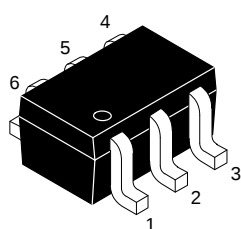


Dual Bias Resistor Transistors PNP Silicon

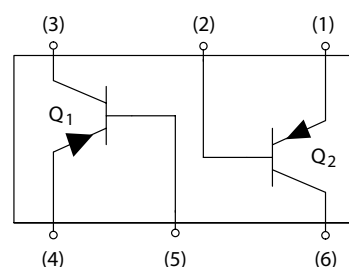
FEATURES:

- We declare that the material of product is ROHS compliant and halogen free.
- h_{FE} , 100–300
- Low $V_{CE(sat)}$, ≤ 0.4 V
- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count

Circuit Diagram & Pin Configuration:



SOT363/SC-88



DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Shipping
TMBT3906DW	46	3000/Tape&Reel

● MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Limits	Unit
Collector–Emitter Voltage	V_{CEO}	–40	Vdc
Collector–Base Voltage	V_{CBO}	–40	Vdc
Emitter–Base Voltage	V_{EBO}	–5	Vdc
Collector Current — Continuous	I_C	–200	mAdc

● THERMAL CHARACTERISTICS

Total Device Dissipation, (Note 1) @ $T_a = 25^\circ\text{C}$	P_D	150	mW
Thermal Resistance, Junction–to–Ambient	$R_{\theta JA}$	833	$^\circ\text{C}/\text{W}$
Junction and Storage temperature	T_J, T_{stg}	–55 ~ +150	$^\circ\text{C}$

1. Device mounted on FR4 glass epoxy printed circuit board using the minimum recommended footprint.

●ELECTRICAL CHARACTERISTICS (Ta= 25℃)
OFF CHARACTERISTICS

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Collector–Emitter Breakdown Voltage (I _C = –1.0 mAdc, I _B = 0)	V _{BR} (CEO)	–40	–	–	V
Collector–Base Breakdown Voltage (I _C = –10 μAdc, I _E = 0)	V _{BR} (CBO)	–40	–	–	V
Emitter–Base Breakdown Voltage (I _E = –10 μAdc, I _C = 0)	V _{BR} (EBO)	–5	–	–	V
Collector Cutoff Current (V _{CE} = –30 Vdc, V _{EB} = –3.0Vdc)	I _C EX	–	–	–50	nA
Base Cutoff Current (V _{CE} = –30 Vdc, V _{EB} = –3.0Vdc)	I _B L	–	–	–50	nA

ON CHARACTERISTICS (Note 1.)

DC Current Gain (I _C = –0.1 mAdc, V _{CE} = –1.0 Vdc) (I _C = –1.0 mAdc, V _{CE} = –1.0 Vdc) (I _C = –10 mAdc, V _{CE} = –1.0 Vdc) (I _C = –50 mAdc, V _{CE} = –1.0 Vdc) (I _C = –100 mAdc, V _{CE} = –1.0 Vdc)	h _{FE}	60 80 100 60 30	– – – – –	– – 300 – –	
Collector–Emitter Saturation Voltage(3) (I _C = –10 mAdc, I _B = –1.0 mAdc) (I _C = –50mAdc, I _B = –5.0 mAdc)	V _{CE} (sat)	– –	– –	–0.25 –0.4	V
Base–Emitter Saturation Voltage (I _C = –10 mAdc, I _B = –1.0 mAdc) (I _C = –50mAdc, I _B = –5.0 mAdc)	V _{BE} (sat)	–0.65 –	– –	–0.85 –0.95	V

