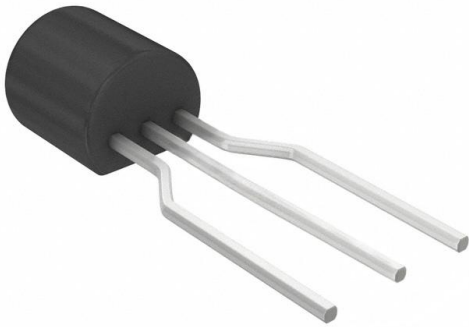


2N4403RLRAG Datasheet

www.digi-electronics.com



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	2N4403RLRAG-DG
Manufacturer	onsemi
Manufacturer Product Number	2N4403RLRAG
Description	TRANS PNP 40V 0.6A TO92
Detailed Description	Bipolar (BJT) Transistor PNP 40 V 600 mA 200MHz 6 25 mW Through Hole TO-92 (TO-226)



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

2N4403RLRAG

Series:

-

Transistor Type:

PNP

Voltage - Collector Emitter Breakdown (Max):

40 V

Current - Collector Cutoff (Max):

-

Power - Max:

625 mW

Operating Temperature:

-55°C ~ 150°C (TJ)

Package / Case:

TO-226-3, TO-92-3 Long Body (Formed Leads)

Base Product Number:

2N4403

Manufacturer:

onsemi

Product Status:

Obsolete

Current - Collector (Ic) (Max):

600 mA

Vce Saturation (Max) @ Ib, Ic:

750mV @ 50mA, 500mA

DC Current Gain (hFE) (Min) @ Ic, Vce:

100 @ 150mA, 2V

Frequency - Transition:

200MHz

Mounting Type:

Through Hole

Supplier Device Package:

TO-92 (TO-226)

Environmental & Export classification

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0075

ON Semiconductor

Is Now

The logo for onsemi, featuring the word "onsemi" in a dark teal, lowercase, sans-serif font. The letter "i" is stylized with a white dot and a teal vertical bar. A small orange triangle is positioned above the top right of the "i". A trademark symbol (TM) is located to the right of the logo.

To learn more about onsemi™, please visit our website at
www.onsemi.com

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2N4403

Preferred Device

General Purpose Transistors

PNP Silicon

Features

- Pb-Free Packages are Available*

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector – Emitter Voltage	V_{CEO}	40	Vdc
Collector – Base Voltage	V_{CBO}	40	Vdc
Emitter – Base Voltage	V_{EBO}	5.0	Vdc
Collector Current – Continuous	I_C	600	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	625 5.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.5 12	W mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

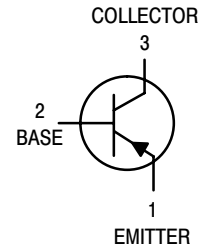
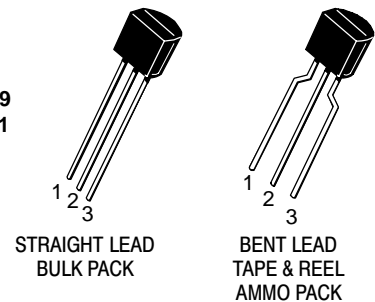
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	83.3	$^\circ\text{C}/\text{W}$

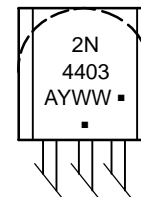
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



ON Semiconductor®

<http://onsemi.com>TO-92
CASE 29
STYLE 1STRAIGHT LEAD
BULK PACKBENT LEAD
TAPE & REEL
AMMO PACK

MARKING DIAGRAM



2N4403 = Device Code
 A = Assembly Location
 Y = Year
 WW = Work Week
 ■ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

Preferred devices are recommended choices for future use and best overall value.

