ELECTRONIC INNOVATIONS IN ACTION

SEMICONDUCTORS

Silicon Consumer Type Transistor

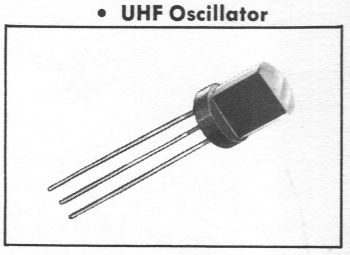
PLANAR EPITAXIAL TRANSISTORS

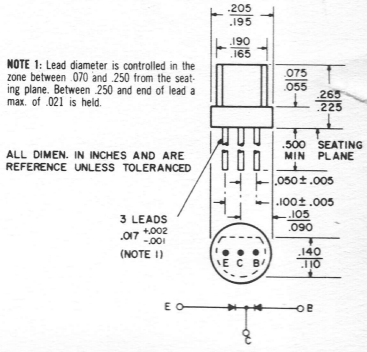
NPN

D16G6

The General Electric D16G6 is an NPN silicon planar epitaxial passivated transistor designed specifically for high frequency applications. The unit is suitable for use as a UHF television tuner oscillator.

- Low Cost
- UHF Oscillator





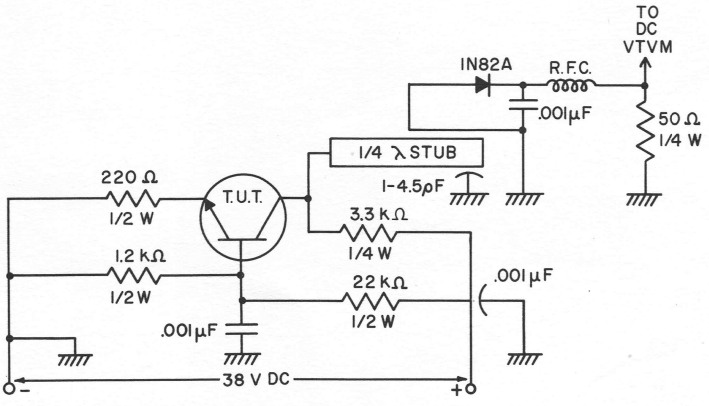
absolute maximum ratings: (25°C) (unless otherwise specified)

Voltages			
Collector to base	V_{CBO}	30	V
Emitter to base	V_{EBO}	3	V
Collector to emitter	V_{CEO}	12	V
Current			
Collector (steady state)*	I_C	25	mA
Dissipation			
Total Power (free air @ 25°C amb.)*	P_T	200	mW
Total Power (free air @ 55°C amb.)*	P_T	120	mW
Temperature			
Storage temperature	T_{stg}	−55 to +125	°C
Soldering temperature 10 sec. 1/16 ± 1/32" from case		260	°C
Operating junction temperature	T_J	100	°C

* Derate 2.67 mW/°C for ambient above 25°C.

electrical characteristics: (25°C) (unless otherwise specified)

	Symbol	Min	Typ	Max	Units
Static					
Collector cutoff current ($V_{CB} = 30$ V, $I_E = 0$)	I_{CBO}			0.5	μA
Emitter cutoff current ($V_{EB} = 3$ V, $I_C = 0$)	I_{EBO}			0.5	μA
Forward current transfer ratio ($I_C = 5$ mA, $V_{CE} = 10$V)	h_{FE}	20			
Collector-base breakdown voltage ($I_E = 0$, $I_C = 100$ μA)	BV_{CBO}	30			V
Emitter-base breakdown voltage ($I_C = 0$, $I_E = 100$ μA)	BV_{EBO}	3			V
Collector-emitter breakdown voltage ($I_B = 0$, $I_C = 3$ mA)	BV_{CEO}	12		35	V
Dynamic					
Gain bandwidth product ($V_{CE} = 10$V, $I_C = 5$ mA)	f_T	500			MHz
Collector base time constant ($V_{CE} = 10$V, $I_C = 5$ mA)	r'_bC_c			20	psec.
Output capacitance ($V_{CB} = 10$V, $I_E = 0$, f = 1 MHz)	C_{cbo}		1.2	1.5	pF
Oscillator output ($V_{CC} = 38$V, $I_C \approx 5$ mA, f ≈ 940 MHz) (See Figure 1)	V_o	2.5			mV



