The RF Line
NPN Silicon
High-Frequency Transistor

- Tape and reel packaging available for MRF3866R2:
  R2 suffix = 2,500 units per reel

MRF3866R2

I_C = 400 mA
HIGH–FREQUENCY
TRANSISTORS
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}	55	Vdc
Emitter–Base Voltage	V_{EBO}	3.5	Vdc
Collector Current — Continuous	I_C	0.4	Adc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	625 5.0	mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.5 12	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to +150	°C
Maximum Junction Temperature	T_{Jmax}	150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	125	°C/W

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Breakdown Voltage (I_C = 5.0 mAdc, R_{BE} = 10 Ω)	$V_{(BR)CER}$	55	—	Vdc
Collector–Emitter Sustaining Voltage (I_C = 5.0 mAdc, I_B = 0)	$V_{CEO(sus)}$	30	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)	$V_{(BR)EBO}$	3.5	—	Vdc
Collector Cutoff Current (V_{CE} = 28 Vdc, I_B = 0)	I_{CEO}	—	0.02	mAdc
Collector Cutoff Current (V_{CE} = 30 Vdc, V_{BE} = –1.5 Vdc (Rev.), T_C = 150°C) (V_{CE} = 55 Vdc, V_{BE} = –1.5 Vdc (Rev.))	I_{CEX}	 — —	 5.0 0.1	mAdc
Emitter Cutoff Current (V_{BE} = 3.5 Vdc, I_C = 0)	I_{EBO}	—	0.1	mAdc

(continued)

ELECTRICAL CHARACTERISTICS — continued (T_A = 25°C unless otherwise noted)

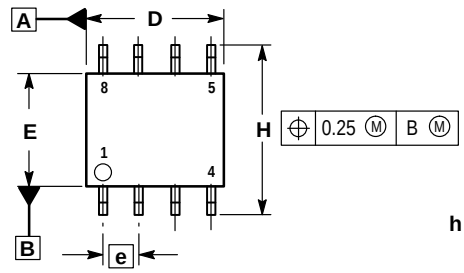
Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS				
DC Current Gain (I_C = 360 mAdc, V_{CE} = 5.0 Vdc) (1) (I_C = 50 mAdc, V_{CE} = 5.0 Vdc)	h_{FE}	 5.0 10	 — 200	—
Collector–Emitter Saturation Voltage (I_C = 100 mAdc, I_B = 20 mAdc)	$V_{CE(sat)}$	—	1.0	Vdc
SMALL–SIGNAL CHARACTERISTICS				
Current–Gain — Bandwidth Product (I_C = 50 mAdc, V_{CE} = 15 Vdc, f = 200 MHz)	f_T	500	—	MHz
Output Capacitance (V_{CB} = 28 Vdc, I_E = 0, f = 1.0 MHz)	C_{obo}	—	3.0	pF
FUNCTIONAL TEST				
Amplifier Power Gain (V_{CC} = 28 Vdc, P_{out} = 1.0 W, f = 400 MHz)	G_{pe}	10	—	dB
Collector Efficiency (V_{CC} = 28 Vdc, P_{out} = 1.0 W, f = 400 MHz)	η	45	—	%

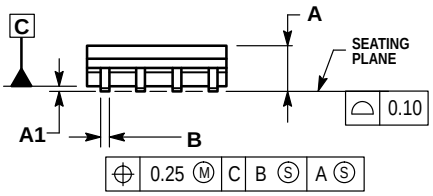
NOTE:
1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

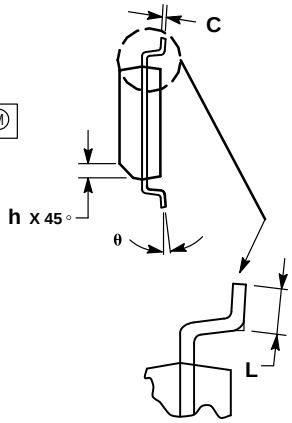
V_{CE} (Volts)	I_C (mA)	f (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
			S_{11}	∠ϕ	S_{21}	∠ϕ	S_{12}	∠ϕ	S_{22}	∠ϕ
15	50	100	0.67	–166	13.75	92	0.016	44	0.32	–27
		200	0.69	–176	6.93	81	0.024	53	0.30	–24
		300	0.70	177	4.57	73	0.032	57	0.32	–31
		400	0.71	172	3.38	67	0.042	59	0.34	–37
		500	0.72	168	2.66	61	0.049	59	0.37	–45
		600	0.72	164	2.17	54	0.056	61	0.40	–53
		700	0.72	160	1.85	49	0.061	63	0.43	–60
		800	0.72	155	1.61	44	0.068	65	0.47	–66
		900	0.71	151	1.40	39	0.075	64	0.50	–73
		1000	0.70	146	1.25	34	0.084	68	0.53	–79

Table 1. MRF3866R2 Common Emitter S–Parameters

PACKAGE DIMENSIONS







NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSION D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE MOLD PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS	
DIM	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.35	0.49
C	0.18	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.25
θ	0°	7°

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

CASE 751–05
ISSUE S

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