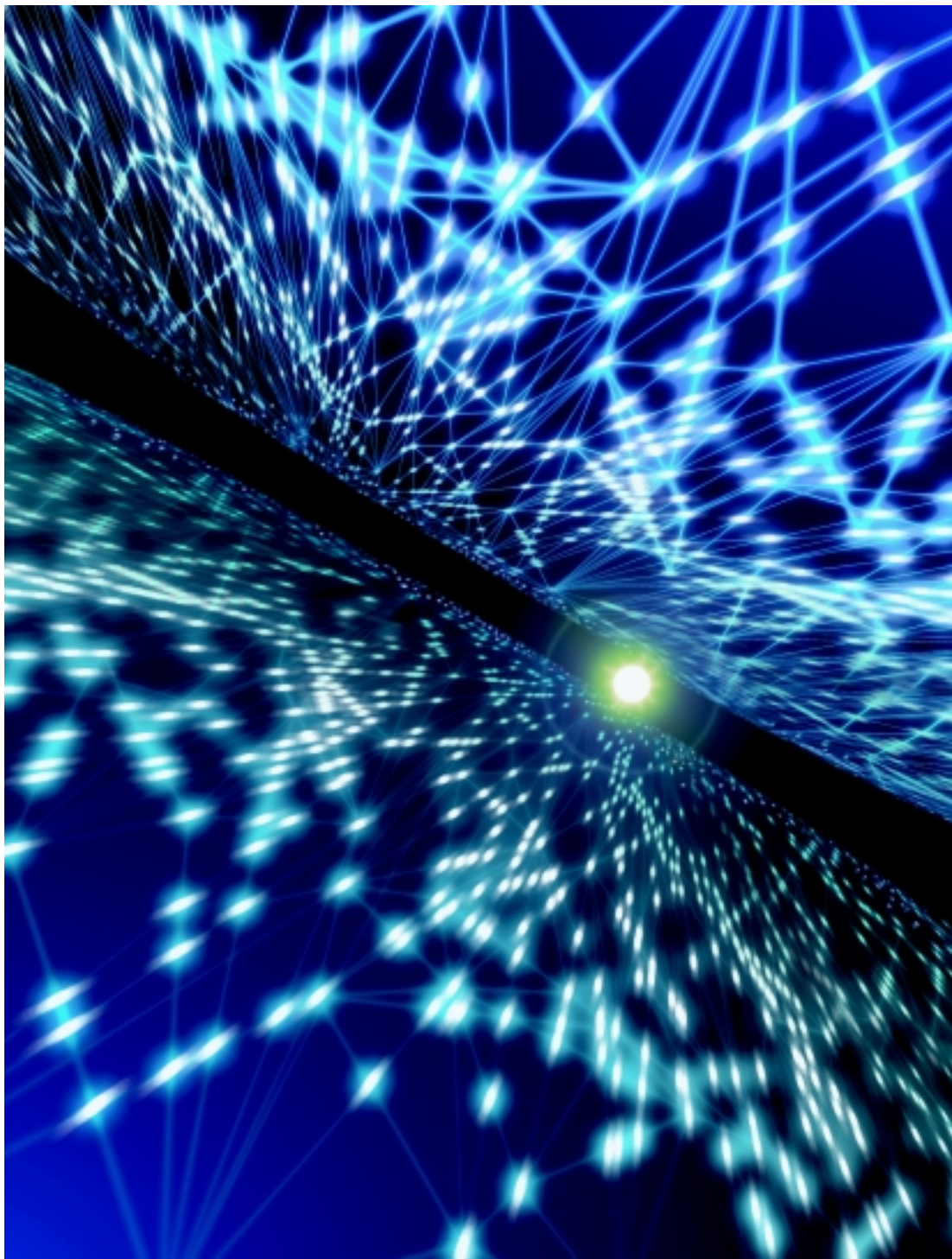


RF Power Products

October 2002



 **ADVANCED
POWER
TECHNOLOGY RF®**

ABOUT ADVANCED POWER TECHNOLOGY RF

In 2002 Advanced Power Technology acquired two leading suppliers of silicon based radio frequency (RF) power transistors - GHz Technology, Inc. and Microsemi RF Products, Inc. a wholly owned subsidiary of Microsemi Corporation. Advanced Power Technology RF (APT-RF) was then formed when these two companies were merged and combined with RF products already existing within APT. This new organization offers products featuring Bipolar, VDMOS, and LDMOS technologies. All of the products are based on silicon and span the frequency range from 1MHz to 3.5GHz using voltage supplies from as low as a few volts to as high as 250V.

Headquarters for APT-RF is located in Santa Clara, California with additional facilities in Montgomeryville, Pennsylvania and our corporate headquarters (Advanced Power Technology, Inc.) in Bend, Oregon. In addition, products are assembled and wafers produced in facilities operated by our production partners located in Mexico, Malaysia, Taiwan, and Austria. The Company produces products in facilities that are ISO9001 registered, space qualified, and Mil Standard approved. Our automated assembly line is among the most modern in the world assuring consistent quality and repeatable performance.

Advanced Power Technology RF aggressively invests in new technology and product development. Our product roadmaps in Avionics, L-Band Radar, S-Band Radar, and pulsed LDMOS applications are intended to provide products that set the performance standard in each of these market niches.

OUR MISSION AND GOALS

The mission of APT-RF is to be the world leader in non-cellular/PCS high power silicon RF & microwave power transistors. With our combined RF & Microwave talent, APT-RF is the technology leader in the market we serve, and expect to continue to push the performance envelop with the new products we introduce.

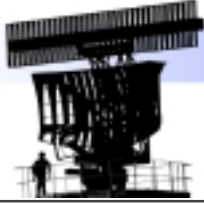
Our goal is to provide the customer with products which meet the full requirements as specified, with performance that is consistent from lot to lot along with meeting the reliability requirements over the full life of the program. This will insure that the customer achieves the optimum system performance and the lowest total cost of ownership.

PRODUCT FEATURES

- Transistor Chips designed for specific applications: CW or Pulsed, Class C or Class A
- Automated Assembly for tightest production control – assuring lot to lot consistency.
- Internal prematch for best performance over entire operating frequency range
- Controlled loop wire bonds for lot to lot repeatability
- Automated RF testing in fixed tuned fixtures over the operating band to insure full system performance on all parts
- Custom parts available in every series — optimized into the customer system and tested in mutually approved fixtures to the agreed specifications
- Hi Rel screening available to selected levels: JAN, JAN-TX, JAN-TXV, JAN-S
- State of the Art and Legacy products to cover both production requirements as well as new designs

RADAR

- Products designed for each of the systems operating:
UHF – 400 – 450 MHz, P-Band 700 – 900 MHz, L-Band 1.2 – 1.4 GHz, S-Band 2.7 – 2.9 GHz, 2.9 – 3.1GHz and 3.1 – 3.4 GHz.
- Characterized to meet the system signal format on parameters such as: rise and fall time, pulse droop, gain spread, short pulse, long pulse and combinations, gain change vs. frequency, power saturation.
- Offering bipolar transistors for existing designs with the potential for LDMOS in the near future.



