Anwendung OSZ 01

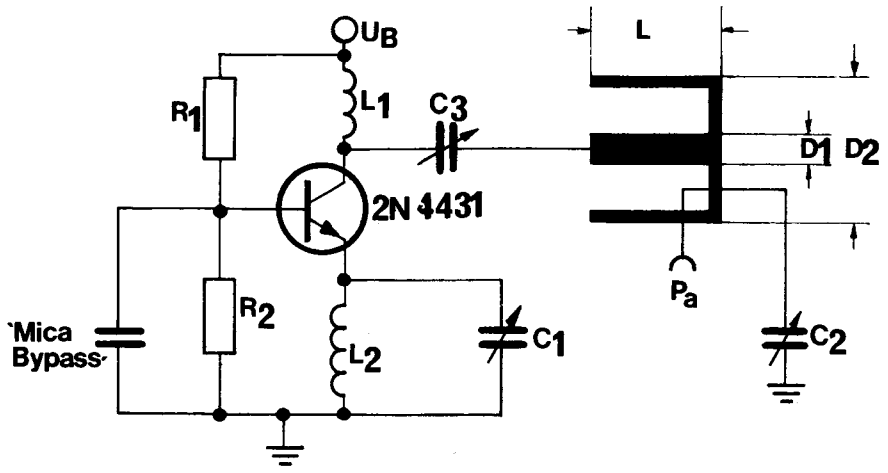
5 Watt Topfkreis-Oszillator für Frequenzen von 800 MHz bis 1 GHz

2N 4428
2N 4429
2N 4430
●2N 4431

Die Fa. United - Aircraft ist einer der führenden Hersteller von HF-Leistungs-Transistoren. Die Grenzwerte des Lieferprogramms sind hinsichtlich Frequenz und HF - Ausgangsleistung z. Z. 10 W bei 1 GHz und 70 W bei 175 MHz. Die hohe Entwicklungs- und Fertigungsqualität der UA - HF - Transistoren gewährleisten ausgezeichnete V SWR und Modulationseigenschaften.

Den Aufbau eines Oszillators, der bei 1 GHz noch 5 Watt Leistung abgibt zeigt nachfolgend Schaltung. Zur Anwendung kam der bekannte UA - Typ 2N 4431. Der 2N 4431 ist ein Single - Chip - TRANSISTOR, untergebracht im UHF - Stripline Gehäuse.
Die typische Grenzfrequenz beträgt 1500 MHz.

1. Schaltung



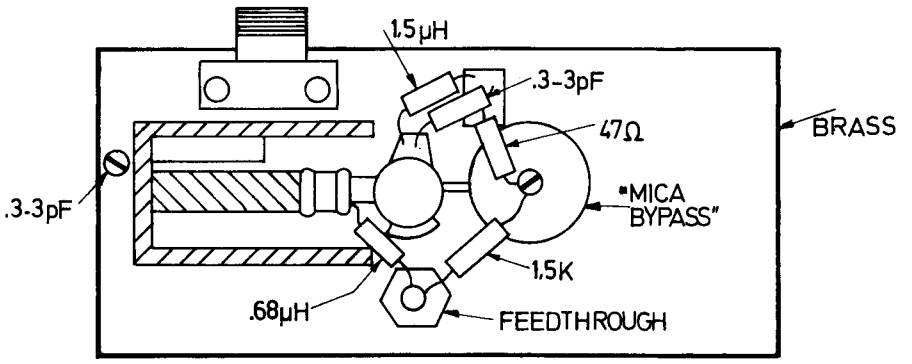
2. Schaltteilliste

C 1	= 0,3 - 3 pF	L 1	= 0,68 µH	R 1	= 1,6 kOhm
C 2	= 0,3 - 3 pF	L 2	= 1,5 µH	R 2	= 47,0 Ohm
C 3	= 0,8 - 10 pF				

Topfkreis Abmaße:
L = 22,2mm D_1 = 5,8mm D_2 = 18,3mm

18. 5. 71

3. Mechanischer Aufbau



4. Kenndaten des Oszillators

Frequenz (MHz)	Pa (W)	Ic (mA)	Wirkungsgrad (%)	Pa bei optimaler Vorspannung
800	5,1	420	43,4	6 W bei 830MHz
900	5,0	410	44,4	6 W bei 960MHz
1000	4,4	445	35,4	4,6 W bei 16 Hz

5. Information

Mehr über HF - Leistungstransistoren der Fa. United - Aircraft erfahren Sie durch den HF - Power - Service. Übrigens - kennen Sie schon den HF - Power - Service - Fragebogen?

