

# XN04390

Silicon NPN epitaxial planer transistor (Tr1)  
 Silicon PNP epitaxial planer transistor (Tr2)

For digital circuit  
 For switching

■ Features

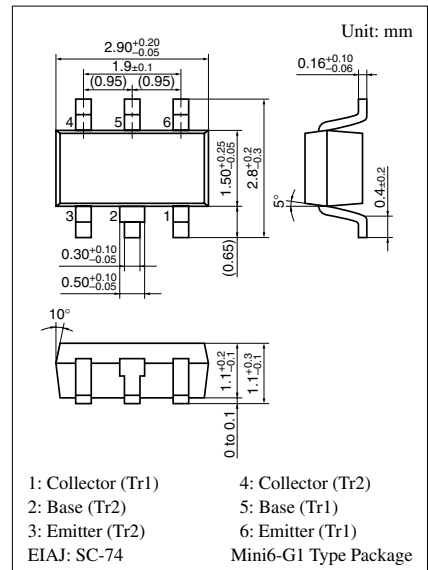
- Two elements incorporated into one package.  
 (Transistor with built-in resistor)
- Reduction of the mounting area and assembly cost by one half.

■ Basic Part Number of Element

- UNR212X (UN212X) + UNR2223 (UN2223)

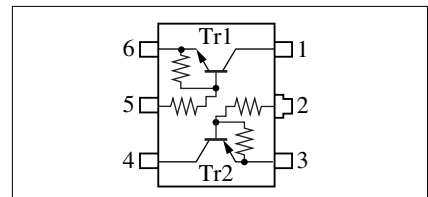
■ Absolute Maximum Ratings  $T_a = 25^\circ\text{C}$

	Parameter	Symbol	Rating	Unit
Tr1	Collector to base voltage	$V_{CBO}$	50	V
	Collector to emitter voltage	$V_{CEO}$	50	V
	Collector current	$I_C$	500	mA
Tr2	Collector to base voltage	$V_{CBO}$	-50	V
	Collector to emitter voltage	$V_{CEO}$	-50	V
	Collector current	$I_C$	-500	mA
Overall	Total power dissipation	$P_T$	300	mW
	Junction temperature	$T_j$	150	$^\circ\text{C}$
	Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$



Marking Symbol: DY

Internal Connection



Note) The part number in the parenthesis shows conventional part number.

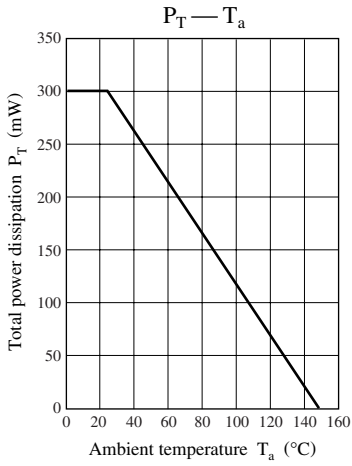
**■ Electrical Characteristics**  $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$ 
**• Tr1**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector to base voltage	$V_{\text{CBO}}$	$I_{\text{C}} = 10 \mu\text{A}, I_{\text{E}} = 0$	50			V
Collector to emitter voltage	$V_{\text{CEO}}$	$I_{\text{C}} = 2 \text{mA}, I_{\text{B}} = 0$	50			V
Collector cutoff current	$I_{\text{CBO}}$	$V_{\text{CB}} = 50 \text{V}, I_{\text{E}} = 0$			1	$\mu\text{A}$
	$I_{\text{CEO}}$	$V_{\text{CE}} = 50 \text{V}, I_{\text{B}} = 0$			1	$\mu\text{A}$
Emitter cutoff current	$I_{\text{EBO}}$	$V_{\text{EB}} = 6 \text{V}, I_{\text{C}} = 0$			1	mA
Forward current transfer ratio	$h_{\text{FE}}$	$V_{\text{CE}} = 10 \text{V}, I_{\text{C}} = 100 \text{mA}$	60			
Collector to emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_{\text{C}} = 100 \text{mA}, I_{\text{B}} = 5 \text{mA}$			0.25	V
High-level output voltage	$V_{\text{OH}}$	$V_{\text{CC}} = 5 \text{V}, V_{\text{B}} = 0.5 \text{V}, R_{\text{L}} = 500 \Omega$	4.9			V
Low-level output voltage	$V_{\text{OL}}$	$V_{\text{CC}} = 5 \text{V}, V_{\text{B}} = 3.5 \text{V}, R_{\text{L}} = 500 \Omega$			0.2	V
Input resistance	$R_1$		-30%	10	+30%	k $\Omega$
Resistance ratio	$R_1/R_2$		0.8	1.0	1.2	
Transition frequency	$f_{\text{T}}$	$V_{\text{CB}} = 10 \text{V}, I_{\text{E}} = -50 \text{mA}, f = 200\text{MHz}$		200		MHz

