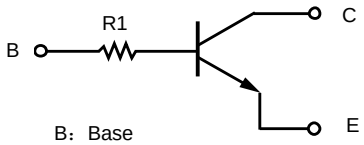
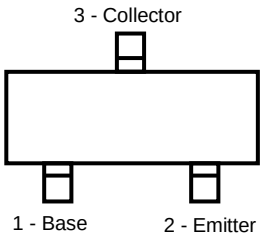
Digital Transistor(built-in resistors)

Feature

- 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 the device design easy.



B：Base
C: Collector
E: Emitter
R1=10KΩ



Top View

Applications

- Inverter
- Interface
- Driver

Mechanical Characteristics

- Lead finish:100% matte Sn(Tin)
- Mounting position: Any
- Qualified max reflow temperature:260℃
- Device meets MSL 1 requirements
- Pure tin plating: 7 ~ 17 um
- Pin flatness：≤3mil

Structure

NPN epitaxial planar silicon transistor (Resistor built-in type)

Electrical characteristics per line@25℃(unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Collector-base breakdown voltage	BV_{CBO}	I_C =50μA	50			V
Collector-emitter breakdown	BV_{CEO}	I_C=1mA	50			V
Emitter-base breakdown voltage	BV_{EBO}	I_E=50μA	5			V
Collector cutoff current	I_{CBO}	V_{CB}=50V			0.5	μA
Emitter cutoff current	I_{EBO}	V_{EB}=4V			0.5	μA
Collector-emitter saturation	$V_{CE(sat)}$	I_C/I_B=5mA/0.25mA			0.3	V
DC current transfer ratio	h_{FE}	I_C=1mA, V_{CE}=5V	100	250	600	-
Input resistance	R_1	-	7	10	13	kΩ
Transition frequency	f_T	V_{CE}=10V, I_E= −5mA,		250		MHz

Absolute maximum rating@25℃

Rating	Symbol	Value	Units
Collector-base voltage	V_{CBO}	50	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	5	V
Collector current	I_C	100	mA
Collector power dissipation	P_C	150	mW
Junction temperature	T_j	150	℃
Storage temperature	T_{stg}	-55 to +150	℃

