

FCX493U-Q1

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FCX493U-Q1

1A, 100V NPN Plastic-Encapsulate Transistor

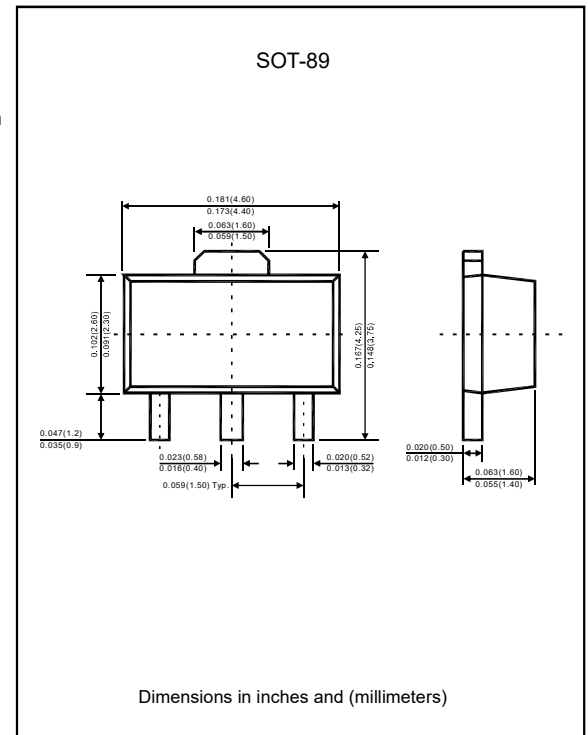
Features

- $V_{(BR)CEO} > 100V$.
- $I_C = 1A$ high Continuous Current.
- Low saturation voltage $V_{CE(sat)} < 300mV$, @ 250mA.
- -Q1 for automotive and other applications requiring unique site and control change requirements; AEC-Q101 qualified and PPAP capable.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen free parts, ex. FCX493U-Q1-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}	120	V
Collector to emitter voltage	V_{CEO}	100	V
Emitter to base voltage	V_{EBO}	7	V
Collector current-continuous	I_C	1	A
Peak pulse current	I_{CM}	2	A
Continuous base current	I_B	200	mA
Collector power dissipation	P_C	1	W
Thermal resistance junction to ambient air	$R_{\theta JA}$	125	$^\circ C/W$
Thermal resistance junction to leads	$R_{\theta JL}$	10.01	$^\circ C/W$
Operating temperature range	T_J	-65 to +150	$^\circ C$
Storage temperature range	T_{STG}	-65 to +150	$^\circ C$

