SOLID STATE MICROWAVE

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2N5016

VHF-UHF SILICON NPN POWER TRANSISTOR

DESCRIPTION:

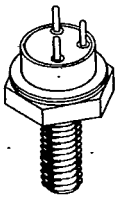
The SSS 2N5016 is a silicon epitaxial NPN planar transistor which employs a multi-emitter electrode design. This feature together with a heavily diffused base matrix located between the individual emitters result in high RF current handling capability, high power gain, low base resistance and low output capacitance. The 2N5016 is intended for Class A, B or C amplifier, oscillator or frequency multiplier circuits operating at 200 to 700mHz.

FEATURES:

- High Power Output
  15 Watts min. at 400mHz
  23 Watts min. at 225mHz
- Grounded Emitter
- Low Dynamic Input Impedance

ABSOLUTE MAX. RATINGS (+25°C except where noted)

V_{CBO}	:	Collector – Base Voltage	65.0 V
V_{CER}	:	Collector – Emitter Voltage R_{be}=30Ω	40.0 V
V_{EBO}	:	Emitter – Base Voltage	4.0 V
I_C (max)	:	Collector Current	4.5 A
P_D	:	Total Device Dissipation at +25°C	30.0 W
ϕ_{JC}	:	Thermal Resistance to Stud	5.8°C/W
T_J	:	Junction Temperature (operating)	+200°C
T_{stg}	:	Storage Temperature	–65°C to +200°C



TO-60

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector Cutoff Current	I_{CEO}	V_{CE} = 30V, I_B = 0	–	–	10.0	mA
Emitter Base Breakdown Voltage	BV_{EBO}	I_E = 5mA, I_C = 0	4.0	–	–	Vdc
Collector Emitter Breakdown Voltage*	BV_{CBV}	I_C = 200mA, V_{BE} = 1.5V	65.0	–	–	Vdc
	BV_{CER}	I_C = 200mA, R_{BE} = 30Ω	40.0	–	–	Vdc
Collector Emitter Saturation Voltage	V_{CE} (sat)	I_C = 2000mA, I_B = 400mA	–	–	1.0	Vdc
Output Capacitance	C_{ob}	V_{CB} = 30V, I_E = 0, f_o = 1.0mHz	–	–	25.0	pF
RF Power Output Class C, Unneutralized	P_{out}	V_{CE} = 28V, f = 400mHz	15.0	–	–	W
RF Power Output Class C, Unneutralized	P_{out}	V_{CE} = 28V, f = 225mHz	23.0	–	–	W
Efficiency at P_{out} = 15W	η	P_{in} = 5.0W, See Figure 2	50.0	–	–	%
Efficiency at P_{out} = 23W	η	P_{in} = 5.0W	60.0	–	–	%
Gain Bandwidth	f_T	V_{CE} = 15V, I_C = 500mA	–	600.0	–	mHz
Dynamic Input Impedance	Z_{in}	V_{CE} = 28V, f = 400mHz	–	2.5 + j5	–	Ω

*Pulsed through an Inductor (25mH); Duty Factor = 50%

ELECTRICAL CHARACTERISTICS

SYMBOL	CHARACTERISTIC (Case Temp.25°C)	LIMIT MIN	LIMIT MAX	UNIT	TEST CONDITIONS
I_{CEO}	Collector Cutoff Current		10	mA	V_{CE} = 30V, I_B = 0
BV_{EBO}	Emitter to Base Breakdown Voltage	4.0		V	I_E = 5mA, I_C = 0
V_{CEV}	Collector to Emitter	65		V	I_C = 200mA*, V_{BE} = -1.5V
V_{CER}	Breakdown Voltage	40		V	I_C = 200mA*, R_{BE} = 30Ω
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage		1	V	I_C = 2000mA, I_B = 400mA
C_{OB}	Collector to Base Capacitance		25	PF	V_{CB} = 30V, I_E = 0, f_o = 1 MHz
P_{out}	RF Power Output Class C, Unneutralized	15		W	V_{CE} = 28V, f = 400 MHz
η	Efficiency at P_{out} = 15W	50		%	P_{in} = 5.0W See FIG. 2
P_{out}	RF Power Output Class C, Unneutralized	23		W	V_{CE} = 28V, f = 225 MHz
η	Efficiency at P_{out} = 23W	60		%	P_{in} = 5W
f_t	Gain-Bandwidth Product	600 (Typ.)		MHz	V_{CE} = 15V, I_C = 500mA
Z_{in}	Dynamic Input Impedance	2.5 + j5 (Typ.)		ohms	V_{CE} = 28V, f = 400 MHz

