

F2SA812Q / F2SA812R / F2SA812S**List**

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F2SA812Q / F2SA812R / F2SA812S

General Purpose Transistors PNP Silicon

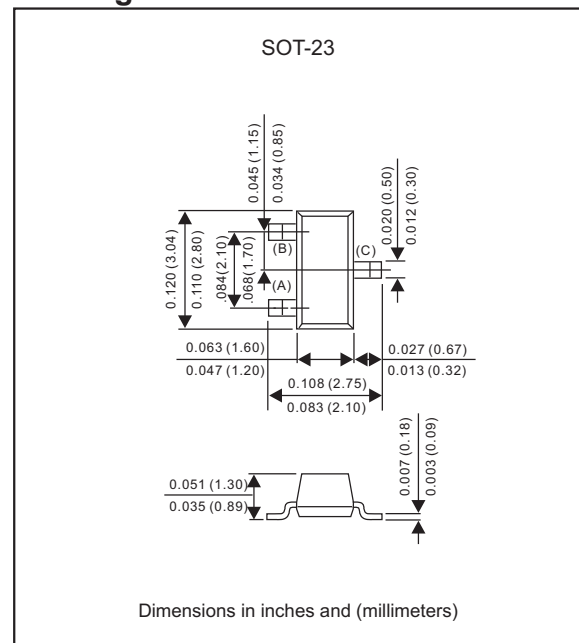
Features

- High Voltage: $V_{CEO} = -50\text{ V}$
- Epitaxial planar type
- We declare that the material of product compliance with RoHS requirements
- Suffix "-H" indicates Halogen free part, ex. F2SA812Q-H.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable 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)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	-50	V
Collector-Base Voltage	V_{CBO}	-60	V
Emitter-Base Voltage	V_{EBO}	-6.0	V
Collector current-continuoun	I_C	-150	mAdc

Thermal characteristics

PARAMETER	Symbol	MIN.	TYP.	MAX.	UNIT
Total device dissipation FR-5 board (1)	P_D			200	mW
				1.8	mW/ $^\circ\text{C}$
Thermal resistance	Junction to ambient	$R_{\theta JA}$		556	$^\circ\text{C}/\text{W}$
Total device dissipation alumina substrate(2)	P_D			200	mW
				2.4	mW/ $^\circ\text{C}$
Thermal resistance	Junction to ambient	$R_{\theta JA}$		417	$^\circ\text{C}/\text{W}$
Operating junction temperature range	T_J	-55		+150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55		+150	$^\circ\text{C}$

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.

F2SA812Q / F2SA812R / F2SA812S**Electrical characteristics** (AT $T_A=25^{\circ}\text{C}$ unless otherwise noted)**Off characteristics**

Characteristic	Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector–Emitter Breakdown Voltage	$I_C=-1\text{mA}$	$V_{(BR)CEO}$	-50			V
Emitter–Base Breakdown Voltage	$I_E=-50\mu\text{A}$	$V_{(BR)EBO}$	-6			V
Collector–Base Breakdown Voltage	$I_C=-50\mu\text{A}$	$V_{(BR)CBO}$	-60			V
Collector Cutoff Current	$V_{CB}=-50\text{V}$	I_{CBO}			-0.1	μA
Emitter cutoff current	$V_{BE}=-6\text{V}$	I_{EBO}			-0.1	μA

On characteristics

Collector-Emitter Saturation Voltage	$I_C=-100\text{mA}$, $I_B=-10\text{mA}$	$V_{CE(sat)}$		-0.18	-0.3	V
DC Current Gain	$V_{CE}=-6\text{V}$, $I_C=-1\text{mA}$	h_{FE}	120		560	
Base -Emitter On Voltage	$V_{CE}=-6\text{V}$, $I_E=-1\text{mA}$	V_{BE}	-0.58	-0.62	-0.68	V

Small-signal characteristics

Current-Gain-Bandwidth Product	$V_{CE}=-6\text{V}$, $I_E=-10\text{mA}$	f_T		180		MHZ
Output Capacitance	$V_{CE}=-10\text{V}$, $I_E=0$, $f=1\text{MHz}$	C_{obo}		4.5		pF

 h_{FE} values are classified as follows:

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

Rating and characteristic curves (F2SA812Q / F2SA812R / F2SA812S)

Fig.1 Grounded emitter propagation characteristics

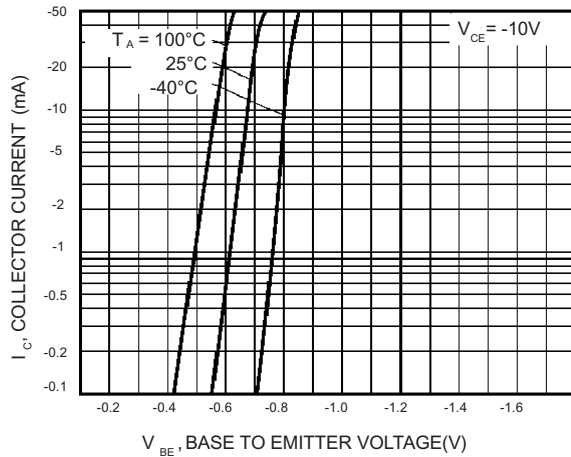


Fig.2 Grounded emitter output characteristics(I)

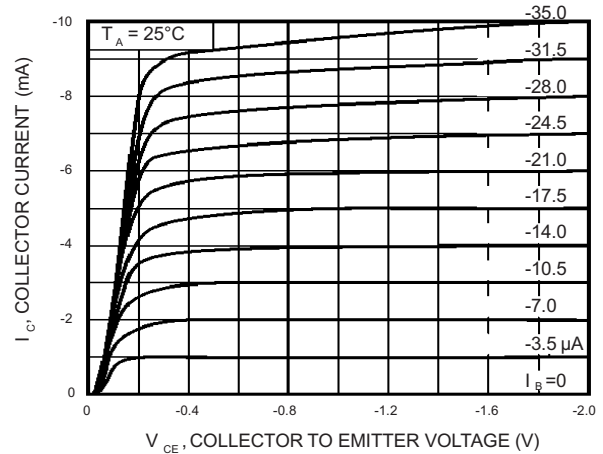


Fig.3 Grounded emitter output characteristics(II)

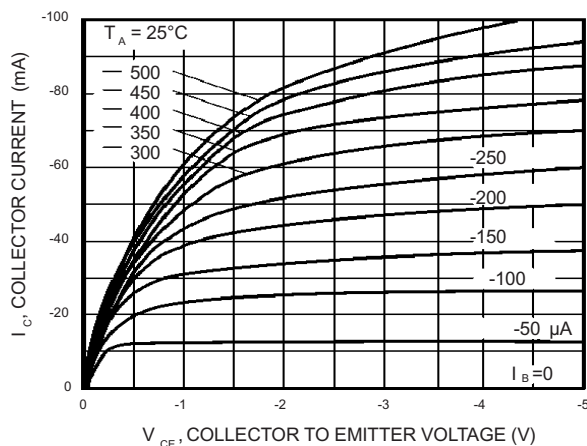


Fig.4 DC current gain vs. collector current (I)

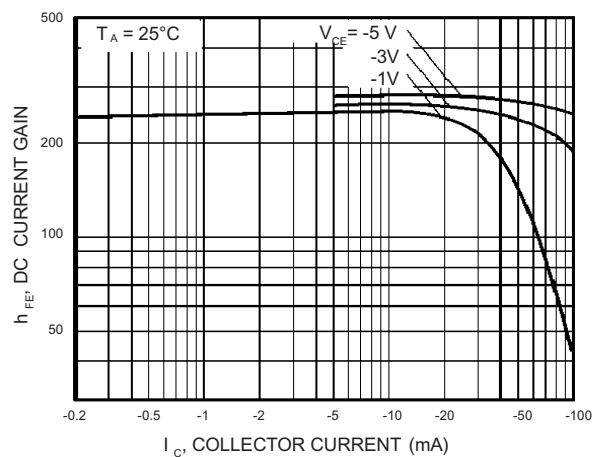


Fig.5 DC current gain vs. collector current (II)

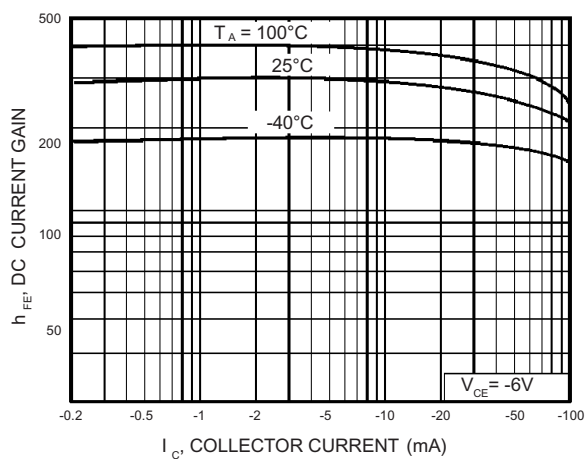
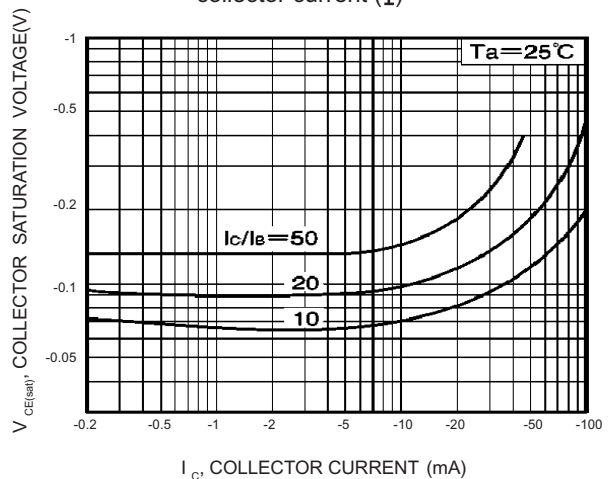


Fig.6 Collector-emitter saturation voltage vs. collector current (I)



Rating and characteristic curves (F2SA812Q / F2SA812R / F2SA812S)