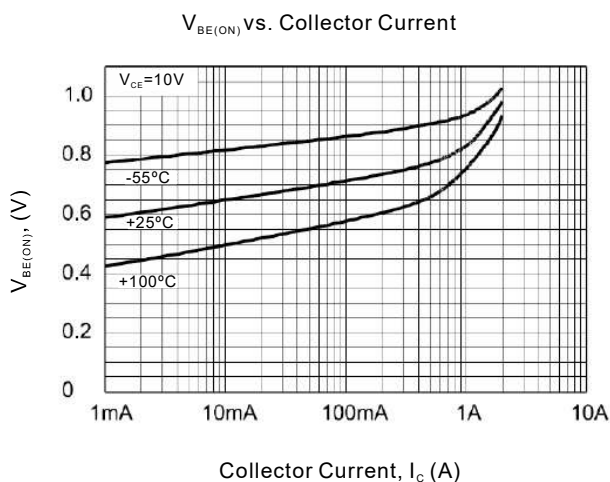
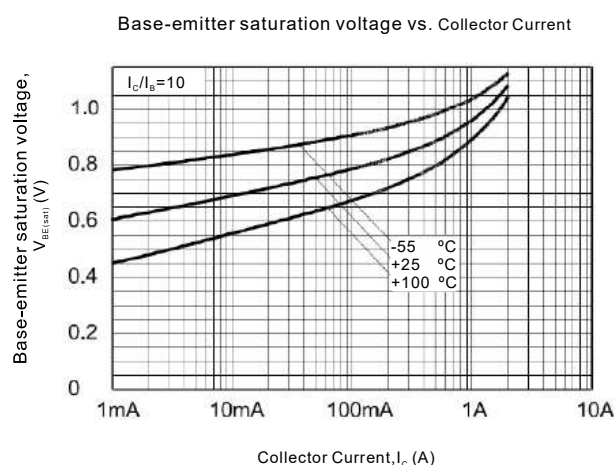
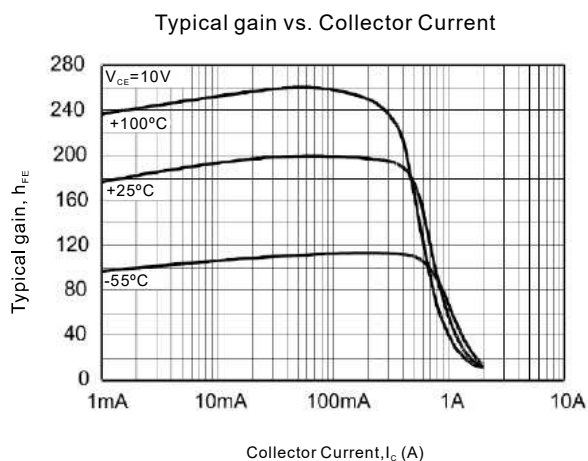
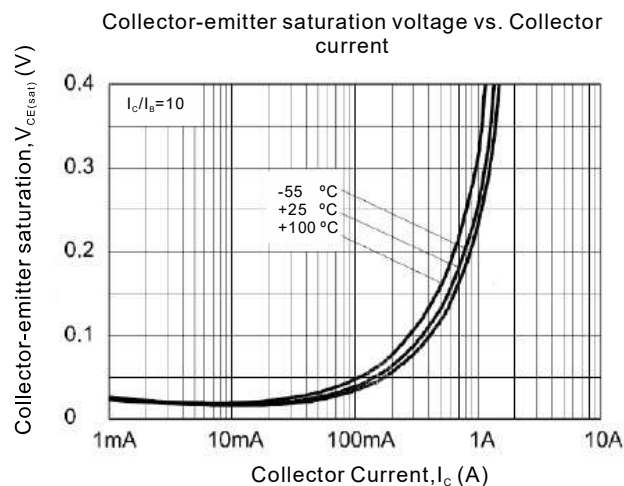
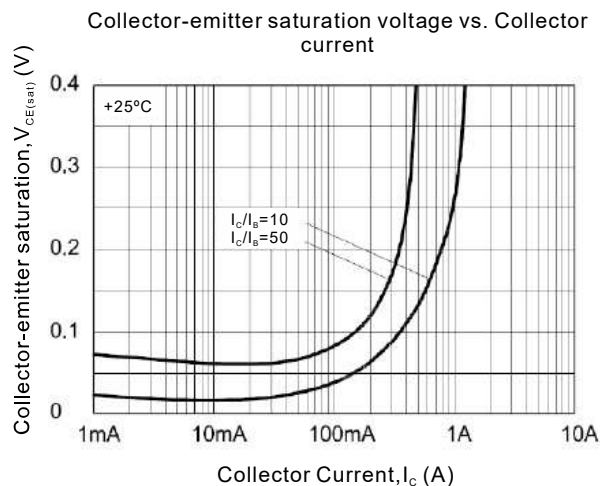
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Electrical characteristics (At $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Off characteristics						
Collector-base breakdown voltage	$I_C=100\mu A, I_E=0$	$V_{(BR)CBO}$	120			V
Collector-emitter breakdown voltage	$I_C=1mA, I_B=0$	$V_{(BR)CEO}$	100			V
Emitter-base breakdown voltage	$I_E=100\mu A, I_C=0$	$V_{(BR)EBO}$	7			V
Collector-base cut off current	$V_{CB}=100V, I_E=0$	I_{CBO}			100	nA
Emitter-base cut off current	$V_{EB}=5V, I_C=0$	I_{EBO}			100	nA
Collector-Emitter cut off current	$V_{CES}=100V$	I_{CES}			100	nA
On characteristics						
DC current gain current gain	$V_{CE}=10V, I_C=1mA$	h_{FE}	100			
	$V_{CE}=10V, I_C=250mA$		100		300	
	$V_{CE}=10V, I_C=500mA$		60			
	$V_{CE}=10V, I_C=1000mA$		20			
Base-emitter saturation voltage	$I_C=1A, I_B=100mA$	$V_{BE(sat)}$			1.15	V
Collector-emitter saturation voltage	$I_C=500mA, I_B=50mA$	$V_{CE(sat)}$			0.3	V
	$I_C=1A, I_B=100mA$				0.6	V
Small signal characteristics						
Output capacitance	$V_{CB}=10V, I_E=0, f=1MHz$	C_{ob}			10	pF
Gain-bandwidth product	$V_{CE}=10V, I_C=50mA, f=100MHz$	f_T	150			MHZ