	Pout Min (W)	Pin Max (W)	Gain Min (dB)	Vcc (V)	η Typ (%)	Pulse Width (μ s)	Duty Cycle (%)	VSWR Load	θ_{jc} ($^{\circ}$ C/W)	Case Style	Part Number
UHF: 400-450 MHz, Class C, Common Emitter-Pulsed	10	1.2	9.2	28	50	CW	CW	--	3.0	M105	SD1511-08
	300	33	9.6	40	50	250	10	20:1	0.2	M106	MS2176
	400	80	7.0	40	50	60	2	20:1	0.15	M119	MS2177
	400	70	8.0	40	60	60	2	5:1	0.15	55JV-2	UDR450
	500	54	9.7	40	50	250	10	20:1	0.15	MS102	MS2200
UHF: 600-700 MHz, Class C, Common Base	70	13	7.3	50	35	10	1	--	0.6	M222	AM0608-70
	220	30	8.7	50	40	10	1	--	0.2	M218	MS2091
	445	90	6.9	50	40	10	1	--	0.13	M216	MS2092
	500	90	7.4	36	40	10	1	5:1	0.10	55AX-1	0708-500
UHF: 750-950 MHz, Class C, Common Base	300	40	8.8	50	40	10	10	--	0.22	M216	AM0710-300
L-Band 1200-1400 MHz, Class C, Common Base-Pulsed	5.5	0.55	10.0	28	47	1000	10	5:1	9.0	M222	MS2216
	6	0.95	8.5	36	48	5000	20	3:1	9.0	55AT-1	1214-6L
	14.5	2	8.6	28	48	1000	10	5:1	4.0	M222	MS2222
	30	6.0	7.0	28	45	2000	20	3:1	1.4	55AT-1	1214-30
	30	5	7.4	28	45	1000	10	20:1	2.4	M222	MS2217
	32	5.55	7.5	36	45	5000	20	3:1	1.0	55AT-1	1214-32L
	55	12.3	7.0	28	45	2000	20	3:1	1.0	55AT-1	1214-55
	55	12	6.6	28	50	1000	10	30:1	1.4	M218	MS2218
	100	25	6.0	28	50	100	10	3:1	0.55	M216	MS2231
	145	30	6.85	36	40	5000	20	3:1	0.5	55ST-1	1214-150L
	270	56	7.2	50	45	50	5	3:1	0.12	55KT-1	1214-300
	270	63	6.3	50	40	50	4	15:1	0.24	M222	MS2221
	325	75	6.4	45	38	13	2	15:1	0.10	M216	MS2233
L-Band 1400-1600 MHz, Class C, Common Base-Pulsed	200	45	6.8	50	40	1	10	10:1	0.25	55AT-1	1416-200
	35	6	7.0	28	50	5	15	10:1	0.60	55AT-1	1617-35
S-Band 2700-2900 MHz, Class C, Common Base-Pulsed	28	6.3	6.5	40	30	50	10	3:1	1.4	M214	MS2606
	60	13	6.6	40	35	50	10	3:1	0.5	M214	AM2729-60
	120	20	8.0	36	45	100	10	3:1	0.45	55KS-1	2729-120D
	120	20	8.0	36	45	100	10	3:1	0.45	55KS-1	2729-120
	125	25	7.0	40	35	50	10	3:1	0.35	M226	MS2607
S-Band 2700-3100 MHz, Class C, Common Base-Pulsed	1.0	0.3	5.2	30	27	100	10	10:1	13.0	M218	MS2601
	3.0	0.8	5.7	30	27	100	10	10:1	6.5	M218	MS2602
	5.5	1.5	5.6	30	27	100	10	5:1	3.75	M218	MS2603
	12	3.0	6.0	40	30	100	10	3:1	4.0	M214	MS2608
	25	6.0	6.2	40	30	100	10	3:1	2.0	M214	MS2604
	50	12.5	6.0	40	30	100	10	3:1	0.75	M214	MS2609
S-Band 2900-3100 MHz, Class C, Common Base-Pulsed	105	25	6.2	42	32	50	10	3:1	0.4	M226	MS2619
S-Band 3100-3500 MHz, Class C, Common Base-Pulsed	1.0	0.3	5.2	30	27	100	10	10:1	13.0	M218	MS2611
	3.0	0.8	5.7	30	27	100	10	10:1	6.5	M218	MS2612
	5.0	1.5	5.2	30	27	100	10	5:1	3.75	M218	MS2613
	10	3.2	5.0	40	30	100	10	3:1	4.0	M222	MS2614
	15	4.5	5.2	40	30	100	10	3:1	2.8	M222	MS2615
	30	8.5	5.5	40	30	100	10	3:1	1.5	M222	MS2616
	40	12.5	5.1	40	30	100	10	3:1	1.2	M222	MS2617
	50	15	5.2	42	30	100	10	3:1	0.4	M222	MS2618

AVIONICS



- Separate designs for each application: DME, IFE, JTIDS, MODE-S, TACAN, TCAS
- Full series of parts for each application – low power to highest power available on the market.
- Highest Power Output to minimize number of transistors required for the final stage.
- Driver transistors with power gain per stage that is set to minimize the number of stages required in the system.
- Structured to meet the system signal signature on parameters such as: rise and fall time, pulse droop, pulse burst uniformity, power gain change versus frequency.
- Tested under the full set of RF operating conditions to insure full compliance within customer final power amplifier with minimum factory tune up.
- Offering both Bipolar for existing designs and LDMOS for newer designs.

