

MOTOROLA SEMICONDUCTOR TECHNICAL DATA

The RF Line NPN Silicon High-Frequency Transistor

... designed for amplifier, oscillator or frequency multiplier applications in industrial equipment. Suitable for use as a Class A, B or C output driver or pre-driver stages in VHF and UHF.

- Low Cost SORF Plastic Surface Mount Package
- Guaranteed RF Specification — $|S_{21}|^2$
- S-Parameter Characterization
- Tape and Reel Packaging Options Available

MRFQ17

$I_C = 300$ mA
SOURCE MOUNT
HIGH-FREQUENCY
TRANSISTOR
NPN SILICON



CASE 751, STYLE 1
(SO-8)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	25	V
Collector-Base Voltage	V_{CBO}	40	V
Emitter-Base Voltage	V_{EBO}	2.0	V
Collector Current — Continuous	I_C	300	mA
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	1.0 8.0	Watt mW/°C
Storage Temperature	T_{stg}	150	°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	125	°C/W

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ($I_C = 10$ mA)	$V_{(BR)CEO}$	25	—	—	V
Collector-Base Breakdown Voltage ($I_C = 100$ μA)	$V_{(BR)CBO}$	40	—	—	V
Emitter-Base Breakdown Voltage ($I_E = 100$ μA)	$V_{(BR)EBO}$	2.0	—	—	V
Collector Cutoff Current ($V_{CB} = 20$ V)	I_{CBO}	—	—	1.0	μA
Emitter Cutoff Current ($V_{EB} = 1.0$ V)	I_{CEO}	—	—	1.0	μA

(continued)

ELECTRICAL CHARACTERISTICS — continued ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS					
DC Current Gain ($I_C = 50\text{ mA}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 150\text{ mA}$, $V_{CE} = 5.0\text{ V}$)	h_{FE}	25 25	— —	200 200	—
Collector-Emitter Saturation Voltage ($I_C = 100\text{ mA}$, $I_B = 10\text{ mA}$)	$V_{CE(sat)}$	—	—	0.5	V
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain — Bandwidth Product ($I_C = 50\text{ mA}$, $V_{CE} = 12.5\text{ V}$, $f = 500\text{ MHz}$)	f_T	—	2250	—	MHz
Insertion Gain ($V_{CE} = 12.5\text{ V}$, $I_C = 50\text{ mA}$, $f = 500\text{ MHz}$)	$ S_{21} ^2$	10	12.2	—	dB

V_{CE} (Volts)	I_C (mA)	f (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
			$ S_{11} $	$\angle \phi$	$ S_{21} $	$\angle \phi$	$ S_{12} $	$\angle \phi$	$ S_{22} $	$\angle \phi$
12.5	50	10	0.32	-72	38.2	165	0.005	47	0.97	-13
		20	0.36	-103	37.8	151	0.007	48	0.88	-23
		50	0.60	-139	33.0	124	0.013	40	0.62	-42
		75	0.66	-152	25.0	112	0.014	36	0.49	-47
		100	0.69	-159	19.6	105	0.016	38	0.43	-49
		200	0.72	-174	10.3	91	0.021	47	0.32	-51
		500	0.72	168	4.10	68	0.040	65	0.37	-70
		750	0.70	157	2.80	57	0.059	72	0.43	-83
		1000	0.69	146	2.10	45	0.081	76	0.47	-95

Table 1. Common Emitter S-Parameters