

FMBTA56W-Q1

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FMBTA56W-Q1

-500mA -80V Transistor PNP Silicon

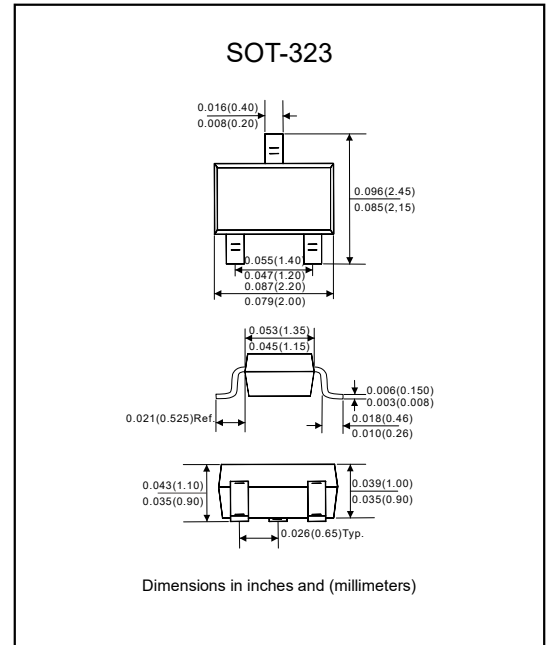
Features

- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen free part, ex. FMBTA56W-Q1-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)

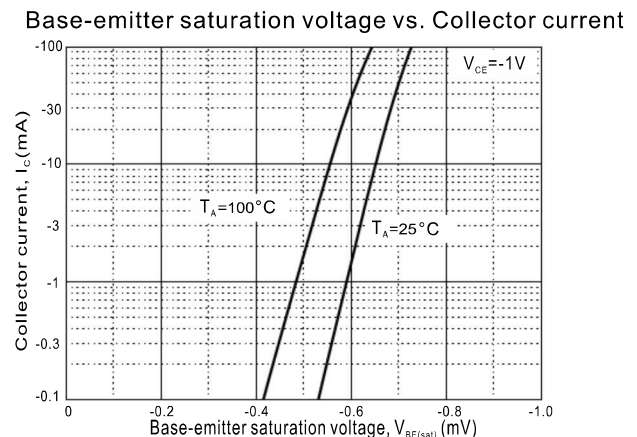
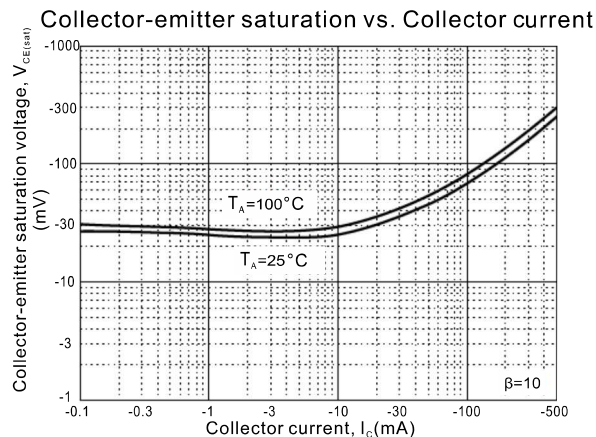
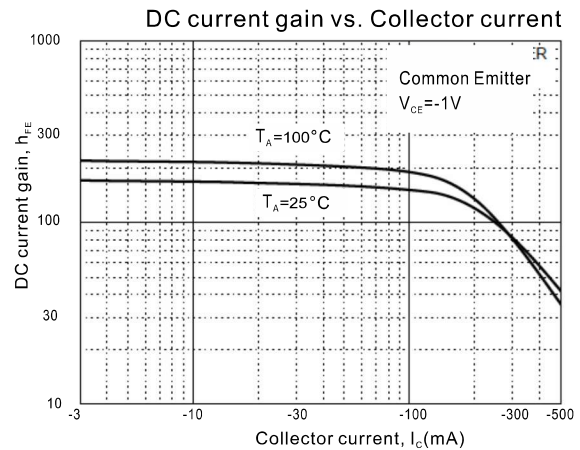
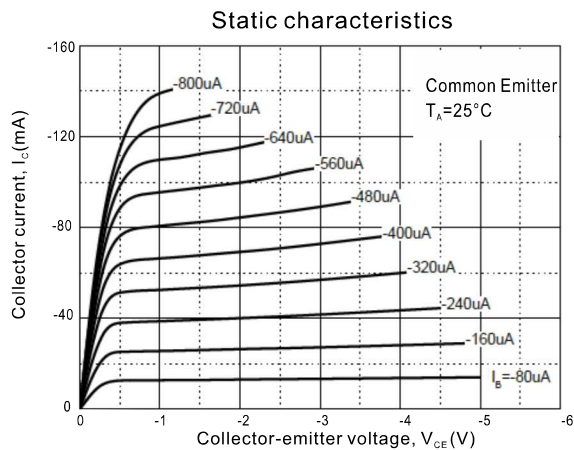
Parameter	Symbol	Value	Unit
Collector to base voltage	$-V_{CBO}$	80	V
Collector to emitter voltage	$-V_{CEO}$	80	V
Emitter to base voltage	$-V_{EBO}$	4	V
Collector current	$-I_C$	500	mA
Collector power dissipation	P_C	350	mW
Thermal resistance, junction to ambient	$R_{\theta JA}$	555	$^{\circ}\text{C/W}$
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)