SMALL–SIGNAL CHARACTERISTICS

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Current–Gain — Bandwidth Product (I _C = –10mAdc, V _{CE} = –20Vdc, f = 100MHz)	f _T	250	–	–	MHz
Output Capacitance (V _{CB} = –5.0 Vdc, I _E = 0, f = 1.0 MHz)	C _{obo}	–	–	4.5	pF
Input Capacitance (V _{EB} = –0.5 Vdc, I _C = 0, f = 1.0 MHz)	C _{ibo}	–	–	10	pF
Input Impedance (V _{CE} = –10 Vdc, I _C = –1.0 mAdc, f = 1.0 kHz)	h _{ie}	2	–	12	k Ω
Voltage Feedback Ratio (V _{CE} = –10 Vdc, I _C = –1.0 mAdc, f = 1.0 kHz)	h _{re}	0.1	–	10	X 10 ^{–4}
Small–Signal Current Gain (V _{CE} = –10 Vdc, I _C = –1.0 mAdc, f = 1.0 kHz)	h _{fe}	100	–	400	
Output Admittance (V _{CE} = –10 Vdc, I _C = –1.0 mAdc, f = 1.0 kHz)	h _{oe}	3	–	60	μmhos
Noise Figure (V _{CE} = –5V, I _C = –100μA, R _S = 1.0kΩ, f = 1.0kHz)	NF	–	–	4	dB

3. Pulse Test: Pulse Width <300 μs, Duty Cycle <2.0%.

●ELECTRICAL CHARACTERISTICS (Ta= 25℃)

SWITCHING CHARACTERISTICS

Delay Time	(V _{CC} = -3.0 Vdc, V _{BE} = 0.5 Vdc, I _C = -10 mAdc, I _{B1} = -1.0 mAdc)	td	-	-	35	ns
Rise Time		tr	-	-	35	
Storage Time	(V _{CC} = -3.0 Vdc, I _C = -10 mAdc, I _{B1} = I _{B2} = -1.0 mAdc)	ts	-	-	225	
Fall Time		tf	-	-	75	

