

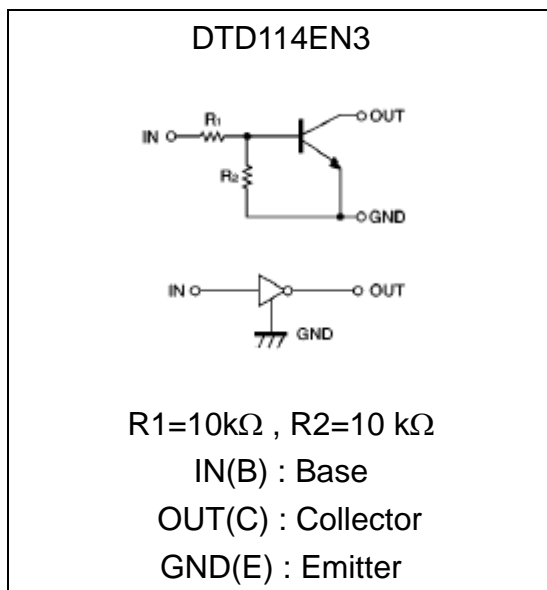
**NPN Digital Transistors (Built-in Resistors)**

# DTD114EN3

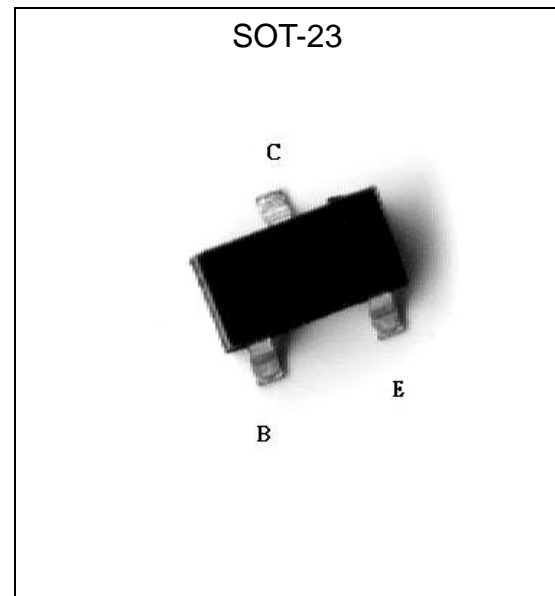
**Features**

- Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit).
- The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of almost completely eliminating parasitic effects.
- Only the on/off conditions need to be set for operation, making device design easy.
- Complements the DTB114EN3
- Pb-free lead plating and halogen-free package

**Equivalent Circuit**

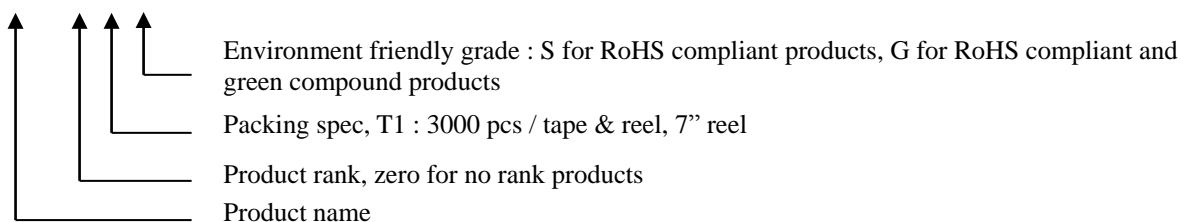


**Outline**



**Ordering Information**

Device	Package	Shipping
DTD114EN3-0-T1-G	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel



**Absolute Maximum Ratings (Ta=25°C)**

Parameter	Symbol	Limits	Unit
Supply Voltage	V <sub>CC</sub>	50	V
Input Voltage	V <sub>IN</sub>	-10~+40	V
Output Current	I <sub>O</sub>	500	mA
Power Dissipation	P <sub>D</sub>	200	mW
Operating Junction Temperature Range	T <sub>j</sub>	-55~+150	°C
Storage Temperature Range	T <sub>stg</sub>	-55~+150	°C

