

2N3903, 2N3904

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector Emitter Breakdown Voltage (Note 2) ($I_C = 1.0\text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	40		Vdc
Collector Base Breakdown Voltage ($I_C = 10\text{ }\mu\text{Adc}$, $I_E = 0$)	$V_{(BR)CBO}$	60		Vdc
Emitter Base Breakdown Voltage ($I_E = 10\text{ }\mu\text{Adc}$, $I_C = 0$)	$V_{(BR)EBO}$	6.0		Vdc
Base Cutoff Current ($V_{CE} = 30\text{ Vdc}$, $V_{EB} = 3.0\text{ Vdc}$)	I_{BL}		50	nAdc
Collector Cutoff Current ($V_{CE} = 30\text{ Vdc}$, $V_{EB} = 3.0\text{ Vdc}$)	I_{CEX}		50	nAdc

ON CHARACTERISTICS

DC Current Gain (Note 2) ($I_C = 0.1\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$)	2N3903	h_{FE}	20		
	2N3904		40		
($I_C = 1.0\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$)	2N3903		35		
	2N3904		70		
($I_C = 10\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$)	2N3903		50	150	
	2N3904		100	300	
($I_C = 50\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$)	2N3903		30		
	2N3904		60		
($I_C = 100\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$)	2N3903		15		
	2N3904		30		
Collector Emitter Saturation Voltage (Note 2) ($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$) ($I_C = 50\text{ mAdc}$, $I_B = 5.0\text{ mAdc}$)		$V_{CE(sat)}$		0.2 0.3	Vdc
Base Emitter Saturation Voltage (Note 2) ($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$) ($I_C = 50\text{ mAdc}$, $I_B = 5.0\text{ mAdc}$)		$V_{BE(sat)}$	0.65	0.85 0.95	Vdc

SMALL-SIGNAL CHARACTERISTICS

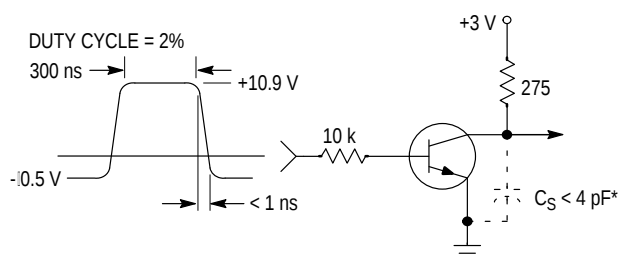
Current Gain Bandwidth Product ($I_C = 10\text{ mAdc}$, $V_{CE} = 20\text{ Vdc}$, $f = 100\text{ MHz}$)	2N3903 2N3904	f_T	250 300		MHz
Output Capacitance ($V_{CB} = 5.0\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)		C_{obo}		4.0	pF
Input Capacitance ($V_{EB} = 0.5\text{ Vdc}$, $I_C = 0$, $f = 1.0\text{ MHz}$)		C_{ibo}		8.0	pF
Input Impedance ($I_C = 1.0\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	2N3903 2N3904	h_{ie}	1.0 1.0	8.0 10	k Ω
Voltage Feedback Ratio ($I_C = 1.0\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	2N3903 2N3904	h_{re}	0.1 0.5	5.0 8.0	$\times 10^{-4}$
Small Signal Current Gain ($I_C = 1.0\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	2N3903 2N3904	h_{fe}	50 100	200 400	
Output Admittance ($I_C = 1.0\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ kHz}$)		h_{oe}	1.0	40	μmhos
Noise Figure ($I_C = 100\text{ }\mu\text{Adc}$, $V_{CE} = 5.0\text{ Vdc}$, $R_S = 1.0\text{ k}\Omega$, $f = 1.0\text{ kHz}$)	2N3903 2N3904				

