

*Advance Information*  
**The RF Line**  
**VHF Power Transistor**

The TP2325 is designed for use in 12.5 V VHF amplifiers operating under Class A, B or C conditions.

Its construction which incorporates gold metallization and diffused ballast resistors enables the part to be used at its maximum ratings and be able to withstand an infinite VSWR at all phase angles.

- 175 MHz
- 25 W —  $P_{out}$
- 12.5 V —  $V_{CC}$
- Gold Metallization for Reliability

**TP2325**

25 W — 175 MHz  
**VHF POWER**  
**TRANSISTOR**  
**NPN SILICON**

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CASE 145D-01, STYLE 1  
 (.380 SOE)

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	16	Vdc
Collector-Base Voltage	$V_{CBO}$	36	Vdc
Emitter-Base Voltage	$V_{EBO}$	4	Vdc
Collector Current — Continuous	$I_C$	8	Adc
Operating Junction Temperature	$T_J$	200	°C
Storage Temperature Range	$T_{stg}$	-65 to +200	°C

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.2	°C/W

**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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**OFF CHARACTERISTICS**

Collector-Emitter Breakdown Voltage ( $I_C = 50\text{ mA}$ , $I_E = 0$ )	$V_{(BR)CEO}$	16	—	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 50\text{ mA}$ , $I_E = 0$ )	$V_{(BR)CBO}$	36	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 5\text{ mA}$ , $I_C = 0$ )	$V_{(BR)EBO}$	4	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 15\text{ V}$ , $I_E = 0$ )	$I_{CBO}$	—	—	5	mAdc
Collector-Emitter Breakdown Voltage ( $I_C = 50\text{ mA}$ , $R_{\theta E} = 10\ \Omega$ )	$V_{(BR)CER}$	35	—	—	Vdc

**ON CHARACTERISTICS**

DC Current Gain ( $I_C = 1\text{ A}$ , $V_{CE} = 5\text{ V}$ )	$h_{FE}$	10	—	—	—
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**FUNCTIONAL TESTS**

Common-Emitter Amplifier Power Gain ( $V_{CE} = 12.5\text{ V}$ , $P_{out} = 25\text{ W}$ , $f = 175\text{ MHz}$ )	$G_{PE}$	6.2	—	—	dB
Collector Efficiency ( $V_{CE} = 12.5\text{ V}$ , $P_{out} = 25\text{ W}$ , $f = 175\text{ MHz}$ )	$\eta_c$	60	—	—	%

This document contains information on a new product. Specifications and information herein are subject to change without notice.

**The RF Line**  
**VHF Power Transistors**

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The TP2330 device is intended for use in VHF transmitter output stages where high gain is desired.

Use of gold metallization and diffused emitter ballast resistors result in enhanced reliability and ruggedness.

- 175 MHz
- 30 W —  $P_{out}$
- 12.5 V —  $V_{CC}$
- High Gain — 10 dB @ 175 MHz

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	16	Vdc
Collector-Base Voltage	$V_{CBO}$	36	Vdc
Emitter-Base Voltage	$V_{EBO}$	4	Vdc
Collector Current — Continuous	$I_C$	8	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	80 0.48	Watts W/°C
Operating Junction Temperature	$T_J$	200	°C
Storage Temperature Range	$T_{stg}$	-65 to +200	°C

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.2	°C/W

**ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$  unless otherwise noted)**

Characteristic	Symbol	Min	Typ	Max	Unit
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**OFF CHARACTERISTICS**

Collector-Emitter Breakdown Voltage ( $I_C = 50\text{ mA}$ , $I_B = 0$ )	$V_{(BR)CEO}$	16	—	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 50\text{ mA}$ , $I_E = 0$ )	$V_{(BR)CBO}$	36	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 5\text{ mA}$ , $I_C = 0$ )	$V_{(BR)EBO}$	4	—	—	Vdc
Collector Cutoff Current ( $V_{CE} = 15\text{ V}$ , $V_{BE} = 0$ )	$I_{CES}$	—	—	10	mAdc

**ON CHARACTERISTICS**

DC Current Gain ( $I_C = 1\text{ A}$ , $V_{CE} = 5\text{ V}$ )	$h_{FE}$	20	—	250	—
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**DYNAMIC CHARACTERISTICS**

Output Capacitance ( $V_{CB} = 15\text{ V}$ , $I_E = 0$ , $f = 1\text{ MHz}$ )	$C_{ob}$	—	70	100	pF
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(continued)

