

IMAGE UNAVAILABLE

■ 9004697 0443000 977 ■

Absolute Maximum Ratings*

T_A = 25°C

Symbol	Parameter	Value		
		HPMA-2000	HPMA-2011 ^[1,3]	HPMA-2035 ^[2,3]
I _d	Device Current	50 mA	50 mA	60 mA
P _t	Total Device Dissipation	325 mW	250 mW	325 mW
P _{in}	RF Input Power	+20 dBm	+20 dBm	+20 dBm
T _j	Junction Temperature	200°C	150°C	200°C
T _{stg}	Storage Temperature	-65°C to +200°C	-65°C to +150°C	-65°C to +150°C

*Operation in excess of any one of these conditions may result in permanent damage to this device.

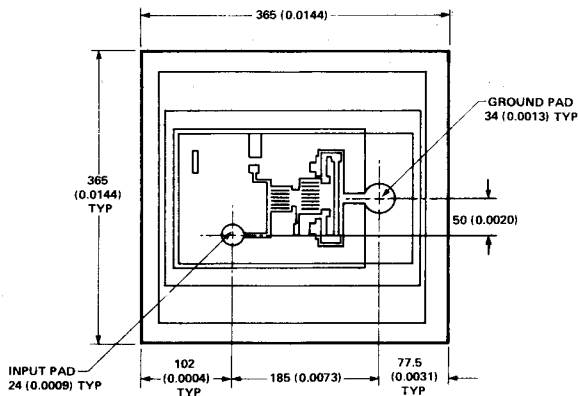
Notes:

1. A θ_{ja} of 500°C/W should be used for derating and junction temperature calculations: $T_j = (P_d \times \theta_{ja}) + T_A$
2. Thermal resistance $\theta_{jc} = 90^\circ\text{C}/\text{W}$. Derate at 11.1 mW/°C for $T_c > 171^\circ\text{C}$.
3. Maximum soldering temperature is 260°C for 5 seconds.

Electrical Specifications, T_A = 25°C

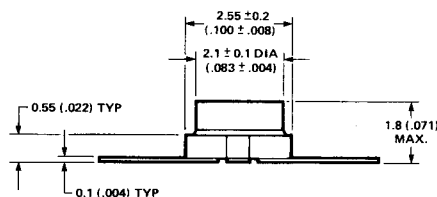
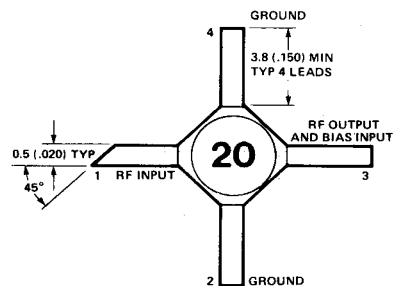
Symbol	Parameters/Test Conditions: I _d = 32 mA, Z ₀ = 50 Ω	Units	HPMA-2000			HPMA-2011			HPMA-2035		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
G	Small Signal Gain (S ₂₁ ²) f = 0.1 GHz f = 0.5 GHz f = 1.0 GHz	dB		18.8 18.3 17.0			18.5 18.0 16.5		17.8	18.8 18.3 17.0	19.8
ΔG	Gain Flatness f = 0.1 to 0.6 GHz	dB		±0.5			±0.7			±0.5	±1.0
f _{3dB}	3 dB Bandwidth	GHz		1.4			1.2			1.4	
VSWR	Input VSWR f = 0.1 to 3.0 GHz			1.9:1			1.6:1			1.9:1	
	Output VSWR f = 0.1 to 3.0 GHz			1.5:1			1.6:1			1.5:1	
P _{1dB}	Output Power @ 1 dB Compression f = 1.0 GHz	dB		9.0			9.0			9.0	
NF	50 Ohm Noise Figure f = 1.0 GHz	dB		4.5			5.0			4.5	
IP ₃	Third Order Intercept Point f = 1.0 GHz	dBm		23.0			19.0			23.0	
t _D	Group Delay f = 1.0 GHz	psec.		150			150			150	
V _d	Device Voltage	Volts	4.5	5.0	5.5	4.0	4.9	5.8	4.5	5.0	5.5
I _d	Normal Operating Current Range	mA		32			32			32	
dV/dT	Device Voltage Temperature Coefficient	mV/°C		-7.0			-7.0			-7.0	

Note: The recommended operating current range for these devices is 20 mA to 40 mA. Typical performance as a function of current is shown on the following pages.



