NEC

GaAs MULTI-CHIP INTEGRATED CIRCUIT

MC-5950

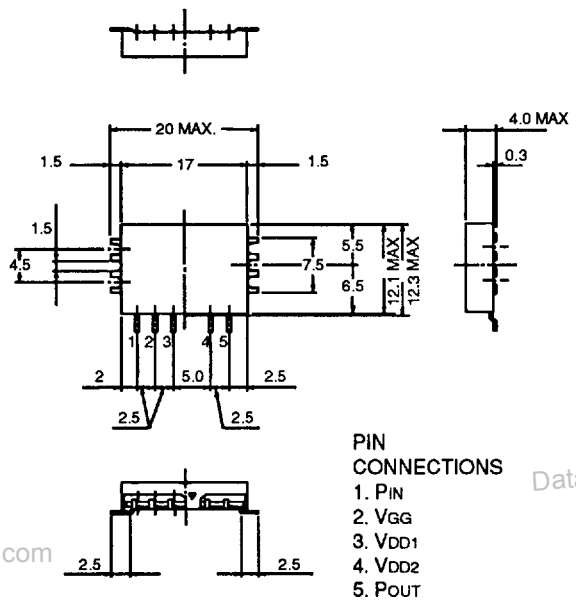
FEATURES

- **LOW DISSIPATIVE CURRENT:**
  Total Current I_{DD} = 330 mA (Typ.) at P_{OUT} = 30.0 dBm
- **HIGH EFFICIENCY:**
  Total Efficiency, η_T = 63% (Typ.) at P_{OUT} Maximum
- **SMALL SIZE**

DESCRIPTION

The MC-5950 is a two stage GaAs Multi-Chip Integrated Circuit (MCIC), designed to be used as the Power Amplifier in a cellular portable or handheld application. Its optimum frequency range of 925-942 MHz makes it ideal for cellular analog phones for use in Japan. This device has similar performance in the 902 - 928 MHz band (ISM) and is therefore suitable for Part 15 applications. With separate access provided to both drain supplies, the output power can be effectively controlled. With over 1 Watt output power, excellent efficiency and small size, this MCIC has advantages for a variety of portable wireless applications.

OUTLINE DIMENSIONS (Units in mm)



PIN CONNECTIONS
1. P_{IN}
2. V_{GG}
3. V_{DD1}
4. V_{DD2}
5. P_{OUT}

Note:
1. Lead dimensions 0.25 x 0.5
2. Tolerance of lead pitch ±0.3

ELECTRICAL CHARACTERISTICS (T_C = 25°C)

PART NUMBER / PACKAGE OUTLINE			MC-5950		
SYMBOLS	**PARAMETERS AND CONDITIONS[1]**	**UNITS**	**MIN**	**TYP**	**MAX**
f	Frequency	MHz	925		942
P_{OUT1}	Output Power 1, P_{IN} = 6 dBm, V_{DD1} = V_{DD2} = 5.8 V, V_{GG} = -5.0 V	dBm	30.8	31.2	
P_{OUT2}	Output Power 2, P_{IN} = 6 dBm, V_{DD1} = 0 V, V_{DD2} = 5.8V, V_{GG} = -5.0 V	dBm		3.0	6.0
I_{DD}[2]	Total Current, P_{IN} = 6 dBm, P_{OUT} = 30.4 dBm, $V_{DD1} \leq$ 5.8 V, V_{DD2} = 5.8 V, V_{GG} = -5.0 V	mA		330	370
2fo	Harmonics, P_{IN} = 6 dBm, P_{OUT} = 30.4 dBm, $V_{DD1} \leq$ 5.8 V, V_{DD2} = 5.8 V, V_{GG} = -5.0 V	dBc		-45	-40
3fo	Harmonics, P_{IN} = 6 dBm, P_{OUT} = 30.4 dBm, $V_{DD1} \leq$ 5.8 V, V_{DD2} = 5.8 V, V_{GG} = -5.0 V	dBc		-45	-40
4fo	Harmonics, P_{IN} = 6 dBm, P_{OUT} = 30.4 dBm, $V_{DD1} \leq$ 5.8 V, V_{DD2} = 5.8 V, V_{GG} = -5.0 V	dBc		-45	-40
I_{GG}[2]	Gate Current, P_{IN} = 6 dBm, P_{OUT} = 30.4 dBm, $V_{DD1} \leq$ 5.8 V, V_{DD2} = 5.8 V, V_{GG} = -5.0	mA		1.0	3.0
VSWR	Input VSWR, P_{OUT} = +30.4 dBm, V_{DD} = 5.8 V			2:1	
	Stability Against Load Fluctuation, P_{IN} = 6 dBm, $P_{OUT} \geq$ 30.8 dBm, V_{GG} = -5.0 V, Zs = 50 Ω, ALL PHASE, Load Time = 30 s, V_{DD1} = V_{DD2} = 8.0 V, LOAD VSWR = 20:1		No characteristic change. Frequency, Output Power 2, Total Current, Harmonics, Gate Current, Input VSWR		

Notes:
1. V_{GG} = ± 0.2 V, Zs = Z_L = 50 Ω.
2. $I_{DD} = I_{DD1} + I_{DD2}$

ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
$V_{DD1, 2}$[2]	Supply Voltage 1, 2	V	10
V_{GG}	Supply Voltage 3	V	-6
P_{IN}	Input Power	dBm	12
$T_{C (OP)}$	Operating Case Temperature	°C	-30 to +90
T_{STG}	Storage Temperature	°C	-30 to +120

