FMBT491A-Q1

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FMBT491A-Q1

NPN Plastic-Encapsulate Transistor

Features

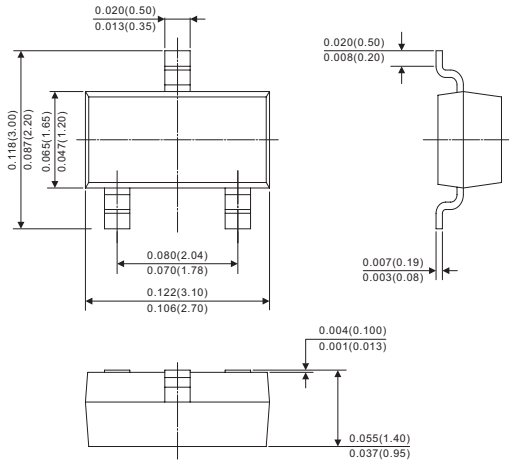
- Switching transistor.
- Lead-free parts meet RoHS requirements.
- Qualified to AEC-Q101 standards for high reliability.
- Suffix "-H" dinicates Halogen-free part, ex.FMBT491A-Q1-H.

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

SOT-23



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}	40	V
Collector to Emitter Voltage	V_{CEO}	40	V
Emitter to base voltage	V_{EBO}	5	V
Collector current	I_C	1	A
	I_{CM}	2	A
Total power dissipation	P_C	200	mW
Junction temperature	T_j	+150	℃
Storage temperature	T_{STG}	-55 ~ +150	℃

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

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
DC Current gain	V_{CE} = 5V, I_C = 1mA	h_{FE}	300			
	V_{CE} = 5V, I_C = 500mA		300		900	
	V_{CE} = 5V, I_C = 1A		200			
Collector-base cut-off current	V_{CE} = 30V, I_E=0	I_{CBO}			100	nA
Collector-emitter cut-off current	V_{CE} = 30V, I_B=0	I_{EBO}			100	nA
Emitter-base cut-off current	V_{EB} = 4V	I_{EBO}			100	nA
Collector-Emitter saturation voltage	I_C = 500mA, I_B = 50mA	$V_{CE(set)}$			0.3	V
	I_C = 1A, I_B = 100mA				0.5	
Base-emitter voltage	I_C = 1A, V_{CE} = 5V	V_{BE}			1.1	V
Base-emitter saturation voltage	I_C=1A, I_B=100mA	$V_{BE(sat)}$			1.2	V
Collector output capacitance	V_{CB} =10V, f = 1MHz	C_{ob}			10	pF
Current gain bandwidth product	V_{CE} = 10V, I_C = 50mA, f = 100MHz	f_T		150		MHz

Rating and characteristic curves (FMBT491A-Q1)

