	—	60	150	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	15V	No load	—	11	15	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	13V ≤ V _{IN} ≤ 24V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	15V	I _{OUT} =10mA 0°C < Ta < 70°C	—	±1.8	—	mV/°C

Application Circuit

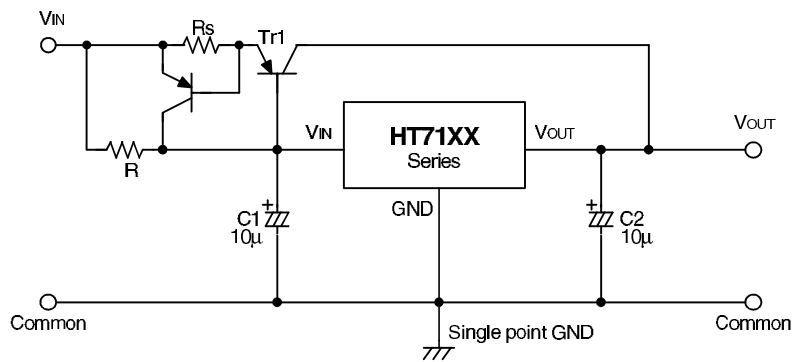
The basic circuits using the HT71XX series



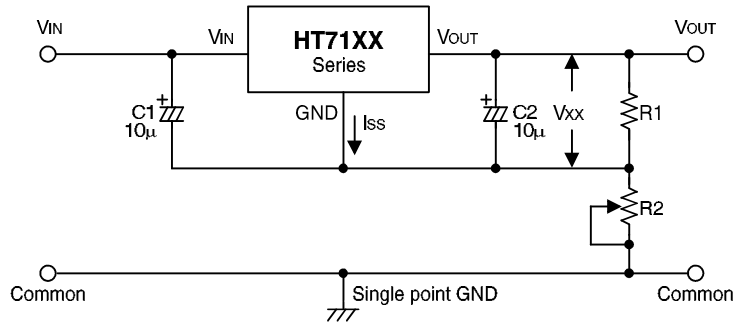
High output current positive voltage regulator



Tr1 short-circuit protection

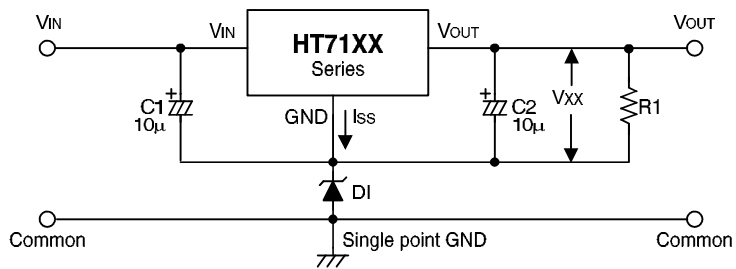


Output voltage increasing circuit



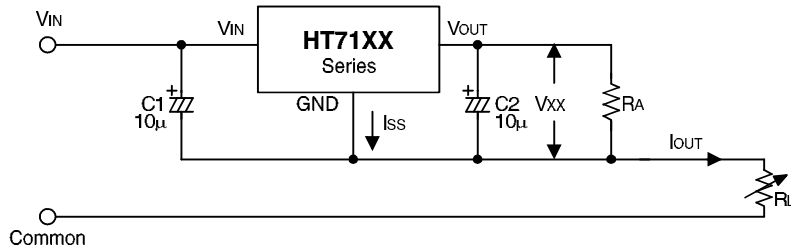
$$V_{OUT} = V_{XX} \left(1 + \frac{R_2}{R_1}\right) + I_{SS} R_2$$

Output voltage increasing circuit



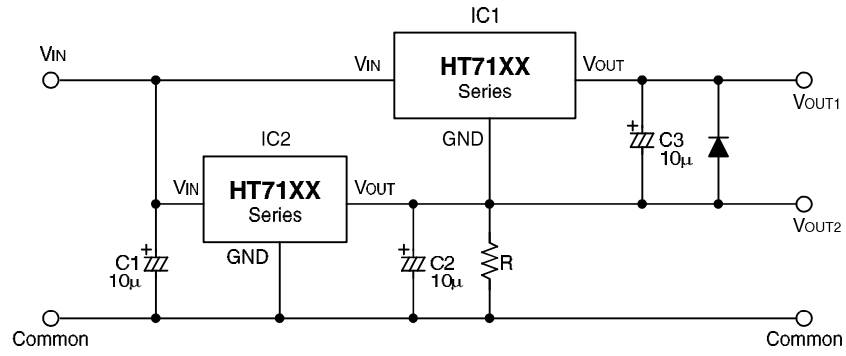
$$V_{OUT} = V_{XX} + V_{D1}$$

Constant current regulator



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

Dual supply

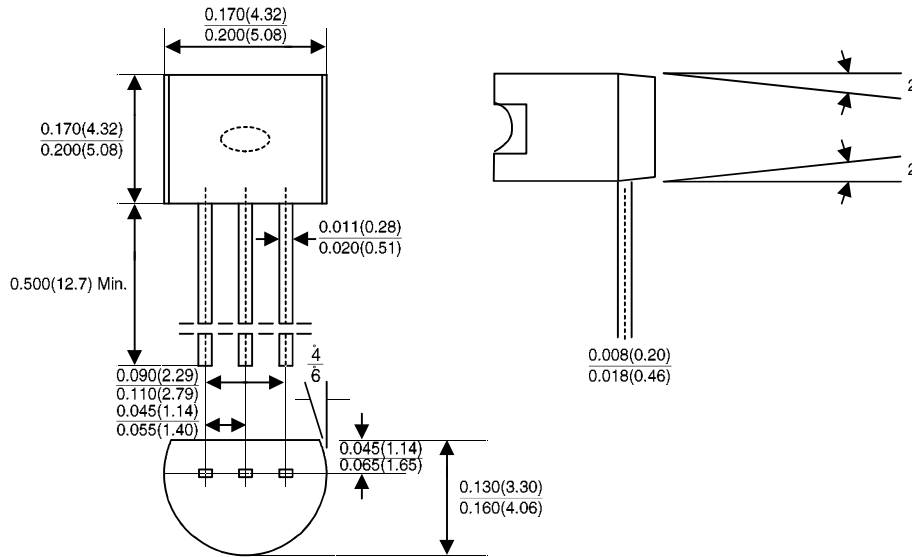


Package Outlines

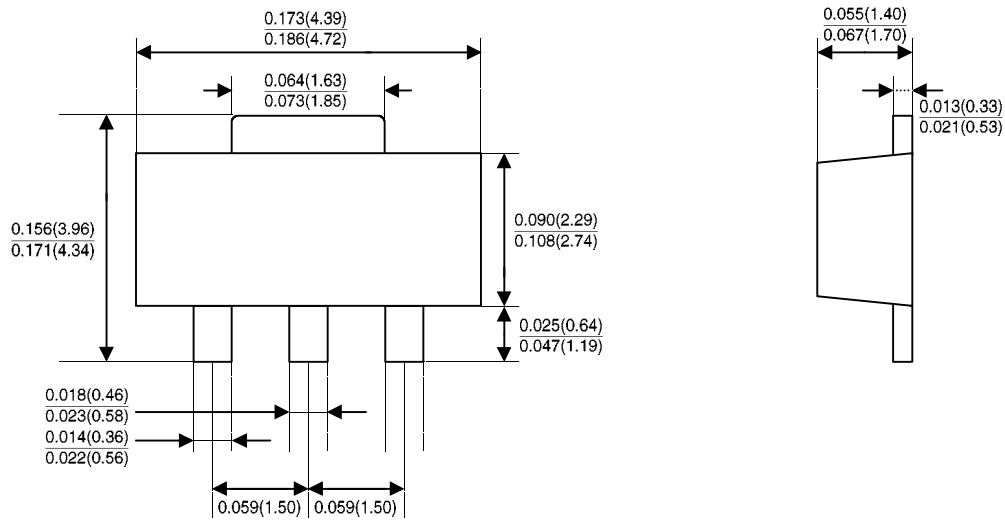
Dimension

All linear dimensions are in inches and parenthetically in millimeters ($\frac{\text{Min.}}{\text{Max.}}$)

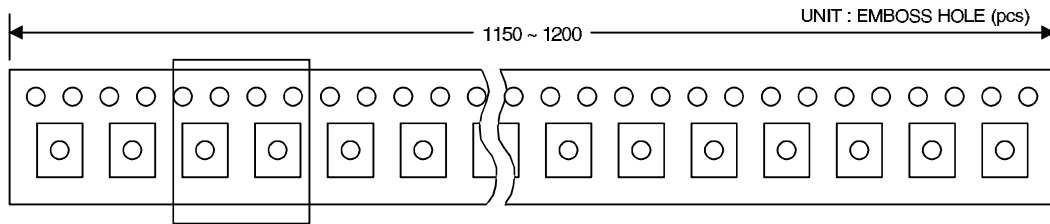
3-pin TO-92 package



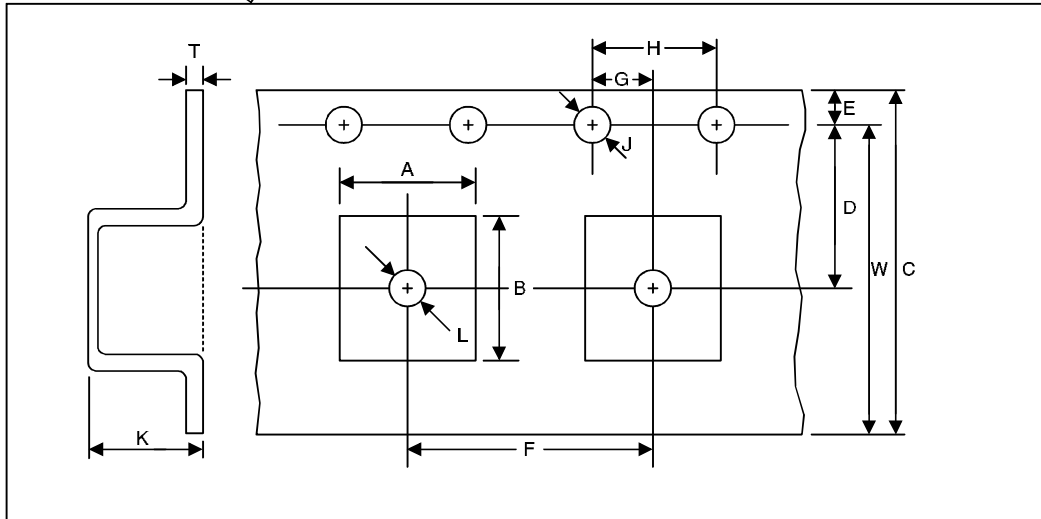
SOT-89 package



Type form and dimensions



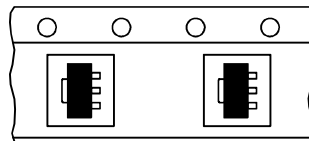
MATERIAL : STYRENE-TYPE PLASTIC



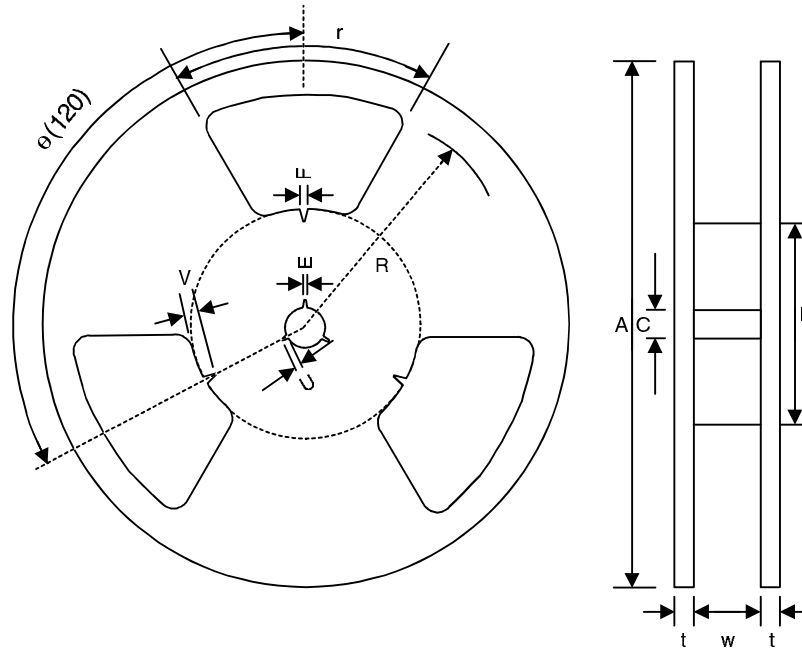
Dimensions

SYMBOL	A	B	C	D	E	F	G	H	J	K	W	T	L
VALUE	5.0	4.6	12	5.65	1.5	8.0	2.0	4.0	φ1.5	1.7	10.5	0.3	φ1.6
TOLERANCE	±0.1	±0.1	±0.2	±0.05	±0.1	±0.1	±0.05	±0.1	±0.1	±0.1	±0.1	±0.05	±0.1