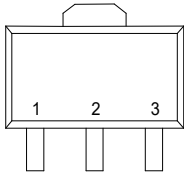
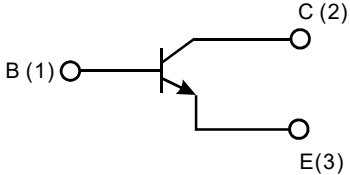
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Rating and characteristic curves



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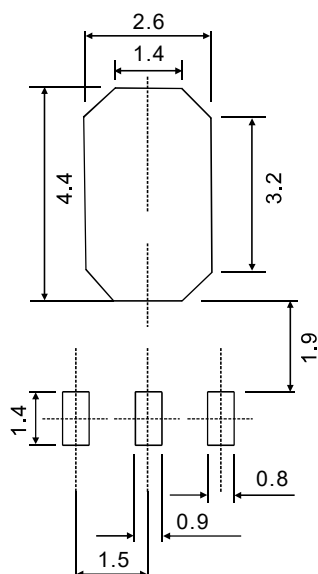
Pinning information

Pin	Simplified outline	Symbol
Pin1 Base Pin2 Collector Pin3 Emitter		

Marking

Type number	Marking code
FCX493U-Q1	N93

Suggested solder pad layout

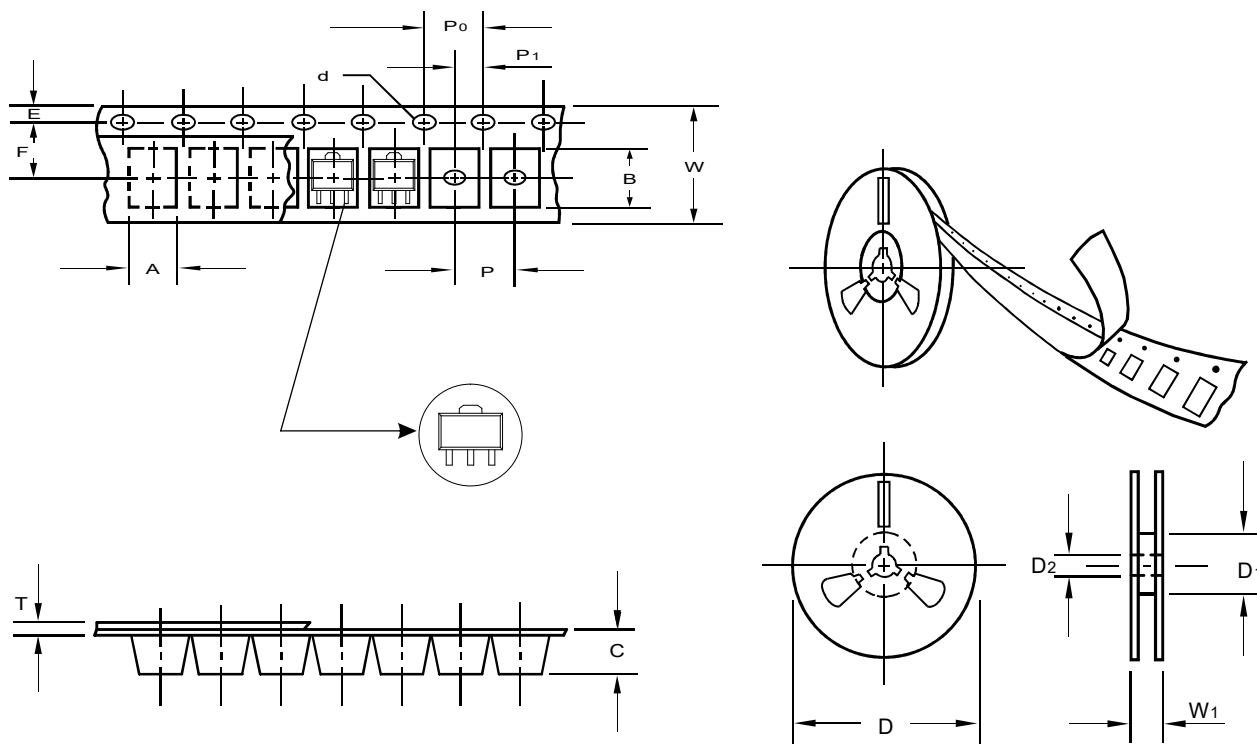


Note :

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	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	D ₁	min	-
7" Reel outside diameter	D	1.0	180.00
7" Reel inner diameter	D ₁	1.5	60.00
