

FMBT591A

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FMBT591A

-1A, -40V Silicon PNP Epitaxial Planar Transistor

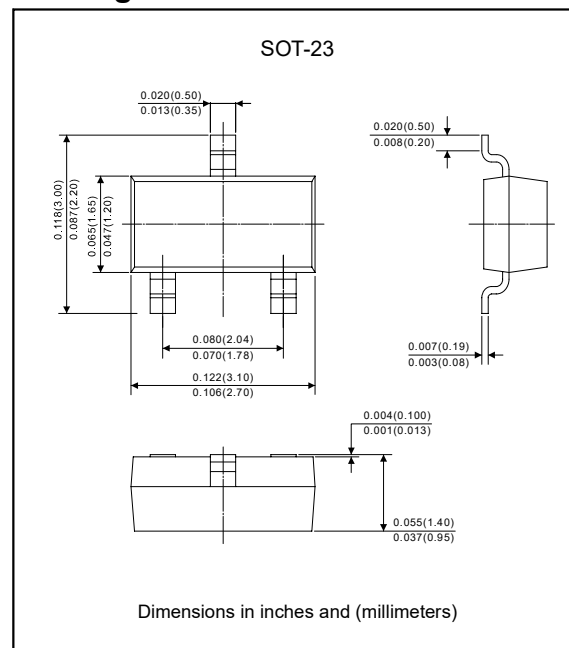
Features

- Switching transistor.
- Lead-free parts for green partner, exceeds environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen free part, ex. FMBT591A-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



