

F2SC4378YU/GU

List

List.....	1
Package outline.....	2
Features.....	2
Mechanical data.....	2
Maximum ratings	2
Electrical characteristics.....	3
Rating and characteristic curves.....	3~4
Pinning information.....	5
Marking.....	5
Suggested solder pad layout.....	5
Packing information.....	6
Reel packing.....	7
Suggested thermal profiles for soldering processes.....	7

F2SC4378YU/GU

1A 60V NPN Silicon Epitaxial Planar Power Transistor

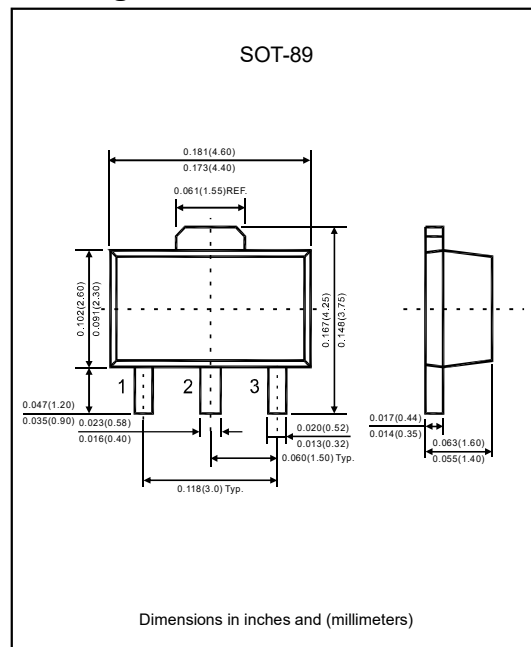
Features

- $V_{CE0}=60V, I_C=1A$.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex. F2SC4378YU-H.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-89.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position : Any.

Package outline



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

Parameter	Symbol	Value	Unit
Collector to base voltage	V_{CBO}	80	V
Collector to Emitter Voltage	V_{CEO}	60	V
Emitter to base voltage	V_{EBO}	5	V
Collector current-DC	I_C	1	A
Peak collector current	I_{CP}	2	A
Total power dissipation	P_D	0.5	W
Total power dissipation (note 1)		1	
Junction temperature	T_J	+150	$^{\circ}C$
Storage temperature range	T_{STG}	-55 ~ +150	$^{\circ}C$

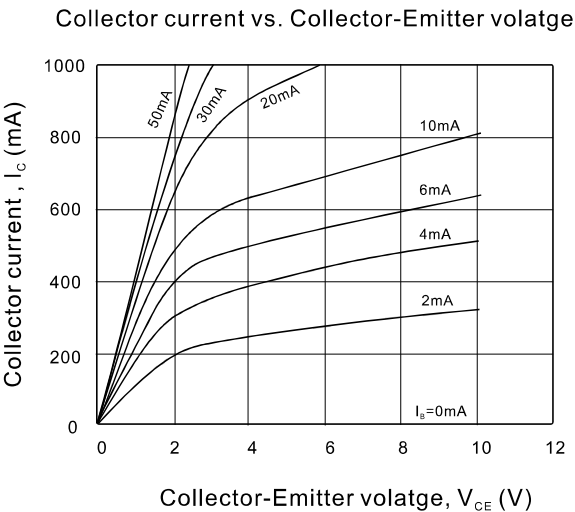
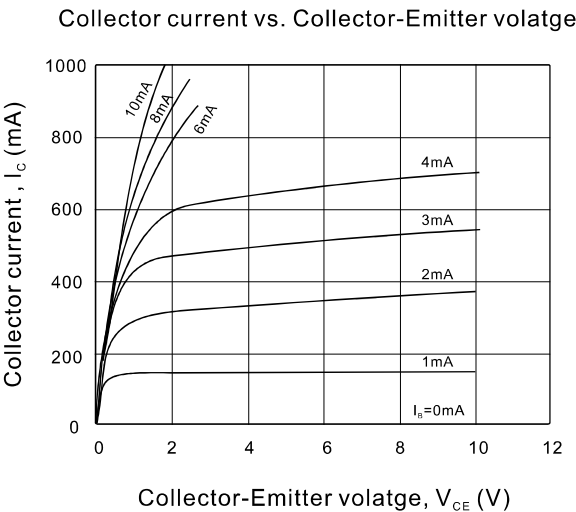
Note: 1. When mounted on a 250 mm² X 0.8 t ceramic substrate.