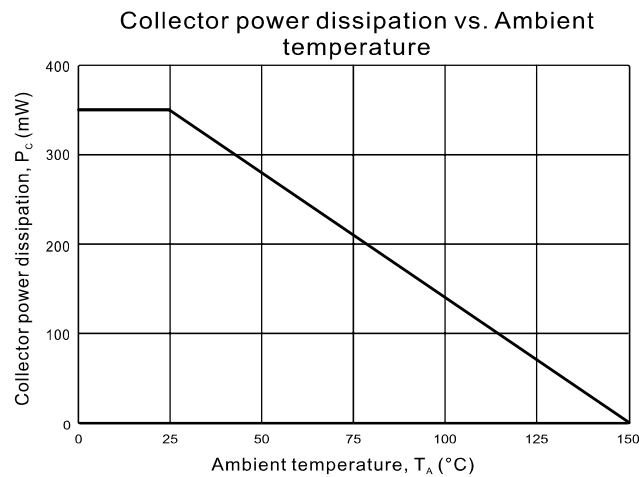
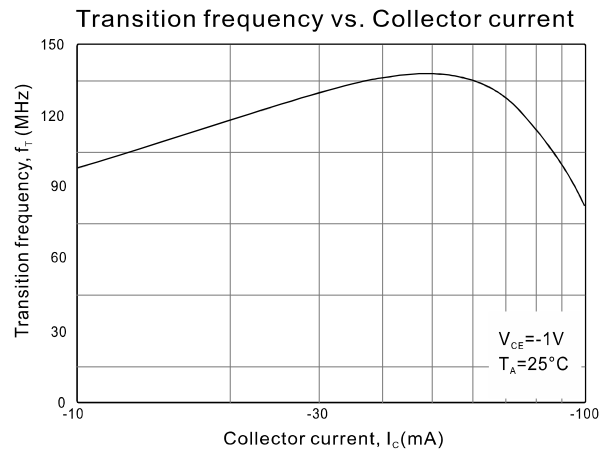
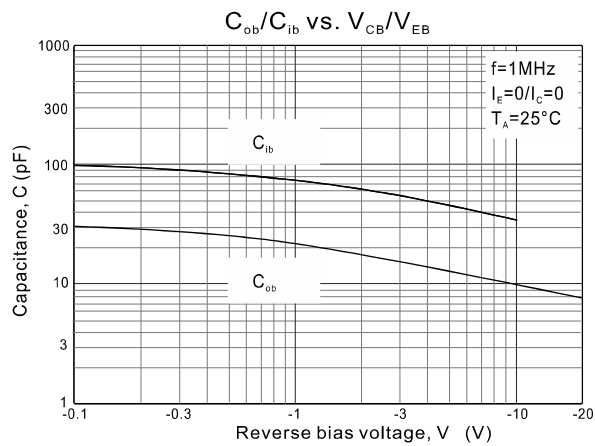
Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector cut-off current	$-V_{CB} = 80\text{V}, I_E = 0$	$-I_{CBO}$			0.1	μA
Collector cut-off current	$-V_{CB} = 60\text{V}, I_B = 0$	$-I_{CEO}$			1	μA
Emitter cut-off current	$-V_{EB} = 4\text{V}, I_C = 0$	$-I_{EBO}$			0.1	μA
Collector saturation voltage	$-I_C = 100\text{mA}, -I_B = 10\text{mA}$	$-V_{CE(SAT)}$			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