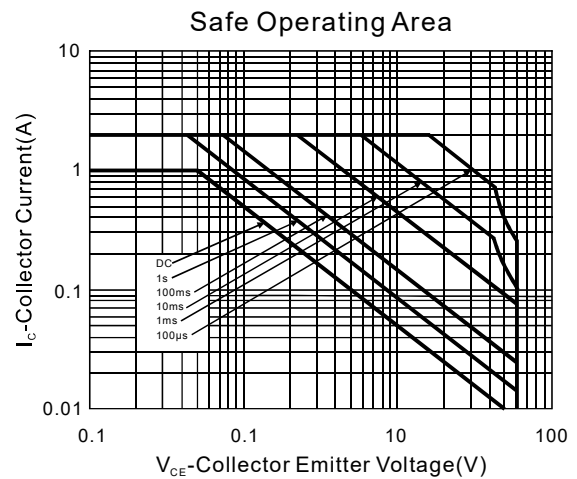
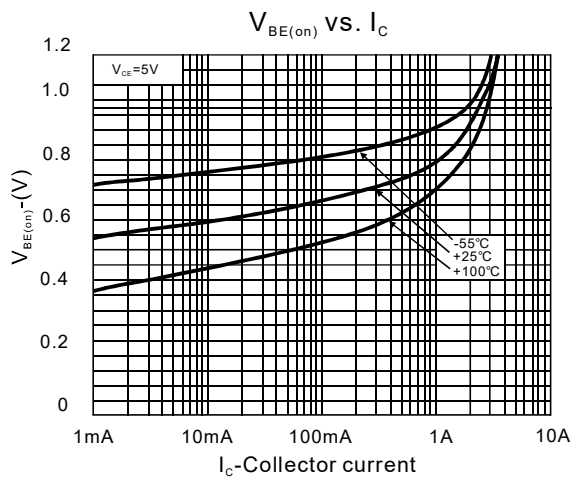
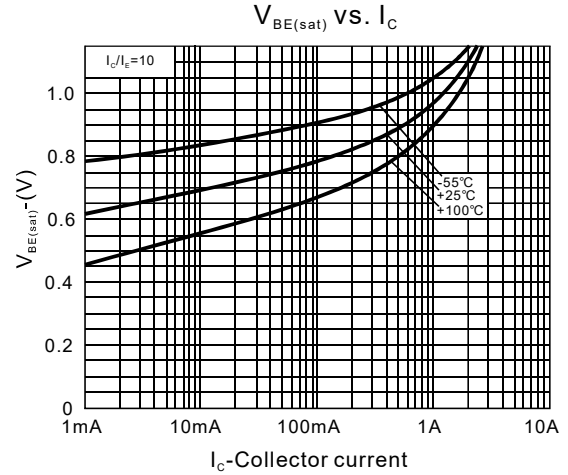
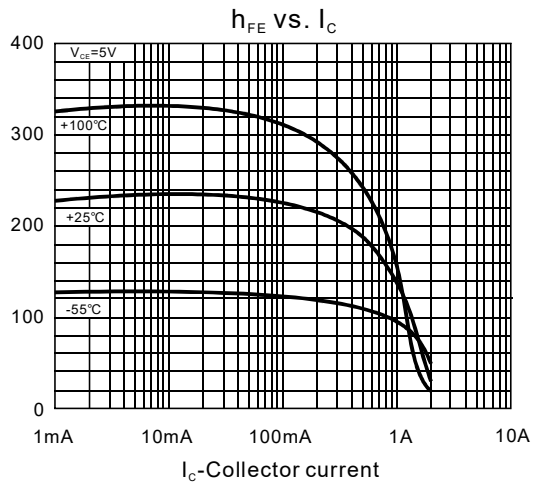
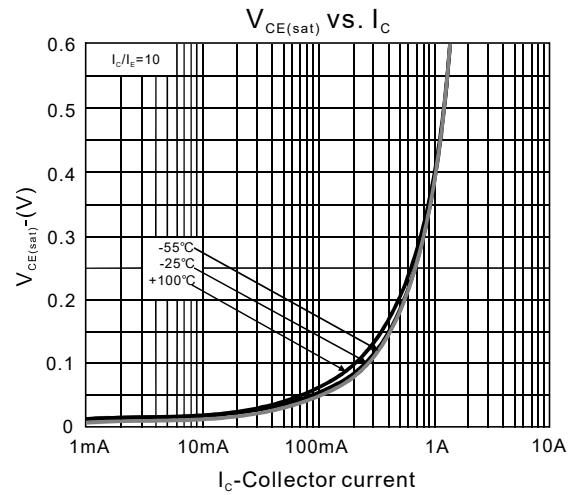
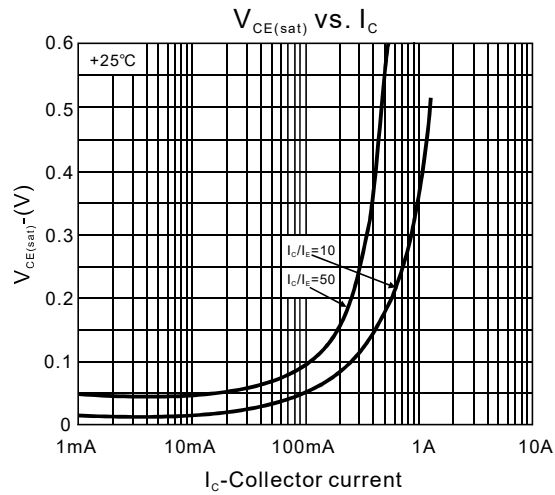
Maximum ratings (AT $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector to base voltage	$-V_{CBO}$	40	V
Collector to Emitter Voltage	$-V_{CEO}$	40	V
Emitter to base voltage	$-V_{EBO}$	5	V
Collector current	$-I_C$	1	A
Peak pulse current	$-I_{CM}$	2	A
Total power dissipation	P_D	200	mW
Junction temperature	T_J	+150	$^{\circ}\text{C}$
Storage temperature range	T_{STG}	-65 ~ +150	$^{\circ}\text{C}$