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

2N4403**ELECTRICAL CHARACTERISTICS** ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit	
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (Note 1)	$(I_C = 1.0 \text{ mAdc}, I_B = 0)$	$V_{(BR)CEO}$	40	–	Vdc
Collector–Base Breakdown Voltage	$(I_C = 0.1 \text{ mAdc}, I_E = 0)$	$V_{(BR)CBO}$	40	–	Vdc
Emitter–Base Breakdown Voltage	$(I_E = 0.1 \text{ mAdc}, I_C = 0)$	$V_{(BR)EBO}$	5.0	–	Vdc
Base Cutoff Current	$(V_{CE} = 35 \text{ Vdc}, V_{EB} = 0.4 \text{ Vdc})$	I_{BEV}	–	0.1	μAdc
Collector Cutoff Current	$(V_{CE} = 35 \text{ Vdc}, V_{EB} = 0.4 \text{ Vdc})$	I_{CEX}	–	0.1	μAdc

ON CHARACTERISTICS

DC Current Gain	$(I_C = 0.1 \text{ mAdc}, V_{CE} = 1.0 \text{ Vdc})$ $(I_C = 1.0 \text{ mAdc}, V_{CE} = 1.0 \text{ Vdc})$ $(I_C = 10 \text{ mAdc}, V_{CE} = 1.0 \text{ Vdc})$ $(I_C = 150 \text{ mAdc}, V_{CE} = 2.0 \text{ Vdc})$ (Note 1) $(I_C = 500 \text{ mAdc}, V_{CE} = 2.0 \text{ Vdc})$ (Note 1)	h_{FE}	30 60 100 100 20	– – – 300 –	–
Collector–Emitter Saturation Voltage (Note 1)	$(I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc})$ $(I_C = 500 \text{ mAdc}, I_B = 50 \text{ mAdc})$	$V_{CE(sat)}$	– –	0.4 0.75	Vdc
Base–Emitter Saturation Voltage (Note 1)	$(I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc})$ $(I_C = 500 \text{ mAdc}, I_B = 50 \text{ mAdc})$	$V_{BE(sat)}$	0.75 –	0.95 1.3	Vdc

SMALL–SIGNAL CHARACTERISTICS

Current–Gain – Bandwidth Product	$(I_C = 20 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 100 \text{ MHz})$	f_T	200	–	MHz
Collector–Base Capacitance	$(V_{CB} = 10 \text{ Vdc}, I_E = 0, f = 1.0 \text{ MHz})$	C_{cb}	–	8.5	pF
Emitter–Base Capacitance	$(V_{EB} = 0.5 \text{ Vdc}, I_C = 0, f = 1.0 \text{ MHz})$	C_{eb}	–	30	pF
Input Impedance	$(I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz})$	h_{ie}	1.5 k	15 k	Ω
Voltage Feedback Ratio	$(I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz})$	h_{re}	0.1	8.0	$\times 10^{-4}$
Small–Signal Current Gain	$(I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz})$	h_{fe}	60	500	–
Output Admittance	$(I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz})$	h_{oe}	1.0	100	μmhos

SWITCHING CHARACTERISTICS

Delay Time	$(V_{CC} = 30 \text{ Vdc}, V_{BE} = +2.0 \text{ Vdc},$ $I_C = 150 \text{ mAdc}, I_{B1} = 15 \text{ mAdc})$	t_d	–	15	ns
Rise Time		t_r	–	20	ns
Storage Time	$(V_{CC} = 30 \text{ Vdc}, I_C = 150 \text{ mAdc},$ $I_{B1} = 15 \text{ mA}, I_{B2} = 15 \text{ mA})$	t_s	–	225	ns
Fall Time		t_f	–	30	ns

1. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

ORDERING INFORMATION

Device	Package	Shipping†
2N4403	TO–92	5000 Units / Bulk
2N4403G	TO–92 (Pb–Free)	5000 Units / Bulk
2N4403RLRA	TO–92	2000 / Tape & Reel
2N4403RLRAG	TO–92 (Pb–Free)	2000 / Tape & Reel
2N4403RLRM	TO–92	2000 / Ammo Pack
2N4403RLRMG	TO–92 (Pb–Free)	2000 / Ammo Pack
2N4403RLRPG	TO–92 (Pb–Free)	2000 / Ammo Pack

