

PRELIMINARY DATA SHEET

NEC

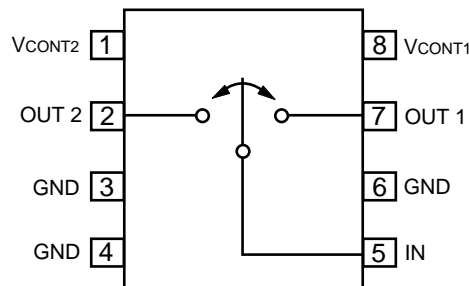
L-BAND SPDT GaAs MMIC SWITCH

UPG137GV UPG138GV

FEATURES

- **WIDE FREQUENCY RANGE:** 100 MHz to 2.5 GHz
- **LOW INSERTION LOSS:** 0.55 dB TYP at 1.0 GHz
0.65 dB TYP at 2.0 GHz
- **HIGH P_{1dB}:** +35 dBm MIN using +5 or -5 V
+34 dBm TYP using +3 or -3 V
- **SMALL 8 PIN SSOP PACKAGE**
- **AVAILABLE ON TAPE AND REEL**

INTERNAL BLOCK DIAGRAM



DESCRIPTION

The UPG137GV and UPG138GV are L-Band Single Pole Double Throw (SPDT) GaAs MMIC switches developed for digital cellular, PCS, and WLAN applications. These devices feature wide bandwidth, low insertion loss, and high P_{1dB}. The UPG137GV operates on a +3 to +5 V control voltage, while the UPG138GV operates on -3 to -5 V. They are housed in a very small, low-cost, 8 pin SSOP package and are available on tape-and-reel.

NEC's stringent quality assurance and test procedures ensure the highest reliability and performance.

ELECTRICAL CHARACTERISTICS¹ (T_A = 25°C)

PART NUMBER PACKAGE OUTLINE				UPG137GV S08			UPG138GV S08		
SYMBOLS	PARAMETERS AND CONDITIONS		UNITS	MIN	TYP	MAX	MIN	TYP	MAX
IL	Insertion Loss	f = 0.1 - 1 GHz	dB		0.55	0.75		0.55	0.75
		f = 1 - 2 GHz	dB		0.65	0.9		0.65	0.9
		f = 2 - 2.5 GHz	dB			0.8		0.8	
ISOL	Isolation	f = 0.1 - 1 GHz	dB				25	30	
		f = 1 - 2 GHz	dB	20	25		18	20	
		f = 0.1 - 2 GHz	dB						
RL _{IN}	Input Return Loss	f = 0.1 - 2 GHz	dB	11			11		
RL _{OUT}	Output Return Loss	f = 0.1 - 2 GHz	dB	11			11		
P _{1dB}	Input Power at 1 dB Compression, f = 0.5 - 2 GHz	V _{CONT} = +3/0 V	dBm	+32	+34				
		V _{CONT} = +5/0 V	dBm	+35					
		V _{CONT} = -3/0 V	dBm				+32	+35	
		V _{CONT} = -5/0 V	dBm				+35		
IIP3	Input 3rd Order Intercept Point, P _{IN} = +10 dBm, f ₁ , f ₂ = 900, 905 MHz		dBm		+43			+43	
t _{SW}	Switching Speed, f = 0.1 - 1 GHz		ns		30			10	
I _{CONT}	Control Current, f = 0.1 - 1 GHz		μA			50			50
		V _{CONT} = +5/0 V	μA						
		V _{CONT} = -5/0 V	μA						

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS UPG137GV	RATINGS UPG138GV
V _{CONT 1,2}	Control Voltage 1 and 2	V	-0.6 to +6	-6 to +0.6
P _{IN}	Input Power V _{CONT} = -5 or +5 V V _{CONT} = -3 or +3 V	dBm dBm	+37 +35	+37 +35
P _T	Total Power Dissipation	W	0.7	0.7
T _{OP}	Operating Case Temperature	°C	-50 to +90	-50 to +90
T _{STG}	Storage Temperature	°C	-65 to +150	-65 to +150

