

Formosa MS

BCP51-10-Q1 / 16-Q1 Thru BCP53-10-Q1/ 16-Q1

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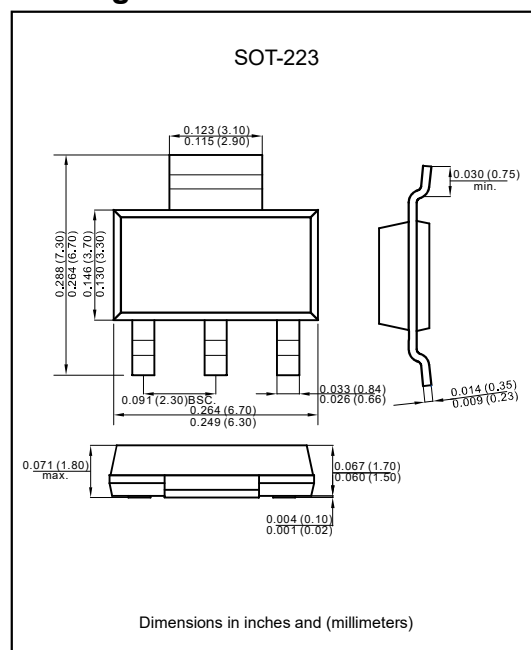
**-1.0A -45V / -60V / -80V General Purpose
Transistor PNP Silicon**

Features

- For AF driver and output stages.
- High collector current.
- Low collector-emitter saturation voltage.
- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.BCP51-10-Q1-H.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-223.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position : Any.

Package outline**Maximum ratings** (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	BCP51-Q1	BCP52-Q1	BCP53-Q1	Unit
Collector-base voltage	$-V_{CBO}$	45	60	100	V
Collector-emitter voltage	$-V_{CEO}$	45	60	80	V
Emitter-base voltage	$-V_{EBO}$	5			V
Collector current -continuous	$-I_C$	1			A
Peak pulse collector current	$-I_{CM}$	2			A
Base current-continuous	$-I_B$	100			mA
Peak pulse base current	$-I_{BM}$	200			mA
Collector power dissipation	P_{C1}	1.5			W
Collector power dissipation @ $T_L \leq 120^{\circ}\text{C}$	P_{C2}	2.1			
Thermal resistance, junction to ambient	$R_{\theta JA}$	83.3			$^{\circ}\text{C/W}$
Thermal resistance, junction to lead	$R_{\theta JL}$	14			$^{\circ}\text{C/W}$
Operation junction temperature	T_J	+150			$^{\circ}\text{C}$
Storage temperature range	T_{STG}	-55 to +150			$^{\circ}\text{C}$

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Electrical characteristics (AT $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Off characteristics						
Collector-emitter breakdown voltage	BCP51-Q1	$-V_{(BR)CEO}$	45			V
	BCP52-Q1		60			
	BCP53-Q1		80			
Collector-base breakdown voltage	BCP51-Q1	$-V_{(BR)CBO}$	45			V
	BCP52-Q1		60			
	BCP53-Q1		100			
Base-emitter breakdown voltage	$-I_E = 10\mu\text{A}, I_C = 0$	$-V_{(BR)EBO}$	5			V
Collector-base cutoff current	$-V_{CB} = 30\text{V}, I_E = 0$	$-I_{CBO}$			100	nA

On characteristics

DC current gain	$-I_C = 5\text{mA}, -V_{CE} = 2.0\text{V}$	h_{FE1}	25			
	$-I_C = 150\text{mA}, -V_{CE} = 2.0\text{V}$	h_{FE2}	63		250	
	$-I_C = 500\text{mA}, -V_{CE} = 2.0\text{V}$	h_{FE3}	25			
Collector-emitter saturation voltage	$-I_C = 500\text{mA}, -I_B = 50\text{mA}$	$-V_{CE(sat)}$			0.5	V
Base-emitter voltage	$-I_C = 500\text{mA}, -V_{CE} = 2.0\text{V}$	$-V_{BE}$			1.0	V

