

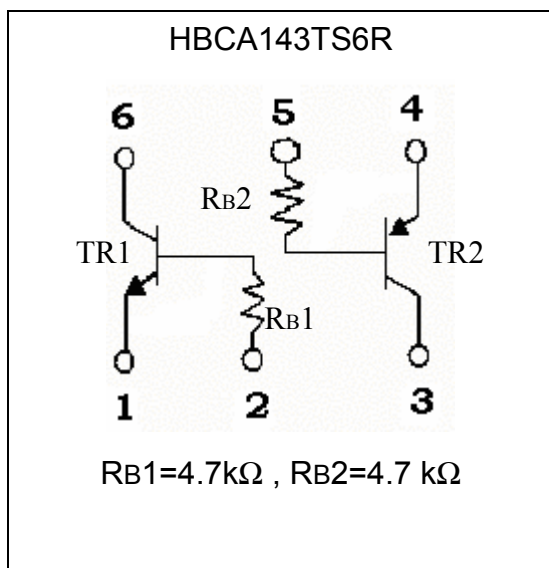
# PNP and NPN Dual Digital Transistors

## HBCA143TS6R

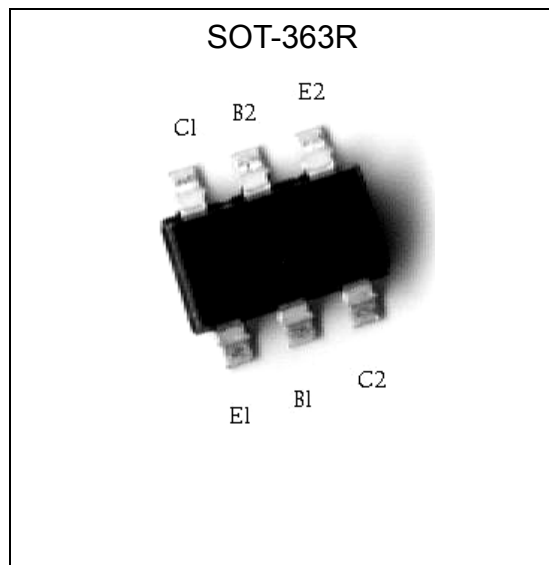
### Features

- 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 positive biasing of the input for PNP transistor, and negative biasing of the input for NPN transistor. 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.
- One DTA143T chip and one DTC143T chip in a SOT-363 package.
- Mounting by SOT-323 automatic mounting machines is possible.
- Mounting cost and area can be cut in half.
- Transistor elements are independent, eliminating interference

### Equivalent Circuit



### Outline





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

Parameter	Symbol	Limits		Unit
		Tr1(NPN)	Tr2(PNP)	
Collector-Base Voltage	V <sub>CBO</sub>	50	-50	V
Collector-Emitter Voltage	V <sub>CEO</sub>	50	-50	V
Emitter-Base Voltage	V <sub>EBO</sub>	5	-5	V
Collector Current	I <sub>C</sub>	100	-100	mA
Total Power Dissipation	P <sub>d</sub>	200 (Note)		mW
Junction Temperature	T <sub>j</sub>	150		°C
Storage Temperature	T <sub>stg</sub>	-55~+150		°C

Note : 150mW per element must not be exceeded.

**Characteristics (Ta=25°C)**

**•Tr1(NPN)**

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector-Base Breakdown Voltage	V <sub>CBO</sub>	50	-	-	V	I <sub>C</sub> =50μA
Collector-Emitter Breakdown Voltage	V <sub>CEO</sub>	50	-	-	V	I <sub>C</sub> =1mA
Emitter-Base Breakdown Voltage	V <sub>EBO</sub>	5	-	-	V	I <sub>E</sub> =50μA
Collector-Base Cutoff Current	I <sub>CBO</sub>	-	-	0.5	μA	V <sub>CB</sub> =50V
Emitter-Base Cutoff Current	I <sub>EBO</sub>	-	-	0.5	μA	V <sub>EB</sub> =4V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	-	-	0.3	V	I <sub>C</sub> =5mA, I <sub>B</sub> =0.25mA
DC Current Gain	h <sub>FE</sub>	100	-	600	-	V <sub>CE</sub> =5V, I <sub>C</sub> =1mA
Input Resistance	R	3.29	4.7	6.11	kΩ	-
Transition Frequency	f <sub>T</sub>	-	250	-	MHz	V <sub>CE</sub> =10V, I <sub>E</sub> =5mA, f=100MHz*

