

# MDC5100

## Advance Information Antenna Switch Controller

The MDC5100 is designed to control GaAs RF switches which require positive and negative going control voltages to select the switch path. All input control signals are 3 V CMOS–logic compatible to allow for direct interface to a microcontroller. The device also has an accessory detect pin for use in applications where there is a portable handset to mobile adapter. The device is designed to interface directly with Double Pull–Double Throw (DPDT) switches such as the M/A–Com SW 363.

This device in combination with a GaAs RF switch can be used to achieve duplex isolation in many Time Division Duplex Radios like DECT or in Frequency Division Duplex Radios employing time division multiple access with staggered Transit/Receive time slots such as GSM. It can also be used to control an RF switch in dual band radio applications. The device is housed in a miniature Micro–8 for minimum space utilization.

### Features

- Micro–miniature Low Profile Micro 8 Package
- 3 V CMOS Logic Control Inputs
- Ultra–low Quiescent Current of 400  $\mu$ A Typical
- Wide Operating Temperature Range of –40 to 85°C

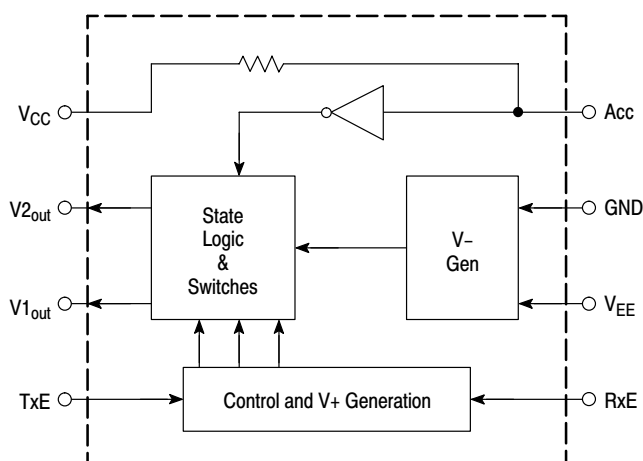
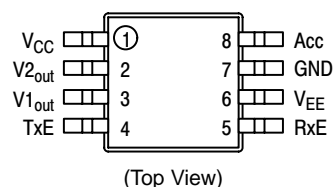
### Applications

- GSM and PCS Portable Phones
- Mobile to Portable Accessories
- Wireless LAN Modems
- Specialized TDD and TDMA Radios
- Dual Band Phones

### ANTENNA SWITCH CONTROLLER



PLASTIC PACKAGE  
CASE 846A–02  
(Micro–8)



Functional Block Diagram

This document contains information on a new product. Specifications and information herein are subject to change without notice.

# MDC5100

## ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Positive Supply Voltage	$V_{CC}$	6	V
Negative Supply Voltage	$ V_{EE} $	12	V
Differential Supply Voltage	$V_{CC}-V_{EE}$	15	V
Voltage Range at Any Input Pin (TxE, RxE, Acc)	$V_{in}$	-1 to $V_{CC}$	V
Junction Temperature	$T_J$	150	°C
Storage Temperature Range	$T_{stg}$	-65 to +150	°C

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Total Power Dissipation Derate above 25°C	$P_D$	510 4	mW mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	245	°C/W

## DEVICE MARKING

5100
------

## ORDERING INFORMATION

MDC5100R2	13 inch Reel, 4000 units
-----------	--------------------------

## TRUTH TABLE

Input Logic			Output Logic		
RxE	TxE	ACC	V1 <sub>out</sub>	V2 <sub>out</sub>	
0	0	0	GND	GND	
0	0	1	GND	GND	
0	1	0	V-	V+	
0	1	1	V+	V-	
1	0	0	V+	V-	
1	0	1	V-	V+	
1	1	0	V+	V+	
1	1	1	V+	V+	