940 MHz Oscillator Test Circuit
Figure 1

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Silicon Consumer Type Transistor

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- Low Cost
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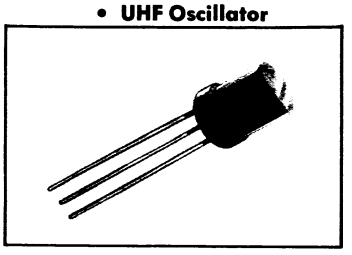
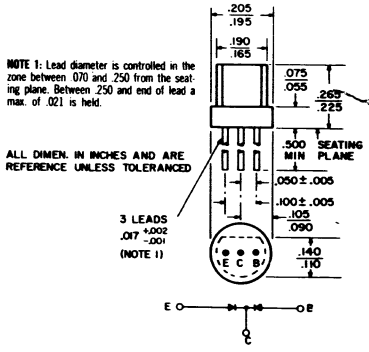




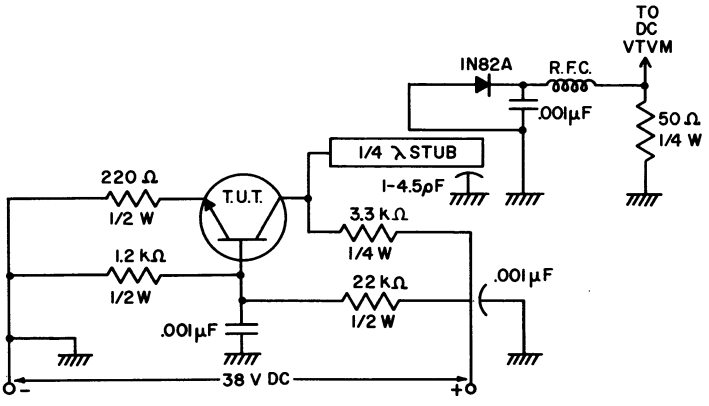
absolute maximum ratings: (25°C) (unless otherwise specified)

Voltages			
Collector to base	V_{CBO}	30	V
Emitter to base	V_{EBO}	3	V
Collector to emitter	V_{CEO}	12	V
Current			
Collector (steady state)*	I_C	25	mA
Dissipation			
Total Power (free air @ 25°C amb.)*	P_T	200	mW
Total Power (free air @ 55°C amb.)*	P_T	120	mW
Temperature			
Storage temperature	T_{stg}	−55 to +125	°C
Soldering temperature 10 sec. 1/16 ± 1/32" from case		260	°C
Operating junction temperature	T_J	100	°C

* Derate 2.67 mW/°C for ambient above 25°C.

electrical characteristics: (25°C) (unless otherwise specified)

	Symbol	Min	Typ	Max	Units
Static					
Collector cutoff current ($V_{CB} = 30$ V, $I_E = 0$)	I_{CBO}			0.5	μA
Emitter cutoff current ($V_{EB} = 3$ V, $I_C = 0$)	I_{EBO}			0.5	μA
Forward current transfer ratio ($I_C = 5$ mA, $V_{CE} = 10$V)	h_{FE}	20			
Collector-base breakdown voltage ($I_E = 0$, $I_C = 100$ μA)	BV_{CBO}	30			V
Emitter-base breakdown voltage ($I_C = 0$, $I_E = 100$ μA)	BV_{EBO}	3			V
Collector-emitter breakdown voltage ($I_B = 0$, $I_C = 3$ mA)	BV_{CEO}	12		35	V
Dynamic					
Gain bandwidth product ($V_{CE} = 10$V, $I_C = 5$ mA)	f_T	500			MHz
Collector base time constant ($V_{CE} = 10$V, $I_C = 5$ mA)	r'_bC_c			20	psec.
Output capacitance ($V_{CB} = 10$V, $I_E = 0$, f = 1 MHz)	C_{cbo}		1.2	1.5	pF
Oscillator output ($V_{CC} = 38$V, $I_C \approx 5$ mA, f ≈ 940 MHz) (See Figure 1)	V_o	2.5			mV