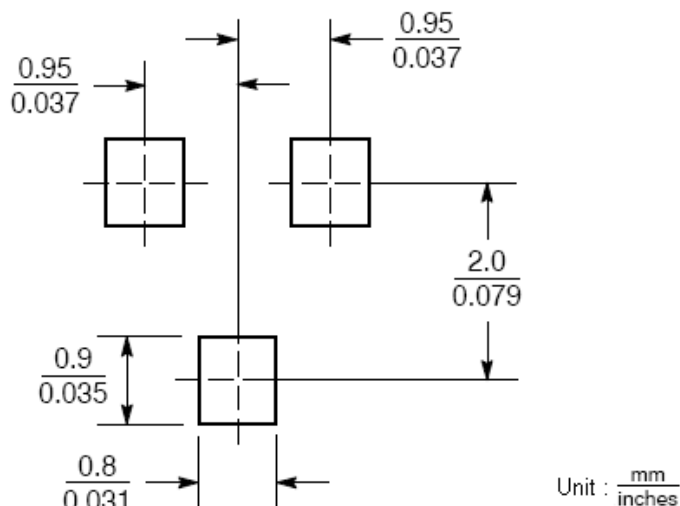
**Thermal Data**

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-ambient, max	R <sub>th,j-a</sub>	625	°C/W

**Characteristics (Ta=25°C)**

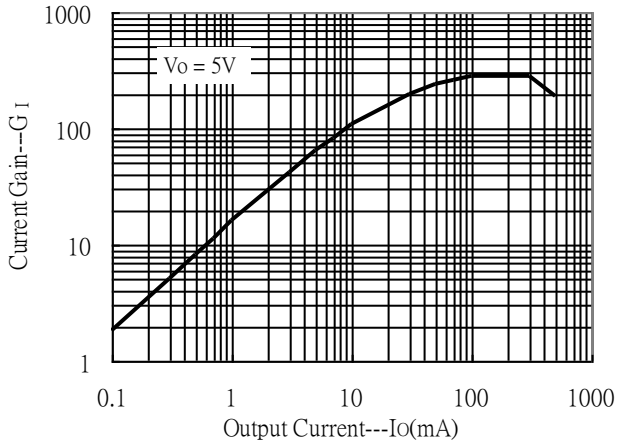
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Input Voltage	V <sub>I(off)</sub>	-	-	0.5	V	V <sub>CC</sub> =5V, I <sub>O</sub> =100μA
	V <sub>I(on)</sub>	3	-	-	V	V <sub>O</sub> =0.3V, I <sub>O</sub> =10mA
Output Voltage	V <sub>O(on)</sub>	-	0.1	0.3	V	I <sub>O</sub> /I <sub>I</sub> =50mA/2.5mA
Input Current	I <sub>I</sub>	-	-	0.88	mA	V <sub>I</sub> =5V
Output Current	I <sub>O(off)</sub>	-	-	0.5	μA	V <sub>CC</sub> =50V, V <sub>I</sub> =0V
DC Current Gain	G <sub>I</sub>	56	-	-	-	V <sub>O</sub> =5V, I <sub>O</sub> =50mA
Input Resistance	R <sub>I</sub>	7	10	13	kΩ	-
Resistance Ratio	R <sub>2</sub> /R <sub>1</sub>	0.8	1	1.2	-	-
Transition Frequency	f <sub>T</sub>	-	200	-	MHz	V <sub>CE</sub> =10V, I <sub>C</sub> =50mA, f=100MHz *

