

F2SC4081Q / F2SC4081R / F2SC4081S**List**

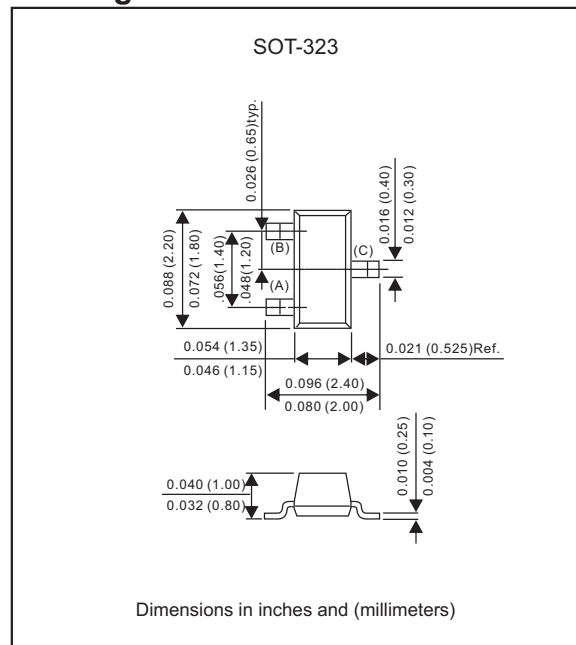
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F2SC4081Q / F2SC4081R / F2SC4081S**General Purpose Transistors
NPN Silicon****Features**

- Low c_{ob} , $c_{ob}=2pF$ (Typ.)
- Epitaxial planar type
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen free part, ex. F2SC4081Q-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)

Rating	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}	50	V
Collector-base voltage	V_{CBO}	60	V
Emitter-base voltage	V_{EBO}	7.0	V
Collector current - continuous	I_C	150	mAdc
Collector power dissipation	P_C	0.15	W
Thermal resistance junction to ambient	$R_{\theta JA}$	833	$^{\circ}C/W$
Operating junction temperature range	T_J	-55 to +150	$^{\circ}C$
Storage temperature range	T_{STG}	-55 to +150	$^{\circ}C$

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

Characteristic	Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector-emitter breakdown voltage	$I_C=1mA$	$V_{(BR)CEO}$	50			V
Emitter-base breakdown voltage	$I_E=50\mu A$	$V_{(BR)EBO}$	7			V
Collector-base breakdown voltage	$I_C=50\mu A$	$V_{(BR)CBO}$	60			V
Collector cutoff current	$V_{CB}=60V$	I_{CBO}			0.1	μA
Emitter cutoff current	$V_{EB}=7V$	I_{EBO}			0.1	μA
Collector-emitter saturation voltage	$I_C / I_E=50mA / 5mA$	$V_{CE(sat)}$			0.4	V
DC current transfer ratio	$V_{CE}=6V, I_C=1mA$	h_{FE}	120		560	-
Transition frequency	$V_{CE}=12V, I_E=-2mA, f=30MHz$	f_T		180		MHZ
Output capacitance	$V_{CB}=12V, I_E=0A, f=1MHz$	C_{ob}		2.0	3.5	pF

 h_{FE} values are classified as follows:

*	Q	R	S
h_{FE}	120~270	180~390	270~560

Rating and characteristic curves (F2SC4081Q / F2SC4081R / F2SC4081S)

Fig.1 Grounded emitter propagation characteristics

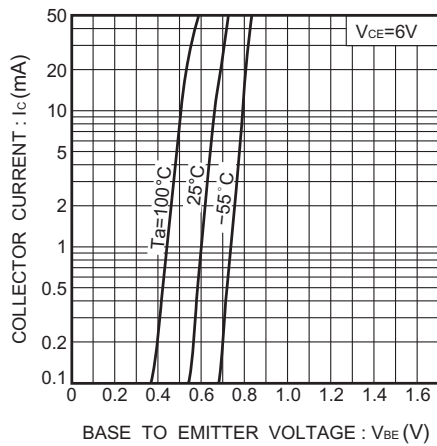


Fig.2 Grounded emitter output characteristics (I)

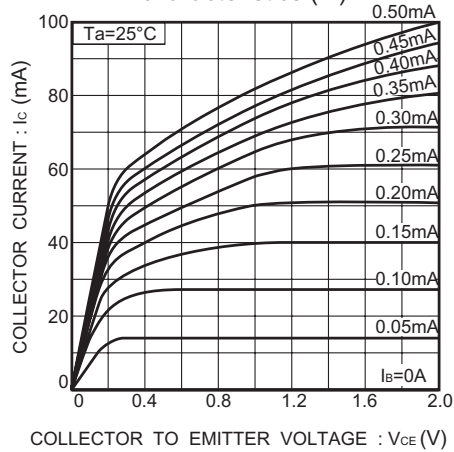


Fig.3 Grounded emitter output characteristics (II)

