

FMBT2222AW-Q1

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FMBT2222AW-Q1

40V, 600mA Silicon NPN Epitaxial Planar Transistor

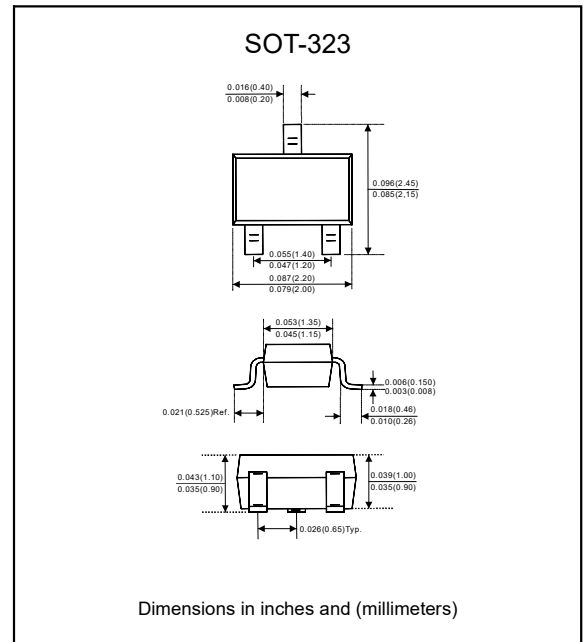
Features

- High collector-emitter breakdown voltage ($BV_{CEO} = 40V @ I_C = 10mA$).
- Small load switch transistor with high gain and low saturation voltage, is designed for general purpose amplifier and switching applications at collector current.
- Capable of 150mW power dissipation.
- -Q1 for automotive and other applications requiring unique site and control change requirements; AEC-Q101 qualified and PPAP capable.
- Lead-free parts for green partner, exceeds environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen-free part, ex.FMBT2222AW-Q1-H.