Feed hole diameter	D ₂	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	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.01	0.292
Tape width	W	0.1	12.00
Reel width	W ₁	0.2	16.50

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

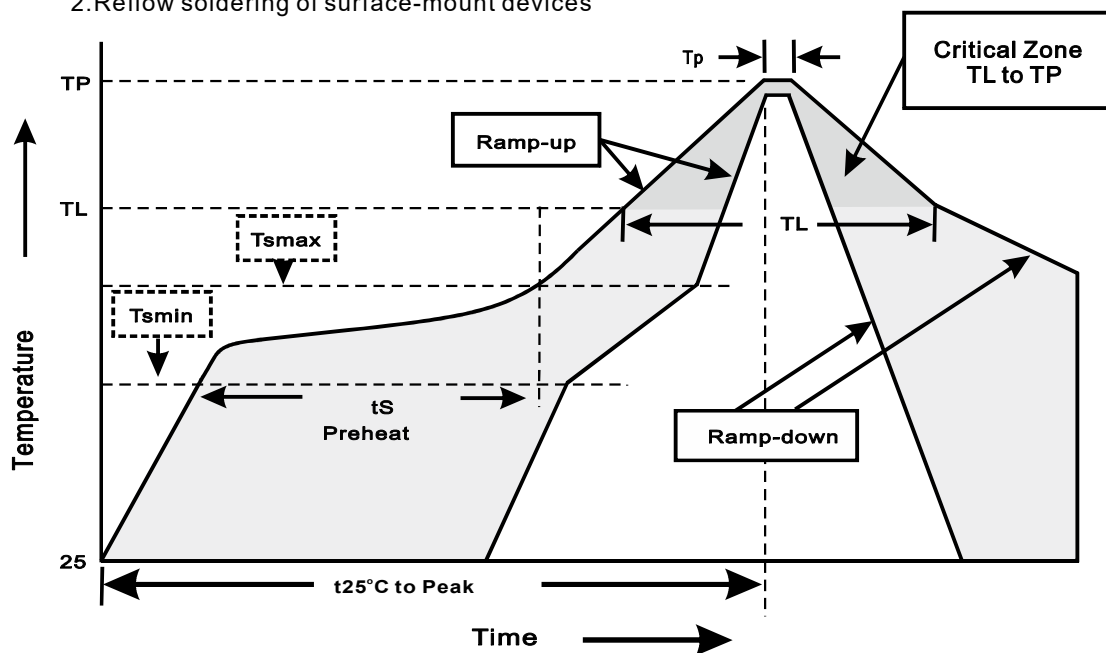
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Reel packing

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

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(TL to TP)	<3°C/sec
Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(ts)	150°C 200°C 60~120sec
Tsmax to TL -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(TL) -Time(tL)	217°C 60~260sec
Peak Temperature(TP)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(tp)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes