

F2SD31N-Q1-H

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F2SD31N-Q1-H

3.0A 100V NPN Silicon Power Transistor

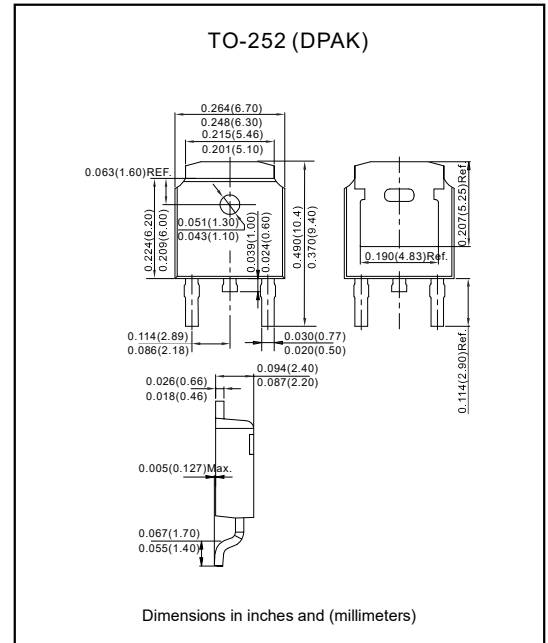
Features

- Designed for general purpose amplifier and low speed applications.
- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21).

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, TO-252 (DPAK).
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position : Any.
- Weight : Approximated 0.35 gram.

Package outline



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

Parameter	Symbol	Ratings	Units
Collector to base voltage	V_{CBO}	100	V
Collector to Emitter Voltage	V_{CEO}	100	V
Emitter to base voltage	V_{EBO}	5	V
Continuous collector current	I_C	3	A
Collector power dissipation	P_C	1.25	W
Junction temperature	T_J	+150	$^{\circ}\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^{\circ}\text{C}$

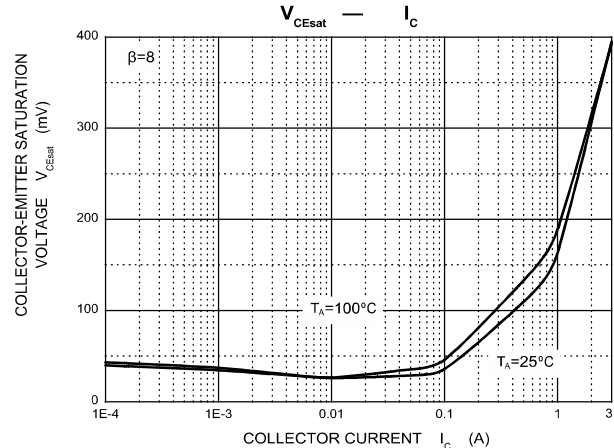
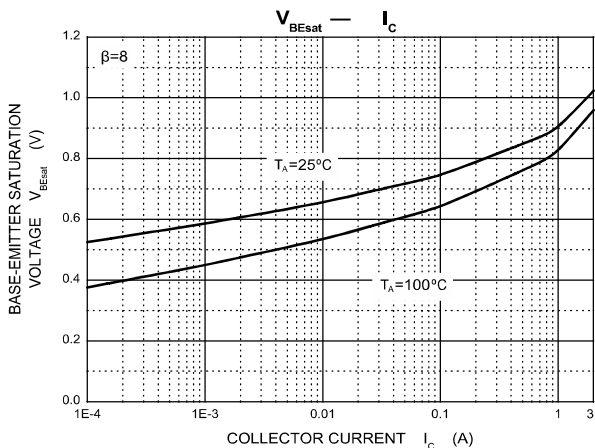
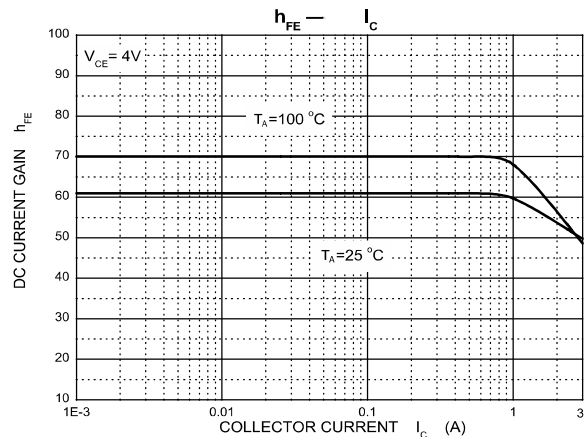
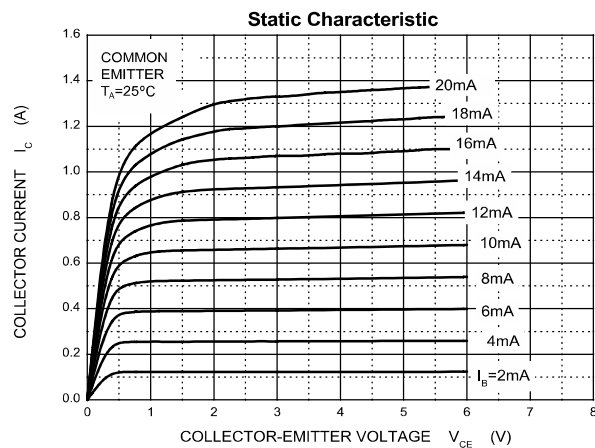
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Electrical characteristics (At T_J=25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector-base breakdown voltage	I _C = 1mA, I _E = 0	V _{(BR)CBO}	100			V
Collector-emitter breakdown voltage (Note1)	I _C = 30mA, I _B = 0	V _{(BR)CEO}	100			V
Emitter-base breakdown voltage	I _E = 1mA, I _C = 0	V _{(BR)EBO}	5			V
Collector cut-off current	V _{CE} = 100V, V _{EB} = 0	I _{CES}			20	μA
Collector cut off current	V _{CB} = 60V, I _B = 0	I _{CEO}			50	μA
Emitter cut-off current	V _{EB} = 5V, I _C = 0	I _{EBO}			1	mA
Collector-emitter saturation voltage	I _C = 3A, I _B = 0.375A	V _{CE(SAT)}			1.2	V
Base-emitter saturation voltage	I _C = 3A, V _{CE} = 4V	V _{BE(on)}			1.8	V
DC current gain	V _{CE} = 4V, I _C = 1A	h _{FE1}	25			
	V _{CE} = 4V, I _C = 3A	h _{FE2}	15		75	