940 MHz Oscillator Test Circuit
Figure 1

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ELECTRONIC INNOVATIONS IN ACTION

SEMICONDUCTORS

Silicon Monolithic Darlington Amplifiers

PLANAR EPITAXIAL PASSIVATED

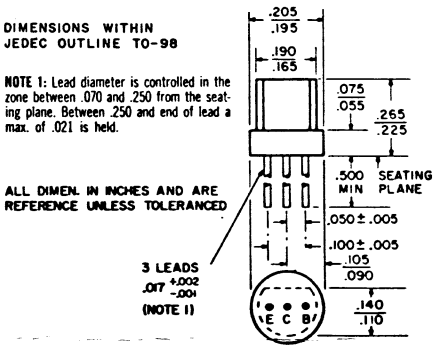
D16P1
D16P2
D16P3
D16P4

13/07/02

The General Electric D16P1, D16P2, D16P3 and D16P4 are planar epitaxial passivated NPN silicon Darlington monolithic amplifiers. They are ideal for preamplifier input stages requiring high input impedances of several megohms.

Features

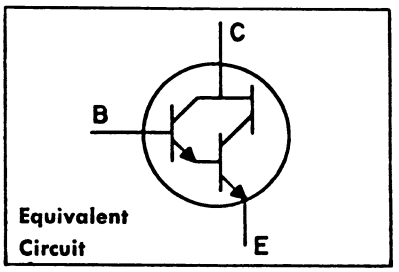
- Low Cost • Very High Beta
- High Input Impedance



absolute maximum ratings: (25°C) (unless otherwise specified)

		D16P1 D16P2	D16P3 D16P4	
Voltages				
Collector to base	V_{CBO}	18	40	V
Collector to emitter	V_{CEO}	12	20	V
Collector to emitter	V_{CES}	18	40	V
Emitter to base	V_{EBO}	8	12	V
Current				
Collector (steady state)	I_C	200	200	mA
Base (steady state)	I_B	20	20	mA
Dissipation				
Total power (free air @ 25°C)	P_T	320	320	mW
Total power (free air @ 65°C)*	P_T	185	185	mW
Temperature				
Storage	T_S	−65 to +150		°C
Operating	T_j	−65 to +120		°C
Lead 1/16" ± 1/32" from case for 10 seconds maximum	T_L	260	260	°C

*Derate 3.4 mW/°C for increase in ambient temperature between 25 and 120°C.



electrical characteristics: (25°C) (unless otherwise specified)

STATIC CHARACTERISTICS

			Min.	Typ.	Max.	
Collector cutoff current						
(V_{CE} = 18V, V_{BE} = 0)	D16P1, 2	I_{CES}			100	nA
(V_{CE} = 18V, V_{BE} = 0, T_j = 100°C)	D16P1, 2	I_{CES}			20	μA
(V_{CE} = 40V, V_{BE} = 0)	D16P3, 4	I_{CES}			100	nA
(V_{CE} = 40V, V_{BE} = 0, T_j = 100°C)	D16P3, 4	I_{CES}			20	μA
Emitter cutoff current						
(V_{EB} = 8V)	D16P1, 2	I_{EBO}			100	nA
(V_{EB} = 12V)	D16P3, 4	I_{EBO}			100	nA

