

Darlington Transistors

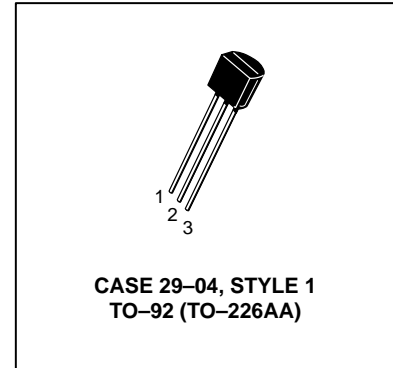
NPN Silicon

2N6426*
2N6427

*ON Semiconductor Preferred Device

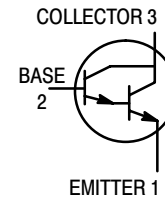
MAXIMUM RATINGS

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°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	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	$^\circ\text{C}/\text{W}$



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 ⁽¹⁾ ($I_C = 10 \text{ mAdc}, V_{BE} = 0$)	$V_{(BR)CEO}$	40	—	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 100 \mu\text{Adc}, I_E = 0$)	$V_{(BR)CBO}$	40	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 10 \mu\text{Adc}, I_C = 0$)	$V_{(BR)EBO}$	12	—	—	Vdc
Collector Cutoff Current ($V_{CE} = 25 \text{ Vdc}, I_B = 0$)	I_{CES}	—	—	1.0	μAdc
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 $\leq 300 \mu\text{s}$; 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
ON CHARACTERISTICS					
DC Current Gain ⁽¹⁾ ($I_C = 10 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$)	h_{FE}	20,000	—	200,000	—
	2N6426	10,000	—	100,000	
	2N6427				
($I_C = 100 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$)		30,000	—	300,000	
	2N6426	20,000	—	200,000	
	2N6427				
($I_C = 500 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$)		20,000	—	200,000	
	2N6426	14,000	—	140,000	
	2N6427				
Collector–Emitter Saturation Voltage ($I_C = 50 \text{ mAdc}$, $I_B = 0.5 \text{ mAdc}$) ($I_C = 500 \text{ mAdc}$, $I_B = 0.5 \text{ mAdc}$)	$V_{CE(sat)}$	—	0.71	1.2	Vdc
		—	0.9	1.5	
Base–Emitter Saturation Voltage ($I_C = 500 \text{ mAdc}$, $I_B = 0.5 \text{ mAdc}$)	$V_{BE(sat)}$	—	1.52	2.0	Vdc
Base–Emitter On Voltage ($I_C = 50 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$)	$V_{BE(on)}$	—	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 ($I_C = 10 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)	h_{ie}	100	—	2000	k Ω
	2N6426	50	—	1000	
	2N6427				
Small–Signal Current Gain ($I_C = 10 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)	h_{fe}	20,000	—	—	—
	2N6426	10,000	—	—	
	2N6427				
Current–Gain — High Frequency ($I_C = 10 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$, $f = 100 \text{ MHz}$)	$ h_{fe} $	1.5	2.4	—	—
	2N6426	1.3	2.4	—	
	2N6427				
Output Admittance ($I_C = 10 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)	h_{oe}	—	—	1000	μmhos
Noise Figure ($I_C = 1.0 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$, $R_S = 100 \text{ k}\Omega$, $f = 1.0 \text{ kHz}$)	NF	—	3.0	10	dB