Preise:

	1 - 24 St.	ab 25 St.	ab 100 St.
2N 4428	31.50 DM	29.-- DM	26.20 DM
2N 4429	47.-- DM	45.-- DM	44.50 DM
2N 4430	97.20 DM	89.-- DM	59.60 DM
● 2N 4431	155.70 DM	148.-- DM	108.-- DM

Ab Lager lieferbar !

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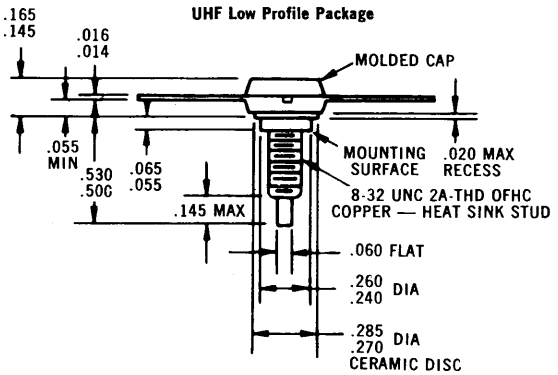
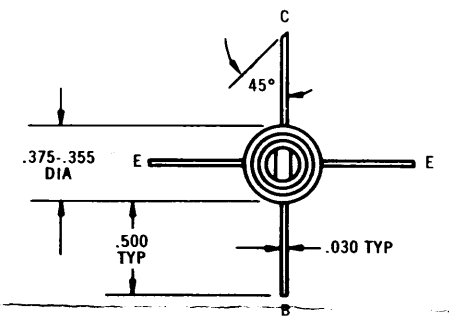
1 Watt 1.0 GHz Medium Power Transistor TYPE 2N4429



ABSOLUTE MAXIMUM RATINGS (25°C)

V_{CBO}	Collector to Base Voltage	55	Volts
V_{CEO}	Collector to Emitter Voltage	35	Volts
V_{EBO}	Emitter to Base Voltage	3.5	Volts
I_C	Continuous Collector Current	425	mA
P_T	Total Dissipation at 25°C Stud	5.0	Watts
Θ_{JC}	Thermal Resistance (Junction to Stud)	35	°C/W
T_{stg}	Storage Temperature	—65 to 200°C	
T_J	Junction Temperature	—65 to 200°C	



ELECTRICAL CHARACTERISTICS (25°C)

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	MIN.	MAX.	UNITS
I_{CEX}	Collector Cutoff Current	$V_{CB} = 55V$ $V_{BE} = -1.5V$		1.0	mA
V_{CEO}	Collector to Emitter Voltage	$I_C = 20mA$ $I_b = 0$	35		Volts
V_{CER}	Collector to Emitter Voltage	$R = 10\Omega$ $I_C = 20mA$	55		Volts
V_{EBO}	Emitter to Base Voltage	$I_e = 0.10mA$	3.5		Volts
h_{FE}	DC Current Gain	$V_{CE} = 5V$ $I_C = 50mA$	20	200	
f_t	Gain-Bandwidth Product Measured at 200 MHz	$V_{CB} = 20V$ $I_C = 50mA$	700		MHz
C_{ob}	Collector to Base Capacitance	$V_{CB} = 28V$ $f = 1.0MHz$		3.5	pF
h_{FE}	DC Current Gain	$V_{CE} = 5.0V$ $I_C = 400mA$	5		
P_{out}	Power Output $V_{CB} = 28$ Volts η = Collector Efficiency > 35%	$f = 1000MHz$ $P_{in} = 300mW$	1.0		Watts

