

F2SC4081Q/R/S-Q1**List**

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F2SC4081Q/R/S-Q1

150mA 50V Silicon NPN Epitaxial Planar Transistor

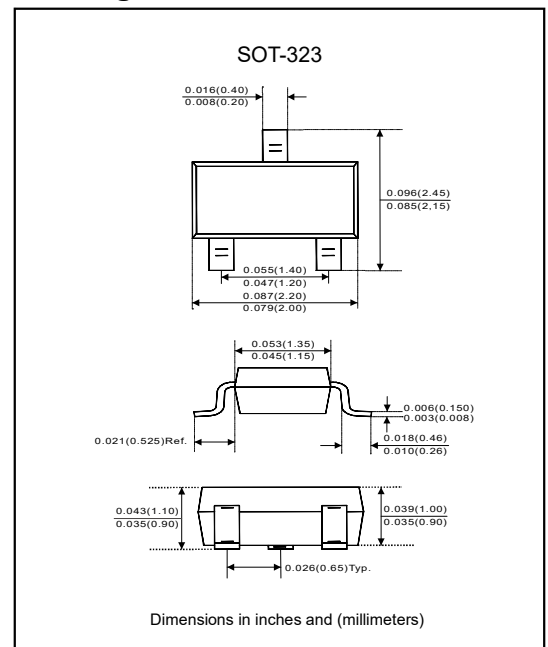
Features

- The transistor is subdivided into three groups Q, R and S according to its DC current gain.
- 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. F2SC4081Q-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 $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector to base voltage	V_{CBO}	60	V
Collector to Emitter Voltage	V_{CEO}	50	V
Emitter to base voltage	V_{EBO}	7	V
Collector current	I_C	150	mA
Total power dissipation	P_D	200	mW
Thermal resistance form junction to ambient	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Junction temperature	T_J	+150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 ~ +150	$^\circ\text{C}$

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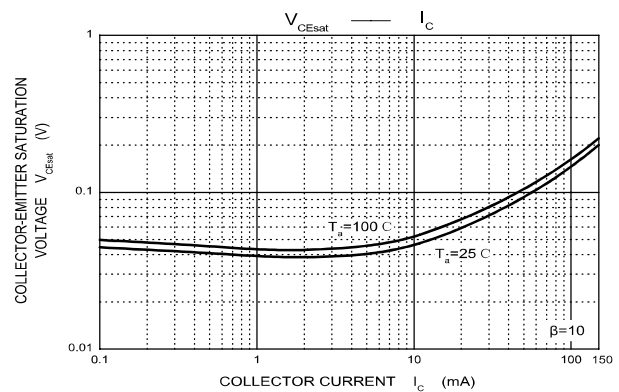
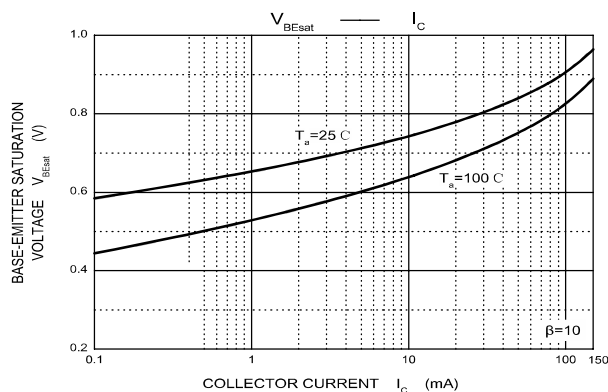
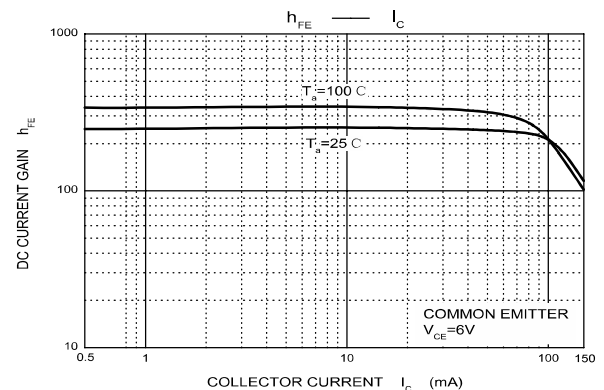
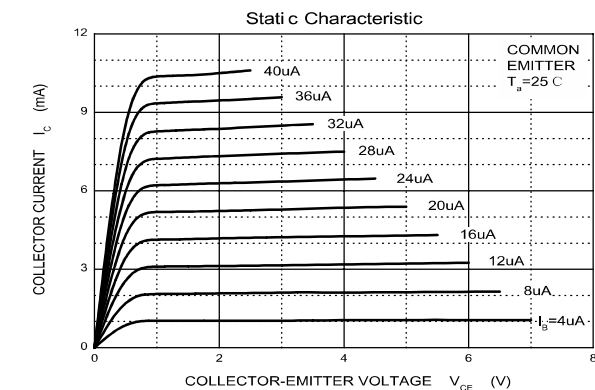
Electrical characteristics (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector base breakdown voltage	$I_C=50\mu\text{A}$	$V_{(BR)CBO}$	60			V
Collector emitter breakdown voltage	$I_C=1\text{mA}$	$V_{(BR)CEO}$	50			V
Emitter base breakdown voltage	$I_E=50\mu\text{A}$	$V_{(BR)EBO}$	7			V
Collector saturation voltage	$I_C=50\text{mA}$, $I_B=5\text{mA}$	$V_{CE(sat)}$			0.4	V
Collector cut off current	$V_{CB}=60\text{V}$, $I_E=0$	I_{CBO}			0.1	μA
Emitter cut-off current	$V_{EB}=7\text{V}$, $I_C=0$	I_{EBO}			0.1	μA
DC current gain	$V_{CE}=6\text{V}$, $I_C=1\text{mA}$	$h_{FE(1)}$	120		560	
Transition Frequency	$V_{CE}=12\text{V}$, $I_E=2\text{mA}$, $f=30\text{MHz}$	f_T		180		MHZ
Output capacitance	$V_{CB}=12\text{V}$, $f=1\text{MHz}$	C_{ob}			3.5	pF

