RECTRON
SEMICONDUCTOR
TECHNICAL SPECIFICATION

2N4401

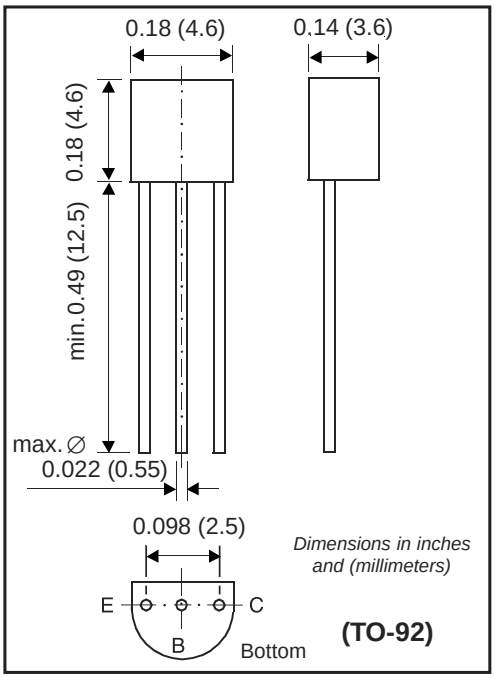
TO - 92 BIPOLAR TRANSISTORS
TRANSISTOR(NPN)

FEATURES

* Power dissipation
  P_{CM}: 0.6 W(Tamb=25°C)
* Collector current
  I_{CM}: 0.6 A
* Collector-base voltage
  $V_{(BR)CBO}$: 60 V
* Operating and storage junction temperature range
  T_J,Tstg: -55°C to+150°C

MECHANICAL DATA

* Case: Molded plastic
* Epoxy: UL 94V-O rate flame retardant
* Lead: MIL-STD-202E method 208C guaranteed
* Mounting position: Any
* Marking :2N4401+Date code



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25 °C ambient temperature unless otherwise specified.
Single phase, half wave, 60 Hz, resistive or inductive load.
For capacitive load, derate current by 20%.

MAXIMUM RATINGES (@ T_A = 25°C unless otherwise noted)

RATINGS	SYMBOL	VALUE	UNITS
Max. Steady State Power Dissipation (1) @TA=25°C Derate above 25°C	P_D	600	mW
Max. Operating Temperature Range	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

ELECTRICAL CHARACTERISTICS (@ T_A = 25°C unless otherwise noted)

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	-	-	417	°C/W

Notes : 1. Alumina=0.4*0.3*0.024in.99.5% alumina
2. "ROHS Compliant"

2019-03
REV:A

ELECTRICAL CHARACTERISTICS (@TA=25°C unless otherwise noted)

Chatacteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage(1) (I_C= 1.0 mAdc, I_B= 0)	$V_{(BR)CEO}$	40	-	Vdc
Collector-Base Breakdown Voltage (I_C= 0.1uAdc, I_E= 0)	$V_{(BR)CBO}$	60	-	Vdc
Emitter-Base Breakdown Voltage (I_E= 0.1uAdc, I_C= 0)	$V_{(BR)EBO}$	6.0	-	Vdc
Base Cutoff Current (V_{CE}= 35Vdc, $V_{BE(off)}$= 0.4Vdc)	I_{BEV}	-	0.1	uAdc
Collector Cutoff Current (V_{CE}= 35Vdc, V_{EB}= 0.4Vdc)	I_{CEX}	-	0.1	uAdc
ON CHARACTERISTICS(1)				
DC Current Gain (I_C= 0.1mAdc, V_{CE}= 1.0Vdc)	hFE	20	-	-
(I_C= 1.0mAdc, V_{CE}= 1.0Vdc)		40	-	
(I_C= 10mAdc, V_{CE}= 1.0Vdc)		80	-	
(I_C= 150mAdc, V_{CE}= 1.0Vdc)		100	300	
(I_C= 500mAdc, V_{CE}= 2.0Vdc)		40	-	
Collector-Emitter Saturation Voltage (1) (I_C= 150mAdc, I_B= 15mAdc)	$V_{CE(sat)}$	-	0.4	Vdc
(I_C= 500mAdc, I_B= 50mAdc)		-	0.75	
Base-Emitter Saturation Voltage (1) (I_C= 150mAdc, I_B= 15mAdc)	$V_{BE(sat)}$	0.75	0.95	Vdc
(I_C= 500mAdc, I_B= 50mAdc)		-	1.2	
SMALL-SIGNAL CHARACTERISTICS				
Current-Gain-Bandwidth Product (I_C= 20mAdc, V_{CE}= 10Vdc, f= 100MHz)	f_T	250	-	MHz
Output Capacitance (V_{CB}= 5.0Vdc, I_E= 0, f= 1.0MHz)	C_{cb}	-	6.5	pF
Input Capacitance (V_{EB}= 0.5Vdc, IC= 0, f= 1.0MHz)	C_{eb}	-	30	pF
Input Impedance (V_{CE}= 10Vdc, I_C= 1.0mAdc, f= 1.0kHz)	h_{ie}	1.0	15	kohms
Voltage Feedback Ratio (V_{CE}= 10Vdc, IC= 1.0mAdc, f= 1.0kHz)	h_{re}	0.1	8.0	X 10^{-4}
Small-Signal Current Gain (V_{CE}= 10Vdc, I_C= 1.0mAdc, f= 1.0kHz)	h_{fe}	40	500	-
Output Admittance (V_{CE}= 10Vdc, I_C= 1.0mAdc, f= 1.0kHz)	h_{oe}	1.0	30	umhos
SWITCHING CHARACTERISTICS				
Delay Time	(V_{CC}= 30Vdc, V_{EB}= 2.0Vdc, I_C= 150mAdc, I_{B1}= 15mAdc)	t_d	-	15	ns
Rise Time		t_r	-	20	
Storage Time	(V_{CC}= 30Vdc, I_C= 150mAdc, I_{B1}= I_{B2}= 15mAdc)	t_s	-	225	ns
Fall Time		t_f	-	30	

Note : Pulse Test: Pulse Width≤300ms,Duty Cycle≤2.0%

RATING AND CHARACTERISTICS CURVES (2N4401)