Note 1: ACC "0" = Open, ACC "1" = 10 kΩ to GND

Note 2: V+ is nominally  $V_{IH} - 0.1$

Note 3: V- is nominally  $V_{EE} - 1$  V

## PIN DESCRIPTION

Pin	Name	Functional Description
1	$V_{CC}$	Positive Supply
2	V2 <sub>out</sub>	Antenna Control Output 1, V+ is referenced to the $V_{IH}$ of TxE, RxE and V- is referenced to the $V_{EE}$ Voltage
3	V1 <sub>out</sub>	Antenna Control Output 2, V+ is referenced to the $V_{IH}$ of TxE, RxE and V- is referenced to the $V_{EE}$ Voltage
4	TxE	Transmit Enable Input
5	RxE	Receive Enable Input
6	$V_{EE}$	Negative Supply
7	GND	Ground
8	Acc	Accessory Present Input

# MDC5100

## ELECTRICAL CHARACTERISTICS ( $V_{CC} = 2.75\text{ V}$ , $V_{EE} = -10\text{ V}$ , $T_A = 25^\circ\text{C}$ )

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

### RECOMMENDED OPERATING CONDITIONS

Positive Supply Voltage	$V_{CC}$	1.8		5.0	V
Negative Supply Voltage	$V_{EE}$	-10		-5.0	V
Voltage Range at Any Input Pin (TxE, RxE, Acc)	$V_{in}$	0		$V_{CC}$	V
Ambient Operating Temperature Range	$T_A$	-40		85	$^\circ\text{C}$

### DC ELECTRICAL CHARACTERISTICS

Positive Supply Current (Acc connected to GND) Negative Supply Current (Acc, V1, V2 unterminated)	$I_{CC}$ $I_{EE}$	100	400	500 -200	$\mu\text{A}$
RxE or TxE Input High State for V1 or V2 = V+ RxE or TxE Input Low State for V1 or V2 = V-	$V_{IH}$ $V_{IL}$	2.65		0.4	V
V1, V2 Output High State – TxE or RxE = $V_{IH}$ , $I_{OH} = -25\ \mu\text{A}$ (1) V1, V2 Output Low State – TxE or RxE = $V_{IL}$ , $I_{OL} = 25\ \mu\text{A}$ (1)	V+ V-	2.50		-5.75	V
Accessory Resistance for V1 = V-, V2 = V+ (TxE = $V_{IH}$ , RxE = $V_{IL}$ ) Accessory Resistance for V1 = V+, V2 = V- (TxE = $V_{IH}$ , RxE = $V_{IL}$ )	Racc Racc	800		12	k $\Omega$

### AC ELECTRICAL CHARACTERISTICS

Propagation Delay – RxE/TxE to V1/V2 (Racc = 800 k $\Omega$ to GND)	$T_{PLH}$ (2) $T_{PHL}$ (2)	0.016 0.004		0.5 1.4	$\mu\text{sec}$ $\mu\text{sec}$
Propagation Delay – RxE/TxE to V1/V2 (Racc = 12 k $\Omega$ to GND)	$T_{PLH}$ $T_{PHL}$	0.35 0.005		4.0 1.4	$\mu\text{sec}$ $\mu\text{sec}$
Propagation Delay – Acc to V1/V2 through 12 k $\Omega$	$T_{PLH}$ $T_{PHL}$	0.4 0.1		7.5 5.0	$\mu\text{sec}$ $\mu\text{sec}$
Transition Time of V1/V2 from RxE or TxE (Racc = 800 k to GND)	$T_{rise}$ (3) $T_{fall}$ (3)	0.3 0.3		7.4 4.4	$\mu\text{sec}$ $\mu\text{sec}$
Transition Time of V1/V2 from RxE or TxE (Racc = 12 k to GND)	$T_{rise}$ $T_{fall}$	0.3 0.2		16 4.0	$\mu\text{sec}$ $\mu\text{sec}$
Transition Time of V1/V2 from Acc Input	$T_{rise}$ $T_{fall}$	0.3 0.3		4.1 4.1	$\mu\text{sec}$ $\mu\text{sec}$

- NOTES:** 1 Refer to truth table for input test states  
 2.  $T_{PLH}$  and  $T_{PHL}$  are measured from the 50% point of input waveform to 50% of the output waveform  
 3.  $T_{rise}$  and  $T_{fall}$  are measured from the 10% point to the 90% point of the output