Classification of h_{FE}

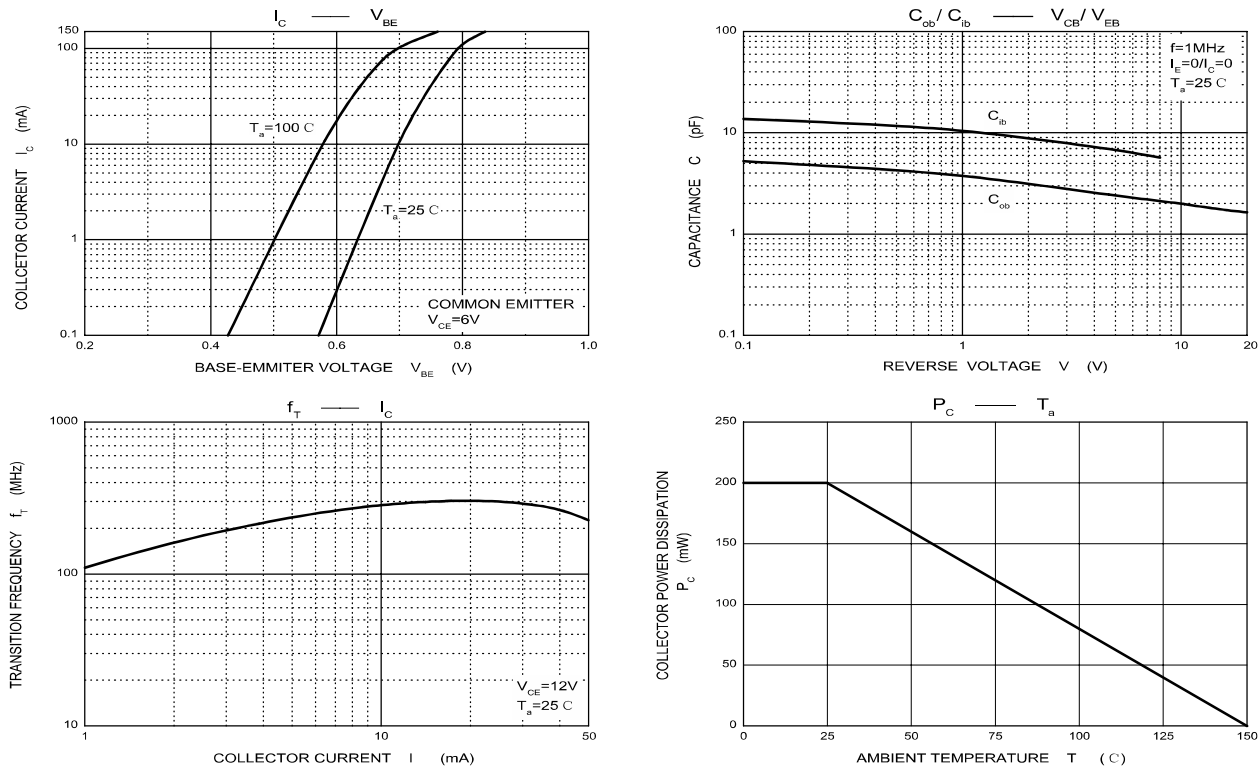
	F2SC4081Q-Q1	F2SC4081R-Q1	F2SC4081S-Q1
Range	120 ~ 270	180 ~ 390	270 ~ 560

