

FMBTA92-Q1 / FMBTA93-Q1**List**

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FMBTA92-Q1 / FMBTA93-Q1

High Voltage PNP Transistor

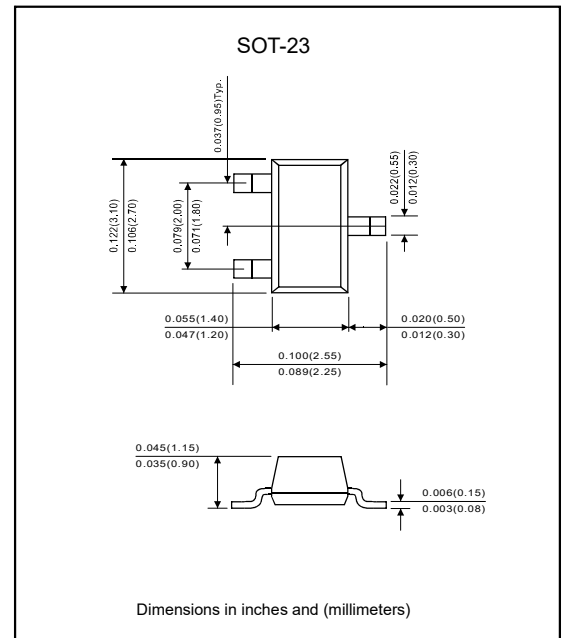
Features

- High voltage transistor.
- For Telephony or Professional communication equipment applications.
- Q1 for automotive and other applications requiring unique site and control change requirements AEC-Q101.
- Qualified and PPAP capable.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex. FMBTA92-Q1-H.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-23.
- Terminals : Solder plated, solder able 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	Ratings		Unit
		FMBTA92-Q1	FMBTA93-Q1	
Collector-base voltage	$-V_{CBO}$	300	200	V
Collector-emitter voltage	$-V_{CEO}$	300	200	V
Emitter-base voltage	$-V_{EBO}$	5.0		V
Collector current - Continuous	$-I_C$	200		mA
Collector current - Pulse	$-I_{CM}$	500		mA
Total device dissipation FR-5 board (T _A =25°C)	P _D	225		mW
Total device dissipation alumina board (T _A =25°C)		300		
Substrates FR-5 board (Derate above 25°C)		1.8		mW/°C
Substrates alumina board (Derate above 25°C)		2.4		
Thermal resistance junction to ambient - FR-5 board	R _{θJA}	556		°C/W
Thermal resistance junction to ambient - Alumina board		417		
Operating junction temperature range	T _J	-55 to +150		°C
Storage temperature range	T _{STG}	-55 to +150		°C

Note :

