FMBTC945

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FMBTC945

NPN Plastic-Encapsulate Transistor

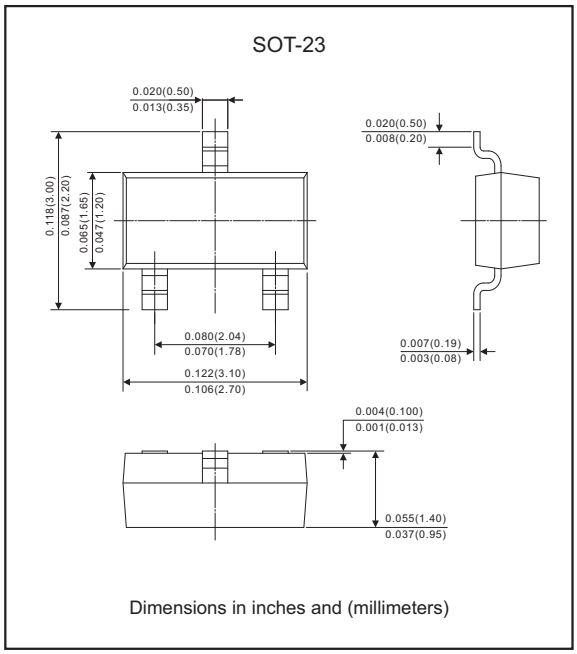
Features

- Excellent h_{FE} linearity
- Low noise
- Lead-free parts meet RoHS requirements
- Suffix "-H" dinicates Halogen-free part, ex.FMBTC945-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



Dimensions in inches and (millimeters)

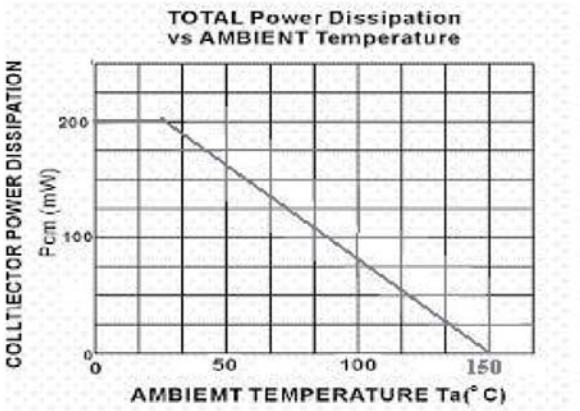
Maximum ratings (At T_A=25°C unless otherwise noted)

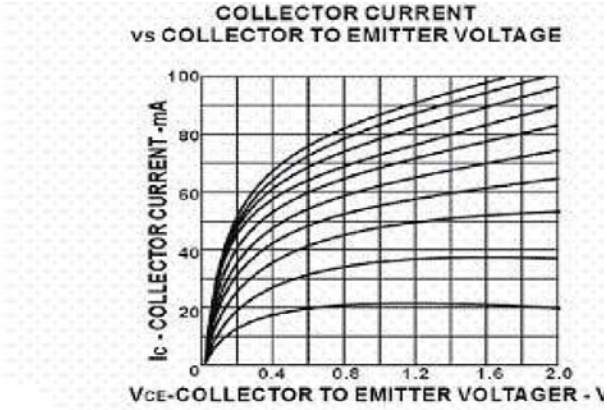
Parameter	Symbol	Value	Unit
Collector to base voltage	V_{CBO}	60	V
Collector emitter voltage	V_{CEO}	50	V
Emitter to base voltage	V_{EBO}	5	V
Collector current -continuous	I_C	150	mA
Total power dissipation	P_C	200	mW
Junction temperature	T_J	+150	℃
Storage temperature range	T_{STG}	-55 ~ +150	℃