Electrical Characteristics Curves

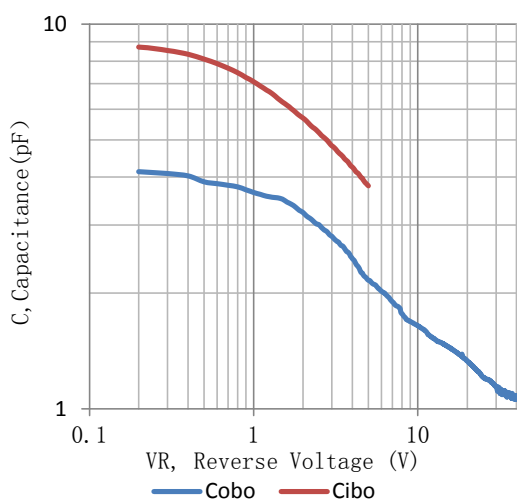


Figure 1. Capacitance

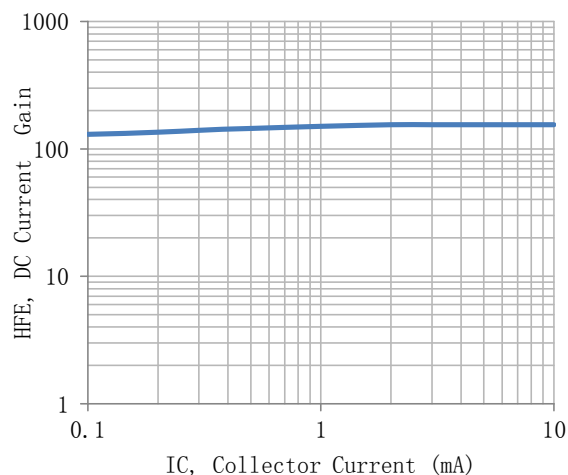


Figure 2. Current Gain

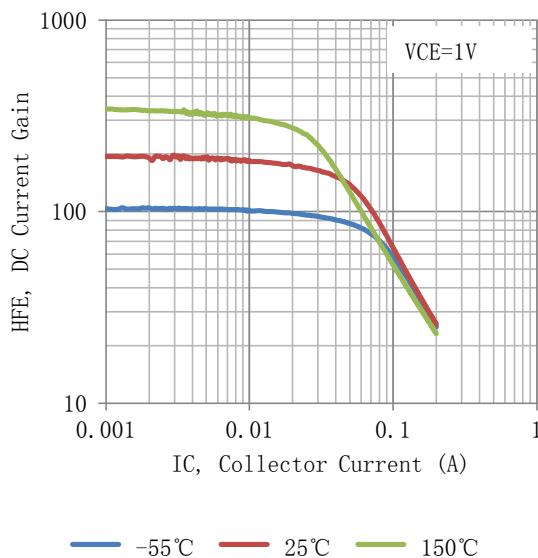


Figure 3. DC Current Gain

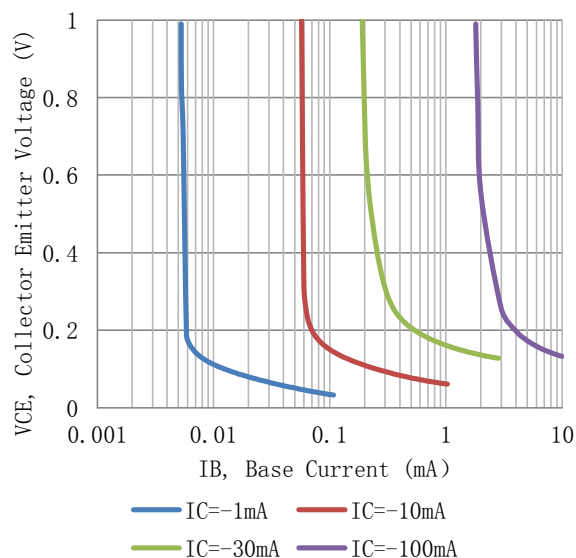


Figure 4. Collector Saturation Region

Electrical Characteristics Curves

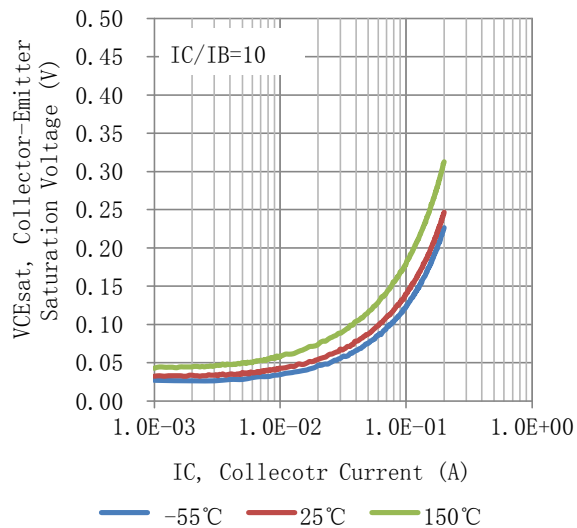


Figure 5. Collector-Emitter Saturation Voltage vs. Collector Current

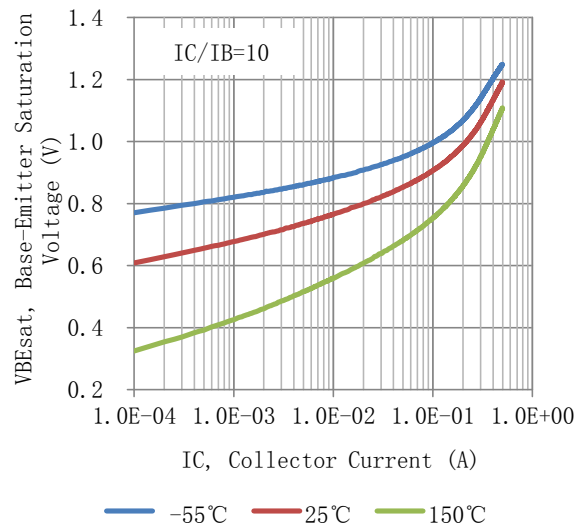


Figure 6. Base-Emitter Saturation Voltage vs. Collector Current

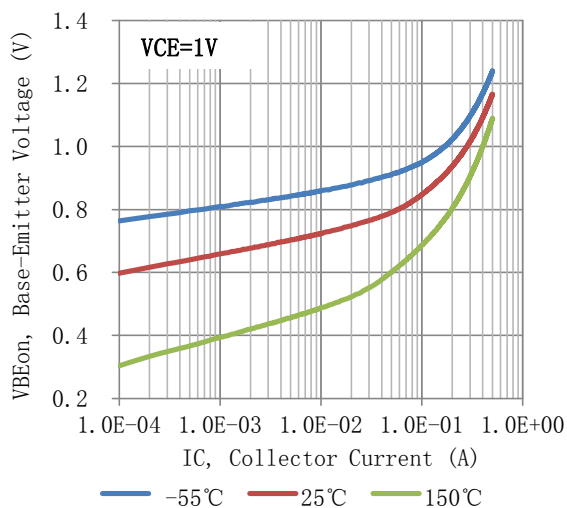