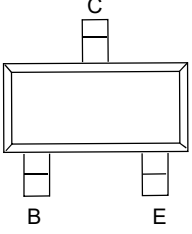
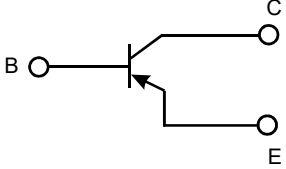
Electrical characteristics (AT $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector-base cut off current	$-V_{CB} = 30\text{V}$	$-I_{CBO}$			0.1	μA
Collector-emitter cut off current	$-V_{CE} = 30\text{V}$	$-I_{CEO}$			0.1	μA
Emitter-Base cut-off current	$-V_{EB}=5\text{V}$	$-I_{EBO}$			0.1	μA
Collector-emitter saturation voltage	$-I_C=100\text{mA}, -I_B=1\text{mA}$	$-V_{CE(SAT)}$			0.2	V
	$-I_C=500\text{mA}, -I_B=20\text{mA}$				0.35	
	$-I_C=1\text{A}, -I_B=100\text{mA}$				0.5	
Base-emitter saturation voltage	$-I_C=1\text{A}, -I_B=50\text{mA}$	$-V_{BE(SAT)}$			1.1	V
Base-emitter voltage	$-I_C=1\text{A}, -V_{CE}=5\text{V}$	$-V_{BE}$			1	V
DC current gain	$-V_{CE}=5\text{V}, -I_C=1\text{mA}$	h_{FE}	300			
	$-V_{CE}=5\text{V}, -I_C=100\text{mA}$		300		800	
	$-V_{CE}=5\text{V}, -I_C=500\text{mA}$		250			
	$-V_{CE}=5\text{V}, -I_C=1\text{A}$		160			
Collector capacitance	$-V_{CB}=10\text{V}, f=1\text{MHz}$	C_C			12	pF
Transition Frequency	$-V_{CE}=10\text{V}, -I_C=20\text{mA}, f=100\text{MHz}$	f_T	200			MHz

Rating and characteristic curves (FMBT591A)

