

FMBTA05W-Q1 / FMBTA06W-Q1

List

List.....1

Package outline.....2

Features.....2

Mechanical data.....2

Maximum ratings.....2

Electrical characteristics.....3

Rating and characteristic curves.....4~5

Pinning information.....5

Marking.....5

Suggested solder pad layout.....5

Packing information.....6

Reel packing.....7

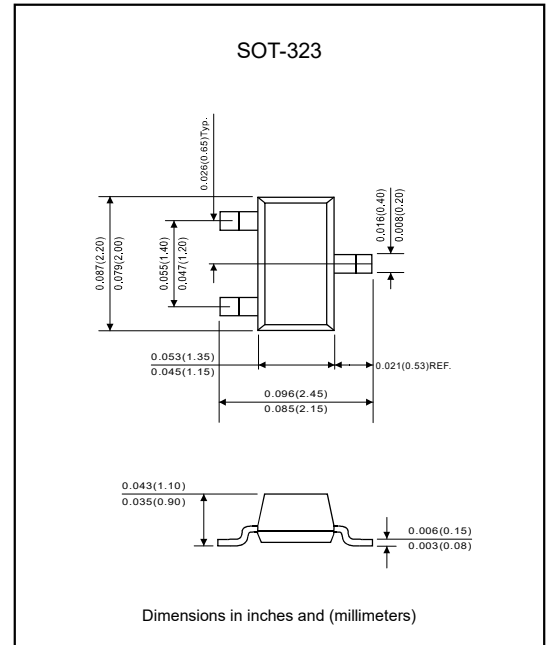
Suggested thermal profiles for soldering processes.....7

FMBTA05W-Q1 / FMBTA06W-Q1**500mA NPN Small Signal Transistor****Features**

- Epitaxial planar die construction.
- Ideal for medium power amplification and switching.
- Ultra-small surface mount package.
- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex. FMBTA05W-Q1-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.

Package outline**Maximum Ratings** ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Characteristic	Symbol	FMBTA05W-Q1	FMBTA06W-Q1	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)	$R_{\theta JA}$	625		$^\circ\text{C/W}$
Operating temperature	T_J	+150		$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150		$^\circ\text{C}$

FMBTA05W-Q1 / FMBTA06W-Q1

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

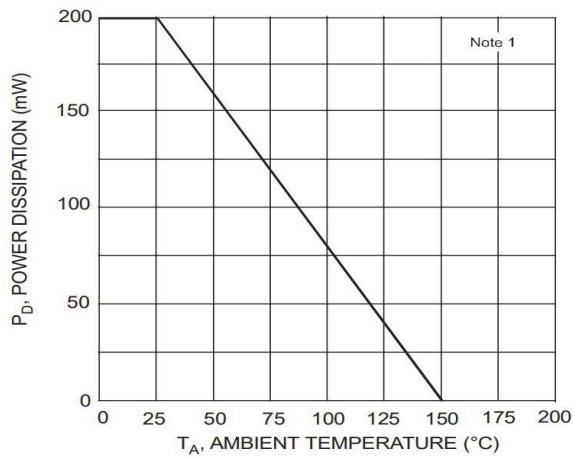
Parameter	Symbol	Test Condition	Min		Max	Unit
OFF CHARACTERISTICS (Note 5)						
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 100\mu A, I_E = 0$ (FMBTA05W-Q1)	60			V
		$I_C = 100\mu A, I_E = 0$ (FMBTA06W-Q1)	80			
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 1.0mA, I_B = 0$ (FMBTA05W-Q1)	60			V
		$I_C = 1.0mA, I_B = 0$ (FMBTA06W-Q1)	80			
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = 100\mu A, I_C = 0$	4.0			V
Collector-base cutoff current	I_{CBO}	$V_{CB} = 60V, I_E = 0$ (FMBTA05W-Q1)			100	nA
		$V_{CB} = 80V, I_E = 0$ (FMBTA06W-Q1)			100	
Collector-emitter cutoff current	I_{CES}	$V_{CE} = 60V, I_{BO} = 0V$ (FMBTA05W-Q1)			100	nA
		$V_{CE} = 80V, I_{BO} = 0V$ (FMBTA06W-Q1)			100	
ON CHARACTERISTICS (Note 5)						
DC current gain	h_{FE}	$I_C = 10mA, V_{CE} = 1.0V$	100			
		$I_C = 100mA, V_{CE} = 1.0V$	100			
Collector-emitter saturation voltage	$V_{CE(SAT)}$	$I_C = 100mA, I_B = 10mA$			0.25	V
Base-emitter saturation voltage	$V_{BE(SAT)}$	$I_C = 100mA, V_{CE} = 1.0V$			1.2	V
SMALL SIGNAL CHARACTERISTICS						
Current gain-bandwidth product	f_T	$V_{CE} = 2.0V, I_C = 10mA, f = 100MHz$	100			MHz

Notes: 1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

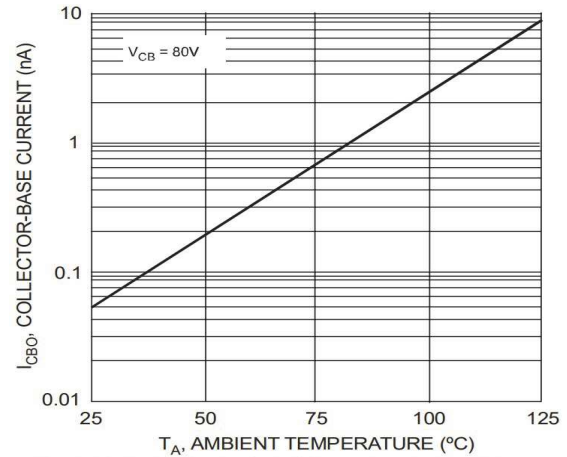
FMBTA05W-Q1 / FMBTA06W-Q1

Rating and characteristic curves

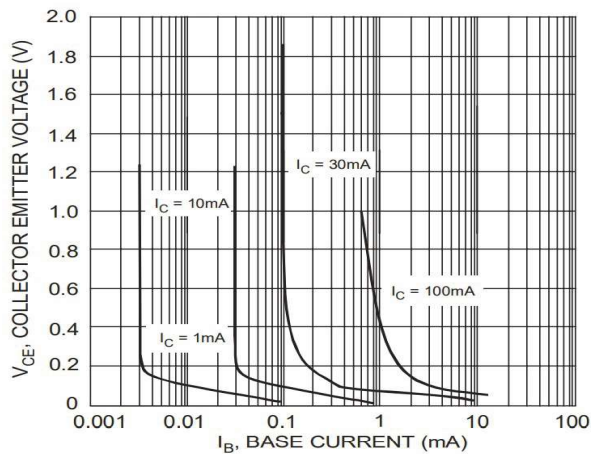
Maximum power dissipation vs. Ambient temperature



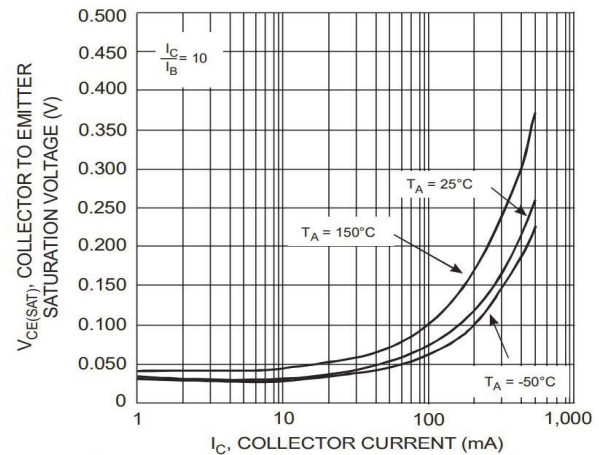
Typical collector-cutoff current vs. Ambient temperature