*Pulsed through an inductor (25mh): Duty Factor = 50%

FIG. 2 RF AMPLIFIER CIRCUIT FOR POWER OUTPUT TEST (400 mHz operation)

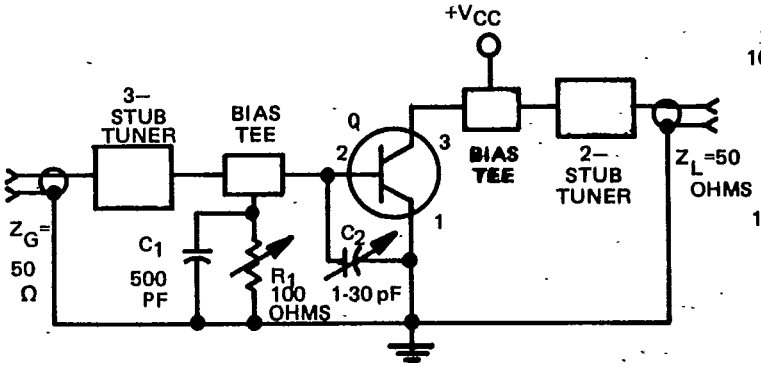


FIG. 3 SAFE OPERATION WITH DC FORWARD BIAS

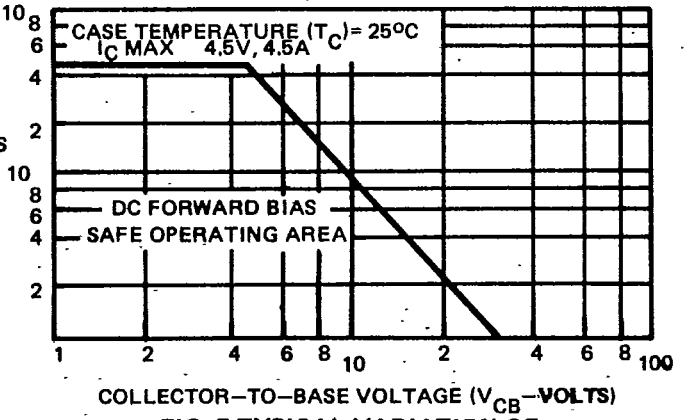


FIG. 4 TYPICAL POWER OUTPUT VS FREQUENCY

CASE TEMPERATURE (T_C) = 25° C
COLLECTOR-TO-EMITTER VOLTS (V_{CE}) = 28 V
INPUT WATTS = P_{IN}

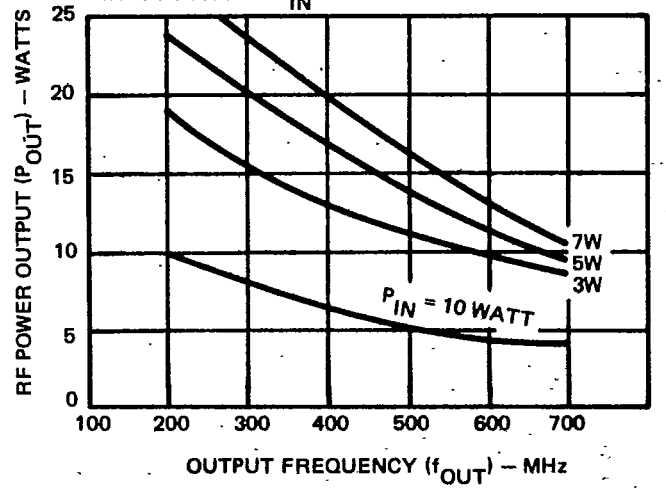


FIG. 5 TYPICAL VARIATION OF COLLECTOR-TO-BASE CAPACITANCE