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

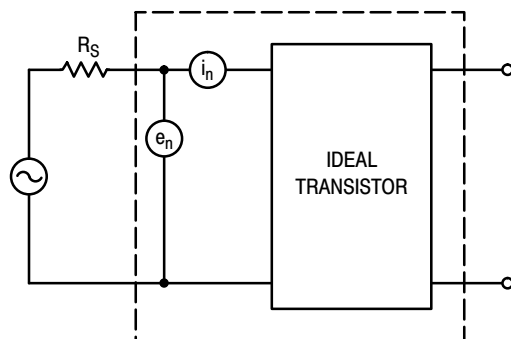


Figure 1. Transistor Noise Model

NOISE CHARACTERISTICS

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

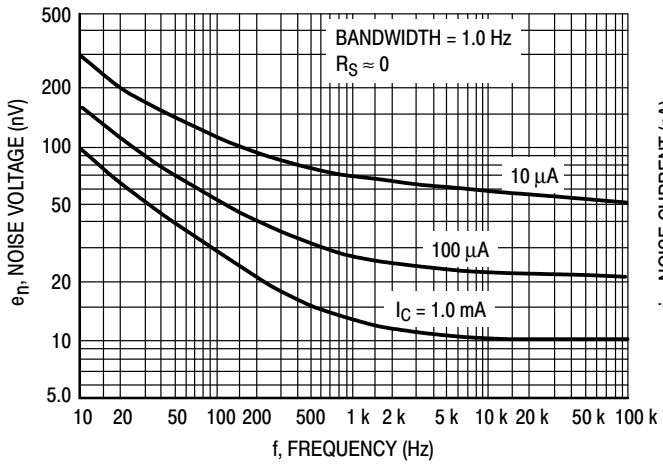


Figure 2. Noise Voltage

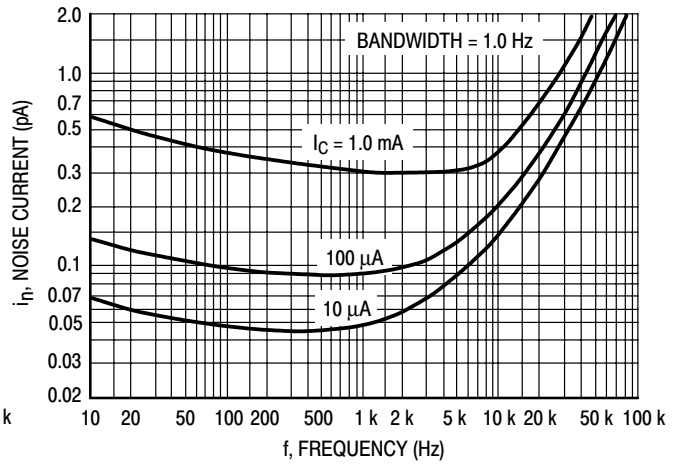


Figure 3. Noise Current

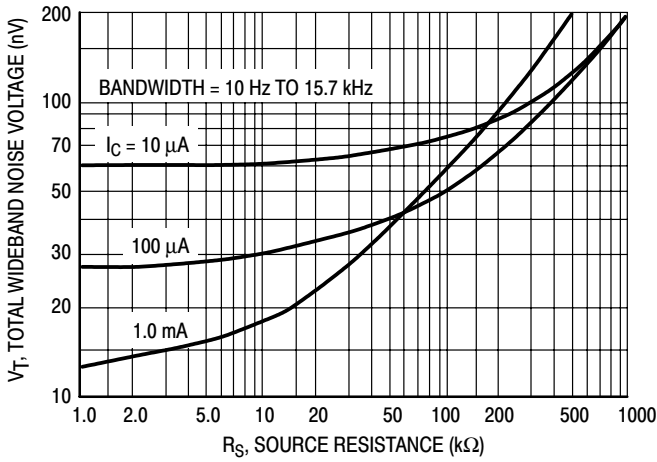


Figure 4. Total Wideband Noise Voltage

