

# Darlington Transistors

## NPN Silicon

**2N6426\***  
**2N6427**

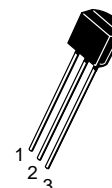
\*ON Semiconductor Preferred Device

### MAXIMUM RATINGS

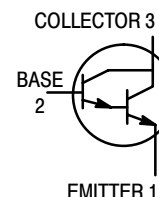
Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	40	Vdc
Collector–Base Voltage	$V_{CBO}$	40	Vdc
Emitter–Base Voltage	$V_{EBO}$	12	Vdc
Collector Current — Continuous	$I_C$	500	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	625 5.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.5 12	Watts 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	$^\circ\text{C}/\text{W}$



**CASE 29–04, STYLE 1**  
**TO–92 (TO–226AA)**



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

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage <sup>(1)</sup> ( $I_C = 10 \text{ mAdc}$ , $V_{BE} = 0$ )	$V_{(BR)CEO}$	40	—	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = 100 \text{ }\mu\text{Adc}$ , $I_E = 0$ )	$V_{(BR)CBO}$	40	—	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 10 \text{ }\mu\text{Adc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	12	—	—	Vdc
Collector Cutoff Current ( $V_{CE} = 25 \text{ Vdc}$ , $I_B = 0$ )	$I_{CES}$	—	—	1.0	$\mu\text{Adc}$
Collector Cutoff Current ( $V_{CB} = 30 \text{ Vdc}$ , $I_E = 0$ )	$I_{CBO}$	—	—	50	nAdc
Emitter Cutoff Current ( $V_{EB} = 10 \text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	—	—	50	nAdc

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

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## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>ON CHARACTERISTICS</b>					
DC Current Gain <sup>(1)</sup> ( $I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$h_{FE}$	20,000	—	200,000	—
2N6426		10,000	—	100,000	
2N6427		—	—	—	
( $I_C = 100\text{ mA}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$h_{FE}$	30,000	—	300,000	—
2N6426		20,000	—	200,000	
( $I_C = 500\text{ mA}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$h_{FE}$	20,000	—	200,000	—
2N6426		14,000	—	140,000	
Collector–Emitter Saturation Voltage ( $I_C = 50\text{ mA}$ , $I_B = 0.5\text{ mA}$ ) ( $I_C = 500\text{ mA}$ , $I_B = 0.5\text{ mA}$ )	$V_{CE(sat)}$	— —	0.71 0.9	1.2 1.5	Vdc
Base–Emitter Saturation Voltage ( $I_C = 500\text{ mA}$ , $I_B = 0.5\text{ mA}$ )	$V_{BE(sat)}$	—	1.52	2.0	Vdc
Base–Emitter On Voltage ( $I_C = 50\text{ mA}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$V_{BE(on)}$	—	1.24	1.75	Vdc

## SMALL–SIGNAL CHARACTERISTICS

Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{obo}$	—	5.4	7.0	pF
Input Capacitance ( $V_{EB} = 1.0\text{ Vdc}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ibo}$	—	10	15	pF
Input Impedance ( $I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ Vdc}$ , $f = 1.0\text{ kHz}$ )	$h_{ie}$	100	—	2000	k $\Omega$
2N6426		50	—	1000	
2N6427	$h_{fe}$	20,000	—	—	—
Small–Signal Current Gain ( $I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ Vdc}$ , $f = 1.0\text{ kHz}$ )		10,000	—	—	
Current–Gain — High Frequency ( $I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ Vdc}$ , $f = 100\text{ MHz}$ )	$ h_{fe} $	1.5	2.4	—	—
2N6426		1.3	2.4	—	
2N6427	$h_{oe}$	—	—	1000	$\mu\text{mhos}$
Output Admittance ( $I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ Vdc}$ , $f = 1.0\text{ kHz}$ )		—	—	—	
Noise Figure ( $I_C = 1.0\text{ mA}$ , $V_{CE} = 5.0\text{ Vdc}$ , $R_S = 100\text{ k}\Omega$ , $f = 1.0\text{ kHz}$ )	NF	—	3.0	10	dB

