

**Description**

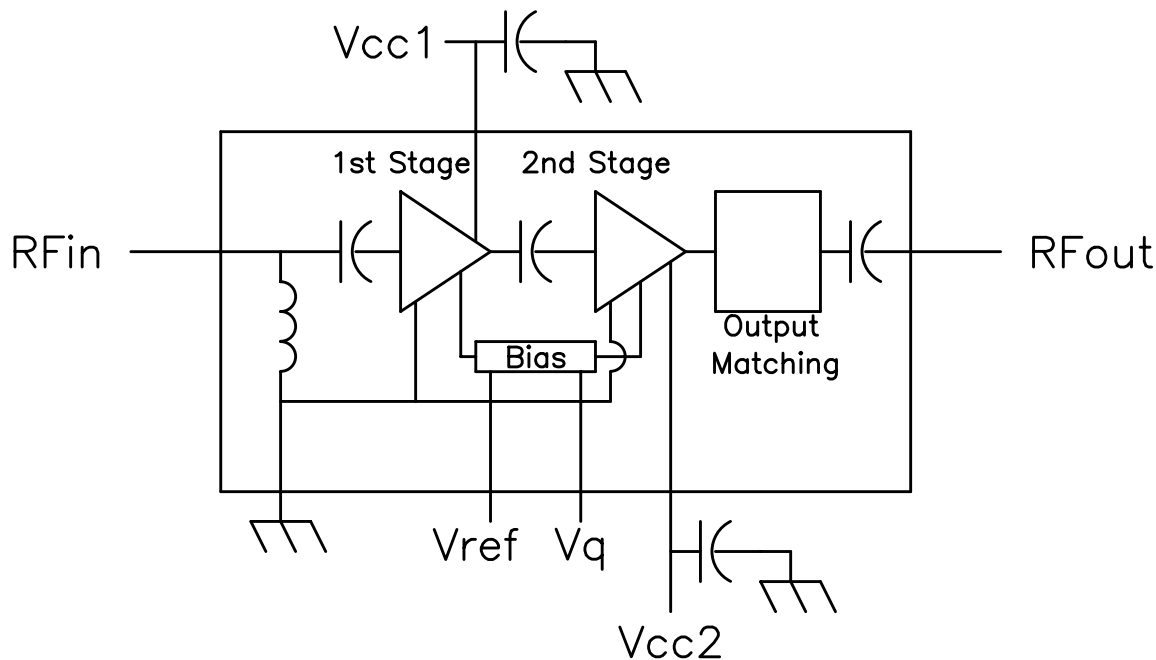
The ECM051 is a 10 signal pin 4 X 4 mm dual mode power amplifier module at 3.5V Vcc with high efficiency. This device was developed using EiC's proprietary InGaP Gallium Arsenide Heterojunction Bipolar Transistor (HBT) process. It is optimized for cellular CDMA (digital) and AMPS (analog) in the 824 MHz to 849 MHz band. It operates from a positive voltage (3.2 - 4.2V Vcc) and includes a power-down feature. The input and output are both matched to 50Ω internally. It is housed in a 4 X 4 mm Land Grid Array package with 10 signal pins. A Q control pin switches the quiescent current to 50mA for low output power range.

**Applications**

- 3.5 V CDMA/AMPS Cellular Handsets

**Features**

- 4 X 4 mm LGA Module with 10 Signal Pins
- Dual Mode CDMA/AMPS
- Quiescent current control
- Single 3.5V Supply for 3-Cell Ni or Li-Ion Battery
- Power-down activated when Vref pin <1V
- 28.0 dBm CDMA Power with 39% Efficiency
- 31.0 dBm AMPS Power
- 50mA Typical Quiescent Current (Low power mode)
- High Reliability InGaP Design with proprietary temperature compensation

**Functional Block Diagram**

**CAUTION!**  
**SENSITIVE ELECTRONIC DEVICE**

## Electrical Specifications

Test Conditions:  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = +3.5\text{ V}$ ,  $V_{REF/PD}$  (reference / power-down voltage) = +2.9 V,  $F = 824$  to  $849\text{ MHz}$

SYMBOL	PARAMETER	LIMITS			UNIT	TEST CONDITION
		MIN.	TYP.	MAX.		
F	Frequency	824		849	MHz	
G	Gain (CDMA Modulation)		28		dB	
P	Output Power (CDMA)	28			dBm	NOTE 1
ACPR	Adjacent Channel Power Rejection		-50	-46	dBc	NOTE 2
Alt CPR	Alternate Channel Power Rejection		-60	-56	dBc	NOTE 3
PAE	Power Added Efficiency (CDMA) @ 28.0 dBm		39		%	High Power Mode
PAE	Power Added Efficiency (CDMA) @ 16.0 dBm		9.5		%	Low Power Mode
G	Gain (AMPS) @ 31.0 dBm, Pin typical +4dBm		27		dB	
PAE	Power Added Efficiency (AMPS) @ 31.0 dBm		48		%	
	Output Load Stability			6:1		NOTE 4
	Ruggedness for output VSWR Mismatch		10:1			No Damage
$I_{CQ}$	Quiescent Current (No RF)		120	170	mA	High Power Mode
$I_{CQ}$	Quiescent Current (No RF)		50	70	mA	Low Power Mode
	Leakage Current $V_{CC} = 3.5\text{V}$ , $V_{ref} = 0\text{V}$		3	10	uA	
$V_{ref/pd}$	Vref/pd Voltage		2.9		V	
$V_{CC}$	Supply Voltage		3.5		V	
$I_{CC}$	Operating Current @ 28dBm		460		mA	
$I_{CC}$	Operating Current @ 16dBm		120		mA	
$V_Q$	$V_Q$ Voltage (High Power Mode)	0		0.8	V	
$V_Q$	$V_Q$ Voltage (Low Power Mode)	2	2.8		V	
IRL	Input Return Loss		-10		dB	
RXBN	Receiver Band Noise		-135		dBm/Hz	
	Harmonics, 2f, 3f, 4f		-40		dBc	
$T_{ON/OFF}$	Power Down On/Off Time		<100		ns	

NOTE 1: Using Application Schematic.

