

Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 3)					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	60	—	V	$I_C = 10\mu\text{A}$, $I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	40	—	V	$I_C = 1.0\text{mA}$, $I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5.0	—	V	$I_E = 10\mu\text{A}$, $I_C = 0$
Collector Cutoff Current	I_{CEX}	—	50	nA	$V_{CE} = 30\text{V}$, $V_{EB(OFF)} = 3.0\text{V}$
Base Cutoff Current	I_{BL}	—	50	nA	$V_{CE} = 30\text{V}$, $V_{EB(OFF)} = 3.0\text{V}$
ON CHARACTERISTICS (Note 3)					
DC Current Gain	h_{FE}	40 70 100 60 30	— — 300 — —	—	$I_C = 100\mu\text{A}$, $V_{CE} = 1.0\text{V}$ $I_C = 1.0\text{mA}$, $V_{CE} = 1.0\text{V}$ $I_C = 10\text{mA}$, $V_{CE} = 1.0\text{V}$ $I_C = 50\text{mA}$, $V_{CE} = 1.0\text{V}$ $I_C = 100\text{mA}$, $V_{CE} = 1.0\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	0.20 0.30	V	$I_C = 10\text{mA}$, $I_B = 1.0\text{mA}$ $I_C = 50\text{mA}$, $I_B = 5.0\text{mA}$
Base- Emitter Saturation Voltage	$V_{BE(SAT)}$	0.65 —	0.85 0.95	V	$I_C = 10\text{mA}$, $I_B = 1.0\text{mA}$ $I_C = 50\text{mA}$, $I_B = 5.0\text{mA}$
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C_{obo}	—	4.0	pF	$V_{CB} = 5.0\text{V}$, $f = 1.0\text{MHz}$, $I_E = 0$
Input Capacitance	C_{ibo}	—	8.0	pF	$V_{EB} = 0.5\text{V}$, $f = 1.0\text{MHz}$, $I_C = 0$
Input Impedance	h_{ie}	1.0	10	k Ω	$V_{CE} = 10\text{V}$, $I_C = 1.0\text{mA}$, $f = 1.0\text{kHz}$
Voltage Feedback Ratio	h_{re}	0.5	8.0	$\times 10^{-4}$	
Small Signal Current Gain	h_{fe}	100	400	—	
Output Admittance	h_{oe}	1.0	40	μS	
Current Gain-Bandwidth Product	f_T	300	—	MHz	$V_{CE} = 20\text{V}$, $I_C = 10\text{mA}$, $f = 100\text{MHz}$
Noise Figure	NF	—	5.0	dB	$V_{CE} = 5.0\text{V}$, $I_C = 100\mu\text{A}$, $R_S = 1.0\text{k}\Omega$, $f = 1.0\text{kHz}$
SWITCHING CHARACTERISTICS					
Delay Time	t_d	—	35	ns	$V_{CC} = 3.0\text{V}$, $I_C = 10\text{mA}$, $V_{BE(off)} = -0.5\text{V}$, $I_{B1} = 1.0\text{mA}$
Rise Time	t_r	—	35	ns	
Storage Time	t_s	—	200	ns	$V_{CC} = 3.0\text{V}$, $I_C = 10\text{mA}$, $I_{B1} = I_{B2} = 1.0\text{mA}$
Fall Time	t_f	—	50	ns	

Notes: 3. Pulse test: Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.