DIMENSIONS IN MICROMETRES (INCHES) ± 25 (0.001)
NOTE: BACK SIDE OF CHIP IS OUTPUT.

CHIP OUTLINE HPMA-2000



OUTLINE HPAC-100X
HPMA-2035

Package Characteristics

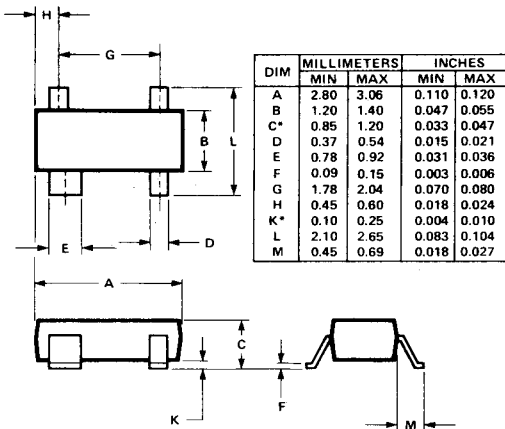
Lead Material	Alloy 42
Lead Finish	HPMA-2035: Tin, 100%
	HPMA-2011: Tin-Lead, 60-40%
Min. Lead Strength (SOT only)	2 pounds pull
Typical Package Inductance (SOT only)	2 nH
Typical Package Capacitance	0.08 pF (opposite leads)
(SOT only)	

Recommended Die Attach and Bonding Procedures

Eutectic Die Attach at a stage temperature of $410 \pm 10^\circ\text{C}$ under an N_2 ambient. Chip should be lightly scrubbed using a tweezer or collet and eutectic should flow within five seconds.

Thermocompression Wire Bond

at a stage temperature of $310 \pm 10^\circ\text{C}$, using a tip force of 30 ± 5 grams with 0.7 or 10 mil gold wire. A one mil minimum wire clearance at the passivation edge is recommended (Ultrasonic bonding is not recommended).

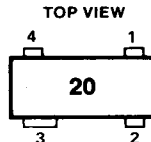


Outline 143

*LOW PROFILE also available.
with C min/max of 0.89/1.04 millimeters, 0.035/0.041 inches;
with K min/max of 0.013/0.10 millimeters, 0.0005/0.004 inches

HPMA-2011

Package Lead Code Identification



Marking: White — Standard Profile
Low Profile (Suffix L)

HPMA-2011 Typical Performance Parameters @ T_A = 25°C

Frequency (MHz)	Linear Phase Deviation (Deg.)	Relative Phase (Deg.)	Gain Deviation (dB)	Group Delay (ns)	Input VSWR	Output VSWR
100	-7.7	0	0	0.21	1.3	1.6
200	-5.7	-8	-0.11	0.21	1.3	1.6
300	-3.7	-15	-0.26	0.21	1.3	1.6
400	-2.0	-22	-0.46	0.20	1.3	1.6
500	-0.6	-29	-0.71	0.19	1.3	1.6
600	0.6	-36	-0.99	0.19	1.3	1.6
700	1.6	-42	-1.29	0.18	1.4	1.5
800	2.3	-48	-1.62	0.17	1.4	1.5
900	3.0	-55	-1.98	0.17	1.4	1.5
1000	3.2	-60	-2.34	0.15	1.4	1.5
1500	1.2	-85	-4.21	0.13	1.5	1.4
2000	-5.0	-106	-6.03	0.11	1.6	1.4
2500	-16.9	-122	-7.61	0.09	1.6	1.4
3000	-28.1	-138	-9.18	0.09	1.7	1.6
3500	-40.8	-152	-10.63	0.08	1.8	1.7
4000	-54.9	-166	-12.00	0.07	2.0	1.9
4500	-70.0	-178	-13.28	0.07	2.2	2.0
5000	-86.0	-189	-14.54	0.06	2.6	2.1

