

FMBTA05W / FMBTA06W**List**

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FMBTA05W / FMBTA06W

500mA NPN Small Signal Surface mount Transistor

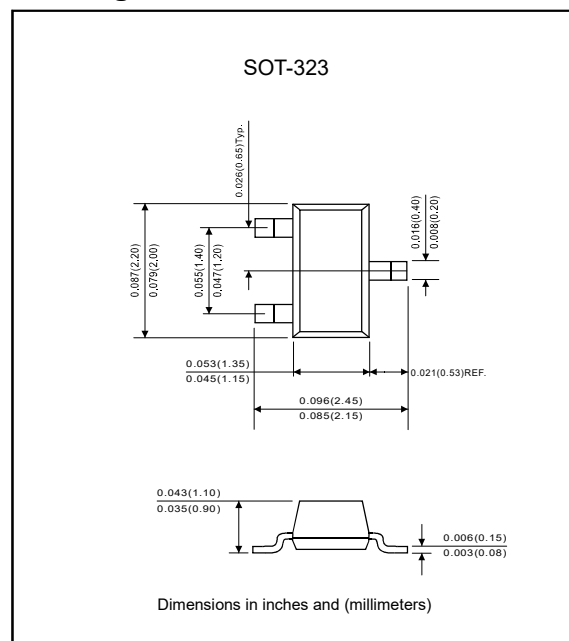
Features

- Epitaxial planar die construction.
- Ideal for medium power amplification and switching.
- Ultra-small surface mount package.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen free part, ex. FMBTA05W-H.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-323.
- Terminals : Solder plated, solder able per MIL-STD-750, Method 2026.
- Mounting Position : Any.
- Weight : Approximated 0.006 gram.

Package outline



Maximum Ratings (T_A = 25°C unless otherwise specified)

Characteristic	Symbol	FMBTA05W	FMBTA06W	Unit
Collector-Base Voltage	V _{CBO}	60	80	V
Collector-Emitter Voltage	V _{CEO}	60	80	V
Emitter-Base Voltage	V _{EBO}	4.0		V
Collector Current - Continuous (Note 1)	I _C	500		mA
Power Dissipation (Note 1)	P _D	200		mW
Thermal Resistance, Junction to Ambient (Note 1)	R _{θJA}	625		°C/W
Operating Temperature Range	T _J	-55 to +150		°C
Storage Temperature Range	T _{STG}	-55 to +150		°C

FMBTA05W / FMBTA06W**Electrical Characteristics** ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min		Max	Unit
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OFF CHARACTERISTICS (Note 5)

Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}, I_E = 0$ (FMBTA05W)	60			V
		$I_C = 100\mu\text{A}, I_E = 0$ (FMBTA06W)	80			
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1.0\text{mA}, I_B = 0$ (FMBTA05W)	60			V
		$I_C = 1.0\text{mA}, I_B = 0$ (FMBTA06W)	80			
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 100\mu\text{A}, I_C = 0$	4.0			V
Collector-Base Cutoff Current	I_{CBO}	$V_{CB} = 60\text{V}, I_E = 0$ (FMBTA05W)			100	nA
		$V_{CB} = 80\text{V}, I_E = 0$ (FMBTA06W)			100	
Collector-Emitter Cutoff Current	I_{CES}	$V_{CE} = 60\text{V}, I_{BO} = 0\text{V}$ (FMBTA05W)			100	nA
		$V_{CE} = 80\text{V}, I_{BO} = 0\text{V}$ (FMBTA06W)			100	

ON CHARACTERISTICS (Note 5)

DC Current Gain	h_{FE}	$I_C = 10\text{mA}, V_{CE} = 1.0\text{V}$	100			
		$I_C = 100\text{mA}, V_{CE} = 1.0\text{V}$	100			
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C = 100\text{mA}, I_B = 10\text{mA}$			0.25	V
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	$I_C = 100\text{mA}, V_{CE} = 1.0\text{V}$			1.2	V

SMALL SIGNAL CHARACTERISTICS

Current Gain-Bandwidth Product	f_T	$V_{CE} = 2.0\text{V}, I_C = 10\text{mA}, f = 100\text{MHz}$	100			MHz
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Notes: 1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

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Rating and characteristic curves