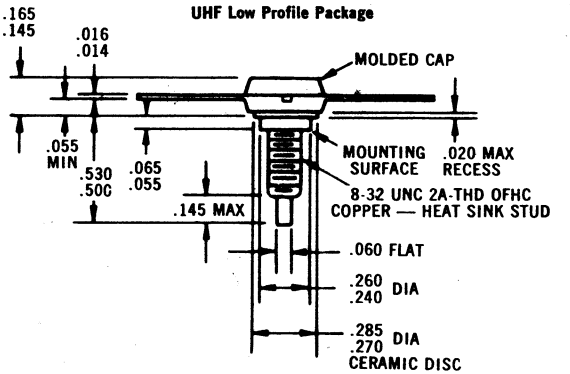
Preise:

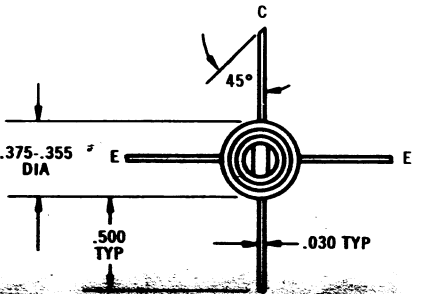
	1 - 24 St.	ab 25 St.	ab 100 St.
DM	68,--	60,--	54,--

Electronic Components DIVISION OF United Aircraft

1 Watt 1.0 GHz Medium Power Transistor TYPE 2N4429

The 2N4429 is a 1.0GHz device having a typical f_T of 1.0GHz in a narrow lead stud mounted package for applications in stripline construction.



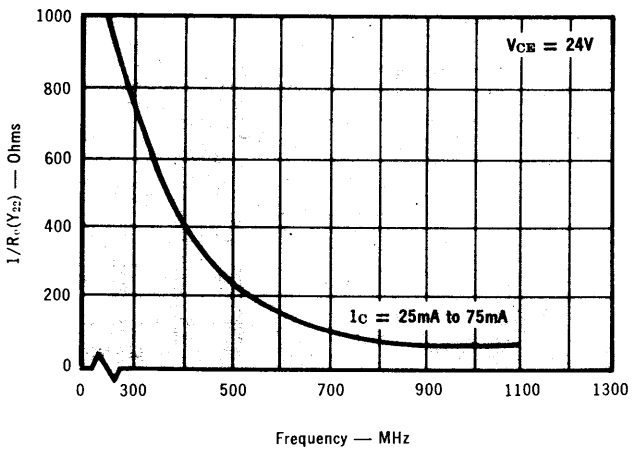


ABSOLUTE MAXIMUM RATINGS (25°C)

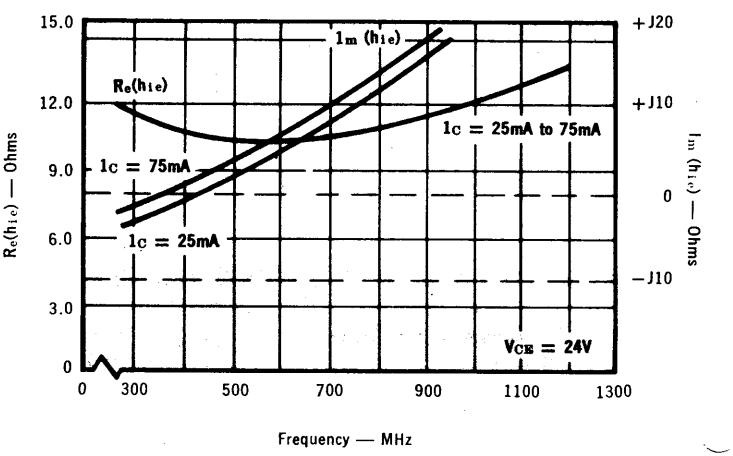
V_{CBO}	Collector to Base Voltage	55	Volts
V_{CEO}	Collector to Emitter Voltage	35	Volts
V_{EBO}	Emitter to Base Voltage	3.5	Volts
I_C	Continuous Collector Current	425	mA
P_T	Total Dissipation at 25°C Stud	5.0	Watts
Θ_{JC}	Thermal Resistance (Junction to Stud)	35	°C/W
T_{stg}	Storage Temperature	—65 to 200°C	
T_J	Junction Temperature	—65 to 200°C	

