

FMBTA42

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FMBTA42

High Voltage NPN Transistor

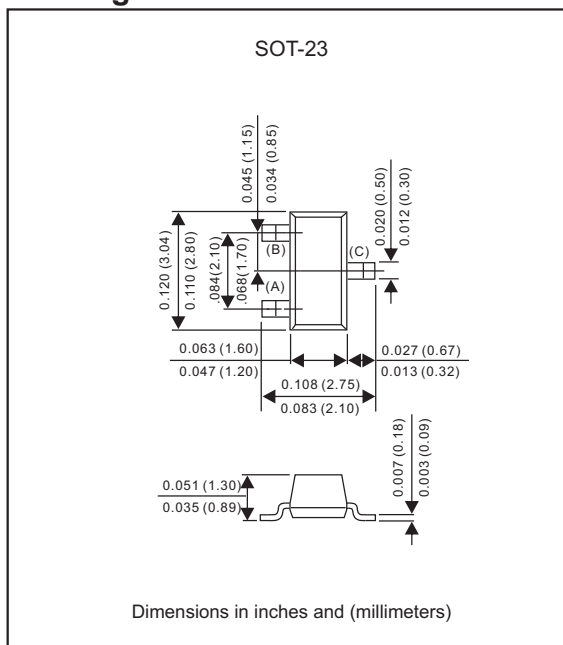
Features

- High voltage
- For telephony or professional communication equipment applications
- Lead-free parts for green partner, exceeds environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen-free part, ex. FMBTA42-H

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.008 gram

Package outline



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

PARAMETER	SYMBOL	Value	UNIT
Collector-base voltage	V_{CBO}	300	Vdc
Collector-emitter voltage	V_{CEO}	300	Vdc
Emitter-base voltage	V_{EBO}	6.0	Vdc
Collector current - continuous	I_C	500	mAdc

Thermal characteristics

CHARACTERISTIC	SYMBOL	Max	UNIT
Total device dissipation FR-5 board $T_A = 25^{\circ}\text{C}$ (1)	P_D	225	mW
Derate above 25°C		1.8	mW/ $^{\circ}\text{C}$
Thermal resistance (1) Junction to ambient	$R_{\theta JA}$	556	$^{\circ}\text{C}/\text{W}$
Total device dissipation alumina substrate(2) $T_A = 25^{\circ}\text{C}$	P_D	300	mW
Derate above 25°C		2.4	mW/ $^{\circ}\text{C}$
Thermal resistance(2) Junction to ambient	$R_{\theta JA}$	417	$^{\circ}\text{C}/\text{W}$
Operating junction temperature range	T_J	-55 to +150	$^{\circ}\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^{\circ}\text{C}$

1. FR-5 = 1.0 X 0.75 X 0.062 in.

2. Alumina = 0.4 X 0.3 X 0.024 in. 99.5% alumina.

FMBTA42**Electrical characteristics** (AT $T_A=25^{\circ}\text{C}$ unless otherwise noted)**Off characteristics**

PARAMETER	CONDITIONS	SYMBOL	Min.	Max.	UNIT
Collector-base breakdown voltage	$I_C = 100\mu\text{A}$, $I_E = 0$	$V_{(BR)CBO}$	300		Vdc
Collector-emitter breakdown voltage(3)	$I_C = 1.0\text{mA}$, $I_B = 0$	$V_{(BR)CEO}$	300		Vdc
Emitter-base breakdown voltage	$I_E = 100\mu\text{A}$, $I_C = 0$	$V_{(BR)EBO}$	6.0		Vdc
Emitter cutoff current	$V_{EB} = 6.0\text{Vdc}$, $I_C = 0$	I_{EBO}		0.1	μA
Collector cutoff current	$V_{CB} = 200\text{Vdc}$, $I_E = 0$	I_{CBO}		0.1	μA

On characteristics(3)

