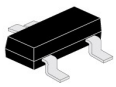
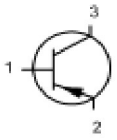
PNP SILICON EPITAXIAL TRANSISTORS

CMBT3906

SOT-23
Surface Mount
Plastic Package
RoHS compliant



SOT-23



Pin Configuration
1 = BASE
2 = EMITTER
3 = COLLECTOR

APPLICATIONS:

This device is designed for general-purpose amplifier and switching applications.

ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

Parameter	SYMBOL	VALUE	UNIT
Collector–base voltage (open emitter)	$-V_{CB0}$	40	V
Collector–emitter voltage (open base)	$-V_{CE0}$	40	V
Emitter–base voltage (open collector)	$-V_{EB0}$	5	V
Collector current (d.c.)	$-I_C$	200	mA
Total power dissipation up to Tamb = 25 °C	P_{tot}	250	mW
D.C. current gain at $-I_C$ = 10mA; $-V_{CE}$ = 1V	h_{FE}	100 to 300	--
Transition frequency at f = 100 MHz $-I_C$ = 10mA; $-V_{CE}$ = 20V	f_T	250	MHz
Storage temperature	T_{stg}	-55 to +150	°C
THERMAL CHARACTERISTICS			
Tj = P(Rθ j–t + Rθ t–s + Rθ s–a) + T_{amb} Thermal resistance from junction to ambient	$R_{\theta(j-a)}$	500	K/W

ELECTRICAL CHARACTERISTICS at T_a = 25 °C

Parameter	Test Condition	Symbol	Value			Unit
			Min	Typ.	Max	
Collector–emitter breakdown voltage	$-I_C$ = 1mA; I_B = 0	$-V_{(BR)CE0}$	40	--	--	V
Collector–base breakdown voltage	$-I_C$ = 10µA; I_E = 0	$-V_{(BR)CB0}$	40	--	--	V
Emitter–base breakdown voltage	—I_E = 10 µA; I_C = 0	$-V_{(BR)EB0}$	5	--	--	V
Collector cut–off current	$-V_{CE}$ =30V; $-V_{EB}$ =3 V	$-I_{CEX}$	--	--	50	nA
Base current with reverse biased emitter		$-I_{BEX}$	--	--	50	nA
Output capacitance at f =100 kHz	I_E = 0; $-V_{CB}$ = 5V	C_c	--	--	4.5	pF
Input capacitance at f=100 kHz	I_C = 0; $-V_{BE}$ = 0,5V	C_e	--	--	10	pF
Saturation voltages	$-I_C$ =10mA; $-I_B$ =1 mA	$-V_{CEsat}$	--	--	0.25	V
	$-I_C$ = 50mA; $-I_B$ = 5mA	$-V_{CEsat}$	--	--	0.4	V
	$-I_C$ = 10mA; $-I_B$ = 1mA	$-V_{BEsat}$	0.65	--	0.85	V
	$-I_C$ = 50mA; $-I_B$ = 5mA	$-V_{BEsat}$	--	--	0.95	V
D.C. current gain	$-I_C$ = 0,1mA; $-V_{CE}$ =1V	h_{FE}	60	--	--	--
	$-I_C$ = 1mA; $-V_{CE}$ = 1V	h_{FE}	80	--	--	--
	$-I_C$ = 10mA; $-V_{CE}$ = 1V	h_{FE}	100	--	300	--
	$-I_C$ = 50mA; $-V_{CE}$ = 1V	h_{FE}	60	--	--	--
	$-I_C$ =100mA;$-V_{CE}$ =1V	h_{FE}	30	--	--	--
Transition frequency at f = 100 MHz	$-I_C$ = 10mA; $-V_{CE}$ = 20V	f_T	250	--	--	MHz
Noise figure at RS = 1 kΩ	$-I_C$ = 100µA; $-V_{CE}$ = 5 V, f = 10 Hz to 15,7 kHz	F	--	--	4	Db
				--		
Small Signal Current Gain	V_{CE} = 10V; I_C = 1 mA;	h_{fe}	100	--	400	--
SWITCHING Time CHARACTERISTICS						
Delay time	V_{CC}=3V, V_{BE}=0.5V I_C=10mA, I_{B1}=1mA	t_d	< 35		< 35	ns
Rise time		t_r	< 35		< 35	ns
Storage time	V_{CC}=3V, I_C=10mA I_{B1}=1_{B2}=1mA	t_s	< 200		< 225	ns
Fall time		t_f	< 60		< 75	ns