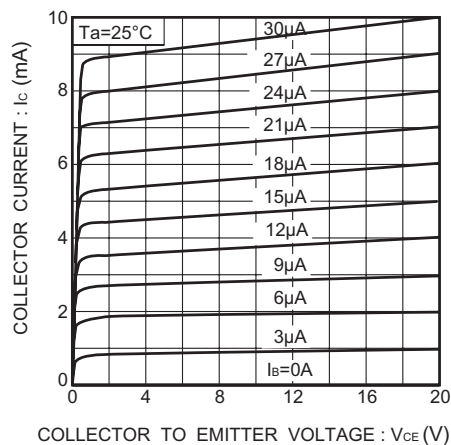


Fig.4 DC current gain vs. collector current (I)

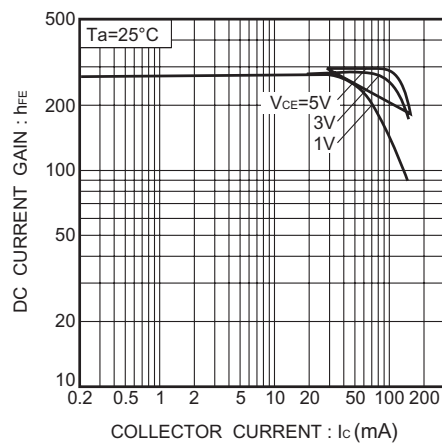


Fig.5 DC current gain vs. collector current (II)

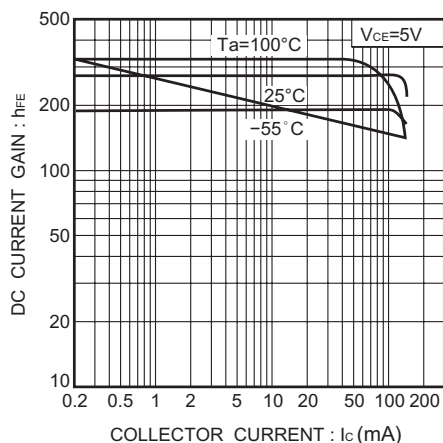
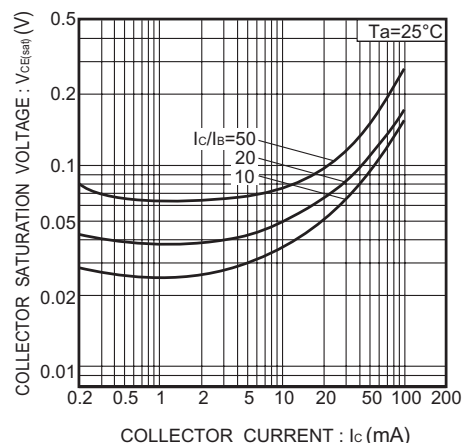


Fig. 6 Collector-emitter saturation voltage vs. collector current



Rating and characteristic curves (F2SC4081Q / F2SC4081R / F2SC4081S)

Fig.7 Collector-emitter saturation voltage vs. collector current (I)

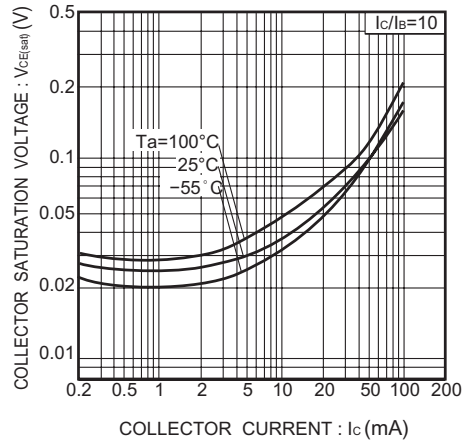


Fig.8 Collector-emitter saturation voltage vs. collector current (II)