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

2N4403

SWITCHING TIME EQUIVALENT TEST CIRCUIT

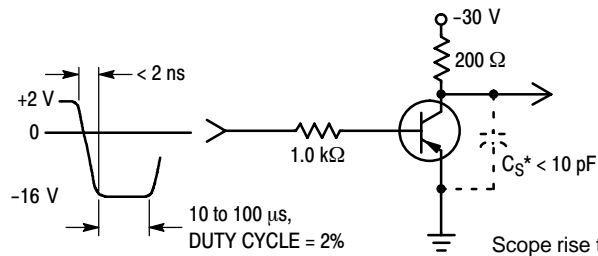


Figure 1. Turn-On Time

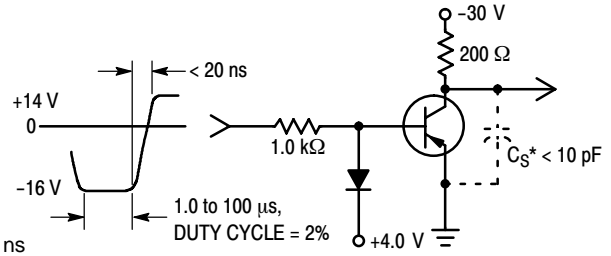


Figure 2. Turn-Off Time

Scope rise time $< 4.0\text{ ns}$
 *Total shunt capacitance of test jig connectors, and oscilloscope