Typical Characteristic Curves

Figure 1. Delay and Rise Time Equivalent Test Circuit

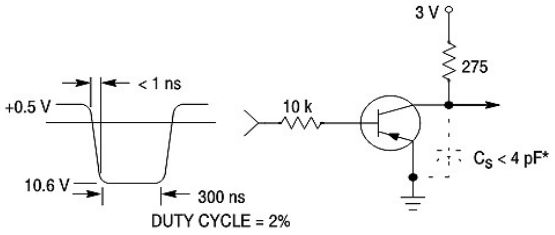
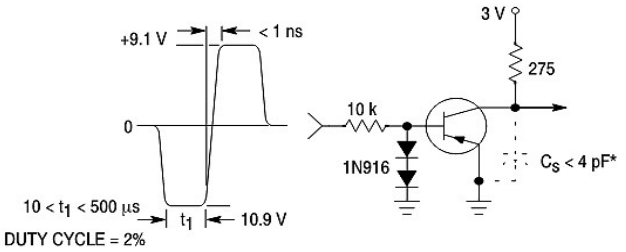


Figure 2. Storage and Fall Time Equivalent Test Circuit



* Total shunt capacitance of test jig and connectors

Figure 3. Capacitance

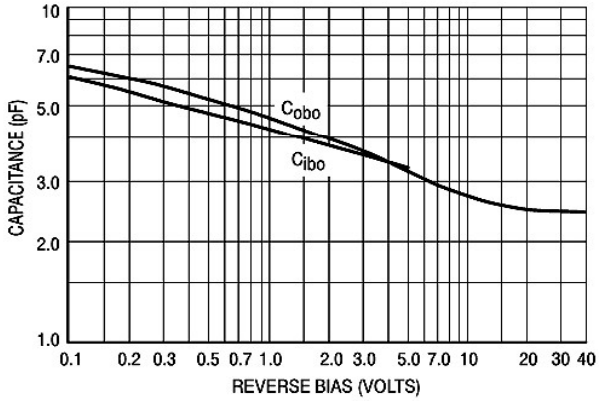


Figure 4. Charge Data

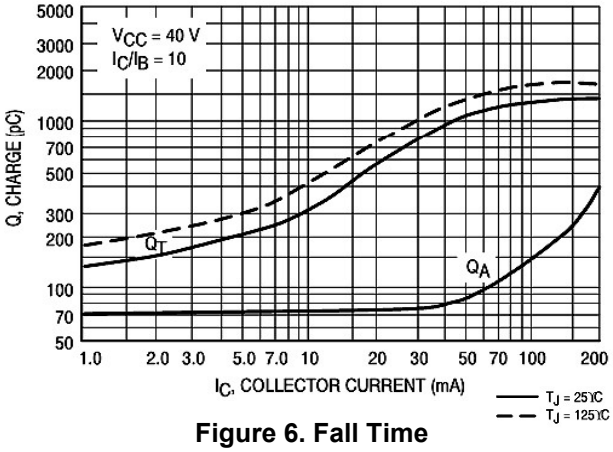


Figure 5. Turn–On Time

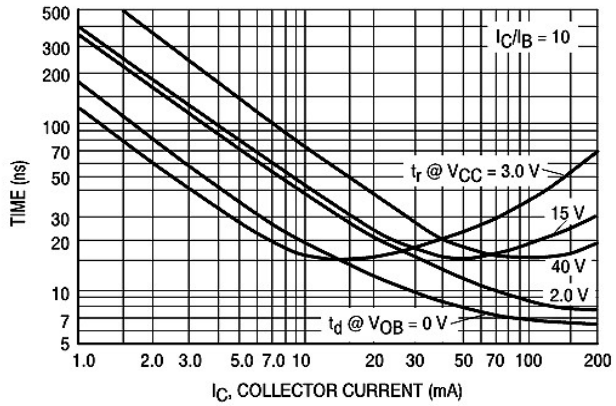
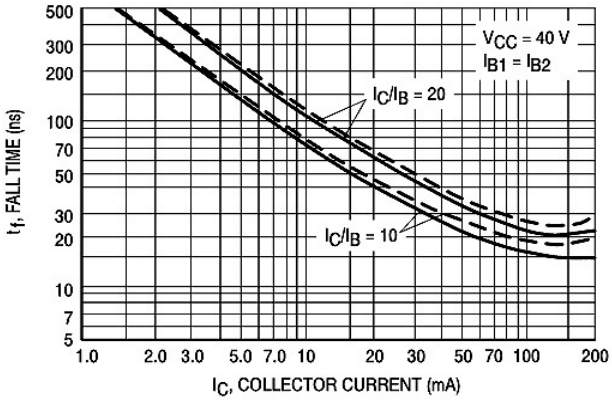