	Pout Min (W)	Pin Max (W)	Gain Min (dB)	Vcc (V)	η Typ (%)	Pulse Width (μ s)	Duty cycle (%)	VSWR Load	θjc (°C/W)	Case Style	Part Number
Transponder / Interrogator, 1030/ 1090 MHz, Class C, Common Based, Pulsed	150 175 400	25 25 75	8.20 8.50 7.30	50 50 50	40 40 40	10 10 10	1 1 1	30:1 30:1 20:1	0.30 0.45 0.20	M138 55CT-1 55CT-1	MS2393 TPR175 TPR400
LDMOS: Transponder/ Interrogator, 1030/1090 MHz, Class AB Common Source	110 200	5.5 10	13.00 13.00	32 32	50* 50*	32 32	2 2	3:1 3:1	0.40 0.25	55Q 55Q	10HLD110 10HLD200
Transponder / 1090 MHz, Class A, Common Emitter	0.20 0.60	0.02 0.05	10.00 10.90	18 18	-- --	CW CW	-- --	30:1 30:1	25.00 25.00	M115 M115	MS2290 MS2204
Transponder / 1090 MHz, Class C, Common Base, Pulsed	5 95 300 350 450 500 500 500 600 600 700 720 1000	0.35 10 70 70 90 70 150 150 150 150 140 150 250	11.50 9.70 6.30 6.90 7.00 8.50 5.20 5.70 7.00 6.00 6.00 6.80 6.00	50 40 50 50 50 50 50 50 50 50 50 50 50	35 40 40 40 40 40 35 35 35 35 35 35 43	10 10 10 10 10 32 10 10 10 10 10 10 10	1 1 1 1 1 2 1 1 1 1 1 1 1	30:1 -- 20:1 20:1 25:1 3:1 10:1 10:1 25:1 30:1 10:1 25:1 9:1	8.00 0.60 0.12 0.11 0.10 0.10 0.09 0.06 0.08 0.06 0.06	M218 M210 M218 M218 M216 M198 55CT-1 55KT-1 M216 M112 55KT-1 M216 55KV-1	SD1527-08 MSC1100 MSC1300M MSC1350M MSC1450M MS2208 TPR500 TPR500A MSC1600M MS2473 TPR700 MS2475 TPR1000
Interrogator / 1030 MHz, Class C, Common Base, Pulsed	1000 1000	159 100	8.00 10.00	50 50	45 50	1 1	1 1	4:1 4:1	0.08 0.08	55SW-1 55SW-1	ITC1000 ITC1100
TCAS 1090 MHz, Class C, Common Base - Pulsed	70 75 400 500	15 9.4 63 70	6.70 9.00 8.00 8.50	28 50 50 50	45 48 45 40	100 32 32 32	2 2 2 2	10:1 10:1 15:1 3:1	1.10 0.86 0.17 0.11	M214 M214 M216 M198	MS2223 MS2228 MS2207 MS2208
TCAS 1030 MHz, Class C, Common Base - Pulsed	450 600 800	100 80 120	6.50 8.70 8.00	45 50 45	35 50 45	32 32 32	2 1 1	10:1 4:1 4:1	0.06 0.12 0.09	55KT-1 55ST-1 55SM-1	TCS450 TCS600 TCS800
MODE -S, 1090 MHz, Class C, Common Base - Comm C, LM, Pulsed Burst	400 500 500 600 800 1100	90 70 70 80 110 120	6.50 8.50 8.50 8.70 8.50 9.40	45 50 50 50 50 50	35 45 45 45 40 40	128** 32 32 32 128** 128**	2 2 2 2 2 2	10:1 4:1 4:1 4:1 4:1 4:1	0.15 0.12 0.12 0.12 0.12 0.02	55KT-1 55ST-1 55SX-1 55ST-1 55ST-1 55TU-1	MDS400 10500 10502 MDS600 MDS800 MDS1100
MODE - S, 1090 MHz, Class C, Common Base - Comm D, ELM, Pulsed Burst	170 350 550	34 55 90	7.00 8.00 7.80	36 45 45	35 47 45	128** 250 128**	4.0 10 4.0	10:1 2:1 3:1	0.50 0.30 0.15	55KT-1 55KT-1 55SW-1	MDS170L MDS350L MDS550L

* Idq for 10HLD110 = 250 mA, Idq for 10HLD200 = 500 mA

** 128 m sec Burst with 50% duty, repeated 1 time in 6.4 millisecond, LTD<1%

AVIONICS (CONTINUED)

	Pout Min (W)	Pin Max (W)	Gain Min (dB)	Vcc (V)	η typ (%)	Pulse Width (μ s)	Duty cycle (%)	VSWR Load	θ_{jc} ($^{\circ}$ C/W)	Case Style	Part Number
DME/TACAN 960-1215 MHz, Class C, Common Base - Pulsed	7.0	1.0	8.50	50	25	10	1	10:1	3.50	55CT-1	0912-7
	15	1.5	10.00	50	30	10	1	20:1	2.00	M105	MS2321
	25	3.5	8.50	50	45	10	1	10:1	1.40	55CT-1	0912-25
	45	7.0	8.00	50	45	10	1	10:1	0.80	55CT-1	0912-45
Air DME 1025-1150 MHz, Class A, Common Emitter C/W	0.60	0.05	10.80	18	--	CW		10:1	33.00	55FW-2	1000MP
Air DME 1025-1150 MHz, Class C, Common Base - Pulsed	2	0.25	9.00	35	40	10	1	10:1	10.00	55FU-1	1002MP
	2	0.25	9.00	35	35	10	1	20:1	10.00	M115	MS2202
	4	0.5	9.00	35	35	10	1	20:1	7.00	55FU-1	1004MP
	4	0.5	9.00	28	35	10	1	20:1	5.00	M220	MS2205
	5	0.55	9.50	28	--	10	1	20:1	8.00	M115	SD1526-01
	15	1.5	10.00	50	35	10	1	10:1	2.00	55FU-1	1015MP
	15	1.5	10.00	50	--	--	--	--	--	M220	MSC1015MP
	35	3	10.60	50	45	10	1	10:1	1.00	55FU-1	1035MP
	35	3	10.70	50	48	10	1	20:1	1.00	M115	MS2575
	75	13	7.60	50	45	10	1	10:1	0.80	55FU-1	1075MP
	75	13	7.60	50	--	--	--	--	1.00	M220	MSC1075MP
	75	13	7.50	50	--	10	1	20:1	0.80	M105	MS2362
	90	13	8.40	50	45	10	1	10:1	0.80	55FU-1	1090MP
	90	13	8.40	50	35	10	1	--	0.60	M220	MSC1090MP
	90	13	8.40	50	--	10	1	20:1	0.60	M115	SD1536--03
	90	13	8.40	50	--	10	1	20:1	0.60	M105	SD1536-08
	150	25	7.80	50	40	10	1	20:1	0.60	55AY-1	DME150
	150	25	7.80	50	40	10	1	20:1	0.30	M218	MSC1150MP
	175	30	7.60	50	40	10	1	20:1	0.30	M218	MSC1175MP
	250	60	6.20	50	40	10	1	20:1	0.20	S042	MS2554
	300	70	6.30	50	35	10	1	30:1	0.20	M103	MS2421
	375	85	6.50	50	40	10	1	30:1	0.20	55AT-1	DME375A
	400	90	6.50	50	--	10	1	30:1	0.12	M122	MS2441
400	90	6.50	50	40	10	1	25:1	0.12	M216	MSC1400M	
500	125	6.00	50	35	10	1	10:1	0.10	55KT-1	DME500	
550	150	5.60	50	--	10	1	30:1	0.06	M122	MS2472	
800	100	9.00	50	40	10	1	5:1	0.05	55ST-1	DME800	
JTIDS 960-1215 MHz, Class C Common Base-Pulsed	6	0.7	9.30	28	45	6.4	21	5:1	7.00	M222	MS2211
	15	2.3	8.10	28	45	10	21	20:1	3.00	M222	MS2212
	25	5.0	7.00	36	40	10	40	5:1	1.80	55AT-1	JTDB25
	30	5	7.80	35	40	6.4	21	15:1	2.20	M214	MS2213
	50	10	7.00	36	40	10	22	10:1	0.80	55AT-1	JTDA50
	75	15	7.00	36	40	10	40	3:1	0.80	55AT-1	JTDB75
	85	15	7.50	35	40	6.4	21	5:1	0.75	M218	MS2214
	145	25	8.00	36	45	7	22	3:1	0.50	55KT-1	JTDA150A
	150	26.7	7.50	35	45	7	21	--	0.57	M216	MS2215
TACAN 960-1215 MHz, Class C Common Base-Pulsed	15	3.0	7.00	40	40	20	5	10:1	1.00	55LT-1	TAN15
	75	12	8.00	50	40	20	5	30:1	0.60	55AZ-1	TAN75A
	90	13	8.40	50	38	10	10	--	0.80	M218	MS2209
	150	30	7.00	50	38	20	5	10:1	0.30	55AT-1	TAN150
	250	60	6.50	50	40	20	5	5:1	0.30	55AT-1	TAN250A
	250	40	8.00	50	38	20	5	--	0.28	M214	MS2267
	300	60	7.00	50	38	10	10	15:1	0.16	M216	MS2210
	300	60	6.90	50	45	20	5	5:1	0.15	55KT-1	TAN300
	350	60	7.60	50	38	10	10	15:1	0.16	M216	MS2272
	350	70	7.00	50	40	10	10	3:1	0.12	55ST-1	TAN350