TRANSIENT CHARACTERISTICS

— 25°C - - - 100°C

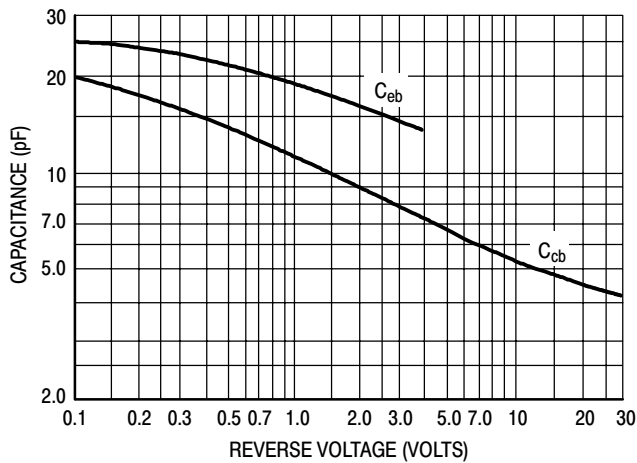


Figure 3. Capacitances

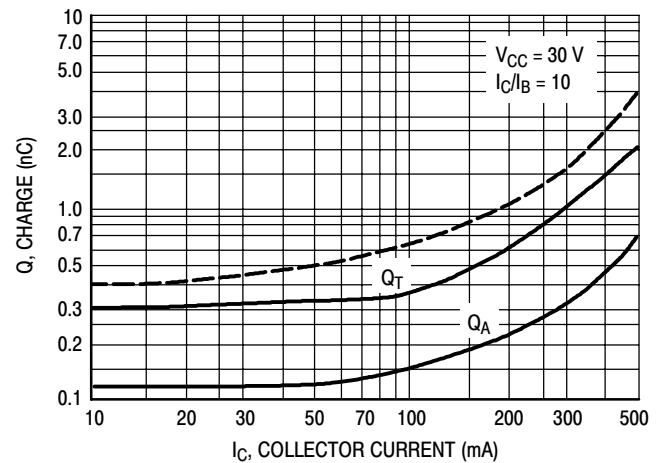


Figure 4. Charge Data

2N4403

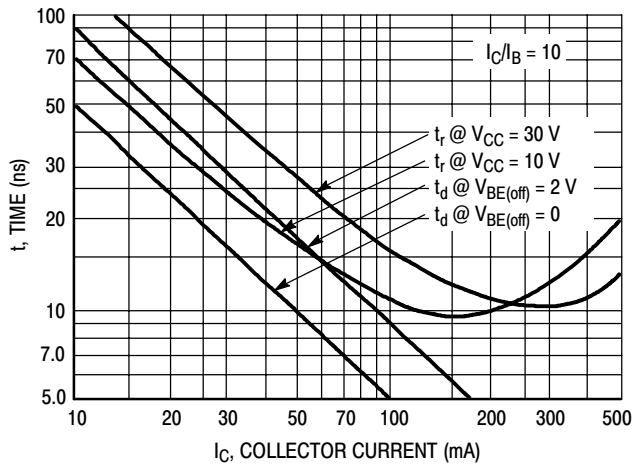


Figure 5. Turn-On Time

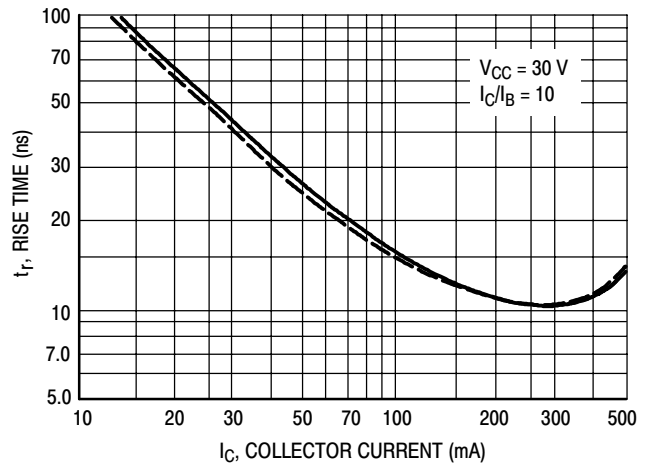


Figure 6. Rise Time

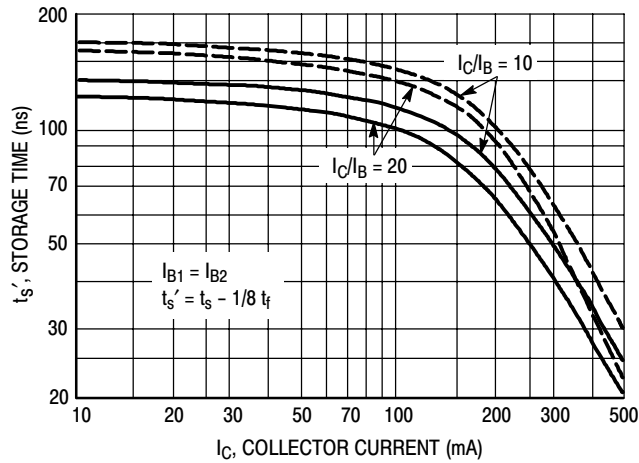


Figure 7. Storage Time

SMALL-SIGNAL CHARACTERISTICS NOISE FIGURE

$V_{CE} = -10$ Vdc, $T_A = 25^\circ\text{C}$; Bandwidth = 1.0 Hz

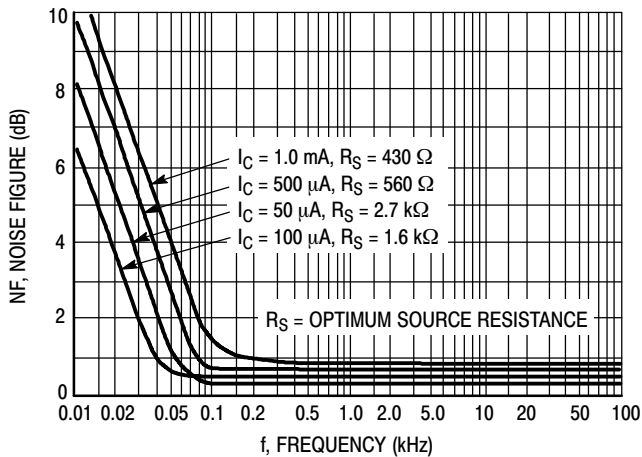


Figure 8. Frequency Effects

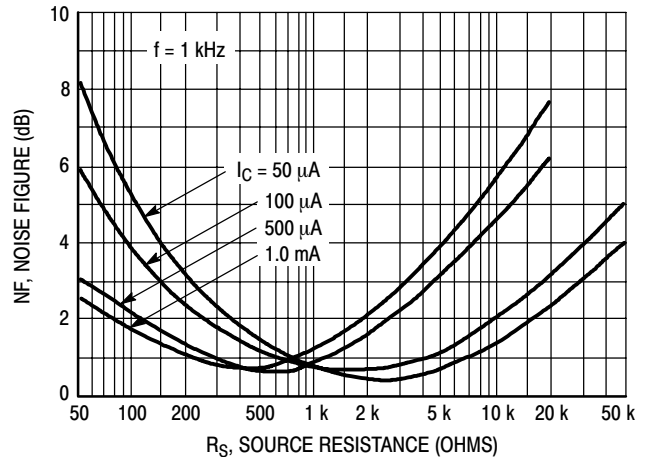


Figure 9. Source Resistance Effects

2N4403

h PARAMETERS

$V_{CE} = -10 \text{ Vdc}$, $f = 1.0 \text{ kHz}$, $T_A = 25^\circ\text{C}$

This group of graphs illustrates the relationship between h_{fe} and other "h" parameters for this series of transistors. To obtain these curves, a high-gain and a low-gain unit were

selected from the 2N4403 lines, and the same units were used to develop the correspondingly-numbered curves on each graph.

