

# UNA0235

Silicon PNP epitaxial planar transistor (3 elements)  
 Silicon NPN epitaxial planar transistor (3 elements)

For motor drives  
 For small motor drive circuits in general

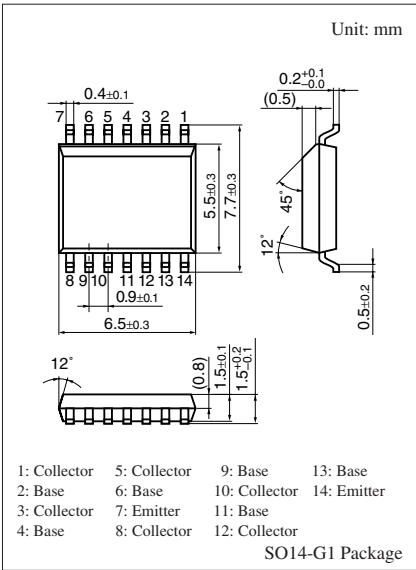
### ■ Features

- Small and lightweight
- Low power consumption
- Low-voltage drive
- With 6 elements incorporated

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

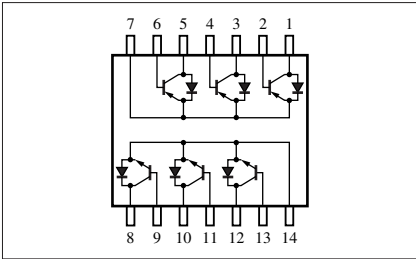
	Parameter	Symbol	Rating	Unit
PNP	Collector-base voltage (Emitter open)	$V_{\text{CBO}}$	-12	V
	Collector-emitter voltage (Base open)	$V_{\text{CEO}}$	-10	V
	Emitter-base voltage (Collector open)	$V_{\text{EBO}}$	-7	V
	Collector current	$I_{\text{C}}$	-3	A
	Peak collector current	$I_{\text{CP}}$	-4	A
NPN	Collector-base voltage (Emitter open)	$V_{\text{CBO}}$	12	V
	Collector-emitter voltage (Base open)	$V_{\text{CEO}}$	10	V
	Emitter-base voltage (Collector open)	$V_{\text{EBO}}$	7	V
	Collector current	$I_{\text{C}}$	3	A
	Peak collector current	$I_{\text{CP}}$	4	A
Overall	Total power dissipation *	$P_{\text{T}}$	0.5	W
	Junction temperature	$T_{\text{j}}$	150	$^{\circ}\text{C}$
	Storage temperature	$T_{\text{stg}}$	-55 to +150	$^{\circ}\text{C}$

Note) \*: When the dissipation on one device is  $T_{\text{C}} = 25^{\circ}\text{C}$



Marking Symbol: UN235

Internal Connection



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

## • PNP

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	$V_{\text{CBO}}$	$I_{\text{C}} = -10\ \mu\text{A}$ , $I_{\text{E}} = 0$	-12			V
Collector-emitter voltage (Base open)	$V_{\text{CEO}}$	$I_{\text{C}} = -1\ \text{mA}$ , $I_{\text{B}} = 0$	-10			V
Emitter-base voltage (Collector open)	$V_{\text{EBO}}$	$I_{\text{E}} = -10\ \mu\text{A}$ , $I_{\text{C}} = 0$	-7			V
Collector-base cutoff current (Emitter open)	$I_{\text{CBO}}$	$V_{\text{CB}} = -10\ \text{V}$ , $I_{\text{E}} = 0$			-1	$\mu\text{A}$
Forward current transfer ratio *1	$h_{\text{FE}}$	$V_{\text{CE}} = -1\ \text{V}$ , $I_{\text{C}} = -0.5\ \text{A}$	200		800	—
Collector-emitter saturation voltage *1	$V_{\text{CE(sat)}}$	$I_{\text{C}} = -2\ \text{A}$ , $I_{\text{B}} = -50\ \text{mA}$			-0.45	V
Transition frequency	$f_{\text{T}}$	$V_{\text{CB}} = -6\ \text{V}$ , $I_{\text{E}} = 50\ \text{mA}$ , $f = 200\ \text{MHz}$		150		MHz
Collector output capacitance (Common base, input open circuited)	$C_{\text{ob}}$	$V_{\text{CB}} = -10\ \text{V}$ , $I_{\text{E}} = 0$ , $f = 1\ \text{MHz}$		65		pF
Forward voltage *2	$V_{\text{F}}$	$I_{\text{F}} = -1\ \text{A}$			-1.5	V

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

2. \*1: Pulse measurement

\*2: Application to the internal diode

## • NPN

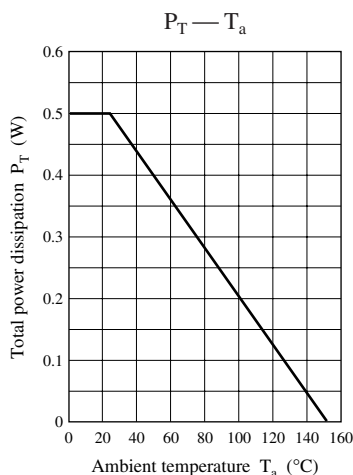
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	$V_{\text{CBO}}$	$I_{\text{C}} = 10\ \mu\text{A}$ , $I_{\text{E}} = 0$	12			V
Collector-emitter voltage (Base open)	$V_{\text{CEO}}$	$I_{\text{C}} = 1\ \text{mA}$ , $I_{\text{B}} = 0$	10			V
Emitter-base voltage (Collector open)	$V_{\text{EBO}}$	$I_{\text{E}} = 10\ \mu\text{A}$ , $I_{\text{C}} = 0$	7			V
Collector-base cutoff current (Emitter open)	$I_{\text{CBO}}$	$V_{\text{CB}} = 10\ \text{V}$ , $I_{\text{E}} = 0$			1	$\mu\text{A}$
Forward current transfer ratio *1	$h_{\text{FE}}$	$V_{\text{CE}} = 1\ \text{V}$ , $I_{\text{C}} = 0.5\ \text{A}$	200		800	—
Collector-emitter saturation voltage *1	$V_{\text{CE(sat)}}$	$I_{\text{C}} = 2\ \text{A}$ , $I_{\text{B}} = 50\ \text{mA}$			0.25	V
Transition frequency	$f_{\text{T}}$	$V_{\text{CB}} = 6\ \text{V}$ , $I_{\text{E}} = -50\ \text{mA}$ , $f = 200\ \text{MHz}$		150		MHz
Collector output capacitance (Common base, input open circuited)	$C_{\text{ob}}$	$V_{\text{CB}} = 10\ \text{V}$ , $I_{\text{E}} = 0$ , $f = 1\ \text{MHz}$		50		pF
Forward voltage *2	$V_{\text{F}}$	$I_{\text{F}} = 1\ \text{A}$			1.5	V

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

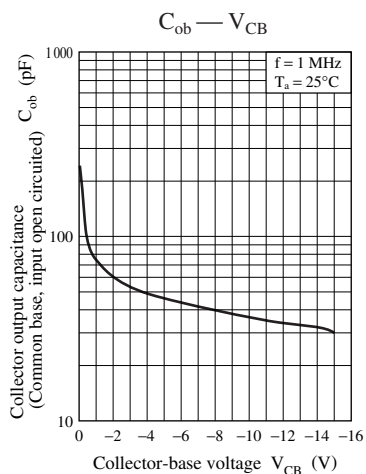
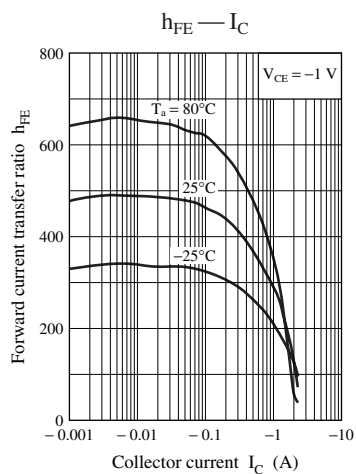
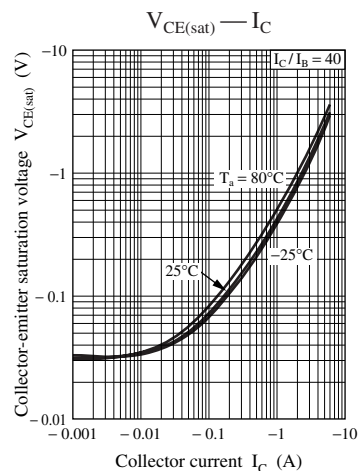
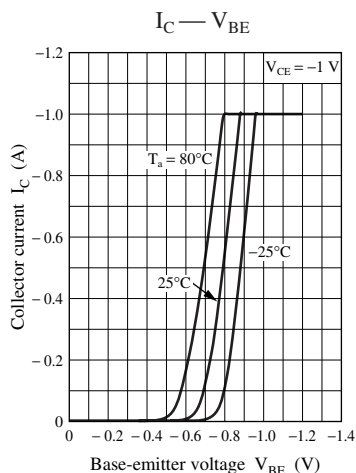
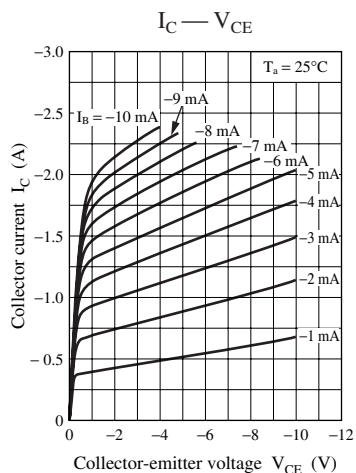
2. \*1: Pulse measurement

\*2: Application to the internal diode

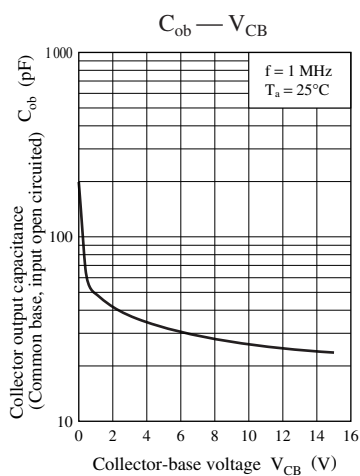
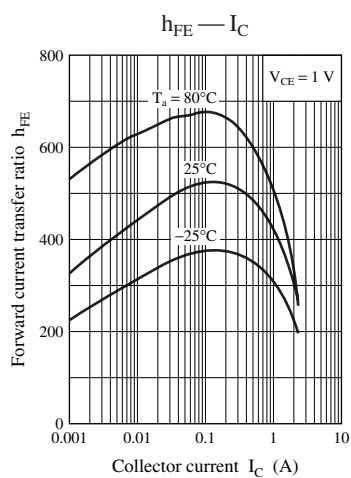
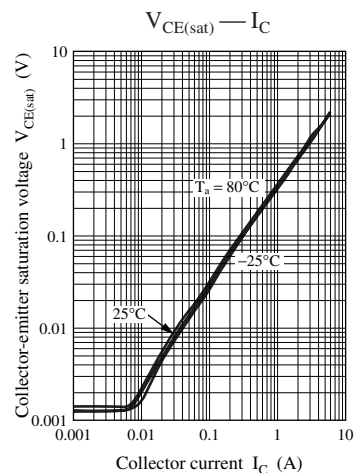
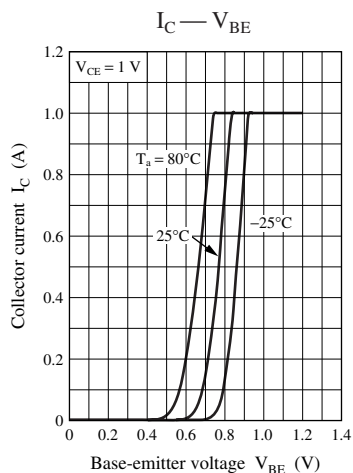
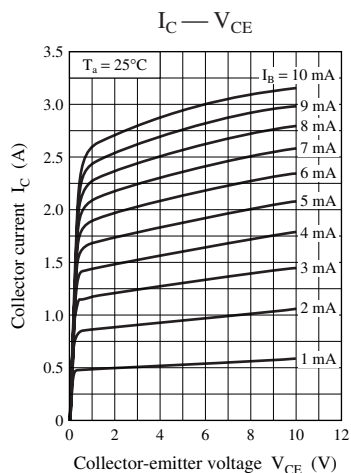
### Common characteristics chart



## Characteristics charts of PNP transistor block



## Characteristics charts of NPN transistor block



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