JTIDS Burst = 6.4 us on, 6.6 us off repeated for 2.1 millisecond, overall duty as stated.

HF/ VHF/ UHF COMMUNICATIONS

HF INDUSTRIAL/COMMUNICATIONS: Single ended transistors for common emitter Class AB operation from 2 - 30 MHz. Devices from 10 to 250 Watts PEP with Vcc of 12.5, 28 and 50 VDC for mobile and base station AM/SSB, industrial and medical RF power supply applications.

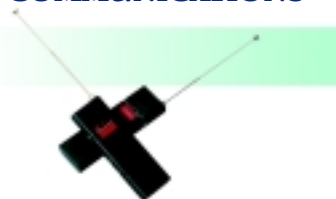
VHF COMMUNICATIONS: Single ended and balanced transistors for common emitter Class C operation from 50 - 175 MHz. Devices from 1 to 150 Watts CW with Vcc of 12.5, 28 and 50 VDC for AM/FM mobile and base station applications.

UHF COMMUNICATIONS: Single ended and balanced transistors for common emitter Class C operation from 450 - 512 MHz. Devices from 1 to 45 Watts CW with Vcc of 12.5 VDC for FM mobile radio applications. Single ended and balanced transistors for common base Class C operation from 806 to 960 MHz. Devices from 1 to 60 Watts CW with Vcc of 24 VDC for FM base station applications. Single ended and balanced transistors for common emitter Class AB operation from 860 to 960 MHz. Devices from 1 to 150 Watts PEP with Vcc of 24 VDC for linear cellular base station applications.

MILITARY COMMUNICATIONS: Single ended and balanced transistors for common emitter Class A, AB, and C operation from 100-500 MHz. Devices from 1 to 125 Watts CW with Vcc of 28 VDC for aircraft, mobile, and base station applications.

	Freq (MHz)	Pout Min (W)	Pin Max (W)	Gain Typ (dB)	η Typ (%)	Vcc (V)	Cob Type (pF)	VSWR Load	θ_{jc} (°C/W)	Case Style	Part Number
HF 2-30 MHz, Class C, Common Emitter	30	20	0.65	15	60	12.5	100	20:1	2.20	M113	MS1227
	30	75	3.80	14	60	28	--	20:1	2.20	M174	MS1001
	30	30	0.48	18	60	28	--	20:1	2.20	M113	MS1226
	30	75	3.00	14	60	50	--	20:1	0.36	M135	MS1006
	30	125	4.00	15	60	28	--	20:1	0.65	M174	MS1000
	30	175	3.50	17	65	50	180	30:1	0.65	55HX-2	S175-50
	30	200	12.00	12	60	50	300	30:1	0.65	55HX-2	S200-50
VHF - AM 100-150 MHz, Class C, Common Emitter	150	1.4	0.10	12	50	7.5	6.0	20:1	35.00	M123	MS1403
	150	2.5	0.20	11.5	50	7.5	19	20:1	11.60	M123	MS1401
	150	30	10.60	5	55	13.5	150	20:1	1.70	M130	SD1019
	108	150	18.00	9.5	70	28	150	20:1	0.75	M174	MS1281
	150	10	1.00	10	55	28	15	20:1	13.50	M135	SD1013
	150	10	1.00	10	55	28	15	20:1	13.50	M113	SD1013-03
	150	60	12.00	7	55	28	80	20:1	2.30	M135	MS1329
	150	40*	4.00	10	65	27	25	30:1	3.50	55HT-2	VAM40
	150	80*	10.00	9	65	27	75	30:1	2.00	55HT-2	VAM80
	150	120*	20.00	7.8	65	27	240	30:1	1.20	55HT-2	VAM120
VHF-FM 100-175 MHz, Class C, Common Emitter	160	30	3.00	10	55	13.5	95	20:1	1.20	M135	MS1504
	160	30	3.00	10	55	13.5	95	20:1	1.20	M113	MS1505
	160	40	5.00	10	55	13.5	95	20:1	1.20	M135	MS1506
	160	40	5.00	10	55	13.5	95	20:1	1.20	M113	MS1506
	175	6	0.75	9	55	12.5	20	20:1	8.75	M113	SD1012-03
	175	10	0.10	10	--	12.5	45	20:1	8.75	M135	SD1143
	175	10	0.10	10	--	12.5	45	20:1	8.75	M113	SD1143-01
	175	15	1.00	12	60	12.5	45	20:1	8.75	M122	MS1261
	175	30	3.00	10	--	12.5	120	10:1	1.20	M135	MS1336
	175	30	3.00	10	--	12.5	120	10:1	1.20	M113	MS1337
	175	40	14.00	4.5	70	12.5	--	10:1	2.20	M135	SD1018
	175	45	10.00	6.5	50	12.5	135	20:1	1.20	M111	MS1251
	175	100	25.00	6	--	12.5	390	10:1	0.65	M111	MS1003
	175	20	3.00	8.2	60	28	35	20:1	5.80	M135	MS1406
	175	13.5	3.50	5.8	70	28	--	--	7.60	M137	SD1070
	175	40	7.00	7.6	60	28	65	20:1	2.90	M135	SD1224
	175	40	7.00	7.6	60	28	65	20:1	2.90	M113	SD1224-02
	175	100	20.00	7.0	60	28	220	30:1	0.65	55HV-2	VMIL100
	175	125	15.00	9.2	55	28	--	--	0.65	M111	MS1009
	VHF 100-175 MHz, Class C, General Purpose	175	1	0.10	10	50	12.5	4	--	175.00	TO-39
175		0.75	0.015	17	--	12.5	4	--	125.00	SO-8	MRF4427
175		1.5	0.10	12	55	12.5	12	10:1	25.00	Pwr Macro	MRF553
175		1.75	0.125	12	50	12.5	15	--	35.70	TO-39	MRF607
175		3	0.50	8	50	12.5	15	--	35.00	TO-39	2N6255
175		4	0.25	12	50	12.5	20	--	22.00	TO-39	SD1127
175		2.5	0.25	10	50	28	10	--	25.00	TO-39	MS1409