Fig.1 IC - VBE(on)
at VCE= 5V, Ta= 25C

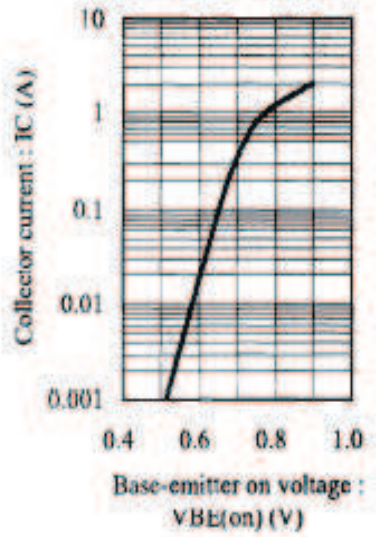


Fig.2 hFE - IC
at VCE= 5V, Ta= 25C

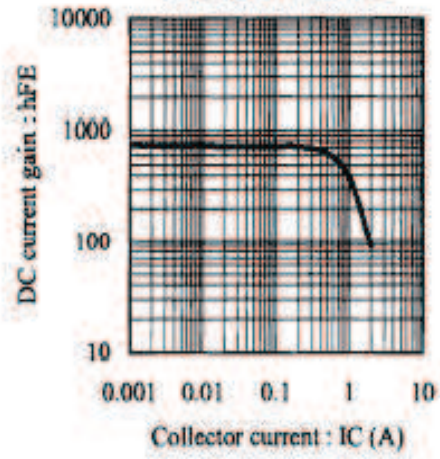


Fig.3 VCE(sat) - IC
at IC/IB= 10, Ta= 25C

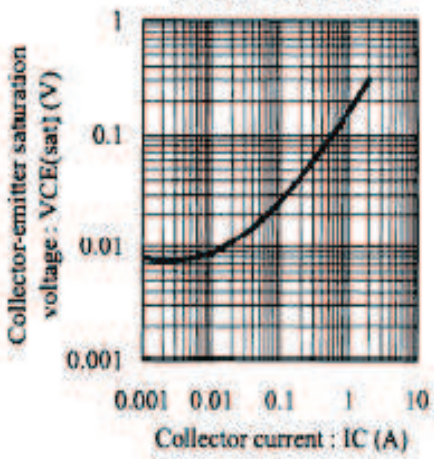


Fig.5 VBE(sat) - IC
at IC/IB= 10, Ta= 25C

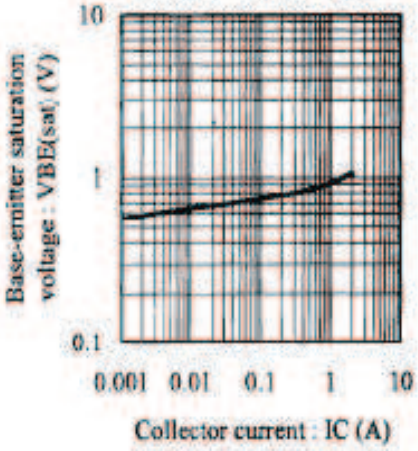


Fig.6 fT - IE
at VCE= 10V, Ta= 25C

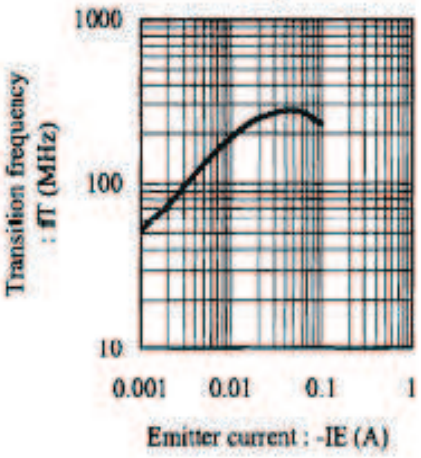


Fig.7 Cob - VCB
at f= 1MHz, Ta= 25C

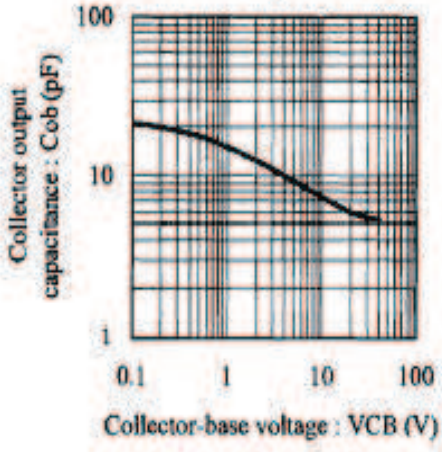
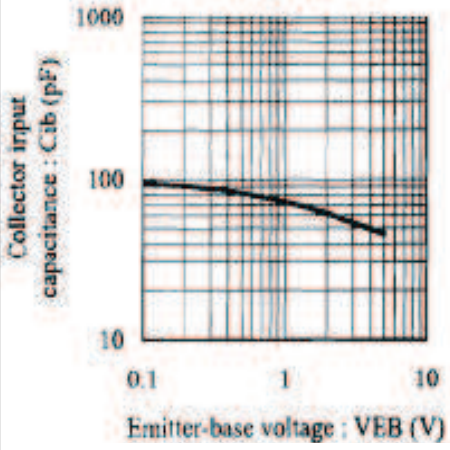
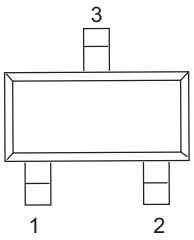
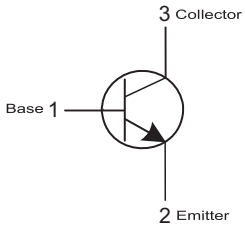


Fig.8 Cib - VEB
at f= 1MHz, Ta= 25C



Pinning information

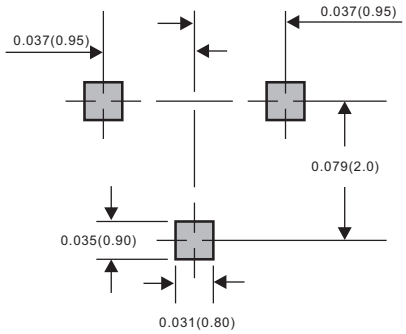
Pin	Simplified outline	Symbol
Pin1 BASE Pin2 EMITTER Pin3 COLLECTOR		