HPMA-2035 Typical Performance Parameters @ T_A = 25°C

Frequency (MHz)	Linear Phase Deviation (Deg.)	Relative Phase (Deg.)	Gain Deviation (dB)	Group Delay (ns)	Input VSWR	Output VSWR
100	-5.4	0	0	0.19	1.3	1.7
200	-4.1	-6.7	-0.08	0.19	1.3	1.7
300	-2.7	-13.5	-0.19	0.19	1.3	1.6
400	-1.6	-20.0	-0.33	0.18	1.3	1.6
500	-0.6	-26.3	-0.50	0.18	1.3	1.6
600	0.3	-32.6	-0.70	0.18	1.4	1.6
700	1.0	-38.7	-0.92	0.17	1.4	1.5
800	1.5	-44.6	-1.18	0.16	1.4	1.5
900	2.4	-50.8	-1.47	0.17	1.4	1.5
1000	2.4	-56.2	-1.75	0.15	1.4	1.4
1500	1.2	-81.8	-3.38	0.13	1.5	1.3
2000	-4.0	-103.5	-5.12	0.11	1.7	1.3
2500	-14.8	-119.7	-6.73	0.10	1.8	1.3
3000	-25.2	-136.1	-8.36	0.09	1.9	1.4
3500	-37.7	-150.3	-9.85	0.08	2.0	1.6
4000	-51.5	-163.6	-11.25	0.07	2.1	1.8
4500	-66.7	-175.3	-12.54	0.06	2.2	2.0
5000	-82.6	-186.3	-13.67	0.06	2.3	2.2

HPMA-2011 Typical S-Parameters, $Z_0 = 50\Omega$, $T_A = 25^\circ\text{C}$, $I_d = 32\text{ mA}$

Frequency (MHz)	S_{11}		S_{21}			S_{12}			S_{22}	
	Mag.	Ang.	dB	Mag.	Ang.	dB	Mag.	Ang.	Mag.	Ang.
100	0.13	-6	18.5	8.43	172	-22.4	0.076	4	0.24	-9
200	0.13	-12	18.4	8.33	165	-22.2	0.077	8	0.24	-18
300	0.13	-19	18.3	8.19	157	-22.0	0.079	11	0.24	-27
400	0.13	-25	18.1	8.00	150	-21.8	0.082	14	0.23	-36
500	0.14	-31	17.8	7.77	143	-21.4	0.085	17	0.23	-44
600	0.14	-38	17.5	7.52	137	-21.1	0.088	19	0.22	-51
700	0.15	-44	17.2	7.27	130	-20.7	0.092	21	0.22	-57
800	0.15	-50	16.9	6.99	124	-20.3	0.096	22	0.21	-63
900	0.16	-56	16.5	6.71	118	-19.9	0.101	23	0.20	-69
1000	0.17	-62	16.2	6.44	112	-19.6	0.105	24	0.19	-73
1500	0.20	-89	14.3	5.20	87	-18.0	0.127	25	0.16	-82
2000	0.22	-115	12.5	4.21	66	-16.9	0.143	23	0.15	-76
2500	0.24	-139	10.9	3.51	51	-16.2	0.155	23	0.18	-68
3000	0.25	-165	9.3	2.93	35	-15.8	0.163	20	0.22	-69
3500	0.28	169	7.9	2.48	20	-15.5	0.169	19	0.27	-75
4000	0.32	145	6.5	2.12	7	-15.1	0.176	19	0.31	-83
4500	0.38	125	5.2	1.83	-5	-14.6	0.186	19	0.33	-94
5000	0.44	110	3.4	1.58	-17	-14.0	0.199	19	0.36	-107