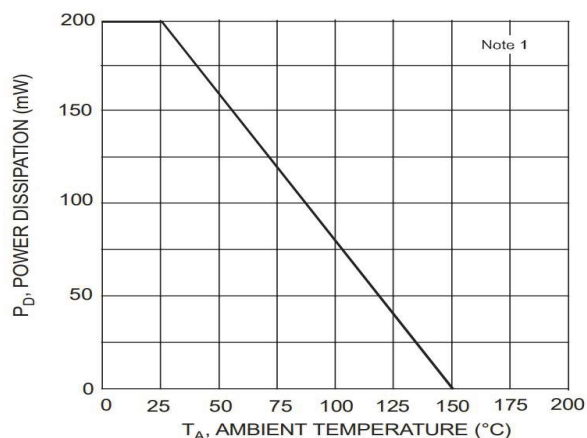


Fig. 1, Max Power Dissipation vs. Ambient Temperature

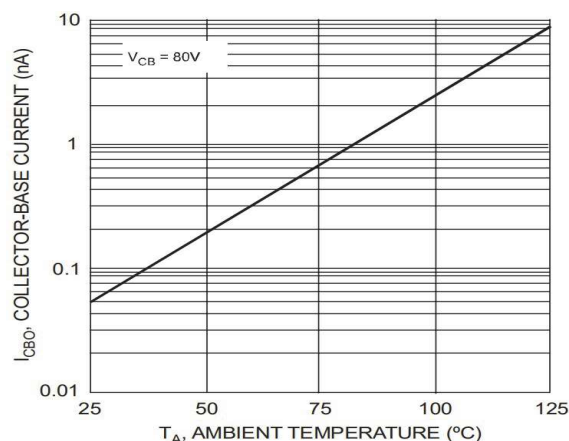


Fig. 2, Typical Collector-Cutoff Current vs. Ambient Temperature

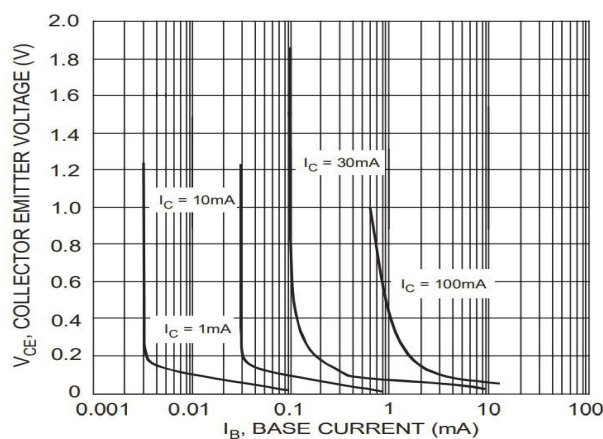


Fig. 3, Typical Collector Saturation Region

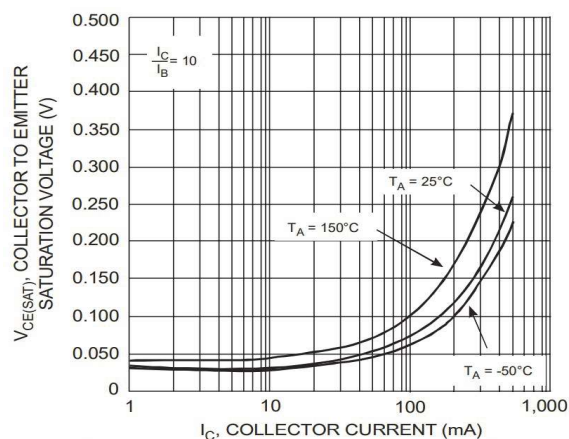


Fig. 4, Collector Emitter Saturation Voltage vs. Collector Current

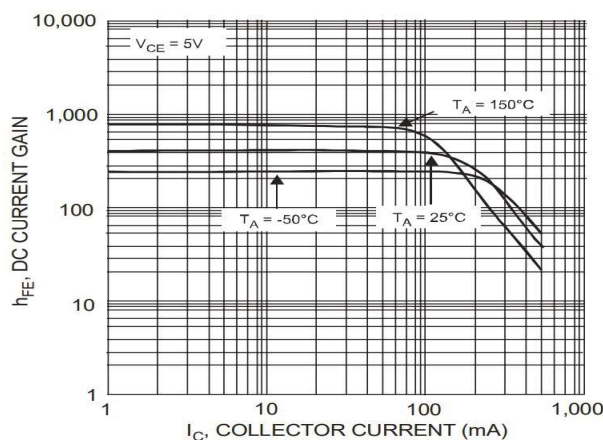


Fig. 5, DC Current Gain vs. Collector Current

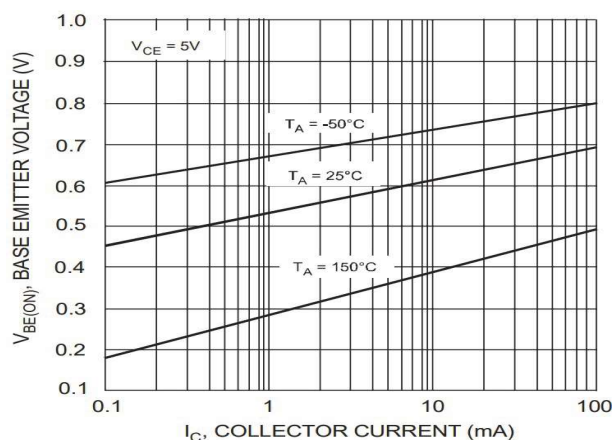
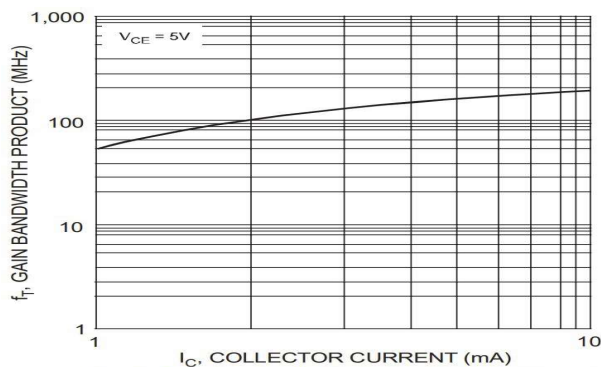


Fig. 6, Base Emitter Voltage vs. Collector Current

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Rating and characteristic curves