NOTE 2: @ 885 KHz offset from band center,  $P_{out} \leq 28\text{dBm}$

NOTE 3: @ 1980 KHz offset from band center,  $P_{out} \leq 28\text{dBm}$

NOTE 4: Spur < -60dBc for all phase angles

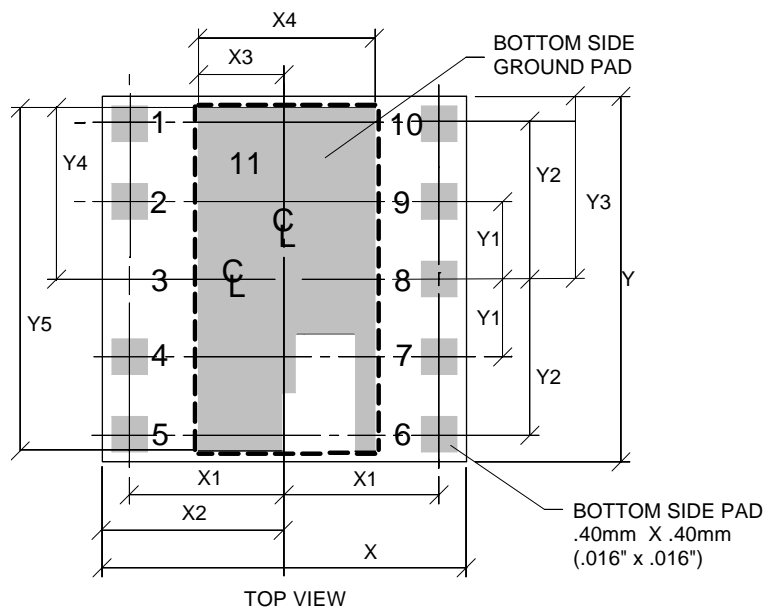
## Pin Description

PIN	FUNCTION	DESCRIPTION
1	$V_{ref} / V_{pd}$	Ref. Voltage for the bias circuit. No significant amplifier current is drawn until $V_{ref}$ reaches approximately 2.5V.
2	$V_Q$	The quiescent current is compensated over the temperature range. In low power mode operation (>2.0V) the current is reduced to 50mA. The efficiency is optimized at the low RF power range ( $\leq 16\text{dBm}$ ).
4	RF In	RF input port connects to internally matched 50 ohm circuit.
5	$V_{CC1}$	PIN 5 connects to the driver stage HBT collector.
6	$V_{CC2}$	$V_{CC2}$ connects to the power amplifier stage HBT collector.
7, 9, 10	GND	Ground.
11	GND	Ground. This ground also serves as heat sink and must connect well to the PCB RF ground and heat sink.
8	RF Out	RF out is internally matched to 50 ohms and expects a 50 ohm load impedance.
Notes:		All supply pins may be connected together at the supply. PIN 3 N/A

## PACKAGE DIMENSIONS AND MARKINGS

The ECM051 is a laminate based, overmold encapsulated modular package designed for surface-mounted solder attachment to a printed circuit board.

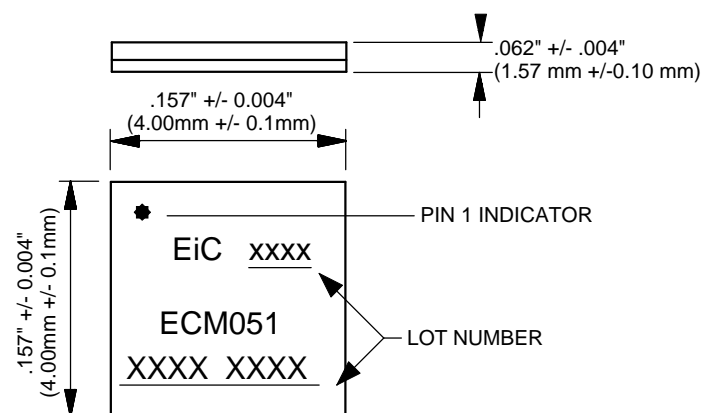
### Package Dimension



	English inches			Metric millimeters		
	min	nom	max	min	nom	max
X	.154	.158	.162	3.90	4.00	4.10
X1	.063	.067	.071	1.60	1.70	1.80
X2	.075	.079	.083	1.90	2.00	2.10
X3	.033	.037	.041	0.84	0.94	1.04
X4	.072	.076	.080	1.84	1.94	2.04
Y	.154	.158	.162	3.90	4.00	4.10
Y1	.030	.034	.038	0.75	0.85	0.95
Y2	.063	.067	.071	1.60	1.70	1.80
Y3	.075	.079	.083	1.90	2.00	2.10
Y4	.070	.074	.078	1.78	1.88	1.98
Y5	.144	.148	.152	3.65	3.75	3.85

English values are converted from Metric values.  
English values are rounded off.

### Device Marking



### PINOUT

- 1 Vref
- 2 Vq
- 3 n/a
- 4 RFin
- 5 Vcc1
- 6 Vcc2
- 7 Gnd
- 8 RFout
- 9 Gnd
- 10 Gnd
- 11 Gnd