NPN Digital Transistors (Built-in Resistors)

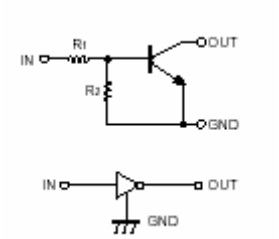
DTC114YC3

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 DTA114YC3

Equivalent Circuit

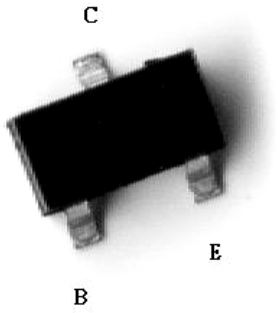
DTC114YC3



R1=10kΩ , R2=47 kΩ
IN(B) : Base
OUT(C) : Collector
GND(E) : Emitter

Outline

SOT-523



Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Supply Voltage	V_{CC}	50	V
Input Voltage	V_I	-6~+40	V
Output Current	I_O	70	mA
	$I_{O(max.)}$	100	mA
Power Dissipation	Pd	150	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	833	°C/W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~+150	°C

Electrical Characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Input Voltage	Vi(off)	-	-	0.3	V	Vcc=5V, Io=100uA
	Vi(on)	3	-	-	V	Vo=0.3V, Io=1mA
Output Voltage	Vo(on)	-	0.1	0.3	V	Io/Ii=5mA/0.25mA
Input Current	Ii	-	-	0.88	mA	Vi=5V
Output Current	Io(off)	-	-	0.5	uA	Vcc=50V, Vi=0V
DC Current Gain	Gi	68	-	-	-	Vo=5V, Io=5mA
Input Resistance	R1	7	10	13	kΩ	-
Resistance Ratio	R2/R1	3.7	4.7	5.7	-	-
Transition Frequency	f_T	-	250	-	MHz	V_{CE}=10V, I_C=5mA, f=100MHz *

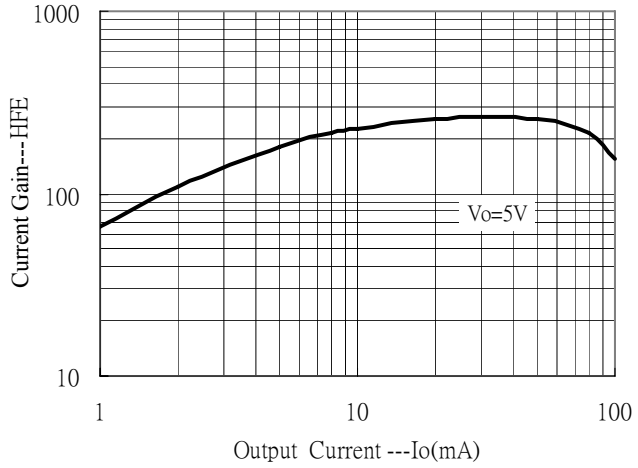
* Transition frequency of the device

Ordering Information

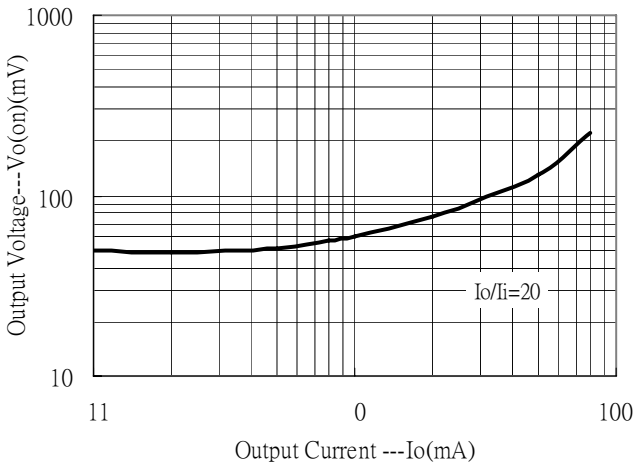
Device	Package	Shipping	Marking
DTC114YC3	SOT-523 (Pb-free package)	3000 pcs / Tape & Reel	64