HF/ VHF/ UHF COMMUNICATIONS



	Freq (MHz)	Pout Min (W)	Pin Max (W)	Gain Typ (dB)	η Typ (%)	Vcc (V)	Cob Type (pF)	VSWR Load	θ_{jc} (°C/W)	Case Style	Part Number
UHF 225-400 MHz, Class C, Common Emitter	400	1.0	0.1	10.0	65	28	3.5	30:1	35	55FU-2	C1-28
	400	1.0	0.1	10.0	65	28	3.5	30:1	35	55FT-2	C1-28Z
	400	3.0	0.2	11.7	60	28	6.0	30:1	16	M111	SD4012
	400	3.0	0.2	12	60	28	4.5	30:1	16	55FT-2	UMIL3
	400	10	1.0	10	60	28	11.5	30:1	6.3	55FT-2	UMIL10
	400	10	1.0	10	50	28	11.5	10:1	6.3	55FU-2	UMIL10P
	400	25	3.2	8.9	50	28	22	5:1	2.5	55HU-2	UMIL25
	400	25	3.15	9	50	28	30	--	2.5	M111	MS1527
	400	60	8.0	8.8	60	28	70	5:1	1.25	55HW-2	UMIL60
	400	70	8.8	9.0	50	28	65	10:1	0.8	M111	SD1462
	400	70	10	8.5	50	28	65	20:1	0.8	M111	MS1511
	400	70	10	8.5	60	28	72	5:1	1.25	55HW-2	UMIL70
	400	80	10	9.0	60	28	80	5:1	0.8	55HU-2	UMIL80
	400	100	20	7.0	60	28	100	--	0.70	M111	MS1503
	400	100	19	7.2	55	28	120	5:1	0.7	55HU-2	UMIL100
	400	10	19	7.2	55	28	120	5:1	0.7	55JU-2	UMIL100A
	400	125	25	8.5	60	28	70	5:1	0.65	55JT-2	0204-125
400	125	25	7.0	60	28	125	10:1	0.65	M168	MS1508	
UHF 100-500 MHz, Class C, Common Emitter	400	100	20	7.0	50	28	70	5:1	0.65	55JT-2	0104-100
	500	12	2.0	7.8	60	28	9.0	20:1	8.0	55CU-2	0105-12
	500	50	7.0	8.5	55	28	52	5:1	1.25	55JT-2	0105-50
	500	100	24	6.2	50	28	140	5:1	0.65	55JT-2	0105-100
	500	100	28.2	5.5	55	28	100	5:1	0.67	M168	MS1509
UHF 470 MHz, Class C, General Purpose	470	1.5	0.12	11	60	12.5	5	10:1	25	Pwr Macro	MRF555
	470	2	0.2	10	--	12.5	10	--	35	M122	MS1402
	470	2	0.32	8	50	12.5	15	--	35	TO-39	SD1444
	470	3	0.34	9.5	50	12.5	12	--	35	TO-39	MS1649
	470	5	0.7	8.5	50	12.5	19	20:1	11.6	M122	MS1404
	470	5	0.5	10	60	12.5	24	--	11.6	M123	MS652S
	470	10	2	7	--	12.5	26	10:1	3.0	M122	MS1426
	470	15	2.7	7.5	--	12.5	50	20:1	4.6	M111	SD1429-03
	470	25	6	6.2	--	12.5	85	20:1	2.5	M111	SD1422
UHF 836-960 MHz, Class C, General Purpose	836	45	15	4.7	--	12.5	100	20:1	1.2	M142	MS1455
	870	0.5	0.08	8	50	12.5	3	--	50	Macro-X	MMR559
	870	0.75	0.12	8	60	12.5	3	--	45	SO-8	MRF8372
	870	1.5	0.24	8	60	12.5	6	--	25	Pwr Macro	MRF557

HF/ VHF/ UHF COMMUNICATIONS CLASS A/AB

	Freq (MHz)	Pout Min (W)	Pin Max (W)	Gain min (dB)	η Typ (%)	Vcc (V)	Icq (μ A)	VSWR Load	θ_{jc} (°C/W)	Case Style	Part Number
HF 2-30 MHz, Class AB, Common Emitter	30	100	7.9	11	50	12.5	150	20:1	0.6	M174	MS1051
	30	130	8.2	12	50	28	150	20:1	1.0	M174	MS1077
	30	130	8.2	12	50	28	150	20:1	1.0	M174	MS1078
	30	220	13.9	12	50	28	750	20:1	0.7	M174	MS1076
	30	150	6.0	14	50	50	100	20:1	0.75	M174	MS1007
	30	150	6.0	14	50	50	100	20:1	0.75	M164	MS1008
	30	220	11	13	50	50	150	20:1	0.7	M174	MS1079
	30	250	10	13.5	50	50	150	20:1	0.4	M174	MS1004

BROADCAST / TV



FM BROADCAST: Single ended and balanced transistors for common emitter Class C operation from 88 to 108 MHz. Devices from 1 to 250 Watts CW with Vcc of 28 and 50 VDC.

VHF TV BROADCAST: Single ended and balanced transistors for common emitter Class A and AB operation from 50 to 225 MHz. Devices from 0.5 to 250 Watts P_{SYNC} with Vcc of 28 to 32 VDC.

UHF TV BROADCAST: Single ended and balanced transistors for common emitter Class A and AB operation from 470 to 860 MHz. Devices from 0.5 to 150 Watts P_{SYNC} with Vcc of 28 VDC.

