NPN Digital Transistors (Built-in Resistors)

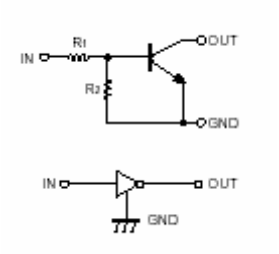
DTC143ZS3

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 DTA143ZS3
- Pb-free package

Equivalent Circuit

DTC143ZS3



R1=4.7kΩ , R2=47 kΩ

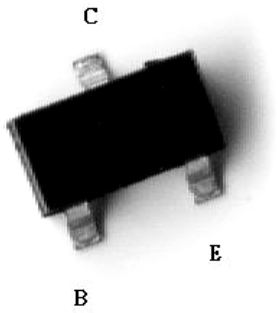
IN(B) : Base

OUT(C) : Collector

GND(E) : Emitter

Outline

SOT-323



Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Supply Voltage	V_{CC}	50	V
Input Voltage	V_{IN}	-5~+30	V
Output Current	I_O	100	mA
	$I_{O(max.)}$	100	mA
Power Dissipation	Pd	200	mW
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	$V_{I(off)}$	-	-	0.5	V	V_{CC}=5V, I_O=100μA
	$V_{I(on)}$	1.3	-	-	V	V_O=0.3V, I_O=5mA
Output Voltage	$V_{O(on)}$	-	0.1	0.3	V	I_O/I_I=5mA/0.25mA
Input Current	I_I	-	-	1.8	mA	V_I=5V
Output Current	$I_{O(off)}$	-	-	0.5	μA	V_{CC}=50V, V_I=0V
DC Current Gain	G_I	80	-	-	-	V_O=5V, I_O=10mA
Input Resistance	R_1	3.29	4.7	6.11	kΩ	-
Resistance Ratio	R_2/R_1	8	10	12	-	-
Transition Frequency	f_T	-	250	-	MHz	V_{CE}=10V, I_C=5mA, f=100MHz*

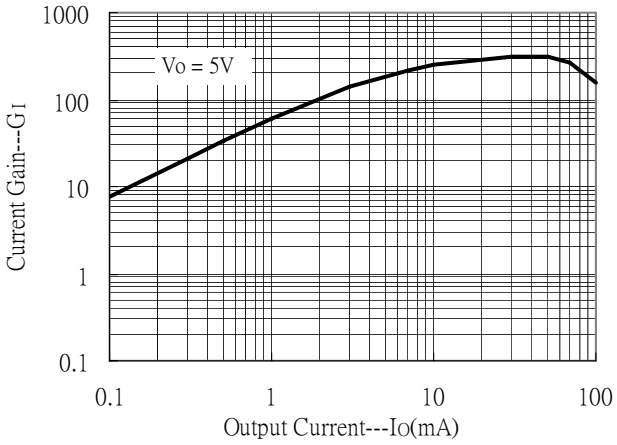
* Transition frequency of the device

Ordering Information

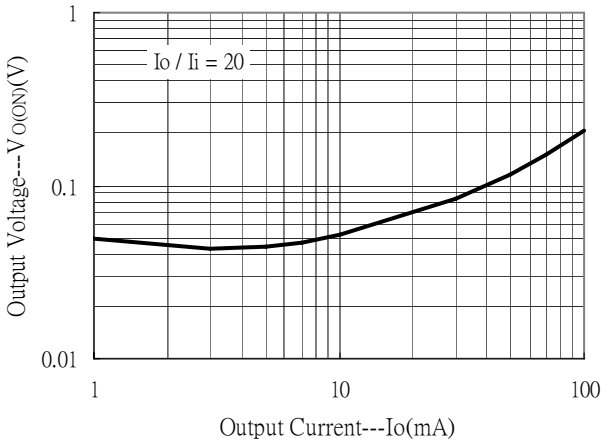
Device	Package	Shipping	Marking
DTC143ZS3	SOT-323 (Pb-free package)	3000 pcs / Tape & Reel	8K