F2SC4378YU/GU

Electrical characteristics (At T_A=25°C unless otherwise noted)

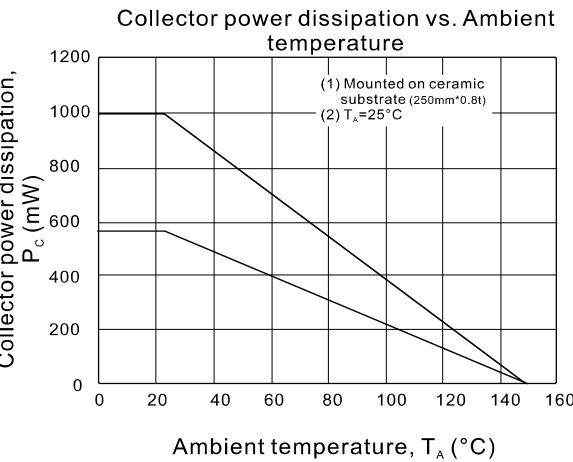
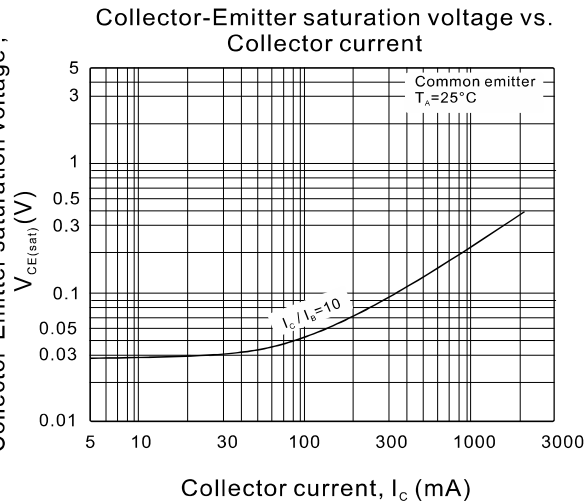
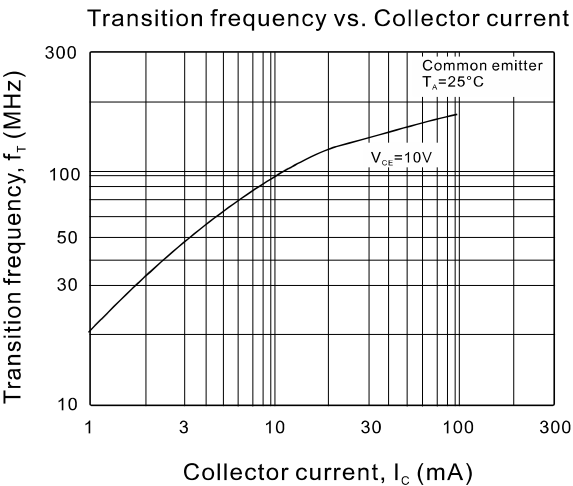
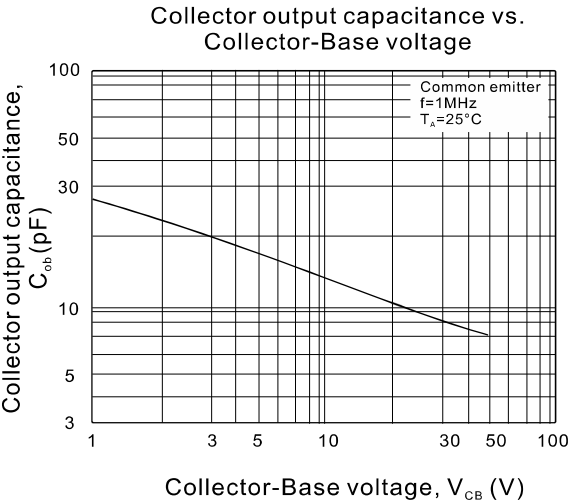
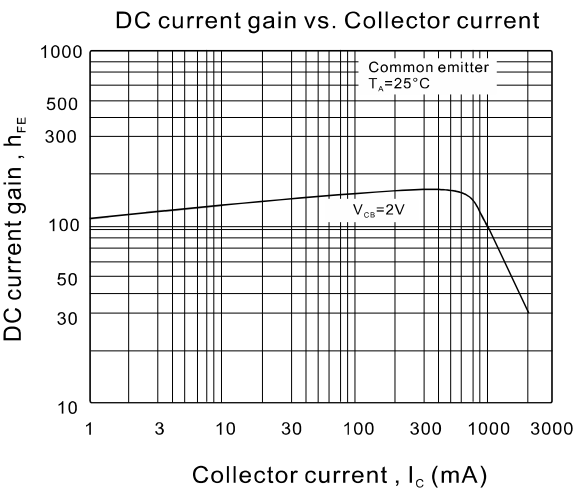
Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Off Characteristics						
Collector-emitter breakdown voltage	I _C = 1mA, I _E = 0	V _{(BR)CEO}	60			V
Collector-emitter cut off current	V _{CE} = 50V, I _E = 0	I _{CBO}			100	nA
Emitter-base cut off current	V _{EB} = 4V, I _C = 0	I _{EBO}			100	nA
On Characteristics						
DC current gain current	F2SC4378YU	V _{CE} =2V, I _C =50mA	h _{FE}	100		200
	F2SC4378GU			160		320
DC current gain current	V _{CE} =2V, I _C =1A			30		
Base-emitter saturation voltage	I _C =500mA, I _B =50mA	V _{BE(sat)}			1.2	V
Collector-emitter saturation voltage	I _C =500mA, I _B =50mA	V _{CE(sat)}			0.5	V
Small Signal Characteristics						
Output capacitance	V _{CE} =10V, I _E =0, f=1MHz	C _{ob}		12		pF
Gain-bandwidth product	V _{CE} =10V, I _C =50mA	f _T		150		MHz