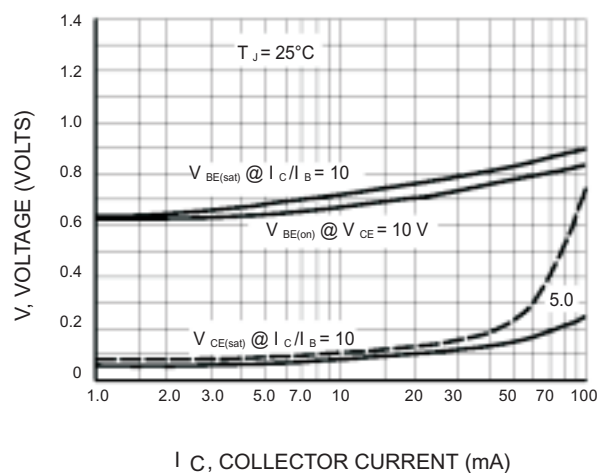
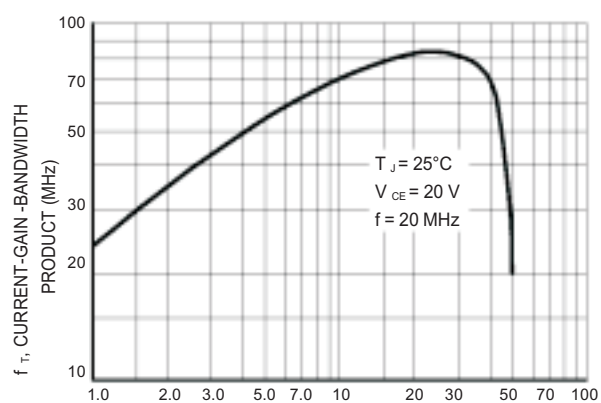
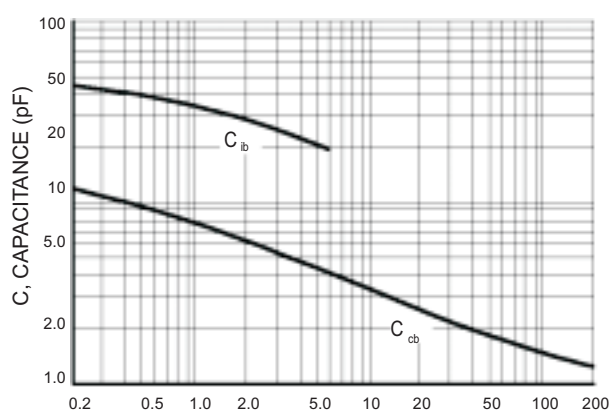
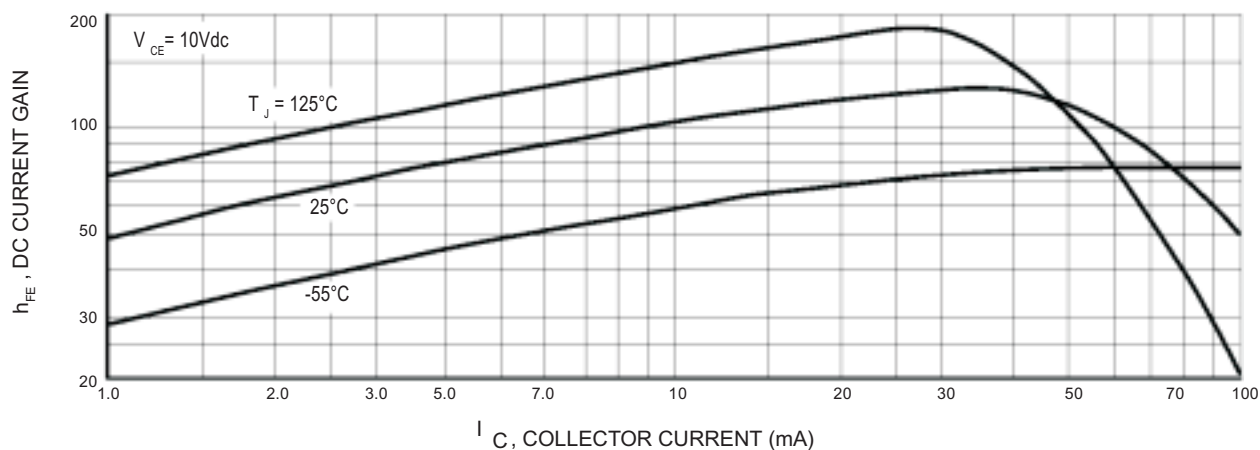
PARAMETER	CONDITIONS	SYMBOL	Min.	Max.	UNIT
DC current gain Both types Both types FMBTA42	$I_C = 1.0\text{mA}$, $V_{CE} = 10\text{Vdc}$ $I_C = 10\text{mA}$, $V_{CE} = 10\text{Vdc}$	h_{FE}	25 40 40		
Collector-emitter saturation voltage	$I_C = 20\text{mA}$, $I_B = 2.0\text{mA}$	$V_{CE(sat)}$		0.5	Vdc
Base-emitter saturation voltage	$I_C = 20\text{mA}$, $I_B = 2.0\text{mA}$	$V_{BE(sat)}$		0.9	Vdc

