

2N3903 2N3904

NPN SILICON PLANAR EPITAXIAL TRANSISTORS

CASE TO-92A

2N3903, 2N3904 are NPN silicon planar epitaxial transistors designed for general purpose switching and amplifier applications. They are complementary to PNP types 2N3905 and 2N3906.



EBC

ABSOLUTE MAXIMUM RATINGS

Collector-Base Voltage	V _{CB0}	60V
Collector-Emitter Voltage	V _{CE0}	40V
Emitter-Base Voltage	V _{EB0}	6V
Collector Current	I _C	200mA
Total Power Dissipation @ T _A =25°C	P _{tot}	350mW
		1W
Operating Junction & Storage Temperature	T _j , T _{stg}	-55 to +150°C

ELECTRICAL CHARACTERISTICS @ T_A=25°C

PARAMETER	SYMBOL	2N3903		2N3904		UNIT	TEST CONDITIONS
		MIN	MAX	MIN	MAX		
Collector-Base Breakdown Voltage	V _{CB0}	60		60		V	I _C =10μA IE=0
Collector-Emitter Breakdown Voltage	V _{CE0} *	40		40		V	I _C =1mA IB=0
Emitter-Base Breakdown Voltage	V _{EB0}	6		6		V	IE=10μA IC=0
Collector Cutoff Current	I _{CEV}		50		50	nA	V _{CE} =30V V _{EB} =3V
Base Cutoff Current	I _{BEV}		50		50	nA	V _{CE} =30V V _{EB} =3V
Collector-Emitter Saturation Voltage	V _{CE(SAT)} *	0.2		0.2		V	I _C =10mA IB=1mA
		0.3		0.3		V	I _C =50mA IB=5mA
Base-Emitter Saturation Voltage	V _{BE(SAT)} *	0.65	0.85	0.65	0.85	V	I _C =10mA IB=1mA
			0.95		0.95	V	I _C =50mA IB=5mA
D.C. Current Gain	H _{FE} *	20		40			I _C =0.1mA V _{CE} =1V
		35		70			I _C =1mA V _{CE} =1V
		50	150	100	300		I _C =10mA V _{CE} =1V
		30		60			I _C =50mA V _{CE} =1V
		15		30			I _C =100mA V _{CE} =1V
Current Gain-Bandwidth Product	f _T	250		300		MHz	I _C =10mA V _{CE} =20V

* Pulse Test : Pulse Width=0.3ms, Duty Cycle=1%

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PARAMETER	SYMBOL	2N3903		2N3904		UNIT	TEST CONDITIONS
		MIN	MAX	MIN	MAX		
Output Capacitance	Cob		4		4	pF	V _{CB} =5V I _E =0 f=100kHz
Input Capacitance	Cib		8		8	pF	V _{EB} =0.5V I _C =0 f=100kHz
Noise Figure	NF		6		5	dB	I _C =100μA V _{CE} =5V R _S =1KΩ f=10Hz to 15.7kHz
Input Impedance	h _{ie}	0.5	8	1	10	kΩ	I _C =1mA V _{CE} =10V f=1kHz
Voltage Feedback Ratio	h _{re}	0.1	5	0.5	8	⁻⁴ x10	I _C =1mA V _{CE} =10V f=1kHz
Small Signal Current Gain	h _{fe}	50	200	100	400		I _C =1mA V _{CE} =10V f=1kHz
Output Admittance	h _{oe}	1	40	1	40	μS	I _C =1mA V _{CE} =10V f=1kHz
Delay Time	t _d		35		35	ns	V _{CC} =3V V _{CE} =0.5V I _C =10mA
Rise Time	t _r		35		35	ns	I _{B1} =1mA
Storage Time	t _s		175		200	ns	V _{CC} =3V I _{B1} =I _{B2} =1mA
Fall Time	t _f		50		50	ns	I _C =10mA