Characteristic Curves

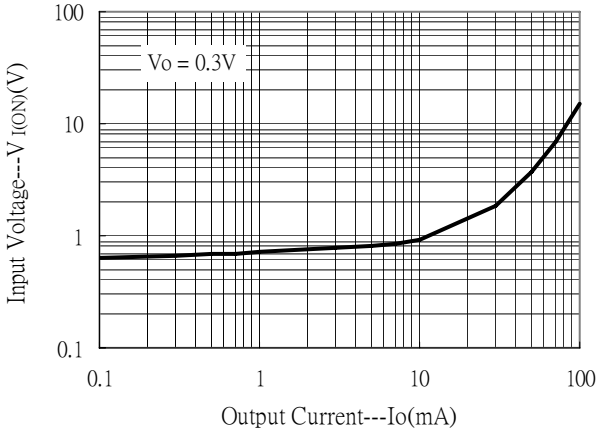
Current Gain vs Output Current



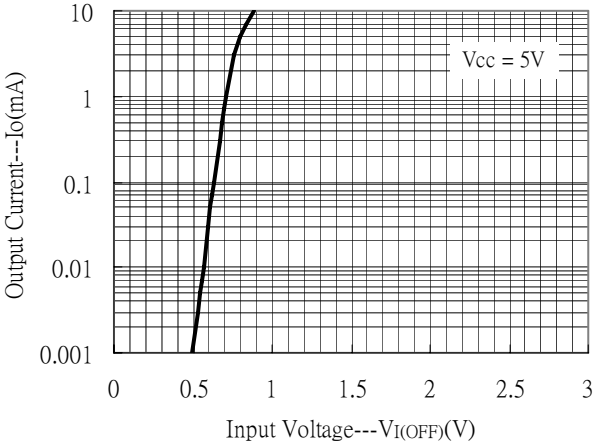
Output Voltage vs Output Current



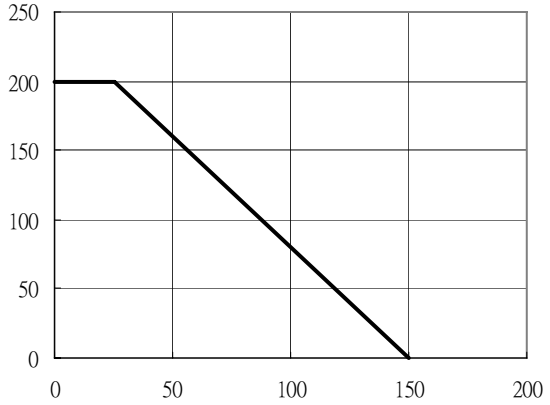
Input Voltage vs Output Current(ON characteristics)



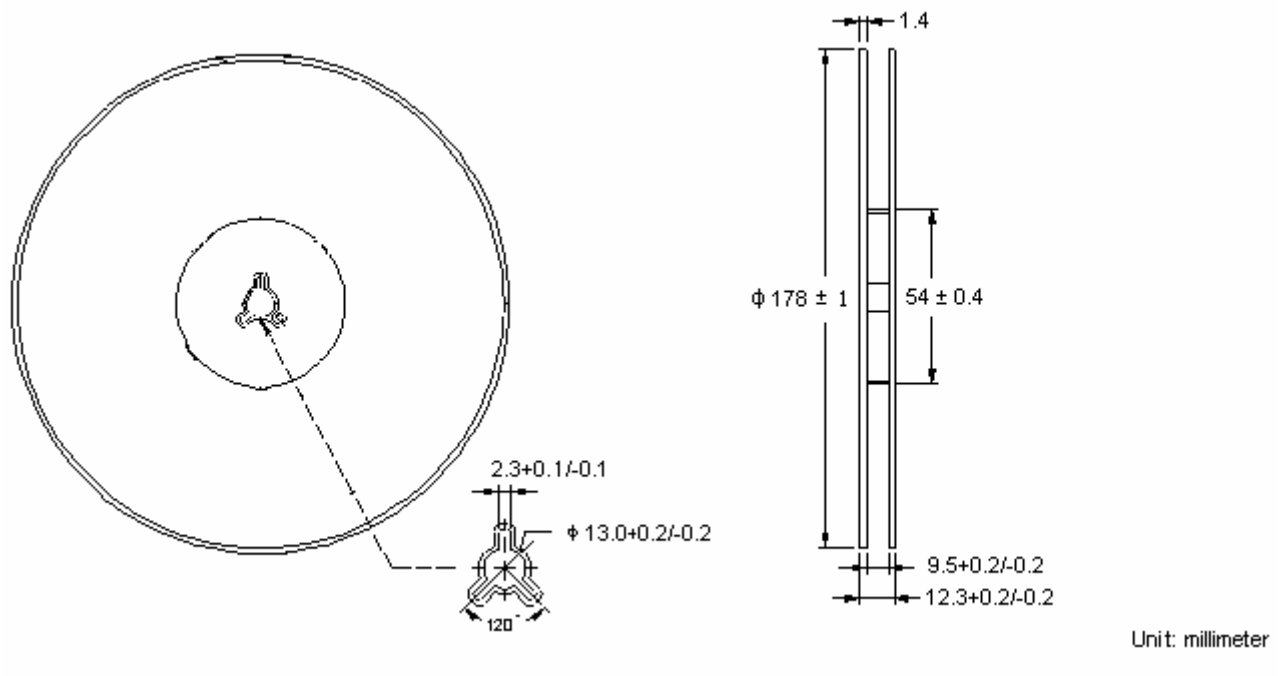
Output Current vs Input Voltage(OFF characteristics)



