

XP03389

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

For digital circuits

■ Features

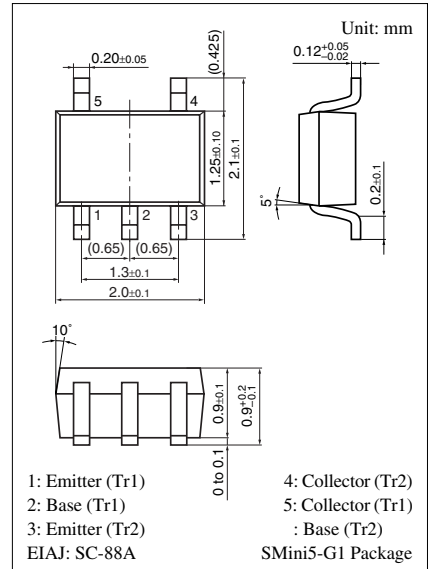
- Two elements incorporated into one package
 (Transistors with built-in resistor)
- Reduction of the mounting area and assembly cost by one half

■ Basic Part Number of Element

- UNR2211 (UN2211) + UNR2118 (UN2118)

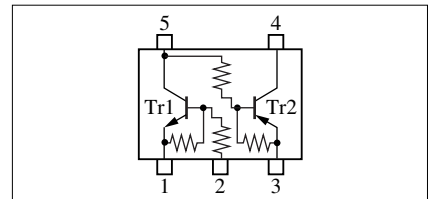
■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

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}	100	mA
Tr2	Collector to base voltage	V_{CBO}	-50	V
	Collector to emitter voltage	V_{CEO}	-50	V
	Collector current	I_{C}	-100	mA
Total	Total power dissipation	P_{T}	150	mW
	Junction temperature	T_{j}	150	$^\circ\text{C}$
	Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$



Marking Symbol: DX

Internal Connection



■ 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_{CBO}	$I_{\text{C}} = 10 \mu\text{A}, I_{\text{E}} = 0$	50			V
Collector to emitter voltage	V_{CEO}	$I_{\text{C}} = 2 \text{ mA}, I_{\text{B}} = 0$	50			V
Collector cutoff current	I_{CBO}	$V_{\text{CB}} = 50 \text{ V}, I_{\text{E}} = 0$			0.1	μA
	I_{CEO}	$V_{\text{CE}} = 50 \text{ V}, I_{\text{B}} = 0$			0.5	
Emitter cutoff current	I_{EBO}	$V_{\text{EB}} = 6 \text{ V}, I_{\text{C}} = 0$			0.5	mA
DC current gain	h_{FE}	$V_{\text{CE}} = 10 \text{ V}, I_{\text{C}} = 5 \text{ mA}$	35			
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_{OH}	$V_{\text{CC}} = 5 \text{ V}, V_{\text{B}} = 0.5 \text{ V}, R_{\text{L}} = 1 \text{ k}\Omega$	4.9			V
Low-level output voltage	V_{OL}	$V_{\text{CC}} = 5 \text{ V}, V_{\text{B}} = 2.5 \text{ V}, R_{\text{L}} = 1 \text{ k}\Omega$			0.2	V
Input resistance	R_{I}		-30%	10	+30%	$\text{k}\Omega$
Resistance ratio	$R_{\text{I}}/R_{\text{2}}$		0.8	1.0	1.2	
Gain bandwidth product	f_{T}	$V_{\text{CB}} = 10 \text{ V}, I_{\text{E}} = -2 \text{ mA}, f = 200\text{MHz}$		150		MHz

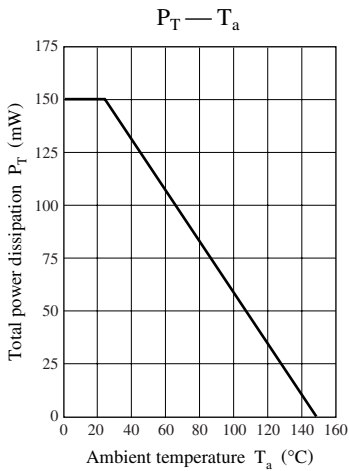
Note) The part number in the parenthesis shows conventional part number.