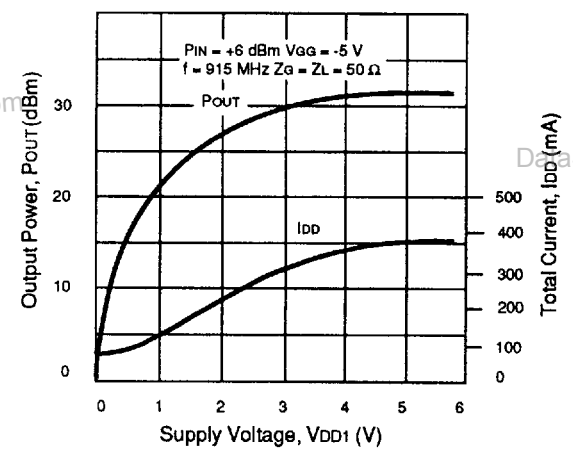
Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. V_{GG} = -5 V.

RECOMMENDED OPERATING CONDITIONS

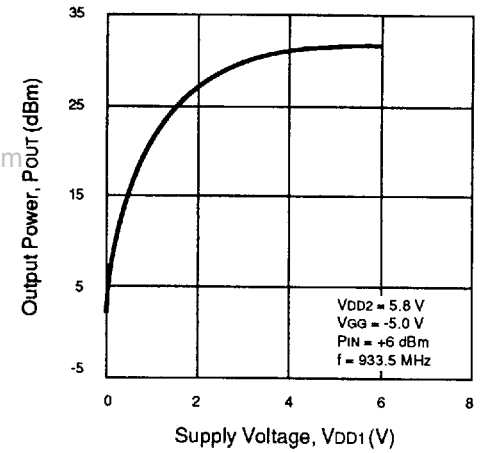
SYMBOL	PARAMETERS	UNITS	MIN	TYP	MAX
V_{DD1}	Supply Voltage 1	V			5.8
V_{DD2}	Supply Voltage 2	V	5.0	5.8	7.0
V_{GG}	Supply Voltage 3	V	-4.8	-5.0	-5.2
P_{IN}	Input Power	dBm		6	7

TYPICAL PERFORMANCE CURVES (T_A = 25°C)

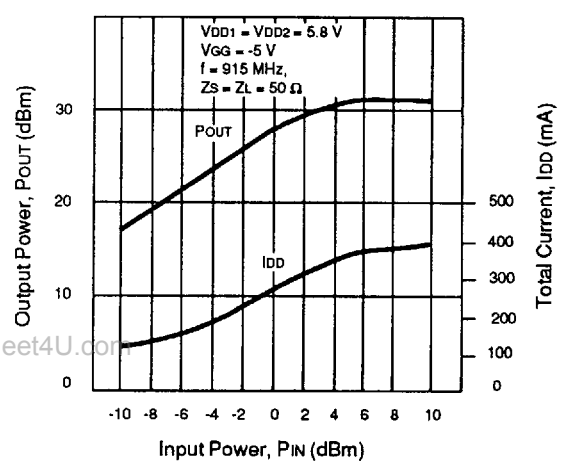
OUTPUT POWER AND TOTAL CURRENT vs SUPPLY VOLTAGE



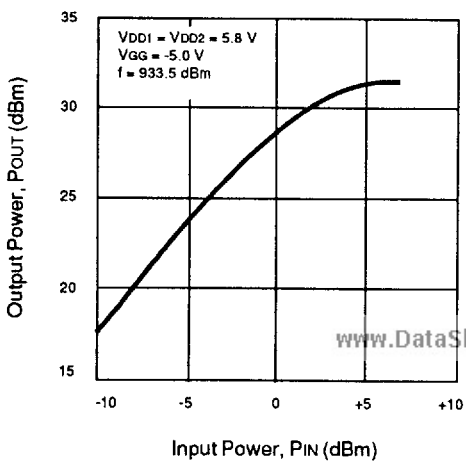
OUTPUT POWER vs.SUPPLY VOLTAGE



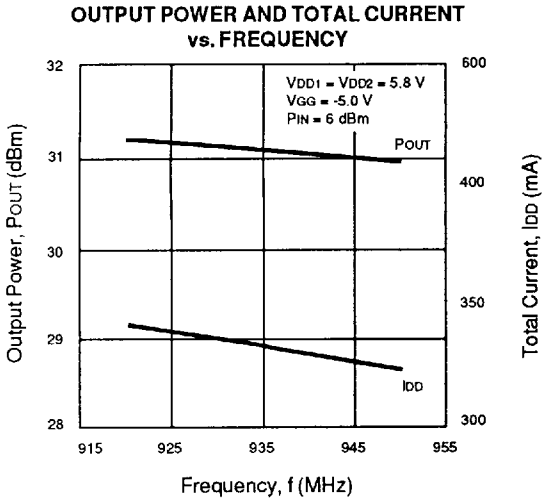
OUTPUT POWER AND TOTAL CURRENT vs. INPUT POWER



OUTPUT POWER vs. INPUT POWER



TYPICAL PERFORMANCE CURVES (TA = 25°C)



EQUIVALENT CIRCUIT