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ORDERING INFORMATION

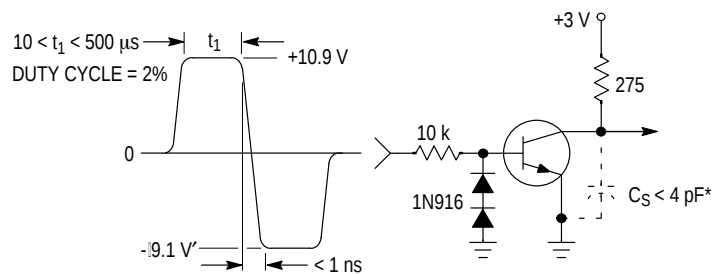
Device	Package	Shipping†
2N3903RLRM	TO 92	2000 / Ammo Pack
2N3904	TO 92	5000 Units / Bulk
2N3904G	TO 92 (Pb Free)	5000 Units / Bulk
2N3904RLRA	TO 92	2000 / Tape & Reel
2N3904RLRAG	TO 92 (Pb Free)	2000 / Tape & Reel
2N3904RLRM	TO 92	2000 / Ammo Pack
2N3904RLRMG	TO 92 (Pb Free)	2000 / Ammo Pack
2N3904RLRP	TO 92	2000 / Ammo Pack
2N3904RLRPG	TO 92 (Pb Free)	2000 / Ammo Pack
2N3904RL1G	TO 92 (Pb Free)	2000 / Tape & Reel
2N3904ZL1	TO 92	2000 / Ammo Pack
2N3904ZL1G	TO 92 (Pb Free)	2000 / Ammo Pack

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.



* Total shunt capacitance of test jig and connectors

Figure 1. Delay and Rise Time Equivalent Test Circuit



* Total shunt capacitance of test jig and connectors

Figure 2. Storage and Fall Time Equivalent Test Circuit

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TYPICAL TRANSIENT CHARACTERISTICS

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TYPICAL STATIC CHARACTERISTICS

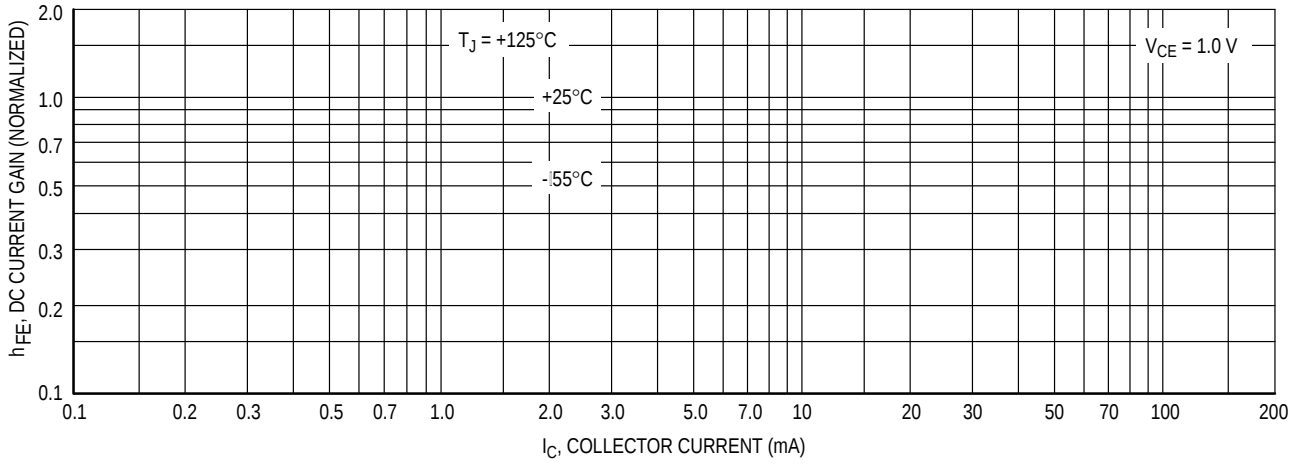


Figure 15. DC Current Gain

TO-92 (TO-226)
CASE 29-11
ISSUE AM

DATE 09 MAR 2007

TO-92 (TO-226)
CASE 29-11
ISSUE AM

DATE 09 MAR 2007

Y 1: .006-46A
N1.
2. BA
3.

Y 2:
N1. BA
2.
3.

Y 3:
N1. AN
2. AN
3. A

Y 6:
N1. A
2. U & UB A
3. AN

Y 7:
N1. U
2. AN
3. A

Y 8:
N1. AN
2. A
3. U & UB A

Y 11:
N1. AN
2. A & AN
3. A

Y 12:
N1. AN NA 1
2. A
3. AN NA 2

Y 13:
N1. AN 1
2. A
3. A 2

Y 16:
N1. AN
2. A
3. A

Y 17:
N1.
2. BA
3.

Y 18:
N1. AN
2. A
3. N NN

Y 21:
N1.
2.
3. BA

Y 22:
N1. U
2. A
3. AN

Y 23:
N1. A
2. U
3. AN

Y 26:
N1.
2. UN 2
3. U U

Y 27:
N1.
2. UB A
3.

Y 28:
N1. A
N1. AN Y 8: 3. AN
2.

Y 31:
N1. A
2. AN
3. U

Y 32:
N1. BA
2.
3.

Y

2. A

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