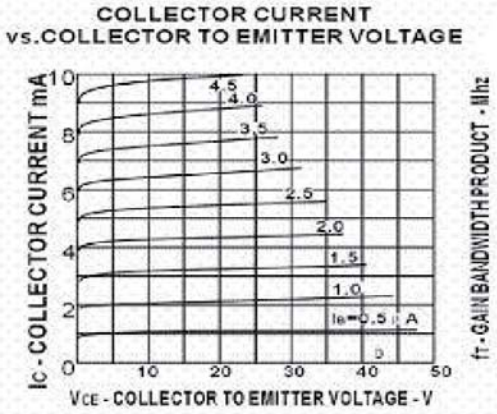
Electrical characteristics (At T_A=25°C unless otherwise noted)

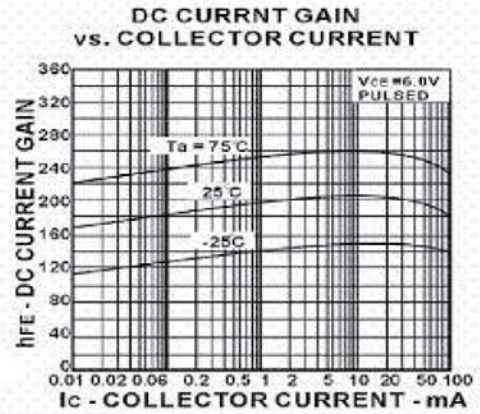
Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector to base breakdown voltage	I_C=100μA, I_E=0	BV_{CBO}	60			V
Collector to emitter breakdown voltage	I_C=1mA, I_B=0	BV_{CEO}	50			V
Emitter to base breakdown voltage	I_E= 100μA, I_C=0V	BV_{EBO}	5			V
Collector-base cut-off current	V_{CB}=60V, I_E=0	I_{CBO}			0.1	μA
Collector-emitter cut-off current	V_{CE}=55V, I_B=0	I_{CEO}			0.1	μA
Emitter-base cut-off current	V_{EB}=5V, I_C=0	I_{EBO}			0.1	μA
DC current gain	V_{CE}=6V, I_C=1mA	$h_{FE(1)}$	200		400	
	V_{CE}=6V, I_C=0.1mA	$h_{FE(2)}$	40			
Collector-emitter saturation voltage	I_C=100mA, I_B=10mA	$V_{CE(set)}$			0.3	V
Base-emitter saturation voltage	I_C=100mA, I_B=10mA	$V_{BE(sat)}$			1.0	V
Transition frequency	V_{CE}=6V, I_C=10mA, f=30MHz	f_T	150			MHz
Collector output capacitance	V_{CB}=10V, I_E=0, f=1MHz	C_{ob}			3.0	pF
Noise figure	V_{CE}=6V, I_C=100μA, R_g=10KΩ, f=1KHz	NF		4	10	dB

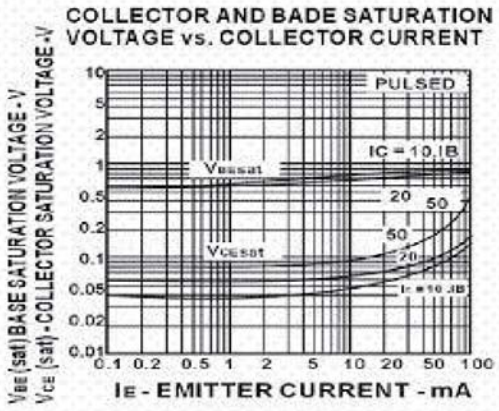
Rating and characteristic curves (FMBTC945)

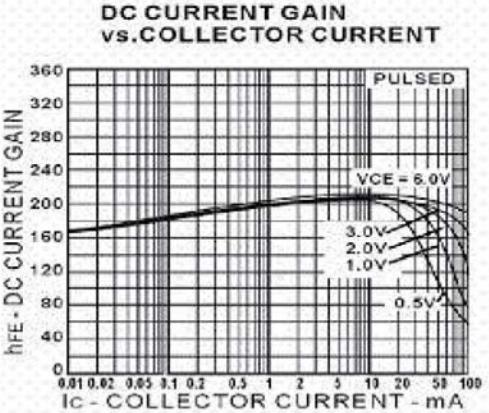






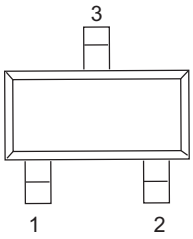
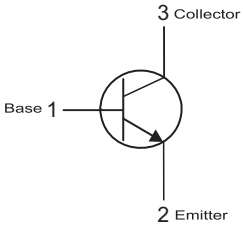