	Freq (MHz)	Pout Min (W)	Gain Min (dB)	Vcc (V)	Icq (A)	η Typ (%)	IMD Typ (dB)	VSWR Load	θ_{jc} (°C/W)	Case Style	Part Number
FM 88-108 MHz, Class C, Common Emitter	108	150.0	9.0	28.0	--	65	--	3:1	1.06	55HX-2	FM150
VHF TV 174-225 MHz, Class A/AB, Common Emitter	225	14	14	28	2.5	--	-55	--	1.5	M111	MS1277
	225	20	8	--	2.5	--	-50	--	1.2	M130	MS1279
	225	30	7.5	25	3.5	--	-50	--	1.2	M164	MS1280
	225	100	11	28	0.2	--	-50	--	1.2	M168	MS1278
	225	200	11	32	1.0	--	-50	--	0.45	M175	SD1485
VHF TV 175-225 MHz, Class A, Common Emitter	225	7.5	10.0	25.0	1.2	33	-55	3:1	3.3	55HV-2	VIV075
	225	15.0	8.0	25.0	24.4	33	-55	3:1	1.8	55HV-2	VIV150
	225	30.0	6.0	25.0	5.0	30	-55	3:1	1.2	55HV-2	VIV300
VHF TV 175-225 MHz, Class AB, Common Emitter	225	125.0	10.0	28.0	0.15	60	--	3:1	0.7	55JT-2	VIV1250
UHF TV 470-860 MHz, Class A, Common Emitter	860	0.5	10.0	20.0	0.22	--	-60	30:1	22.0	55FT-2	UTV005
	860	0.5	10.0	20.0	0.22	--	-60	30:1	22.0	55FU-2	UTV005P
	860	1.0	10.0	20.0	0.44	--	-60	30:1	12.0	55FT-2	UTV010
	860	2.0	10.0	25.0	0.41	--	-60	30:1	10.0	55FT-2	UTV020
	860	4.0	8.5	25.0	0.85	--	-60	30:1	7.0	55FT-2	UTV040
	860	8.0	9.0	26.5	1.7	--	-58	3:1	2.5	55JV-2	UTV080
	860	12.0	8.9	26.5	1.7	--	-52	3:1	1.6	55JT-2	UTV120
	860	20.0	8.5	26.5	2.7	--	-48	3:1	1.2	55JV-2	UTV200
UHF TV 470-860 MHz Class AB, Common Emitter	860	100.0	8.5	28.0	0.4	55	--	5:1	0.87	55RT-2	UTV8100B
UHF 860-960 MHz Class A/AB, Common Emitter	860	0.5	9.5	20	0.22	--	-60	--	5.5	M122	MS1502
	860	1	10	20	0.44	--	-60	--	9	M122	MS1512
	860	2	8.5	25	0.45	--	-60	--	11	M122	MS1501
	860	14	8.5	25	1.65	--	-45	--	2.5	M156	MS1579
	860	25	8	25	3.2	--	-45	--	1.3	M173	MS1582
	860	30	7.5	25	0.06	55	-60	--	2.0	M142	MS1454
	860	100	9.5	28	0.2	--	--	--	1.0	M208	MS1576
	960	30	7.5	24	0.15	--	--	--	3.0	M156	MS1452
	960	30	7.5	24	0.15	--	--	--	3.0	M142	MS1453

MICROWAVE



- These transistors are industry standards for legacy systems and replacement parts for discontinued products made by other suppliers.
- Full series of parts covering low power to highest power output available.
- All use Gold metalization, glass passivation and in solder sealed packages for best reliability and long term operation.
- All products are functionally tested per the specification.

	Freq Range (MHz)	Pout Min (W)	Pin Max (W)	Gain Typ (dB)	η typ (%)	Vcc (V)	Cob Typ (pF)	VSWR load	θ_{jc} ($^{\circ}$ C/W)	Case Style	Part Number
2.0 GHz, Class C, Common Base	2000	1.0	0.125	9.5	40	28	4.0	30:1	35.0	55BT-1	2001
	2000	3.0	0.47	8.6	40	28	5.0	30:1	15.0	55BT-1	2003
	2000	5.0	0.8	8.5	40	28	7.5	30:1	8.5	55BT-1	2005
	2000	10.0	2.0	8.0	40	28	15.0	20:1	6.0	55BT-1	2010
2.3 GHz, Class C, Common Base	2300	1.5	0.24	8.5	40	20	4.0	30:1	31.0	55BT-1	2301
	2300	2.0	0.48	8.5	40	20	5.5	30:1	24.0	55BT-1	2302
	2300	4.0	0.63	8.5	40	20	7.0	30:1	17.0	55BT-1	2304
	2300	7.0	1.1	8.5	40	20	10.0	30:1	8.5	55BT-1	2307
3.0 GHz, Class C, Common Base	3000	1.0	0.2	8.5	30	28	4.0	30:1	35.0	55BT-1	3001
	3000	3.0	0.75	6.5	30	28	7.0	30:1	17.0	55BT-1	3003
	3000	4.5	1.59	4.5	30	28	7.5	30:1	8.5	M210	MS3302
	3000	5.0	1.5	5.5	30	28	--	20:1	7.0	55BT-1	3005
4.0 GHz, Class C, Common Base	4000	0.5	0.16	5.0	25	28	2	3:1	45	M210	MSC4000
	4000	1.0	0.32	5.0	25	28	3.5	3:1	25	M210	MSC4001
	4000	2.5	0.79	5.0	23	28	4.5	3:1	12.5	M210	MSC4003

MICROWAVE BROADBAND



- Transistors available for all the standard operating frequency bands: 1.0 – 1.4 GHz, 1.4 – 1.7 GHz, 1.7 – 2.0 GHz and 2.0 – 2.4 GHz.
- Full series of parts for each band – low power drivers to high power output transistors, including highest power available on the market.
- All Gold Metalization and glass passivation for long term operation.
- Each part functionally tested over the specified frequency band.

	Freq Range (MHz)	Pout Min (W)	Pin Max (W)	Gain Typ (dB)	η typ (%)	Vcc (V)	Cob Typ (pF)	VSWR load	θ_{jc} ($^{\circ}$ C/W)	Case Style	Part Number
1000 - 1400 MHz, 28V, Class C, Common Base	1000 - 1400	2.0	0.3	8.0	45	28	4.5	10:1	14.0	55LT-1	1014-2
	1000 - 1400	6.0	1.2	7.0	40	28	6.5	10:1	9.0	55LV-1	1014-6A
	1000 - 1400	12.0	2.5	7.3	40	28	12.0	30:1	4.5	55LT-1	1014-12
1400 - 1700 MHz, 28V, Class C, Common Base	1400 - 1700	6.0	1.14	7.5	40	28	6.5	30:1	9.0	55LV-1	1417-6A
	1450 - 1550	35.0	7.0	7.0	40	28	--	10:1	1.3	55AW-1	1516-35
1700 - 2000 MHz, Class C, Common Base	1600 - 1800	35.0	7.0	7.5	40	28	--	10:1	1.3	55AW-1	1618-35
	1700 - 1800	32.0	7.0	6.5	45	22	--	9:1	1.5	55AW-1	1718-32L
	1750 - 1850	2.0	0.355	7.0	40	22	5.5	10:1	15.0	55LV-1	1719-2
	1750 - 1850	8.0	1.75	7.0	40	28	15.0	10:1	5.8	55LV-1	1719-8
	1700 - 1900	20.0	5.0	6.5	32	28	--	10:1	2.6	55AT-1	1719-20
	1725 - 1850	35.0	6.23	7.5	45	28	--	4.5:1	1.8	55AR-1	1719-35
	1700 - 2000	2.0	0.35	7.5	35	28	4.5	10:1	15.0	55LT-1	1720-2
	1850 - 1950	35.0	7.0	7.5	40	28	--	5:1	1.3	55AT-1	1819-35

MICROWAVE BROADBAND - CONT.