1. FR-5 = 1.0 X 0.75 X 0.062 in.

2. Alumina = 0.4 X 0.3 X 0.024 in. 99.5% alumina.

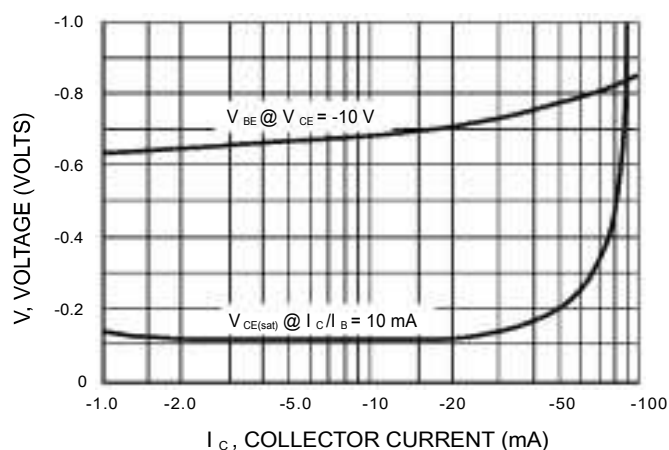
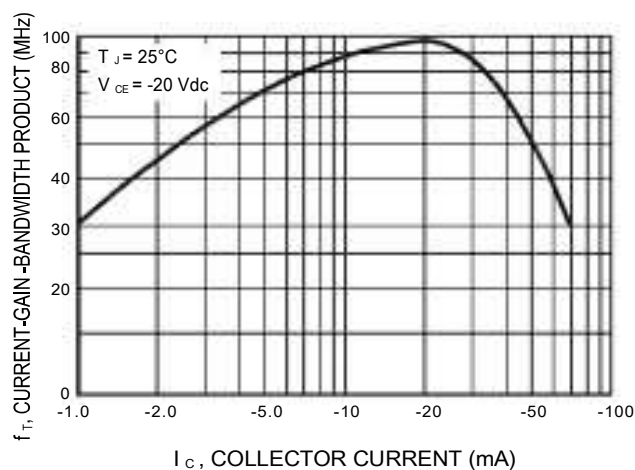
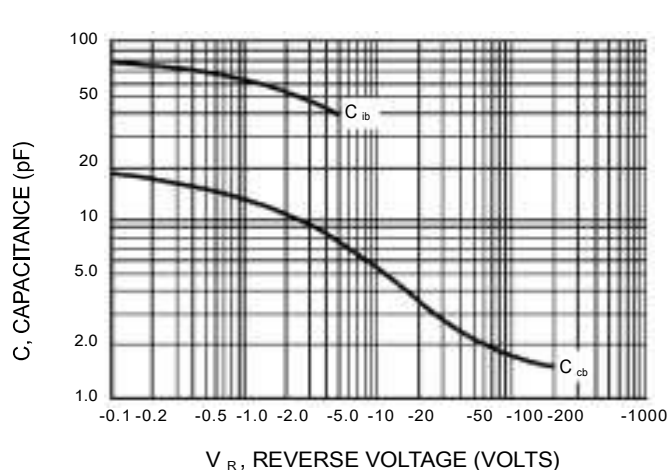
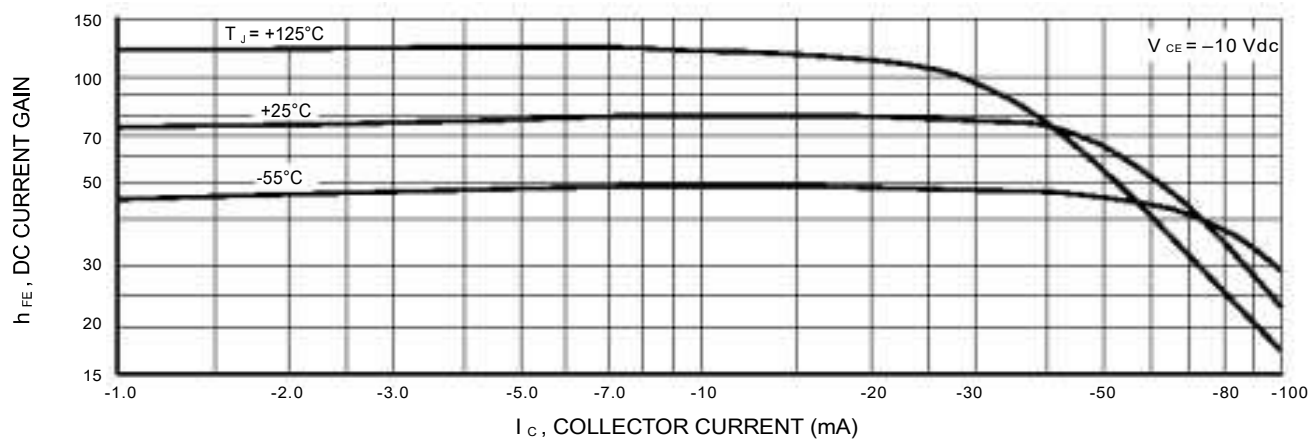
FMBTA92-Q1 / FMBTA93-Q1**Electrical characteristics** (AT $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Off characteristics						
Collector-Base breakdown voltage (FMBTA92) (FMBTA93)	$-I_C = 100\mu\text{A}, I_E = 0$	$-V_{(BR)CBO}$	300 200			V
Collector-Emitter breakdown voltage (FMBTA92) (FMBTA93)	$-I_C = 1.0\text{mA}, I_B = 0$	$-V_{(BR)CEO}$	300 200			V
Emitter-Base breakdown voltage	$-I_E = 100\mu\text{A}, I_C = 0$	$-V_{(BR)EBO}$	5			V
Collector Cutoff Current (FMBTA92) (FMBTA93)	$-V_{EB} = 6.0\text{V}, I_C = 0$ $-V_{EB} = 5.0\text{V}, I_C = 0$	$-I_{EBO}$			0.1 100	μA
Collector - base cut of current (FMBTA92) (FMBTA93)	$-V_{CB} = 200\text{V}, I_E = 0$ $-V_{CB} = 300\text{V}, I_E = 0$	$-I_{CBO}$			0.25 100	μA
On characteristics						
DC current gain	$-I_C = 1.0\text{mA}, -V_{CE} = 10\text{V}$ $-I_C = 10\text{mA}, -V_{CE} = 10\text{V}$ $-I_C = 30\text{mA}, -V_{CE} = 10\text{V}$	h_{FE}	60 100 60	200		
Collector-emitter saturation voltage (FMBTA92) (FMBTA93)	$-I_C=20\text{mA}, -I_B=2.0\text{mA}$	$-V_{CE(sat)}$			0.2 0.5	V
Base - emitter saturation voltage	$-I_C=20\text{mA}, -I_B=2.0\text{mA}$	$-V_{BE(sat)}$			0.9	V
Small signal characteristics						
Current gain bandwidth product	$-I_C=10\text{mA}, -V_{CE}=20\text{V}, f=100\text{MHz}$	f_T	50			MHz
Collector - base capacitance (FMBTA92) (FMBTA93)	$I_E=0, -V_{CB}=20, f=1.0\text{MHz}$	C_{cb}			6.0 8.0	pF