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Pinning information

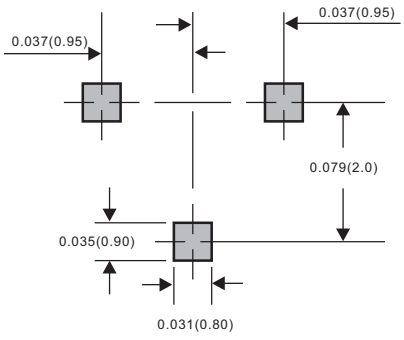
Pin	Simplified outline	Symbol
Pin1 BASE Pin2 EMITTER Pin3 COLLECTOR		

Marking and resistor values

Type Number	Marking Code
FMBTC945	CR

Suggested solder pad layout

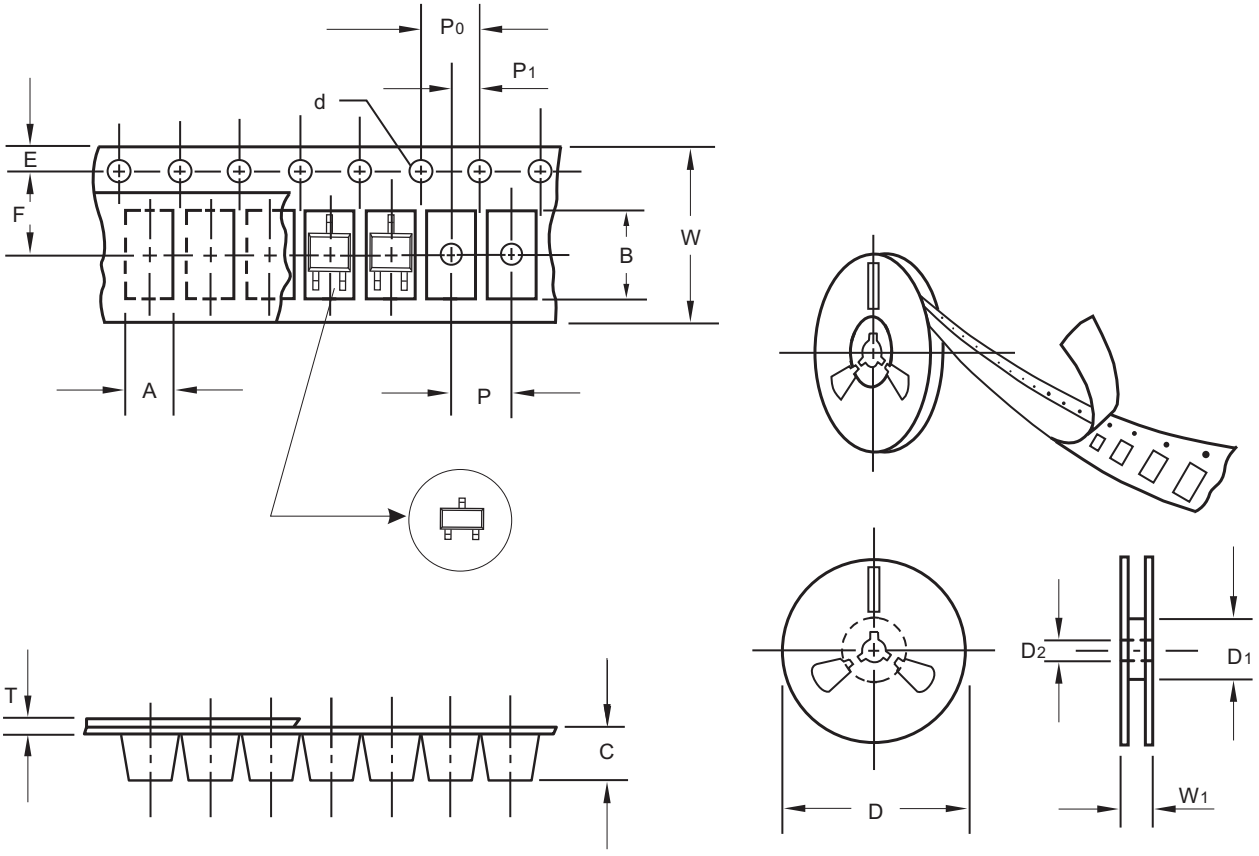
SOT-23



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	D_1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D_1	min	54.40
Feed hole diameter	D_2	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	P_0	0.1	4.00
Embossment center	P_1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W_1	1.0	11.40