Rating and characteristic curves



F2SC4081Q/R/S-Q1

Rating and characteristic curves



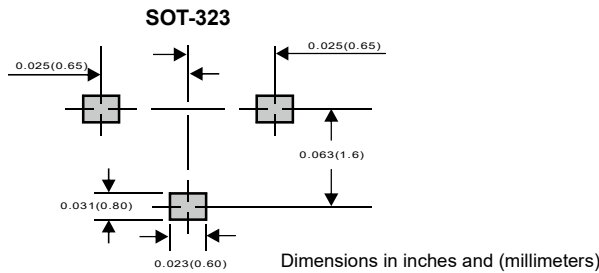
Pinning information

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

Marking

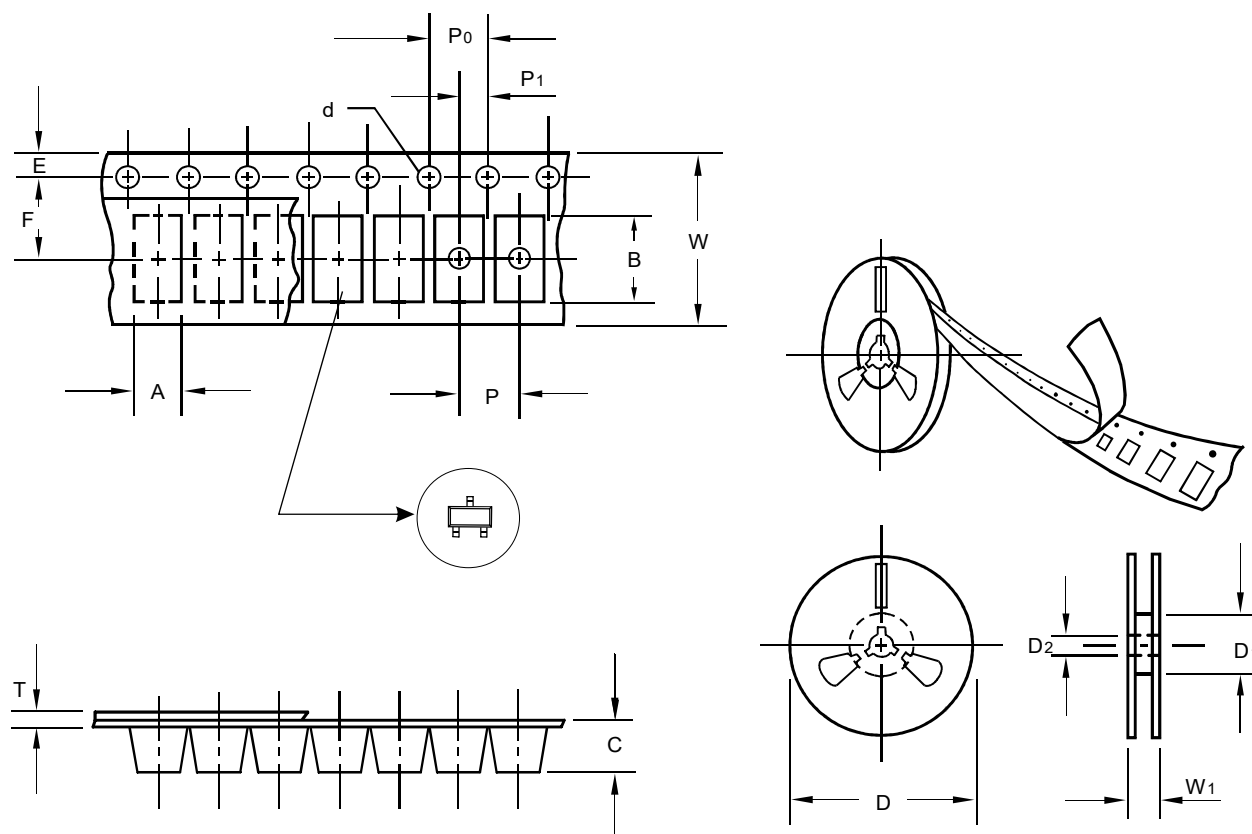
Type Number	Marking Code
F2SC4081Q-Q1	BQ
F2SC4081R-Q1	BR
F2SC4081S-Q1	BS