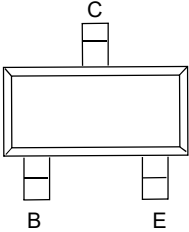
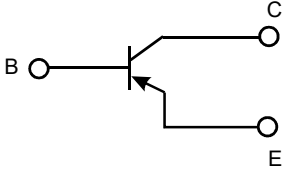
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Rating and characteristic curves



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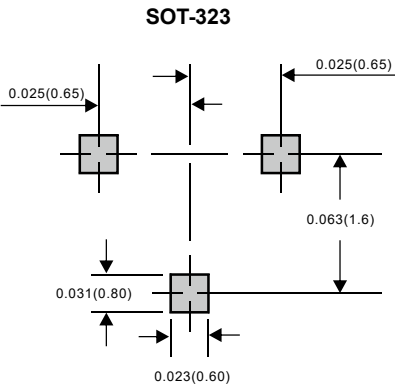
Pinning information

Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

Marking

Type number	Marking code
FMBTA56W-Q1	HR2G

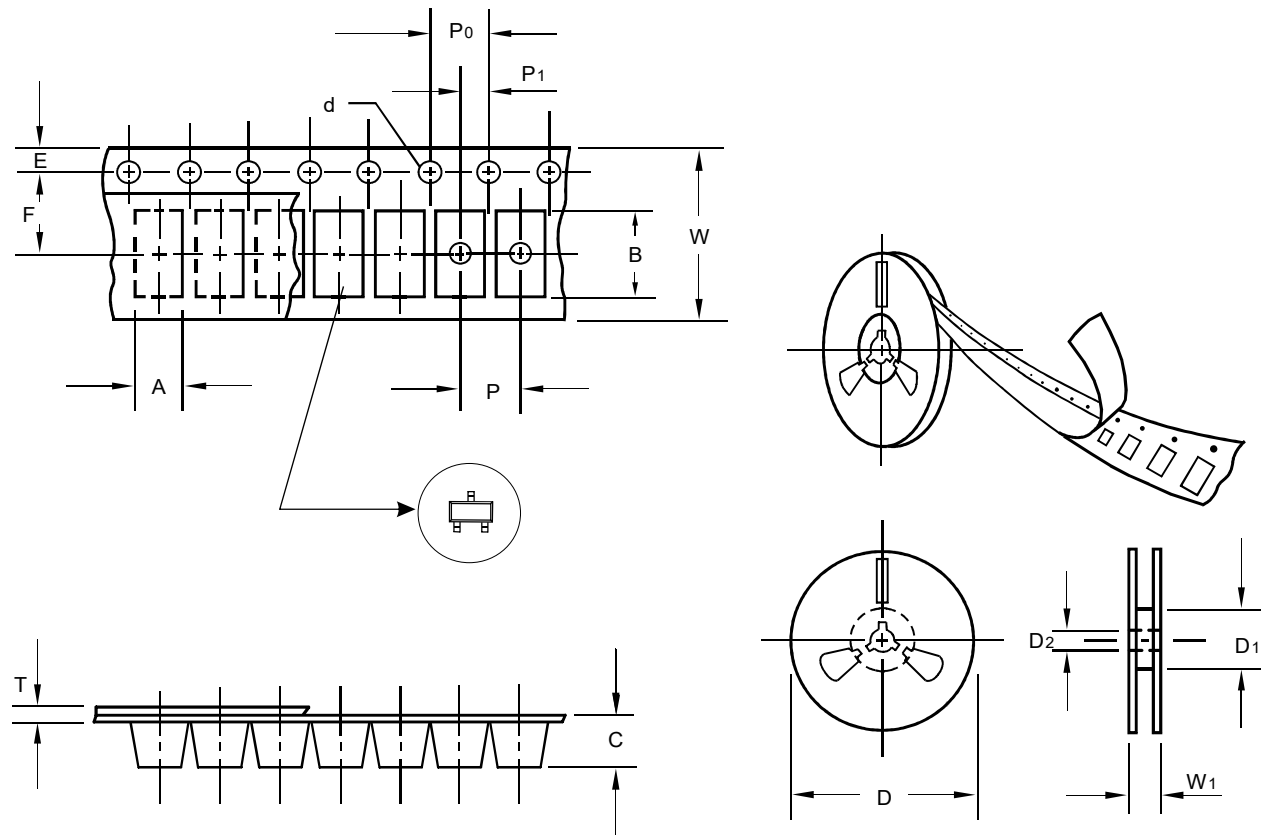
Suggested solder pad layout



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.

