

FMBTA56W

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# FMBTA56W

## -500mA -80V Transistor PNP Silicon

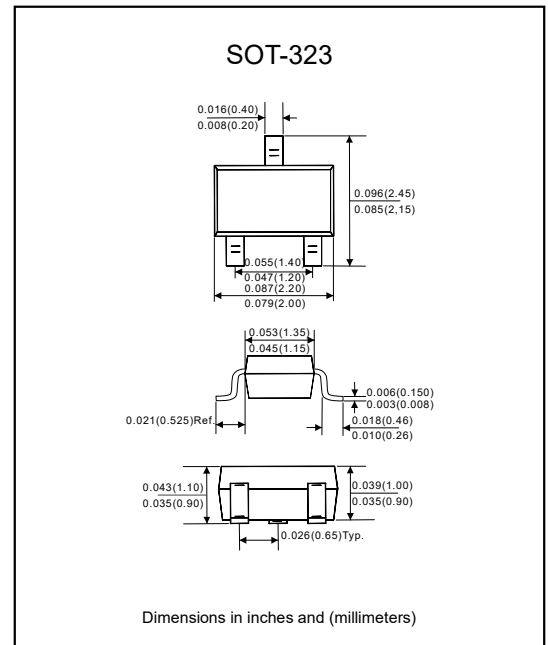
### Features

- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen free part, ex. FMBTA56W-H.

### Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-323.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position : Any.

### Package outline



### Maximum ratings (AT $T_A=25^{\circ}\text{C}$ unless otherwise noted)

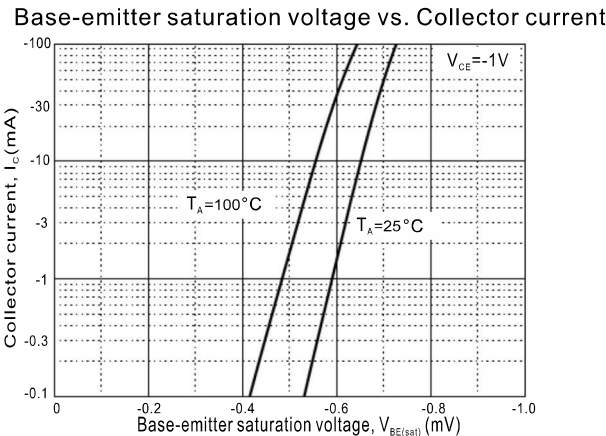
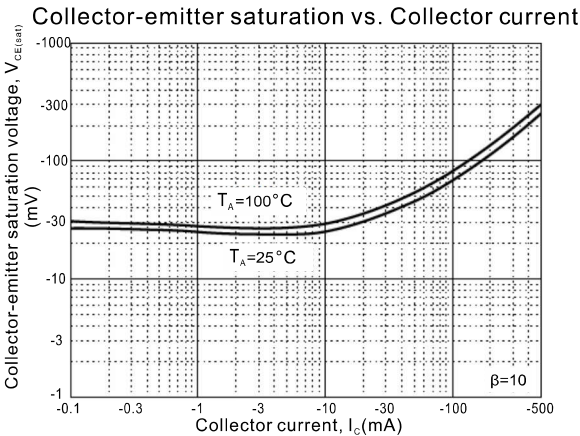
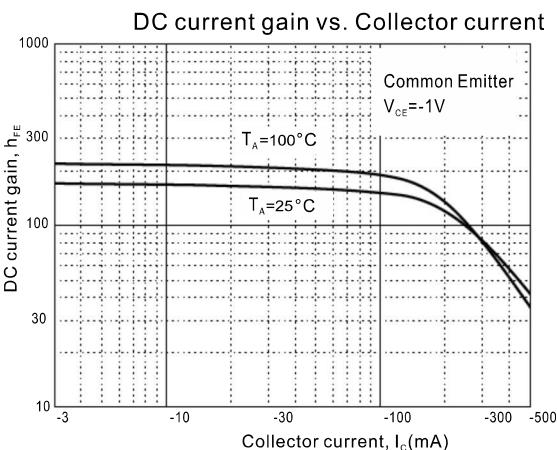
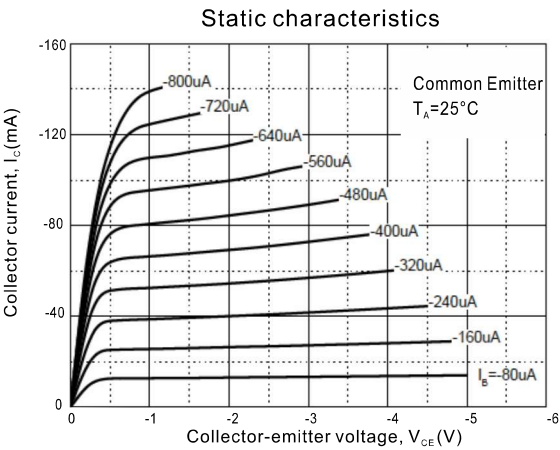
| Parameter                               | Symbol          | Value       | Unit                 |
|-----------------------------------------|-----------------|-------------|----------------------|
| Collector to base voltage               | $-V_{CBO}$      | 80          | V                    |
| Collector to emitter voltage            | $-V_{CEO}$      | 80          | V                    |
| Emitter to base voltage                 | $-V_{EBO}$      | 4           | V                    |
| Collector current                       | $-I_C$          | 500         | mA                   |
| Collector power dissipation             | $P_C$           | 350         | mW                   |
| Thermal resistance, junction to ambient | $R_{\theta JA}$ | 555         | $^{\circ}\text{C/W}$ |
| Junction temperature                    | $T_J$           | +150        | $^{\circ}\text{C}$   |
| Storage temperature range               | $T_{STG}$       | -55 to +150 | $^{\circ}\text{C}$   |