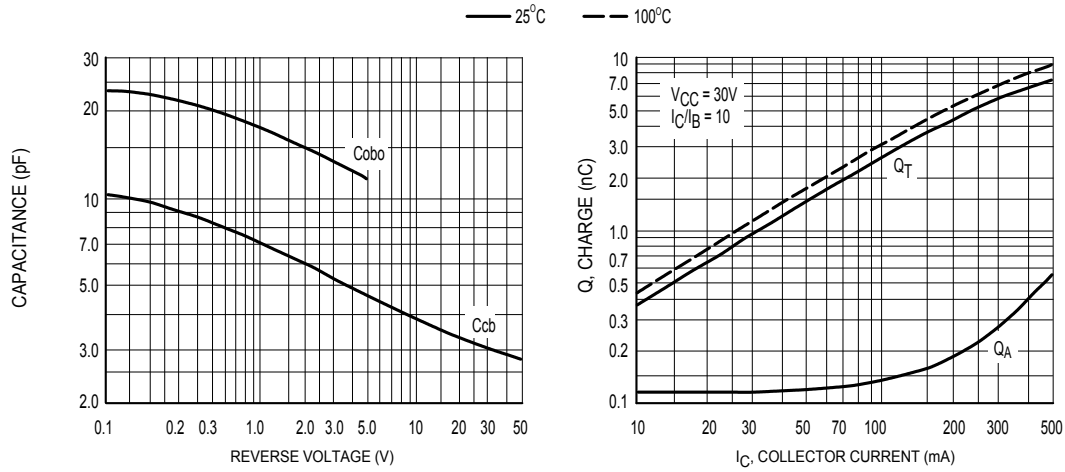


Figure 1. Capacitances

Figure 2. Charge Data

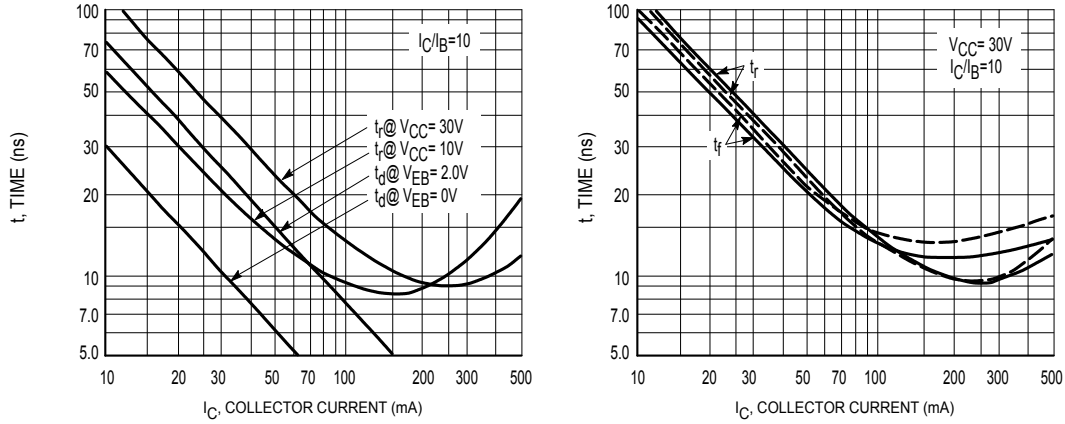


Figure 3. Turn-On Time

Figure 4. Rise and Fall Times

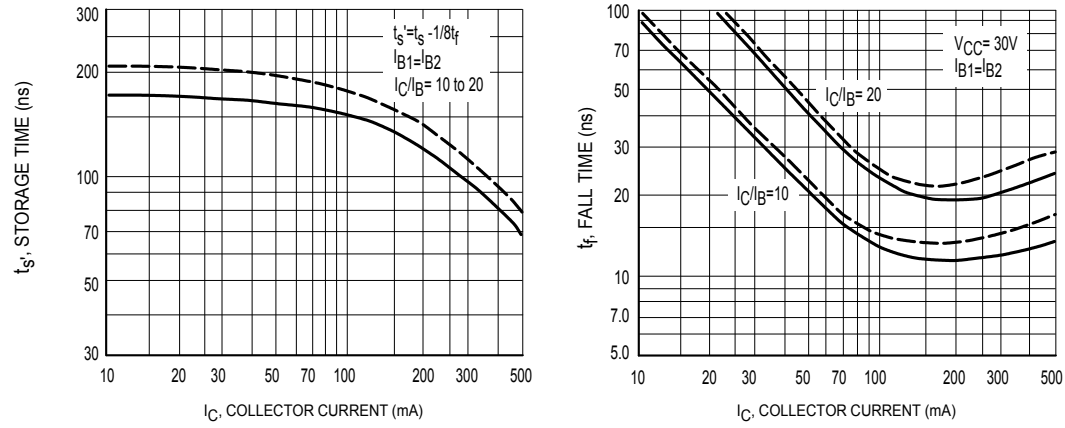


Figure 5. Storage Time

Figure 6. Fall Time

RATING AND CHARACTERISTICS CURVES (2N4401)

