

PRELIMINARY DATA SHEET

NEC**GaAs INTEGRATED CIRCUIT
MC-5963, MC-5964****800 M TO 900 MHz-BAND POWER AMPLIFIER
FOR THE ANALOG HAND-HELD PHONE (FOR AMPS, E-TACS)****DESCRIPTION**

The MC-5963, 5964 are 800 to 900 MHz band GaAs Multi-chip IC's which were developed for digital Cellular hand-held phone. The device incorporates new GaAs FETs which was developed for L-band application and realizes high power and high efficiency at 4.6 V operation voltage.

FEATURES

- Low Operation Current : $I_{DD} = 410$ mA typ. @ $P_{out} = +30.0$ dBm
- High Efficiency : 60 % typ. @ $P_{out} = P_{sat}$
- Low Operation Voltage : $V_{DD} = 4.6$ V
- 0.6 cc SMD type package (PKG size : 17.0 × 12.3 × 3.0 mm)
- Tape & Reel packaging option available

ORDERING INFORMATION

PART NUMBER	PACKAGE	PACKING FORM
MC-5963 MC-5964	0.6 cc SMD type	100 pcs/tray
MC-5963-E1 MC-5964-E1		24 mm tape width, 1 pin faces toward the open end of the tape, 500 pcs/Reel

Remark For evaluation sample order, please contact your local NEC sales office. (Order number: MC-5963, MC-5964)

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

PARAMETERS	SYMBOL	RATINGS	UNIT
Supply Voltage 1, 2	$V_{DD1,2}$	10 ^{Note1}	V
Supply Voltage 3	V_{GG}	-5.0	V
Input Power	P_{in}	+10	dBm
Operating Case Temperature	T_c	-30 to +90	°C
Storage Temperature	T_{stg}	-35 to +120	°C

Note $V_{GG} = -3.5$ V (MC-5963), $V_{GG} = -3.3$ V (MC-5964)

Caution The IC must be handled with care to prevent static discharge because its circuit is composed of GaAs MES FET.

[MC-5963]

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage 1	V _{DD1}		4.6	4.8	V
Supply Voltage 2	V _{DD2}	4.2	4.6	7.0	V
Supply Voltage 3	V _{GG}	-3.6	-3.5	-3.4	V
Input Power	P _{in}	+4.0		+8.0	dBm

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, T_c = 25 °C, Z_s = Z_L = 50 Ω, Using NEC standard test fixture.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Frequency	f		824		849	MHz
Output Power 1	P _{out1}	P _{in} = +8 dBm V _{DD1} = V _{DD2} = 4.6 V, V _{GG} = -3.5 V	+30.0	+30.8		dBm
Output Power 2	P _{out2}	P _{in} = +8 dBm V _{DD1} = V _{DD2} = 4.2 V, V _{GG} = -3.5 V		+29.0		dBm
Total Current	I _{DD}	I _{DD} = I _{DD1} + I _{DD2} P _{in} = +8 dBm		410	460	mA
Harmonics	2, 3, 4 f _o	P _{out} = +30.0 dBm V _{DD1} = Controlled = 4.6 V max. V _{DD2} = 4.6 V			-30	dBc
Input VSWR	-	V _{GG} = -3.5 V			3:1	-
Gate Current	I _{GG}	P _{in} = None V _{DD1} = V _{DD2} = 4.6 V, V _{GG} = -3.5 V	-3.0	-1.2	0	mA
Damage Withstanding	-	P _{in} = +8 dBm, P _{out} = +30.0 dBm Z _s = 50 Ω, V _{GG} = -3.5 V V _{DD1} = 0 to 8.0 V, V _{DD1} ≤ V _{DD2} V _{DD2} = 4.0 to 8.0 V, LOAD VSWR = 20 : 1, ALL PHASE LOAD TIME 30 sec	No damage is allowed			

[MC-5964]

