



2N3904

NPN GENERAL PURPOSE SWITCHING TRANSISTOR

VOLTAGE 40 Volts **POWER** 625 mWatts

TO-92 Unit: inch (mm)

FEATURES

- NPN epitaxial silicon, planar design
- Collector-emitter voltage $V_{CE} = 40V$
- Collector current $I_C = 200mA$
- Complimentary (PNP) device:2N3906
- Pb free product are available :99% Sn above can meet RoHS environment substance directive request

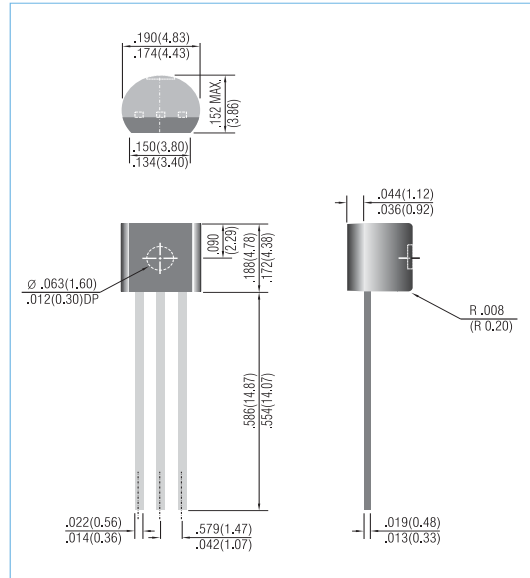
MECHANICAL DATA

Case: TO-92

Terminals: Solderable per MIL-STD-202, Method 208

Approx Weight : 0.02grams

Marking : 3904



ABSOLUTE MAXIMUM RATINGS

PARAMETER	Symbol	Value	Units
Collector - Emitter Voltage	V_{CEO}	40	V
Collector - Base Voltage	V_{CBO}	60	V
Emitter - Base Voltage	V_{EBO}	6.0	V
Collector Current - Continuous	I_C	200	mA

THERMAL CHARACTERISTICS

PARAMETER	Symbol	Value	Units
Max Power Dissipation	P_{TOT}	625	mW
Storage Temperature	T_{STG}	-55 to 150	°C
Junction Temperature	T_J	-55 to 150	°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	200	°C/W

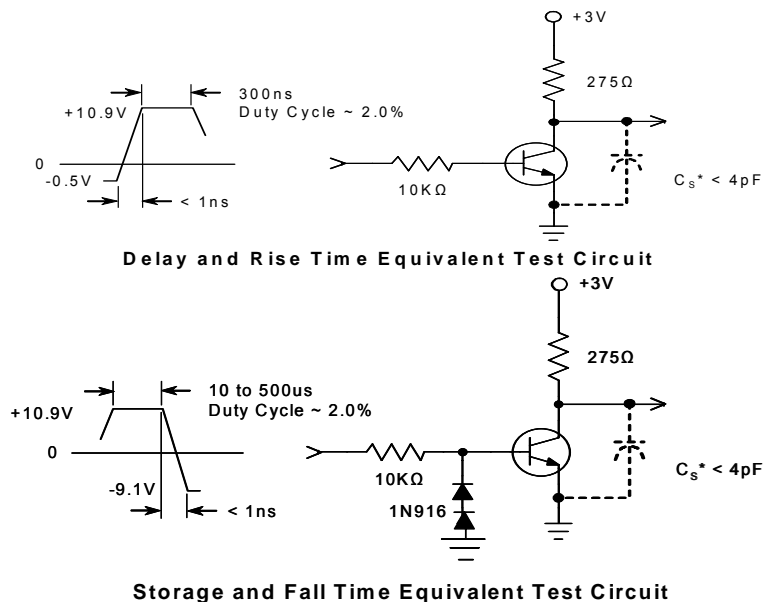


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ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise noted)