Small-signal characteristics

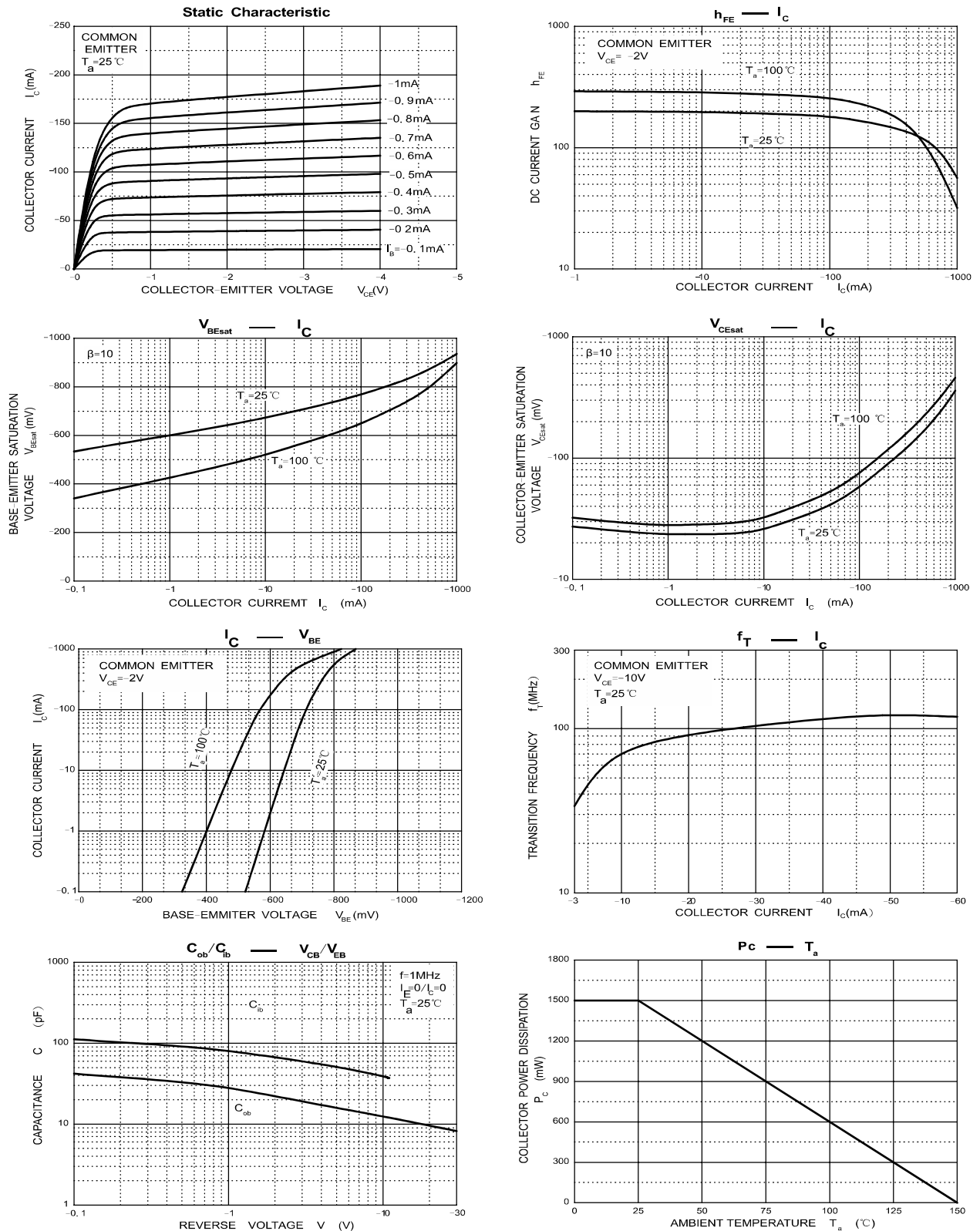
Transition frequency	$-I_C = 50\text{mA}, -V_{CE} = 10\text{V}, f = 100\text{MHz}$	f_T	100			MHZ
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Classification of $h_{FE(2)}$

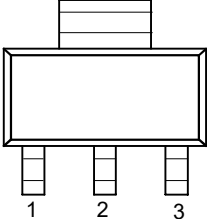
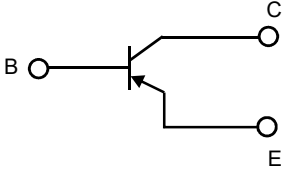
Rank	BCP51-10-Q1, BCP52-10-Q1, BCP53-10-Q1	BCP51-16-Q1, BCP52-16-Q1, BCP53-16-Q1
Range	63~160	100~250

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Rating and characteristic curves (BCP51/52/53)