\* Transition frequency of the device

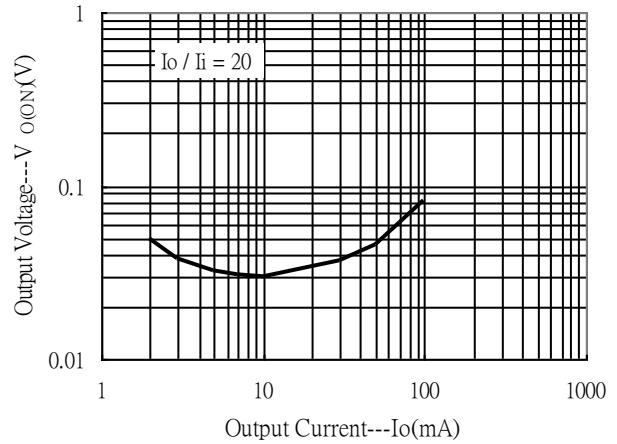
**Recommended Soldering Footprint**


## Typical Characteristics

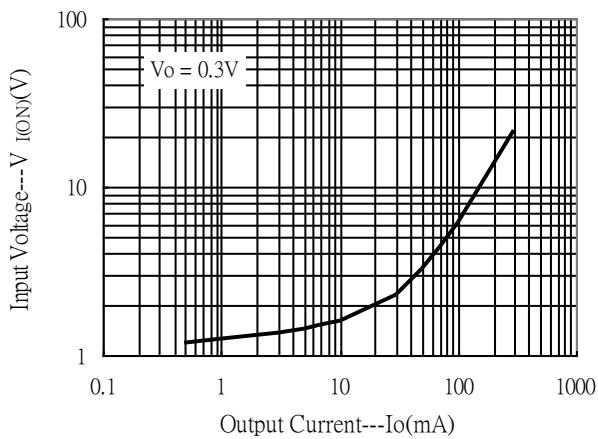
Current Gain vs Output Current



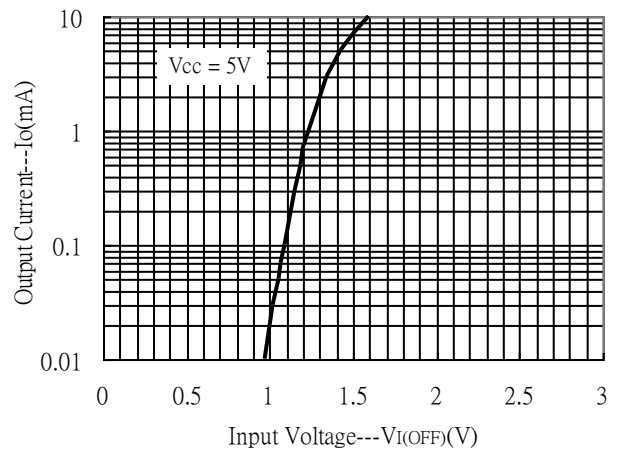
Output Voltage vs Output Current



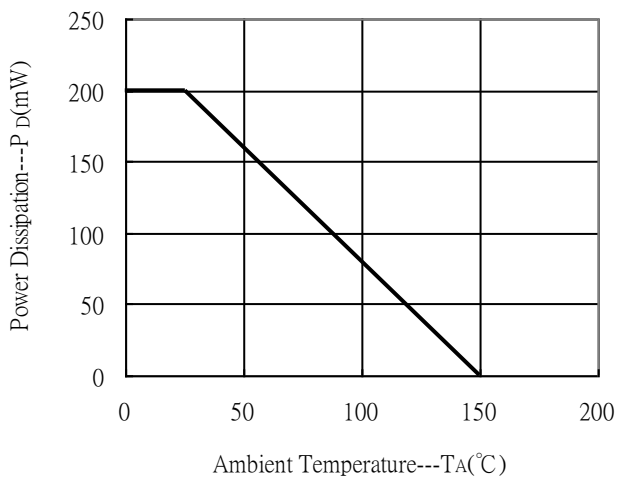
Input Voltage vs Output Current(ON characteristics)