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

Package outline



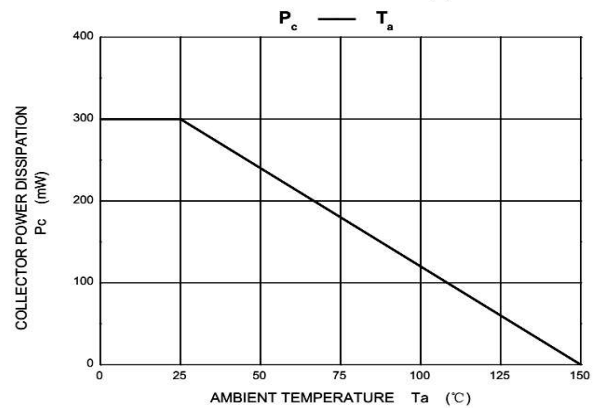
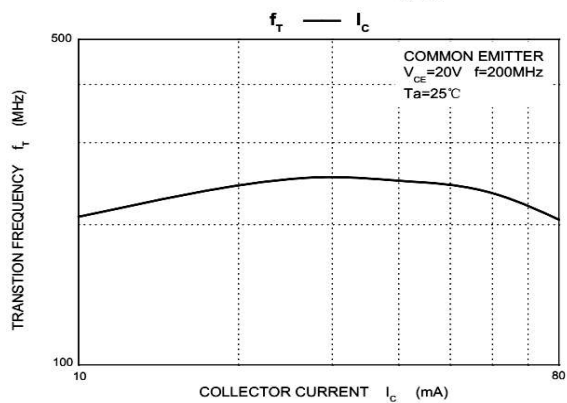
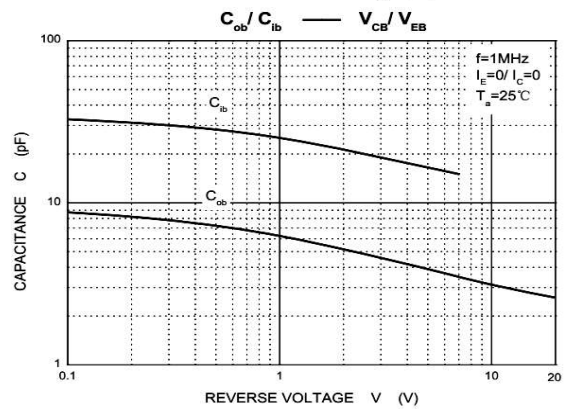
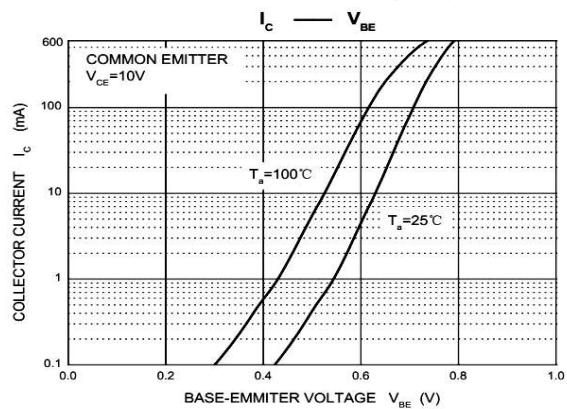
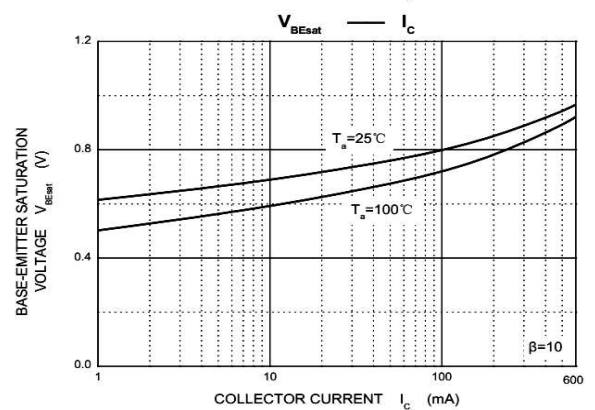
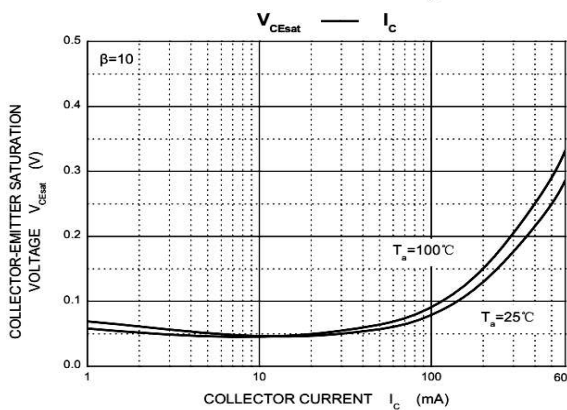
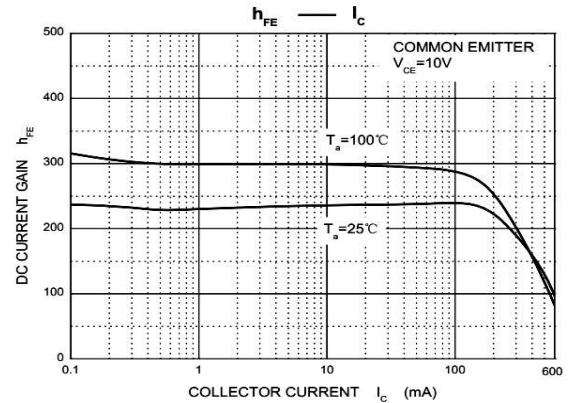
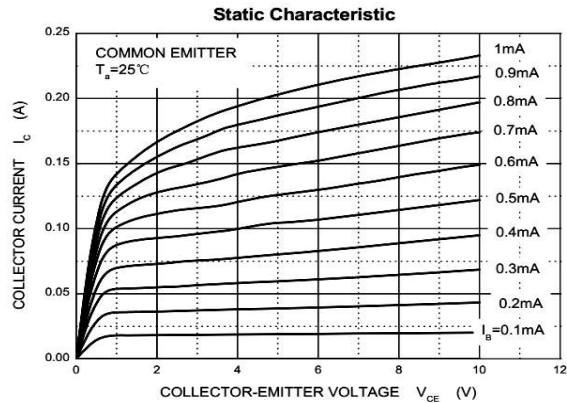
Maximum ratings (At $T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector to base voltage	V_{CBO}	75	V
Collector to Emitter Voltage	V_{CEO}	40	V
Emitter to base voltage	V_{EBO}	6	V
Collector current	I_C	600	mA
Power dissipation	P_D	0.2	W
Junction temperature	T_J	+150	$^\circ C$
Storage temperature	T_{STG}	-55 ~ +150	$^\circ C$

FMBT2222AW-Q1**Electrical characteristics** (At $T_A=25^{\circ}\text{C}$ unless otherwise noted)