PARAMETER	Symbol	Test Condition	MIN.	TYP.	MAX.	Units
Collector - Emitter Breakdown Voltage	V _{(BR)CEO}	I _C =1.0mA, I _B =0	40	-	-	V
Collector - Base Breakdown Voltage	V _{(BR)CBO}	I _C =10uA, I _E =0	60	-	-	V
Emitter - Base Breakdown Voltage	V _{(BR)EBO}	I _E =10uA, I _C =0	6.0	-	-	V
Base Cutoff Current	I _{BEV}	V _{CE} =30V, V _{EB} =3.0V	-	-	50	nA
Collector Cutoff Current	I _{CEx}	V _{CE} =30V, V _{EB} =3.0V	-	-	50	nA
DC Current Gain	h _{FE}	I _C =0.1mA, V _{CE} =1.0V	40	-	-	-
		I _C =1.0mA, V _{CE} =1.0V	70	-	-	
		I _C =10mA, V _{CE} =1.0V	100	-	300	
		I _C =50mA, V _{CE} =1.0V	60	-	-	
		I _C =100mA, V _{CE} =1.0V	30	-	-	
Collector - Emitter Saturation Voltage	V _{CE(SAT)}	I _C =10mA, I _B =1.0mA I _C =50mA, I _B =5.0mA	- -	- -	0.2 0.3	V
Base - Emitter Saturation Voltage	V _{BE(SAT)}	I _C =10mA, I _B =1.0mA I _C =50mA, I _B =5.0mA	0.65 -	- -	0.85 0.95	V
Current-Gain - Bandwidth Product	f _T	I _C =10mA, V _{CE} =20V f=100MHz	300	-	-	MHz
Collector-Base Capacitance	C _{CBO}	V _{CB} =5.0V, I _E =0, f=1MHz	-	-	4.0	pF
Emitter - Base Capacitance	C _{EBO}	V _{CB} =0.5V, I _E =0, f=1MHz	-	-	8	pF
Delay Time	t _d	V _{CC} =3V, V _{BE} =0.5V, I _C =10mA, I _{B1} =1mA	-	-	35	ns
Rise Time	t _r		-	-	35	ns
Storage Time	t _s		-	-	200	ns
Fall Time	t _f		V _{CC} =3V, I _C =10mA I _{B1} =I _{B2} =1mA	-	-	50

SWITCHING TIME EQUIVALENT TEST CIRCUITS





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ELECTRICAL CHARACTERISTICS CURVE

