The RF Line

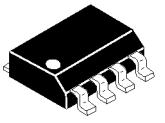
NPN Silicon High-Frequency Transistor

MRF5943, R1, R2

. . . 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 by adding suffix:
  R1 suffix = 500 units per reel
  R2 suffix = 2,500 units per reel

I_C = 400 mA
SURFACE MOUNT
HIGH–FREQUENCY
TRANSISTOR
NPN SILICON



CASE 751–05, STYLE 1
(SO–8)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	30	Vdc
Collector–Base Voltage	V_{CBO}	40	Vdc
Emitter–Base Voltage	V_{EBO}	3.5	Vdc
Collector Current — Continuous	I_C	400	mAdc
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150	°C

DEVICE MARKING

MRF5943 = 5943

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation @ T_A = 25°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°C unless otherwise noted.)

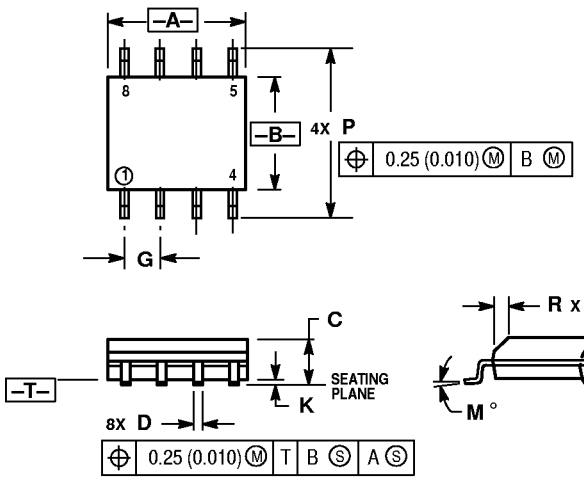
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 5.0 mA)	$V_{(BR)CEO}$	30	—	—	V
Collector–Base Breakdown Voltage (I_C = 100 μA)	$V_{(BR)CBO}$	40	—	—	V
Emitter–Base Breakdown Voltage (I_E = 100 μA)	$V_{(BR)EBO}$	3.5	—	—	V
Collector Cutoff Current (V_{CE} = 20 V)	I_{CEO}	—	—	50	μA
Collector Cutoff Current (V_{CB} = 15 V)	I_{CBO}	—	—	10	μA
ON CHARACTERISTICS					
DC Current Gain (I_C = 50 mA, V_{CE} = 15 V)	h_{FE}	25	—	300	—
Collector–Emitter Saturation Voltage (I_C = 100 mA, I_B = 10 mA)	$V_{CE(sat)}$	—	—	0.2	V
Base–Emitter Saturation Voltage (I_C = 100 mA, I_B = 10 mA)	$V_{BE(sat)}$	—	—	1.0	V
SMALL–SIGNAL CHARACTERISTICS					
Current–Gain — Bandwidth Product (I_C = 35 mA, V_{CE} = 15 V, f = 100 MHz)	f_T	—	1550	—	MHz
Insertion Gain (V_{CE} = 15 V, I_C = 35 mA, f = 250 MHz)	$\|S_{21}\|^2$	12	15	—	dB

MOTOROLA

V_{CE} (Volts)	I_C (mA)	f (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
			$\|S_{11}\|$	ϕ	$\|S_{21}\|$	ϕ	$\|S_{12}\|$	ϕ	$\|S_{22}\|$	ϕ
15	35	10	0.37	−63	53.7	157	0.01	59	0.91	−18
		30	0.52	−120	36.5	128	0.01	48	0.64	−38
		50	0.58	−142	25.4	113	0.02	45	0.47	−44
		70	0.59	−154	19	105	0.02	46	0.38	−44
		100	0.60	−162	13.6	97	0.02	49	0.32	−43
		300	0.64	178	4.6	77	0.05	59	0.28	−49
		500	0.65	168	2.8	64	0.07	60	0.32	−62
		700	0.65	159	2.0	53	0.09	63	0.38	−76
		1000	0.64	144	1.4	38	0.13	63	0.46	−93

Table 1. Common Emitter S–Parameters

PACKAGE DIMENSIONS



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.18	0.25	0.007	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

STYLE 1:
PIN 1. EMITTER
2. COLLECTOR
3. COLLECTOR
4. EMITTER
5. EMITTER
6. BASE
7. BASE
8. EMITTER

CASE 751–05
ISSUE N

ARCHIVE INFORMATION

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