■ Electrical Characteristics (continued) $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

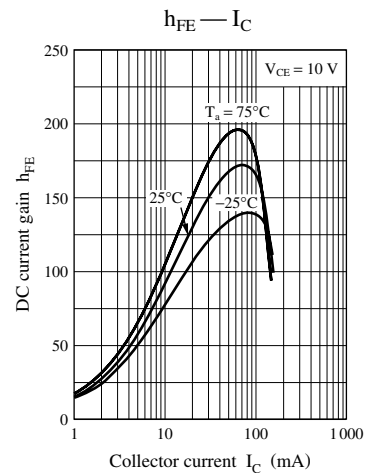
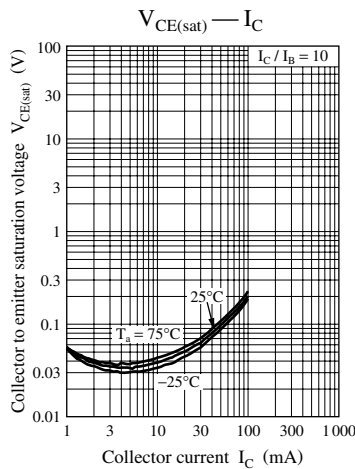
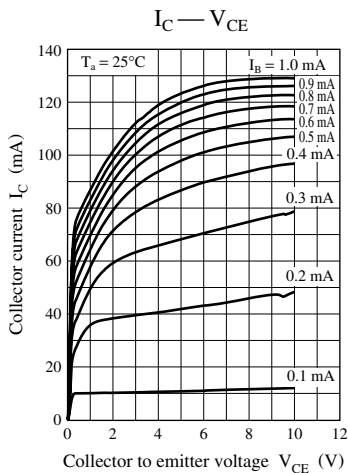
• Tr2

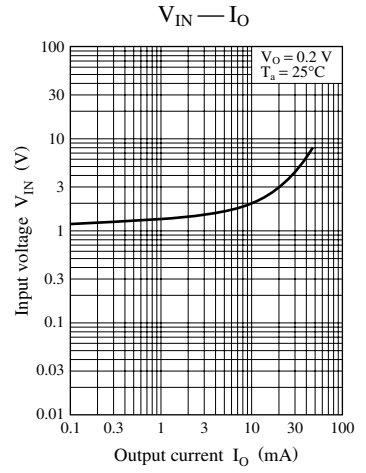
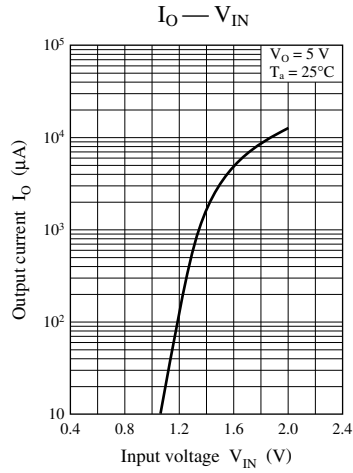
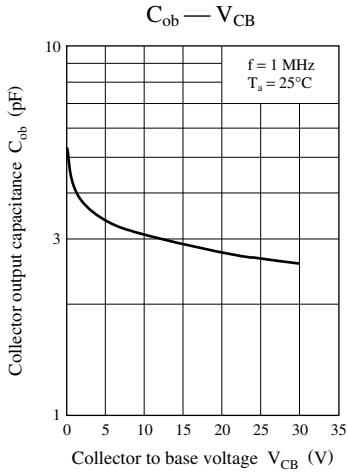
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector to base voltage	V_{CBO}	$I_C = -10 \mu\text{A}, I_E = 0$	-50			V
Collector to emitter voltage	V_{CEO}	$I_C = -2 \text{ mA}, I_B = 0$	-50			V
Collector cutoff current	I_{CBO}	$V_{CB} = -50 \text{ V}, I_E = 0$			-0.1	μA
	I_{CEO}	$V_{CE} = -50 \text{ V}, I_B = 0$			-0.5	
Emitter cutoff current	I_{EBO}	$V_{EB} = -6 \text{ V}, I_C = 0$			-2.0	mA
DC current gain	h_{FE}	$V_{CE} = -10 \text{ V}, I_C = -5 \text{ mA}$	20			
Collector to emitter saturation voltage	$V_{CE(sat)}$	$I_C = -10 \text{ mA}, I_B = -0.3 \text{ mA}$			-0.25	V
High-level output voltage	V_{OH}	$V_{CC} = -5 \text{ V}, V_B = -0.5 \text{ V}, R_L = 1 \text{ k}\Omega$	-4.9			V
Low-level output voltage	V_{OL}	$V_{CC} = -5 \text{ V}, V_B = -2.5 \text{ V}, R_L = 1 \text{ k}\Omega$			-0.2	V
Input resistance	R_1		-30%	0.51	+30%	$\text{k}\Omega$
Resistance ratio	R_1/R_2		0.08	0.10	0.12	
Gain bandwidth product	f_T	$V_{CB} = -10 \text{ V}, I_E = 1 \text{ mA}, f = 200\text{MHz}$		80		MHz

