NPN SILICON PLANAR EPITAXIAL TRANSISTORS

CMBT2222
CMBT2222A

SOT-23

SOT-23
Formed SMD Package
RoHS compliant

Device marking

CMBT2222 =1B
CMBT2222A =1P

Note:

1. This device is available in AEC-Q101 complaint also.
2. For AEC-Q101 compliant products , please suffix - AQ in the part number while ordering

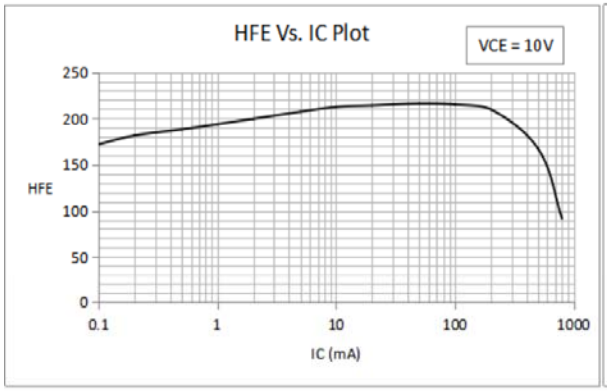
ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

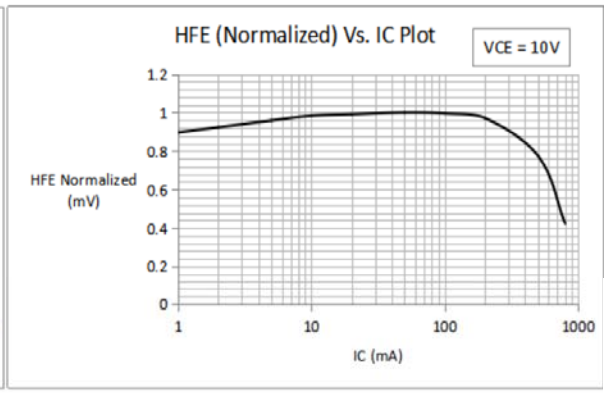
Parameter		Symbol	Min/ Max	CMBT 2222	CMBT 2222A	Unit
Collector-base voltage (open emitter)		V_{CBO}	Max	60	75	V
Collector emitter voltage (open base)		V_{CEO}	Max	30	40	V
Emitter base voltage (open collector)		V_{EBO}	Max	5	6	V
Collector current (dc.)		I_C	Max	600		mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	Max	250		mA
DC Current Gain	I_C = 150mA, V_{CE} = 10 V	h_{FE}	Min	100		
	I_C = 150mA, V_{CE} = 10 V	h_{FE}	Max	300		
	I_C = 500 mA, V_{CE} =10 V	h_{FE}	Min	30	40	
Transition Frequency at f = 100 MHz	I_C = 20 mA, V_{CE} = 20 V	f_T	Min	250	300	MHz
Storage Temperature Range		T_{stg}	Min	-55		°c
		T_{stg}	Max	150		°c
Junction Temperature		T_j	Max	150		°c
THERMAL RESISTANCE						
From junction to ambient		$R_{\theta ja}$		500		K/W

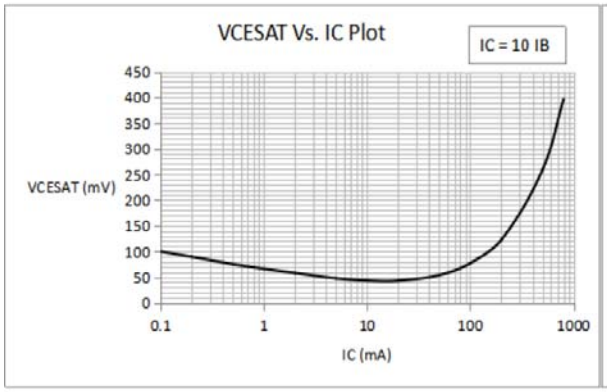
ELECTRICAL CHARACTERISTICS (T_j = 25 °C Unless Otherwise Specified)