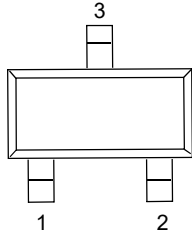
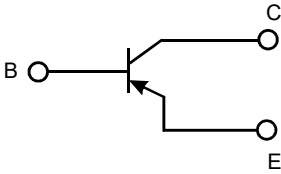
3. Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2.0\%$

FMBTA92-Q1 / FMBTA93-Q1

Rating and characteristic curves

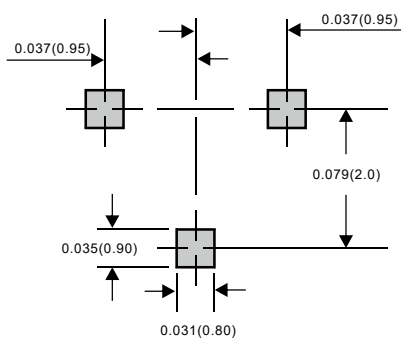


FMBTA92-Q1 / FMBTA93-Q1**Pinning information**

Pin	Simplified outline	Symbol
Pin1 Base		
Pin2 Emitter		
Pin3 Collector		

Marking

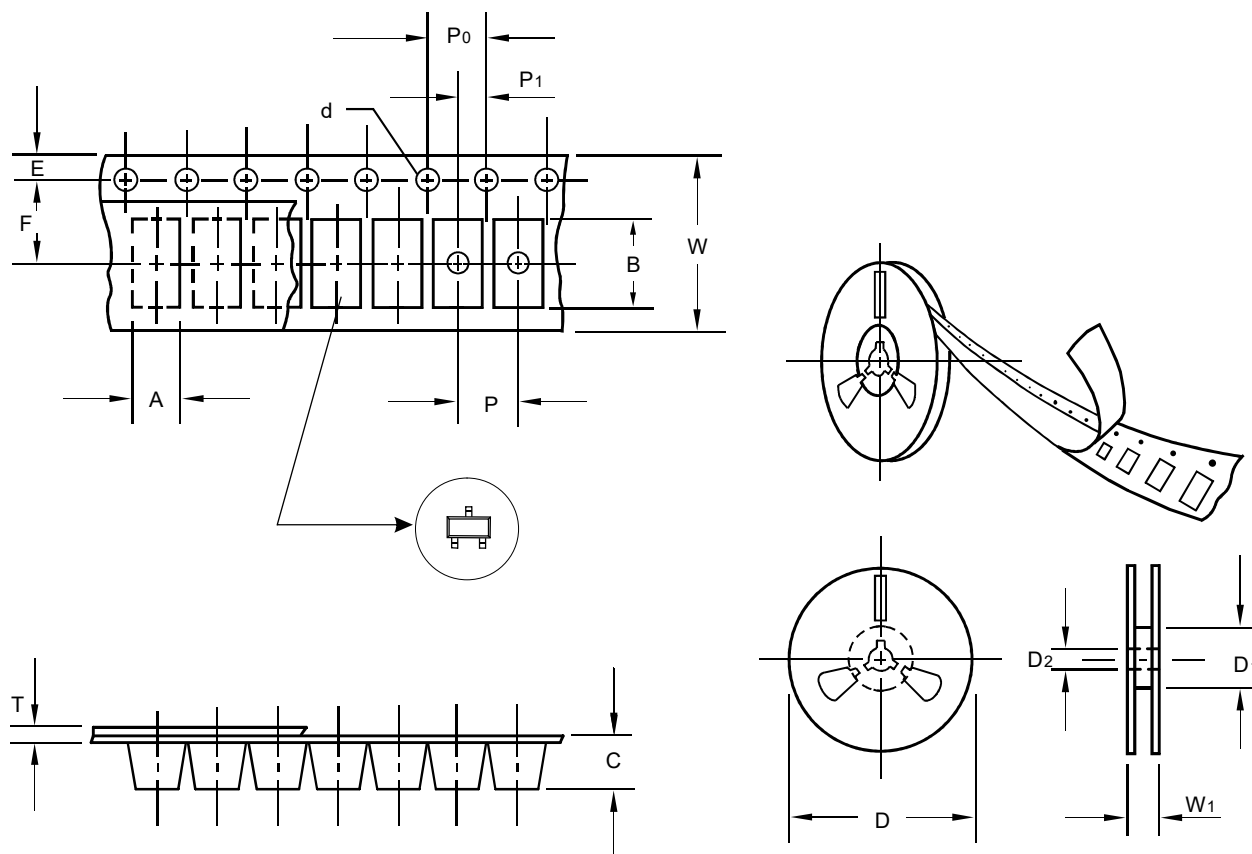
Type number	Marking code
FMBTA92-Q1	2D
FMBTA93-Q1	2E

