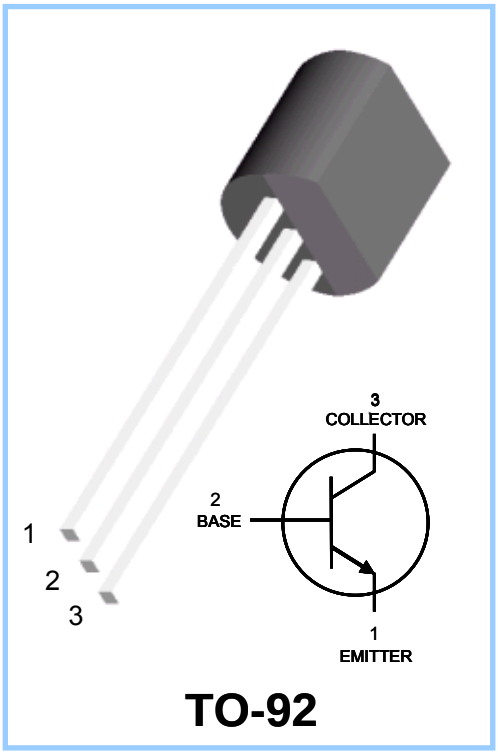
2N4401

NPN GENERAL PURPOSE SWITCHING TRANSISTOR

VOLTAGE 40 Volts **POWER** 625 mWatts



FEATURES

- NPN epitaxial silicon, planar design
- Collector-emitter voltage V_{CE} = 40V
- Collector current I_C = 600mA
- Complimentary (PNP) device:2N4403
- 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 : 4401

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	600	mA

THERMAL CHARACTERISTICS

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

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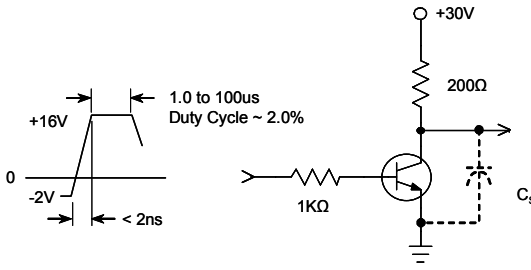
ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise noted)

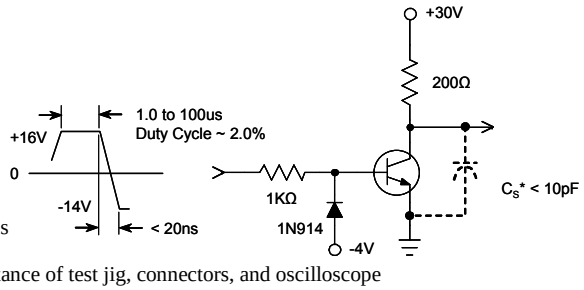
PARAMETER	Symbol	Test Condition	MIN.	TYP.	MAX.	Units
Collector - Emitter Breakdown Voltage	$V_{(BR)}CEO$	I_C=1.0mA, I_B=0	40	-	-	V
Collector - Base Breakdown Voltage	$V_{(BR)}CBO$	I_C=100uA, I_E=0	60	-	-	V
Emitter - Base Breakdown Voltage	$V_{(BR)}EBO$	I_E=100uA, I_C=0	6.0	-	-	V
Base Cutoff Current	I_{BEV}	V_{CE}=35V, V_{EB}=0.4V	-	-	100	nA
Collector Cutoff Current	I_{CEX}	V_{CE}=35V, V_{EB}=0.4V	-	-	100	nA
DC Current Gain	h_{FE}	I_C=0.1mA, V_{CE}=1.0V I_C=1.0mA, V_{CE}=1.0V I_C=10mA, V_{CE}=1.0V I_C=150mA, V_{CE}=1.0V I_C=500mA, V_{CE}=2.0V	20 40 80 100 40	- - - - -	- - - 300 -	-
Collector - Emitter Saturation Voltage	$V_{CE(SAT)}$	I_C=150mA, I_B=15mA I_C=500mA, I_B=50mA	- -	-	0.4 0.75	V
Base - Emitter Saturation Voltage	$V_{BE(SAT)}$	I_C=150mA, I_B=15mA I_C=500mA, I_B=50mA	0.75 -	- -	0.95 1.2	V
Current-Gain - Bandwidth Product	f_T	I_C=200mA, V_{CE}=10V f=100MH_Z	250	-	-	MH_Z
Collector-Base Capacitance	C_{CBO}	V_{CB}=5.0V, I_E=0, f=1MH_Z	-	-	6.5	$_PF$
Emitter - Base Capacitance	C_{EBO}	V_{CB}=5.0V, I_E=0, f=1MH_Z	-	-	30	$_PF$
Delay Time	t_d	V_{CC}=30V, V_{BE}=2.0V, I_C=150mA, I_{B1}=15mA	-	-	15	ns
Rise Time	t_r		-	-	20	ns
Storage Time	t_s	V_{CC}=30V,I_C=150mA I_{B1}=I_{B2}=15mA	-	-	225	ns
Fall Time	t_f		-	-	30	ns

