



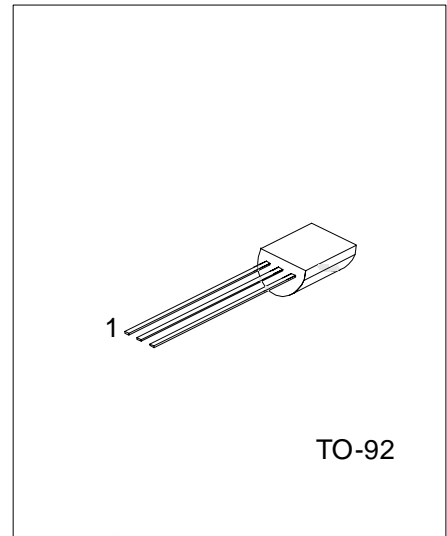
2N3904

NPN SILICON TRANSISTOR

NPN GENERAL PURPOSE AMPLIFIER

FEATURES

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



*Pb-free plating product number: 2N3904L

ORDERING INFORMATION

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

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

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	
Operating and Storage Temperature	T_{STG}	-55 ~ +150	

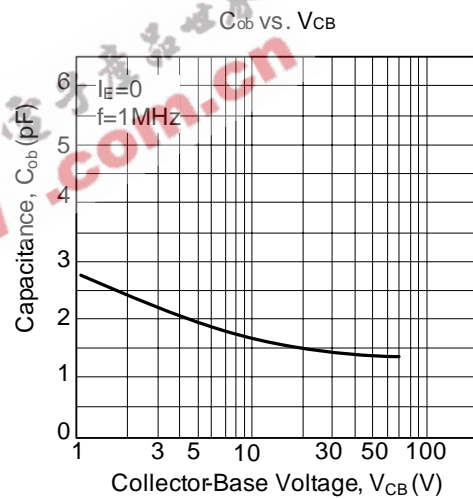
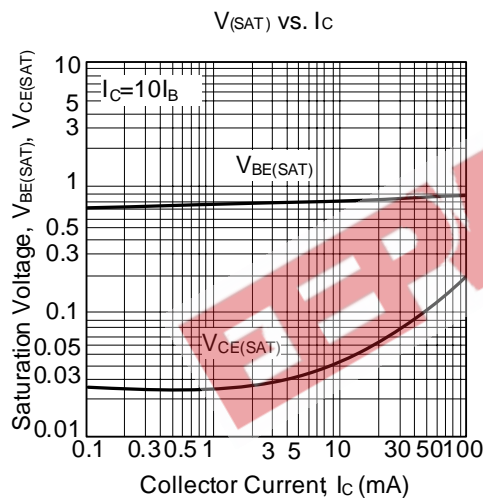
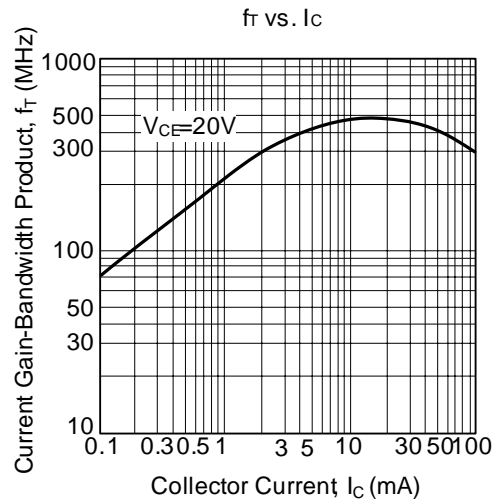
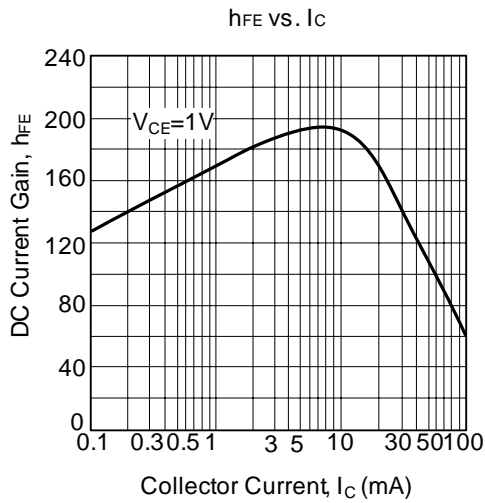
Note Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-Base Breakdown Voltage	BV_{CBO}	$I_C=10\mu A, I_E=0$	60			V
Collector-Emitter Breakdown Voltage (note)	BV_{CEO}	$I_C=1mA, I_B=0$	40			V
Emitter-Base Breakdown Voltage	BV_{EBO}	$I_E=10\mu A, I_C=0$	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	
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	
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}	$V_{CC}=3V, V_{BE}=0.5V, I_C=10mA, I_B1=1mA$			70	ns
Turn off Time	t_{OFF}	$I_B1=1mA, I_B2=1mA$			250	ns

Note: Pulse test: Pulse Width 300 μ s, Duty Cycle 2%

TYPICAL CHARACTERISTICS



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