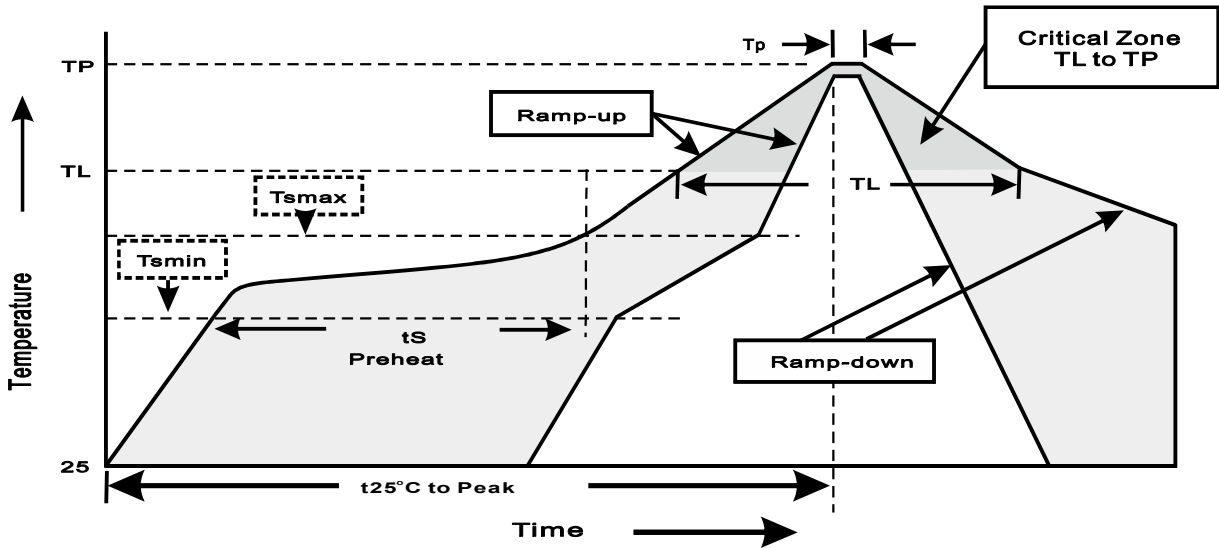
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Reel packing

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

Suggested thermal profiles for soldering processes

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



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T _L to T _P)	<3°C/sec
Preheat - Temperature Min(T _{smin}) - Temperature Max(T _{smax}) - Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smax} to T _L - Ramp-upRate	<3°C/sec
Time maintained above: - Temperature(T _L) - Time(t _L)	217°C 60~260sec
Peak Temperature(T _P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t _p)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

FMBTA56W-Q1**High reliability test capabilities**

Item Test	Conditions	Reference
1. MSL Preconditioning	24hr bake@125°C+168hrs@85°C /85%RH+3xIR@260°C+1flux immersion+alcohol+DI H2O rinse	JESD22-A113
2. Intermittent Operating Life	Ta=25°C, $\Delta T_j \geq 100^\circ\text{C}$ On/Off=2min Test Duration:1000hrs	MIL-STD-750E METHOD 1037
3. High Temperature Reverse Bias	VCE=80%B _{VCE0} (T _J =T _J max.)Test Duration:1000hrs	JESD22-A108
4. High Temperature Storage Life	Ta=150°C Test Duration:1000hrs	JESD22 A-103
5. Temperature Cycle	-55°C(15min) to 150°C(15min)Test Cycles:1000cycles	JESD22 A-104
6. Autoclave	P=2atm Ta=121°C RH=100% Test Duration:96hrs	JESD22 A-102
7. Solderability	245±5°C for 5sec	J-STD-002
8. Moisture Resistance	Ta=85°C/85%Relative humidity Test Duration:1000hrs	MIL-STD-750E METHOD 1021.2
9. Resistance To Solder Heat	260±5°C for 10sec	JESD22 B-106
10. High Temperature High Humidity Reverse Bias	Ta=85°C, 85%RH, VCE=80%B _{VCE0} Test Duration: 1000hrs	JESD22-A101