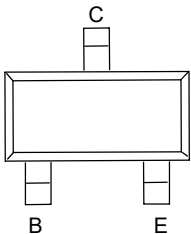
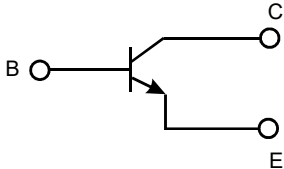
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Collector-base breakdown voltage	V _{(BR)CBO}	I _C =10μA, I _E =0	75			V
Collector-emitter breakdown voltage	V _{(BR)CEO}	I _C =10mA, I _B =0	40			V
Emitter-base breakdown voltage	V _{(BR)EBO}	I _E =10μA, I _C =0	6			V
Collector-emitter cut off current	I _{CBO}	V _{CB} =60V, I _E =0			100	nA
Emitter-base cut off current	I _{EBO}	V _{EB} =3V, I _C =0			100	nA
On Characteristics						
DC current gain	h _{FE}	V _{CE} = 10V, I _C = 0.1mA	35			
		V _{CE} = 10V, I _C = 1mA	50			
		V _{CE} = 10V, I _C = 10mA	75			
		V _{CE} = 1V, I _C = 150mA	50			
		V _{CE} = 10V, I _C = 150mA	100		300	
		V _{CE} = 10V, I _C = 500mA	40			
Collector-emitter saturation voltage	V _{CE(sat)}	I _C =150mA, I _B =15mA			0.3	V
		I _C =500mA, I _B =50mA			1.0	
Base-emitter saturation voltage	V _{BE(sat)}	I _C =150mA, I _B =15mA			1.2	V
		I _C =500mA, I _B =50mA			2.0	
Small Signal Characteristics						
Output capacitance	C _{ob}	V _{CB} =10V, I _E =0, f=100KHz			8	pF
Emitter input capacitance	C _{ib}	V _{EB} =0.5V, I _E =0, f=100KHz			25	pF
Gain-bandwidth product	f _T	V _{CE} =20V, I _E =20mA, f=100MHz	300			MHZ
Delay time	t _d	V _{CC} =30V, V _{BE(OFF)} =0.5V, I _C =150mA, I _{B1} =15mA			10	ns
Rise time	t _r	V _{CC} =30V, V _{BE(OFF)} =0.5V, I _C =150mA, I _{B1} =15mA			25	
Storage time	t _{stg}	V _{CC} =30V, I _C =150mA, I _{B1} =I _{B2} =15mA			225	
Fall time	t _f	V _{CC} =30V, I _C =150mA, I _{B1} =I _{B2} =15mA			60	

Rating and characteristic curves (FMBT2222AW-Q1)



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Pinning information

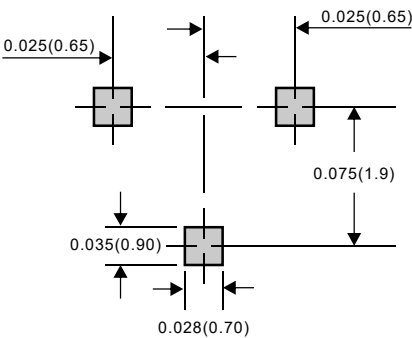
Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

