



PRELIMINARY INFORMATION

2 V Dual-Mode WCDMA & Dual-Band GSM/DCS Switch
0.5 – 2.0 GHz

SW-488
Rev 1.2

Features

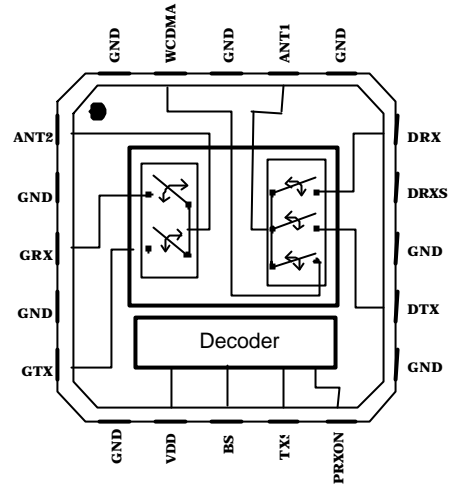
- GSM Power Handling with +2.0 V Control Voltage
- Low Power Consumption. Less than 1 μ A current in Receive mode.
- Integrated Decoder.
- Leadless 4 x 4mm FQFP-N, 20 Pin Package.
- Low Insertion Loss, 0.3 dB in GSM Transmit mode.

Description

The M/A-COM SW-488 is a GaAs monolithic switch in a low cost, FQFP-N, surface mount plastic package. The SW-488 is ideally suited for applications where very low power consumption, high power handling, and low cost are required. The SW-488 includes an integrated decoder. The switch offers GSM power handling with below +2.5V control voltage. The supply voltage VDD should be connected to the highest available voltage.

The SW-488 is fabricated using a new 0.5-micron gate length GaAs pHEMT process. The process features full chip passivation for increased performance and reliability. This switch is designed for Dual Mode WCDMA/GSM/DCS handsets where the phone needs to be able to simultaneously receive a WCDMA and GSM signal.

Functional Schematic



Ordering Information

| Part Number | Description |
|---------------|------------------------------------|
| SW-488TR | SW-488 on 1000 Piece Tape and Reel |
| SW-488TR-3000 | SW-488 on 3000 Piece Tape and Reel |
| SW-488SMB | SW-488 Sample Test Board |

* If specific reel size is required, consult factory for part number assignment

The Preliminary Specifications Data Sheet Contains Typical Electrical Specifications Which May Change Prior to Final Introduction.

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ELECTRICAL CHARACTERISTICS: Test Conditions: VDD = 2.5V, Vctrl =2.0V, TA = +25°C

| Mode | Specifications | Freq. (MHz) | Units | Min. | Typ. | Max. |
|-----------------------|----------------------------|-------------|-------|------|------|------|
| ANT2 -> GSM RX | Insertion Loss | 925 -960 | dB | 0.54 | 0.6 | 0.7 |
| ANT1 -> UMTS Tx | Insertion Loss | 1920-1980 | dB | 0.65 | 0.7 | 0.9 |
| ANT1 -> UMTS Rx | Insertion Loss | 2110-2170 | dB | 0.7 | 0.75 | 0.95 |
| | Isolation ANT1 to DCS Tx | 1710-1785 | dB | 22 | 22 | 22 |
| | Isolation ANT2 to GSM Tx | 880 - 915 | dB | 15 | 15 | 15 |
| | Isolation UMTS to DCS Rx | 1920 -1980 | dB | 30 | 30 | 30 |
| | Isolation UMTS to GSM Rx | 1920 -1980 | dB | 30 | 30 | 30 |
| | Isolation UMTS to GSM Tx | 1920 -1980 | dB | 30 | 30 | 30 |
| | Isolation DCS Tx to DCS Rx | 1710 - 1785 | dB | 30 | 30 | 30 |
| | Isolation DCS Tx to GSM Rx | 1710 - 1785 | dB | 30 | 30 | 30 |
| | Isolation GSM Tx to DCS Rx | 880 - 915 | dB | 30 | 30 | 30 |
| | Isolation GSM Tx to GSM Rx | 880 - 915 | dB | 15 | 15 | 15 |
| ANT1 -> DCS RX | Insertion Loss | 1805 -1880 | dB | 0.74 | 0.8 | 0.9 |
| | Isolation ANT1 to DCS Tx | 1710 - 1785 | dB | 20 | 20 | 20 |
| | Isolation ANT2 to GSM Tx | 880 - 915 | dB | 10 | 10 | 10 |
| | Isolation DCS Tx to DCS Rx | 1710 - 1785 | dB | 20 | 20 | 20 |
| | Isolation DCS Tx to GSM Rx | 1710 - 1785 | dB | 30 | 30 | 30 |
| | Isolation GSM Tx to DCS Rx | 880 - 915 | dB | 30 | 30 | 30 |
| | Isolation GSM Tx to GSM Rx | 880 - 915 | dB | 30 | 30 | 30 |
| ANT2 -> GSM TX | Insertion Loss | 880 - 915 | dB | 0.24 | 0.3 | 0.4 |
| | Isolation GSM Tx to UMTS | 880 - 915 | dB | 30 | 30 | 30 |
| | Isolation GSM Tx to DCS Rx | 880 - 915 | dB | 30 | 30 | 30 |
| | Isolation GSM Tx to GSM Rx | 880 - 915 | dB | 25 | 25 | 25 |
| | Isolation DCS Tx to DCS Rx | 1710 - 1785 | dB | 30 | 30 | 30 |
| | Isolation DCS Tx to GSM Rx | 1710 - 1785 | dB | 30 | 30 | 30 |
| ANT1 -> DCS TX | Insertion Loss | 1710 -1785 | dB | 0.54 | 0.6 | 0.7 |
| | Isolation DCS Tx to UMTS | 1710 -1785 | dB | 20 | 20 | 20 |
| | Isolation DCS Tx to DCS Rx | 1710 -1785 | dB | 30 | 30 | 30 |
| | Isolation DCS Tx to GSM Rx | 1710 -1785 | dB | 30 | 30 | 30 |
| | Isolation GSM Tx to DCS Rx | 880 - 915 | dB | 30 | 30 | 30 |
| | Isolation GSM Tx to GSM Rx | 880 - 915 | dB | 30 | 30 | 30 |
| 2nd Harmonics | See attached data | | dBc | -84 | -80 | -70 |
| 3rd Harmonics | See attached data | | dBc | -79 | -76 | -65 |
| Supply Voltage | | | Volts | 2.0 | 2.5 | 4.0 |
| High Control Voltages | | | Volts | 2.0 | 2.5 | 4.0 |
| Low Control Voltages | | | Volts | -0.2 | 0 | 0.2 |

- DC blocking capacitors are required on all RF and shunt ports.
- All impedances are 50 ohms

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2

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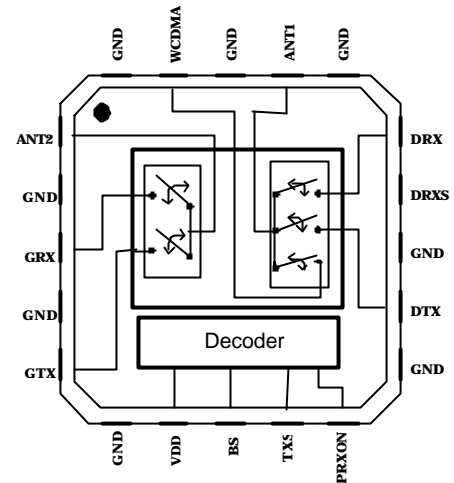
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Pin Configuration