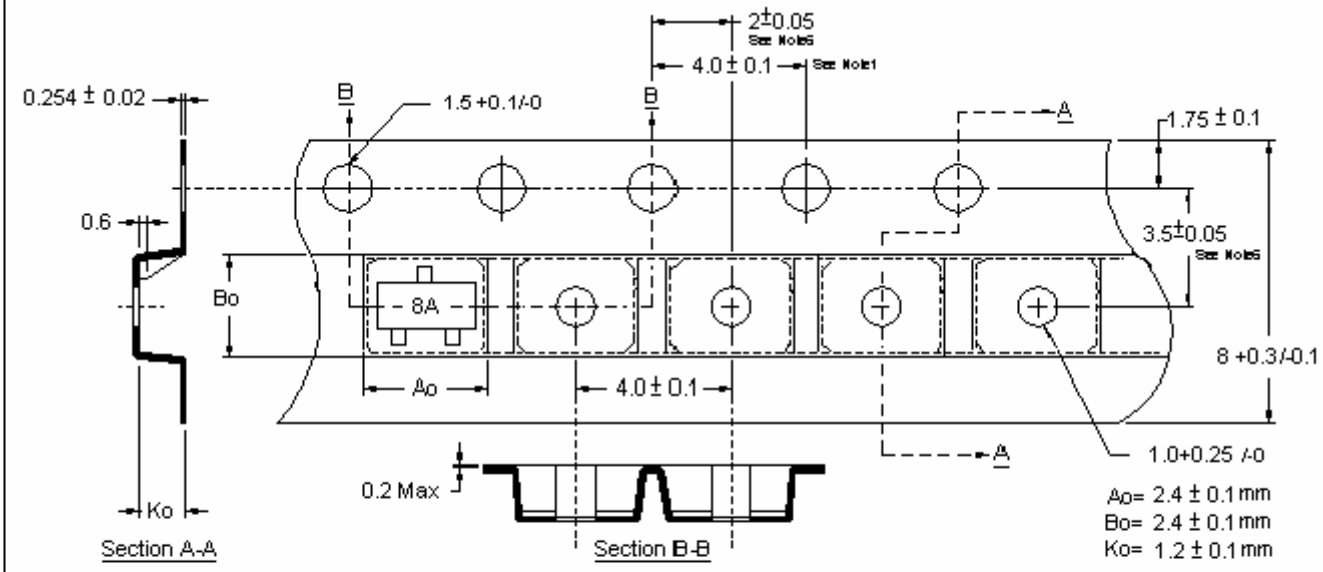
Power Derating Curve



Reel Dimension



Carrier Tape Dimension



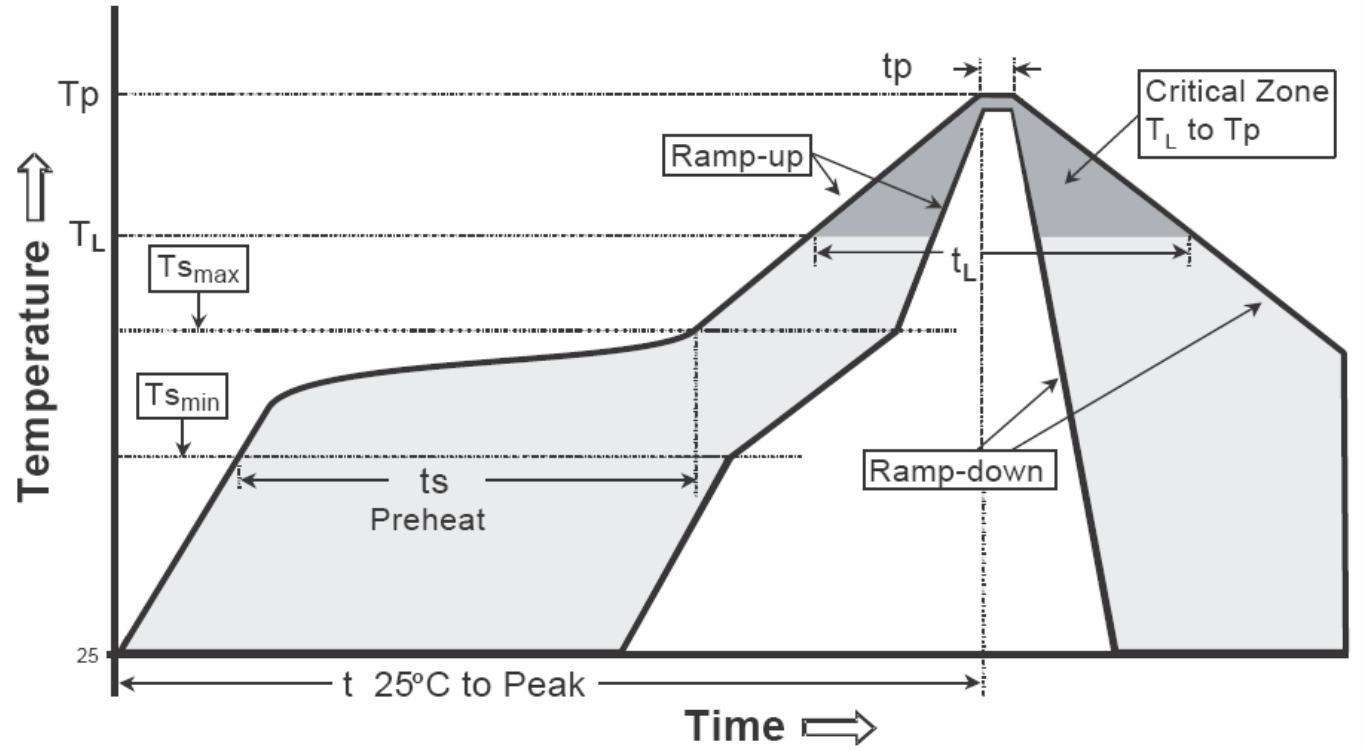
Notes:
1. 10 sprocket hole pitch cumulative tolerace ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Advantek Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Unit : millimeter