Marking

Type Number	Marking Code
FMBT491A-Q1	491

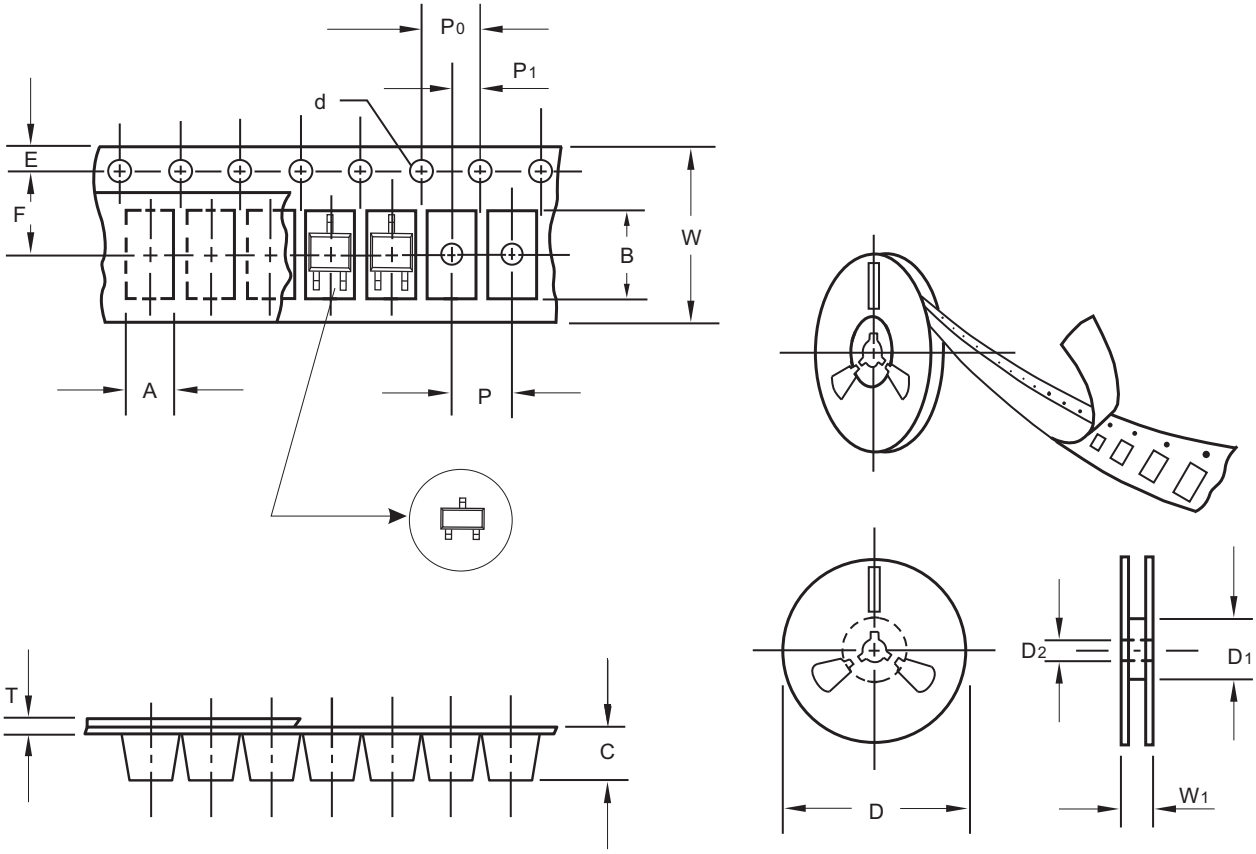
Suggested solder pad layout

SOT-23



Dimensions in inches and (millimeters)

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.

FMBT491A-Q1

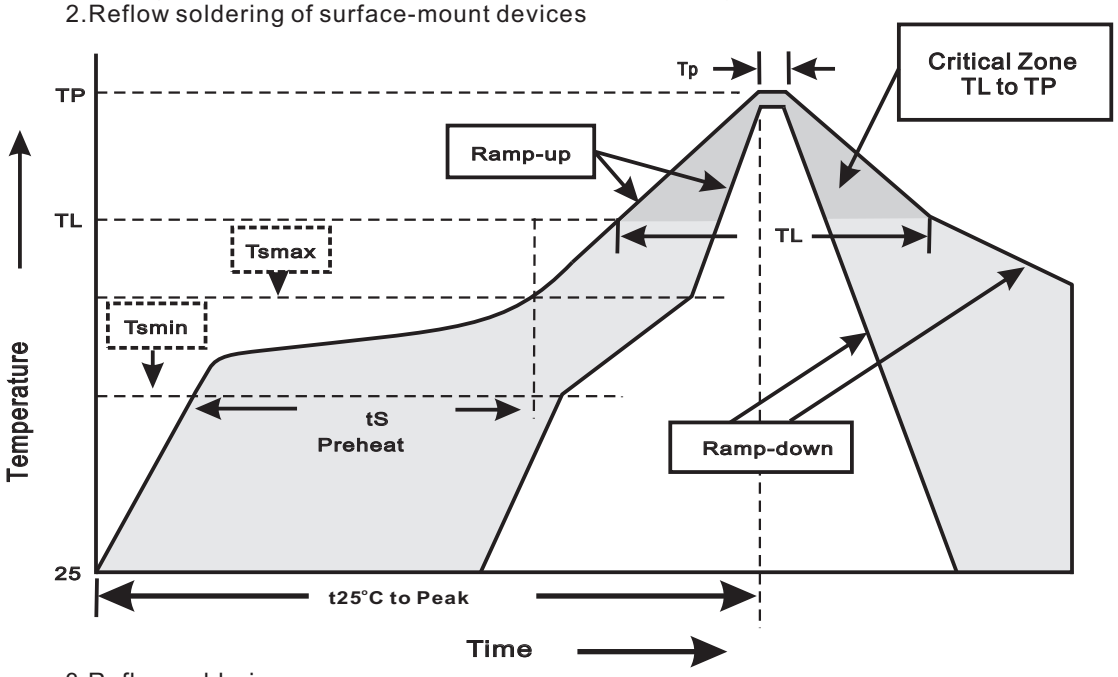
Reel packing

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