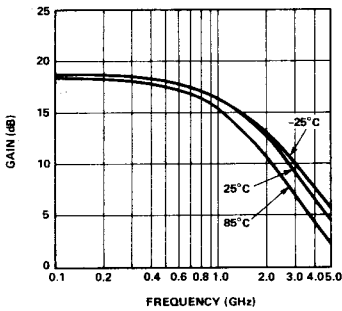


Figure 1. Typical Small Signal Gain vs. Frequency at Three Temperatures

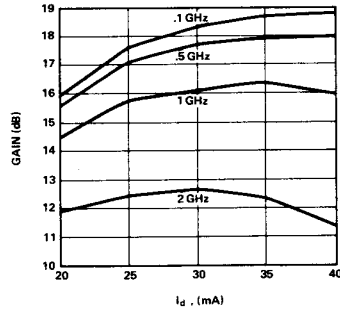


Figure 2. Typical Small Signal Gain vs. I_d at 25°C

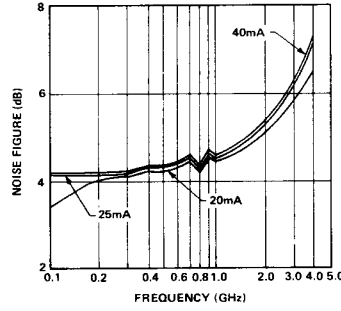


Figure 3. Typical Noise Figure vs. Frequency at 25°C

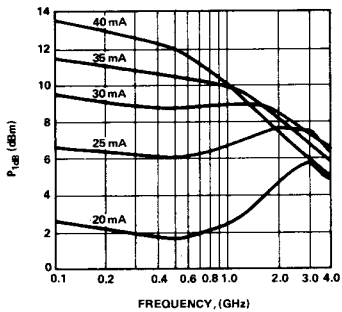


Figure 4. Typical P_{1dB} vs. Frequency at 25°C

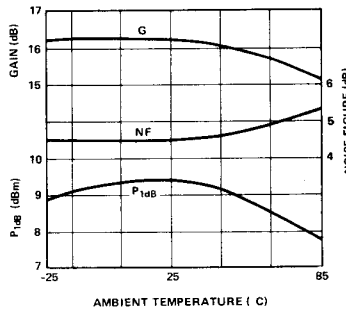


Figure 5. Small Signal Gain, Noise Figure and P_{1dB} vs. Temperature at 1 GHz and $I_d = 32\text{ mA}$

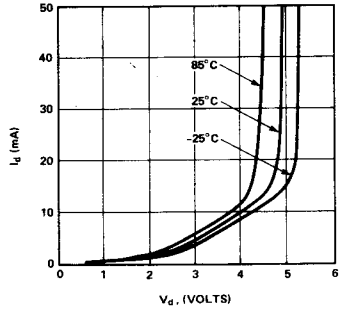


Figure 6. I_d vs V_d at Three Temperatures

HPMA-2035 Typical S-Parameters, $Z_0 = 50\Omega$, $T_A = 25^\circ\text{C}$, $I_d = 32\text{ mA}$