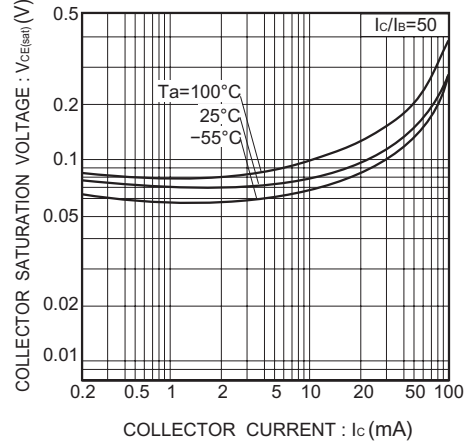


Fig.9 Gain bandwidth product vs. emitter current

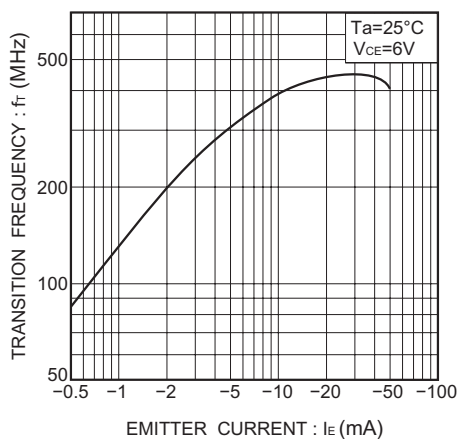


Fig.10 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage

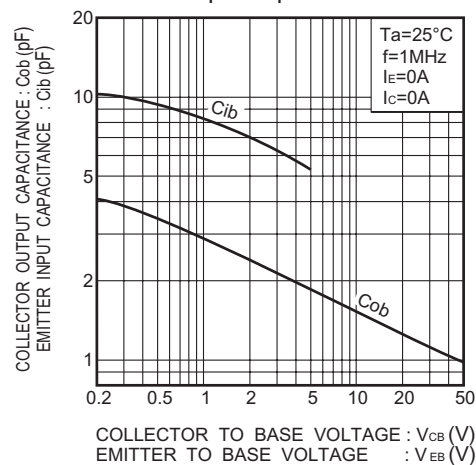
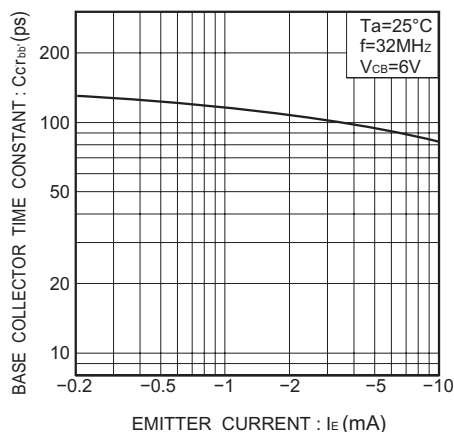
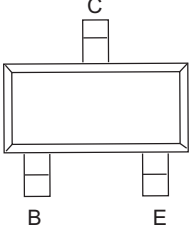
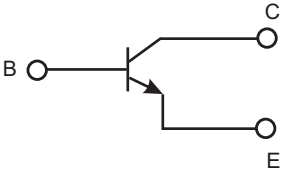