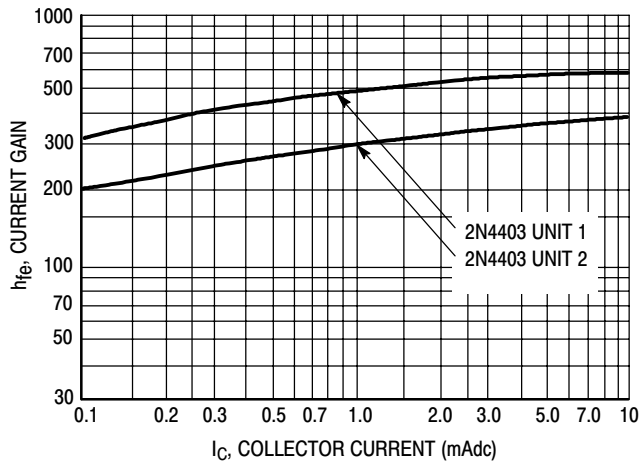


Figure 10. Current Gain

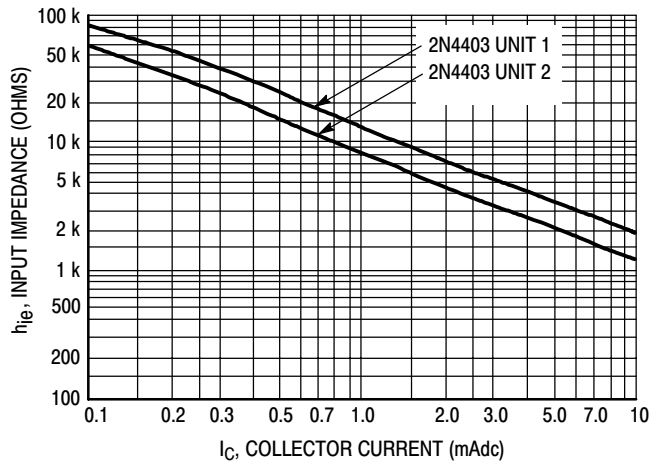


Figure 11. Input Impedance

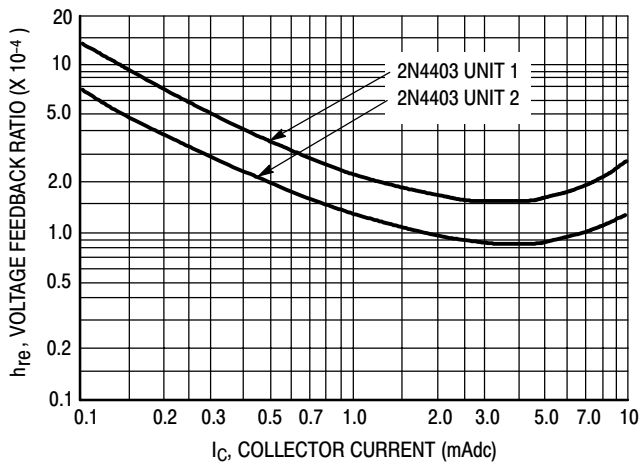


Figure 12. Voltage Feedback Ratio

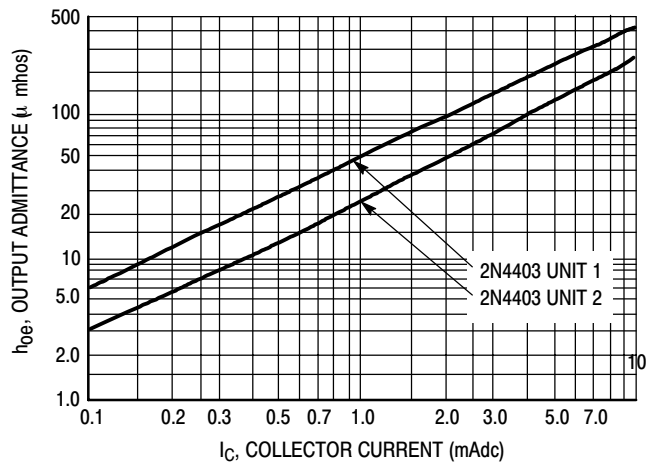


Figure 13. Output Admittance

2N4403

STATIC CHARACTERISTICS

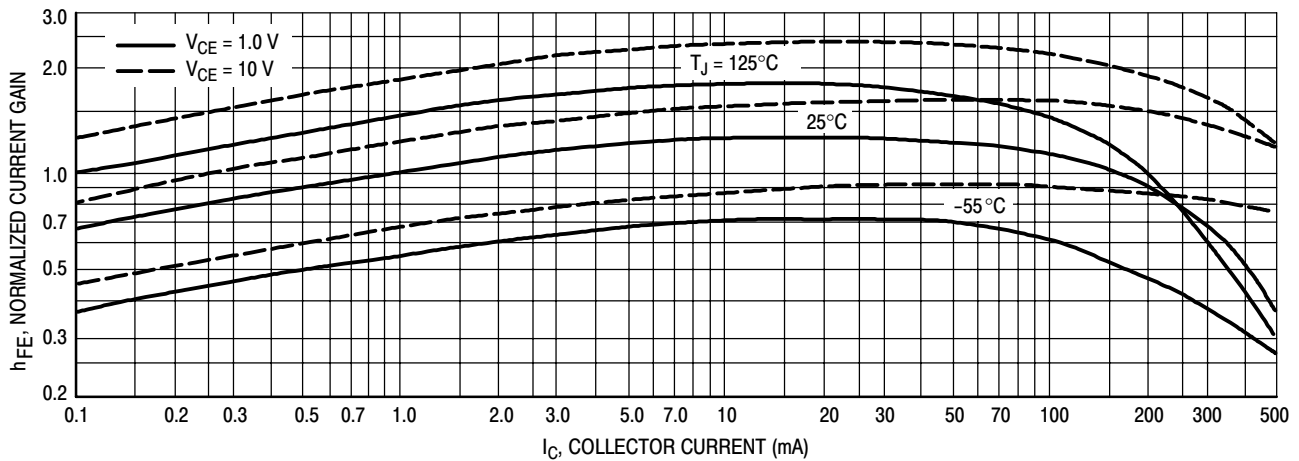


Figure 14. DC Current Gain

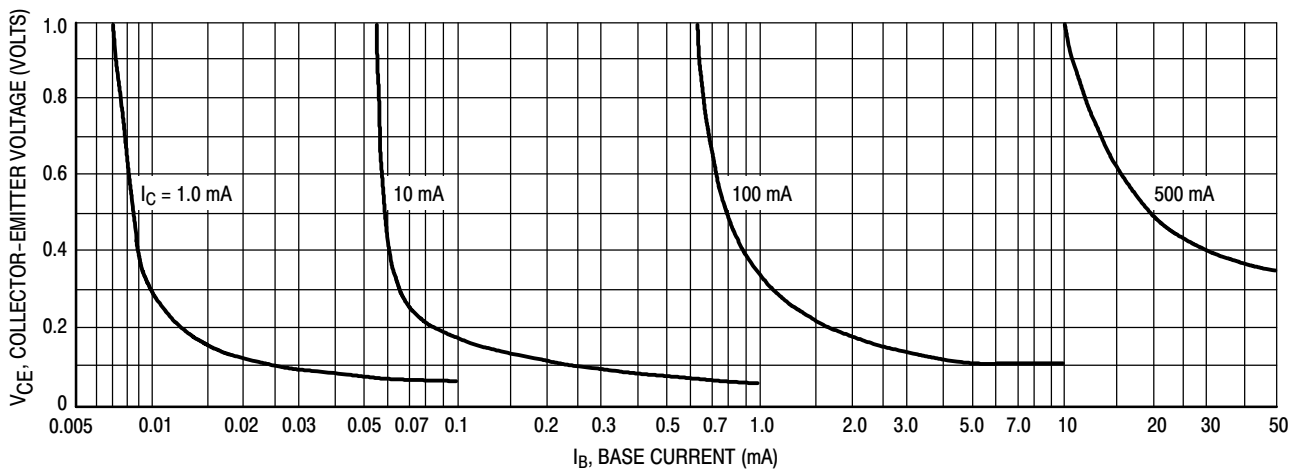


Figure 15. Collector Saturation Region

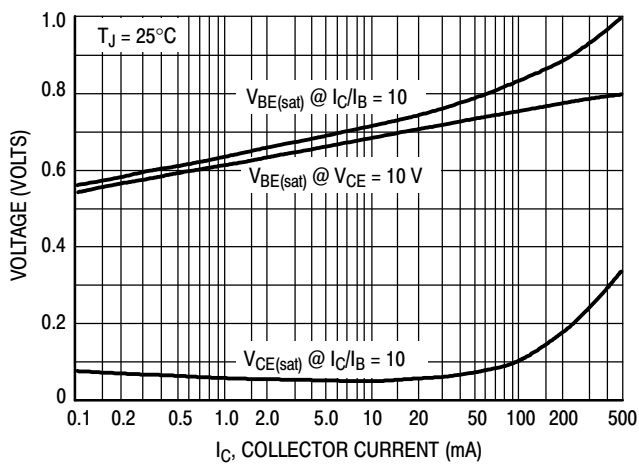


Figure 16. "On" Voltages