Common characteristics chart

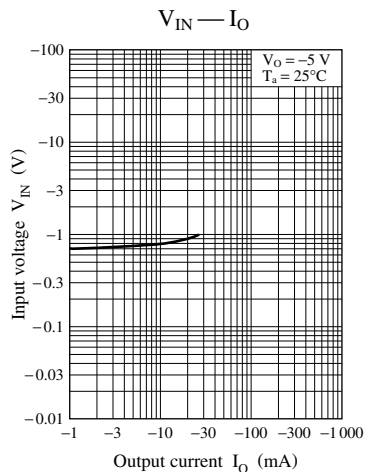
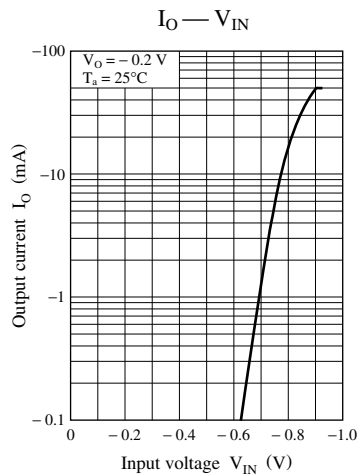
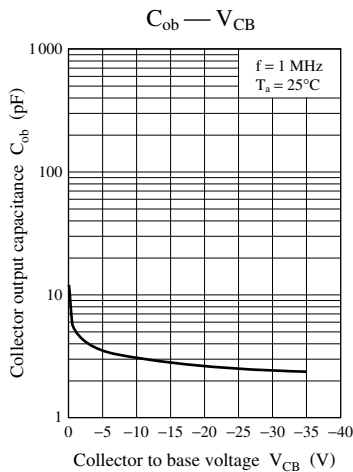
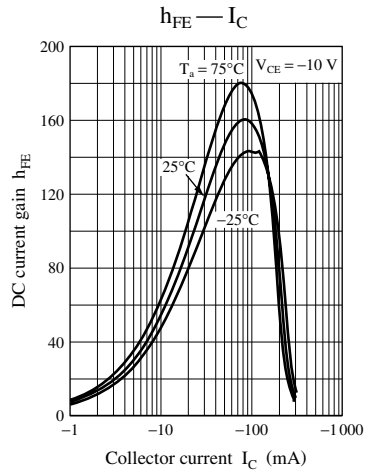
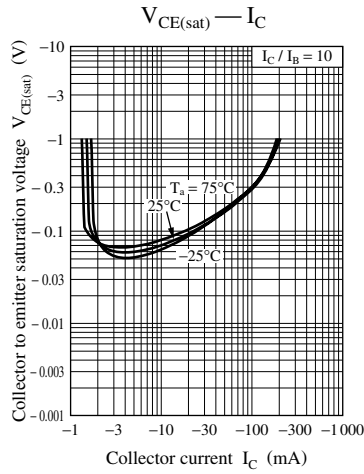
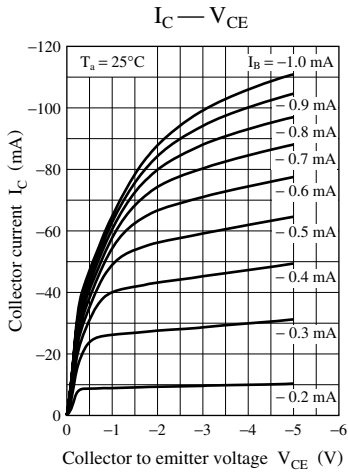


Characteristics chart of Tr1





Characteristics chart of Tr2



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