TYPE 2N4429

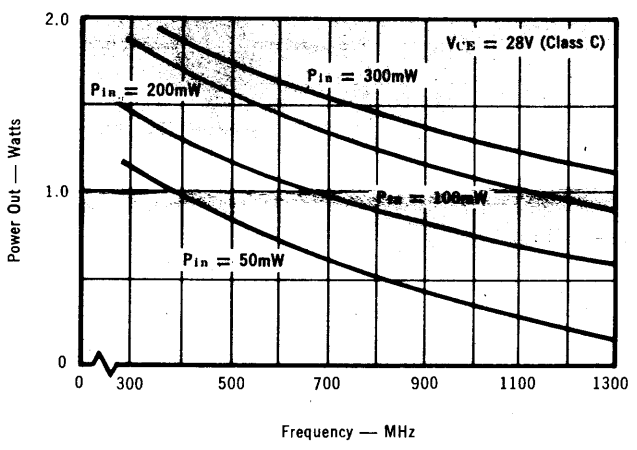
$1/R_e(Y_{22})$ Vs Frequency



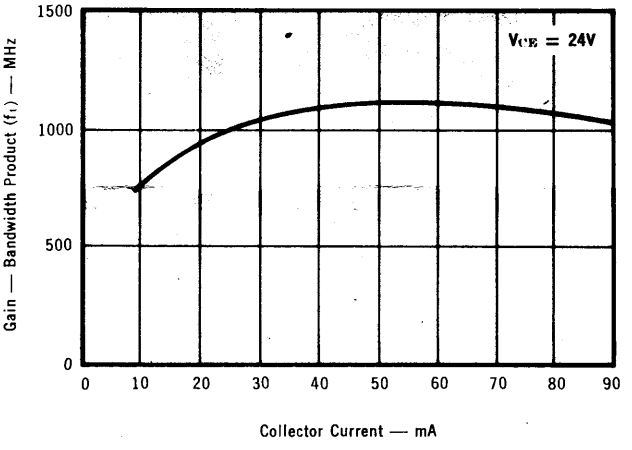
h_{ie} Vs Frequency



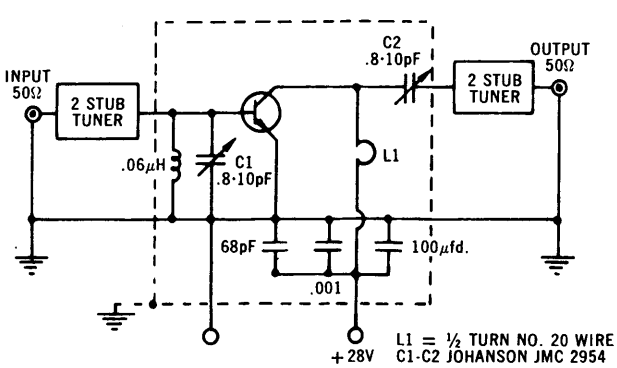
Power Out Vs Frequency



Gain — Bandwidth Product Vs Collector Current



1.0 GHz Test Circuit



L1 = ½ TURN NO. 20 WIRE — ¼" DIA
C1-C2 JOHANSON JMC 2954

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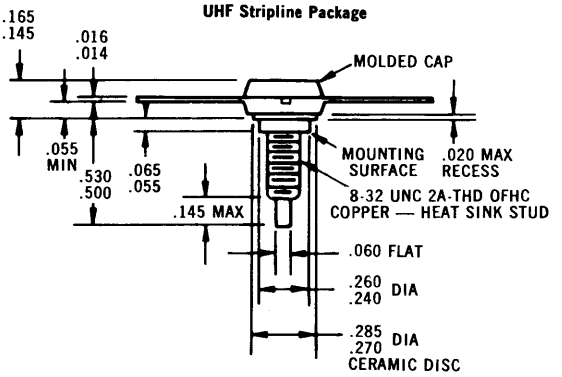
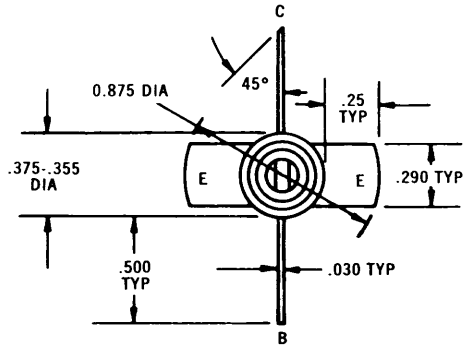
3 Watt 1.0 GHz Power Transistor TYPE 2N4430