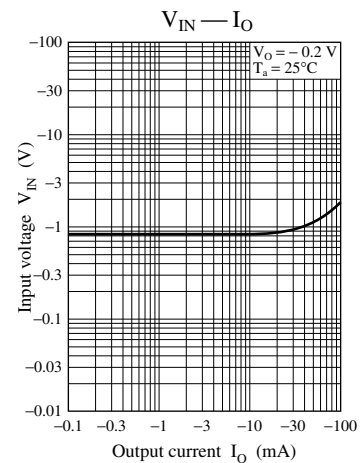
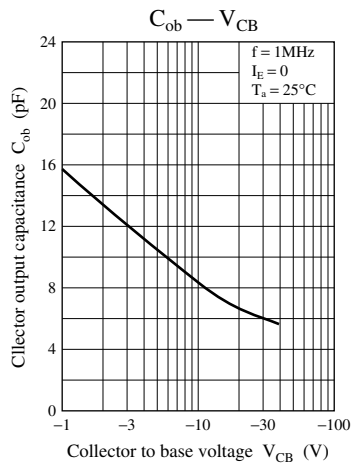
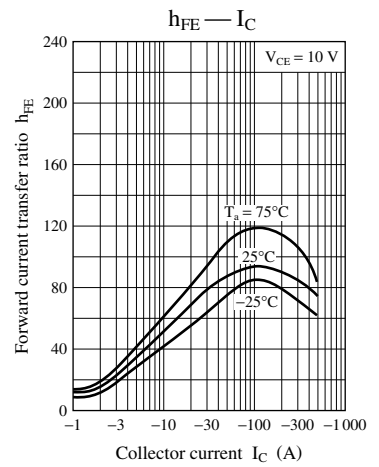
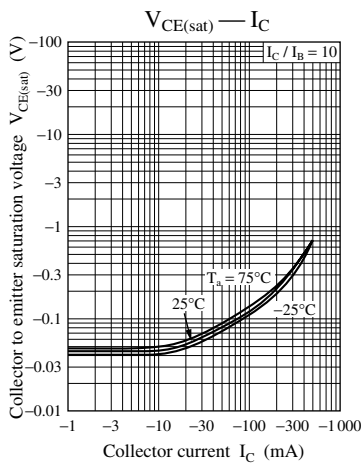
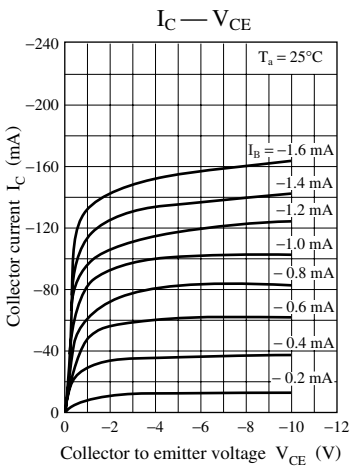
**• Tr2**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector to base voltage	$V_{\text{CBO}}$	$I_{\text{C}} = -10 \mu\text{A}, I_{\text{E}} = 0$	-50			V
Collector to emitter voltage	$V_{\text{CEO}}$	$I_{\text{C}} = -2 \text{mA}, I_{\text{B}} = 0$	-50			V
Collector cutoff current	$I_{\text{CBO}}$	$V_{\text{CB}} = -50 \text{V}, I_{\text{E}} = 0$			-0.1	$\mu\text{A}$
	$I_{\text{CEO}}$	$V_{\text{CE}} = -50 \text{V}, I_{\text{B}} = 0$			-0.5	$\mu\text{A}$
Emitter cutoff current	$I_{\text{EBO}}$	$V_{\text{EB}} = -6 \text{V}, I_{\text{C}} = 0$			-2.0	mA
Forward current transfer ratio	$h_{\text{FE}}$	$V_{\text{CE}} = -10 \text{V}, I_{\text{C}} = -100 \text{mA}$	20			
Collector to emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_{\text{C}} = -10 \text{mA}, I_{\text{B}} = -0.3 \text{mA}$			-0.25	V
High-level output voltage	$V_{\text{OH}}$	$V_{\text{CC}} = -5 \text{V}, V_{\text{B}} = -0.5 \text{V}, R_{\text{L}} = 500 \Omega$	-4.9			V
Low-level output voltage	$V_{\text{OL}}$	$V_{\text{CC}} = -5 \text{V}, V_{\text{B}} = -3.5 \text{V}, R_{\text{L}} = 500 \Omega$			-0.2	V
Input resistance	$R_1$		-30%	0.27	+30%	k $\Omega$
Resistance ratio	$R_1/R_2$		0.043	0.054	0.065	
Transition frequency	$f_{\text{T}}$	$V_{\text{CB}} = -10 \text{V}, I_{\text{E}} = 50 \text{mA}, f = 200\text{MHz}$		200		MHz