* Total 10 Pitch tolerance ± 2mm

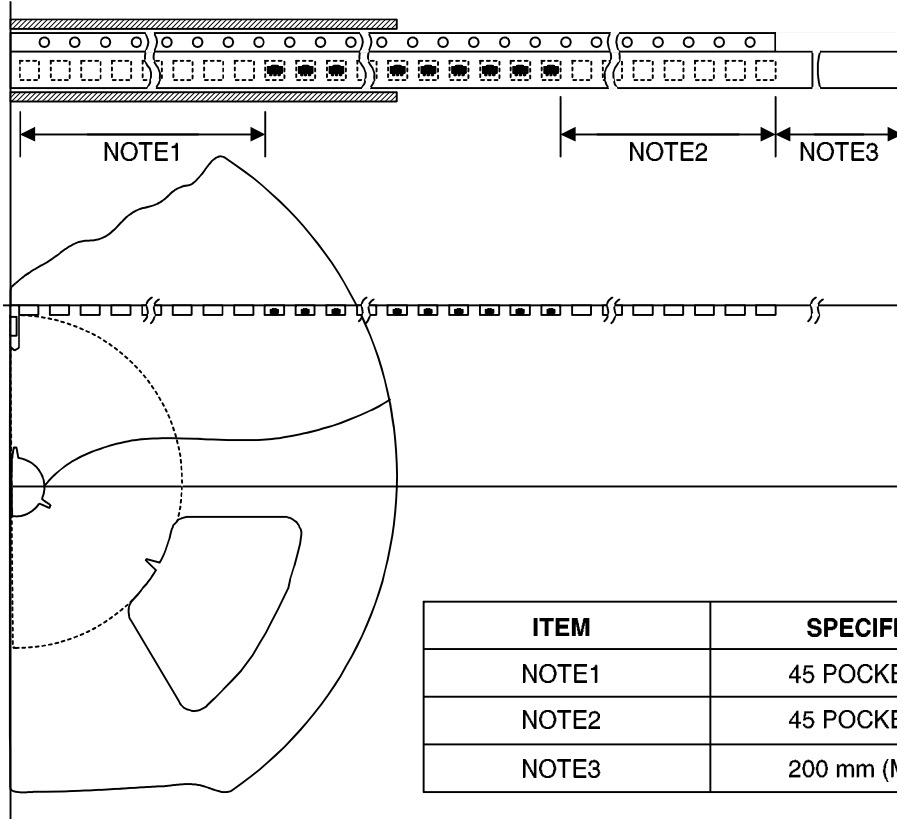


Reel form and dimensions



A	B	C	E	F	U	V	R	r	w	t
ϕ 178±2	ϕ 80±1	ϕ 13±0.5	20±0.5	1.5±0.5	4±0.5	6±1	70±1	40°	14±1.5	2±0.1

Leader and trailer portions



Taped part quantity

1000 Pcs/1 reel (-0/+10PCS)

Mechanical data

ITEM	DATA	REMARK
Cover tape	30 ~ 60g	Carrier tape and cover tape open angle 0 ~ 5°
Adhesion		F=120±5mm/minute