Note:Devices are packed in accor dance with EIA standar RS-481-A and specifications listed above.

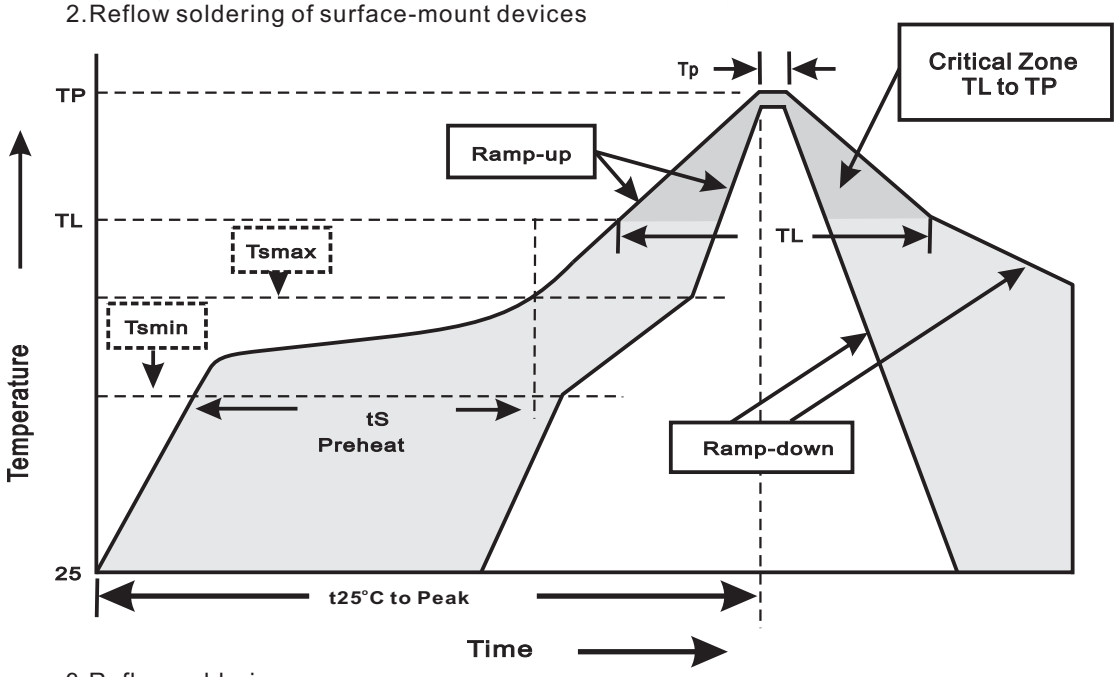
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Reel packing

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(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(t_s)	 150°C 200°C 60~120sec
Tsmax 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

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High reliability test capabilities

Item Test	Conditions
1. Steady State Operating Life	P_D=200mW Test Duration:1000hrs
2. High Temperature Reverse Bias	T_J=150℃, V_{CE}=80% related volage, 1000hrs
3. Temperature Cycle	-55℃(15min) to 150℃(15min)Air to Air Transition Time<20sec Test Cycles:1000cycle
4. Autoclave	P=2atm Ta=121℃ RH=100% Test Duration:96hrs
5. High Temperature Storage Life	Ta=150℃ Test Duration:1000hrs
6. Solderability	245℃,5sec
7. High Temperature High Humidity Reverse Bias	Ta=85℃, 85%RH, V_{CE}=80% related volage, 1000hrs
8. Resistance to Soldering Heat	260℃,10sec