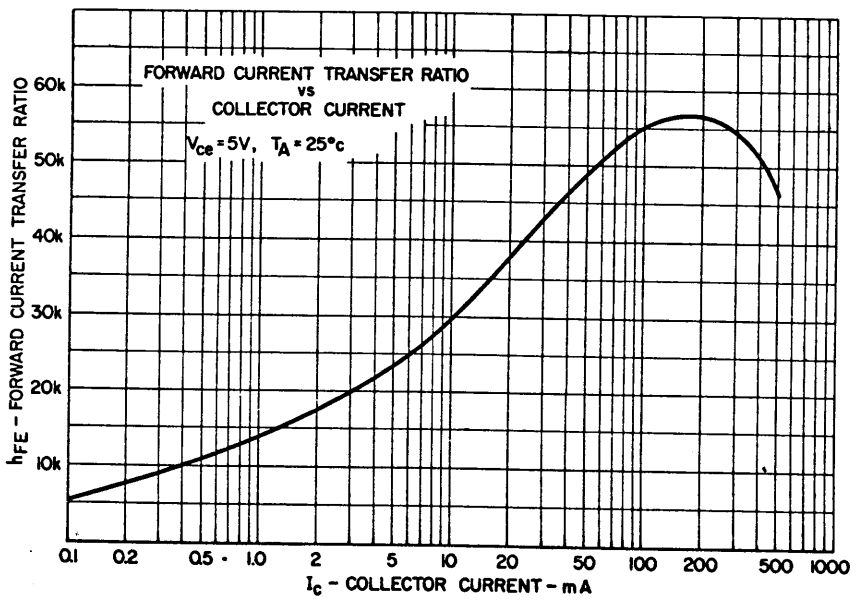
electrical characteristics (25°C): (unless otherwise specified) (cont'd)

			Min.	Typ.	Max.	
Collector emitter breakdown voltage						
(I_C = 10 mA, I_B = 0)	D16P1, 2	BV_{CEO}			12	V
	D16P3, 4	BV_{CEO}			20	V
Forward current transfer ratio						
(I_C = 2 mA, V_{CE} = 5V)	D16P1, 3	h_{FE}	2,000			
	D16P2, 4	h_{FE}	7,000		70,000	
(I_C = 100 mA, V_{CE} = 5V)	D16P1, 3	h_{FE}†	10,000			
	D16P2, 4	h_{FE}†	20,000			
Collector emitter saturation voltage						
(I_C = 200 mA, I_B = 0.2 mA)	D16P1, 2	$V_{CE(sat)}$†			1.4	V
	D16P3, 4	$V_{CE(sat)}$†			1.0	V
Base emitter saturation voltage						
(I_C = 200 mA, I_B = 0.2 mA)		$V_{BE(sat)}$†			1.5	V
Base emitter drive voltage						
(I_C = 200 mA, I_B = 0.2 mA)		V_{BE}†			1.5	V

DYNAMIC CHARACTERISTICS

Forward current transfer ratio						
(I_C = 2 mA, V_{CE} = 5V, f = 1 kHz)	D16P1, 3	h_{fe}	2,000			
	D16P2, 4	h_{fe}	7,000	15,000		
Input impedance						
(I_C = 2 mA, V_{CE} = 5V, f = 1 kHz)	D16P1, 2	h_{ie}			500	kΩ
	D16P3, 4	h_{ie}			650	kΩ
Forward current transfer ratio						
(I_C = 2 mA, V_{CE} = 5V, f = 20 MHz)		h_{fe}	3	8.4		
Output capacitance						
(V_{CB} = 10V, f = 1 MHz)		C_{cbo}		7.6	10	pF
Input capacitance						
(V_{EB} = 0.5V, f = 1 MHz)		C_{ebo}		10.5		pF

†Pulsed Measurement: Pulse width ≦ 300 μ sec., Duty cycle ≦ 2%



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