\* Transition frequency of the device

**•Tr2(PNP)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-50	-	-	V	I <sub>C</sub> =-50μA
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	-50	-	-	V	I <sub>C</sub> =-1mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-5	-	-	V	I <sub>E</sub> =-50μA
Collector-Base Cutoff Current	I <sub>CBO</sub>	-	-	-0.5	μA	V <sub>CB</sub> =-50V
Emitter-Base Cutoff Current	I <sub>EBO</sub>	-	-	-0.5	μA	V <sub>EB</sub> =-4V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	-	0.1	-0.3	V	I <sub>C</sub> =-5mA, I <sub>B</sub> =-0.25mA
DC Current Gain	h <sub>FE</sub>	100	-	600	-	V <sub>CE</sub> =-5V, I <sub>C</sub> =-1mA
Input Resistance	R	3.29	4.7	6.11	kΩ	-
Transition Frequency	f <sub>T</sub>	-	250	-	MHz	V <sub>CE</sub> =-10V, I <sub>C</sub> =-5mA, f=100MHz *

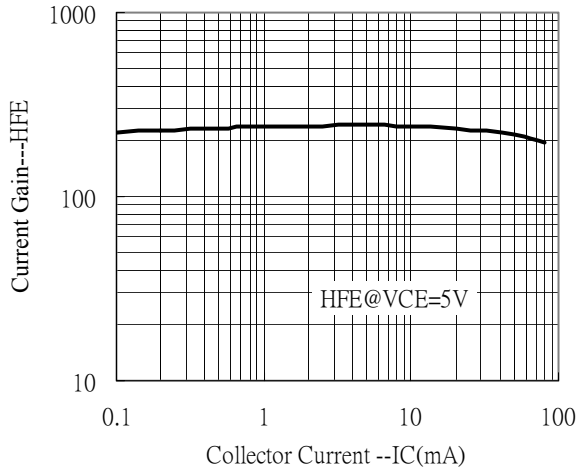
\* Transition frequency of the device



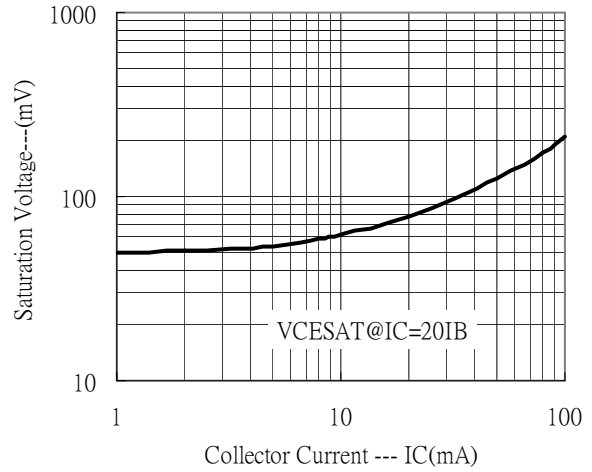
## Characteristic Curves

### •Tr1(NPN)

Current Gain vs Collector Current

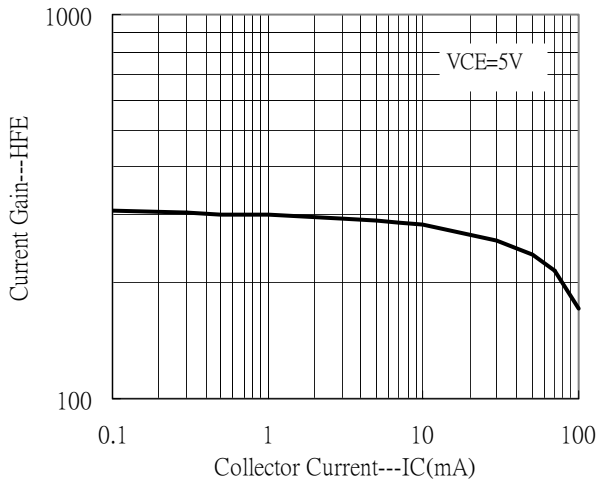


Saturation Voltage vs Collector Current

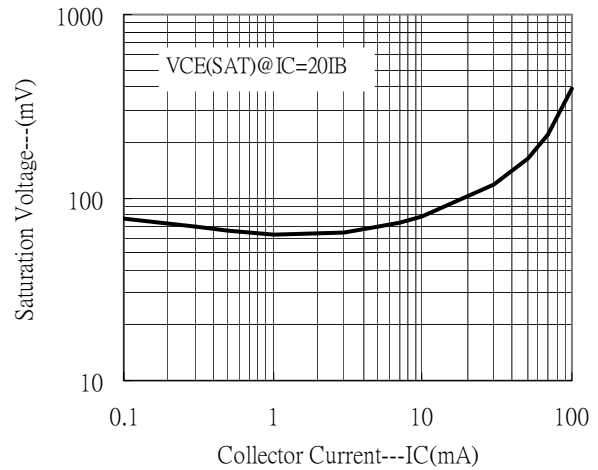