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

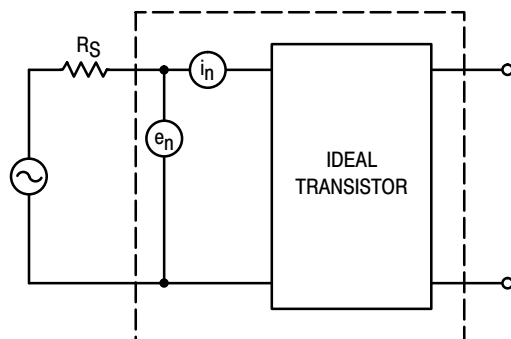


Figure 1. Transistor Noise Model

# NOISE CHARACTERISTICS

( $V_{CE} = 5.0 \text{ Vdc}$ ,  $T_A = 25^\circ\text{C}$ )

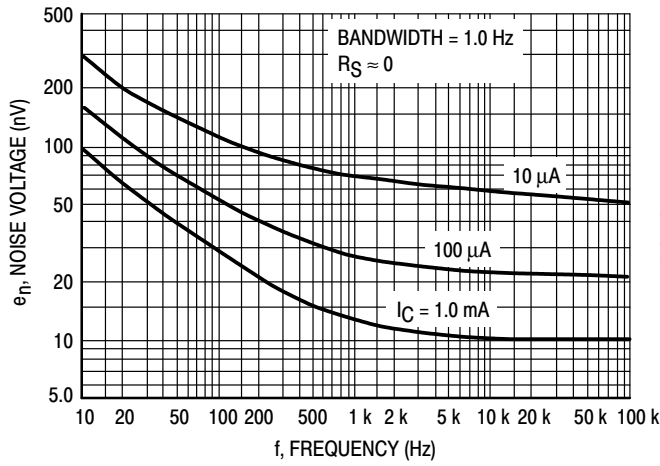


Figure 2. Noise Voltage

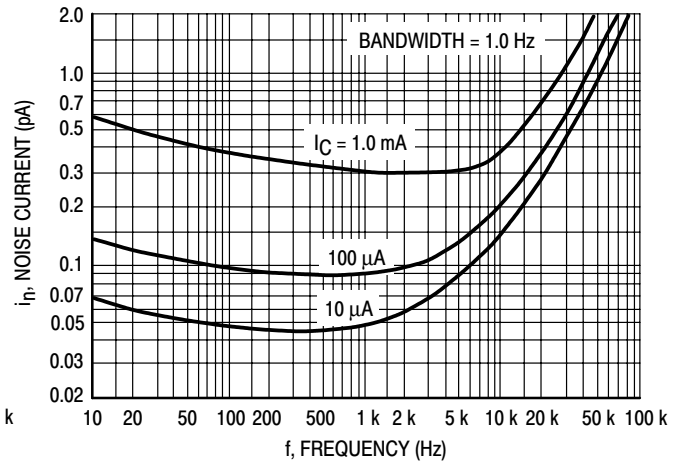


Figure 3. Noise Current

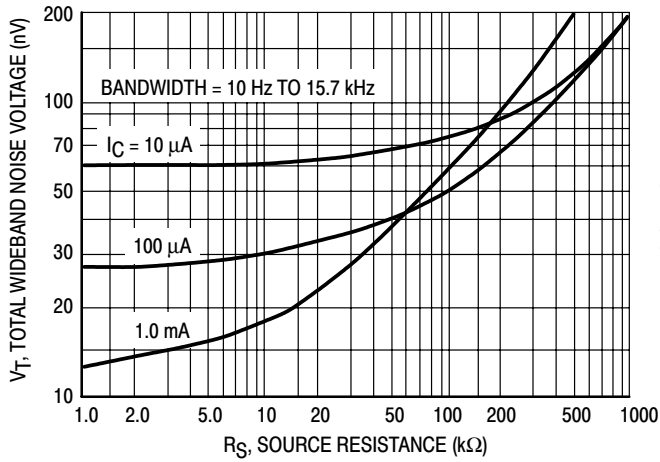


Figure 4. Total Wideband Noise Voltage

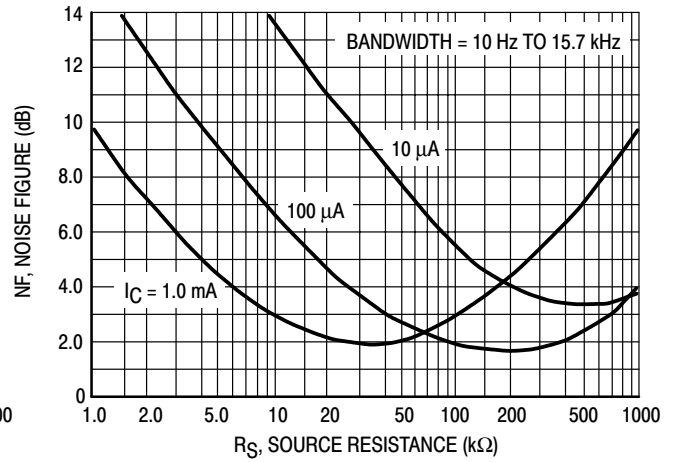