Small signal characteristics

PARAMETER	CONDITIONS	SYMBOL	Min.	Max.	UNIT
Current gain bandwidth product	$I_C = 10\text{mA}$, $V_{CE} = 20\text{Vdc}$, $f = 100\text{MHz}$	f_T	50		MHz
Collector-base capacitance	$I_E = 0$, $V_{CB} = 20\text{Vdc}$, $f = 1.0\text{MHz}$	C_{cb}		3.0	pF

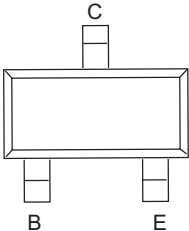
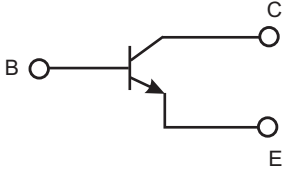
3. Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2.0\%$

Rating and characteristic curves (FMBTA42)



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Pinning information

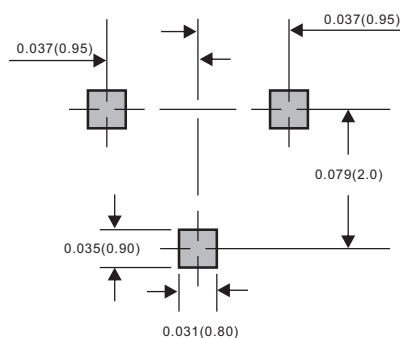
Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

Marking

Type number	Marking code
FMBTA42	1D

Suggested solder pad layout

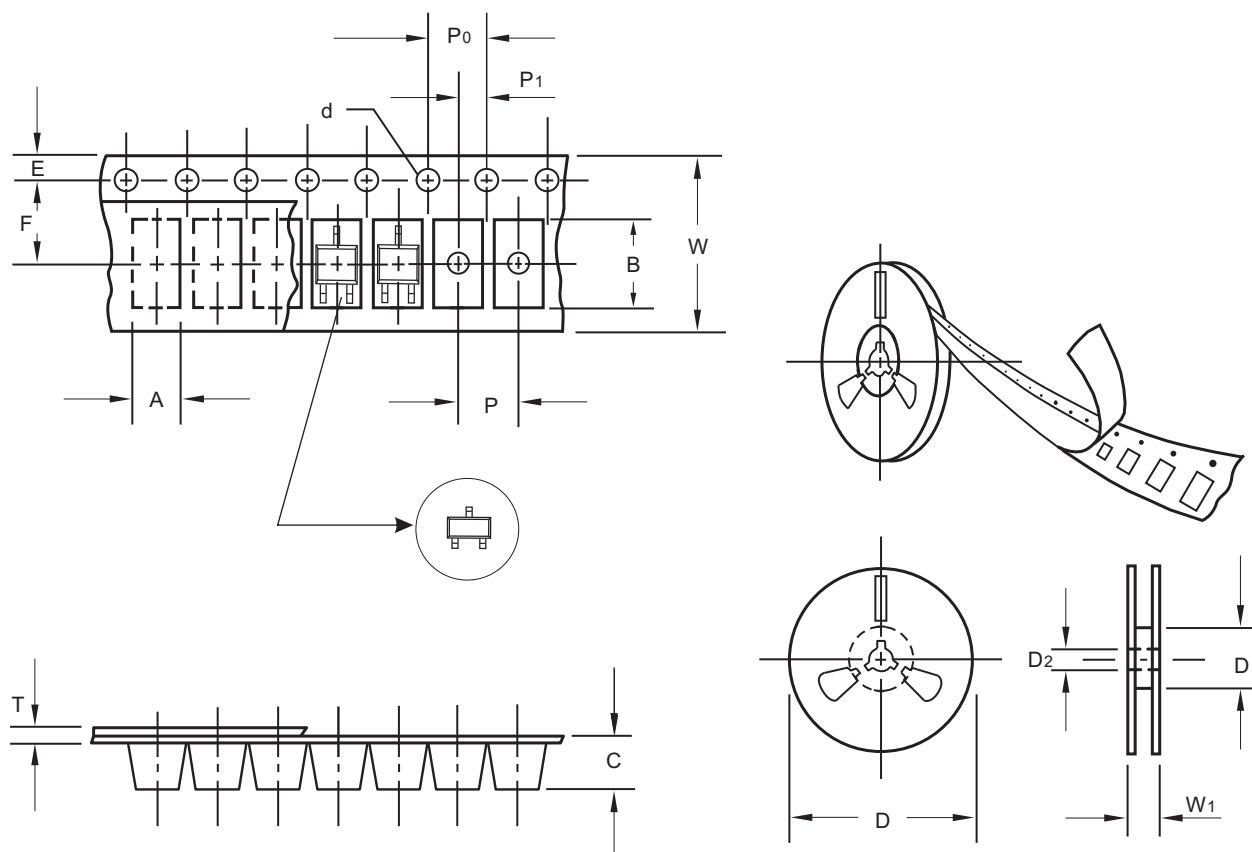
SOT-23



Dimensions in inches and (millimeters)

