FMBT2907AW

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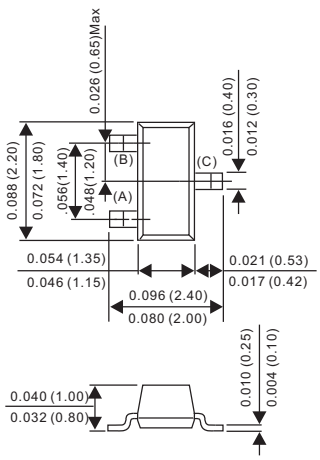
600mA General Purpose Transistor
PNP Silicon

Features

- High collector-emitter breakdown voltage (BV_{CEO} = -60V@I_C=-10mA)
- PNP silicon epitaxial planar transistor, is designed for general purpose and amplifier applications.
- Capable of 150mW power dissipation.
- Lead-free parts for green partner, exceeds environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen-free part, ex.FMBT2907AW-H.

Package outline

SOT-323



Dimensions in inches and (millimeters)

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-323
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.006 gram

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

PARAMETER	Symbol	FMBT2907AW	UNIT
Collector-emitter voltage	V_{CEO}	-60	V
Collector-base voltage	V_{CBO}	-60	V
Emitter-base voltage	V_{EBO}	-5.0	V
Collector current - continuous	I_C	-600	mA
Total device dissipation FR-5 board, (1) T_A= 25°C Thermal resistance junction to ambient	P_D $R_{\theta JA}$	150 833	mW °C/W
Operating junction temperature range	T_J	-55 to +150	°C
Storage temperature range	T_{STG}	-55 to +150	°C

1.FR-5 = 1.0 X 0.75 X0.062 in.

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

Off characteristics

PARAMETER	CONDITIONS	Symbol	Min.	Max.	UNIT
Collector-base breakdown voltage	I_c = -10uA, I_E = 0	$V_{(BR)CBO}$	-60		V
Collector-emitter breakdown voltage (3)	I_c = -10mA, I_B = 0	$V_{(BR)CEO}$	-60		V
Emitter-base breakdown voltage	I_E = -10uA, I_C = 0	$V_{(BR)EBO}$	-5.0		V
Collector cutoff current	V_{CE} = -30Vdc, $V_{EB(off)}$ = -0.5Vdc	I_{CEX}		-50	nA
Base cutoff current	V_{CE} = -30Vdc, $V_{EB(off)}$ = -0.5Vdc	I_{BL}		-50	

On characteristics (3)

PARAMETER	CONDITIONS	Symbol	Min.	Max.	UNIT
Dc current gain	I_c = -0.1mA, V_{CE} = -10V	h_{FE}	75		
	I_c = -1.0mA, V_{CE} = -10V		100		
	I_c = -10mA, V_{CE} = -10V		100		
	I_c = -150mA, V_{CE} = -10V		100	300	
	I_c = -500mA, V_{CE} = -10V		50		
Collector-emitter Saturation voltage	I_c = -150mA, I_B = -15mA	$V_{CE(sat)}$		-0.4	V
	I_c = -500mA, I_B = -50mA			-1.6	
Base-emitter Saturation voltage	I_c = 150mA, I_B = -15mA	$V_{BE(sat)}$		-1.3	V
	I_c = 500mA, I_B = -50mA			-2.6	

Small-signal characteristics

PARAMETER	CONDITIONS	Symbol	Min.	Max.	UNIT
Current-gain-bandwidth product (4)	I_C = -50mA, V_{CE} = -20V, f = 100MHz	f_T	200		MHz
Output capacitance	V_{CB} = -10V, I_E = 0, f = 1.0MHz	C_{obo}		8.0	pF
Input capacitance	V_{EB} = -2V, I_C = 0, f = 1.0MHz	C_{ibo}		30	pF

3. Pulse test: pulse width≦300μs, duty cycle ≦ 2.0%
4. f_T is defined as the frequency at which h_{fe} extrapolates to unity.