ABSOLUTE MAXIMUM RATINGS (25°C)

V_{CBO}	Collector to Base Voltage	55	Volts
V_{CEO}	Collector to Emitter Voltage	40	Volts
V_{EBO}	Emitter to Base Voltage	3.5	Volts
I_C	Continuous Collector Current	1.0	Amperes
P_T	Total Dissipation at 25°C Stud	10	Watts
Θ_{JC}	Thermal Resistance (Junction to Stud)	17.5	°C/W
T_{stg}	Storage Temperature	—65 to 200°C	
T_J	Junction Temperature	—65 to 200°C	



ELECTRICAL CHARACTERISTICS (25°C)

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	MIN.	MAX.	UNITS
I_{CEX}	Collector Cutoff Current	V_{CE} = 55V V_{BE} = −1.5V		2.0	mA
V_{CEO}	Collector to Emitter Voltage	I_C = 50mA I_b = 0	40		Volts
V_{CER}	Collector to Emitter Voltage	R = 10Ω I_C = 50mA	55		Volts
V_{EBO}	Emitter to Base Voltage	I_e = 0.20mA	3.5		Volts
h_{FE}	DC Current Gain	V_{CE} = 5V I_C = 100mA	20	200	
f_t	Gain-Bandwidth Product Measured at 200 MHz	V_{CE} = 20V I_C = 100mA	600		MHz
C_{ob}	Collector to Base Capacitance	V_{CB} = 28V f = 1.0MHz		5.0	pF
h_{FE}	DC Current Gain	V_{CE} = 5.0V I_C = 1.0A	5		
P_{out}	Power Output V_{CE} = 28 Volts n = Collector Efficiency > 35%	f = 1000MHz P_{in} = 750mW	2.5		Watts

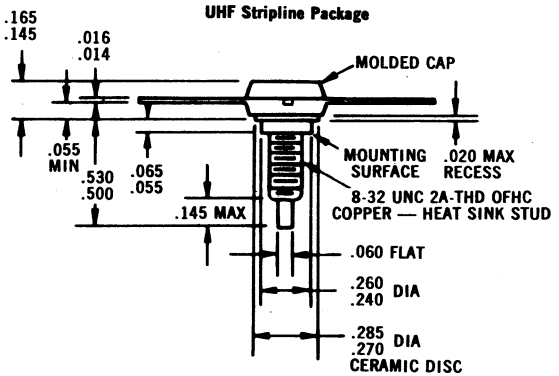
Preise:

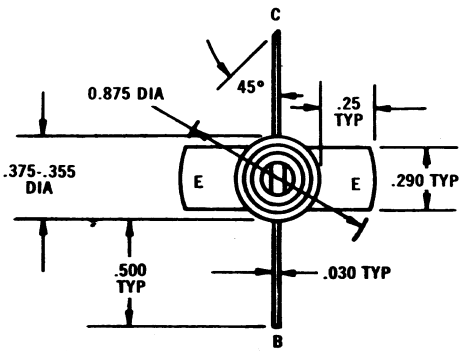
	1 - 24 St.	ab 25 St.	ab 100 St.
DM	140,--	110,--	95,--