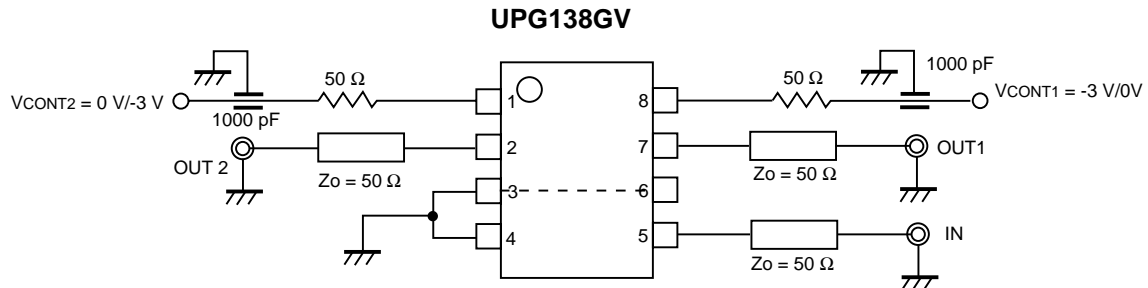
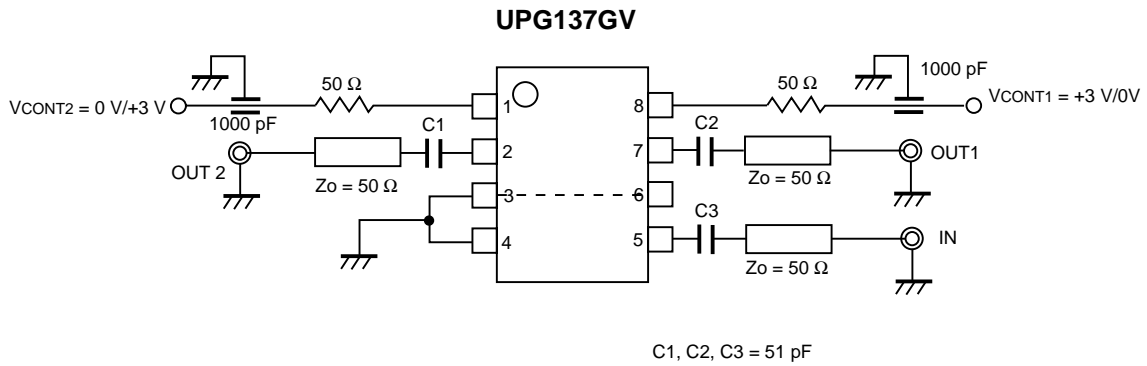
Note:

1. Operation in excess of any one of these parameters may result in permanent damage.

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	UNITS	UPG137GV			UPG138GV		
			MIN	TYP	MAX	MIN	TYP	MAX
V _{CONT}	Control Voltage (HIGH)	V	+2.7	+3.0	+5.3	-0.2	0	+0.2
V _{CONT}	Control Voltage (LOW)	V	-0.2	0	+0.2	-5.0	-3.0	-2.7
P _{IN}	Input Power Level V _{CONT} = +5 V V _{CONT} = +3 V V _{CONT} = -5 V V _{CONT} = -3 V	dBm dBm dBm dBm			+35 +33			+35 +33

TEST CIRCUITS



SWITCH LOGIC TABLES

UPG137GV

CONTROL INPUTS (V)		CONDITION OF OUTPUT PORTS ¹	
V _{CONT1}	V _{CONT2}	OUT1	OUT2
0	0	OFF	OFF
0	+3	ON	OFF
+3	0	OFF	ON
+3	+3	OFF	OFF

UPG138GV

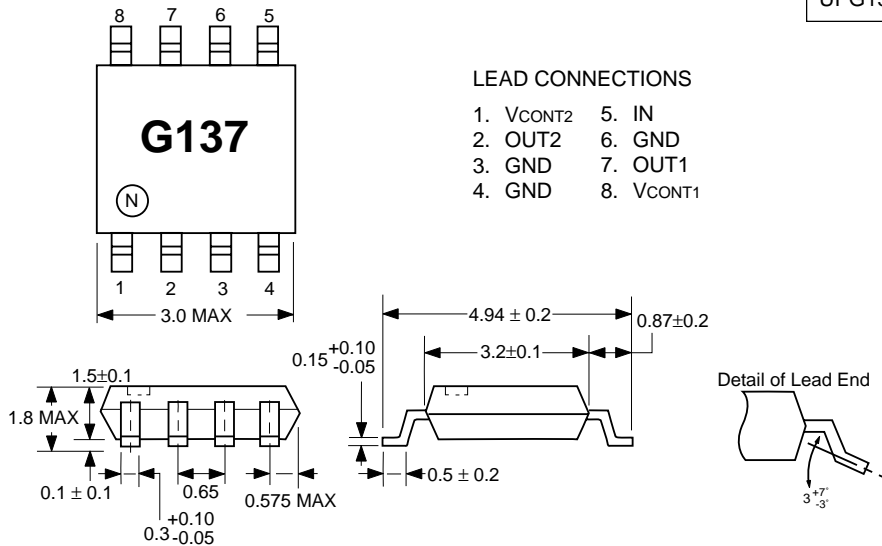
CONTROL INPUTS (V)		CONDITION OF OUTPUT PORTS ¹	
V _{CONT1}	V _{CONT2}	OUT1	OUT2
0	0	OFF	OFF
-3	0	ON	OFF
0	-3	OFF	ON
-3	-3	OFF	OFF

Note:

1. Impedance of the output port in the "OFF" state is reflective.

OUTLINE DIMENSIONS (Units in mm)

**UPG137GV, UPG138GV
PACKAGE OUTLINE S08**



- LEAD CONNECTIONS**
- 1. V_{CONT2}
 - 2. OUT2
 - 3. GND
 - 4. GND
 - 5. IN
 - 6. GND
 - 7. OUT1
 - 8. V_{CONT1}

ORDERING INFORMATION

PART NUMBER	QTY
UPG137GV-E1	2000/Reel
UPG138GV-E1	2000/Reel

MARKINGS:

UPG137GV: G137
UPG138GV: G138

All dimensions are typical unless otherwise specified.