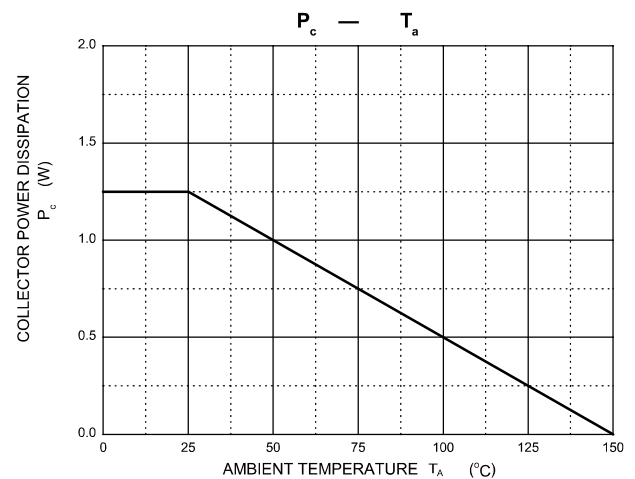
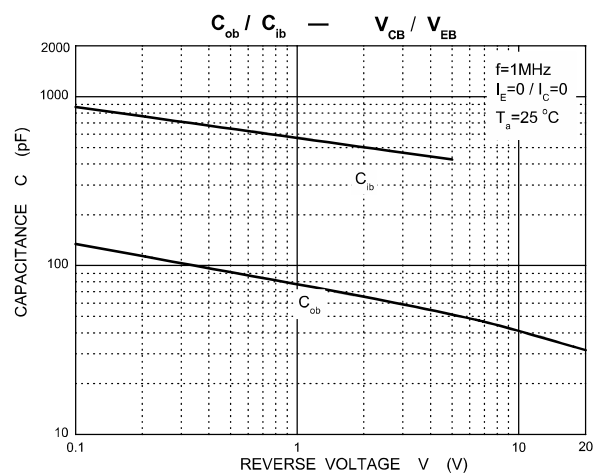
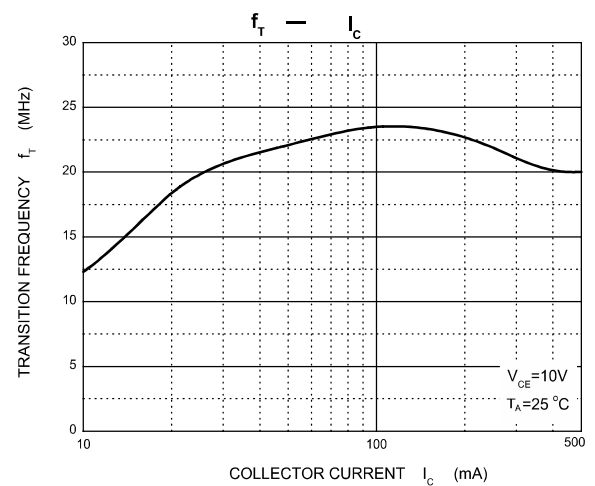
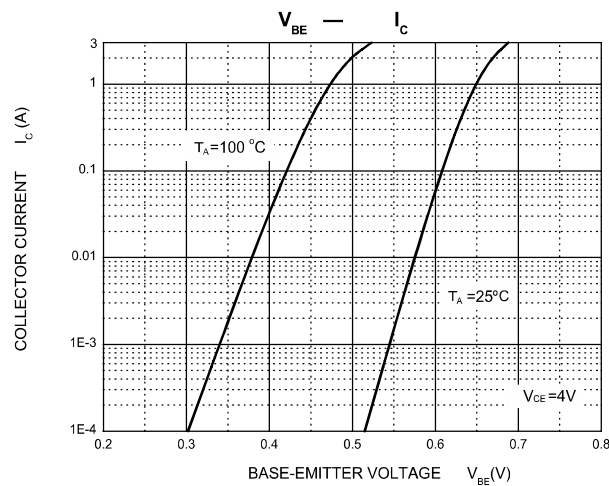
Note: 1. Pulse test: P_w ≤ 300μs, duty cycles ≤ 2%.