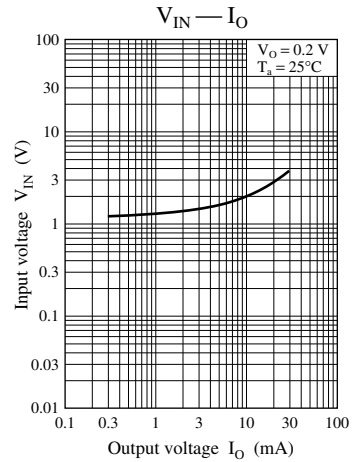
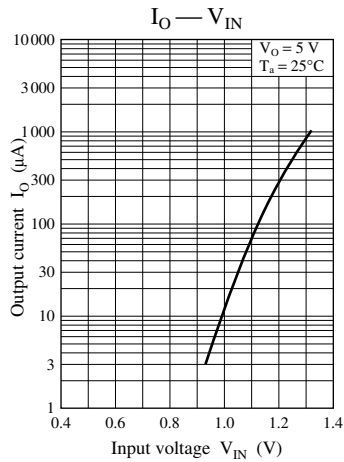
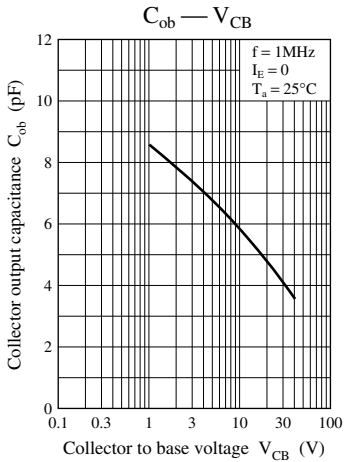
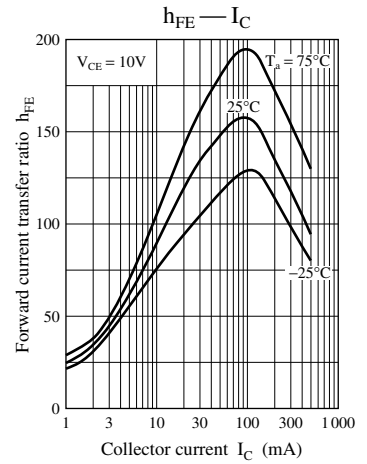
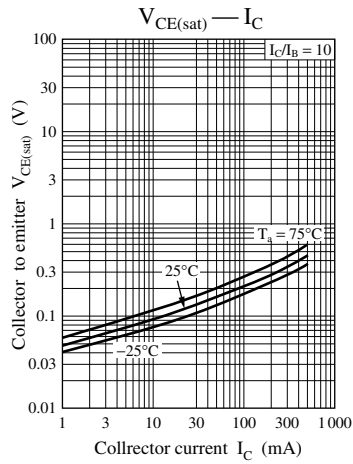
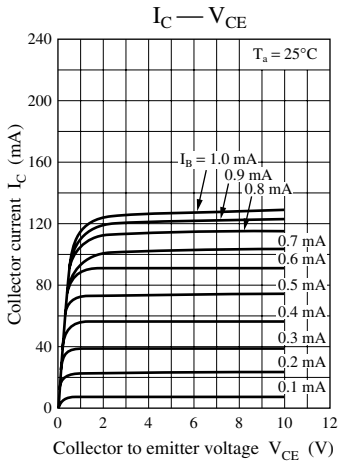
Common characteristics chart



Characteristics chart of Tr1



Characteristics chart of Tr2



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