# MDC5100

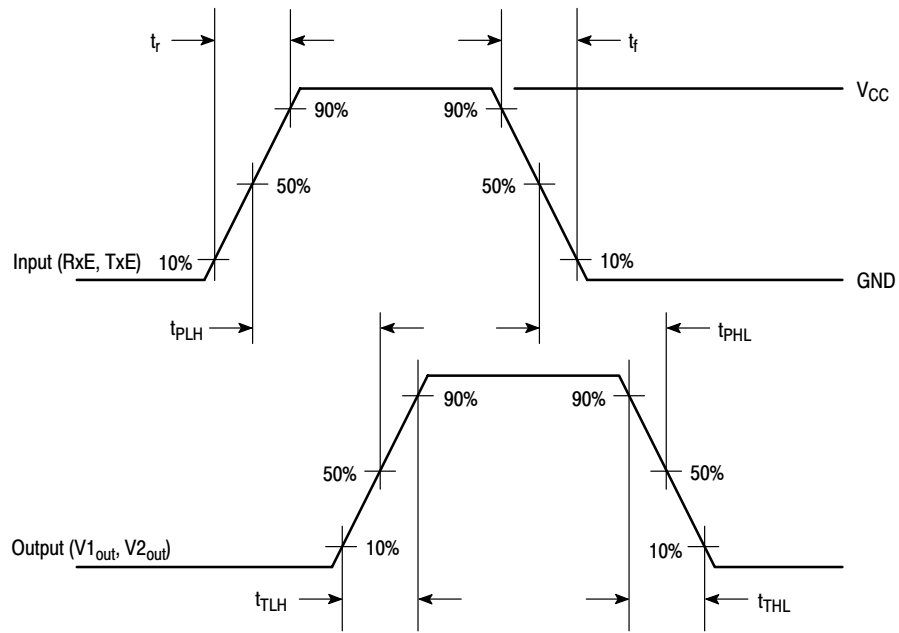


Figure 1.

