



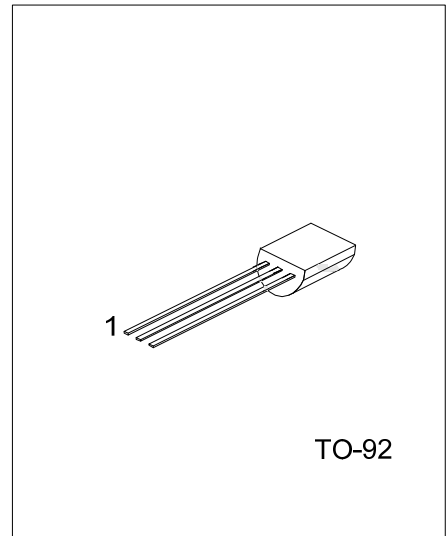
2N3904

NPN SILICON TRANSISTOR

NPN GENERAL PURPOSE AMPLIFIER

■ FEATURES

- * Collector-Emitter Voltage: $V_{CE0}=40V$
- * Collector Dissipation: $P_{C(MAX)}=625mW$
- * Complementary to 2N3906



Lead-free: 2N3904L
Halogen-free: 2N3904G

■ ORDERING INFORMATION

Ordering Number			Package	Pin Assignment			Packing
Normal	Lead Free Plating	Halogen Free		1	2	3	
2N3904-T92-B	2N3904L-T92-B	2N3904G-T92-B	TO-92	E	B	C	Tape Box
2N3904-T92-K	2N3904L-T92-K	2N3904G-T92-K	TO-92	E	B	C	Bulk

<p>2N3904L-T92-B</p>	<p>(1)Packing Type (2)Package Type (3)Lead Plating</p> <p>(1) B: Tape Box, K: Bulk (2) T92: TO-92 (3) G: Halogen Free, L: Lead Free, Blank: Pb/Sn</p>
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■ ABSOLUTE MAXIMUM RATING (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current	I _C	200	mA
Collector Dissipation	P _C	625	mW
Junction Temperature	T _J	150	°C
Operating and Storage Temperature	T _{STG}	-55 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

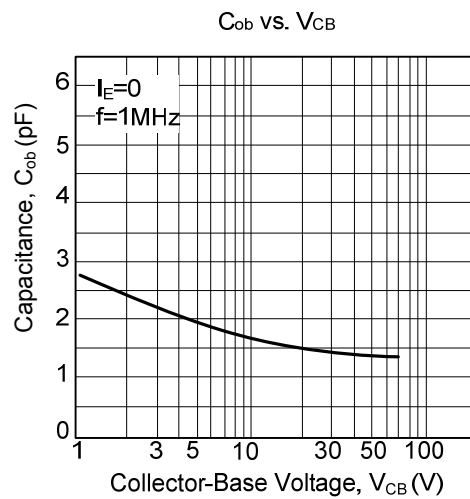
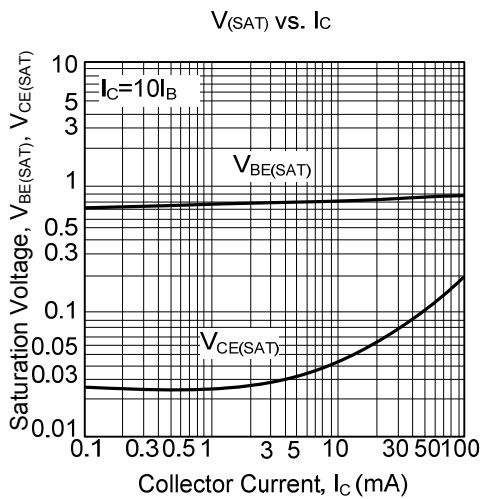
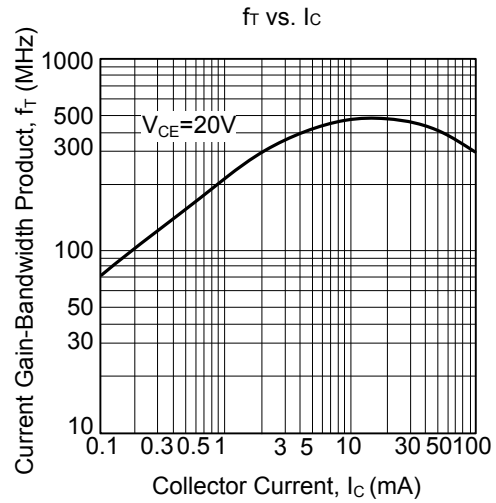
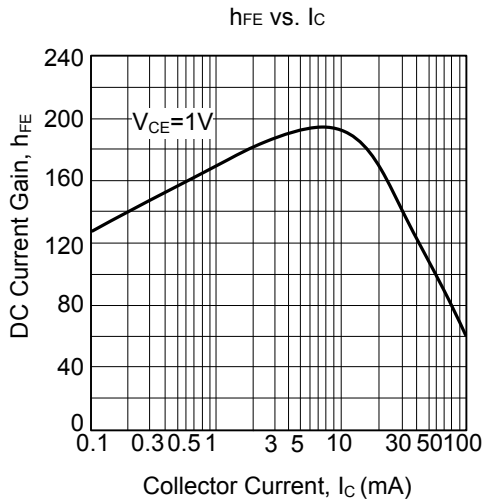
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μA, I _E =0	60			V
Collector-Emitter Breakdown Voltage (note)	BV _{CEO}	I _C =1mA, I _B =0	40			V
Emitter-Base Breakdown Voltage	BV _{EBO}	I _E =10μA, I _C =0	6			V
Collector-Emitter Saturation Voltage (note)	V _{CE(SAT)1}	I _C =10mA, I _B =1mA			0.2	V
	V _{CE(SAT)2}	I _C =50mA, I _B =5mA			0.3	V
Base-Emitter Saturation Voltage (note)	V _{BE(SAT)1}	I _C =10mA, I _B =1mA	0.65		0.85	V
	V _{BE(SAT)2}	I _C =50mA, I _B =5mA			0.95	V
Collector Cut-off Current	I _{CBO}	V _{CE} =30V, V _{EB} =3V			50	nA
Base Cut-off Current	I _{BL}	V _{CE} =30V, V _{EB} =3V			50	nA
DC Current Gain (note)	h _{FE1}	V _{CE} =1V, I _C =0.1mA	40			
	h _{FE2}	V _{CE} =1V, I _C =1mA	70			
	h _{FE3}	V _{CE} =1V, I _C =10mA	100		300	
	h _{FE4}	V _{CE} =1V, I _C =50mA	60			
	h _{FE5}	V _{CE} =1V, I _C =100mA	30			
Current Gain Bandwidth Product	f _T	V _{CE} =20V, I _C =10mA, f=100MHz	300			MHz
Output Capacitance	C _{ob}	V _{CB} =5V, I _E =0, f=1MHz			4	pF
Turn on Time	t _{ON}	V _{CC} =3V, V _{BE} =0.5V, I _C =10mA, I _B 1=1mA			70	ns
Turn off Time	t _{OFF}	I _B 1=1mA, I _B 2=1mA			250	ns

Note: Pulse test: Pulse Width ≦ 300μs, Duty Cycle ≦ 2%

TYPICAL CHARACTERISTICS



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