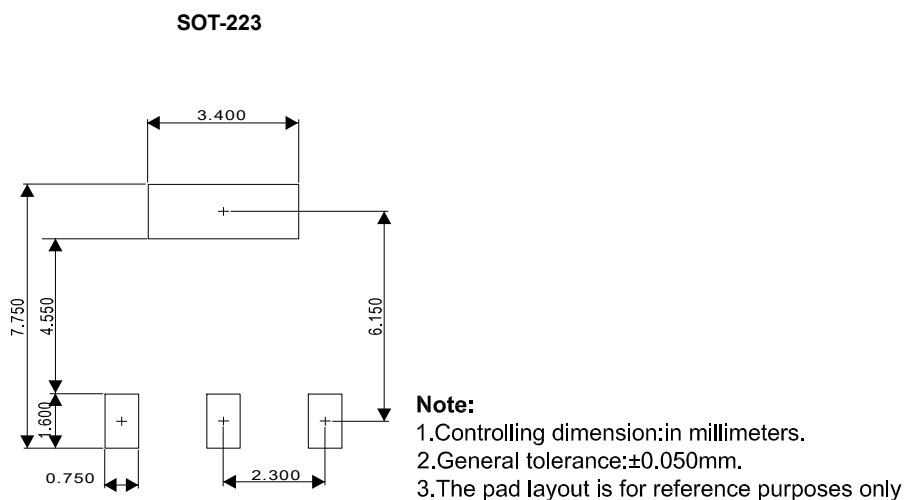


BCP51-10-Q1 / 16-Q1 Thru BCP53-10-Q1/ 16-Q1**Pinning information**

Pin	Simplified outline	Symbol
Pin 1 Base Pin 2 Collector Pin 3 Emitter		

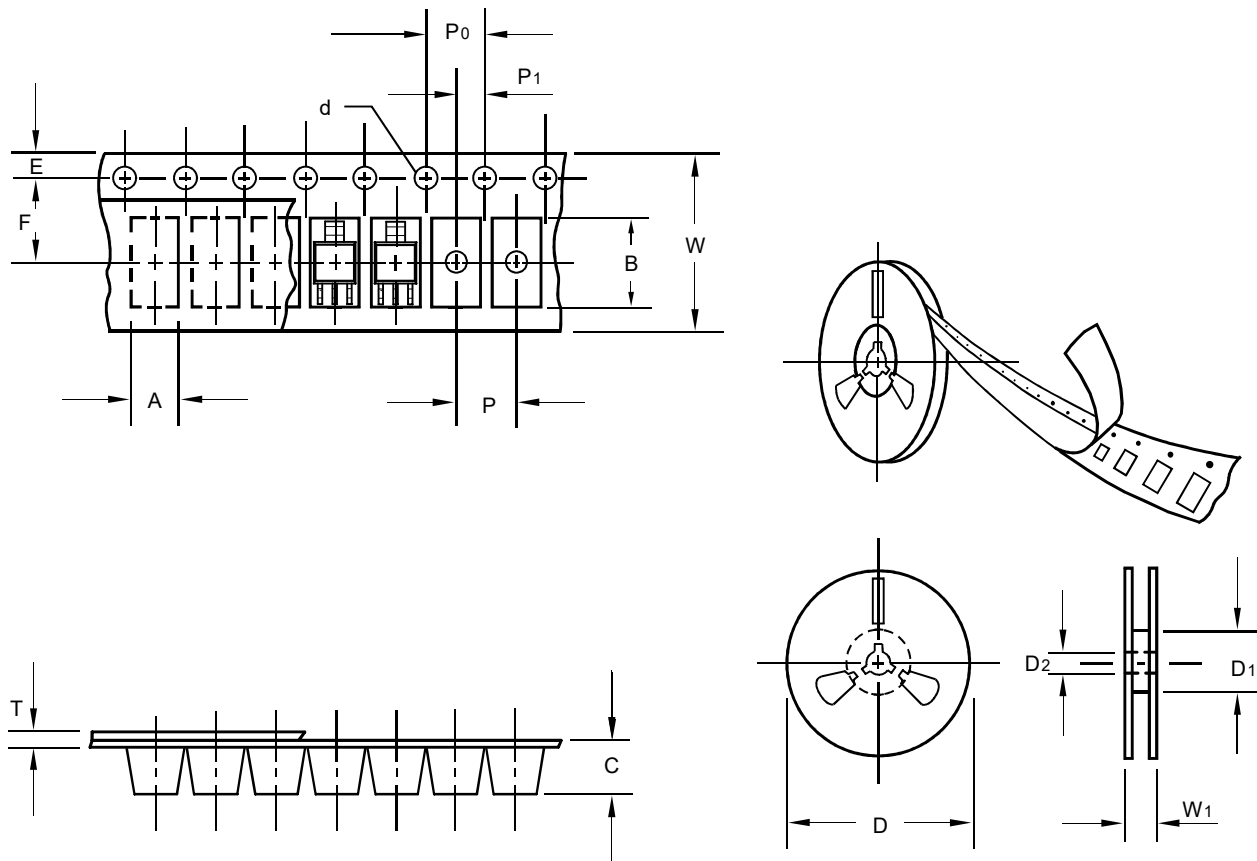
Marking

Type number	Marking code
BCP51-10-Q1	BCP51-10
BCP52-10-Q1	BCP52-10
BCP53-10-Q1	BCP53-10
BCP51-16-Q1	BCP51-16
BCP52-16-Q1	BCP52-16
BCP53-16-Q1	BCP53-16