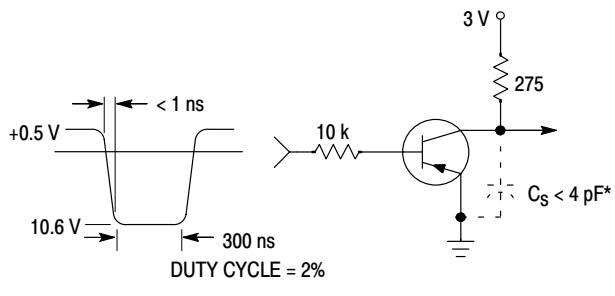


Figure 7. Base-Emitter Voltage vs. Collector Current



* Total shunt capacitance of test jig and connectors

Figure 8. Delay and Rise Time Equivalent Test

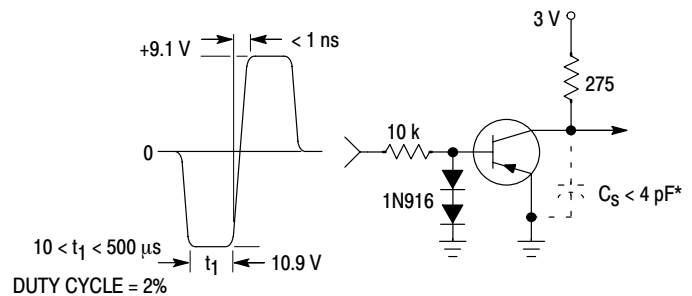
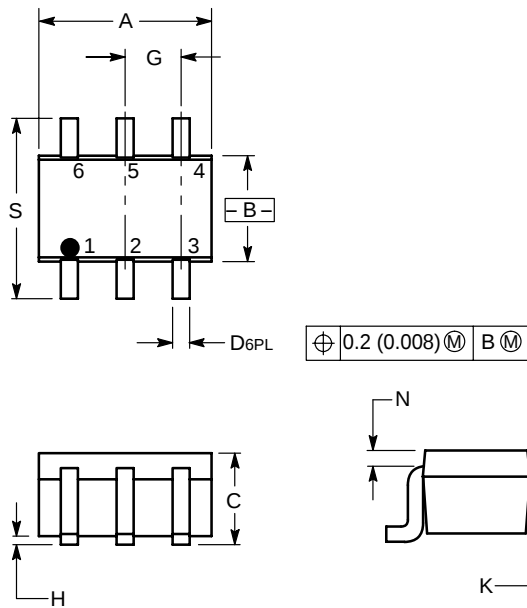


Figure 9. Storage and Fall Time Equivalent Test

SC-88

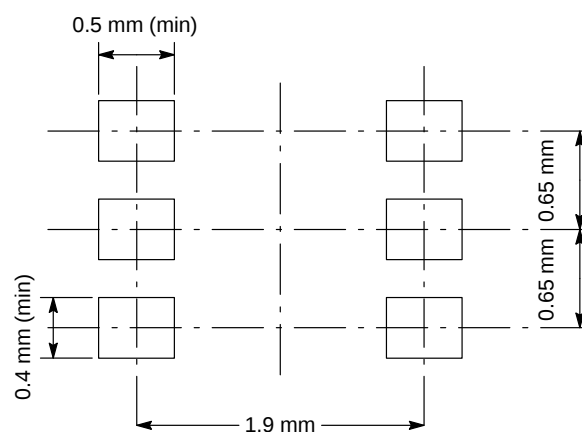


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
H	---	0.004	---	0.10
J	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20

- PIN 1. EMITTER 2
 2. BASE 2
 3. COLLECTOR 1
 4. EMITTER 1
 5. BASE 1
 6. COLLECTOR 2



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