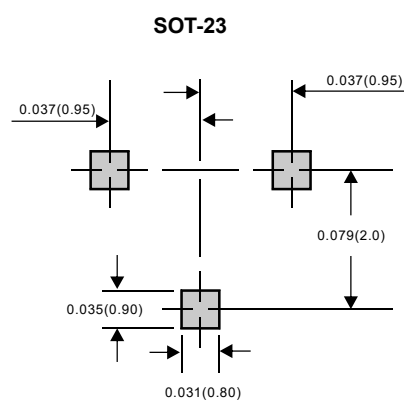


FMBT591A**Pinning information**

Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

Marking

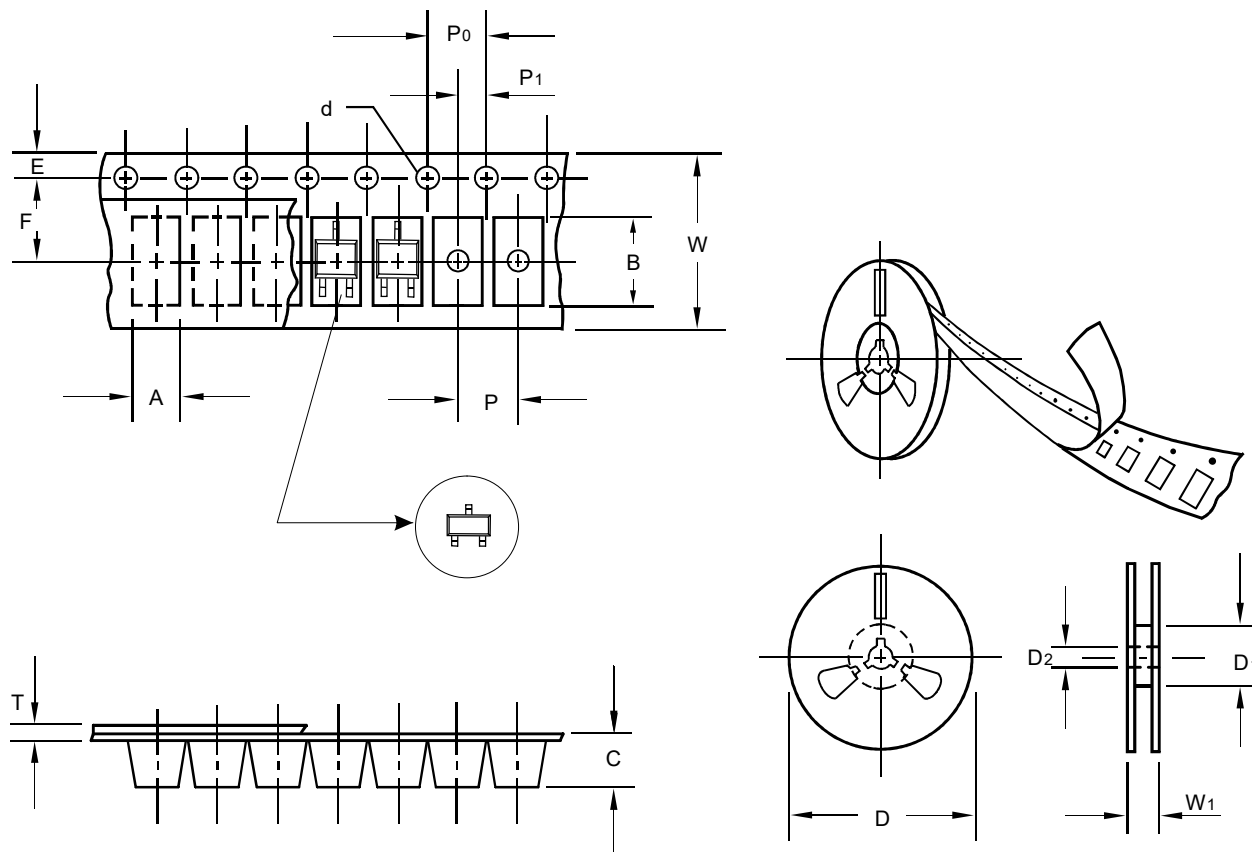
Type Number	Marking Code
FMBT591A	591A

Suggested solder pad layout

Dimensions in inches and (millimeters)

FMBT591A

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	54.40
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.

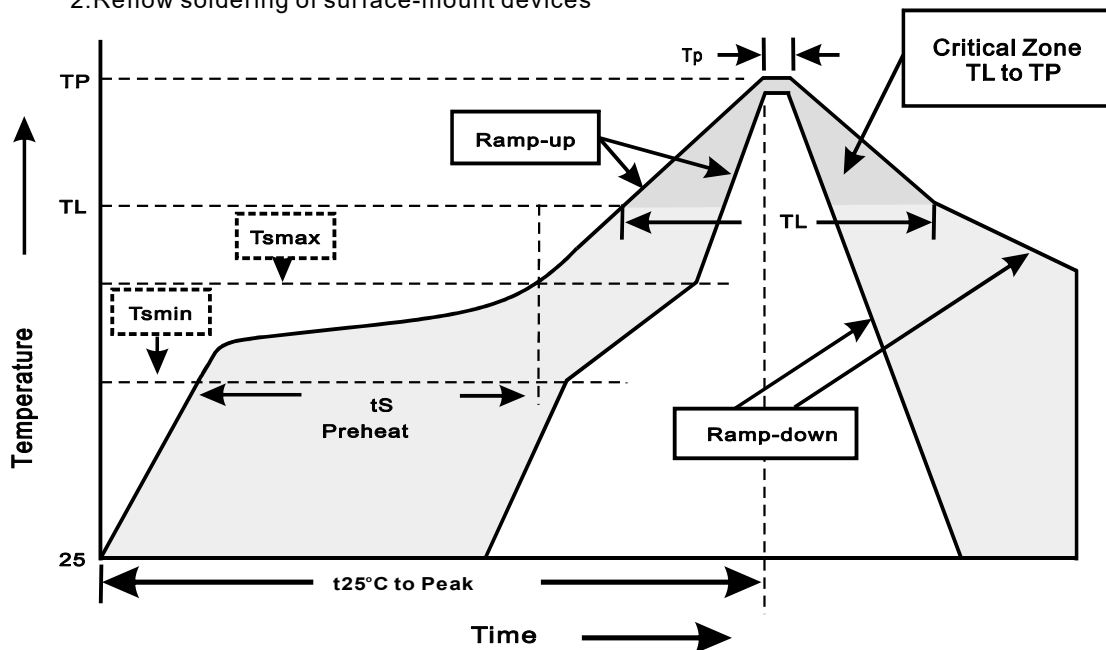
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Reel packing

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-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

- Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 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