

FMBTS9014

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FMBTS9014

100mA, 45V NPN Silicon Epitaxial Planer Transistor

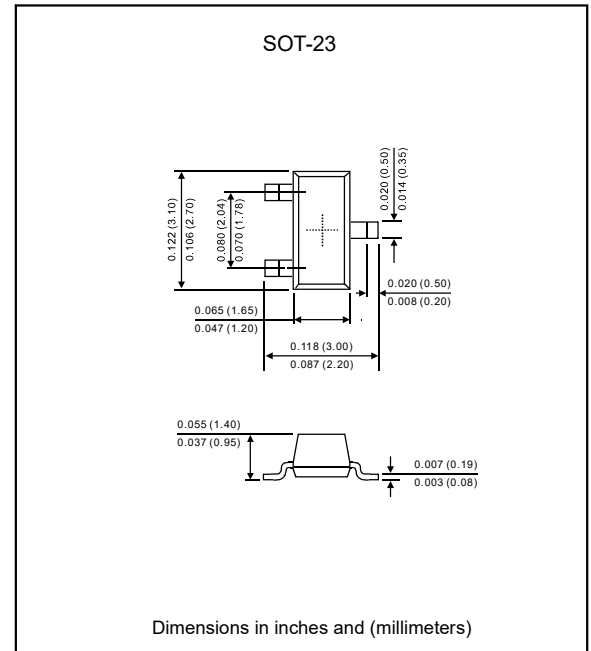
Features

- $V_{CE}=45V$, $I_C=100mA$.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" dinicates Halogen-free part, ex.FMBTS9014-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 $T_A=25^{\circ}C$ unless otherwise noted)

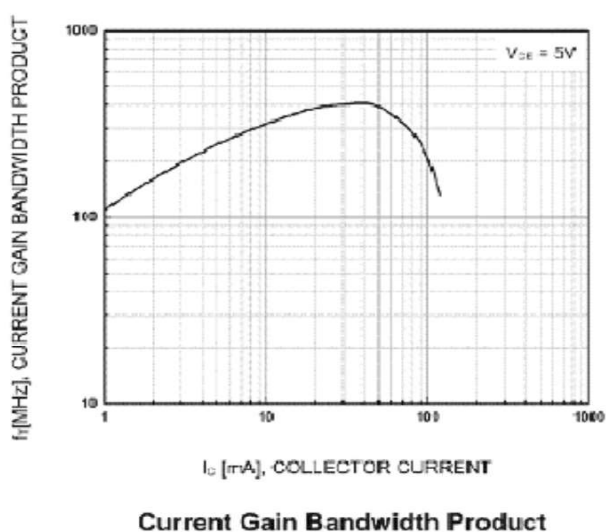
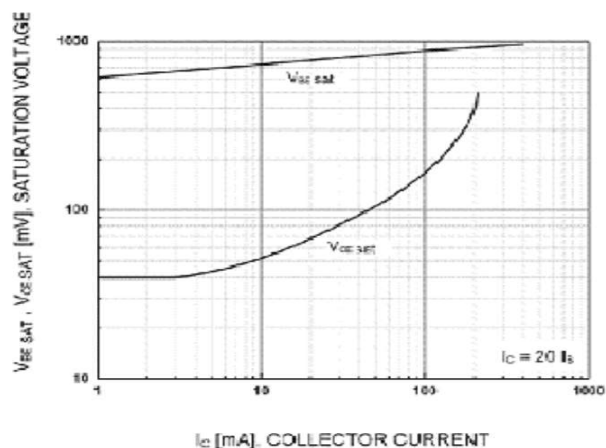
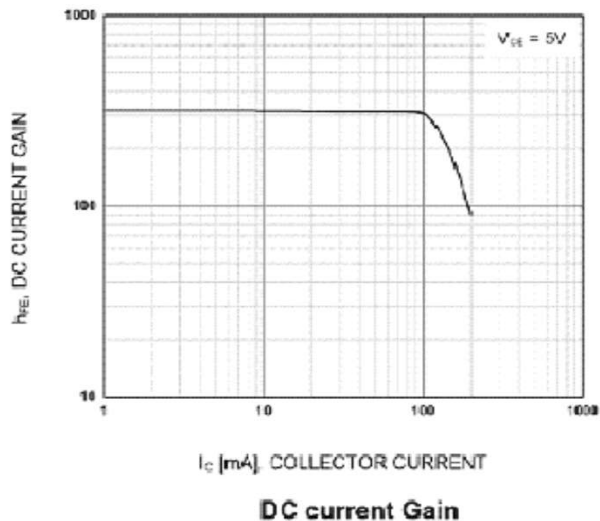
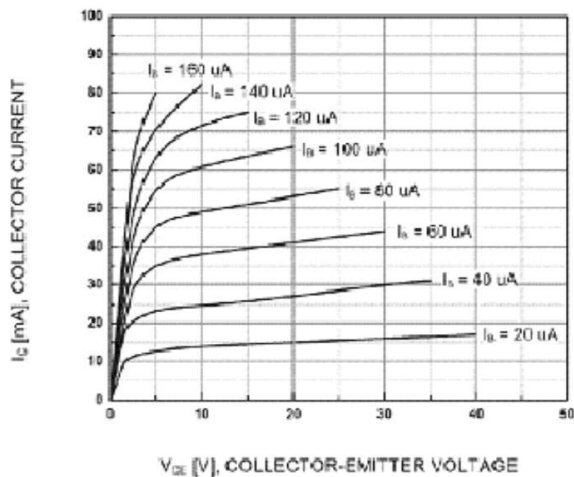
Parameter	Symbol	Value	Unit
Collector to base voltage	V_{CBO}	50	V
Collector to Emitter Voltage	V_{CEO}	45	V
Emitter to base voltage	V_{EBO}	5	V
Collector current	I_C	100	mA
Power dissipation	P_C	200	mW
Junction temperature	T_j	+150	$^{\circ}C$
Storage temperature	T_{STG}	-55 ~ +150	$^{\circ}C$

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

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector base breakdown voltage	$I_C = 100\mu A$, $I_E = 0$	$V_{(BR)CBO}$	50			V
Collector emitter breakdown voltage	$I_C = 100\mu A$, $I_B = 0$	$V_{(BR)CEO}$	45			V
Emitter base breakdown voltage	$I_E = 100\mu A$, $I_C = 0$	$V_{(BR)EBO}$	5			V
Collector-base cut-off current	$V_{CB} = 50V$, $I_E = 0$	I_{CBO}			100	nA
Collector-emitter cut-off current	$V_{CE} = 35V$, $I_B = 0$	I_{CEO}			100	nA
Emitter-base cut-off current	$V_{EB} = 3V$, $I_C = 0$	I_{EBO}			100	nA
DC Current gain	$V_{CE} = 5V$, $I_C = 1mA$	h_{FE}	200		450	
Collector-Emitter saturation voltage	$I_C = 100mA$, $I_B = 5mA$	$V_{CE(sat)}$			0.3	V
Base-emitter saturation voltage	$I_C = 100mA$, $I_B = 5mA$	$V_{BE(sat)}$			1.0	V
Current gain bandwidth product	$V_{CE} = 5V$, $I_C = 10mA$, $f = 30MHz$	f_T	150			MHz

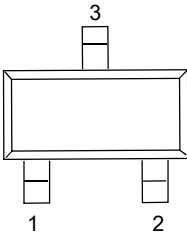
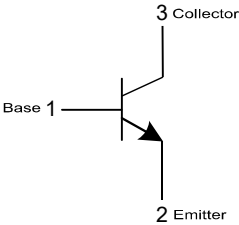
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Rating and characteristic curves



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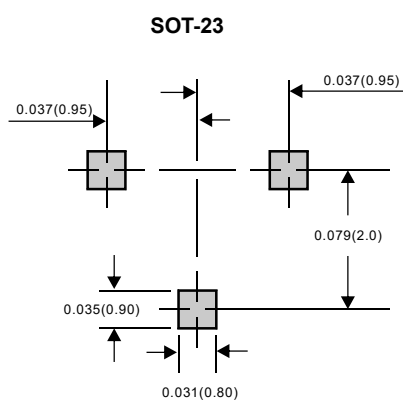
Pinning information

Pin	Simplified outline	Symbol
Pin1 Base Pin2 Emitter Pin3 Collector		

Marking and resistor values

Type Number	Marking Code
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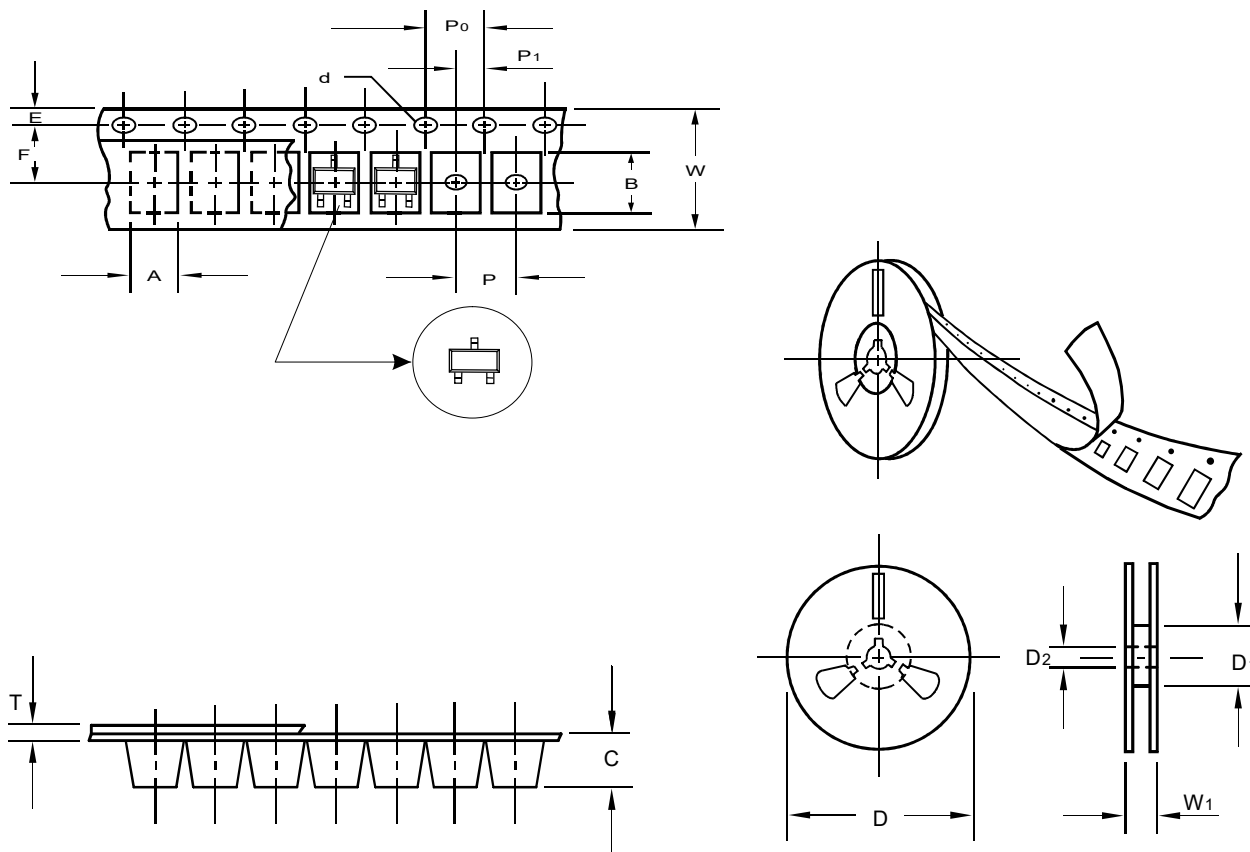
Suggested solder pad layout



Dimensions in inches and (millimeters)

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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.

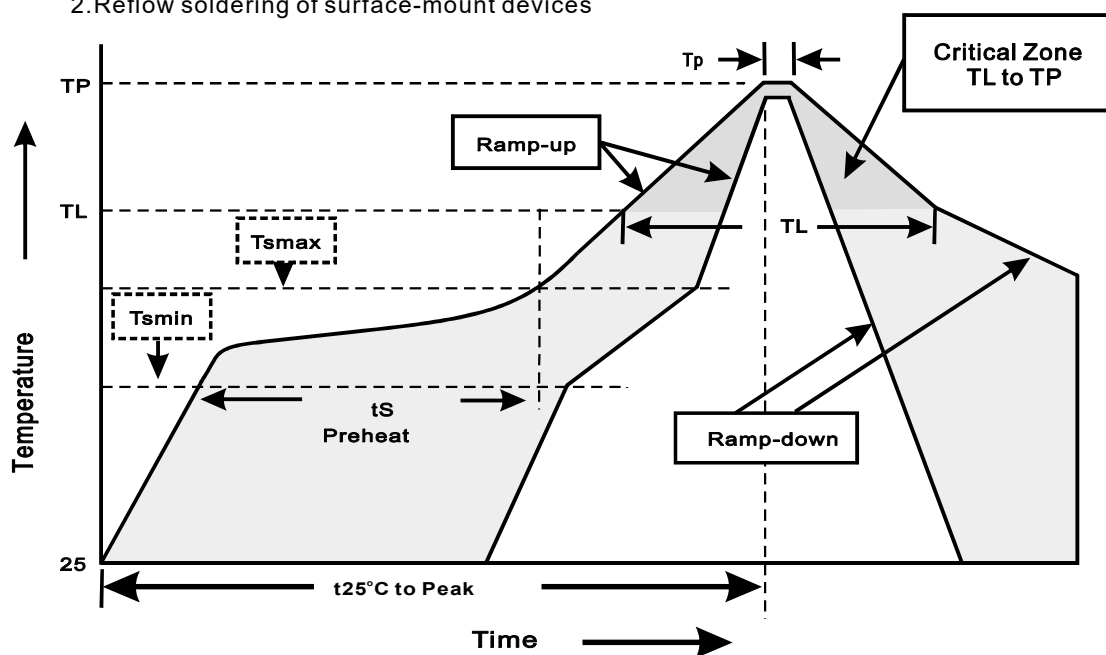
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Reel packing

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

- 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