**TP2330**  
**TP2330F**

30 W — 175 MHz  
**VHF POWER**  
**TRANSISTORS**  
**NPN SILICON**



CASE 145D-01, STYLE 1  
 (389 SOE)  
 TP2330



CASE 211-07, STYLE 1  
 (389 SOE F)  
 TP2330F

ELECTRICAL CHARACTERISTICS — continued (T<sub>C</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit	
<b>FUNCTIONAL TESTS</b>						
Common-Emitter Amplifier Power Gain (V <sub>CE</sub> = 12.5 V, P <sub>out</sub> = 30 W, f = 175 MHz)	TP2330 TP2330F	G <sub>PE</sub>	10 9	— —	— —	dB
Collector Efficiency (V <sub>CE</sub> = 12.5 V, P <sub>out</sub> = 30 W, f = 175 MHz)		η <sub>c</sub>	60	—	—	%
Load Mismatch (V <sub>CE</sub> = 12.5 V, P <sub>out</sub> = 30 W, f = 175 MHz, Load VSWR = ∞, All Phase Angles)		φ	No Degradation in Output Power			
Input Impedance, Common Emitter (Typ) (V <sub>CE</sub> = 12.5 V, P <sub>out</sub> = 30 W, f = 175 MHz)			Z <sub>in</sub> = 1.05 + j0.5 Ohms			
Load Impedance, Common Emitter (Typ) (V <sub>CE</sub> = 12.5 V, P <sub>out</sub> = 30 W, f = 175 MHz)			Z <sub>Load</sub> = 2.7 + j0.2 Ohms			

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TYPICAL CHARACTERISTICS

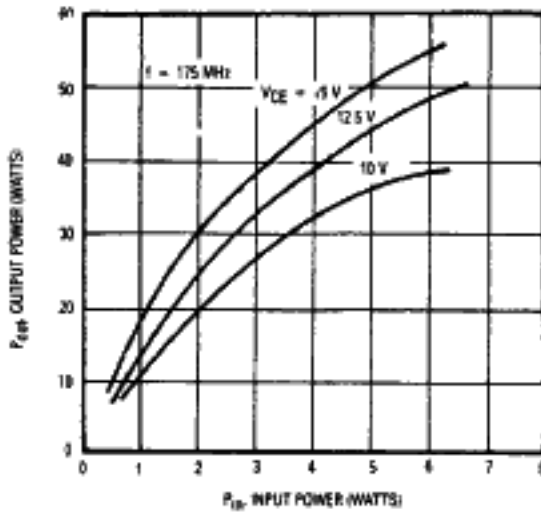


Figure 1. Output Power versus Frequency

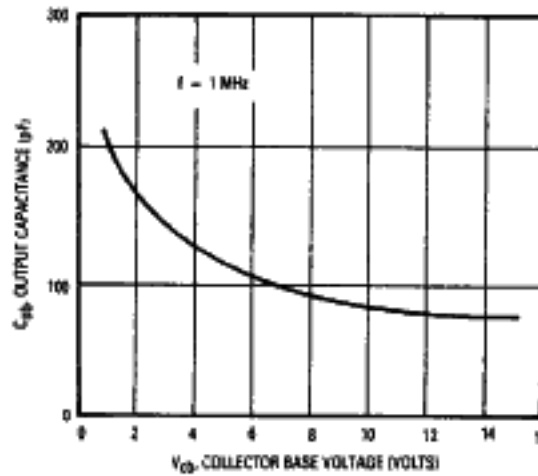


Figure 2. Output Capacitance versus Voltage

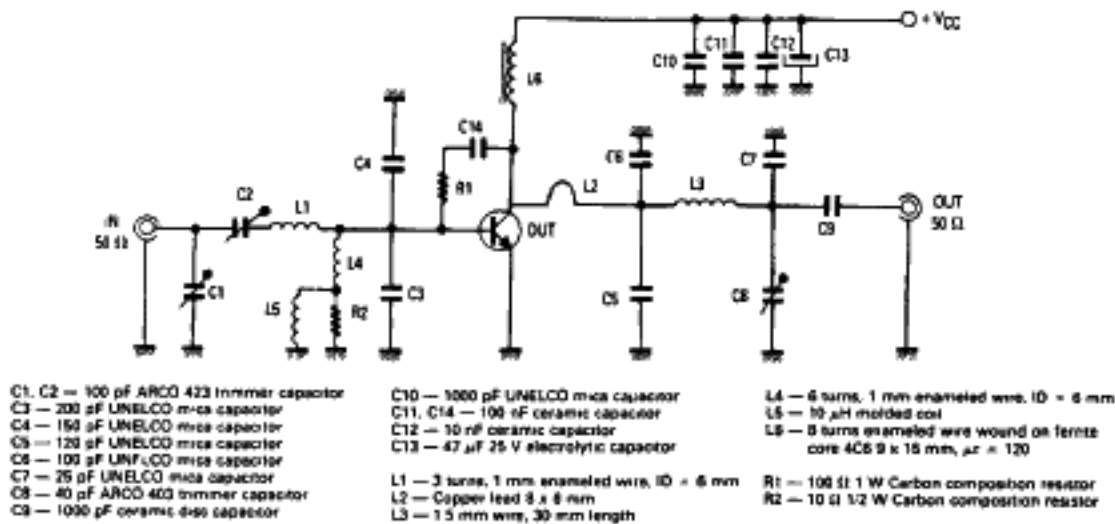


Figure 3. 175 MHz Test Circuit

MOTOROLA RF DEVICE DATA