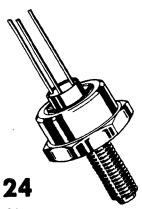
2N3296 (SILICON)



CASE 24
(TO-102)
Collector connected to case; stud isolated from case

NPN silicon annular transistor for linear amplifier applications from 2 to 100 MHz.

MAXIMUM RATINGS (Note 1)

Rating	Symbol	Value	Unit
Collector-Base Voltage	V_{CB}	60	Vdc
Collector-Emitter Voltage	V_{CES}	60	Vdc
Emitter-Base Voltage	V_{EB}	3.0	Vdc
Collector Current (Continuous)	I_C	700	mAdc
Base Current (Continuous)	I_B	100	mAdc
RF Input Power (Note 2)	P_{in}	1.0	Watt (PEP)
RF Output Power (Note 2)	P_{out}	5.0	Watts (PEP)
Total Device Dissipation (25°C Case Temperature) Derating Factor above 25°C	P_D	6.0 40	Watts mW/°C
Total Device Dissipation at (25°C Ambient Temperature) Derating Factor above 25°C	P_D	0.7 4.67	Watts mW/°C
Junction Temperature	T_J	175	°C
Storage Temperature Range	T_{stg}	-65 to +175	°C

Note 1: The maximum ratings as given for dc conditions can be exceeded on a pulse basis. See Electrical Characteristics.
Note 2: PEP = Peak Envelope Power.

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Conditions	Min	Typ	Max	Unit
Collector-Emitter Sustain Voltage	$V_{CES(sus)}$[1]	I_C = 0.200A, R_{BE} = 0	85	120	--	Volts
Collector Emitter-Open Base Sustain Voltage	$V_{CEO(sus)}$[1]	I_C = 0.200A, I_B = 0	40	--	--	Volts

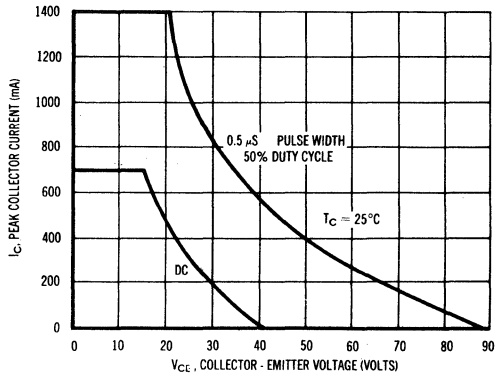
Collector-Emitter Current	I_{CES}	V_{CE} = 60Vdc, V_{BE} = 0	--	--	100	μAdc
		V_{CE} = 50Vdc, V_{BE} = 0, T_C = +175°C	--	--	500	
Collector-Cutoff Current	I_{CBO}	V_{CB} = 50Vdc, I_E = 0	--	--	0.1	μAdc
Emitter-Cutoff Current	I_{EBO}	V_{EB} = 3Vdc, I_C = 0	--	--	100	μAdc
DC Current Gain	h_{FE}	V_{CE} = 2.0Vdc, I_C = 40mAdc	5.0	--	50	--
		V_{CE} = 2.0Vdc, I_C = 400mAdc	5.0	--	--	--
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 400mAdc, I_B = 80mAdc	--	--	0.5	Vdc
Emitter-Base Saturation Voltage	$V_{BE(sat)}$	I_C = 400mAdc, I_B = 80mAdc	--	--	2.0	Vdc

AC Current Gain	$\lvert h_{fe} \rvert$	V_{CE} = 2.0Vdc, I_C = 40mAdc, f = 50MHz	2.0	--	--	--
Collector Output Capacitance	C_{ob}	V_{CB} = 25Vdc, I_E = 0, f = 100kHz	--	--	20	pF

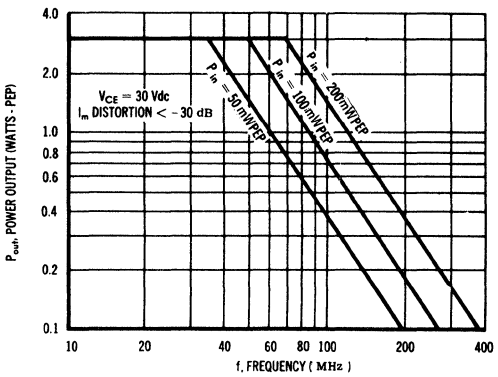
Power Input (PEP) (Note 2)	P_{in}	P_{out} = 3.0 Watts (PEP) (1.5 W rms) V_{CE} = 30 Volts, f = 30 MHz $I_{C(max)}$ = 125 mA	--	--	75	mW
Power Gain	G_e		16	19	--	dB
Intermodulation Distortion Ratio	I_m		30	35	--	dB
Efficiency	η		40	48	--	%

[1] Pulse Test. Pulse Width = 100 μsec. Duty Cycle = 2%.
Note 2 PEP. Peak Envelope Power.

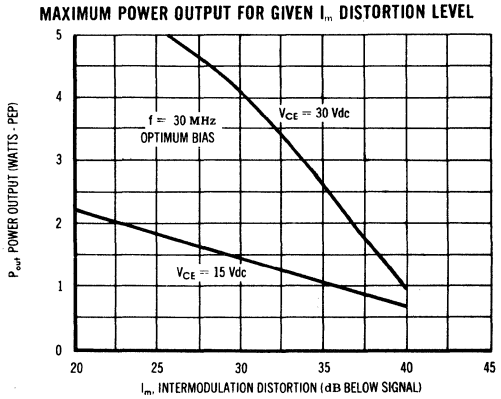
SAFE OPERATING AREA



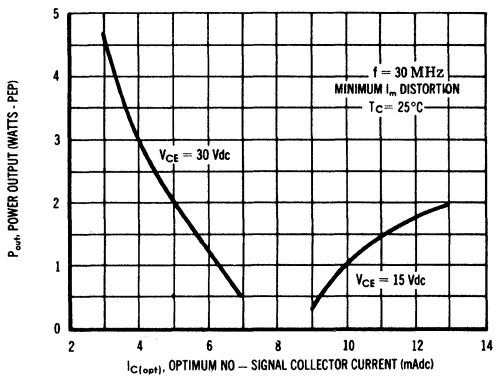
POWER OUTPUT versus FREQUENCY



MAXIMUM POWER OUTPUT FOR GIVEN I_m DISTORTION LEVEL

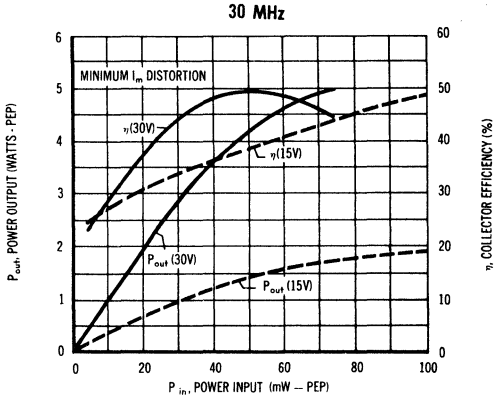


POWER OUTPUT versus OPTIMUM BIAS



OUTPUT CHARACTERISTICS versus POWER INPUT

30 MHz



4 MHz