

# UNRF2A1

## Silicon NPN epitaxial planar transistor

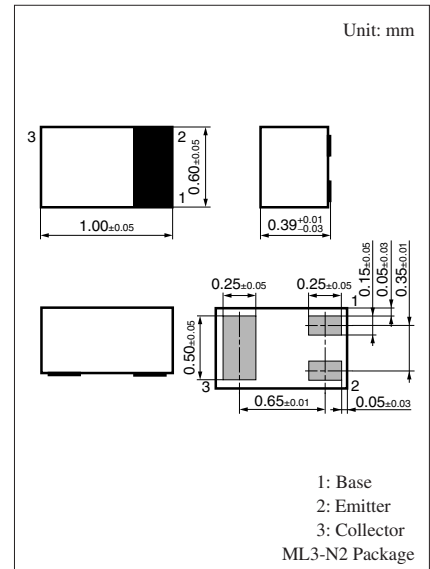
For digital circuits

### ■ Features

- Suitable for high-density mounting and downsizing of the equipment for Ultraminiature leadless package  
0.6 mm × 1.0 mm (height 0.39 mm)

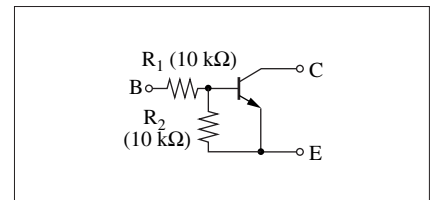
### ■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter	Symbol	Rating	Unit
Collector-base voltage (Emitter open)	$V_{\text{CBO}}$	50	V
Collector-emitter voltage (Base open)	$V_{\text{CEO}}$	50	V
Collector current	$I_{\text{C}}$	80	mA
Total power dissipation	$P_{\text{T}}$	100	mW
Junction temperature	$T_{\text{j}}$	125	$^\circ\text{C}$
Storage temperature	$T_{\text{stg}}$	-55 to +125	$^\circ\text{C}$



Marking Symbol: 1T

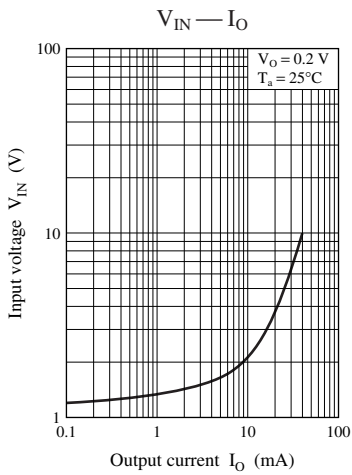
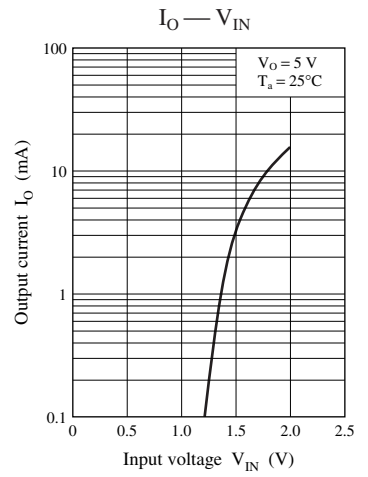
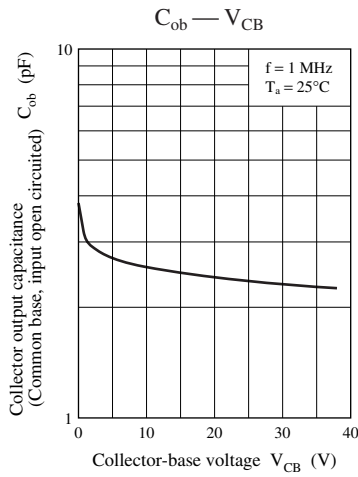
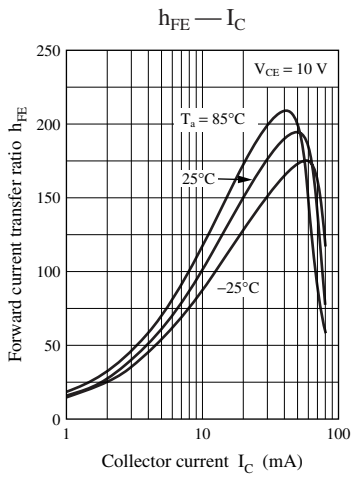
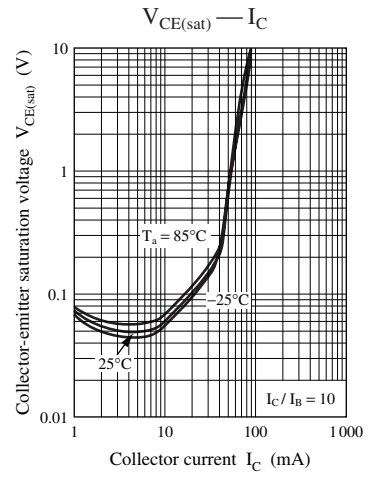
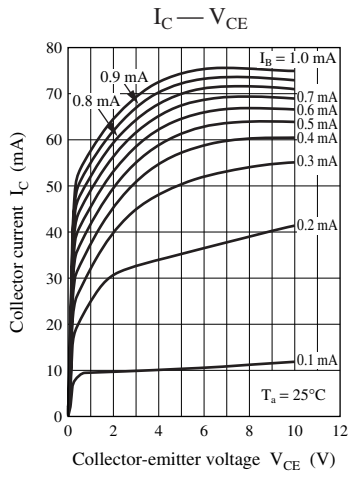
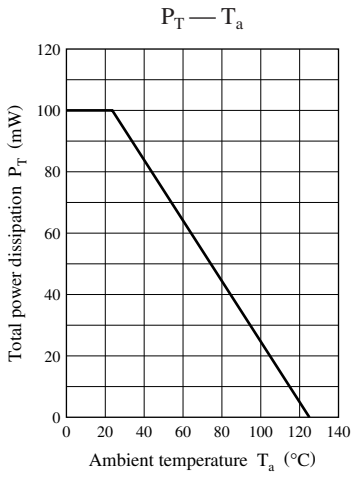
Internal Connection