Figure 6. Fall Time



Typical Characteristic Curves

Figure 7. DC Current Gain

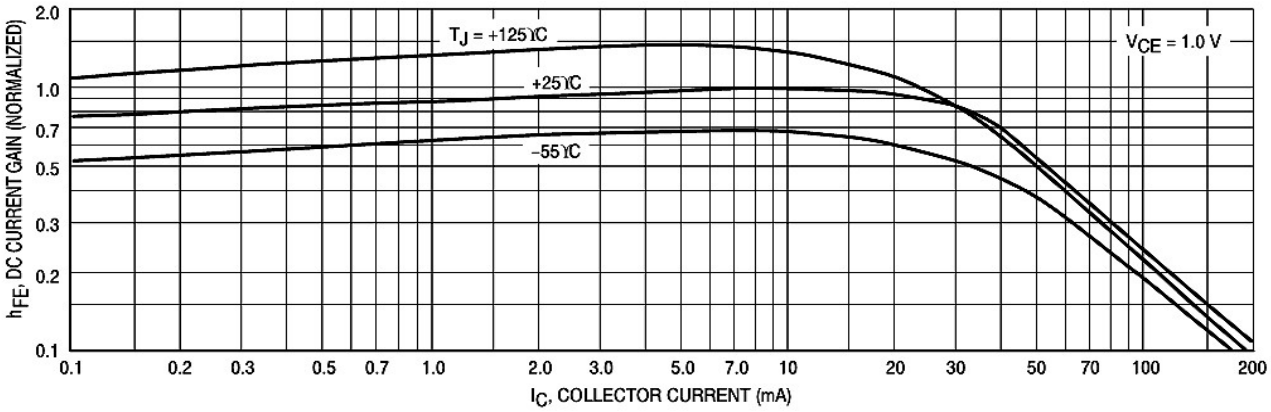


Figure 8. Collector Saturation Region

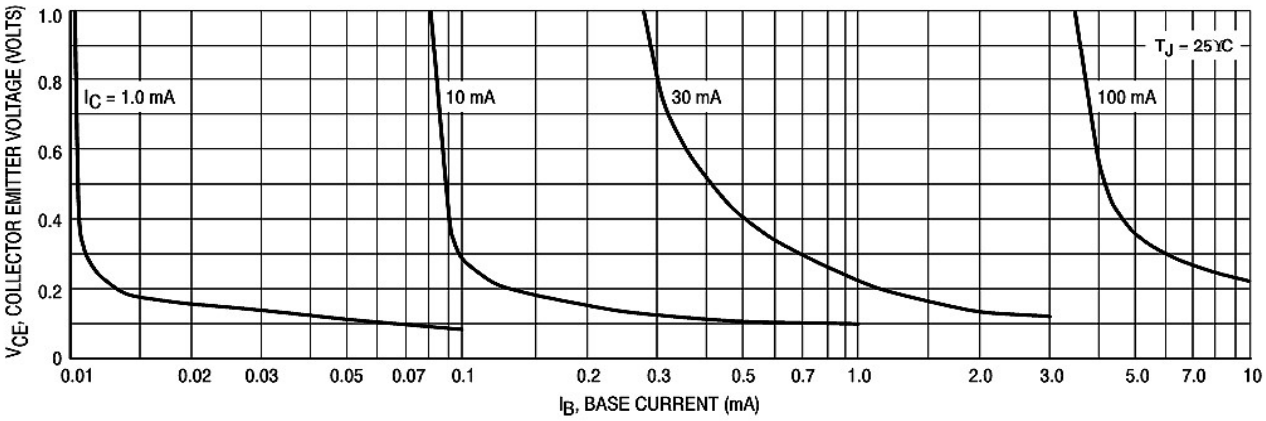


Figure 9. "ON" Voltages

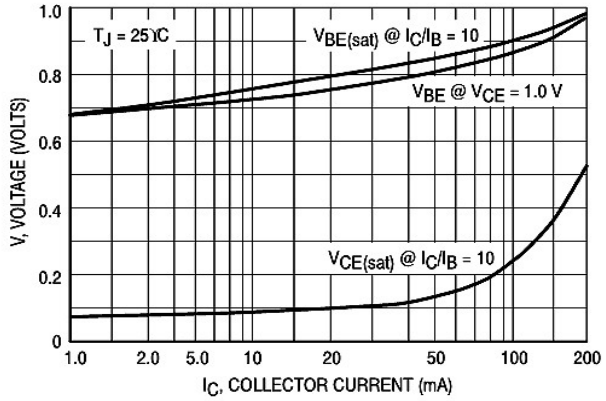