Electronic Components DIVISION OF United Aircraft

3 Watt 1.0 GHz Power Transistor TYPE 2N4430

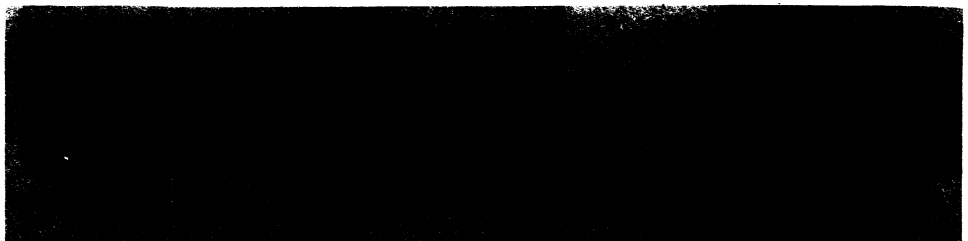
The 2N4430 is a silicon overlay transistor particularly suitable as a 1.0GHz power amplifier. Having a typical f_T of 1.2GHz and a θ_{JC} of 11°C/watt this unit is provided in a stud mounted low inductance package for stripline construction applications.





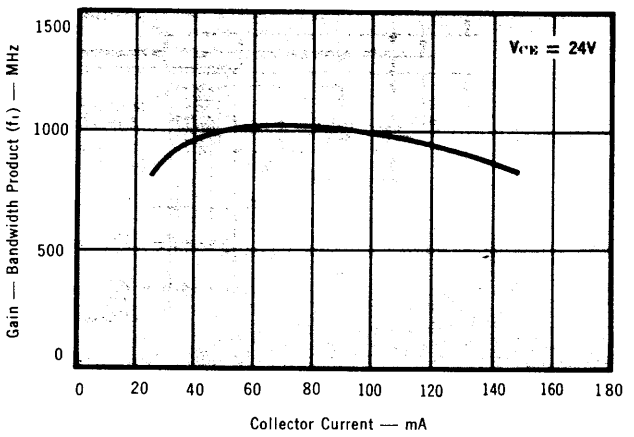
ABSOLUTE MAXIMUM RATINGS (25°C)

V_{CBO}	Collector to Base Voltage	55	Volts
V_{CEO}	Collector to Emitter Voltage	40	Volts
V_{EBO}	Emitter to Base Voltage	3.5	Volts
I_C	Continuous Collector Current	1.0	Amperes
P_T	Total Dissipation at 25°C Stud	10	Watts
Θ_{JC}	Thermal Resistance (Junction to Stud)	17.5	°C/W
T_{stg}	Storage Temperature	—65 to 200°C	
T_J	Junction Temperature	—65 to 200°C	

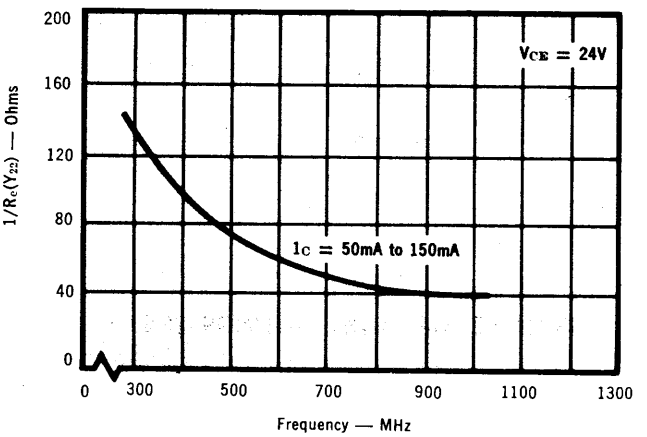


TYPE 2N4430

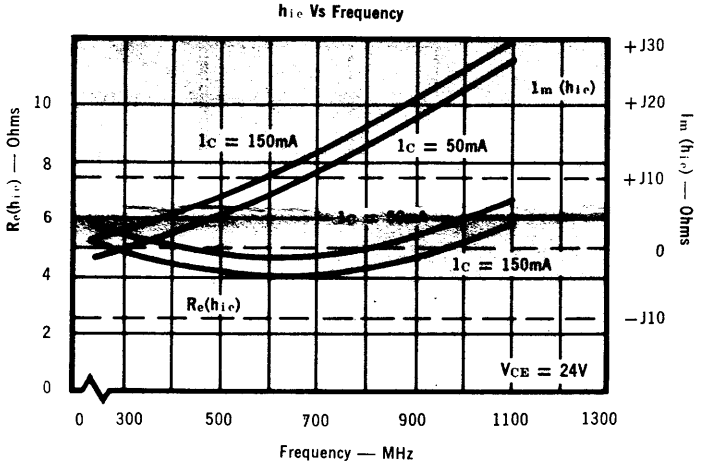
Gain — Bandwidth Product Vs Collector Current