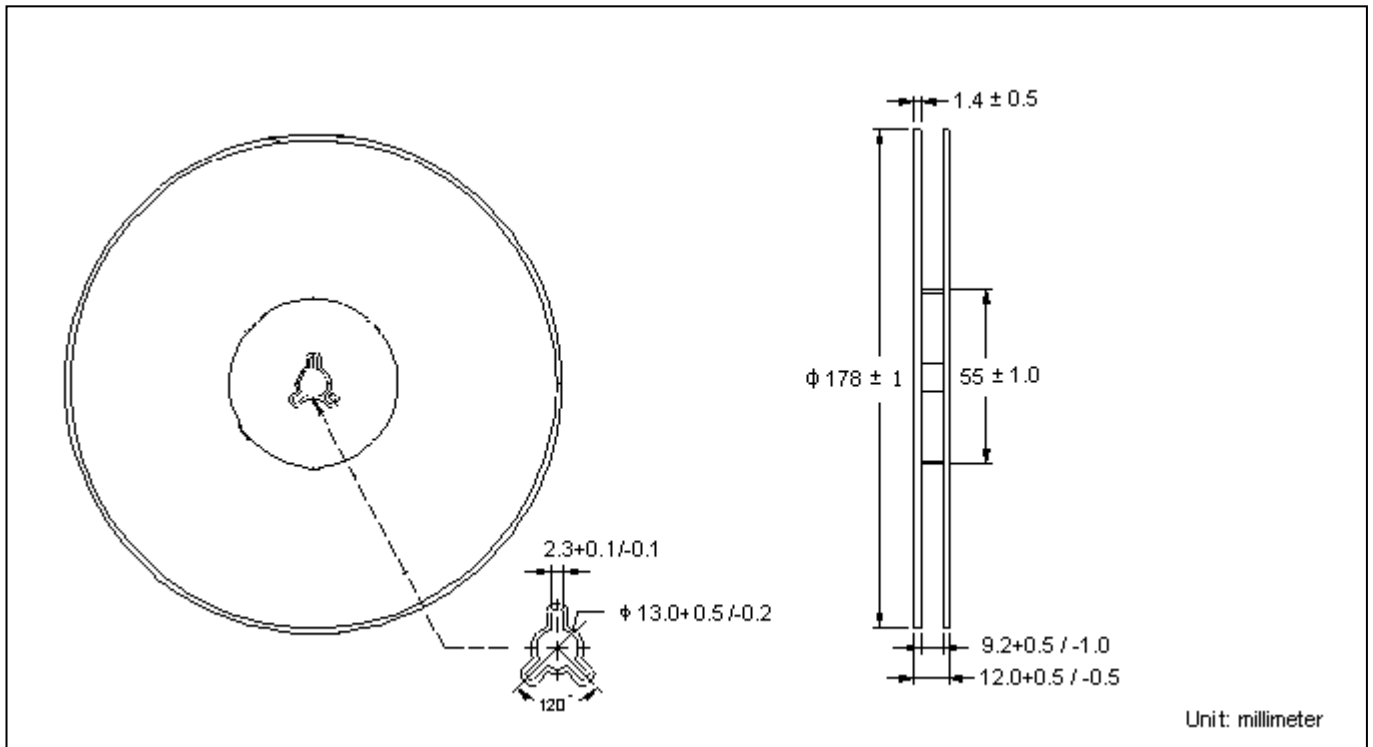
Output Current vs Input Voltage(OFF characteristics)