2000 - 2400 MHz, Class C,
Common Base

Freq Range (MHz)	Pout Min (W)	Pin Max (W)	Gain Typ (dB)	η Typ (%)	Vcc (V)	Cob Typ (pF)	VSWR Load	θ_{jc} ($^{\circ}$ C/W)	Case Style	Part Number
2000 - 2100	25.0	5.0	7.0	50	24	--	3:1	3.0	55AT-1	2021-25
2100 - 2400	12.0	2.4	7.0	40	22	--	5:1	3.5	55AT-1	2124-12L
2200 - 2300	1.7	0.3	8.0	35	22	--	30:1	3.0	55LV-1	2223-1.7
2200 - 2300	9.0	1.6	7.5	45	24	--	5:1	6.0	55AT-1	2223-9A
2200 - 2300	18.0	4	6.5	40	24	--	--	3.0	M214	AM82223-018
2200 - 2400	6.0	1.2	7.0	40	22	--	5:1	10.0	55LV-1	2224-6L
2200 - 2500	4.0	0.8	7.0	40	22	7.0	5:1	15.0	55LV-1	2225-4L
2300 - 2400	5.0	0.7	9.0	40	24	--	10:1	8.0	55AT-1	2324-5
2300 - 2400	12.0	2.2	7.5	40	22	5.5	5:1	3.5	55AT-1	2324-12L
2300 - 2400	20.0	4.0	7.0	35	24	--	3:1	3.0	55AT-1	2324-20
2300 - 2400	25.0	5.0	7.0	35	24	--	3:1	2.5	55AT-1	2324-25
2410 - 2470	25.0	4.8	7.5	49	24	--	3:1	2.5	55AP-1	2424-25

GENERAL PURPOSE & SMALL SIGNAL



SMALL SIGNAL: Transistors for common emitter class A operation up to 1 GHz. Devices with $G_{max} > 10\text{dB}$, $NF < 2.5\text{dB}$ with V_{cc} of 5, 7.5, 10, 12 and 15 VDC for hand held and mobile applications. Use includes gain blocks, low noise amplifiers, and oscillators. Package styles include thru-hole metal cans, plastic Macro, SO-8, SOT-23, and SOT-143. End use examples include land/mobile and FRS radios (receivers and synthesizers), "invisible fence" radio dog collars, wireless alarms, and keyless entry.

POWER DEVICES: Transistors for common emitter class A, B, and C operation up to 1 GHz. Devices with $P_{GAIN} > 8\text{dB}$, P_{OUT} up to 4 W with V_{cc} of 7.5 and 12 VDC for hand held and mobile predriver amplifier applications. Package styles include thru-hole metal cans, plastic Macro, and SO-8. End use examples include PA stage for hand-held radios, low power amplifier stages to drive high power amplifiers (HPA).

Freq (MHz)	Supply (V)	Pout (W)	Gain (dB)	Case Style	Packing	Part Number
175	12.5	1	10	TO-39	500 Units Bulk	2N4427
175	12.5	1		M254	500 Units Bulk	MRF4427
175	12.5	1		M254	T&R 500 Units	MRF4427R1
175	12.5	1		M254	T&R 2500 Units	MRF4427R2
175	12.5	1.5	11.5	M234	500 Units Bulk	MRF553
175	12.5	1.5	11.5	M234	T&R 1000 Bulk	MRF553T
175	12.5	1.75	11.5	TO-39	500 Units Bulk	MRF607
175	12.5	3	7.8	TO-39	500 Units Bulk	2N6255
175	12.5	4	12	TO-39	500 Units Bulk	SD1127
400	28	1	10	TO-39	500 Units Bulk	2N3866
400	28	1	10	TO-39	500 Units Bulk	2N3866A
400	28	1	10	M254	500 Units Bulk	MRF3866
400	28	1	10	M254	T&R 500 Units	MRF3866R1
400	28	1	10	M254	T&R 2500 Units	MRF3866R2
470	12.5	1.5	11	M234	500 Units Bulk	MRF555
470	12.5	1.5	11	M234	T&R 1000 Units	MRF555T
470	12.5	3	10	TO-39	500 Units Bulk	MS1649
470	12.5	4	12	TO-39	500 Units Bulk	SD1444
870	12.5	0.75	8	M254	500 Units Bulk	MRF8372
870	12.5	0.75	8	M254	T&R 500 Units	MRF8372R1
870	12.5	0.75	8	M254	T&R 2500 Units	MRF8372R2
870	12.5	0.75	8	Macro X	500 Units Bulk	MRF837
870	12.5	1.5	8	M234	500 Units Bulk	MRF557
870	12.5	1.5	8	M234	T&R 1000 Units	MRF557T
870	12.5	0.5		Macro X	500 Units Bulk	MRF951

Freq (MHz)	Ftau (MHz)	GNF (dB)	VCE (V)	Ic (mA)	NF min (dB)	Case Style	Part Number
200	1400	-	6.00	1.5	4.5	SOT-23	MMBR5179LT1
500	4500	-	1.50	3.0	3.0	SOT-23	BFR92ALTI
1000	6000	11	10.00	10.0	2.9	SOT-23	MMBR911LT1
1000	8000	14	6.00	5.0	1.3	SOT-23	MMBR941LT1
1000	8000	14	6.00	5.0	1.3	SOT-23	MMBR951LT1
1000	8000	14	6.00	5.0	1.3	SOT-143	MRF9411LT1
1000	8000	14	6.00	5.0	1.3	SOT-143	MRF9511LT1

LNA / OSC

LINEAR - CLASS A



- Class A driver transistors for applications ranging from 1 MHz to 2.3 GHz power levels from 0.25 Watts to 20 Watts
- All transistors utilize emitter ballasting and are tested under the full bias conditions for linearity, power gain and load mismatch tolerance.
- Many devices are in solder sealed packages for use in applications requiring high reliability