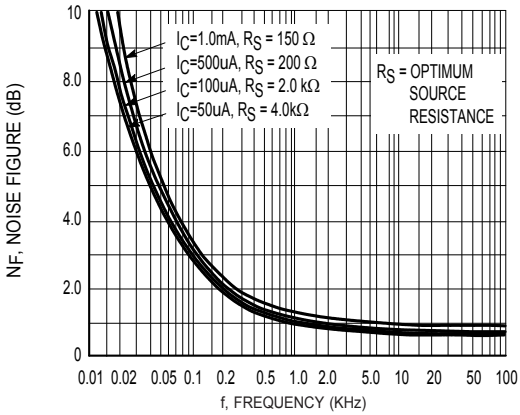


Figure 7.Frequency Effects

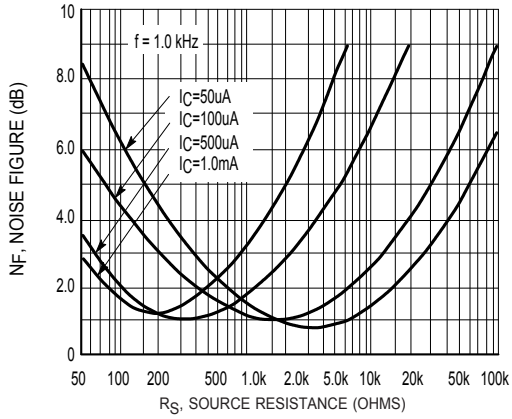


Figure 8.Source Resistance Effects

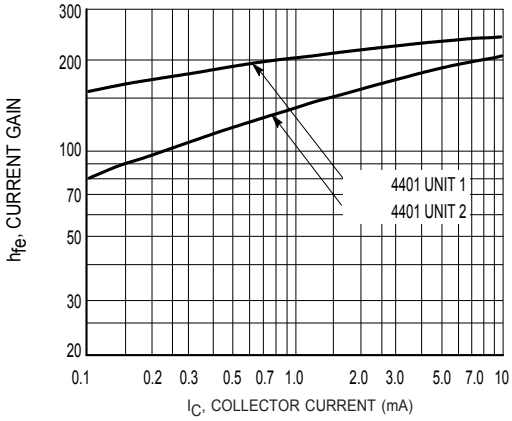


Figure 9.Cuttent Gain

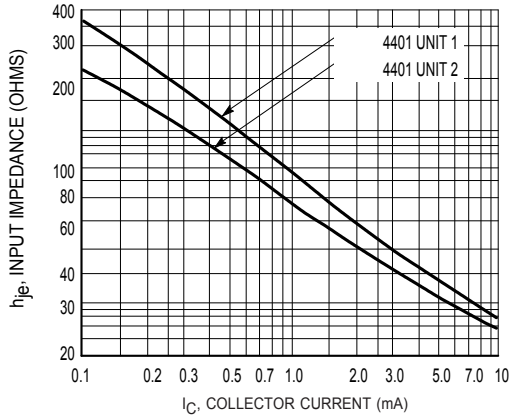


Figure 10.Input Impedance

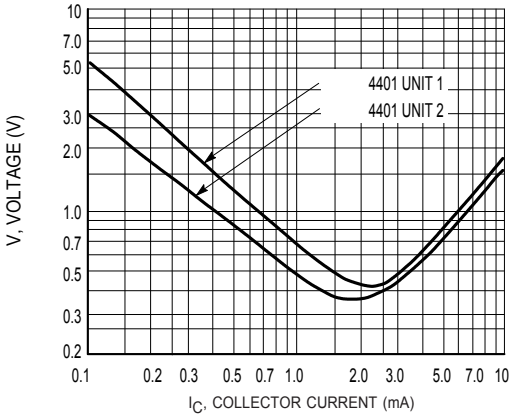


Figure 11.Voltage Feedback Ratio

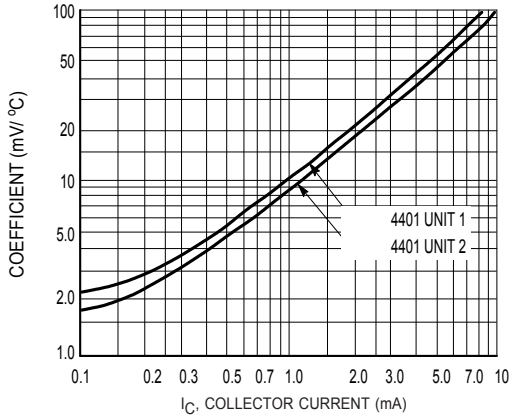


Figure 12.Temperature Coefficients

RATING AND CHARACTERISTICS CURVES (2N4401)