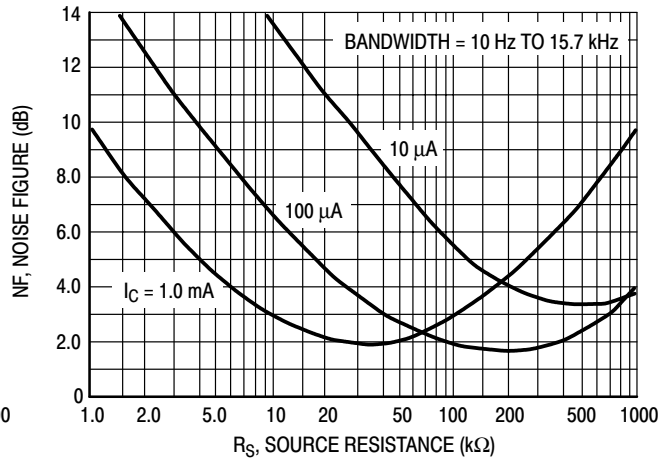


Figure 5. Wideband Noise Figure

SMALL-SIGNAL CHARACTERISTICS

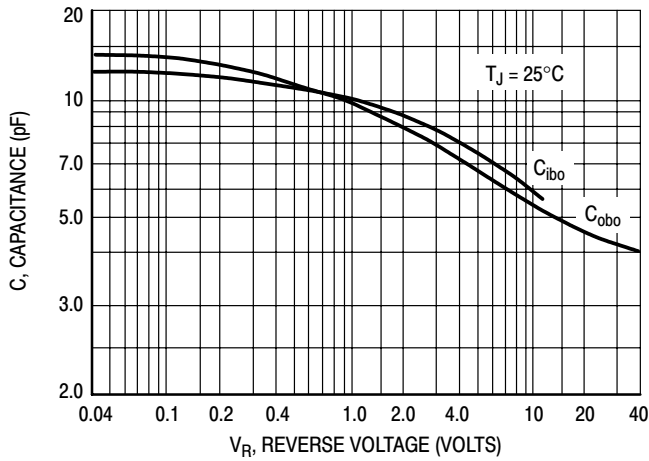


Figure 6. Capacitance

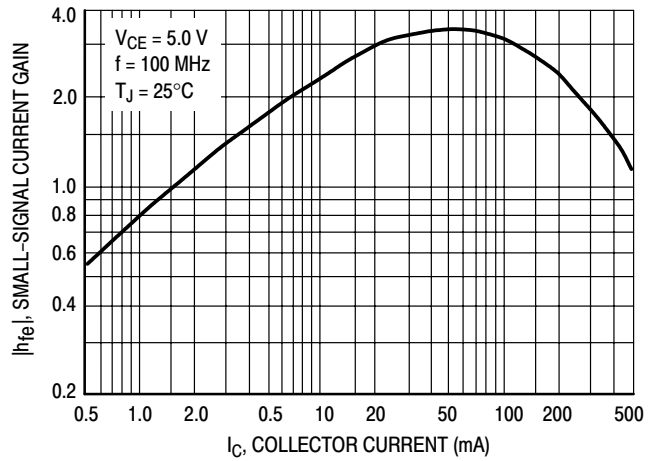


Figure 7. High Frequency Current Gain

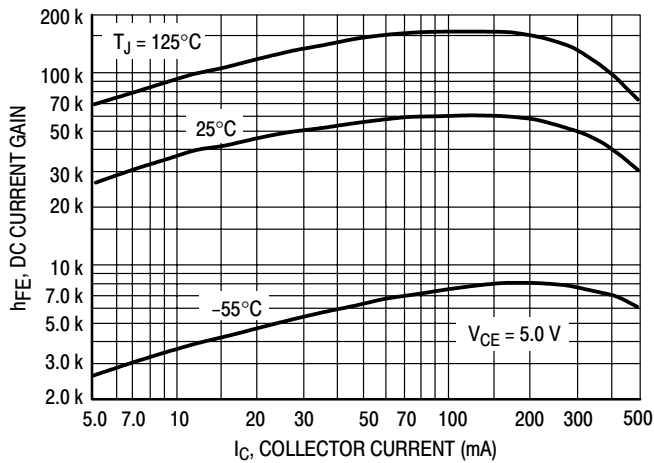


Figure 8. DC Current Gain

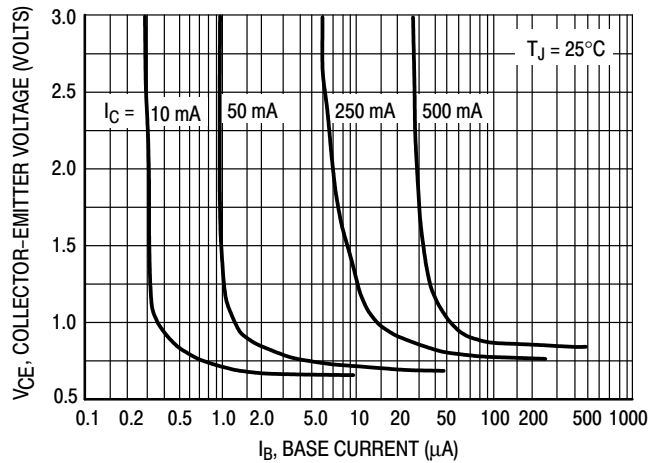


Figure 9. Collector Saturation Region

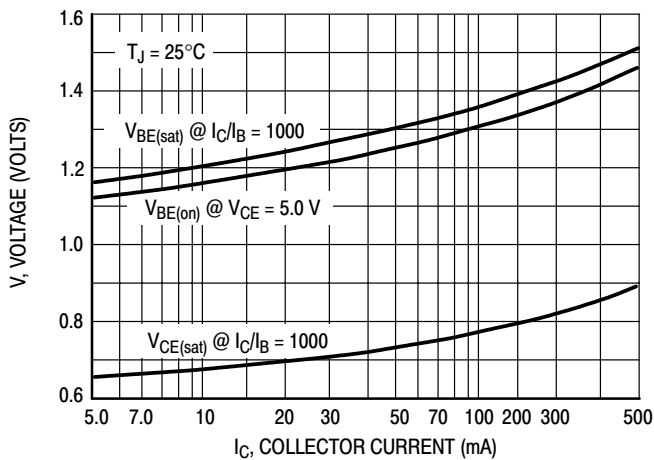