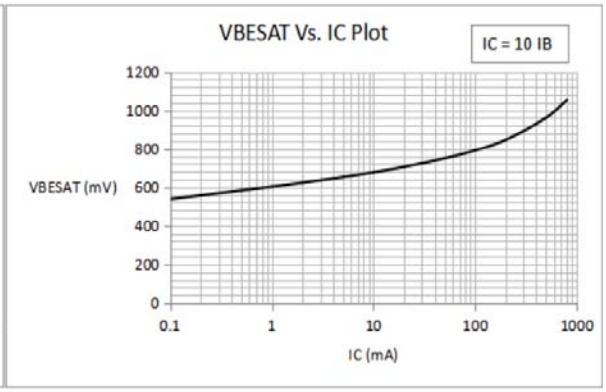
Parameter		Symbol	Test Conditions	Min/ Max	CMBT 2222	CMBT 2222A	Unit
Collector Cut Off Current		I_{CBO}	IE = 0 , VCB = 50 V	Max	0.01	-	µA
		I_{CBO}	IE = 0 , VCB = 60 V	Max	-	0.01	µA
		I_{CBO}	IE = 0 , VCB = 50 V	Max	10	-	µA
		I_{CBO}	IE = 0 , VCB = 60 V	Max	-	10	µA
		I_{CEX}	V_{EB} = 3 V, V_{CE} = 60V	Max	-	10	nA
Base current with reverse biased Emitter Junction		I_{BEX}	V_{FB} =3V, V_{CE} = 60V	Max	-	20	nA
Emitter Cut Off Current		I_{EBO}	I_C = 0, V_{EB} = 3V	Max	-	10	nA
Saturation Voltages		V_{CESat}	I_C= 150mA , I_B= 15mA	Max	400	300	mV
		V_{BESat}		Min	-	0.6	
		V_{BESat}		Max	1.3	1.2	V
		V_{CESat}	I_C= 500mA , I_B= 50mA	Max	1.6	1	V
		V_{BESat}		Max	2.6	2	V
Breakdown Voltages		$V_{BR(CEO)}$	I_C= 1µA, I_B= 0	Min	30	40	V
		$V_{BR(CBO)}$	I_C= 100µA, I_E= 0	Min	60	75	V
		$V_{BR(EBO)}$	I_C= 0, I_E= 10µA	Min	5	6	V
DC Current Gain		h_{FE}	I_C = 0.1 mA; V_{CE} = 10V	Min	35		
			I_C = 1 mA; V_{CE} = 10V	Min	50		
			I_C = 10 mA; V_{CE} = 10 V	Min	75		
			I_C = 10 mA; V_{CE} = 10 V; T_{amb} = –55 °C	Min	35		
			I_C = 150mA; V_{CE} = 10V	Min	100		
			I_C = 150mA; V_{CE} = 10V	Max	300		
			I_C = 150 mA; V_{CE} = 1 V	Min	50		
			I_C = 500 mA; V_{CE} = 10 V	Min	30	40	
Transition Frequency at f = 100 MHz		f_T	I_C = 20 mA, V_{CE} = 20 V	Min	250	300	MHz
Output Capacitance at f =1 MHz		C_o	I_E = 0 , V_{CB} = 10 V	Max	8		pF
Input Capacitance at f = 1 MHz		C_{in}	I_C = 0, V_{EB} = 0.5V	Max	30	25	pF
Noise figure at Rs = 1 KΩ		NF	I_C = 100 mA, V_{CE}=10 V, f = 1KHz	Max	4		dB
SWITCHING TIME (BETWEEN 10% AND 90% LEVELS)							
Turn On Time switched to	Delay	t_d	I_C = 150 mA	Max	10		ns
	Rise	t_r		Max	25		ns
Turn Off Time switched from	Storage	t_{stg}		Max	225		ns
	Fall	t_f		Max	60		ns
Small Signal Current Gain		h_{FE}	I_C = 1 mA, V_{CE}=10 V, f = 1KHz	Min	50		
				Max	300		
			I_C = 10 mA, V_{CE}=10 V, f = 1KHz	Min	75		
				Max	375		