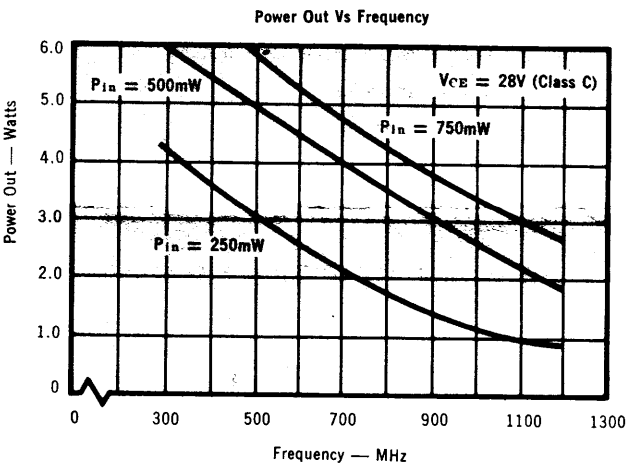
$1/R_e(Y_{22})$ Vs Frequency



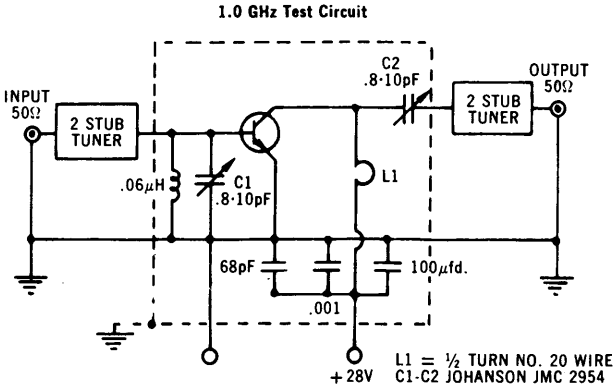
h_{ie} Vs Frequency



Power Out Vs Frequency



1.0 GHz Test Circuit



L1 = ½ TURN NO. 20 WIRE — ¼" DIA
C1-C2 JOHANSON JMC 2954

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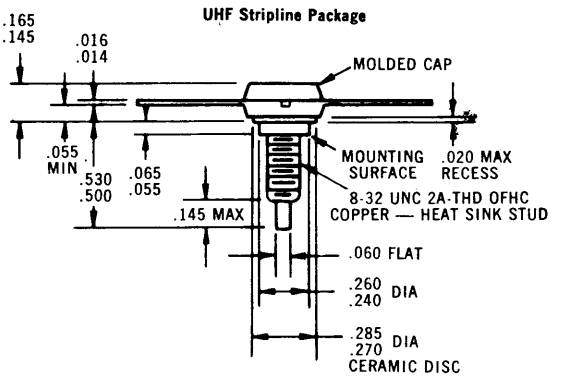
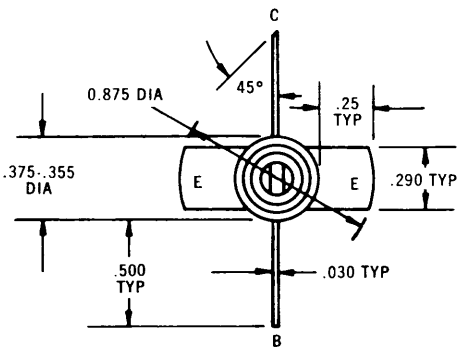
Single Chip 5 Watt 1.0 GHz Power Transistor TYPE 2N4431



ABSOLUTE MAXIMUM RATINGS (25°C)