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

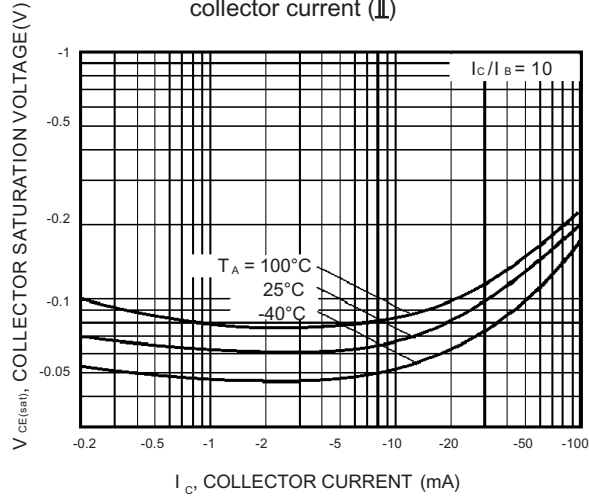


Fig.8 Gain bandwidth product vs. emitter current

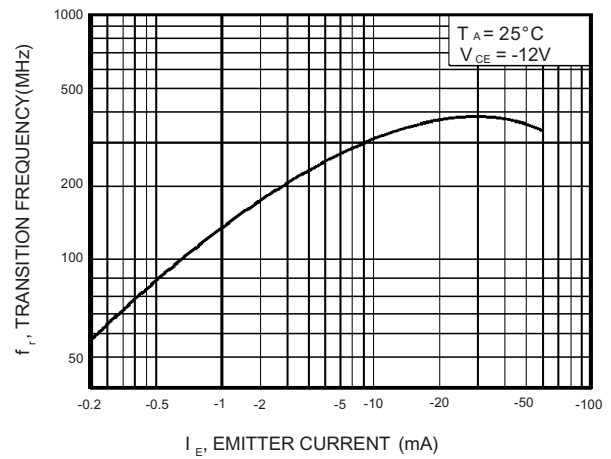
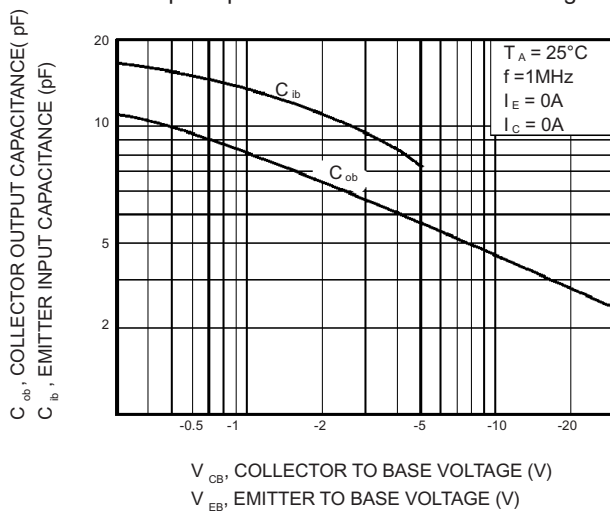
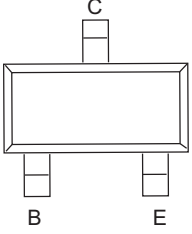
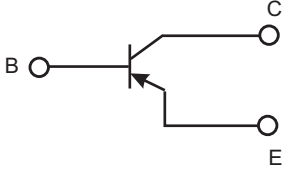


Fig.9 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage



F2SA812Q / F2SA812R / F2SA812S**Pinning information**

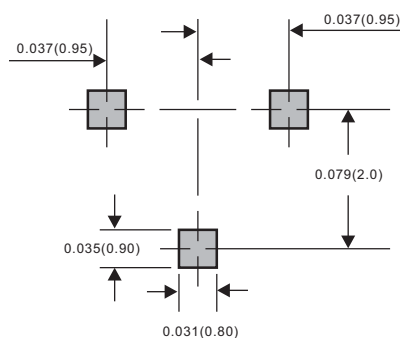
Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