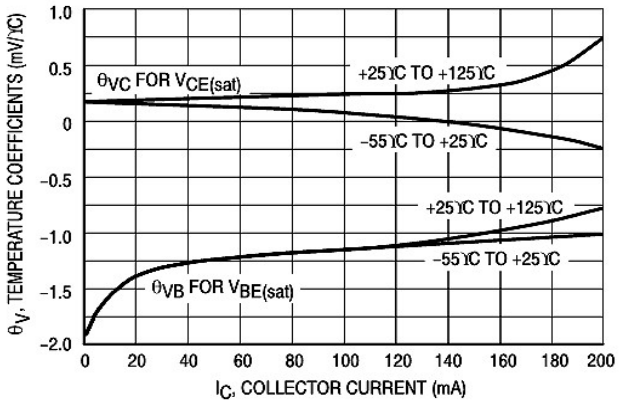
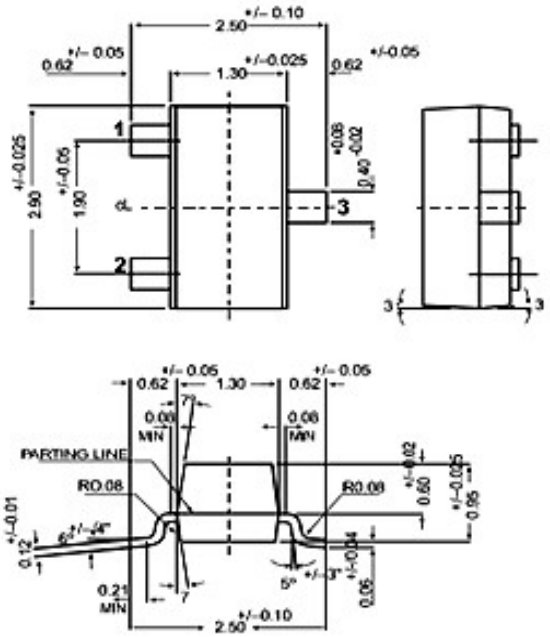


Figure 10. Temperature Coefficients

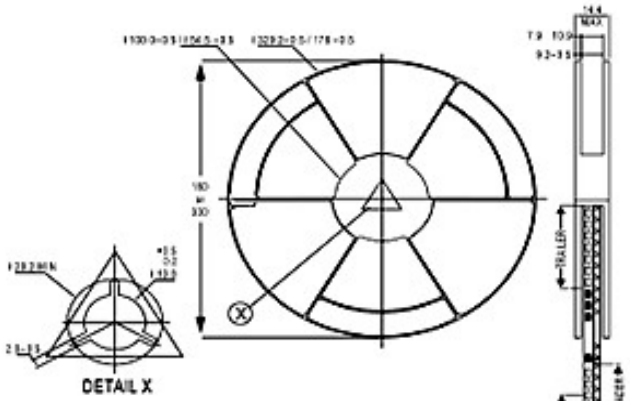


PACKAGE DETAILS

SOT-23 Formed SMD Package



SOT-23 Package Reel Information
Reel specifications for Packing (13"/7" reels)