Recommended wave soldering condition

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

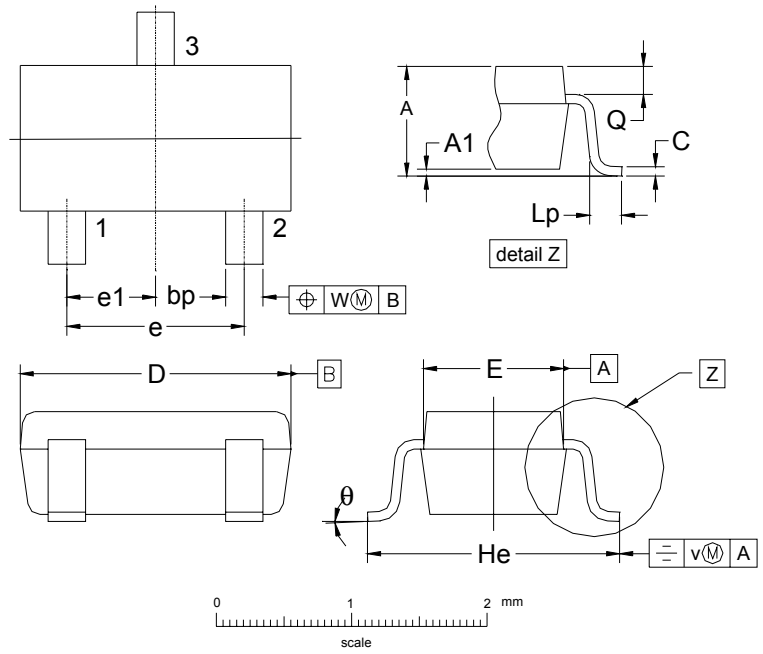
Recommended temperature profile for IR reflow

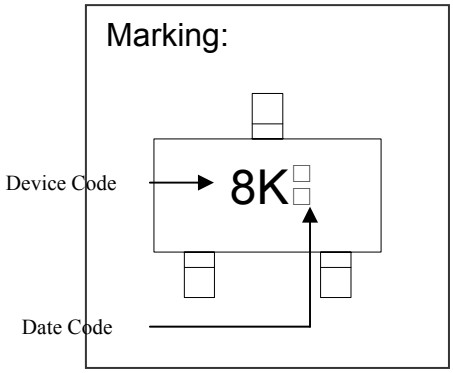


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (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-323 Dimension





3-Lead SOT-323 Plastic
Surface Mounted Package
CYStek Package Code: S3

Style: Pin 1.Base 2.Emitter 3.Collector

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.0315	0.0433	0.80	1.10	e1	0.0256	-	0.65	-
A1	0.0000	0.0039	0.00	0.10	He	0.0787	0.0886	2.00	2.25
bp	0.0118	0.0157	0.30	0.40	Lp	0.0059	0.0177	0.15	0.45
C	0.0039	0.0098	0.10	0.25	Q	0.0051	0.0091	0.13	0.23
D	0.0709	0.0866	1.80	2.20	v	0.0079	-	0.2	-
E	0.0453	0.0531	1.15	1.35	w	0.0079	-	0.2	-
e	0.0512	-	1.3	-	θ	-	-	10°	0°

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.