Figure 10. "On" Voltages

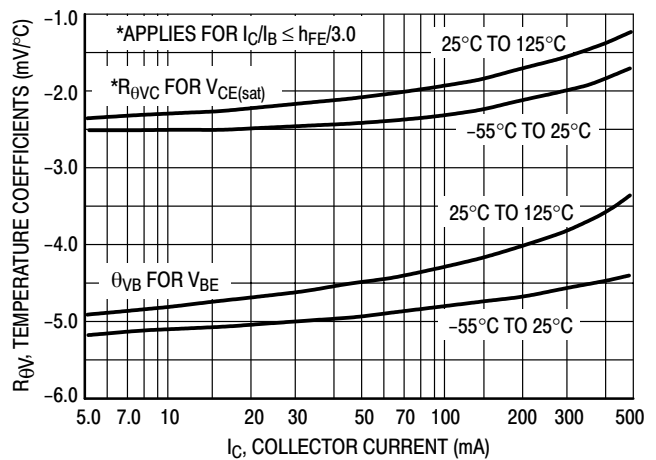


Figure 11. Temperature Coefficients

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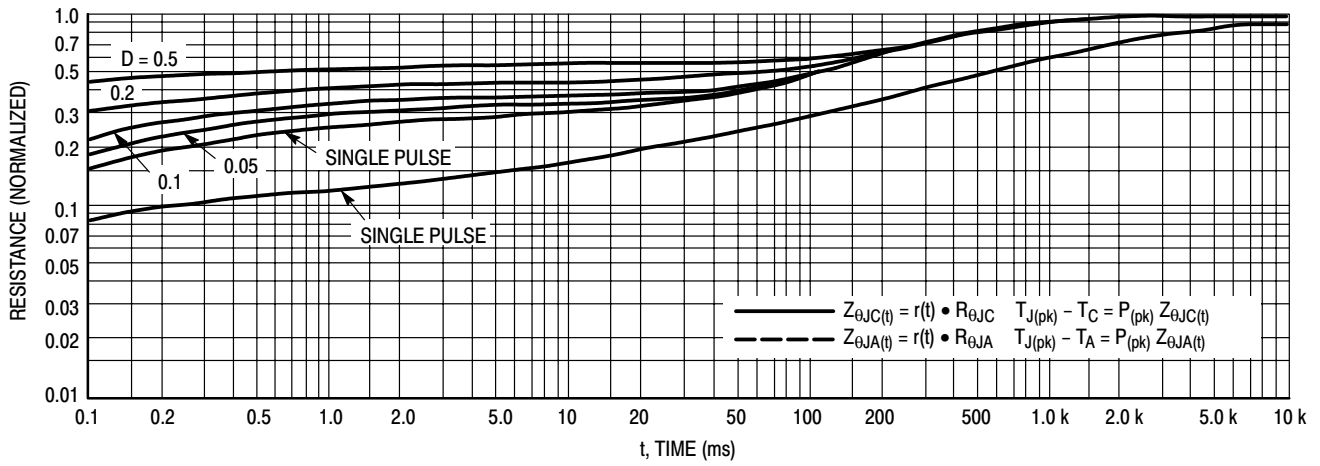


Figure 12. Thermal Response

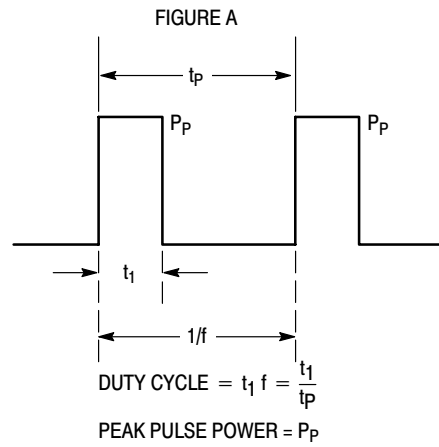
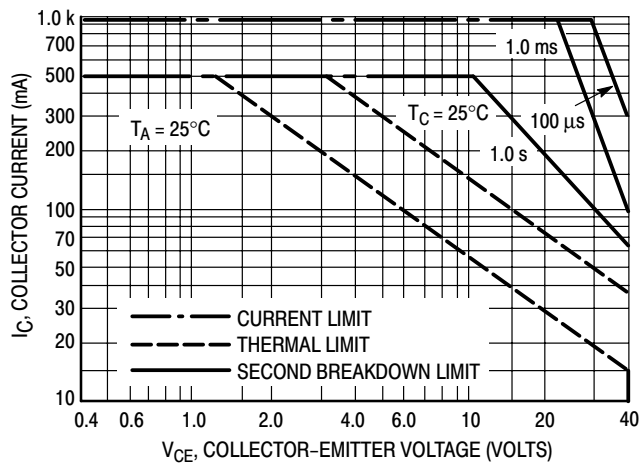


Figure 13. Active Region Safe Operating Area Design Note: Use of Transient Thermal Resistance Data