Suggested solder pad layout

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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-223
Carrier width	A	0.1	6.765
Carrier length	B	0.1	7.335
Carrier depth	C	0.1	1.88
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	330.00
13" Reel inner diameter	D1	min	100.00
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	5.50
Punch hole pitch	P	0.1	8.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.29
Tape width	W	0.3	12.00
Reel width	W1	0.3	17.60

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

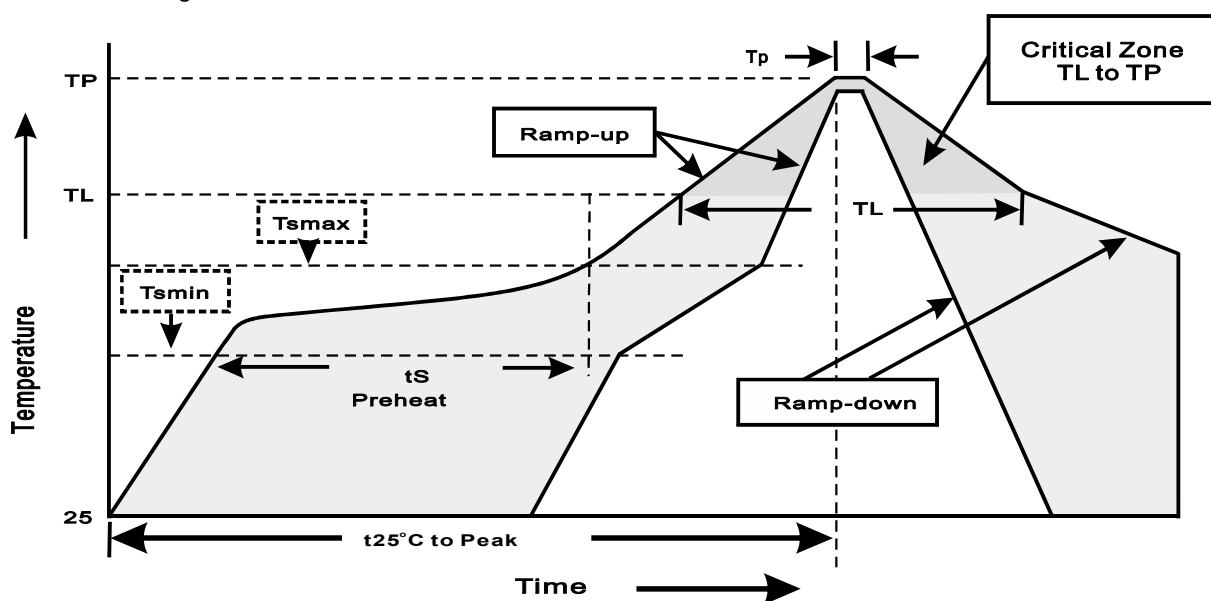
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Reel packing

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)
SOT-223	13"	2,500	8.0	5,000	335*335*38	330	350*330*360	40,000

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

BCP51-10-Q1 / 16-Q1 Thru BCP53-10-Q1/ 16-Q1**High reliability test capabilities**

Item Test	Conditions	Reference
1. MSL Preconditioning	24hr bake@125°C+168hrs@85°C /85%RH+3xIR@260°C+1flux immersion+alcohol+DI H2O rinse	JESD22-A113
2. Intermittent Operating Life	Ta=25°C, $\Delta T_j \geq 100^\circ\text{C}$ On/Off=2min Test Duration:1000hrs	MIL-STD-750E METHOD 1037
3. High Temperature Reverse Bias	VCE=80%B _{VCE0} (T _J =T _J max.)Test Duration:1000hrs	JESD22-A108
4. High Temperature Storage Life	Ta=150°C Test Duration:1000hrs	JESD22 A-103
5. Temperature Cycle	-55°C(15min) to 150°C(15min)Test Cycles:1000cycles	JESD22 A-104
6. Autoclave	P=2atm Ta=121°C RH=100% Test Duration:96hrs	JESD22 A-102
7. Solderability	245±5°C for 5sec	J-STD-002
8. Moisture Resistance	Ta=85°C/85%Relative humidity Test Duration:1000hrs	MIL-STD-750E METHOD 1021.2
9. Resistance To Solder Heat	260±5°C for 10sec	JESD22 B-106
10. High Temperature High Humidity Reverse Bias	Ta=85°C, 85%RH, VCE=80%B _{VCE0} Test Duration: 1000hrs	JESD22-A101