FMBTA42

Packing information



unit:mm

Item	Symbol	Tolerance	SOT-23
Carrier width	A	0.1	3.15
Carrier length	B	0.1	2.77
Carrier depth	C	0.1	1.22
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	55.00
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	12.0

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

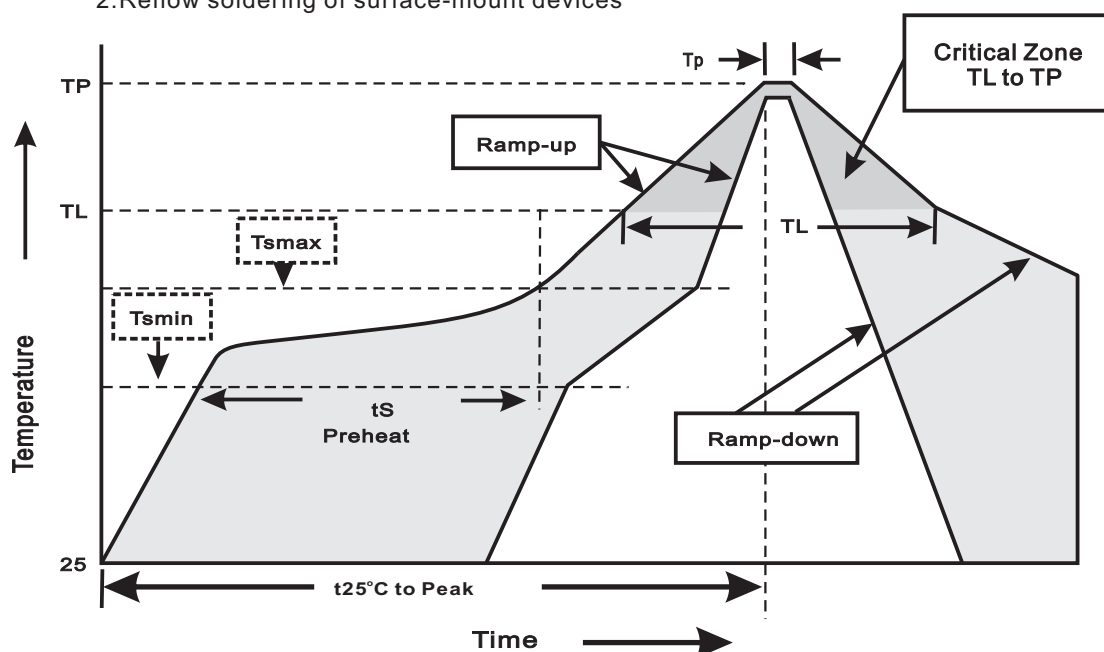
FMBTA42

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-23	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	11.6

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 _{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

FMBTA42

High reliability test capabilities

Item Test	Conditions
1. Steady State Operating Life	$T_A=25^{\circ}\text{C}$ $P_D=225\text{mW}$ Test Duration:1000hrs
2. High Temperature Reverse Bias	$T_J=150^{\circ}\text{C}$, $V_{CE}=80\%$ related volage, Test Duration:1000hrs
3. Temperature Cycle	-55°C (15min) to 150°C (15min) Air to Air Transition Time<20sec Test Cycles: 1000cycle
4. Autoclave	$P=2\text{atm}$ $T_a=121^{\circ}\text{C}$ $\text{RH}=100\%$ Test Duration: 96hrs
5. High Temperature Storage Life	$T_a=150^{\circ}\text{C}$ Test Duration: 1000hrs
6. Solderability	245°C ,Test Duration: 5sec
7. High Temperature High Humidity Reverse Bias	$T_a=85^{\circ}\text{C}$, 85%RH, $V_{CE}=80\%$ related volage, Test Duration: 1000hrs
8. Resistance to Soldering Heat	260°C ,Test Duration: 10sec