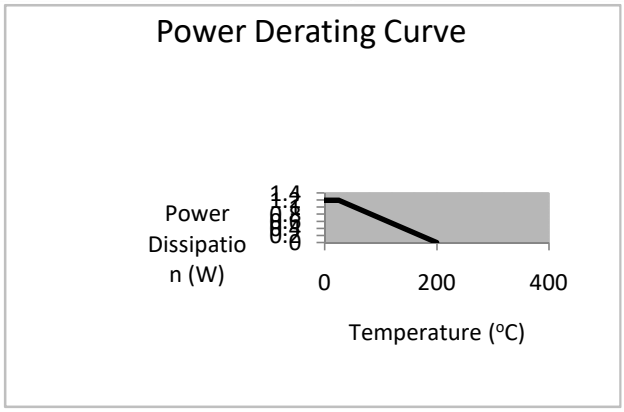
Typical Characteristic curves





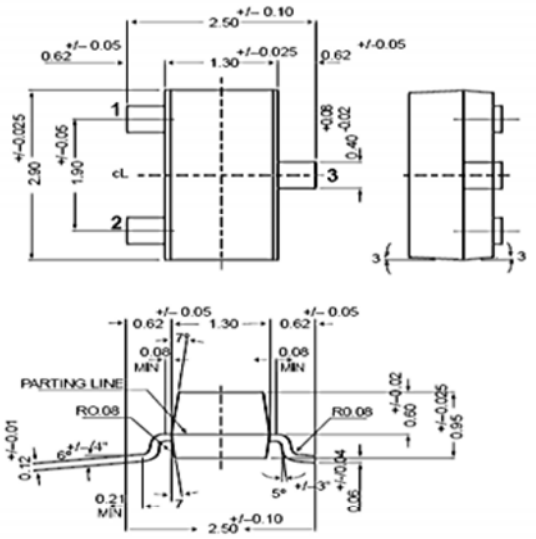




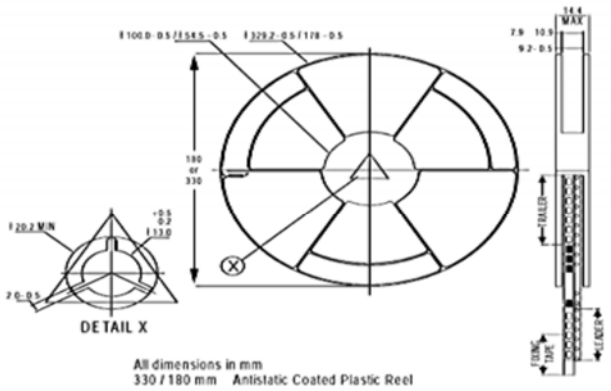


Package Details

SOT-23 Formed SMD Package



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



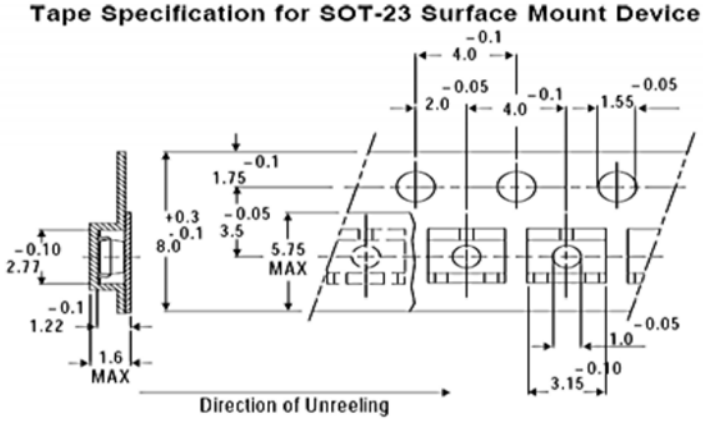
All dimensions in mm
330 / 180 mm Antistatic Coated Plastic Reel

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

Packing Detail

PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
SOT-23 T&R	3K/reel	136 gm/3K pcs	3" x 7.5" x 7.5"	12.0K	17" x 15" x 13.5"	192.0K	12 kgs
			9" x 9" x 9"	51.0K	19" x 19" x 19"	408.0K	28 kgs
	10K/reel	415 gm/10K pcs	13" x 13" x 0.5"	10.0K	17" x 15" x 13.5"	300.0K	16 kgs

PIN CONFIGURTION

1 - Base
2 - Emitter
3 - Collector

CMBT2222_A
Rev 2_29102020EM

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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CMBT2222_A
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