Typical Characteristics

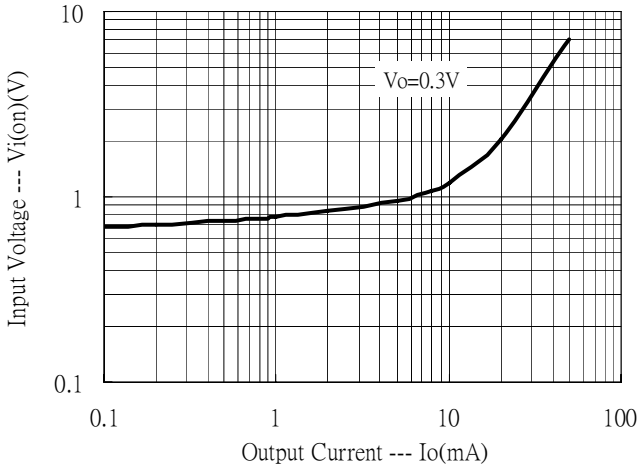
DC Current Gain vs Output Current



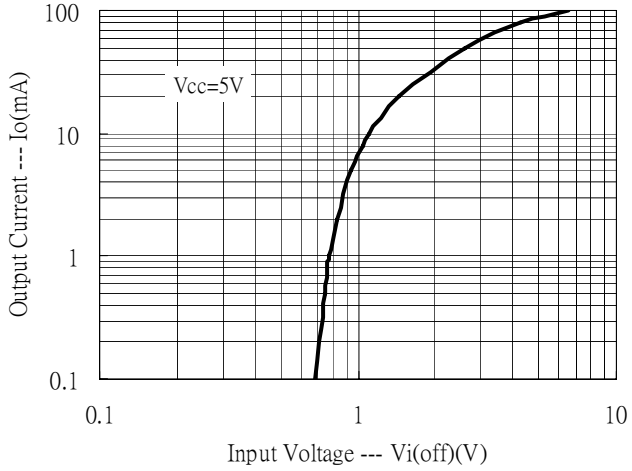
Output Voltage vs Output Current



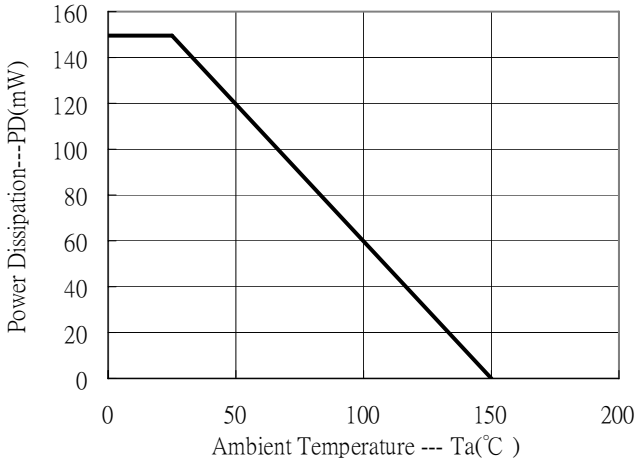
Input Voltage vs Output Current (ON Characteristics)