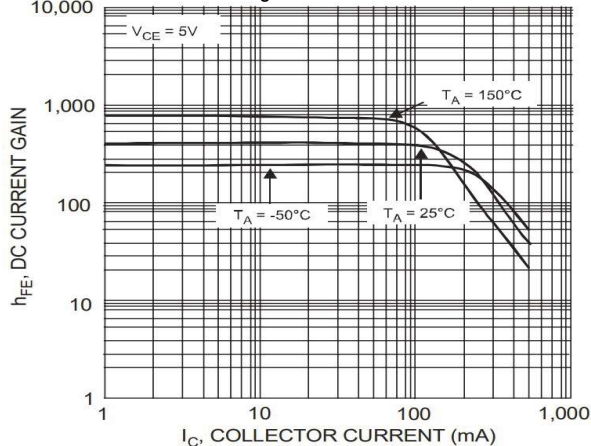
Typical collector saturation region



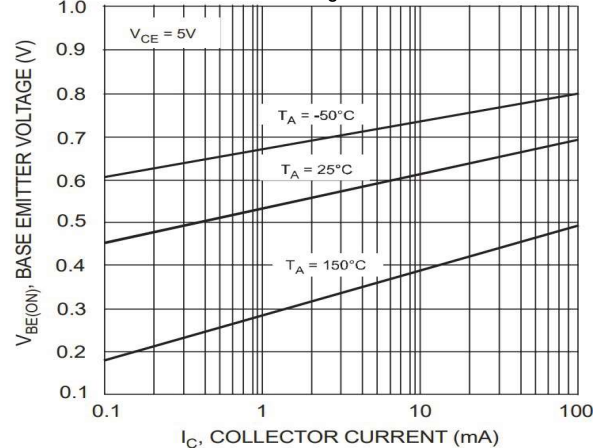
Collector-emitter saturation voltage vs. collector current