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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	$V_{\text{CBO}}$	$I_{\text{C}} = 10 \mu\text{A}$ , $I_{\text{E}} = 0$	50			V
Collector-emitter voltage (Base open)	$V_{\text{CEO}}$	$I_{\text{C}} = 2 \text{ mA}$ , $I_{\text{B}} = 0$	50			V
Collector-base cutoff current (Emitter open)	$I_{\text{CBO}}$	$V_{\text{CB}} = 50 \text{ V}$ , $I_{\text{E}} = 0$			0.1	$\mu\text{A}$
Collector-emitter cutoff current (Base open)	$I_{\text{CEO}}$	$V_{\text{CE}} = 50 \text{ V}$ , $I_{\text{B}} = 0$			0.5	$\mu\text{A}$
Emitter-base cutoff current (Collector open)	$I_{\text{EBO}}$	$V_{\text{EB}} = 6 \text{ V}$ , $I_{\text{C}} = 0$			0.5	mA
Forward current transfer ratio	$h_{\text{FE}}$	$V_{\text{CE}} = 10 \text{ V}$ , $I_{\text{C}} = 5 \text{ mA}$	35			—
Collector-emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_{\text{C}} = 10 \text{ mA}$ , $I_{\text{B}} = 0.3 \text{ mA}$			0.25	V
Output voltage high level	$V_{\text{OH}}$	$V_{\text{CC}} = 5 \text{ V}$ , $V_{\text{B}} = 0.5 \text{ V}$ , $R_{\text{L}} = 1 \text{ k}\Omega$	4.9			V
Output voltage low level	$V_{\text{OL}}$	$V_{\text{CC}} = 5 \text{ V}$ , $V_{\text{B}} = 2.5 \text{ V}$ , $R_{\text{L}} = 1 \text{ k}\Omega$			0.2	V
Input resistance	$R_{\text{I}}$		-30%	10	+30%	$\text{k}\Omega$
Resistance ratio	$R_{\text{I}} / R_{\text{2}}$		0.8	1.0	1.2	—
Transition frequency	$f_{\text{T}}$	$V_{\text{CB}} = 10 \text{ V}$ , $I_{\text{E}} = -2 \text{ mA}$ , $f = 200 \text{ MHz}$		150		MHz

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



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