

# UNR3210/3213/3216/321L/321N

Silicon NPN epitaxial planar transistor

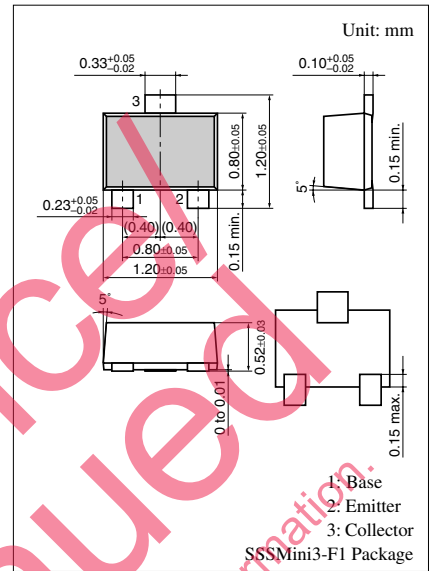
For digital circuits

**■ Features**

- Optimum for downsizing of the equipment and high-density mounting
- Contribute for low power consumption

**■ Resistance by Part Number**

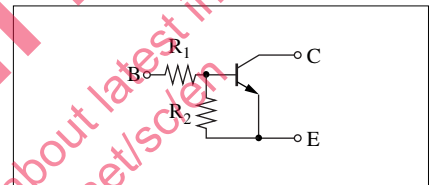
	Marking symbol	(R <sub>1</sub> )	(R <sub>2</sub> )
• UNR3210	8L	47 kΩ	—
• UNR3213	8C	47 kΩ	47 kΩ
• UNR3216	8F	4.7 kΩ	—
• UNR321L	8Q	4.7 kΩ	4.7 kΩ
• UNR321N	EX	4.7 kΩ	47 kΩ



**■ Absolute Maximum Ratings** T<sub>a</sub> = 25°C

Parameter	Symbol	Rating	Unit
Collector to base voltage	V <sub>CB0</sub>	50	V
Collector to emitter voltage	V <sub>CEO</sub>	50	V
Collector current	I <sub>C</sub>	100	mA
Total power dissipation	P <sub>T</sub>	100	mW
Junction temperature	T <sub>j</sub>	125	°C
Storage temperature	T <sub>stg</sub>	-55 to +125	°C

**Internal Connection**



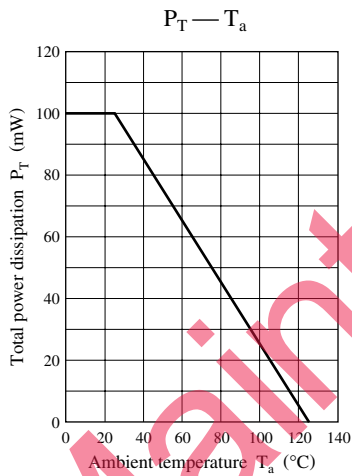
**■ Electrical Characteristics** T<sub>a</sub> = 25°C ± 3°C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector cutoff current	I <sub>CB0</sub>	V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0			0.1	μA
	I <sub>CEO</sub>	V <sub>CE</sub> = 50 V, I <sub>B</sub> = 0			0.5	
Emitter cutoff current	UNR3210/3216 UNR3213 UNR321N UNR321L	I <sub>EB0</sub> V <sub>EB</sub> = 6 V, I <sub>C</sub> = 0			0.01	mA
					0.1	
					0.2	
					2.0	
Collector to base voltage	V <sub>CB0</sub>	I <sub>C</sub> = 10 μA, I <sub>E</sub> = 0	50			V
Collector to emitter voltage	V <sub>CEO</sub>	I <sub>C</sub> = 2 mA, I <sub>B</sub> = 0	50			V
Forward current transfer ratio	UNR321L UNR3213 UNR321N UNR3210/3216	h <sub>FE</sub> V <sub>CE</sub> = 10 V, I <sub>C</sub> = 5 mA	20			
			80			
			80		400	
			160		460	
Collector to emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0.3 mA			0.25	V

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
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
		$V_{CC} = 5\text{ V}$ , $V_B = 3.5\text{ V}$ , $R_L = 1\text{ k}\Omega$				
Transition frequency	$f_T$	$V_{CB} = 10\text{ V}$ , $I_E = -2\text{ mA}$ , $f = 200\text{ MHz}$		150		MHz
Input resistance	UNR3216/321L/321N	$R_1$	-30%	4.7	+30%	k $\Omega$
	UNR3210/3213			47		
Resistance ratio		$R_1/R_2$	0.8	1.0	1.2	
	UNR321N		0.1			

Common characteristics chart



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