SWITCHING TIME EQUIVALENT TEST CIRCUITS



Scope rise time < 4ns

Fig. 1. Turn-On Time



* Total shunt capacitance of test jig, connectors, and oscilloscope

Fig. 2. Turn-Off Time

ELECTRICAL CHARACTERISTICS CURVE

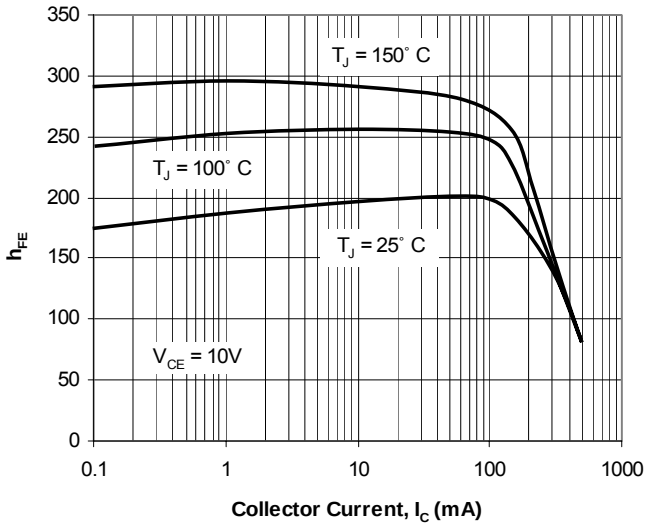


Fig. 3. Typical h_{FE} vs Collector Current

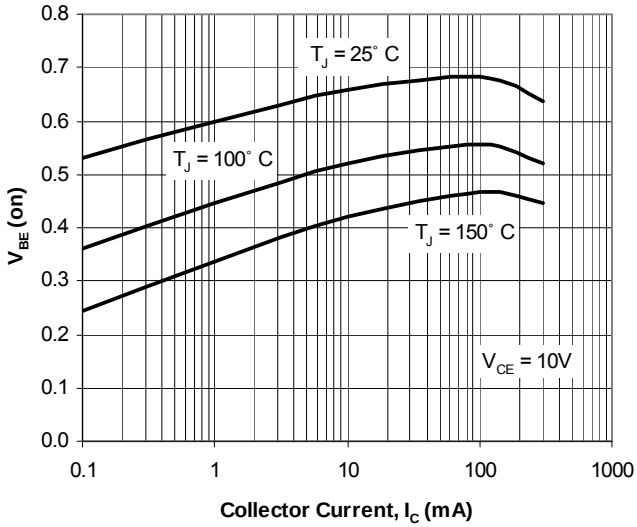


Fig. 4. Typical V_{BE} vs Collector Current

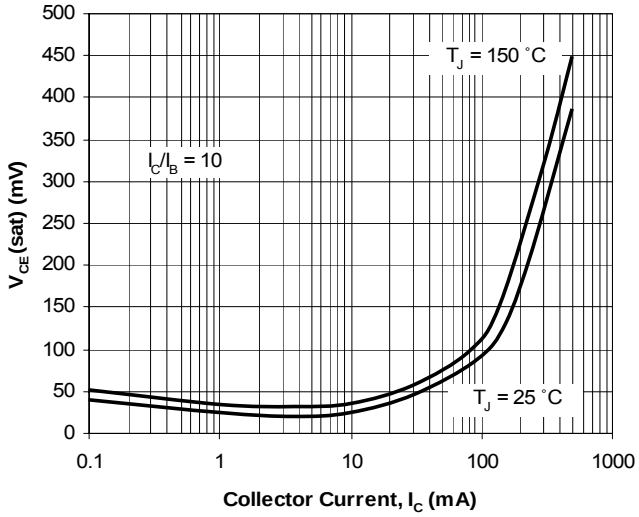