Fig.11 Base-collector time constant vs. emitter current

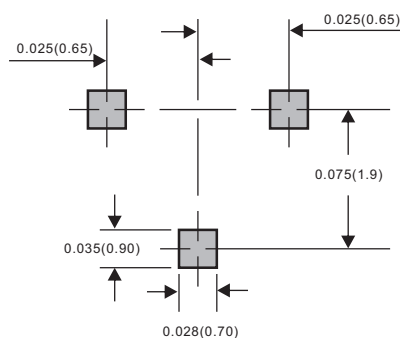


F2SC4081Q / F2SC4081R / F2SC4081S**Pinning information**

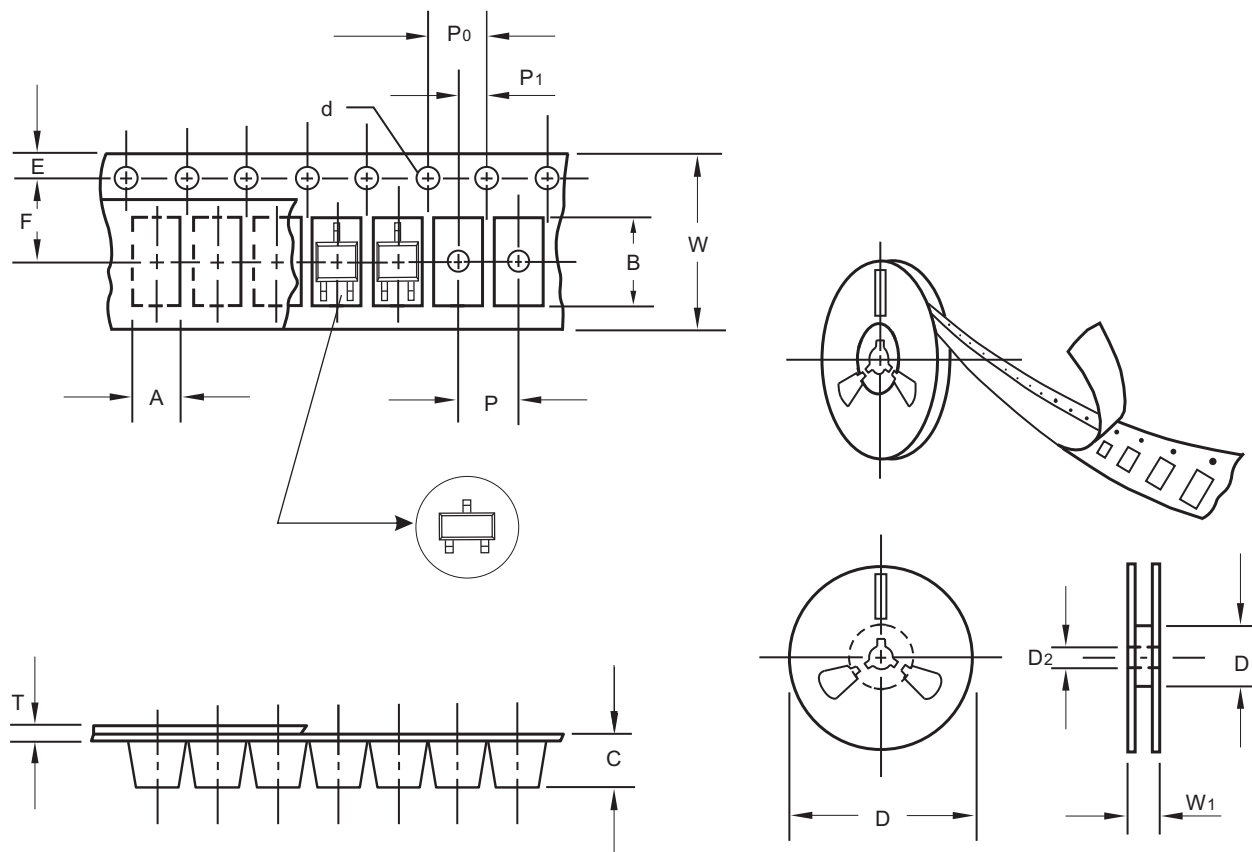
Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

Marking

Type number	Marking code
F2SC4081Q	BQ
F2SC4081R	BR
F2SC4081S	BS

Suggested solder pad layout**SOT-323**

Dimensions in inches and (millimeters)

F2SC4081Q / F2SC4081R / F2SC4081S**Packing information**

unit:mm

Item	Symbol	Tolerance	SOT-323
Carrier width	A	0.1	2.25
Carrier length	B	0.1	2.55
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.

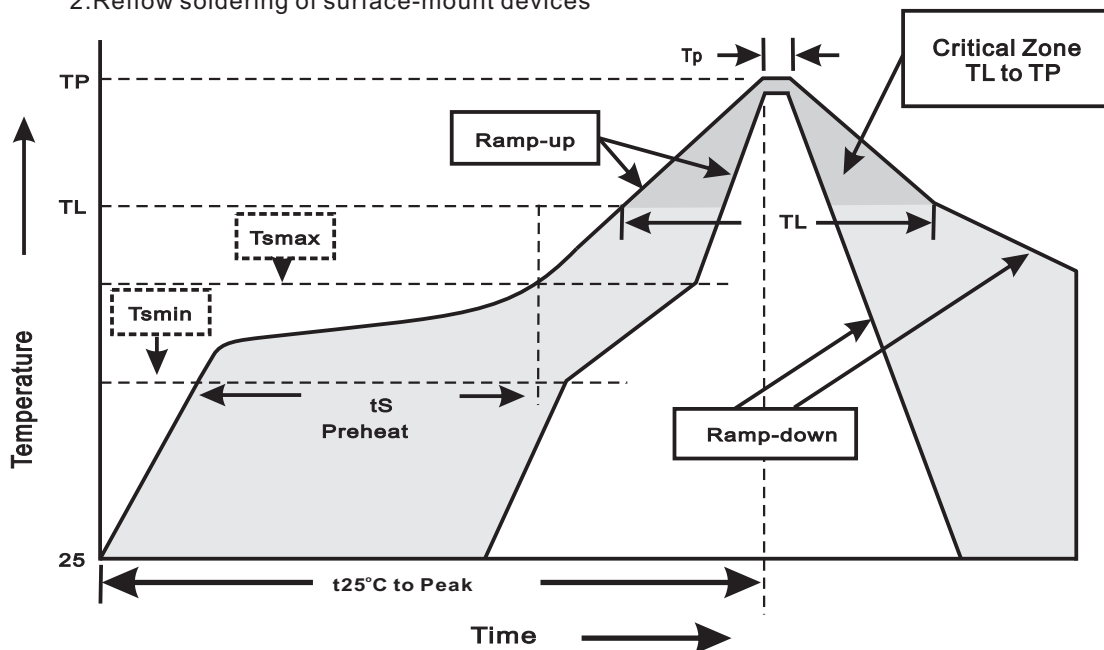
F2SC4081Q / F2SC4081R / F2SC4081S

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*123*183	178	382*257*387	240,000	9.50

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