Rating and characteristic curves



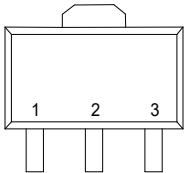
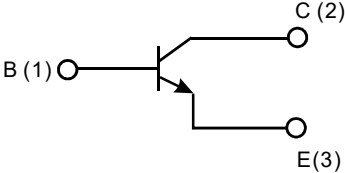
F2SC4378YU/GU

Rating and characteristic curves



F2SC4378YU/GU

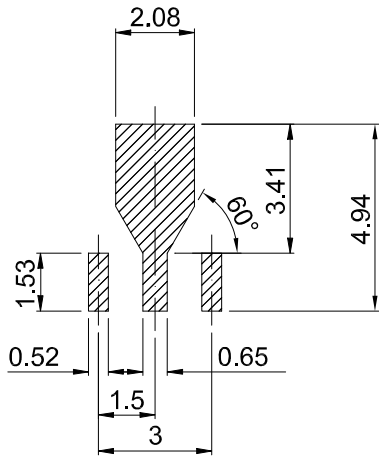
Pinning information

Pin	Simplified outline	Symbol
Pin1 Base Pin2 Collector Pin3 Emitter		

Marking

Type number	Marking code
F2SC4378YU	TY
F2SC4378GU	TGR

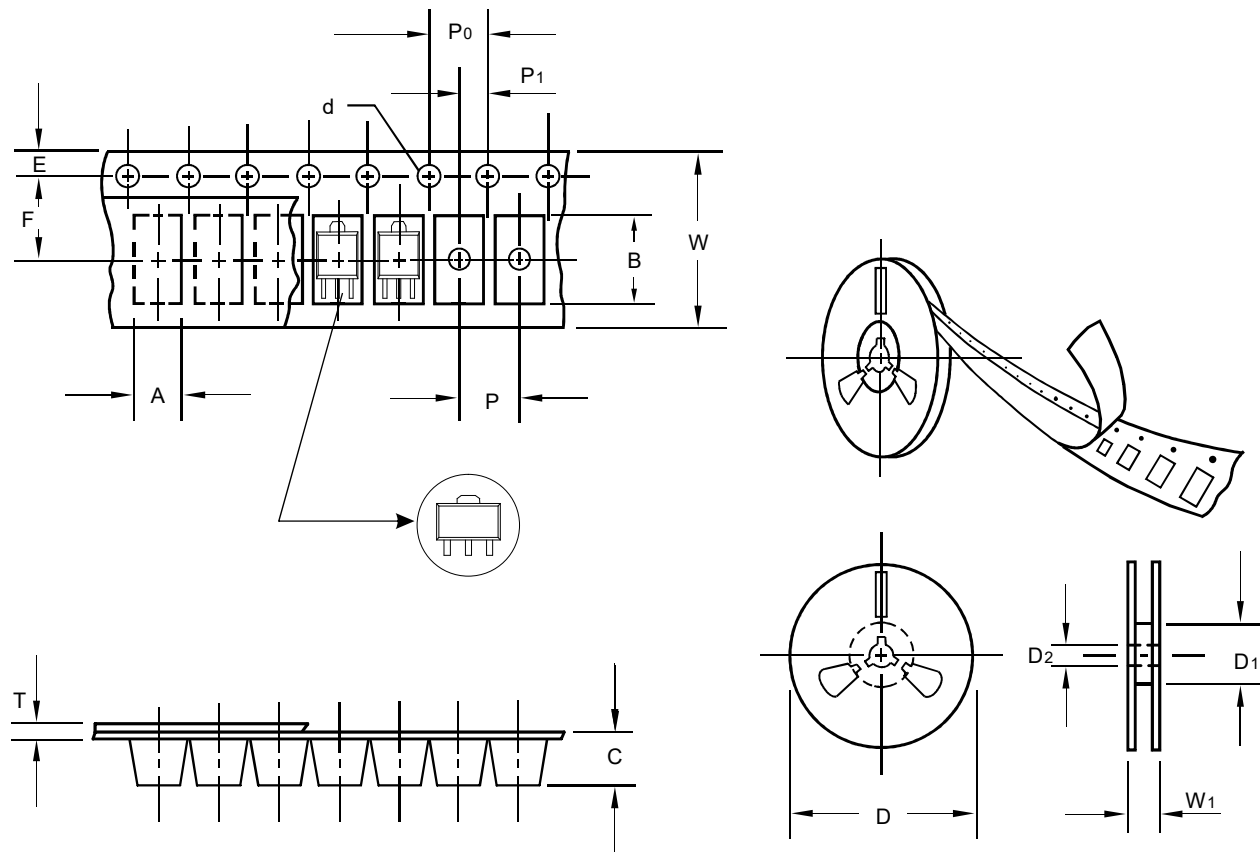
Suggested solder pad layout



- Note :
- 1. Controlling dimension : in millimeters.
 - 2. General tolerance : $\pm 0.05\text{mm}$.
 - 3. The pad layout is for reference purposes only.