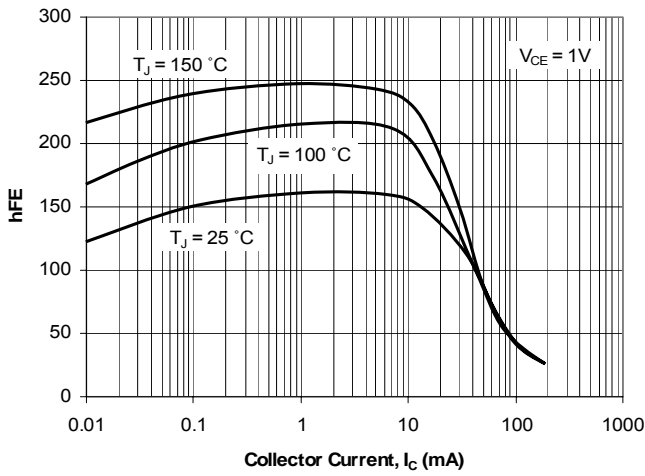


Fig. 1. Typical h_{FE} vs Collector Current

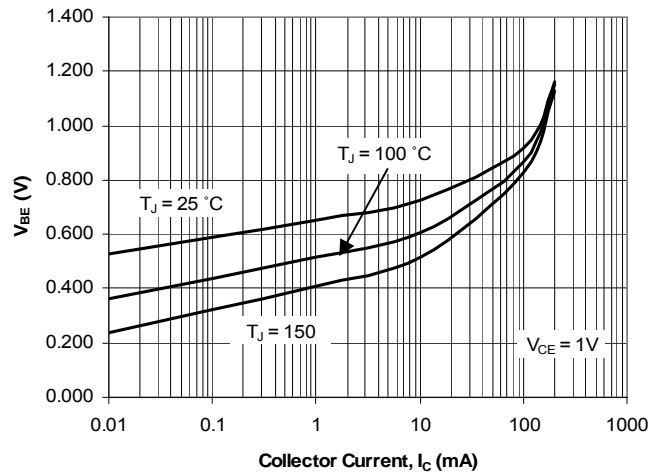


Fig. 2. Typical V_{BE} vs Collector Current

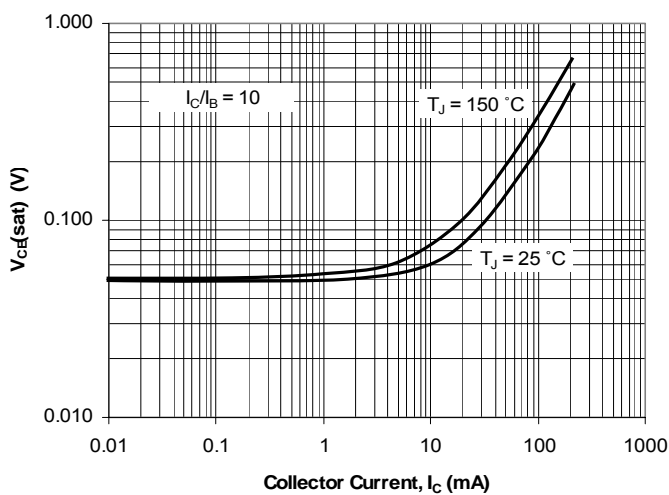


Fig. 3. Typical $V_{CE(sat)}$ vs Collector Current

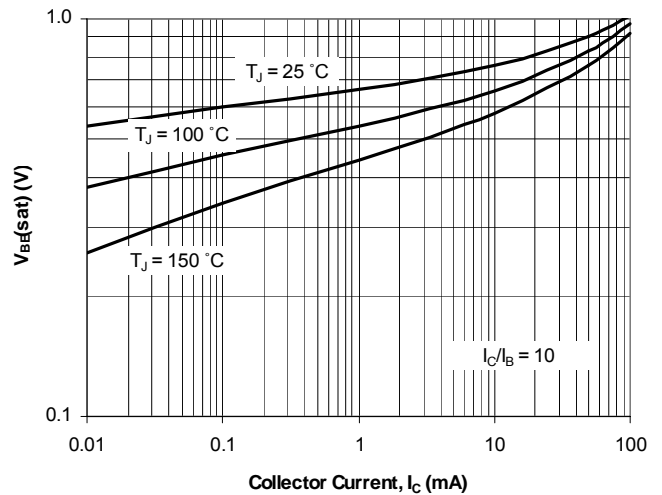


