

2N5320/2N5321 2N5322/2N5323

10 Watt NPN-PNP Silicon Power

- $V_{CE(sat)}$... -0.7 V
- h_{FE} ... 40-250 @ $V_{CE} = 4.0$ V, $I_C = 0.5$ A
- Complements ... 2N5320, NPN (2N5322, PNP);
2N5321, NPN (2N5322, PNP)

PACKAGE

2N5320	TO-39
2N5321	TO-39
2N5322	TO-39
2N5323	TO-39

ABSOLUTE MAXIMUM RATINGS (Note 1)

Temperatures

Storage Temperature	-65°C to 200°C
Operating Junction Temperature	200°C

Power Dissipation (Notes 2 & 3)

Total Dissipation at 25°C Case Temperature	10 W
Linear Derating Factor	0.057W/°C

Voltages & Currents

	5320	5321
V_{CEO} Collector to Emitter Voltage	75 V	50 V
V_{CBO} Collector to Base Voltage	100 V	75 V
V_{EBO} Emitter to Base Voltage	7.0 V	5.0 V
I_C Collector Current	2.0 A	2.0 A
I_B Base Current	1.0 A	1.0 A

Voltages & Currents

	5322	5323
V_{CEO} Collector to Emitter Voltage	-75 V	-50 V
V_{CBO} Collector to Base Voltage	-100 V	-75 V
V_{EBO} Emitter to Base Voltage	-7.0 V	-5.0 V
I_C Collector Current	2.0 A	2.0 A
I_B Base Current	1.0 A	1.0 A

ELECTRICAL CHARACTERISTICS (25°C Ambient Temperature unless otherwise noted) (Note 6)

SYMBOL	CHARACTERISTIC	5320		5321		UNITS	TEST CONDITIONS
		MIN	MAX	MIN	MAX		
I_{EBO}	Emitter Cutoff Current		0.1		0.1	mA	$V_{EB} = 7.0$ V
						mA	$V_{EB} = 5.0$ V

NOTES:

1. These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
2. Pulse conditions: length = 300 μ s; duty cycle $\leq$ 10%.
3. Pulse Rep. Frequency = 1 kHz, pulse width = 20 μ s.
4. These ratings give a maximum junction temperature of 200°C and junction-to-case thermal resistance of 0.2°C/W (derating factor of 0.057 W/°C).
5. Emitter diode is reversed biased.
6. For product family characteristic curves, refer to Curve Set T314 (2N5320 and 2N5321) and Curve Set T414 (2N5322 and 2N5323).

2N5320/2N5321
2N5322/2N5323

SYMBOL	CHARACTERISTIC	5320		5321		UNITS	TEST CONDITIONS
		MIN	MAX	MIN	MAX		
I_{CEX}	Collector Cutoff Current (Note 3)		5.0			mA	$V_{CE} = 70 \text{ V}$, $V_{BE} = 1.5 \text{ V}$, $T_C = 150^\circ\text{C}$
					5.0	mA	$V_{CE} = 45 \text{ V}$, $V_{BE} = 1.5 \text{ V}$, $T_C = 150^\circ\text{C}$
			0.1			mA	$V_{CE} = 100 \text{ V}$, $V_{BE} = 1.5 \text{ V}$
					0.1	mA	$V_{CE} = 75 \text{ V}$, $V_{BE} = 1.5 \text{ V}$
h_{FE}	DC Current Gain (Note 2)	10 30	130	40	250		$I_C = 1.0 \text{ A}$, $V_{CE} = 2.0 \text{ V}$ $I_C = 0.5 \text{ A}$, $V_{CE} = 4.0 \text{ V}$
$V_{CEO(sus)}$	Collector to Emitter Sustaining Voltage (Note 2)	75		50		V	$I_C = 100 \text{ mA}$, $I_B = 0$
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Note 2)		0.5		0.8	V	$I_C = 500 \text{ mA}$, $I_B = 50 \text{ mA}$
$V_{BE(ON)}$	Base to Emitter "On" Voltage (Note 2)		1.1		1.4	V	$I_C = 500 \text{ mA}$, $V_{CE} = 4.0 \text{ V}$
h_{fe}	Small Signal Current Gain	5.0		5.0			$I_C = 50 \text{ mA}$, $V_{CE} = 4.0 \text{ V}$, $f = 10 \text{ MHz}$
t_{on}	Turn On Time (Note 3)		80		80	ns	$I_C = 500 \text{ mA}$, $I_{B1} = 50 \text{ mA}$
t_{off}	Turn Off Time (Note 3)		800		800	ns	$I_C = 500 \text{ mA}$, $I_{B1} = 50 \text{ mA}$, $I_{B2} = -50 \text{ mA}$

SYMBOL	CHARACTERISTIC	5322		5323		UNITS	TEST CONDITIONS
		MIN	MAX	MIN	MAX		
I_{EBO}	Emitter Cutoff Current		0.1			mA	$V_{EB} = -7.0 \text{ V}$
					0.1	mA	$V_{EB} = -5.0 \text{ V}$
I_{CEX}	Collector Cutoff Current		5.0			mA	$V_{CE} = -70 \text{ V}$, $V_{BE} = -1.5 \text{ V}$, $T_C = 150^\circ\text{C}$
					5.0	mA	$V_{CE} = -45 \text{ V}$, $V_{BE} = -1.5 \text{ V}$, $T_C = 150^\circ\text{C}$
			0.1			mA	$V_{CE} = -100 \text{ V}$, $V_{BE} = -1.5 \text{ V}$
					0.1	mA	$V_{CE} = -75 \text{ V}$, $V_{BE} = -1.5 \text{ V}$
h_{FE}	DC Current Gain	10 30	130	40	250		$I_C = 1.0 \text{ A}$, $V_{CE} = -2.0 \text{ V}$ $I_C = 500 \text{ mA}$, $V_{CE} = -4.0 \text{ V}$
$V_{CEO(sus)}$	Collector to Emitter Sustaining Voltage (Note 2)	-75		-50		V	$I_C = -100 \text{ mA}$, $I_B = 0$
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Note 2)		-0.7		-1.20	V	$I_C = 50 \text{ mA}$, $I_B = 50 \text{ mA}$
$V_{BE(ON)}$	Base to Emitter "On" Voltage (Note 2)		-1.1		-1.4	V	$I_C = 500 \text{ mA}$, $V_{CE} = -4.0 \text{ V}$
h_{fe}	Small Signal Current Gain	5.0		5.0			$I_C = 50 \text{ mA}$, $V_{CE} = 4.0 \text{ V}$, $f = 10 \text{ MHz}$
t_{on}	Turn On Time (Note 3)		100		100	ns	$I_C = 500 \text{ mA}$, $I_{B1} = -50 \text{ mA}$
t_{off}	Turn Off Time (Note 3)		1000		1000	ns	$I_C = 500 \text{ mA}$, $I_{B1} = -50 \text{ mA}$, $I_{B2} = 50 \text{ mA}$