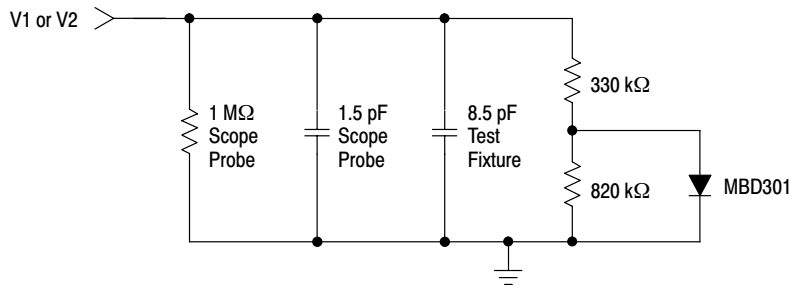


Figure 2. AC Test Load

# MDC5100

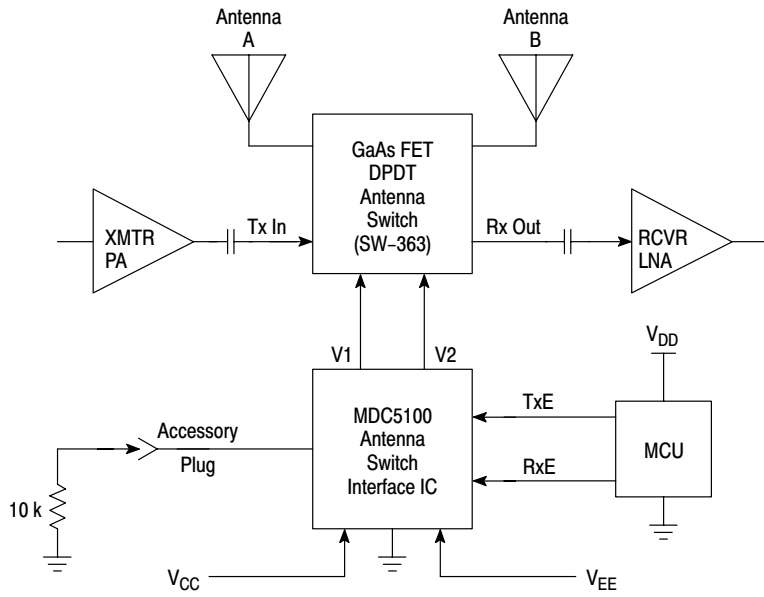


Figure 3. Diversity Antenna Application

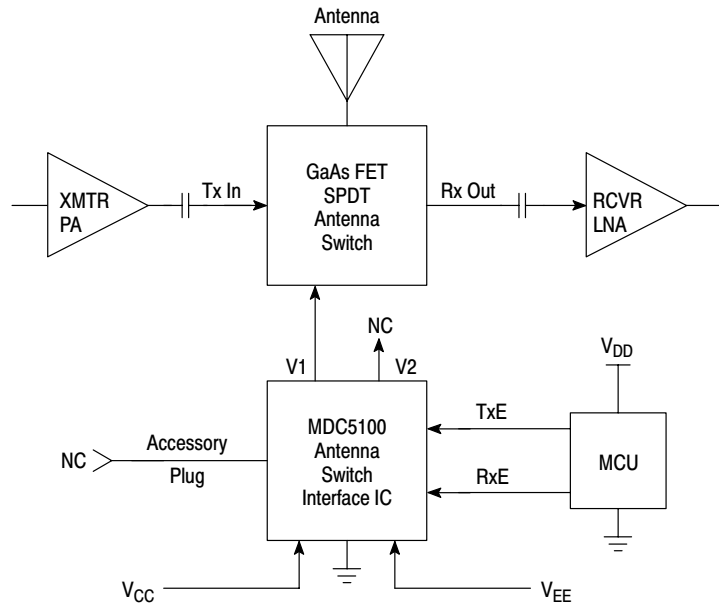
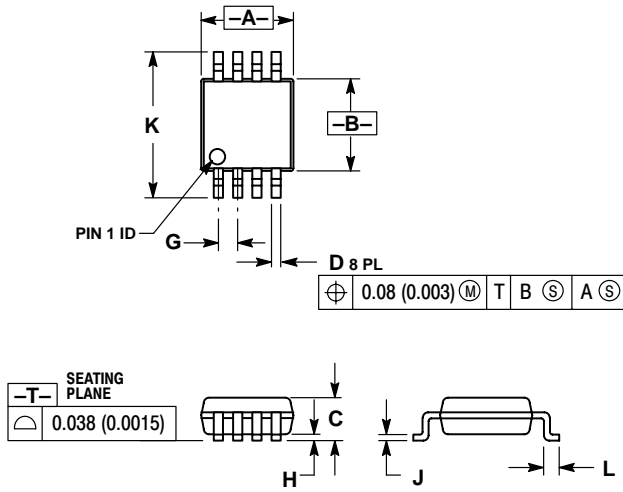


Figure 4. T<sub>DD</sub> or Half-Duplex Handie-Talkie Application

# MDC5100

## PACKAGE DIMENSIONS

Micro8  
CASE 846A-02  
ISSUE E



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.90	3.10	0.114	0.122
B	2.90	3.10	0.114	0.122
C	---	1.10	---	0.043
D	0.25	0.40	0.010	0.016
G	0.65 BSC		0.026 BSC	
H	0.05	0.15	0.002	0.006
J	0.13	0.23	0.005	0.009
K	4.75	5.05	0.187	0.199
L	0.40	0.70	0.016	0.028

**Notes**

**ON Semiconductor** and  are trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer.

## PUBLICATION ORDERING INFORMATION

### Literature Fulfillment:

Literature Distribution Center for ON Semiconductor  
P.O. Box 5163, Denver, Colorado 80217 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** ONlit@hibbertco.com

**N. American Technical Support:** 800-282-9855 Toll Free USA/Canada

**JAPAN:** ON Semiconductor, Japan Customer Focus Center  
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0031  
**Phone:** 81-3-5740-2700  
**Email:** r14525@onsemi.com

**ON Semiconductor Website:** <http://onsemi.com>

For additional information, please contact your local Sales Representative.