Fig. 4. Typical $V_{BE(sat)}$ vs Collector Current

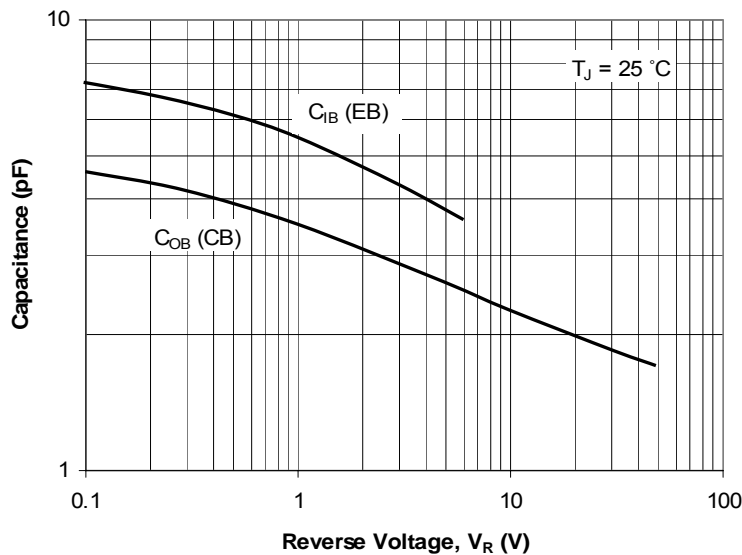
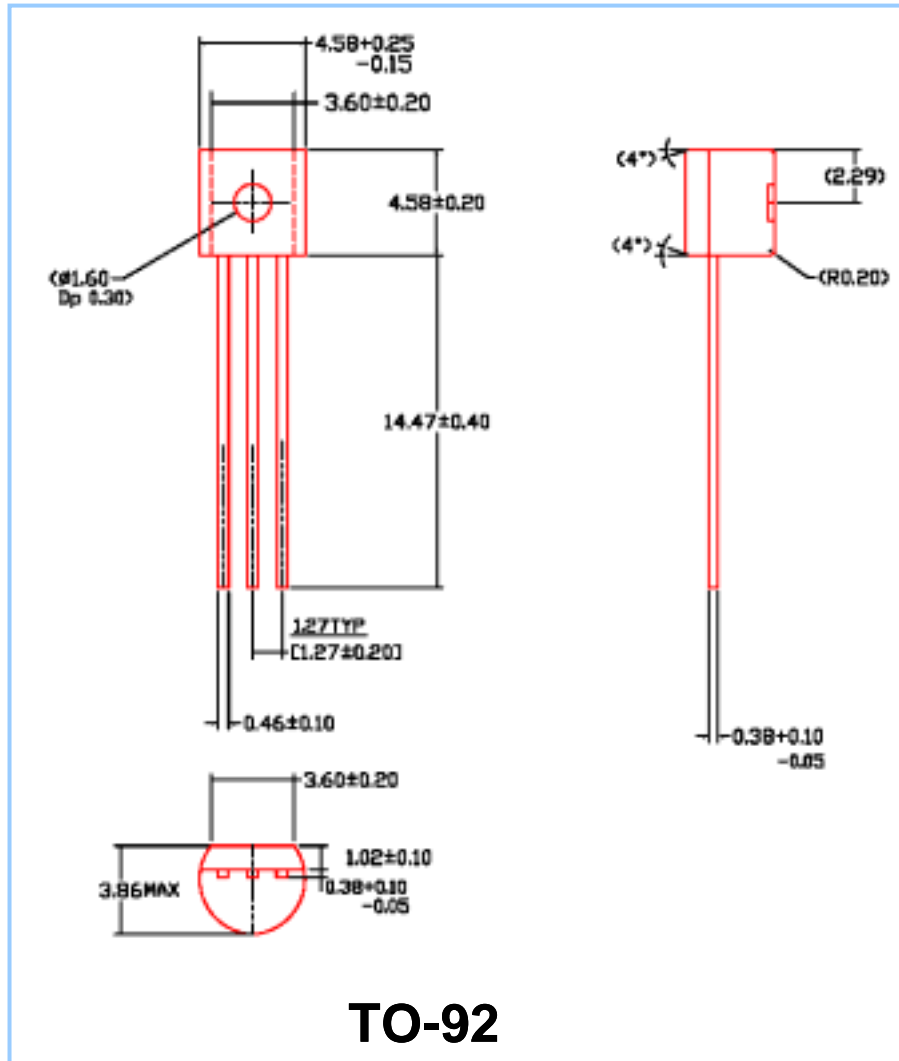


Fig. 5. Typical Capacitances vs Reverse Voltage



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TO-92 Case Outline



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