Rating and characteristic curves

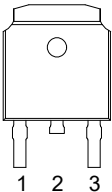
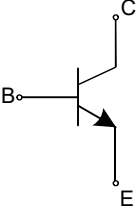


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Rating and characteristic curves

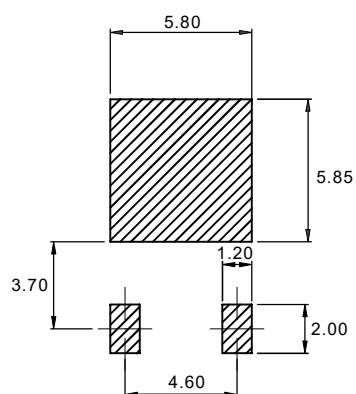


F2SD31N-Q1-H**Pinning information**

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

Marking

Type number	Marking Code
F2SD31N-Q1-H	SD31N

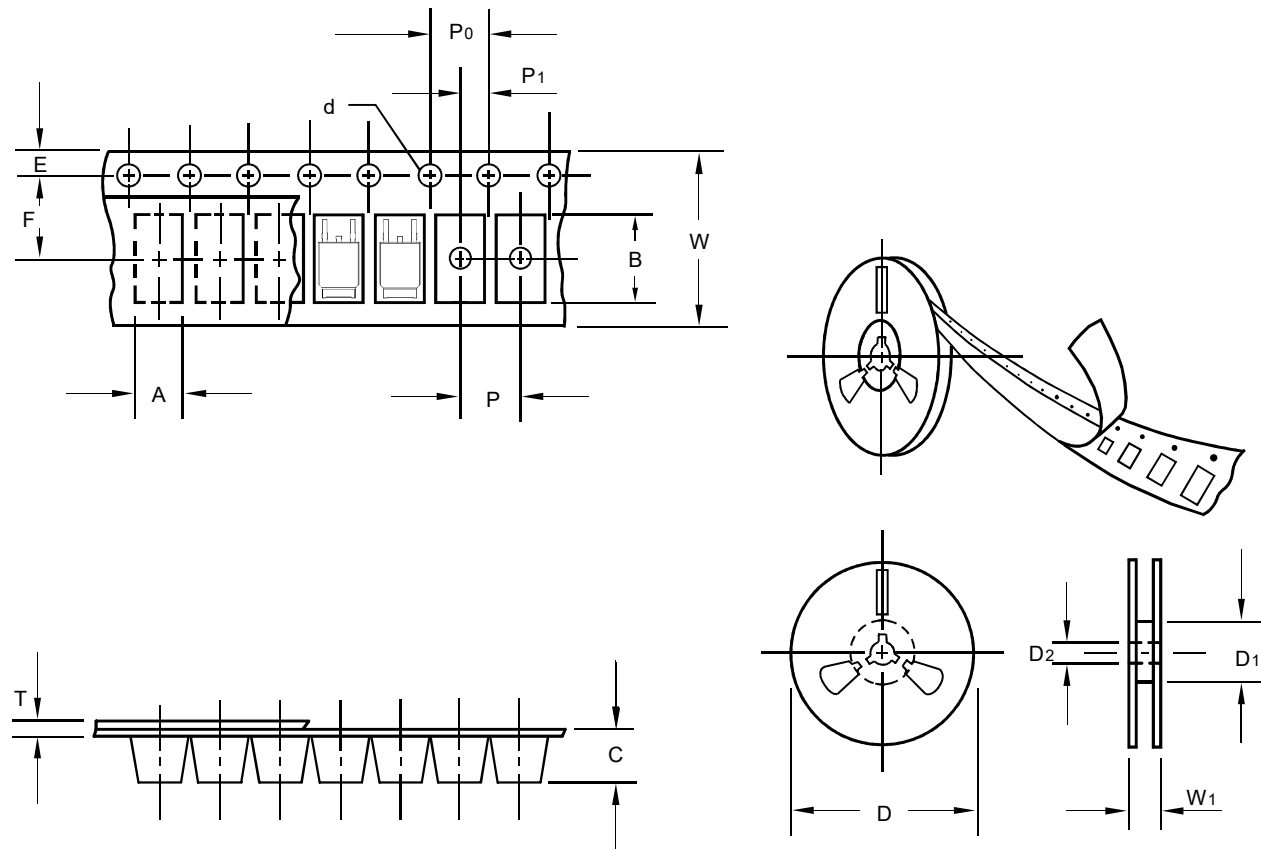
Suggested solder pad layout

Note:

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

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Packing information



unit:mm

Item	Symbol	Tolerance	TO-252
Carrier width	A	0.1	6.90
Carrier length	B	0.1	10.50
Carrier depth	C	0.1	2.70
Sprocket hole	d	0.1	1.55
13" Reel outside diameter	D	2.0	330.00
13" Reel inner diameter	D1	min	100.00
7" Reel outside diameter	D	2.0	-