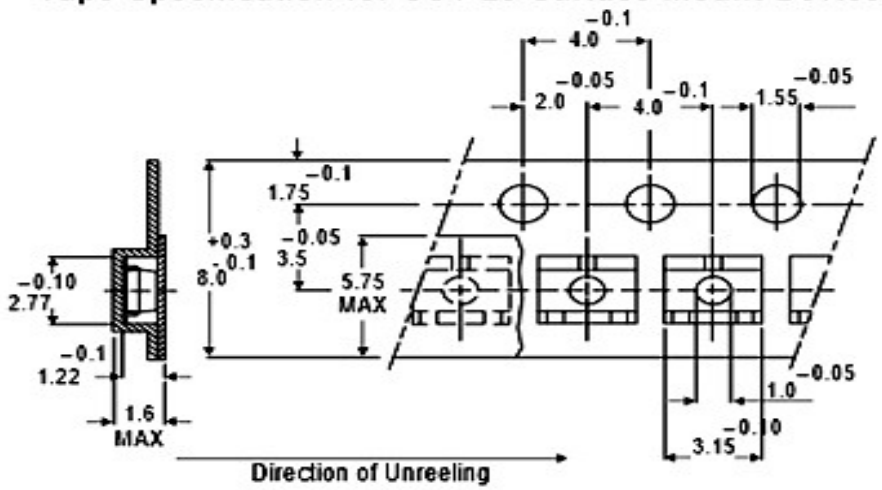
All dimensions in mm
330 / 180 mm Antistatic Coated Plastic Reel

NOTES:

No. of Devices	8mm Tape Size of Reel 330 mm (13")	8mm Tape Size of Reel 180 mm (7")
	10,000 Pcs	3,000 Pcs

1. The bandolier of 330 mm reel contains at least 10,000 devices.
2. The bandolier of 180 mm reel contains at least 3,000 devices.
3. No more than 0.5% missing devices / reel. 50 empty compartments for 330 mm reel. 15 empty compartments for 180 mm reel.
4. Three consecutive empty places might be found provided this gap is followed by 6 consecutive devices.
5. The carrier tape (leader) starts with at least 75 empty positions (equivalent to 330 mm). In order to fix the carrier tape a self adhesive tape of 20 to 50 mm is applied. At the end of the bandolier at least 40 empty positions (equivalent to 160 mm) are there.

Tape Specification for SOT-23 Surface Mount Device



All dimensions in mm

CMBT3906
Rev1 14052020EM

Recommended Product Storage Environment for Discrete Semiconductor Devices

This storage environment assumes that the Diodes and transistors are packed properly inside the original packing supplied by CDIL.

- Temperature 5 °C to 30 °C
- Humidity between 40 to 70 %RH
- Air should be clean.
- Avoid harmful gas or dust.
- Avoid outdoor exposure or storage in areas subject to rain or water spraying .
- Avoid storage in areas subject to corrosive gas or dust. Product shall not be stored in areas exposed to direct sunlight.
- Avoid rapid change of temperature.
- Avoid condensation.
- Mechanical stress such as vibration and impact shall be avoided.
- The product shall not be placed directly on the floor.
- The product shall be stored on a plane area. They should not be turned upside down. They should not be placed against the wall.

Shelf Life of CDIL Products

The shelf life of products is the period from product manufacture to shipment to customers. The product can be unconditionally shipped within this period. The period is defined as 2 years.
If products are stored longer than the shelf life of 2 years the products shall be subjected to quality check as per CDIL quality procedure.
The products are further warranted for another one year after the date of shipment subject to the above conditions in CDIL original packing.

Floor Life of CDIL Products and MSL Level

When the products are opened from the original packing, the floor life will start.
For this, the following JEDEC table may be referred:

JEDEC MSL Level		
Level	**Time**	**Condition**
1	Unlimited	≤30 °C / 85% RH
2	1 Year	≤30 °C / 60% RH
2a	4 Weeks	≤30 °C / 60% RH
3	168 Hours	≤30 °C / 60% RH
4	72 Hours	≤30 °C / 60% RH
5	48 Hours	≤30 °C / 60% RH
5a	24 Hours	≤30 °C / 60% RH
6	Time on Label(TOL)	≤30 °C / 60% RH

Customer Notes

Component Disposal Instructions

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

Disclaimer

The product information and the selection guides facilitate selection of the CDIL's Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Data Sheet and on the CDIL Web Site/CD are believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information. Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s).

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