V_{CBO}	Collector to Base Voltage	55	Volts
V_{CEO}	Collector to Emitter Voltage	40	Volts
V_{EBO}	Emitter to Base Voltage	3.5	Volts
I_C	Continuous Collector Current	2.0	Amperes
P_T	Total Dissipation at 25°C Stud	18	Watts
Θ_{JC}	Thermal Resistance (Junction to Stud)	9.7	°C/W
T_{stg}	Storage Temperature	—65 to 200°C	
T_J	Junction Temperature	—65 to 200°C	



ELECTRICAL CHARACTERISTICS (25°C)

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	MIN.	MAX.	UNITS
I_{CEX}	Collector Cutoff Current	$V_{CE} = 55V$ $V_{BE} = -1.5V$		4.0	mA
*V_{CBO}	Collector to Emitter Voltage	$I_C = 50mA$ $I_b = 0$	40		Volts
*V_{CER}	Collector to Emitter Voltage	$R_{BE} = 10\Omega$ $I_C = 50mA$	55		Volts
V_{EBO}	Emitter to Base Voltage	$I_e = 0.1mA$	3.5		Volts
h_{FE}	DC Current Gain	$V_{CE} = 5V$ $I_C = 100mA$	20	200	
f_t	Gain-Bandwidth Product Measured at 200 MHz	$V_{CE} = 20V$ $I_C = 100mA$	600		MHz
C_{ob}	Collector to Base Capacitance	$V_{CB} = 28V$ $f = 1.0MHz$		10	pF
h_{FE}	DC Current Gain	$V_{CE} = 5.0V$ $I_C = 2.0A$	5		
P_{out}	Power Output $V_{CE} = 28$ Volts η = Collector Efficiency > 35%	$f = 1000MHz$ $P_{in} = 1.57W$	5.0		Watts

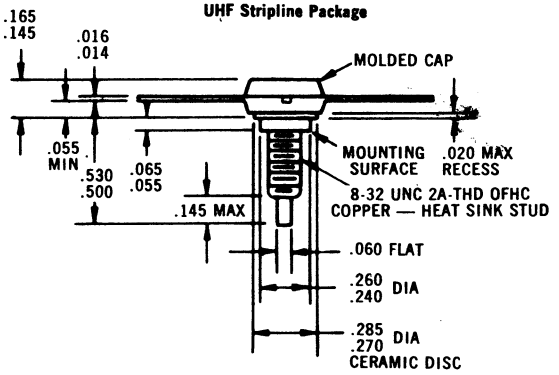
*Pulsed thru 25 MH inductor, 50% duty factor

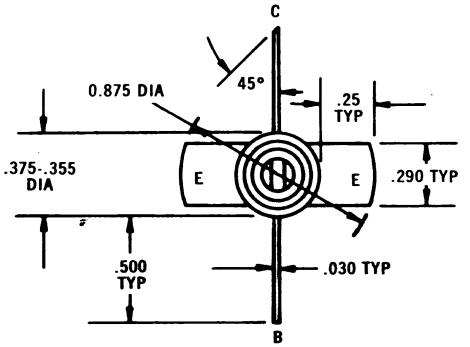
Preise:	1 - 24 St.	ab 25 St.	ab 100 St.
DM	280,--	240,--	210,--

Electronic Components DIVISION OF United Aircraft

Single Chip 5 Watt 1.0 GHz Power Transistor TYPE 2N4431

The ECD 2N4431 is a single chip *silicon overlay transistor with inherently better reliability. Having typical f_T of 1500MHz, a θ_{JC} of 7°C/watt and a C_{OB} of 7pf this unit operates at normally 45-50% efficient. Available in a stud mounted low inductance package this unit is particularly suitable for stripline construction.*





ABSOLUTE MAXIMUM RATINGS (25°C)

V_{CBO}	Collector to Base Voltage	55	Volts
V_{CEO}	Collector to Emitter Voltage	40	Volts
V_{EBO}	Emitter to Base Voltage	3.5	Volts
I_C	Continuous Collector Current	2.0	Amperes
P_T	Total Dissipation at 25°C Stud	18	Watts
Θ_{JC}	Thermal Resistance (Junction to Stud)	9.7	°C/W
T_{stg}	Storage Temperature	—65 to 200°C	
T_J	Junction Temperature	—65 to 200°C