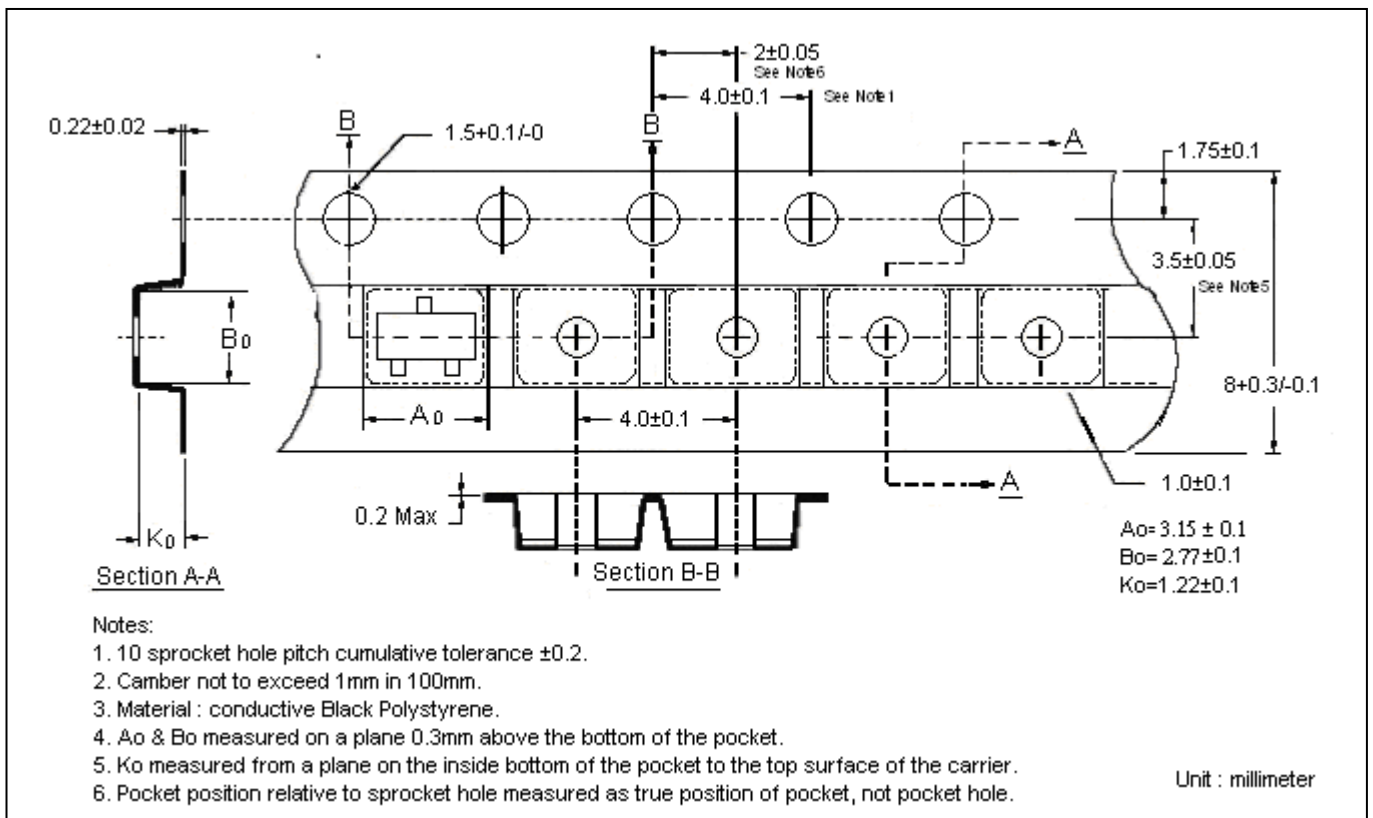
Power Derating Curve



**Reel Dimension**



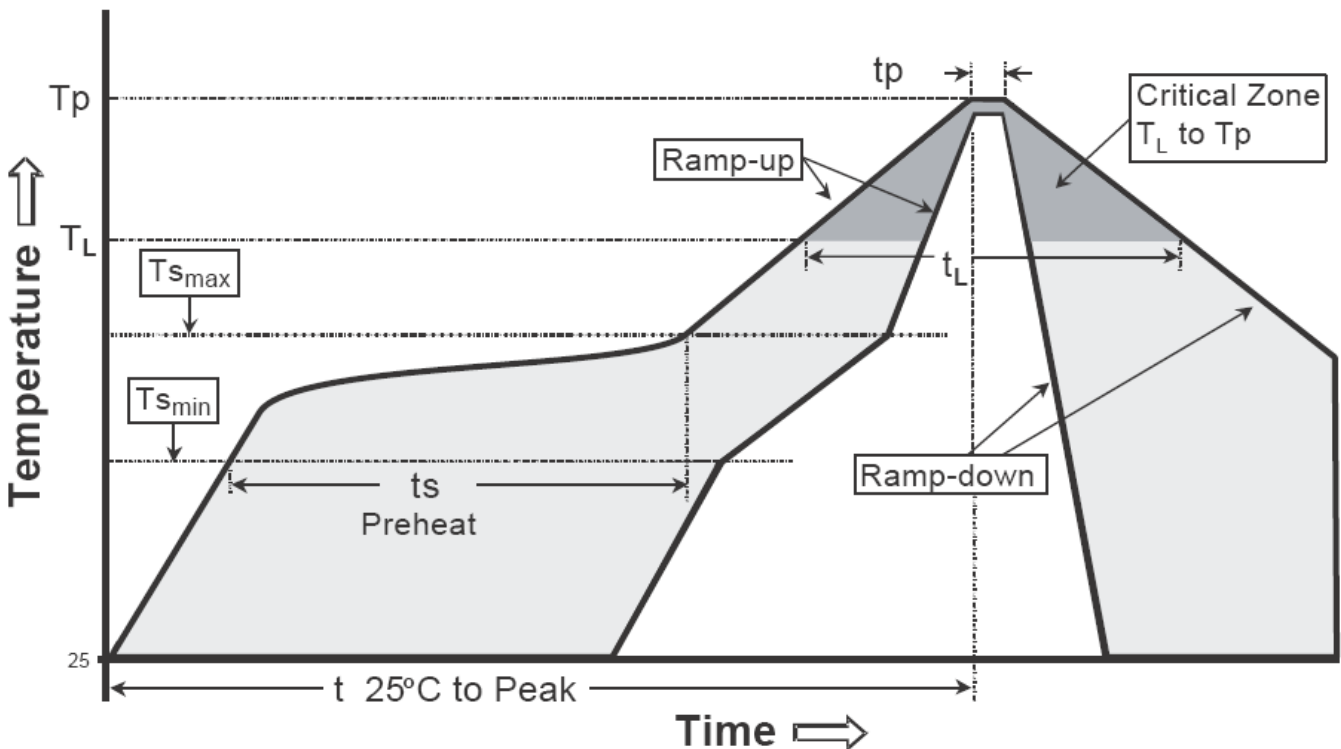
**Carrier Tape Dimension**



**Recommended wave soldering condition**

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

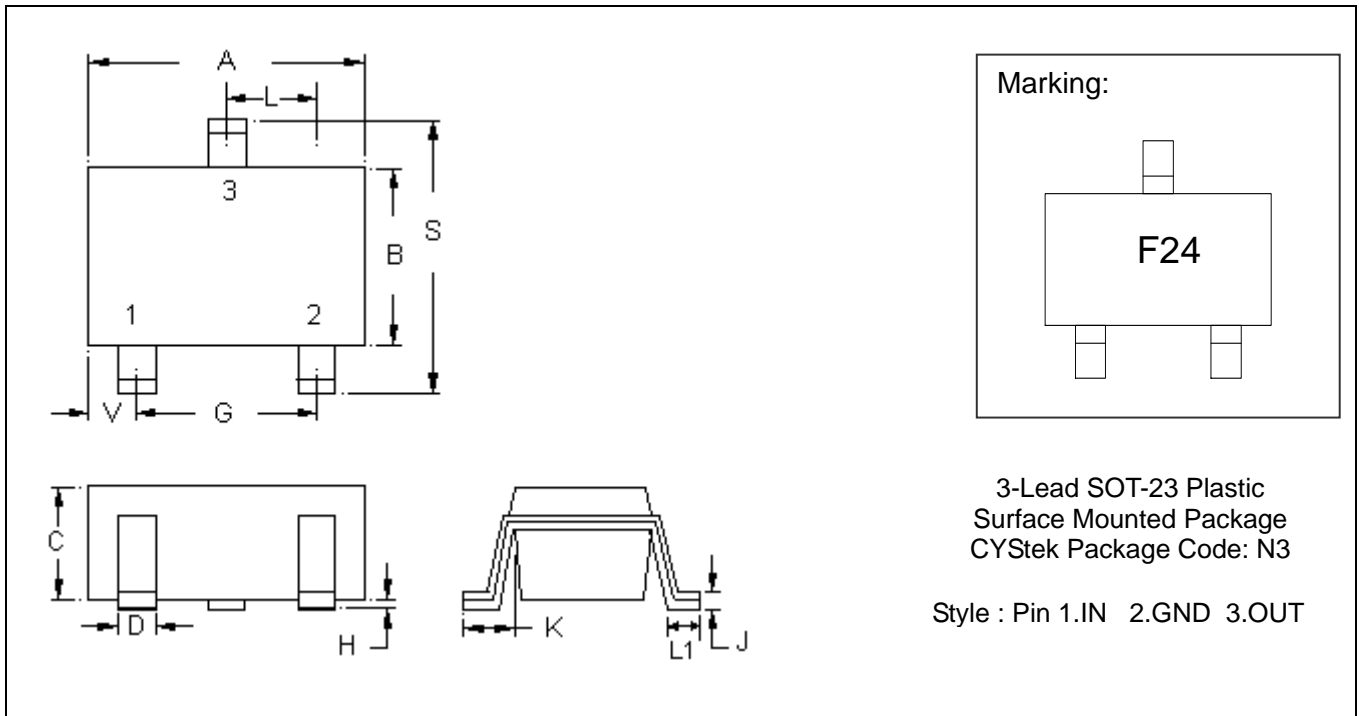
**Recommended temperature profile for IR reflow**



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T <sub>s min</sub> )	100°C	150°C
-Temperature Max(T <sub>s max</sub> )	150°C	200°C
-Time(t <sub>s min</sub> to t <sub>s max</sub> )	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T <sub>L</sub> )	183°C	217°C
- Time (t <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak Temperature(T <sub>p</sub> )	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

**SOT-23 Dimension**



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1102	0.1204	2.80	3.04	J	0.0032	0.0079	0.08	0.20
B	0.0472	0.0551	1.20	1.40	K	0.0118	0.0266	0.30	0.67
C	0.0335	0.0512	0.89	1.30	L	0.0335	0.0453	0.85	1.15
D	0.0118	0.0197	0.30	0.50	S	0.0830	0.1004	2.10	2.55
G	0.0669	0.0910	1.70	2.30	V	0.0098	0.0256	0.25	0.65
H	0.0000	0.0040	0.00	0.10	L1	0.0118	0.0197	0.30	0.50

**Notes :** 1.Controlling dimension : millimeters.  
 2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.  
 3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

**Material :**

- Lead : Tin plated.
- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0.

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