Switching characteristics

PARAMETER	CONDITIONS	Symbol	Min.	Max.	UNIT
Turn-on time	V_{CC} = -30V, I_C = -150mA, I_{B1} = -15mA	t_{on}		45	ns
Delay time		t_d		10	
Rise time		t_r		40	
Turn-out time	V_{CC} = -6V, I_C = -150mA, I_{B1} =I_{B2}= -15mA	t_{off}		280	
Storage time		t_s		225	
Fall time		t_f		60	

Rating and characteristic curves (FMBT2907AW)

Switching time equivalent test circuits

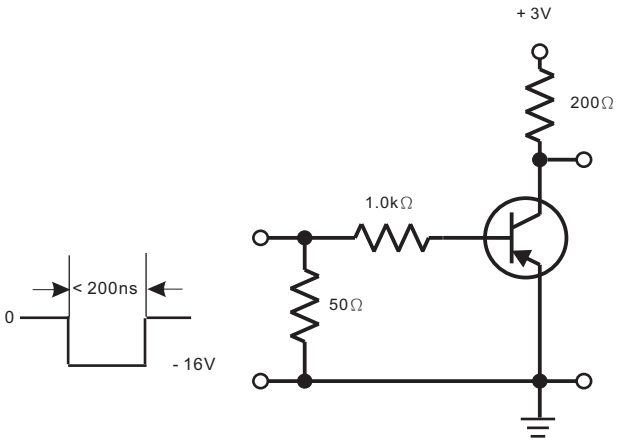


Fig 1. Saturated Turn-On Switching Time

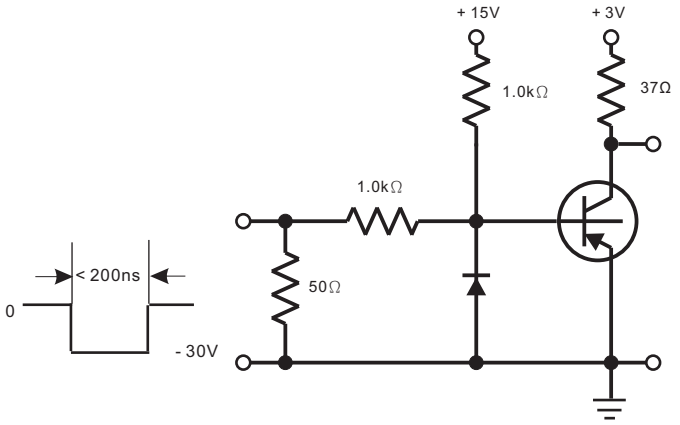


Fig 2.Saturated Turn-Off Switching Time

FIG.3-Typical Pulsed Current Gain vs Collect Current

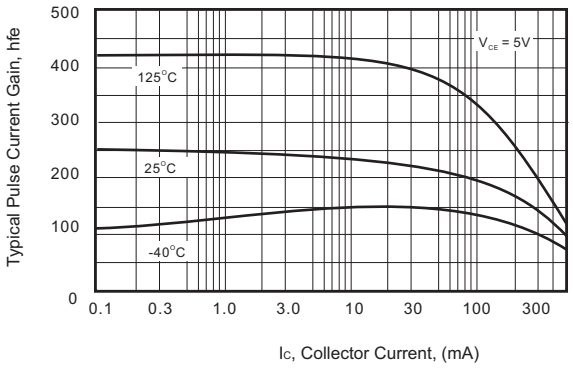


FIG.4-Collect-Emitter Saturation Voltage vs Collect Current

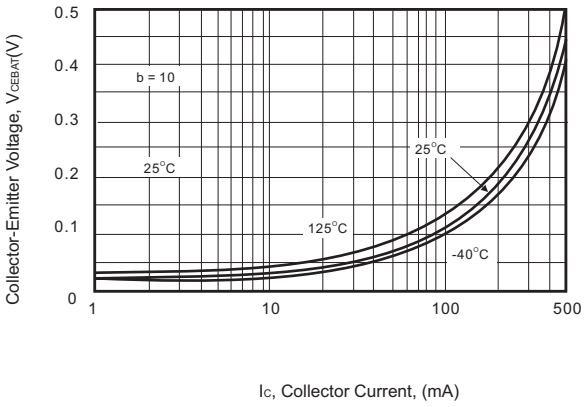


FIG.5-Base-Emitter Saturation Voltage vs Collector Current

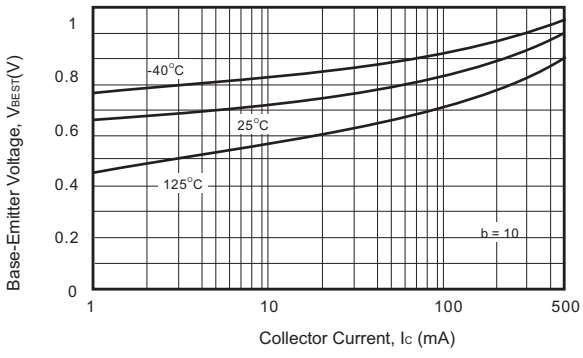
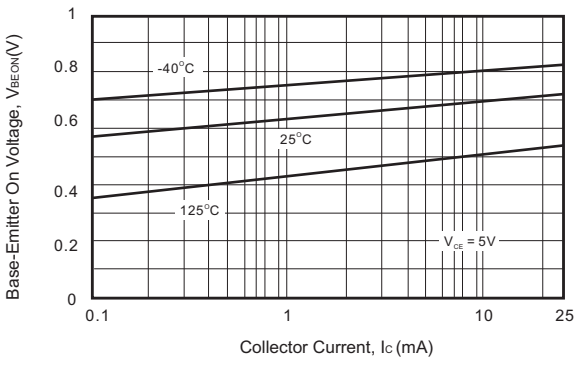


FIG.6-Base-Emitter On Voltage vs Colltector Current



Rating and characteristic curves (FMBT2907AW)