Suggested solder pad layout



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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-323
Carrier width	A	0.1	1.47
Carrier length	B	0.1	2.95
Carrier depth	C	0.1	1.15
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.

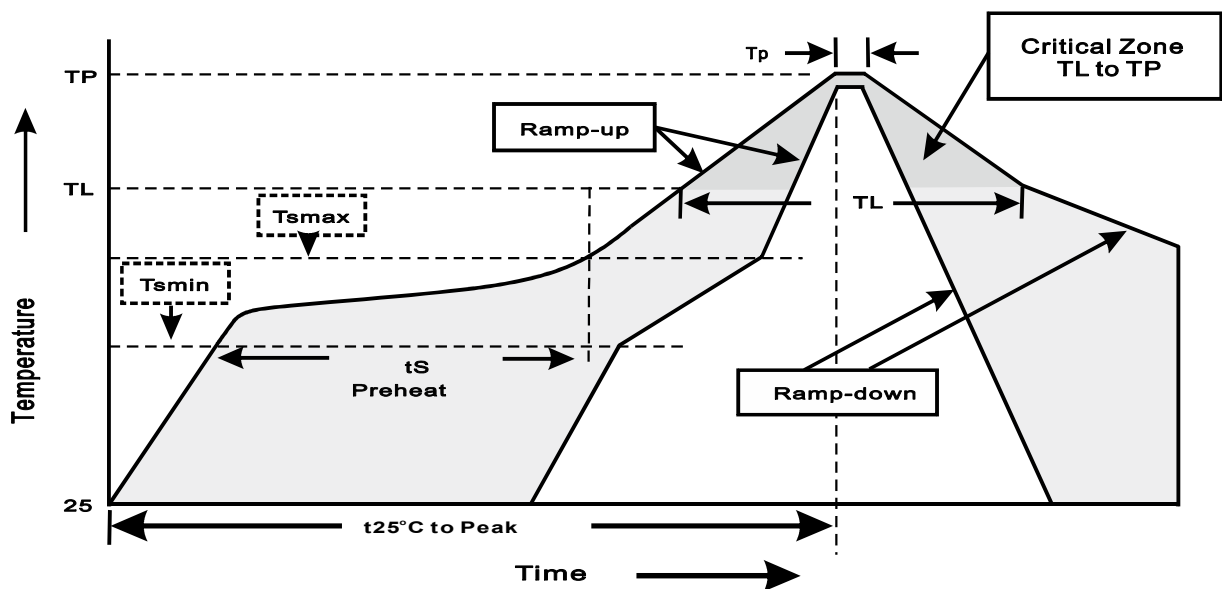
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Reel packing

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 _{smín}) - Temperature Max(T _{smáx}) - Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smáx} 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