DC current gain vs. collector current

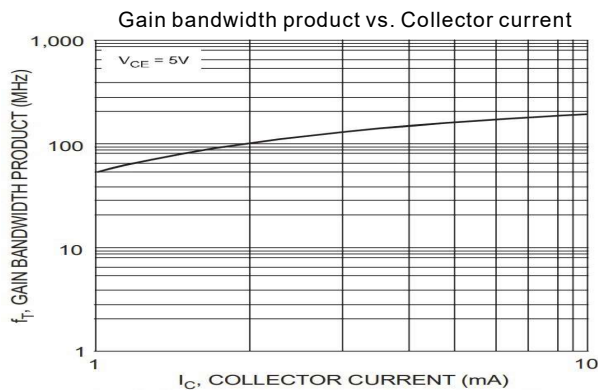


Base-emitter voltage vs. Collector current



FMBTA05W-Q1 / FMBTA06W-Q1

Rating and characteristic curves



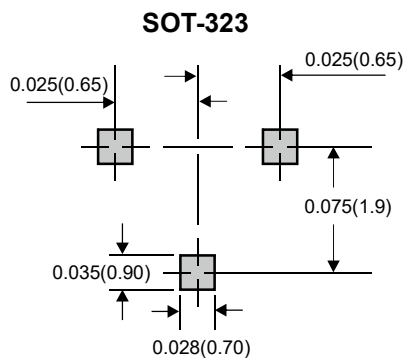
Pinning information

Pin	Simplified outline	Symbol
Pin 1 Base Pin 2 Emitter Pin 3 Collector		

Marking

Type number	Marking code
FMBTA05W-Q1	K1H
FMBTA06W-Q1	K1G

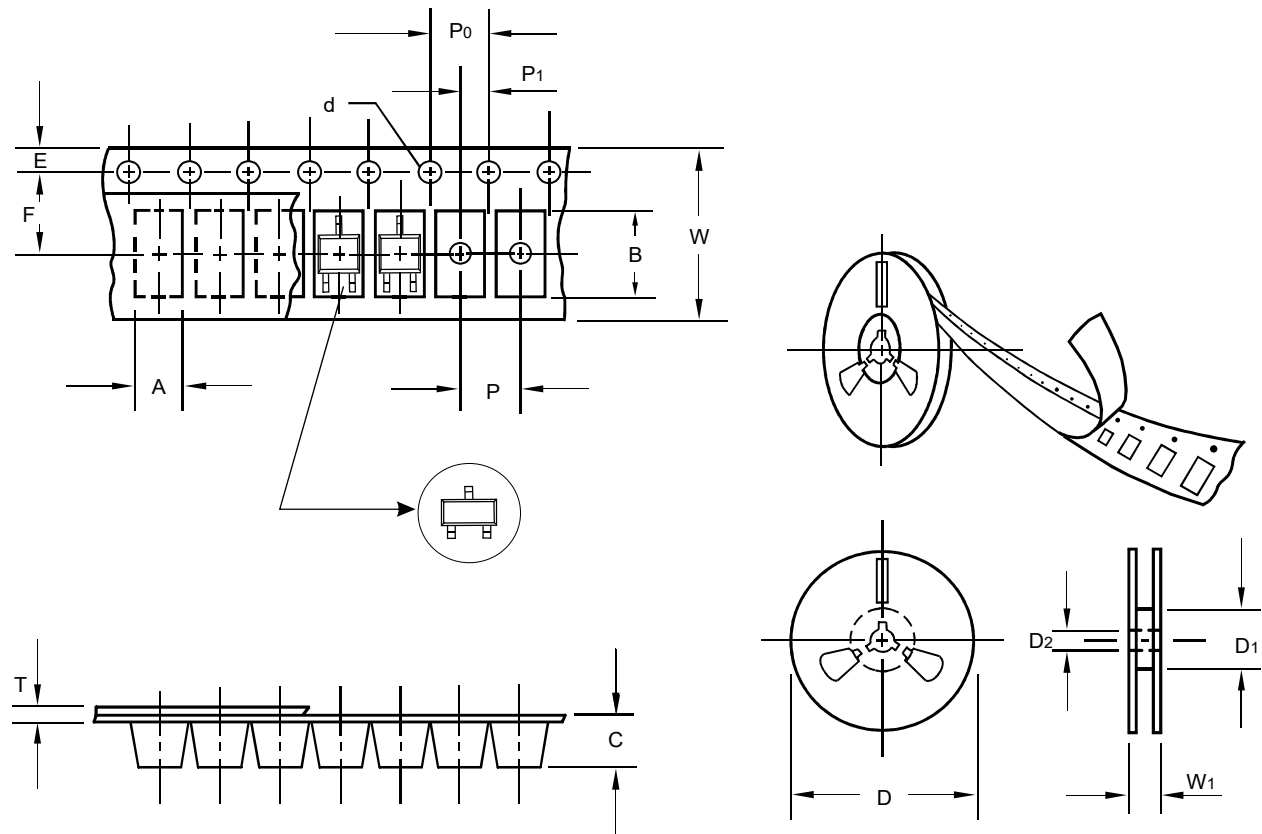
Suggested solder pad layout



Dimensions in inches and (millimeters)

FMBTA05W-Q1 / FMBTA06W-Q1

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.

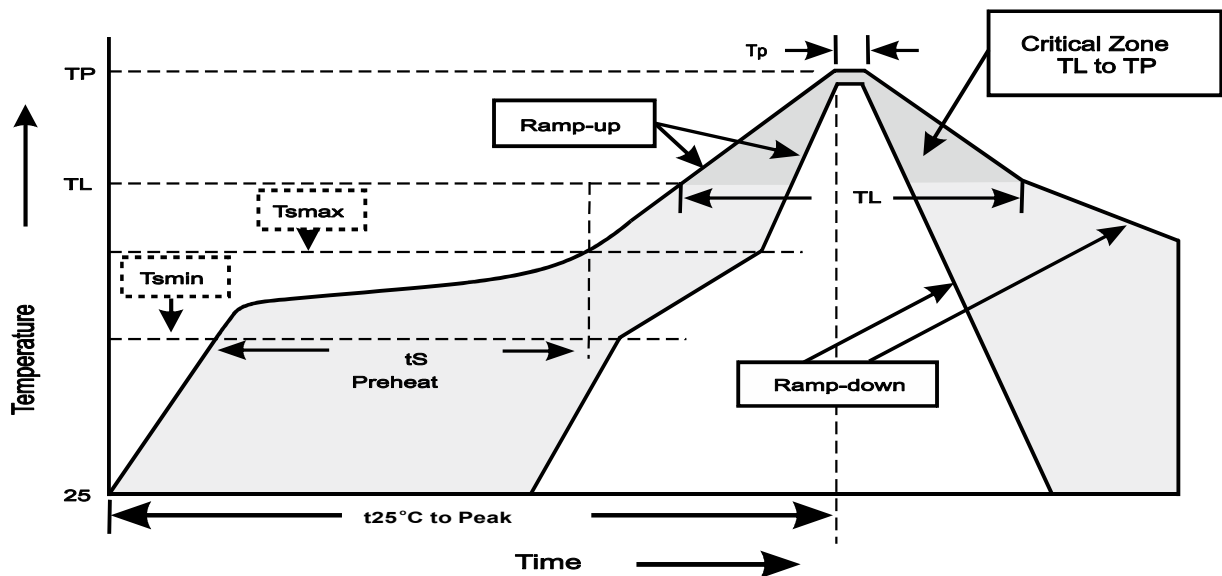
FMBTA05W-Q1 / FMBTA06W-Q1

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*123*183	178	382*257*387	240,000

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=25°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 _{smmin}) -Temperature Max(T _{smmax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smmax} 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