FIG.7-Collect Cutoff Current vs Ambient Temperature

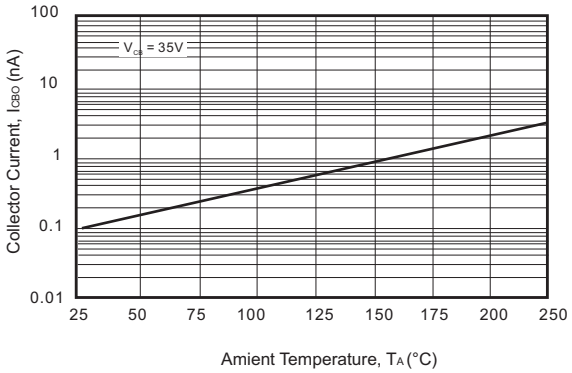


FIG.8-Input & Output Capacitance vs Reverse Bias Voltage

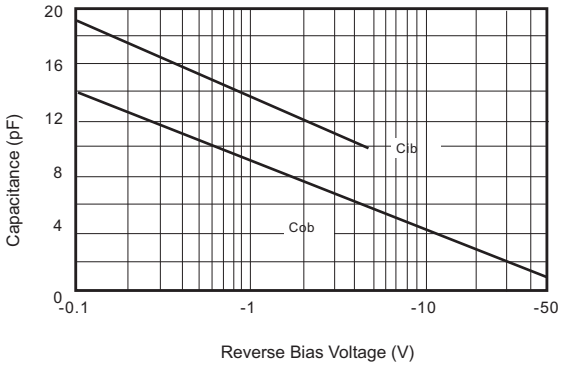


FIG.9-Switching Times vs Collector Current

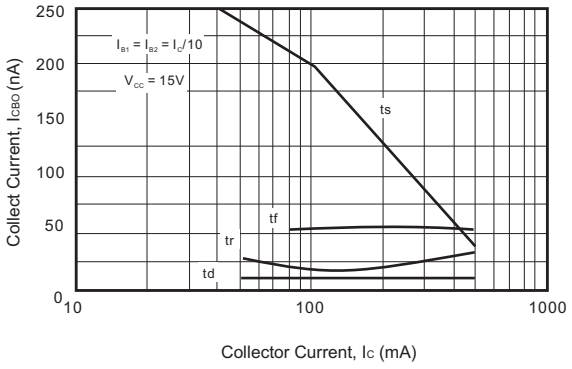


FIG.10-Turn On and Turn Off Times vs Collector Current

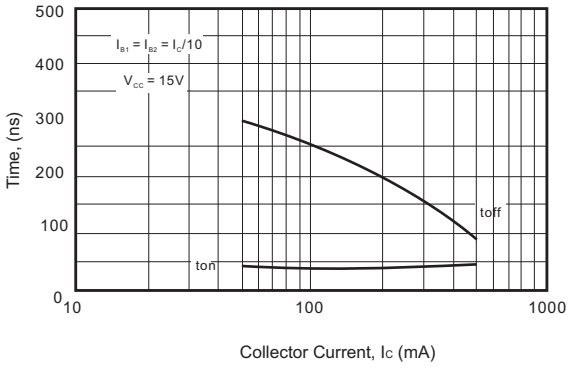
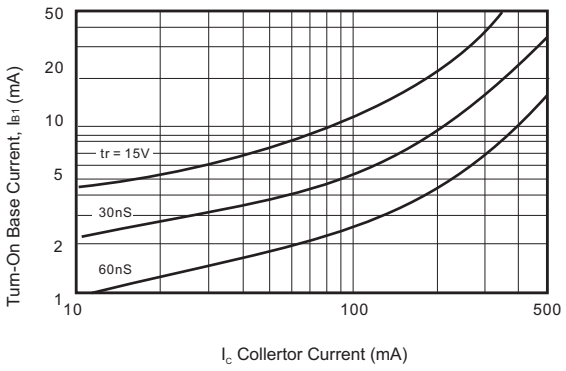
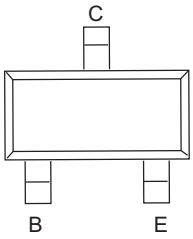
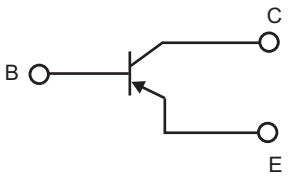


FIG. 11-Rise Time vs Collector & Turn On Base Current



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Pinning information

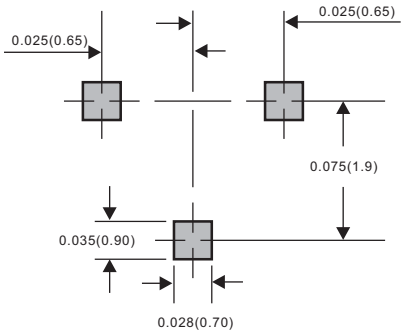
Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