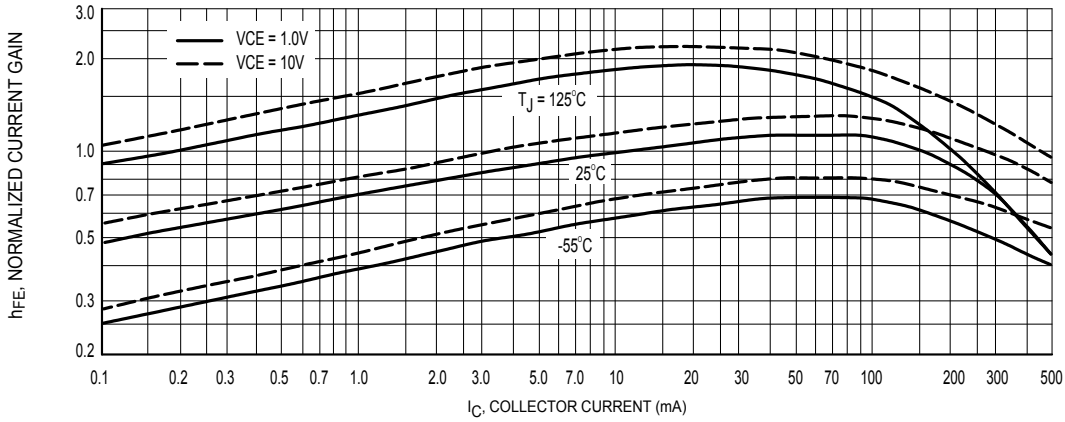


Figure 13. DC Current Gain

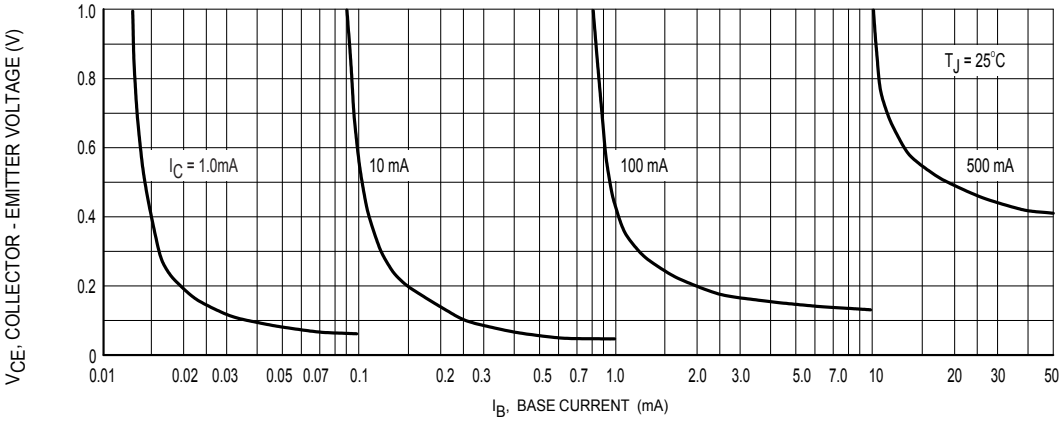


Figure 14. Collector Saturation Region

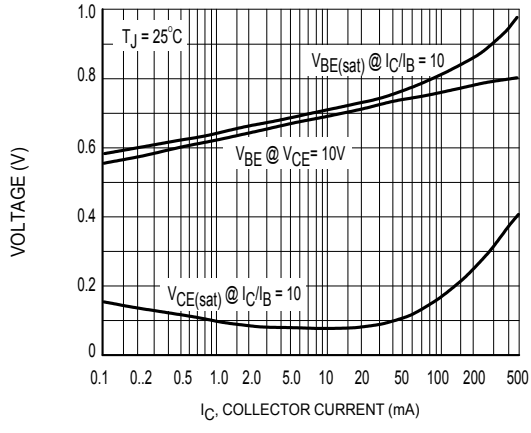


Figure 15. "ON" Voltages

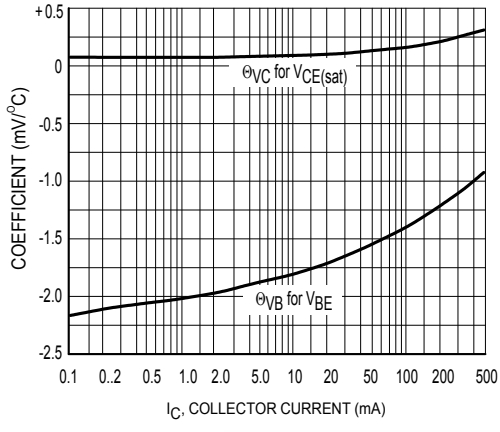


Figure 16. Temperature Coefficients

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