Suggested solder pad layout**SOT-23**

Dimensions in inches and (millimeters)

FMBTA92-Q1 / FMBTA93-Q1

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	55.00
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	12.0

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

FMBTA92-Q1 / FMBTA93-Q1

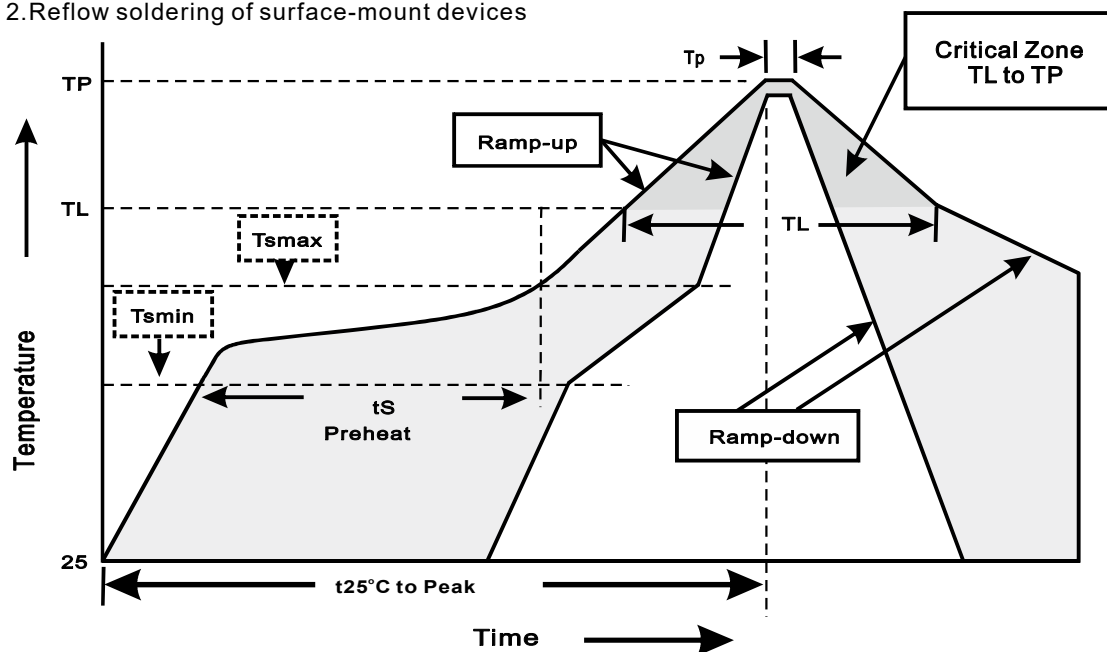
Reel packing

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*183*123	178	382*262*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)	$< 3^\circ\text{C/sec}$
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	$< 3^\circ\text{C/sec}$
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	$< 6^\circ\text{C/sec}$
Time 25°C to Peak Temperature	$< 6\text{minutes}$

FMBTA92-Q1 / FMBTA93-Q1

High reliability test capabilities

Item Test	Conditions
1. Steady State Operating Life	TA=25°C P _o =225mW Test Duration:1000hrs
2. High Temperature Reverse Bias	Tj=150°C, V _{CE} =80% related volage, Test Duration:1000hrs
3. Temperature Cycle	-55°C(15min) to 150°C(15min)Air to Air Transition Time<20sec Test Cycles:1000cycle
4. Autoclave	P=2atm Ta=121°C RH=100% Test Duration:96hrs
5. High Temperature Storage Life	Ta=150°C Test Duration:1000hrs
6. Solder ability	245°C,Test Duration:5sec
7. High Temperature High Humidity Reverse Bias	Ta=85°C, 85%RH, V _{CE} =80% related volage, Test Duration:1000hrs
8. Resistance to Soldering Heat	260°C,Test Duration:10sec