Marking

Type number	Marking code
FMBT2907AW	20

Suggested solder pad layout

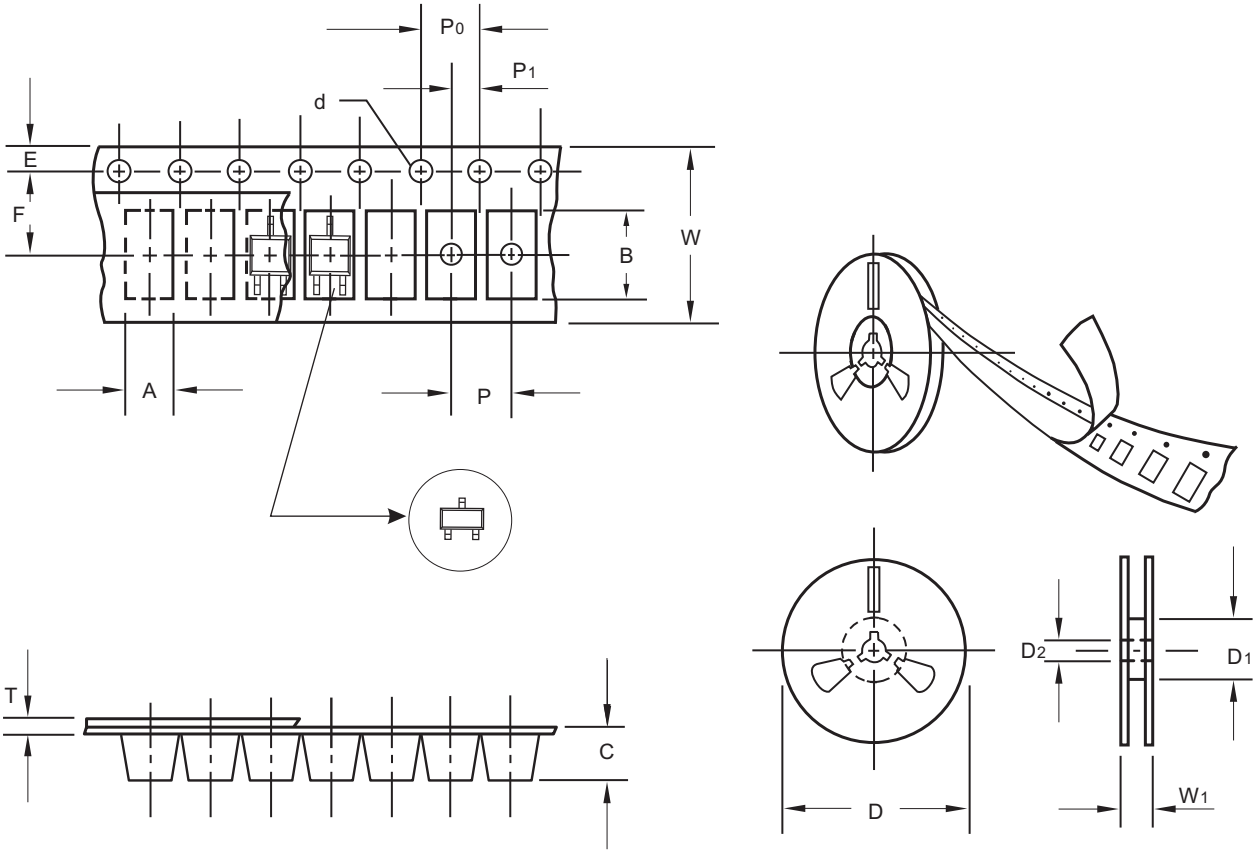
SOT-323



Dimensions in inches and (millimeters)

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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	1.19
Sprocket hole	d	0.1	1.55
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	12.30

