

T-33-09

# MOTOROLA SEMICONDUCTOR TECHNICAL DATA

## Advance Information

### The RF Line

## VHF Power Transistor

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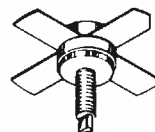
The TP2033 has been specifically designed and characterized for 12.5 V operation in 225 MHz high power amplifiers.

Its construction which incorporates gold metallization and diffused ballast resistors enables the part to withstand infinite VSWR at all phase angles at rated output power. It can be operated under Class A, B or C.

- 30 W
- High Gain
  - 10 dB Min @ 175 MHz
  - 9 dB Min @ 225 MHz
- 12.5 V —  $V_{CC}$
- Gold Metallization for Reliability

# TP2033

30 W — 225 MHz  
VHF POWER  
TRANSISTOR  
NPN SILICON



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
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	80 0.46	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

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	—	150	—
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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)

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

## ELECTRICAL CHARACTERISTICS — continued

Characteristic	Symbol	Min	Typ	Max	Unit
<b>FUNCTIONAL TESTS</b>					
Common-Emitter Amplifier Power Gain (VCE = 12.5 V, P <sub>Out</sub> = 30 W, f = 225 MHz)	GPE <sub>1</sub>	9	—	—	dB
Common-Emitter Amplifier Power Gain (VCE = 12.5 V, P <sub>Out</sub> = 30 W, f = 175 MHz)	GPE <sub>2</sub>	10	—	—	dB
Collector Efficiency (VCE = 12.5 V, P <sub>Out</sub> = 30 W, f = 225 MHz)	$\eta_c$	60	—	—	%
Load Mismatch (VCE = 12.5 V, P <sub>Out</sub> = 30 W, f = 225 MHz, Load VSWR = $\infty$ :1, All Phase Angles)	$\psi$	No Degradation in Output Power			
Input Impedance, Common Emitter (Typ) (VCE = 12.5 V, P <sub>Out</sub> = 30 W, f = 225 MHz)	$Z_{in} = 1.05 + j0.6$ Ohms				
Load Impedance, Common Emitter (Typ) (VCE = 12.5 V, P <sub>Out</sub> = 30 W, f = 225 MHz)	$Z_{load} = 2.5 + j0.15$ Ohms				

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