Typical Characteristics

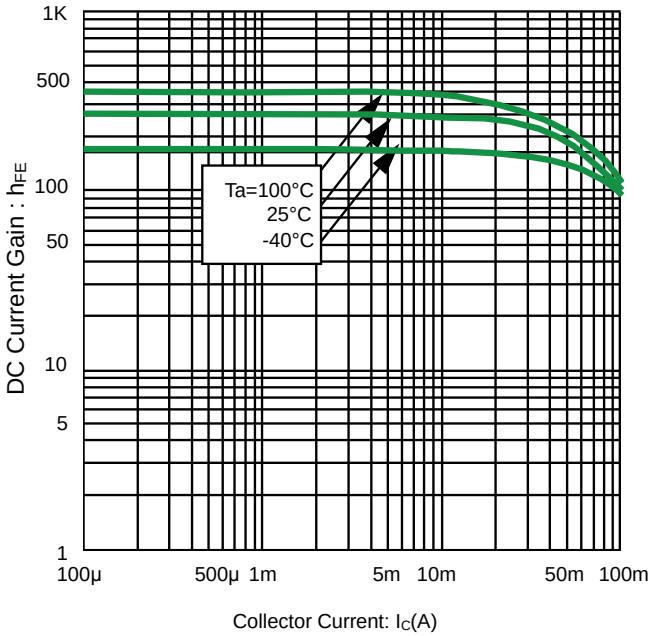


Fig 1.DC current gain vs. collector current @ V_{CE}=5V

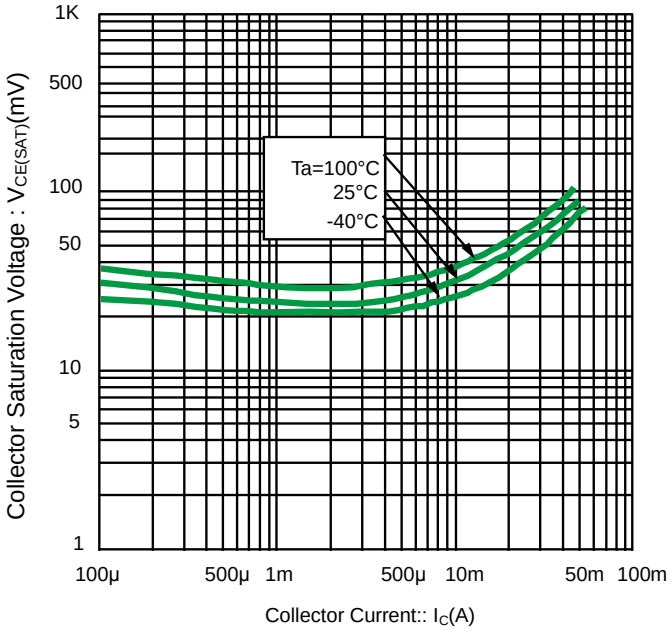
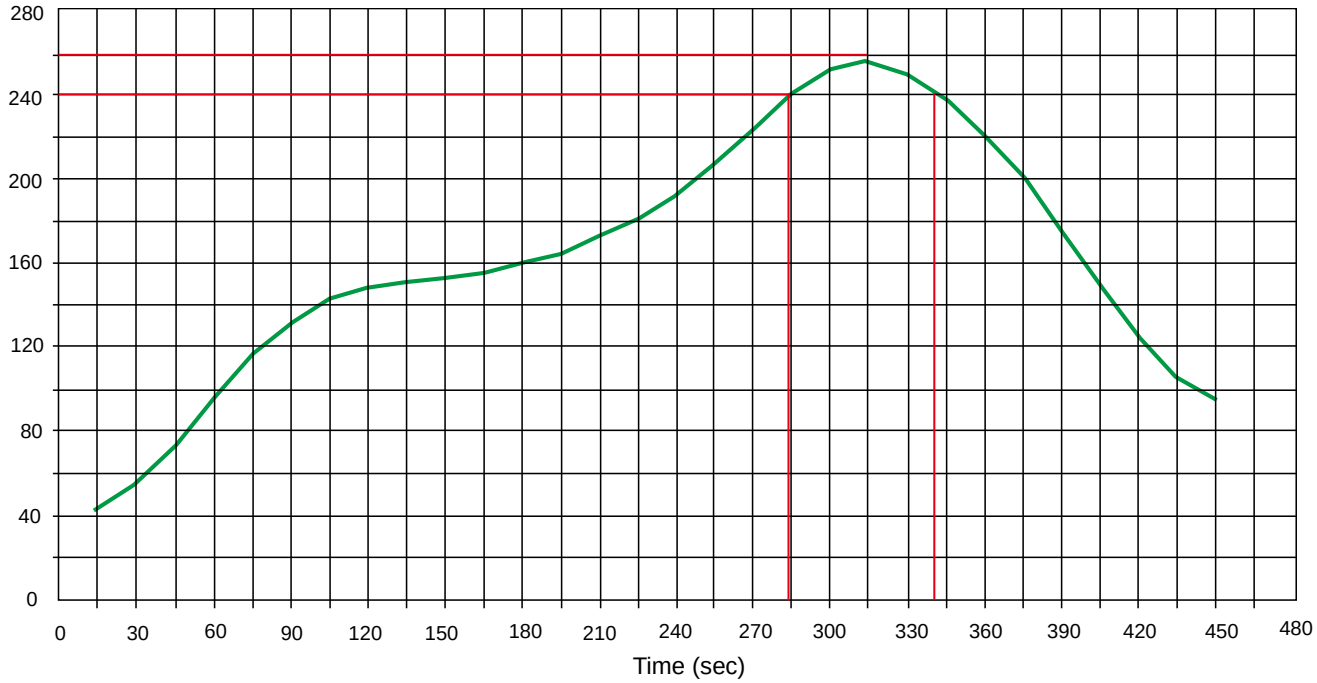


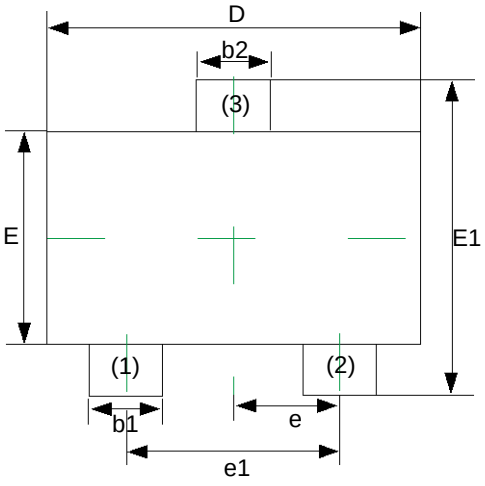
Fig 2.Collector-emitter saturation voltage vs. collector current @I_C/I_B=10

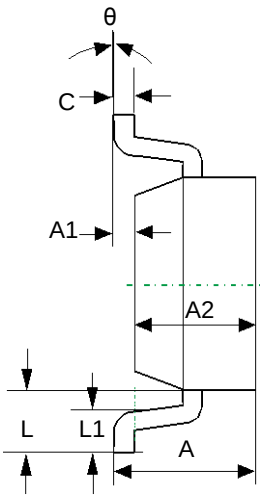
Solder Reflow Recommendation

Peak Temp=257℃, Ramp Rate=0.802deg. ℃/sec

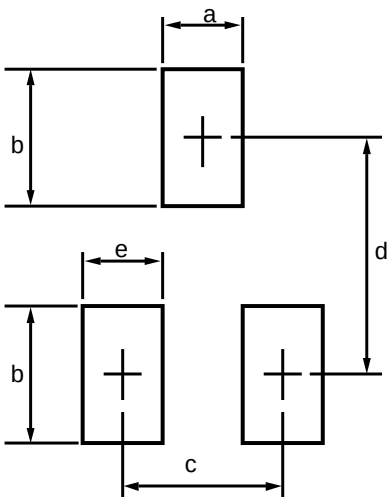


Product dimension（SOT-523）





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



Dim	Millimeters	
	MIN	MAX
a	--	0.5
b	--	0.6
c	--	1.0
d	--	1.24
e	--	0.4

Ordering information

Device	Package	Shipping
PDTC114TE	SOT-523 (Pb-Free)	3000 / Tape & Reel

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