F2SC4378YU/GU

Packing information



unit:mm

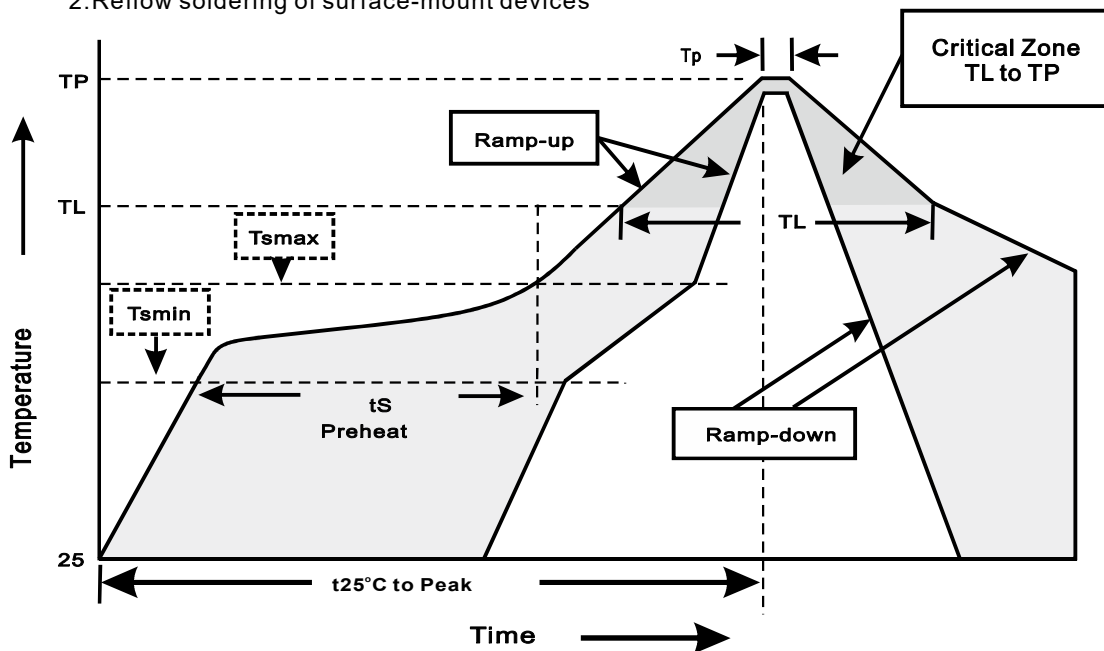
Item	Symbol	Tolerance	SOT-89
Carrier width	A	0.1	4.85
Carrier length	B	0.1	4.45
Carrier depth	C	0.1	1.85
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D1	min	-
7" Reel outside diameter	D	1.0	180.00
7" Reel inner diameter	D1	1.5	60.00
Feed hole diameter	D2	0.2	13.00
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	0.01	0.292
Tape width	W	0.1	12.00
Reel width	W1	0.2	16.50

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

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-89	7"	1,000	8.0	10,000	183*123*183	178	382*257*387	80,000	18.5

1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
2.Reflow soldering of surface-mount devices



Profile Feature	Soldering Condition
Average ramp-up rate(T_L to T_P)	$<3^{\circ}\text{C}/\text{sec}$
Preheat -Temperature Min(T_{min}) -Temperature Max(T_{max}) -Time(min to max)(t_s)	150°C 200°C $60\sim 120\text{sec}$
T_{max} to T_L -Ramp-upRate	$<3^{\circ}\text{C}/\text{sec}$
Time maintained above: -Temperature(T_L) -Time(t_L)	217°C $60\sim 260\text{sec}$
Peak Temperature(T_P)	$255^{\circ}\text{C}-0/+5^{\circ}\text{C}$
Time within 5°C of actual Peak Temperature(t_P)	$10\sim 30\text{sec}$
Ramp-down Rate	$<6^{\circ}\text{C}/\text{sec}$
Time 25°C to Peak Temperature	$<6\text{minutes}$