Fig. 5. Typical V_{CE} (sat) vs Collector Current

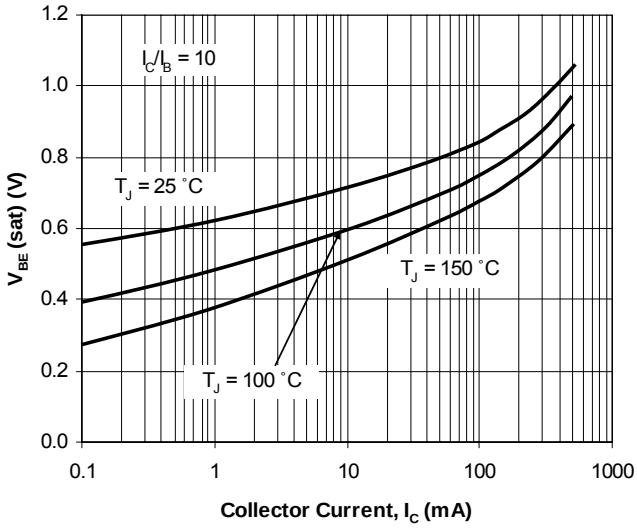


Fig. 6. Typical V_{BE} (sat) vs Collector Current

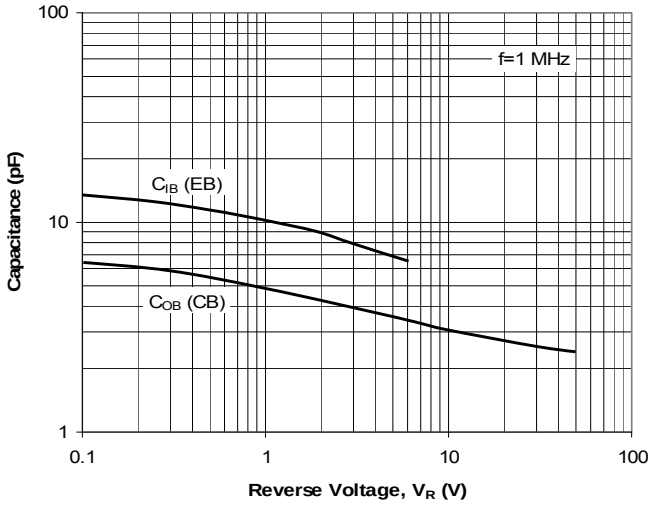


Fig. 7. Typical Capacitances vs Reverse Voltage

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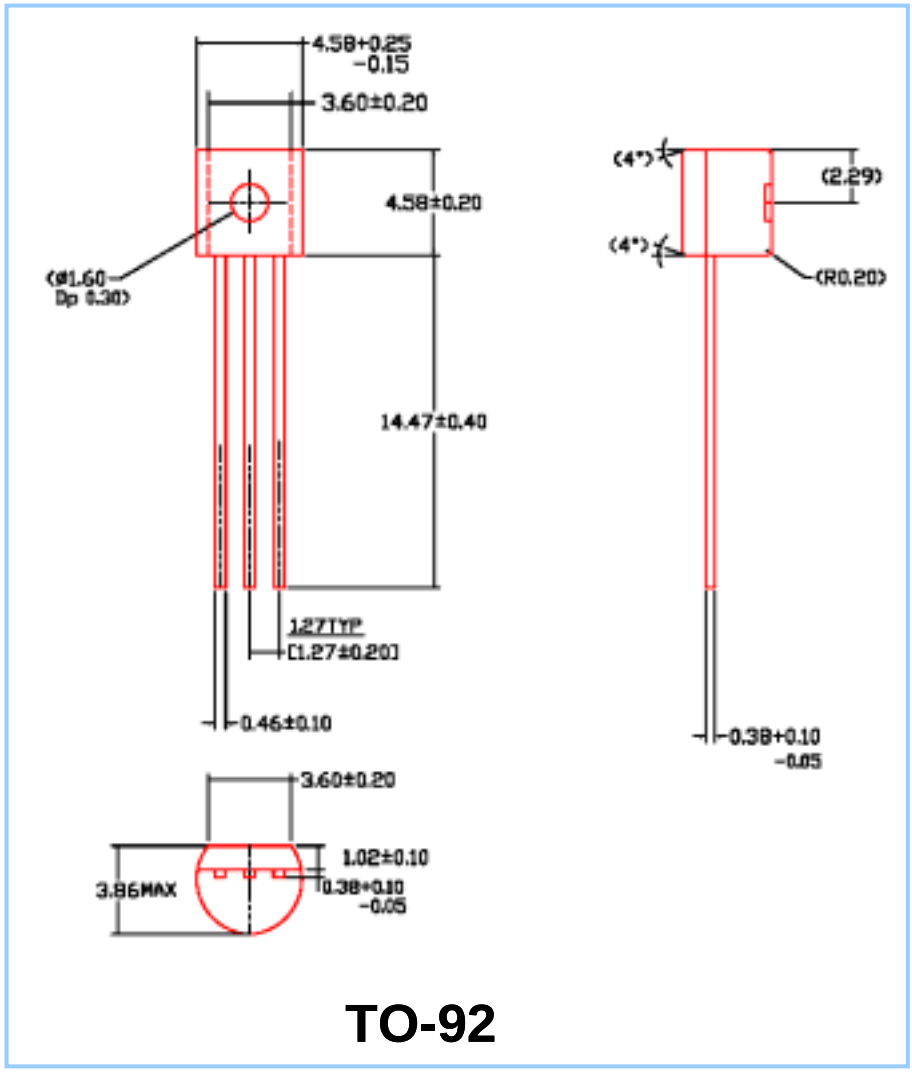
TO-92 Case Outline



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