| Pin No. | Pin Name | Description |
|---------|----------|---------------|
| 1 | ANT2 | GSM ANT Port |
| 2 | GND | RF Ground |
| 3 | GRX | GSM Rx Port |
| 4 | GND | RF Ground |
| 5 | GTX | GSM Tx Port |
| 6 | GND | Decoder GND |
| 7 | VDD | Decoder Vdd |
| 8 | BS | Control 1 |
| 9 | TXS | Control 2 |
| 10 | PRXON | Control 3 |
| 11 | GND | RF Ground |
| 12 | DCS TX | DCS Tx Port |
| 13 | GND | RF Ground |
| 14 | DCSRX_S | DCS Rx Shunt |
| 15 | DCSRX | DCS Rx Port |
| 16 | GND | RF Ground |
| 17 | ANT 1 | WCDMA/DCS ANT |
| 18 | GND | RF Ground |
| 19 | WCDMA | WCDMA Port |
| 20 | GND | RF Ground |
| 21 | GND | Paddle |

Block Diagram



Truth Table

| BS | TXS | PRXON | MODE |
|----|-----|-------|-------------------------------|
| 0 | 0 | 0 | GSM RX – ANT2 WCDMA – ANT1 |
| 0 | 1 | 0 | GSM TX – ANT2 |
| 1 | 1 | 0 | DCS TX – ANT1 |
| 1 | 0 | 0 | DCS RX – ANT1 |

| Logic Level | Voltage Level |
|-------------|---------------|
| VLo "0"= | 0 V |
| VHi "1"= | 2.5 V |

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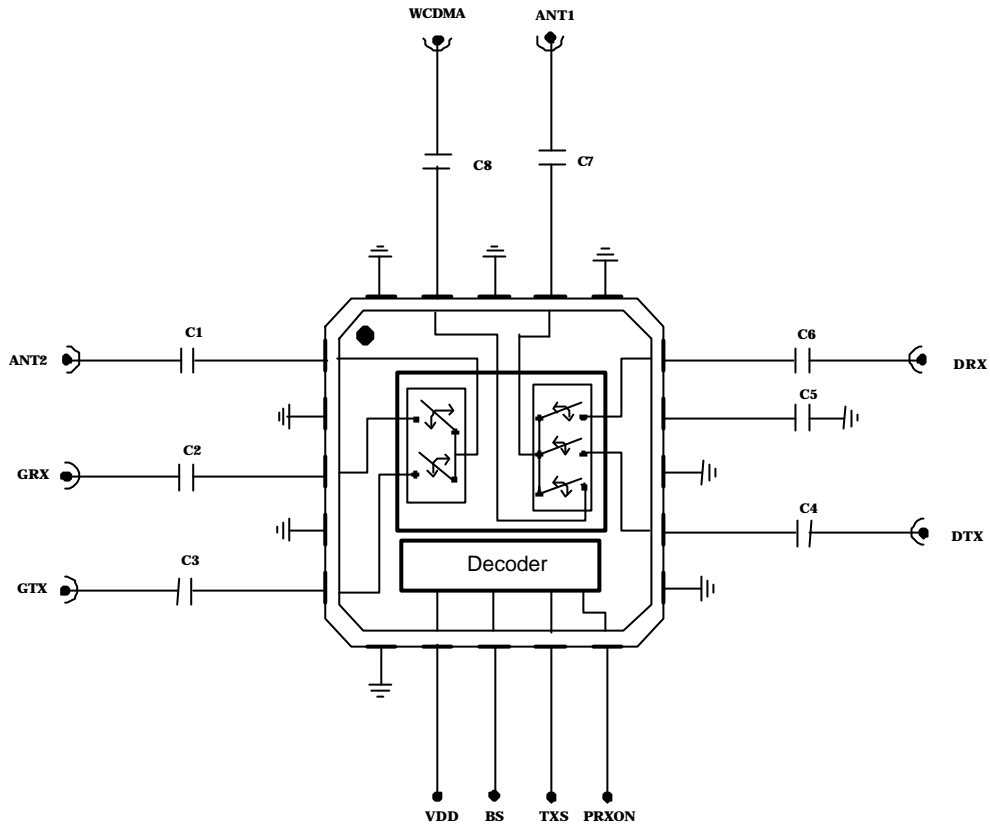
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Sample Board Schematic