Marking

Type number	Marking code
F2SA812Q	M8
F2SA812R	M6
F2SA812S	M7

Suggested solder pad layout

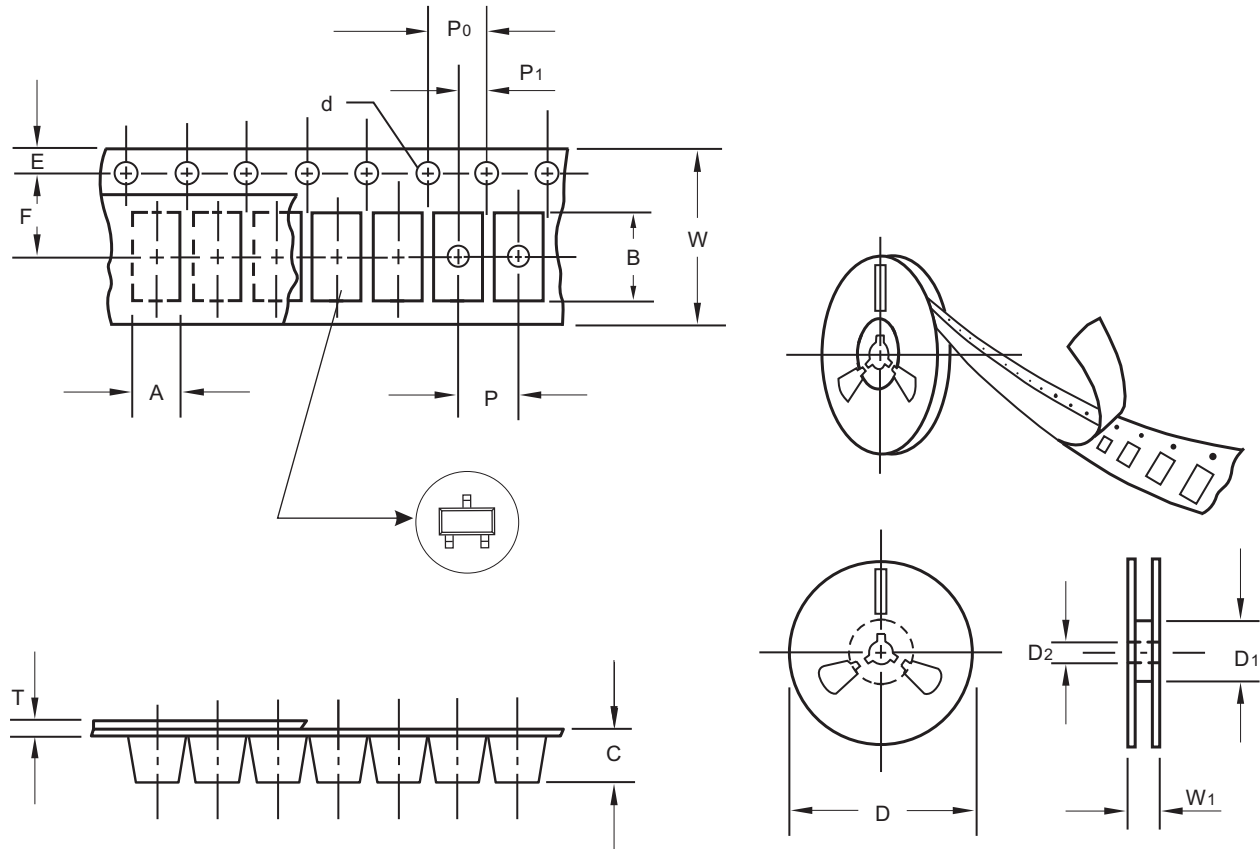
SOT-23



Dimensions in inches and (millimeters)

F2SA812Q / F2SA812R / F2SA812S

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.

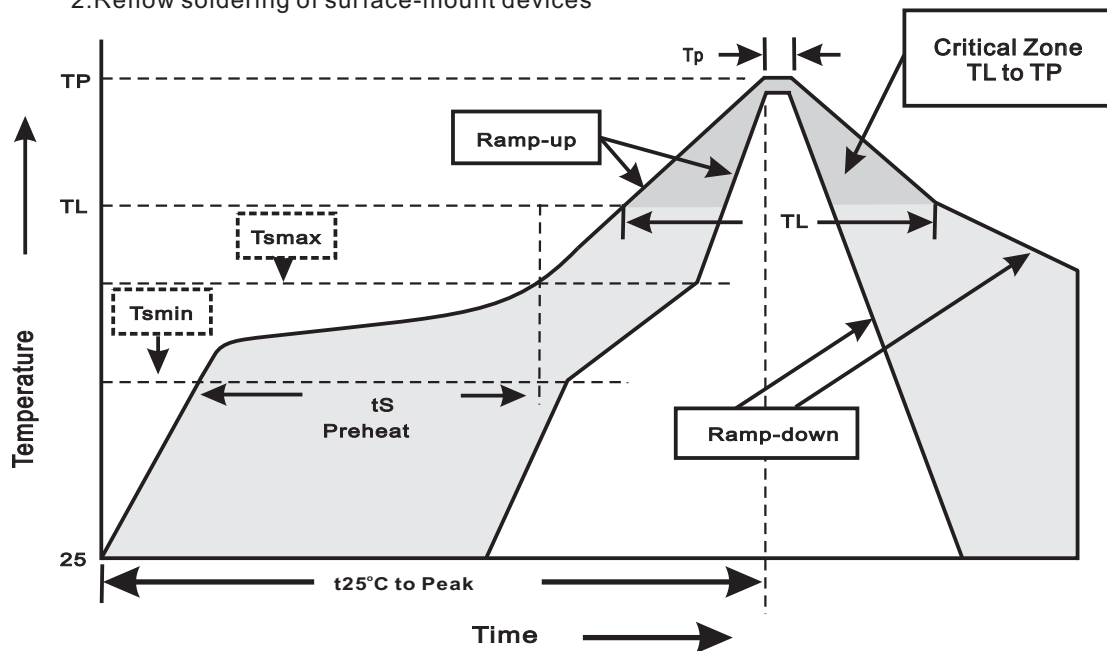
F2SA812Q / F2SA812R / F2SA812S

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"	3000	4.0	30,000	183*183*123	178	383*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°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