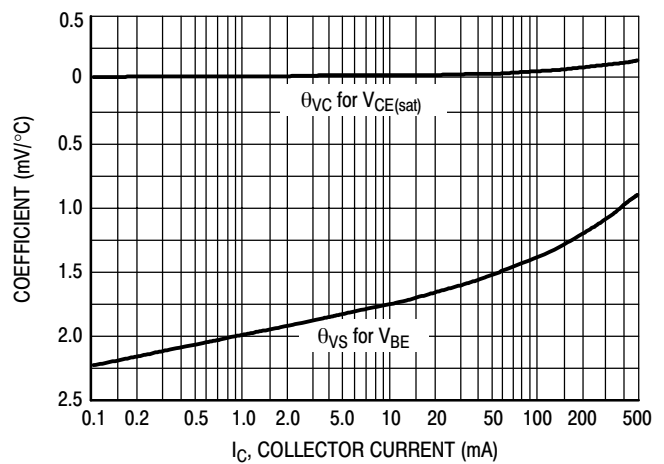
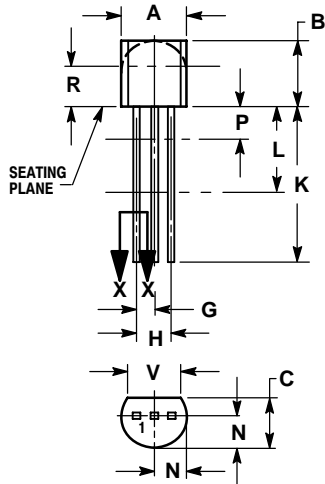
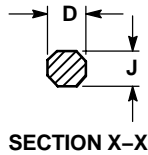


Figure 17. Temperature Coefficients

2N4403**PACKAGE DIMENSIONS****TO-92 (TO-226)**

CASE 29-11

ISSUE AM

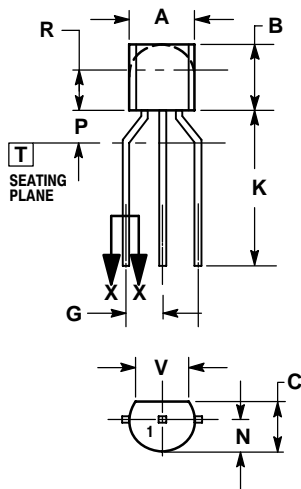
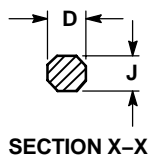
STRAIGHT LEAD
BULK PACK

SECTION X-X

NOTES:

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: INCH.
- CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
- LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---

BENT LEAD
TAPE & REEL
AMMO PACK

SECTION X-X

NOTES:

- DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
- CONTROLLING DIMENSION: MILLIMETERS.
- CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
- LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	MILLIMETERS	
	MIN	MAX
A	4.45	5.20
B	4.32	5.33
C	3.18	4.19
D	0.40	0.54
G	2.40	2.80
J	0.39	0.50
K	12.70	---
N	2.04	2.66
P	1.50	4.00
R	2.93	---
V	3.43	---

STYLE 1:

- PIN 1. EMITTER
- BASE
- COLLECTOR

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OUR CERTIFICATE

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