7" Reel inner diameter	D1	min	-
Feed hole diameter	D2	0.5	21.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	7.50
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	0.23
Tape width	W	0.3	16.00
Reel width	W1	1.0	21.00

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

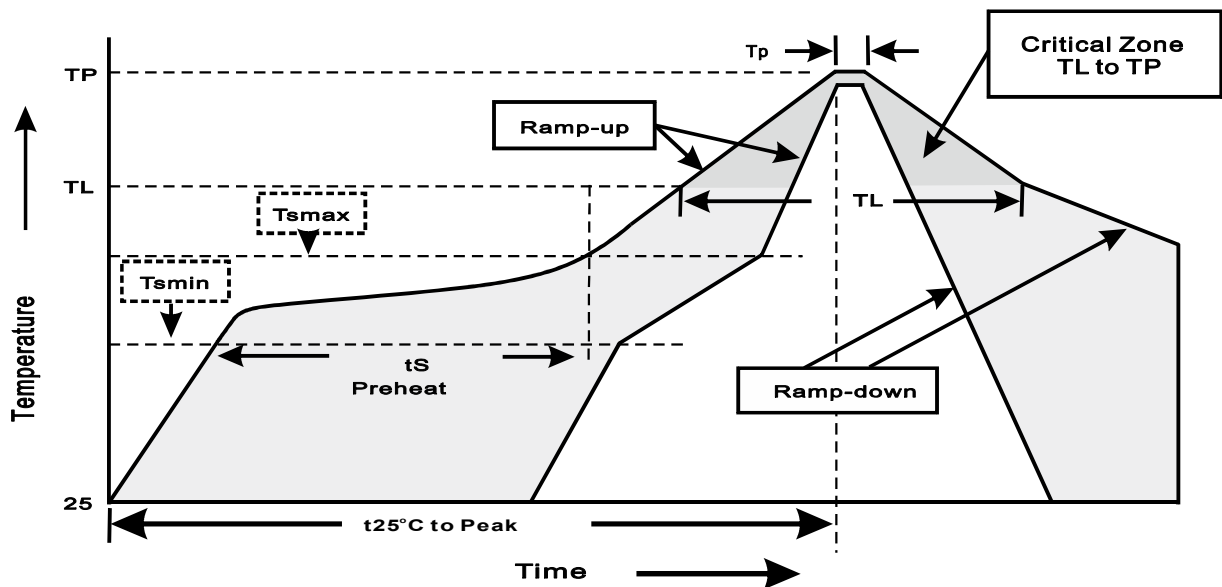
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Reel packing

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)
TO-252	13"	2,500	8.0	5,000	335*335*38	330	350*350*225	25,000

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 _{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	<3°C/sec
Time 25°C to Peak Temperature	<6minutes

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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%BVCEO (Tj=Tj 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%BVCEO Test Duration: 1000hrs	JESD22-A101