External Circuitry Parts List (Note: Values of external elements not final)

| Ref. Designation | Value | Purpose |
|------------------|--------|----------|
| C1 | 22 pF | DC Block |
| C2 | 22 pF | DC Block |
| C3 | 22 pF | DC Block |
| C4 | 22 pF | DC Block |
| C5 | 4.7 pF | RF Shunt |
| C6 | 22 pF | DC Block |
| C7 | 22 pF | DC Block |
| C8 | 22 pF | DC Block |

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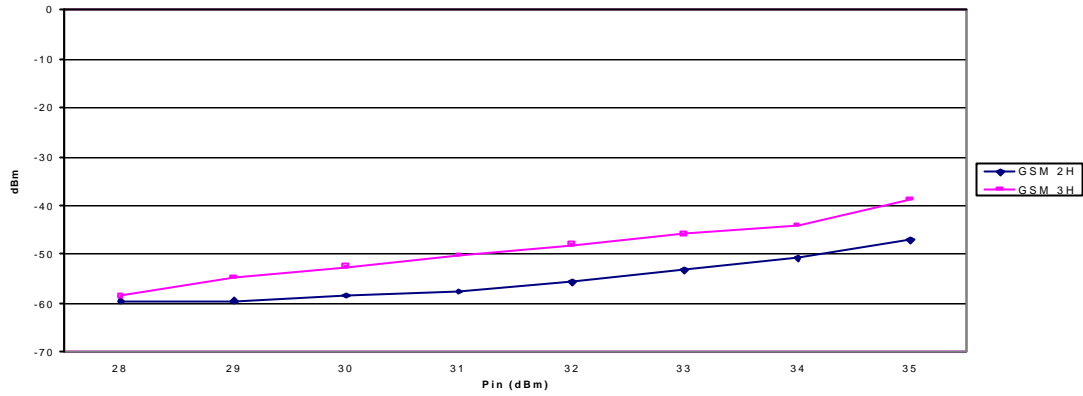
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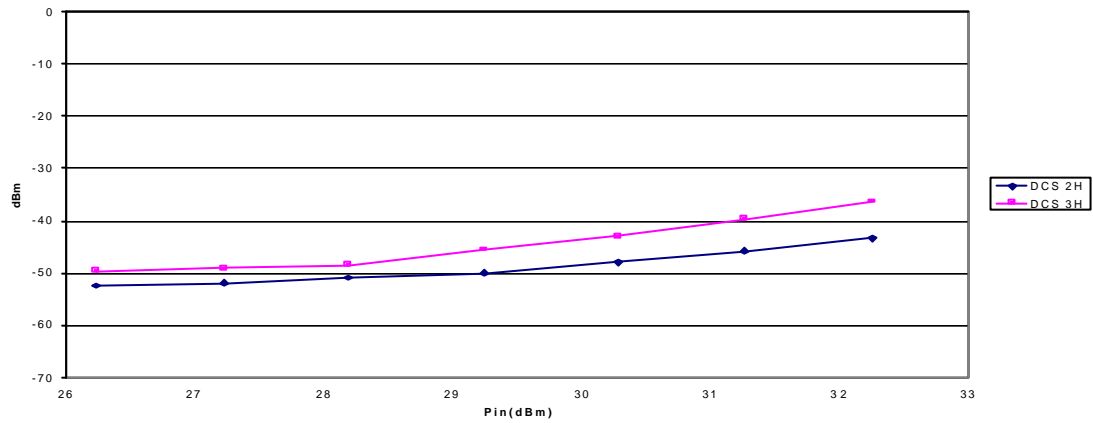
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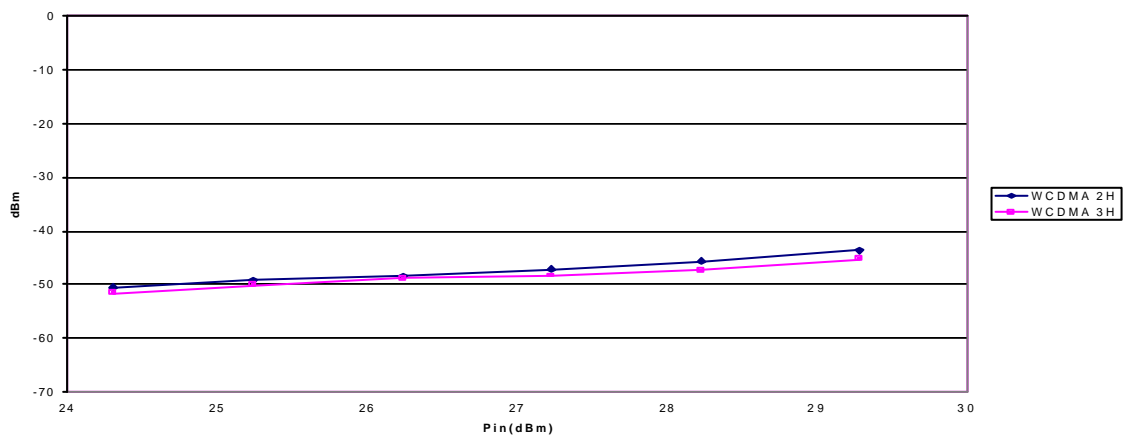
SW-488 Harmonics at the GSM TX Port versus Pin
Vdd=2.5V; Vcontrol=2.5V