### •Tr2(PNP)

Current Gain vs Collector Current

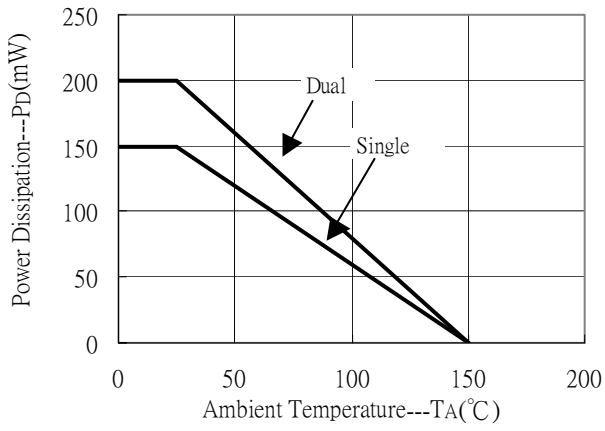


Saturation Voltage vs Collector Current

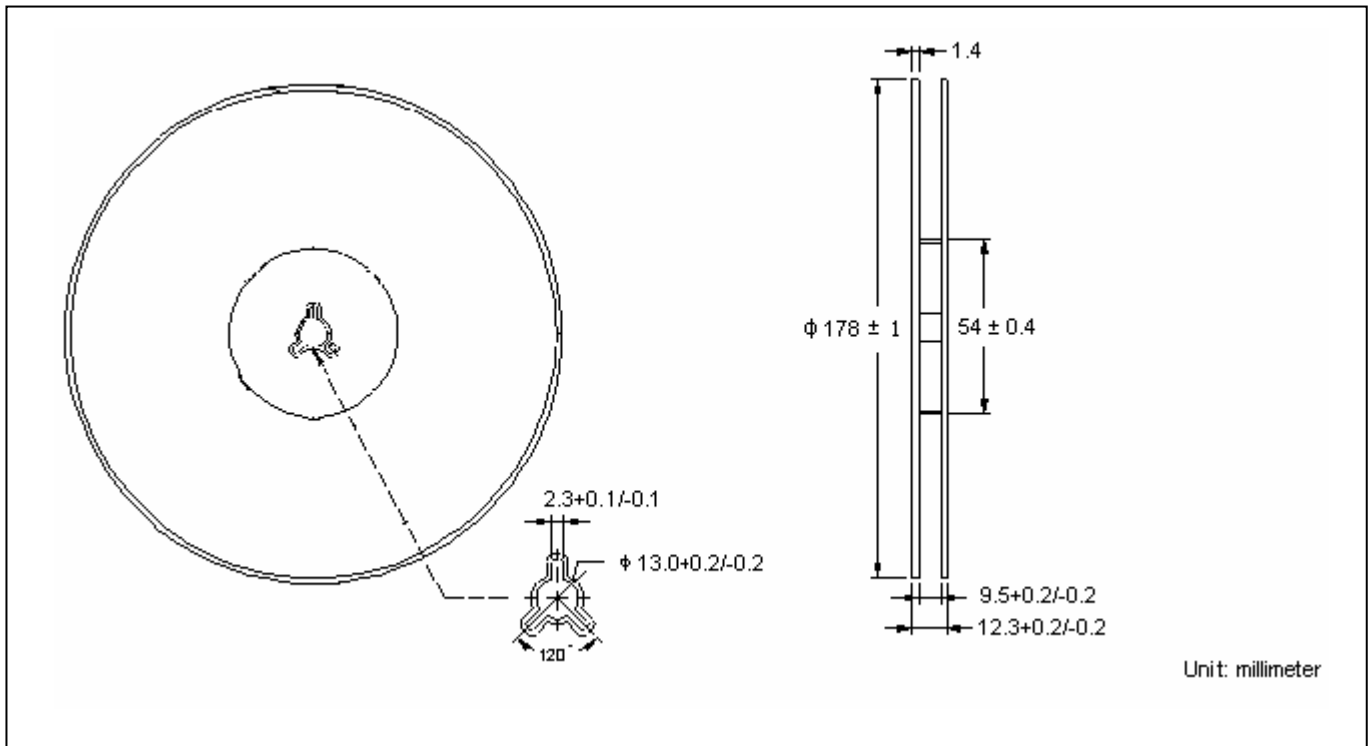




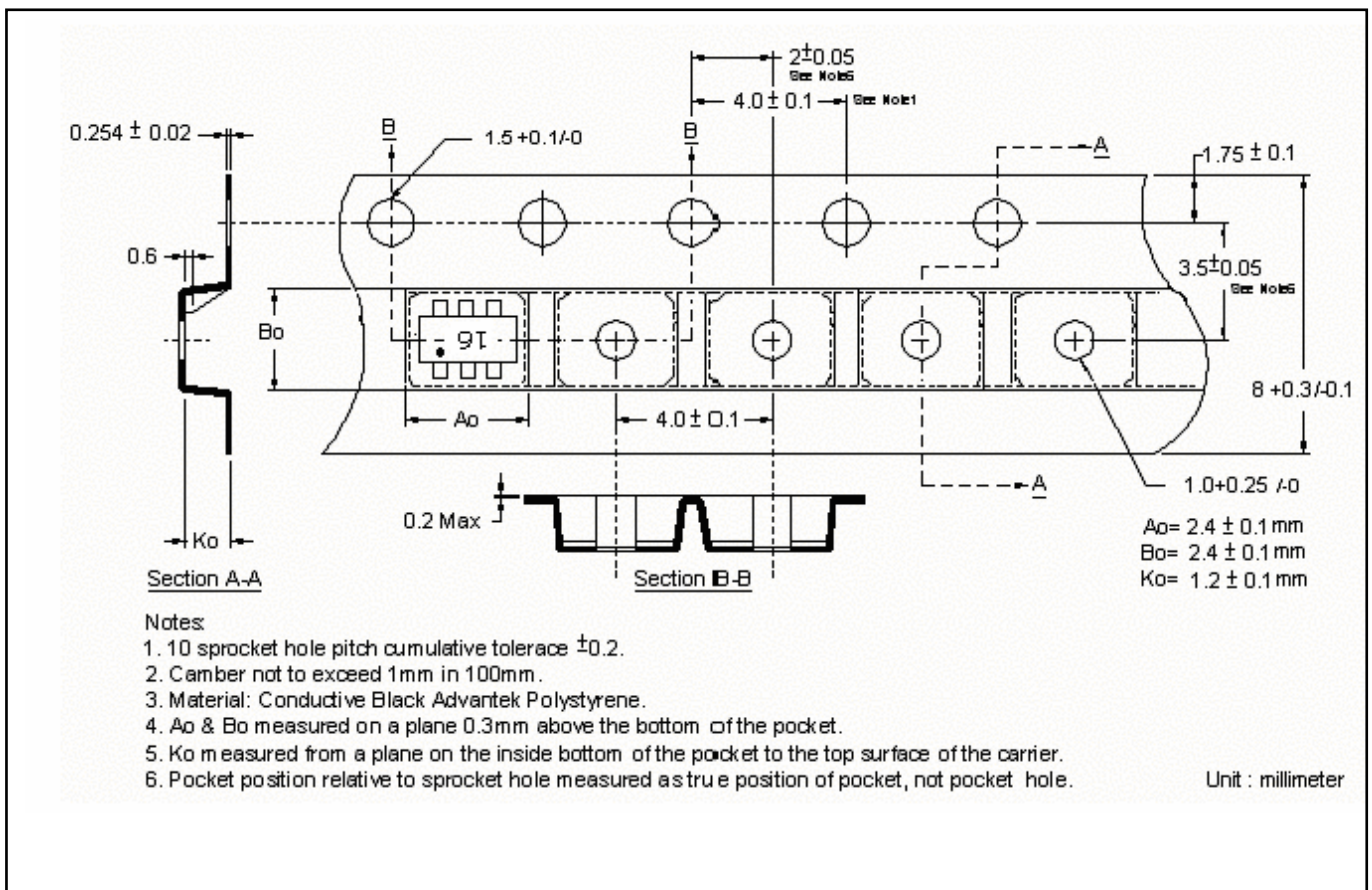
Power Derating Curves



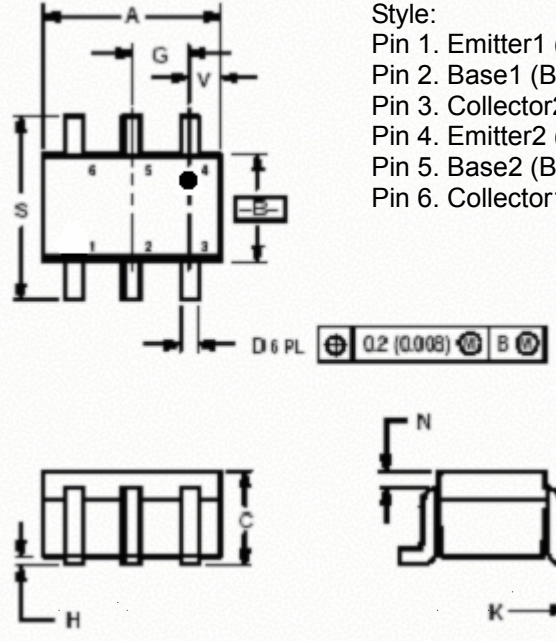
### Reel Dimension



### Carrier Tape Dimension

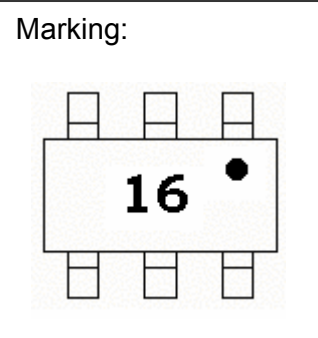


**SOT-363 Dimension**



Style:  
 Pin 1. Emitter1 (E1)  
 Pin 2. Base1 (B1)  
 Pin 3. Collector2 (C2)  
 Pin 4. Emitter2 (E2)  
 Pin 5. Base2 (B2)  
 Pin 6. Collector1 (C1)

Marking:



6-Lead SOT-363R Plastic Surface Mounted Package  
 CYStek Package Code: S6R

\*:Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.071	0.087	1.8	2.2	J	0.004	0.010	0.1	0.25
B	0.045	0.053	1.15	1.35	K	0.004	0.012	0.1	0.30
C	0.031	0.043	0.8	1.1	N	0.008 REF		0.20 REF	
D	0.004	0.012	0.1	0.3	S	0.079	0.087	2.00	2.20
G	0.026BSC		0.65BSC		Y	0.012	0.016	0.30	0.40
H	-	0.004	-	0.1					

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 : 42 Alloy ; solder plating
- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0

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