Figure 5. Wideband Noise Figure

SMALL-SIGNAL CHARACTERISTICS

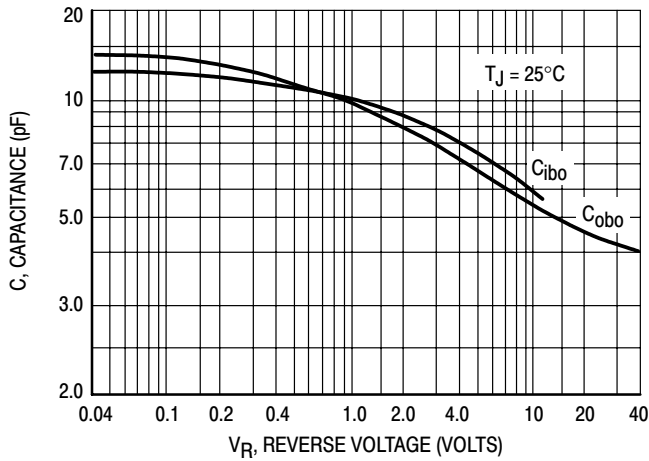


Figure 6. Capacitance

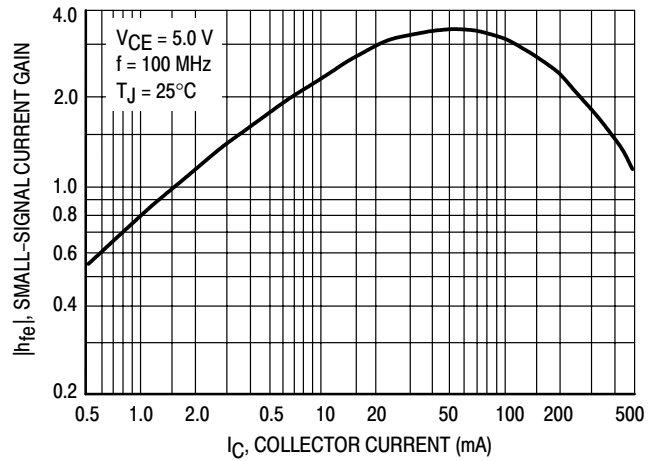


Figure 7. High Frequency Current Gain

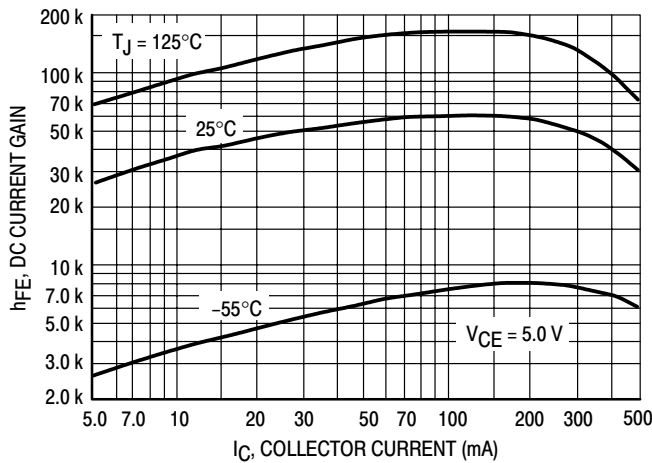


Figure 8. DC Current Gain

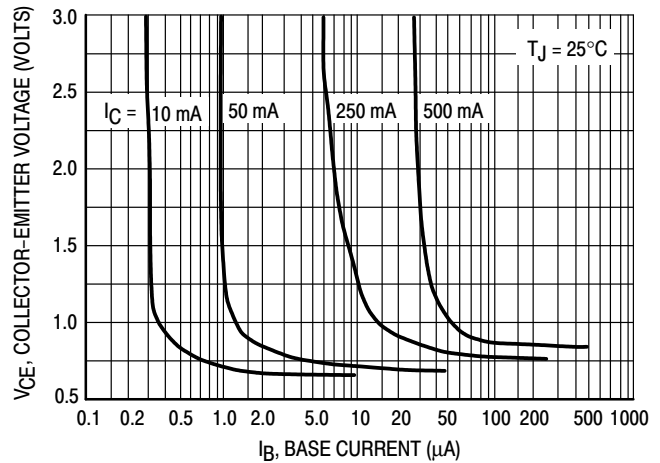


Figure 9. Collector Saturation Region

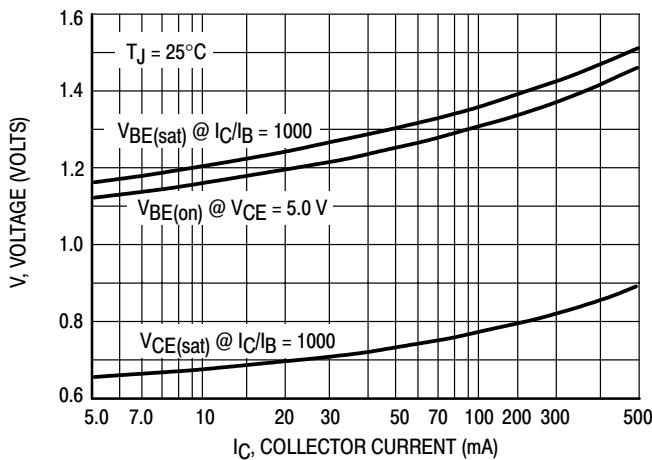


Figure 10. "On" Voltages