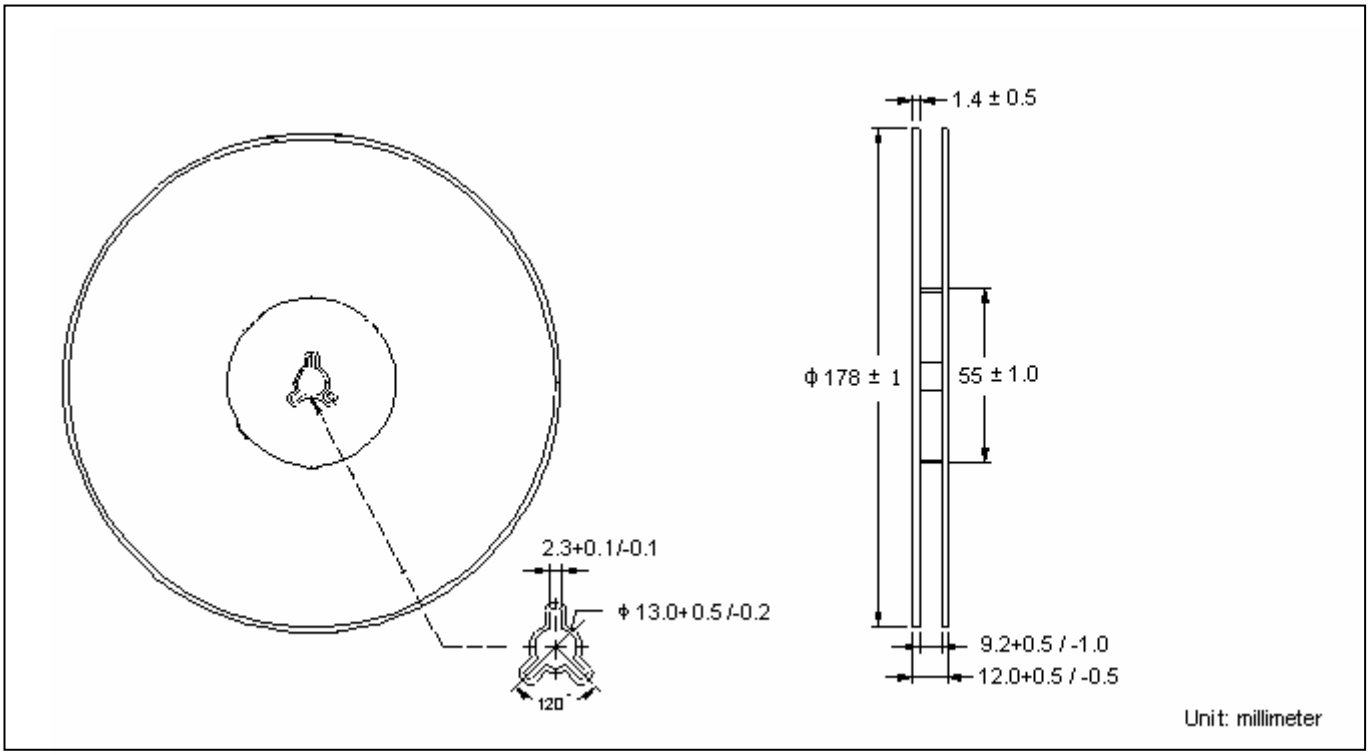
Output Current vs Input Voltage (OFF Characteristics)