	Freq Range (MHz)	Pout Min (W)	Pin Max (W)	Gain Typ (dB)	Vcc (V)	Icq (A)	Cob Typ (pF)	VSWR load	θjc (°C/W)	Case Style	Part Number
10-500 MHz, Class A, Common Emitter	1-500	0.5	.02	12	12.5	.25	-	30:1	20	55AZ-2	MPA201
500-1000 MHz, Class A, Common Emitter	1000	0.5	.08	9.0	20	.14	2.0	30:1	33	55ET-2	IA5
	1000	0.5	.08	9.0	20	.14	2.0	30:1	33	55EU-2	IA5A
	1000	1.5	0.2	9.5	20	.22	3.8	30:1	29	55FT-2	10A015
	1000	3.0	0.5	9.0	20	.44	7.3	30:1	12.5	55FT-2	10A030
	1000	6.0	0.95	8.5	20	.88	10.8	10:1	8.3	55FT-2	10A060
500-1000 MHz, Class A, Common Emitter, Internal Prematch	1000	5.0	0.63	10.0	20	1.0	16.0	30:1	7.0	55CF-2	10AM05
	1000	20	3.0	7.0	20	2.8	40	3:1	1.0	55AT-2	10AM20
1.0-2.0 GHz, Class A, Common Emitter - (Operational from DC to 2.0 GHz)	2000	0.11	0.012	9.0	18	.05	2.5	20:1	45	S011	MSC80064
	2000	0.3	0.05	7.7	20	.14	2.0	30:1	45	55ET-2	2A3
	2000	0.5	0.1	7.0	20	.14	2.0	30:1	33	55ET-2	2A5
	2000	0.5	0.1	7.0	20	.14	2.0	30:1	33	55EU-2	2A5A
	2000	0.8	0.15	7.0	20	.15	2.0	30:1	33	55EU-2	2A8
	2000	1.0	0.2	7.0	18	.22	5.0	15:1	17	M210	MS3011
2.0-2.3 GHz, Class A, Common Emitter - (Operational from DC to 2.3 GHz)	2300	0.3	0.03	10.0	15	.10	2.5	10:1	45	55BT-2	23A003
	2300	0.5	0.07	9.5	20	.12	2.4	30:1	30	55BT-2	23A005
	2300	0.8	0.07	9.5	20	.14	3.0	30:1	35	55BT-2	23A008
	2300	1.7	0.38	7.0	20	.28	4.8	30:1	15	55BT-2	23A017
	2300	2.5	0.6	6.5	20	.42	6.5	30:1	11	55BT-2	23A025
	2300	1.0	0.12	10.0	15	.20	3.4	30:1	30	55BT-2	80143

COMMUNICATIONS LINEAR



- Broadband, High Power Class AB – linear transistor
- Highest power output covering the full range 500 – 1000 MHz.

	Freq Range (MHz)	Pout Min (W)	Pin Max (W)	Gain Typ (dB)	Vcc (V)	Icq (A)	η Typ (%)	VSWR Load	θjc (°C/W)	Case Style	Part Number
500 - 1000 MHz, Class AB, Common Emitter	1000	50	10	7.0	28	0.1	50	30:1	1.4	55AV-2	0510-50A

BIAS DEVICES

- Designed for use in the biasing of high power silicon transistors
- Feature excellent thermal tracking to provide the highest performance over the entire operating temperature range.

Bias Current	Resistance (Ohm)	Case Style	Part Number	Bias Current	Resistance (Ohm)	Case Style	Part Number
0.35	1.0	55FV	BYI-1	0.35	1.0	55FU	BYI-1Z
0.35	1.0	55GV	BYI-1F	0.35	1.0	55LU	BYI-1T
TO 0.35	1.0	55GV	Z0-28F				

HIGH VOLTAGE MOSFETS Industrial, Scientific, Medical (ISM) & HF Communications

APT RF Power MOSFETs are optimized for high voltage power applications up to 150 MHz. The die geometry has been optimized for high RF power efficiency and gain.

The special RF Power TO-247 package uses an internal isolation substrate to create a common source configuration. The source is directly connected to the center pin and heatsink tab; no insulator is needed. This provides maximum thermal efficiency without the expense and assembly problems of drain isolation. Symmetric wire bonding schemes inside insure that both pin-out versions of each device are perfect mirror image pairs. This configuration facilitates the layout of push-pull and parallel pairs for circuit board symmetry and separation of input and output sections.

For the very highest powers, the

ceramic package of ARF1500 series permits operation up to 200°C maximum junction temperature while providing superior thermal and RF performance.

The ARF460 and ARF1500 series have been designed for superior mismatch ruggedness. The die used for these part types have 75% more Forward-Biased Safe Operating Area (FBSOA) than previous devices. The increased FBSOA and high voltage breakdown make these parts particularly rugged in difficult RF load environments. The 460 series is ideal for class AB operation as well as high efficiency nonlinear operation.

New Packages... The ARF473 and ARF520 are a new series of higher frequency high voltage parts in industry standard Gemini and .5" SOE packages.

Highest Voltage Operation...

Historically, all RF Power MOSFETs were operated at supply voltages of 50V or less. This limitation has been removed by combining our high voltage MOSFET technology with RF-specific die geometries. RF amplifier operation is now possible from 50 to 300 volts.

Why Higher Voltage... Higher V_{dd} means higher load impedance. For 150W output from a 50V supply the load impedance is only 8 ohms. At 125V, the load impedance is 50 ohms. The higher impedance allows simpler transformers and combiners. Paralleled devices can still operate into reasonable and convenient impedances. Increasing the operating voltage also lowers the DC current required for any given power output, reducing the size, weight and cost of other system components.



Pout (W)	Freq. (MHz)	V_{DD}/BV_{DSS} (V)	θ_{JC} (°C/W)	Package Style	Part Number	Class of Operation
85	100	125V/500V	0.76	TO-247CS	ARF449A/B	C-E
100	100	125V/500V	0.70	TO-247CS	ARF463A/B	A-E
	100	65V/200V	0.70	TO-247CS	ARF464A/B	A-E
115	65	250V/1kV	0.55	TO-247CS	ARF446	C-E
	65	250V/1kV	0.55	TO-247CS	ARF447	C-E
	65	125V/500V	0.55	TO-247CS	ARF448A/B	C-E
125	60	125V/500V	0.50	TO-247CS	ARF460A/B	A-E
	60	250V/1kV	0.50	TO-247CS	ARF461A/B	A-E
	60	65V/200V	0.50	TO-247CS	ARF462A/B	A-E
	65	300V/1.2kV	0.50	TO-247CS	ARF465A/B	A-E
150	100	125V/500V	0.70	.5 SOE	ARF520	A-E
300	130	125V/500V	0.35	GEMINI	ARF473	A-E
750	40	125V/500V	0.12	T1	ARF1500	C-E
	40	250V/1kV	0.12	T1	ARF1501	C-E
	40	65V/200V	0.12	T1	ARF1502	C-E
750	30	300V/1.2kV	0.12	T1	ARF1505	A-E



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