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

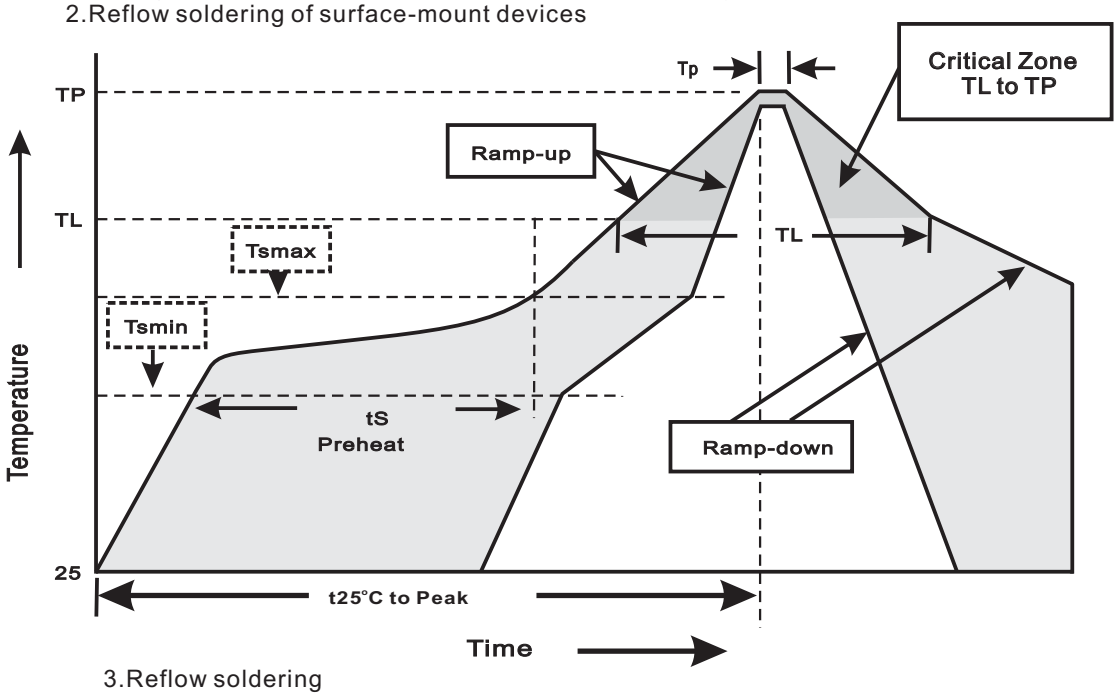
FMBT2907AW

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-323	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	9.5

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=150mW Test Duration:1000hrs
2. High Temperature Reverse Bias	Tj=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