Marking

Type number	Marking code
FMBT2222AW-Q1	K3P,1P

Suggested solder pad layout

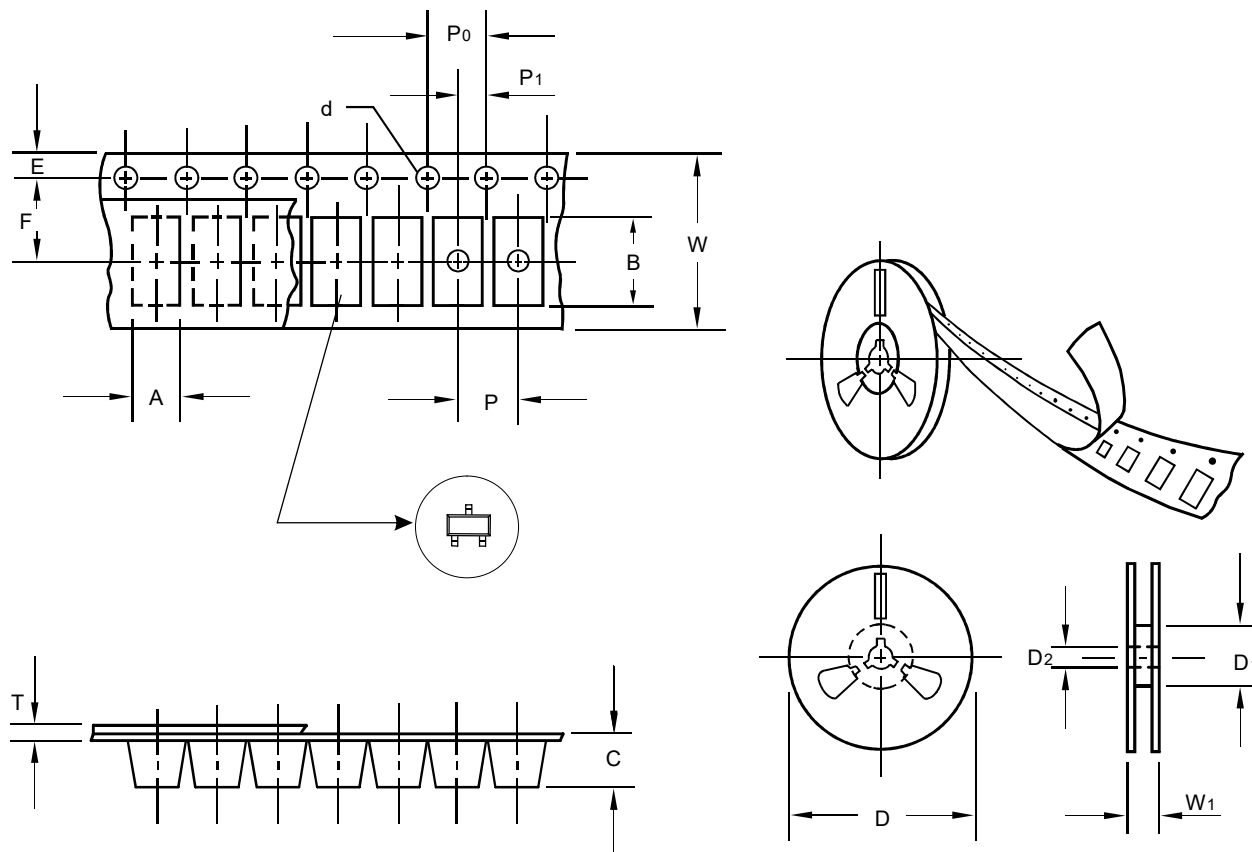
SOT-323



Dimensions in inches and (millimeters)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-323
Carrier width	A	0.1	2.36
Carrier length	B	0.1	2.40
Carrier depth	C	0.1	1.20
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	62.00
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	11.40

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

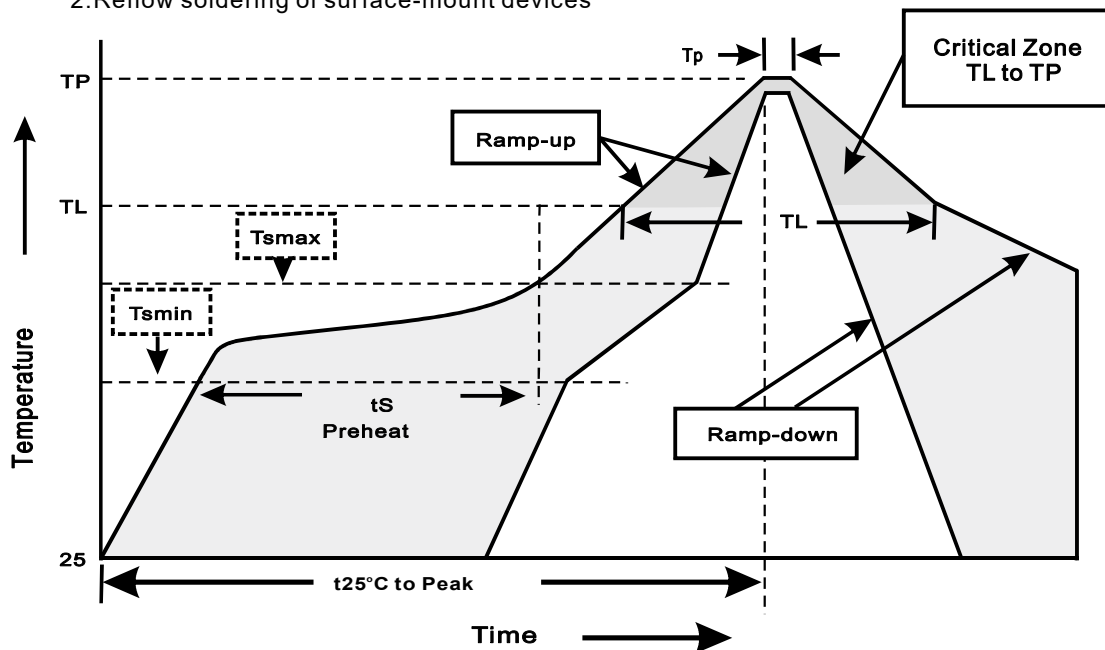
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Reel packing

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-323	7"	3,000	4.0	30,000	183*183*123	178	382*262*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(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