RECOMMENDED OPERATING CONDITIONS

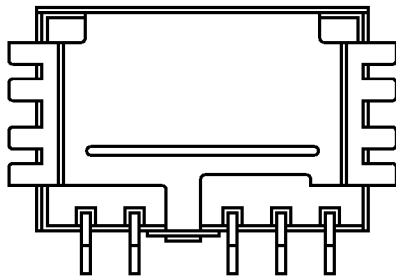
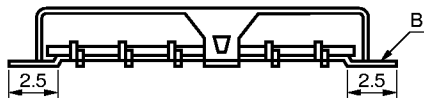
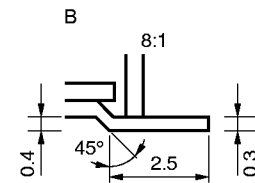
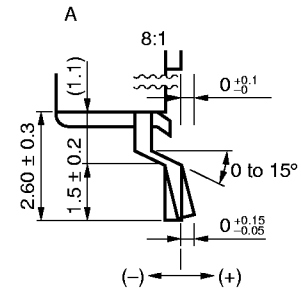
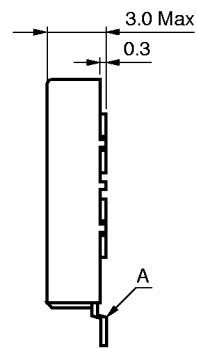
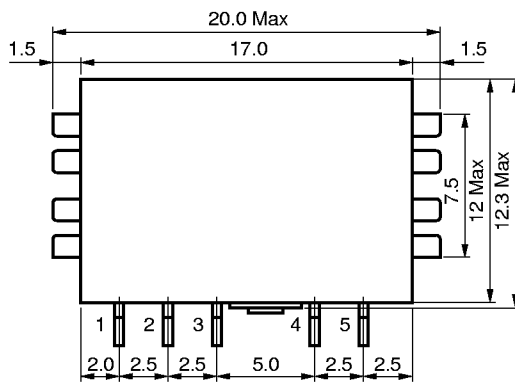
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage 1	V_{DD1}		4.6	4.8	V
Supply Voltage 2	V_{DD2}	4.2	4.6	7.0	V
Supply Voltage 3	V_{GG}	-3.4	-3.3	-3.2	V
Input Power	P_{in}	+4.0		+8.0	dBm

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, $T_c = 25\text{ }^\circ\text{C}$, $Z_s = Z_L = 50\ \Omega$, Using NEC standard test fixture.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Frequency	f		872		905	MHz
Output Power 1	P_{out1}	$P_{in} = +8\text{ dBm}$ $V_{DD1} = V_{DD2} = 4.6\text{ V}$, $V_{GG} = -3.3\text{ V}$	+30.0	+30.8		dBm
Output Power 2	P_{out2}	$P_{in} = +8\text{ dBm}$ $V_{DD1} = V_{DD2} = 4.2\text{ V}$, $V_{GG} = -3.3\text{ V}$		+29.0		dBm
Total Current	I_{DD}	$I_{DD} = I_{DD1} + I_{DD2}$ $P_{in} = +8\text{ dBm}$		410	460	mA
Harmonics	2, 3, 4 f_0	$P_{out} = +30.0\text{ dBm}$ $V_{DD1} = \text{Controlled} = 4.6\text{ V max.}$ $V_{DD2} = 4.6\text{ V}$			-30	dBc
Input VSWR	-	$V_{GG} = -3.3\text{ V}$			3:1	-
Gate Current	I_{GG}	$P_{in} = \text{None}$ $V_{DD1} = V_{DD2} = 4.6\text{ V}$, $V_{GG} = -3.3\text{ V}$	-3.0	-1.2	0	mA
Damage Withstanding	-	$P_{in} = +8\text{ dBm}$, $P_{out} = +30.0\text{ dBm}$ $Z_S = 50\ \Omega$, $V_{GG} = -3.3\text{ V}$ $V_{DD1} = 0\text{ to }8.0\text{ V}$, $V_{DD1} \leq V_{DD2}$ $V_{DD2} = 4.0\text{ to }8.0\text{ V}$, LOAD VSWR = 20 : 1, ALL PHASE LOAD TIME 30 sec	No damage is allowed			

0.6 cc (M1A) PACKAGE DIMENSIONS (Unit : mm)



PIN CONNECTIONS

1. P_{in}
2. V_{GG}
3. V_{DD1}
4. V_{DD2}
5. P_{out}

Note Lead dimensions : 0.25×0.5
 Tolerance of lead pitch : ± 0.3
 Unless otherwise specified tolerance : ± 0.3

NOTE ON CORRECT USE

- (1) Form the ground pattern as wide as possible to minimize ground impedance.
(to prevent undesired oscillation)

All the ground pins must be connected together with wide ground pattern to decrease impedance difference.

RECOMMENDED SOLDERING CONDITION

This product should be soldered in the following recommended condition. Other soldering methods and conditions than the recommended conditions are to be consulted with our sales representatives.

Soldering method	Soldering conditions	Recommended condition symbol
Pin part heating	Pin area temperature : less than 260 °C Hour : within 10 sec./pin.	

For details of recommended soldering conditions, please contact your local NEC sales office.