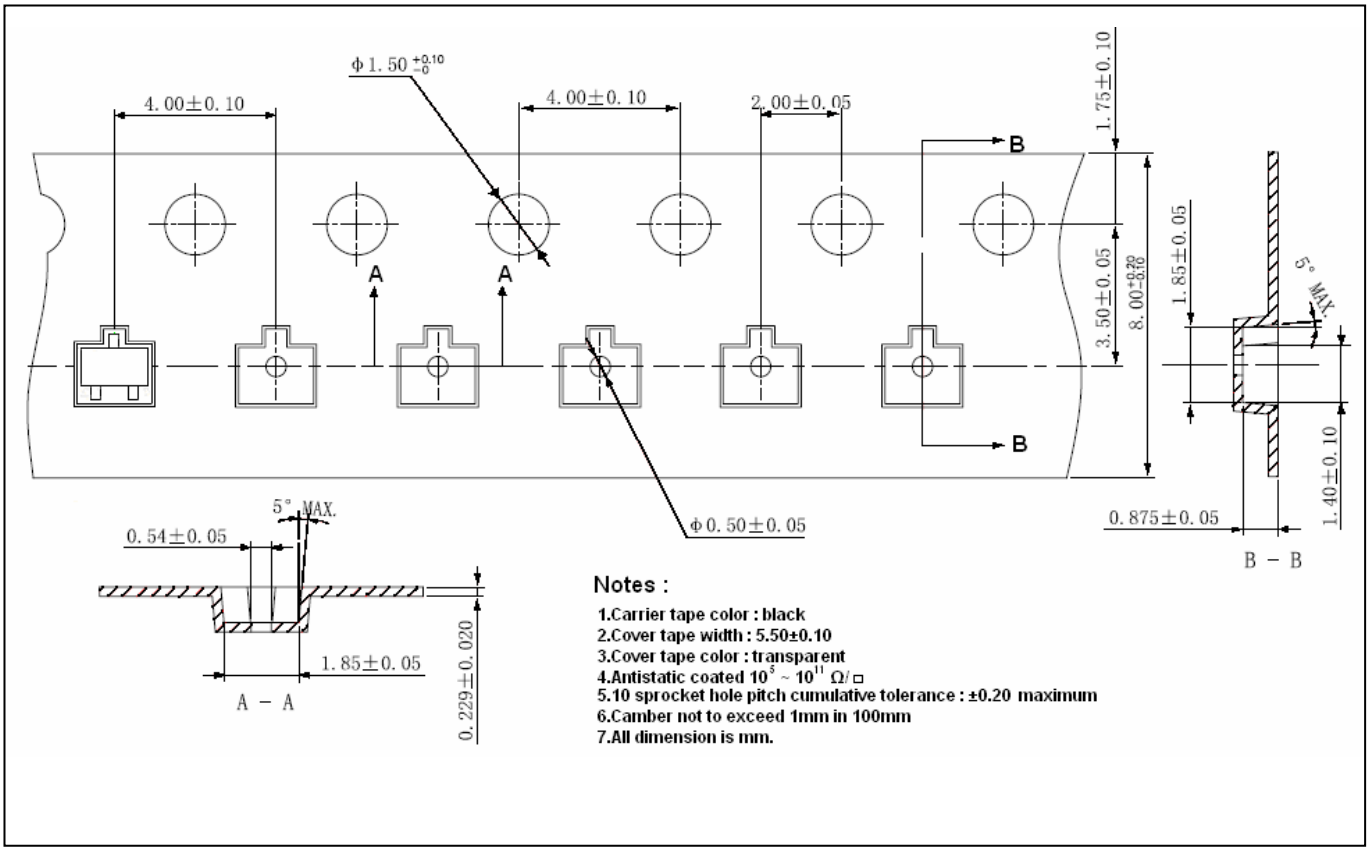
Power Derating Curve



Reel Dimension



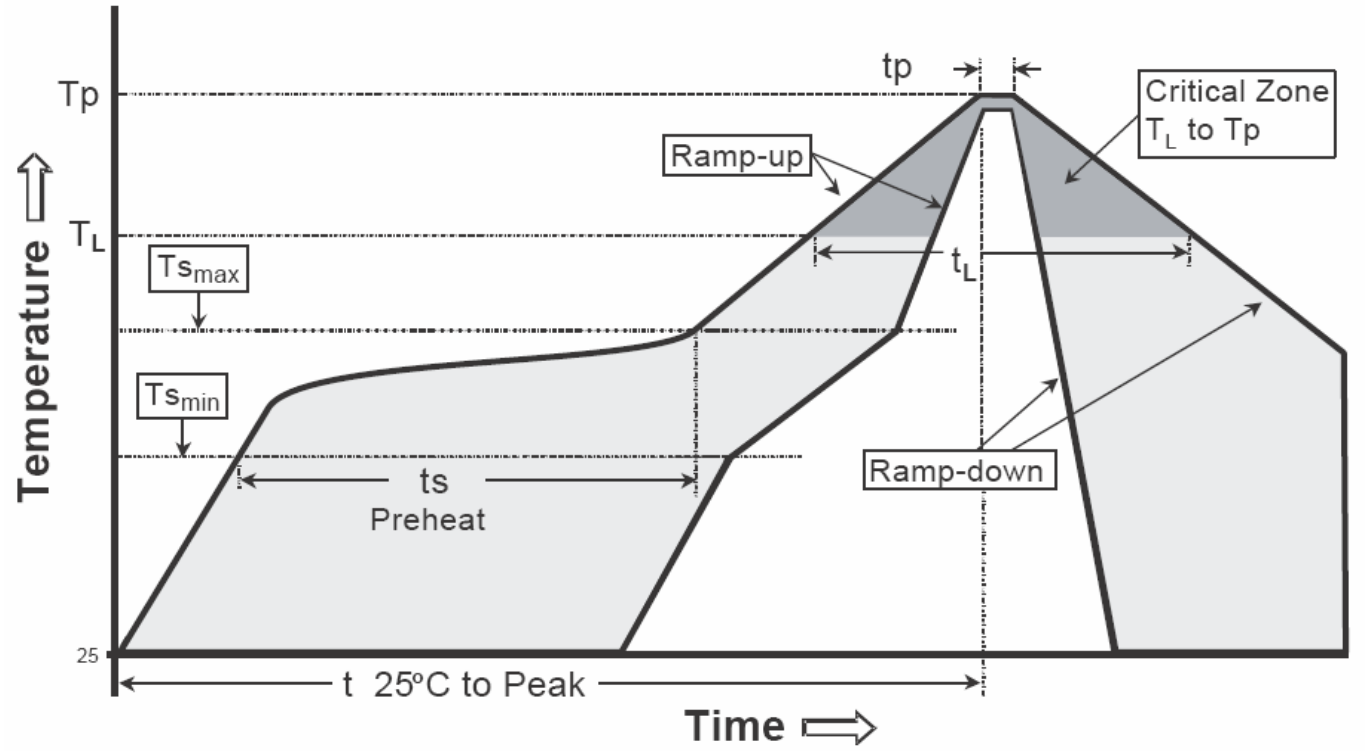
Carrier Tape Dimension



Recommended wave soldering condition

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

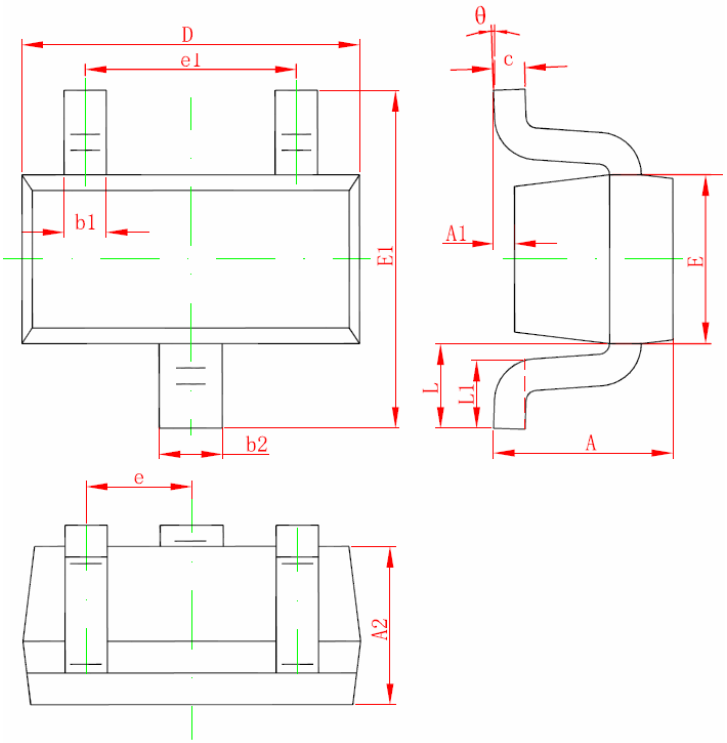
Recommended temperature profile for IR reflow



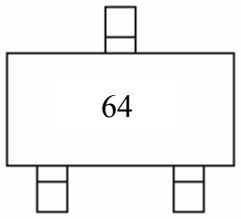
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − Time (t_L)	 183°C 60-150 seconds	 217°C 60-150 seconds
Peak Temperature(T_P)	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-523 Dimension



Marking:



3-Lead SOT-523 Plastic
Surface Mounted Package
CYStek Package Code: C3

Style: Pin 1.Base (Input)
2.Emitter (Ground)
3.Collector (Output)

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.028	0.035	0.700	0.900	E	0.028	0.035	0.700	0.900
A1	0.000	0.004	0.000	0.100	E1	0.057	0.069	1.450	1.750
A2	0.028	0.031	0.700	0.800	e	0.020*		0.500*	
b1	0.006	0.010	0.150	0.250	e1	0.035	0.043	0.900	1.100
b2	0.010	0.014	0.250	0.350	L	0.016 REF		0.400 REF	
c	0.004	0.008	0.100	0.200	L1	0.010	0.018	0.260	0.460
D	0.059	0.067	1.500	1.700	θ	0°	8°	0°	8°

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