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Electrical characteristics (AT  $T_A=25^{\circ}\text{C}$  unless otherwise noted)

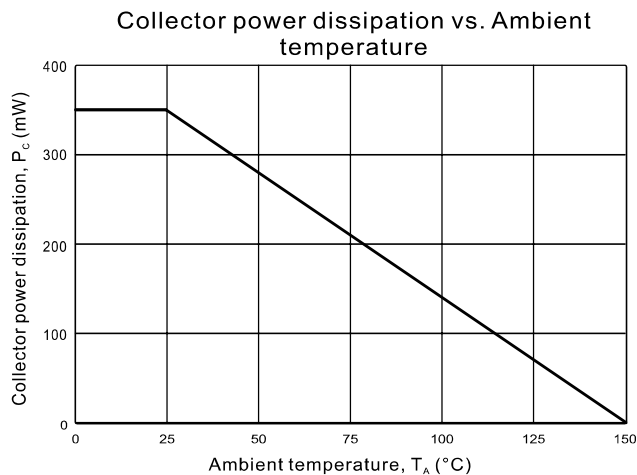
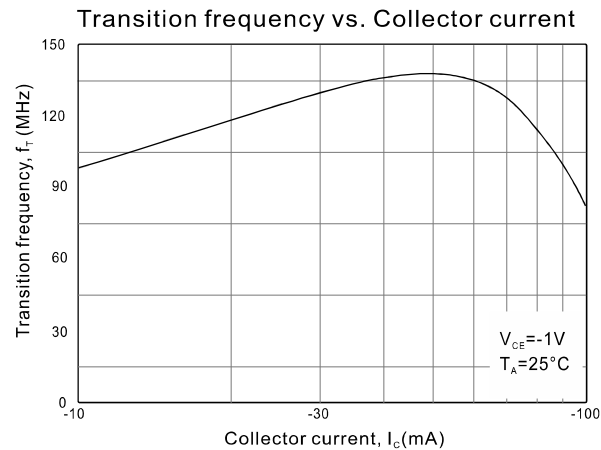
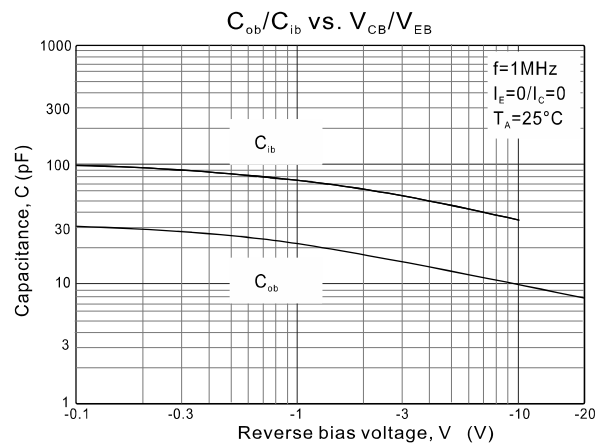
| Parameter                           | Conditions                                                    | Symbol                | Min. | Typ. | Max. | Unit          |
|-------------------------------------|---------------------------------------------------------------|-----------------------|------|------|------|---------------|
| Collector cut-off current           | $-V_{CB} = 80\text{V}, I_E = 0$                               | $-I_{CBO}$            |      |      | 0.1  | $\mu\text{A}$ |
| Collector cut-off current           | $-V_{CB} = 60\text{V}, I_B = 0$                               | $-I_{CEO}$            |      |      | 1    | $\mu\text{A}$ |
| Emitter cut-off current             | $-V_{EB} = 4\text{V}, I_C = 0$                                | $-I_{EBO}$            |      |      | 0.1  | $\mu\text{A}$ |
| Collector saturation voltage        | $-I_C = 100\text{mA}, -I_B = 10\text{mA}$                     | $-V_{CE(\text{SAT})}$ |      |      | 0.25 | V             |
| Collector base breakdown voltage    | $-I_C = 100\mu\text{A}, I_E = 0$                              | $-V_{(BR)CBO}$        | 80   |      |      | V             |
| Collector emitter breakdown voltage | $-I_C = 1\text{mA}, I_B = 0$                                  | $-V_{(BR)CEO}$        | 80   |      |      | V             |
| Emitter base breakdown voltage      | $-I_E = 100\mu\text{A}, I_C = 0$                              | $-V_{(BR)EBO}$        | 4    |      |      | V             |
| DC current gain                     | $-V_{CE} = 1\text{V}, -I_C = 10\text{mA}$                     | $h_{FE(1)}$           | 100  |      | 400  |               |
|                                     | $-V_{CE} = 1\text{V}, -I_C = 100\text{mA}$                    | $h_{FE(2)}$           | 100  |      |      |               |
| Transition Frequency                | $-V_{CE} = 1\text{V}, -I_C = 100\text{mA}, f = 100\text{MHz}$ | $f_T$                 | 50   |      |      | MHZ           |
| Output capacitance                  | $-V_{CE} = 1\text{V}, -I_C = 100\text{mA}$                    | $-V_{BE}$             |      |      | 1.2  | V             |