Frequency (MHz)	S_{11}		S_{21}			S_{12}			S_{22}	
	Mag.	Ang.	dB	Mag.	Ang.	dB	Mag.	Ang.	Mag.	Ang.
100	0.13	-5	18.8	8.75	173	-22.6	0.074	3	0.25	-7
200	0.13	-10	18.8	8.67	166	-22.5	0.075	6	0.25	-14
300	0.13	-15	18.7	8.56	159	-22.4	0.076	9	0.24	-22
400	0.14	-20	18.5	8.43	153	-22.2	0.078	12	0.24	-28
500	0.14	-25	18.3	8.26	147	-21.9	0.080	14	0.23	-35
600	0.15	-31	18.1	8.07	140	-21.6	0.083	16	0.22	-41
700	0.16	-37	17.9	7.86	134	-21.3	0.086	18	0.21	-47
800	0.16	-43	17.7	7.64	128	-21.0	0.089	20	0.20	-52
900	0.17	-50	17.4	7.39	122	-20.6	0.093	21	0.19	-58
1000	0.18	-56	17.1	7.15	117	-20.3	0.096	22	0.18	-62
1500	0.21	-85	15.5	5.93	91	-18.9	0.114	23	0.13	-74
2000	0.25	-112	13.7	4.85	69	-17.8	0.129	21	0.11	-69
2500	0.28	-135	12.1	4.03	53	-17.2	0.138	20	0.14	-61
3000	0.31	-156	10.5	3.34	37	-16.8	0.145	17	0.18	-66
3500	0.33	-175	9.0	2.81	22	-16.5	0.150	16	0.23	-76
4000	0.35	-169	7.6	2.39	9	-16.2	0.155	16	0.28	-89
4500	0.38	-154	6.3	2.06	-2	-15.8	0.162	16	0.33	-102
5000	0.40	-140	5.2	1.81	-13	-15.3	0.172	16	0.37	-115

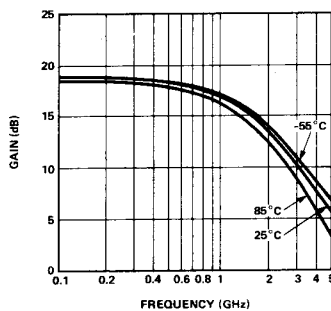


Figure 1. Typical Small Signal Gain vs. Frequency at Three Temperatures

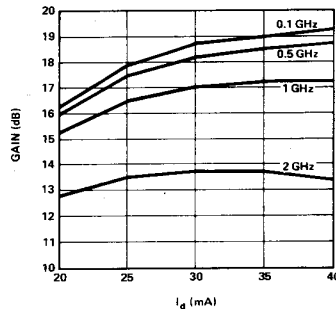


Figure 2. Typical Small Signal Gain vs. I_d at 25°C

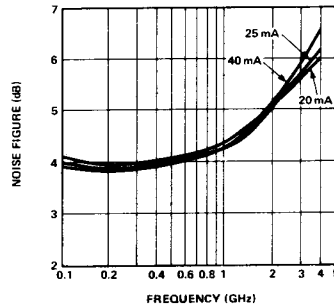


Figure 3. Typical Noise Figure vs. Frequency at 25°C

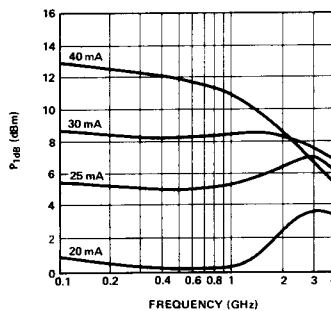


Figure 4. Typical P_{1dB} vs. Frequency at 25°C

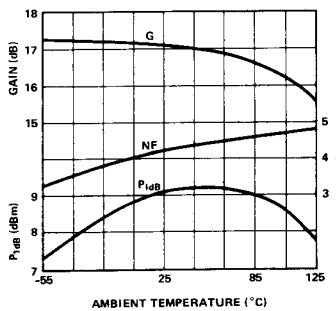


Figure 5. Small Signal Gain, Noise Figure and P_{1dB} vs. Temperature at 1 GHz and $I_d = 32\text{ mA}$

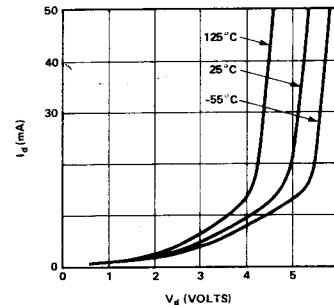


Figure 6. I_d vs V_d at Three Temperatures