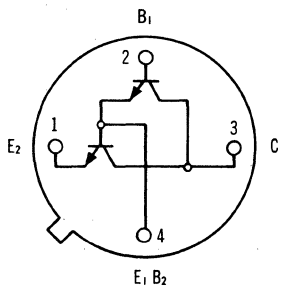
2N998 (SILICON)

CASE 20(8)
(TO-72)

Darlington amplifier containing two NPN silicon annular transistors is designed for applications requiring very high-gain, low-noise, and high-input impedance.



MAXIMUM RATINGS

Rating	Symbol	2N998	Unit
Collector-Emitter Voltage	V_{CEO}	60	Vdc
Collector-Base Voltage	V_{CB}	100	Vdc
Emitter-Base Voltage	V_{EB}	15	Vdc
Collector Current	I_C	500	mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	0.5 2.86	Watt mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.8 10.3	Watts mW/°C
Operating Junction Temperature	T_J	+200	°C
Storage Temperature Range	T_{stg}	-65 to +200	°C

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Sustaining Voltage [1] (I_C = 30 mAdc, I_B = 0)	$BV_{CEO(sus)}$	60	—	Vdc
Collector-Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)	BV_{CBO}	100	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)	BV_{EBO}	15	—	Vdc
Collector Cutoff Current (V_{CB} = 90 Vdc, I_E = 0)	I_{CBO}	—	0.01	μAdc
(V_{CB} = 90 Vdc, I_E = 0, T_A = 150°C)		—	15	
Emitter Cutoff Current (V_{BE} = 10 Vdc, I_C = 0)	I_{EBO}	—	0.01	μAdc
ON CHARACTERISTICS				
DC Current Gain [1] (I_C = 1 mAdc, V_{CE} = 5 Vdc)	h_{FE}	800	—	—
(I_C = 10 mAdc, V_{CE} = 5 Vdc)		1,600	8,000	
(I_C = 100 mAdc, V_{CE} = 5 Vdc)		2,000	—	
(I_C = 10 mAdc, V_{CE} = 5 Vdc, measured across each transistor within the device)		25	—	
DYNAMIC CHARACTERISTICS				
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 140 kHz)	C_{ob}	—	30	pF
Input Capacitance (V_{BE} = 0.5 Vdc, I_C = 0, f = 140 kHz)	C_{ib}	—	50	pF
Small-Signal Current Gain (I_C = 1 mAdc, V_{CE} = 5 Vdc, f = 1 kHz)	h_{fe}	1,000	—	—
Noise Figure** (I_C = 0.1 mAdc, V_{CE} = 10 Vdc, R_S = 5 kohms, f = 1 kHz, Bandwidth = 200 Hz)	NF**	—	6.0	dB

[1] Pulse Test: Pulse Width = 300 μs, Duty Cycle = 1%

**Measured with constant current supply of 20 μAdc connected to the emitter of the input transistor. (See Figure 1)

FIGURE 1 — NOISE-FIGURE TEST CIRCUIT