Rating and characteristic curves



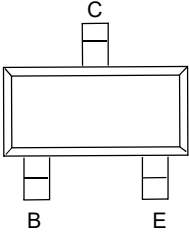
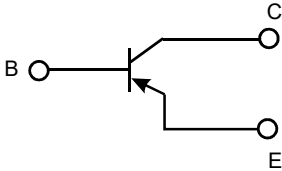
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Rating and characteristic curves



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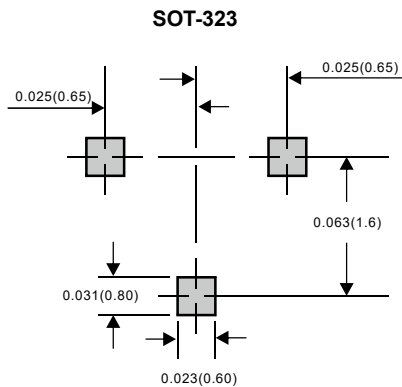
Pinning information

| Pin                                         | Simplified outline                                                                | Symbol                                                                              |
|---------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| PinB Base<br>PinC Collector<br>PinE Emitter |  |  |

Marking

| Type number | Marking code |
|-------------|--------------|
| FMBTA56W    | HR2G         |

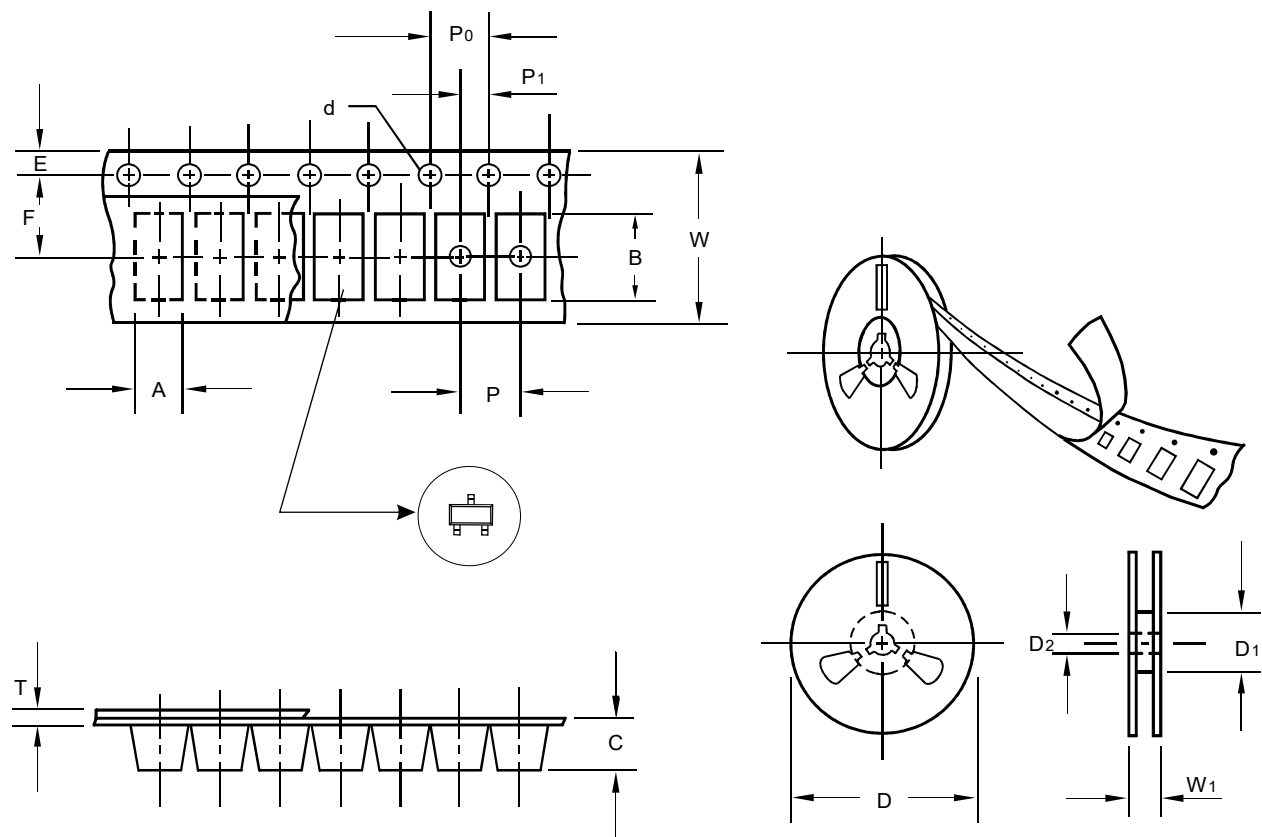
Suggested solder pad layout



Dimensions in inches and (millimeters)