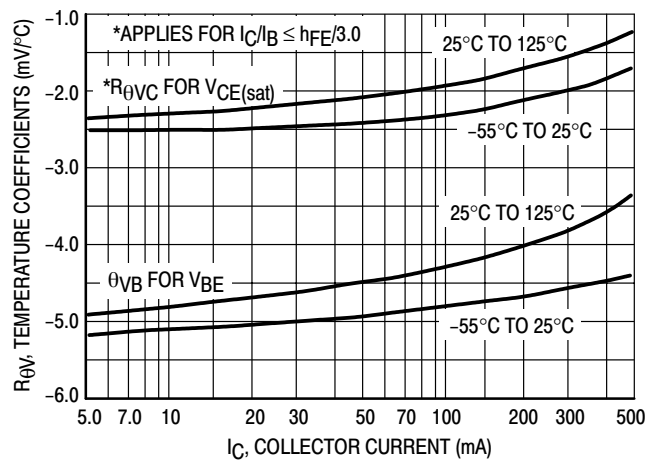


Figure 11. Temperature Coefficients

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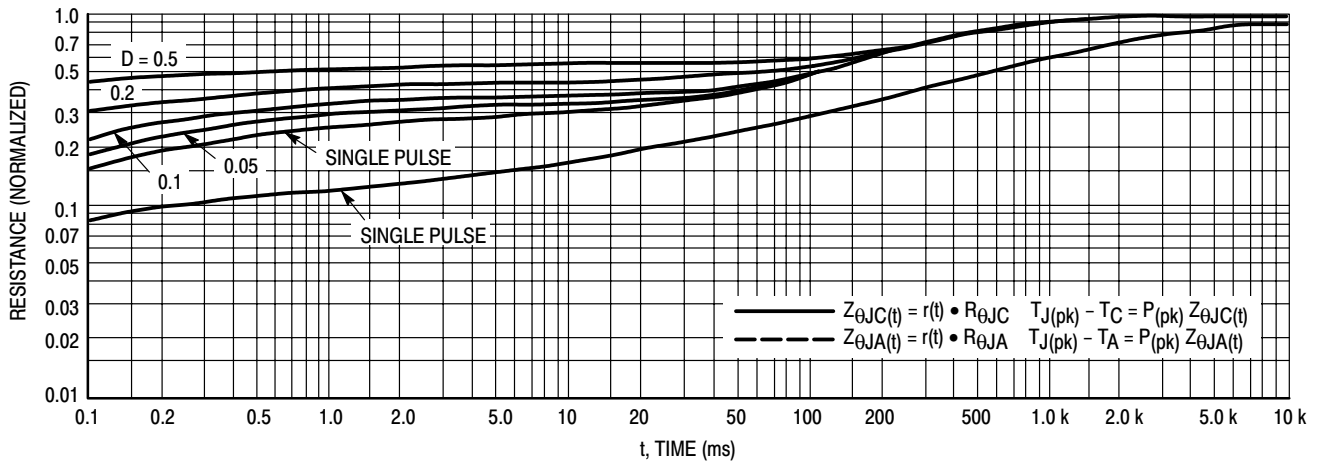


Figure 12. Thermal Response

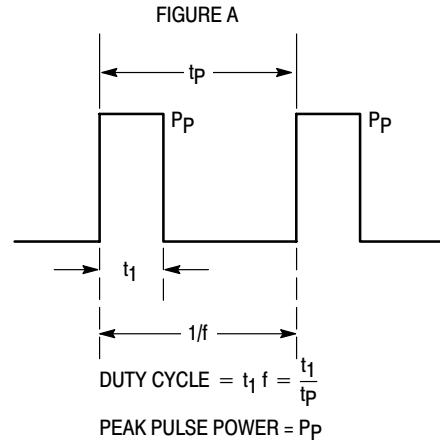
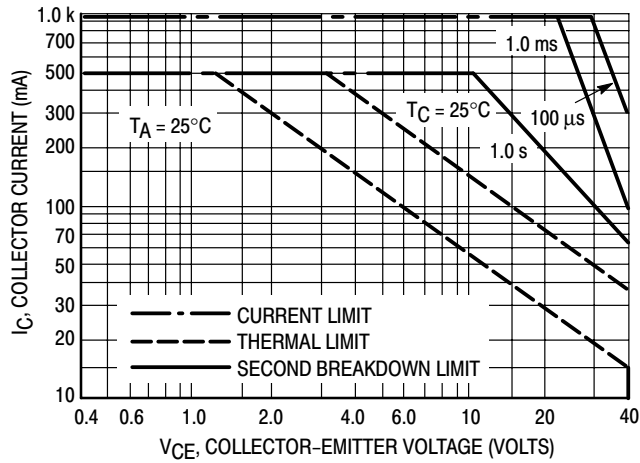
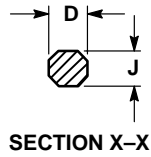
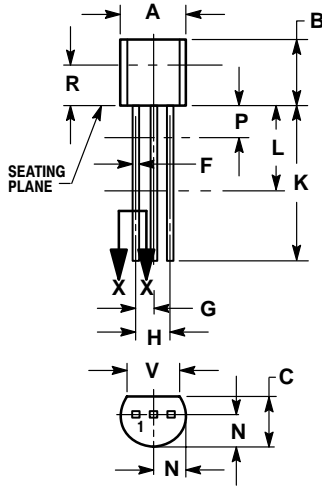


Figure 13. Active Region Safe Operating Area Design Note: Use of Transient Thermal Resistance Data

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## PACKAGE DIMENSIONS

CASE 029-04  
(TO-226AA)  
ISSUE AD



### NOTES:


1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSION D AND J APPLY BETWEEN L AND K MINIMUM. 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	0.022	0.41	0.55
F	0.016	0.019	0.41	0.48
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	---

### STYLE 1:

- PIN 1. EMITTER
- BASE
- COLLECTOR

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