SW-488 Harmonics at the DCS TX Port versus Pin
Vdd=2.5V; Vcontrol=2.5V

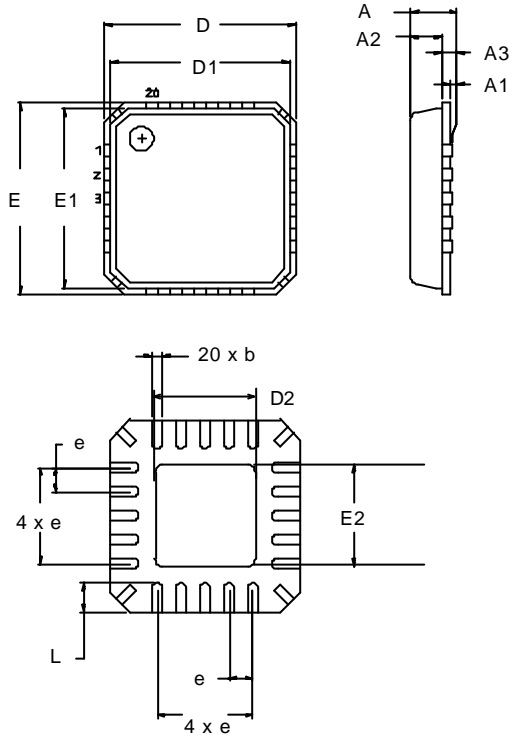


SW-488 Harmonics at the WCDMA Port versus Pin
Vdd=2.5V; Vcontrol=2.5V



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4 mm FQFP-N, 20-Lead



| Dimension | Measurement (mm) | | |
|-----------|------------------|------------|------|
| | Min. | Nom. | Max. |
| A | 0.80 | 0.90 | 1.00 |
| A1 | 0 | 0.02 | 0.05 |
| A2 | 0 | 0.65 | 1.00 |
| A3 | | 0.25 ref. | |
| b | 0.18 | 0.23 | 0.30 |
| D | | 4.00 basic | |
| D1 | | 3.75 basic | |
| D2 | 0.75 | 1.70 | 2.25 |
| e | | 0.50 basic | |
| E | | 4.00 basic | |
| E1 | | 3.75 basic | |
| E2 | 0.75 | 1.70 | 2.25 |
| L | 0.35 | 0.55 | 0.75 |

Note: See JEDEC MO-220A VGGD-1 for additional dimensional and tolerance information

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