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Packing information



unit:mm

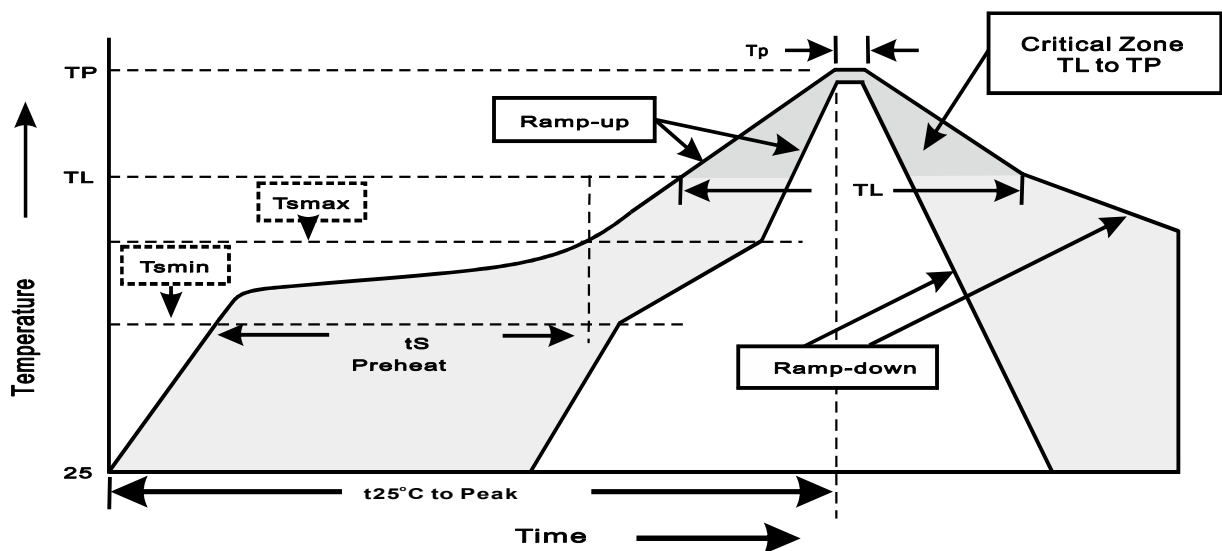
| Item                      | Symbol | Tolerance | SOT-323 |
|---------------------------|--------|-----------|---------|
| Carrier width             | A      | 0.1       | 1.47    |
| Carrier length            | B      | 0.1       | 2.95    |
| Carrier depth             | C      | 0.1       | 1.15    |
| Sprocket hole             | d      | 0.1       | 1.50    |
| 13" Reel outside diameter | D      | 2.0       | -       |
| 13" Reel inner diameter   | D1     | min       | -       |
| 7" Reel outside diameter  | D      | 2.0       | 178.00  |
| 7" Reel inner diameter    | D1     | min       | 62.00   |
| Feed hole diameter        | D2     | 0.5       | 13.00   |
| Sprocket hole position    | E      | 0.1       | 1.75    |
| Punch hole position       | F      | 0.1       | 3.50    |
| Punch hole pitch          | P      | 0.1       | 4.00    |
| Sprocket hole pitch       | P0     | 0.1       | 4.00    |
| Embossment center         | P1     | 0.1       | 2.00    |
| Overall tape thickness    | T      | 0.1       | 0.23    |
| Tape width                | W      | 0.3       | 8.00    |
| Reel width                | W1     | 1.0       | 11.40   |

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

## Reel packing

| PACKAGE | REEL SIZE | REEL<br>(pcs) | COMPONENT<br>SPACING<br>(m/m) | BOX<br>(pcs) | INNER<br>BOX<br>(m/m) | REEL<br>DIA,<br>(m/m) | CARTON<br>SIZE<br>(m/m) | CARTON<br>(pcs) |
|---------|-----------|---------------|-------------------------------|--------------|-----------------------|-----------------------|-------------------------|-----------------|
| SOT-323 | 7"        | 3,000         | 4.0                           | 30,000       | 183*183*123           | 178                   | 382*262*387             | 240,000         |

1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%  
2.Reflow soldering of surface-mount devices



| Profile Feature                                                                                           | Soldering Condition                                                      |
|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Average ramp-up rate( $T_L$ to $T_P$ )                                                                    | $<3^{\circ}\text{C/sec}$                                                 |
| Preheat<br>-Temperature Min( $T_{smin}$ )<br>-Temperature Max( $T_{smax}$ )<br>-Time(min to max)( $t_s$ ) | $150^{\circ}\text{C}$<br>$200^{\circ}\text{C}$<br>$60\sim 120\text{sec}$ |
| $T_{smax}$ to $T_L$<br>-Ramp-upRate                                                                       | $<3^{\circ}\text{C/sec}$                                                 |
| Time maintained above:<br>-Temperature( $T_L$ )<br>-Time( $t_L$ )                                         | $217^{\circ}\text{C}$<br>$60\sim 260\text{sec}$                          |
| Peak Temperature( $T_P$ )                                                                                 | $255^{\circ}\text{C}-0/+5^{\circ}\text{C}$                               |
| Time within $5^{\circ}\text{C}$ of actual Peak Temperature( $t_P$ )                                       | $10\sim 30\text{sec}$                                                    |
| Ramp-down Rate                                                                                            | $<6^{\circ}\text{C/sec}$                                                 |
| Time $25^{\circ}\text{C}$ to Peak Temperature                                                             | $<6\text{minutes}$                                                       |