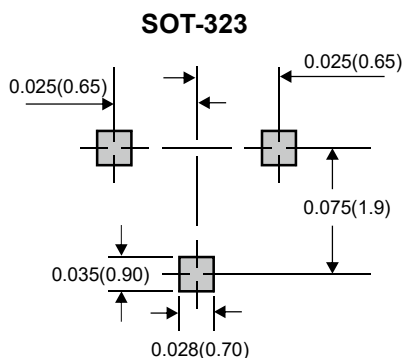
Pinning information

Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

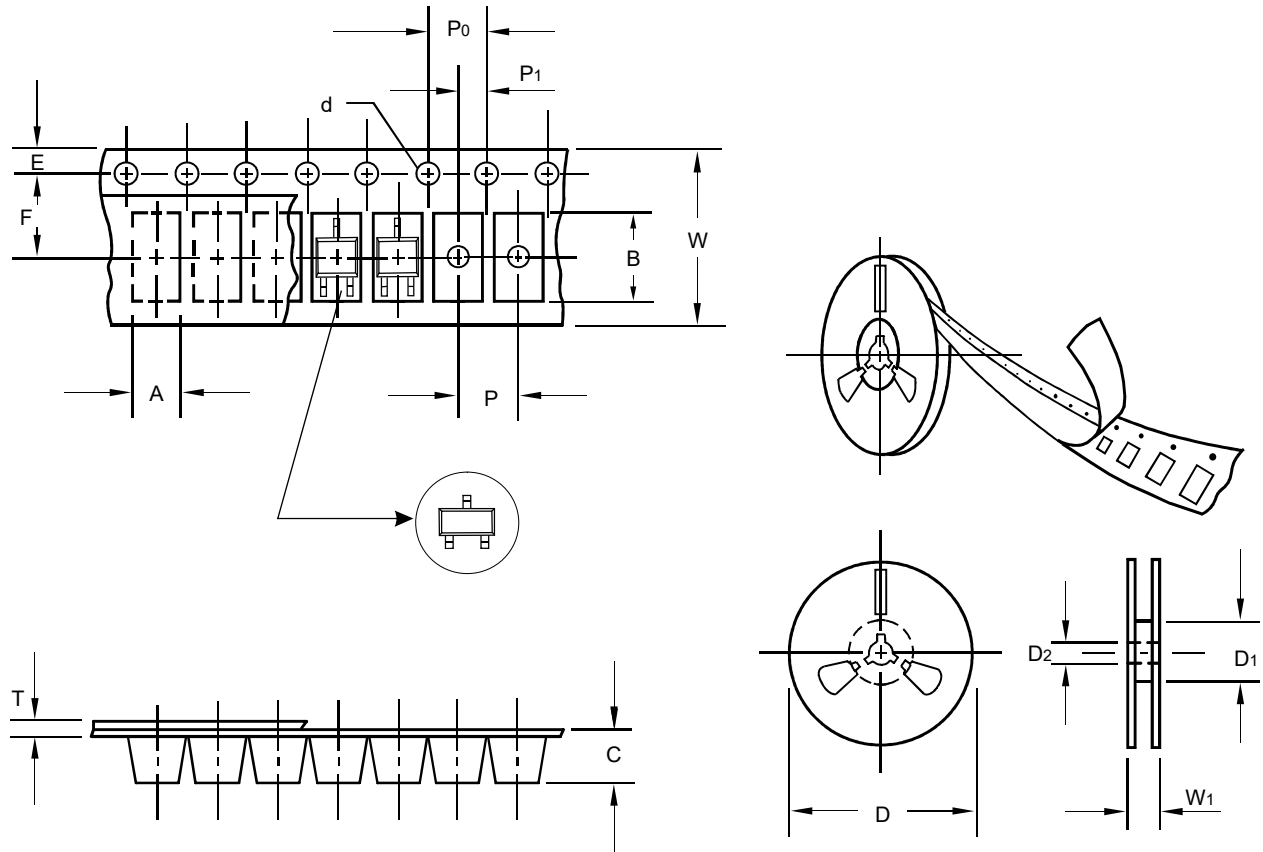
Marking

Type number	Marking code
FMBTA05W	K1H
FMBTA06W	K1G

Suggested solder pad layout



Dimensions in inches and (millimeters)

FMBTA05W / FMBTA06W**Packing information**

unit:mm

Item	Symbol	Tolerance	SOT-323
Carrier width	A	0.1	2.25
Carrier length	B	0.1	2.55
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.

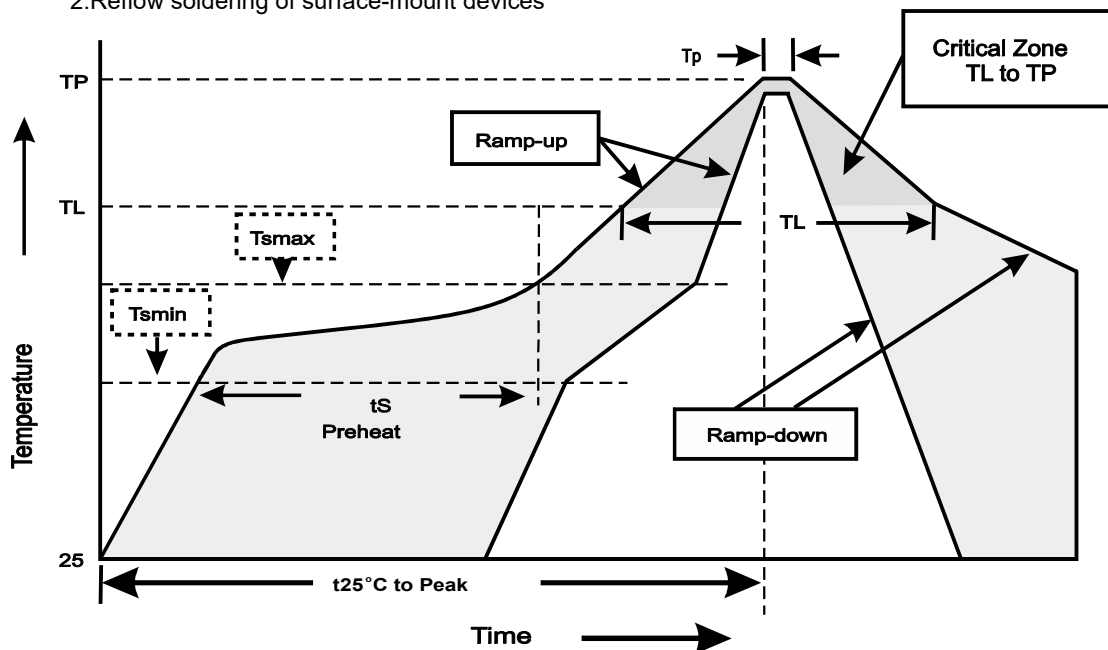
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Reel packing

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)	APPROX. GROSS WEIGHT (kg)
SOT-323	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	9.50

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)	$<3^{\circ}\text{C/sec}$
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	$<3^{\circ}\text{C/sec}$
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	$<6^{\circ}\text{C/sec}$
Time 25°C to Peak Temperature	$<6\text{minutes}$