CEL

NEC's GaAs MMIC DPDT SWITCH FOR 5 GHz BAND

UPG2024TQ

FEATURES

- **OPERATING FREQUENCY:**
  4.8 to 5.85 GHz
- **LOW INSERTION LOSS:**
  1.2 dB TYP. @ 4.8 to 5.85 GHz
- **POWER HANDLING:**
  $P_{in\ (0.1\ dB)}$ = +32 dBm TYP. @ 4.8 to 5.85 GHz
- **CONTROL VOLTAGE:**
  +2.8 V/0 V TYP.
- **HIGH ISOLATION:**
  (Between TX and RX) = 30 dB TYP. @ 5.2 GHz
  (Between ANT1/2 and RX/TX) = 25 dB TYP. @ 5.2 GHz
- **INPUT/OUTPUT RETURN LOSS:**
  20 dB TYP. @ 4.8 to 5.85 GHz
- **SWITCHING SPEED:**
  20 ns TYP. @ t_{RISE}/t_{FALL} (10/90% RF)
- **HIGH-DENSITY SURFACE MOUNTING:**
  10-pin plastic TSON package (2.30 × 2.55 × 0.60 mm)
- **PB-FREE**

DESCRIPTION

NEC's UPG2024TQ is a high power GaAs MMIC DPDT switch for 5 GHz band wireless LAN and other applications.

The UPG2024TQ combines high performance features in a Pb-Free low profile (0.6 mm max height) 2.30 mm x 2.55 mm package.

APPLICATIONS

- **5 GHZ BAND WIRELESS LAN (802.11A)**
- **5 GHZ ELECTRONIC TOLL COLLECTION**
- **5 GHZ FIXED WIRELESS ACCESS**

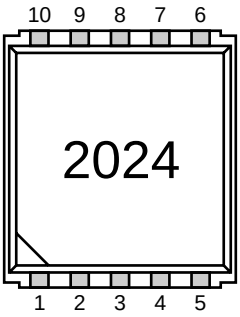
ORDERING INFORMATION

PART NUMBER	PACKAGE	MARKING	SUPPLYING FORM
μPG2024TQ-E1-A	10-pin plastic TSON	2024	• Embossed tape 8 mm wide • Pin 5, 6 face the perforation side of the tape • Qty 3 kpcs/reel

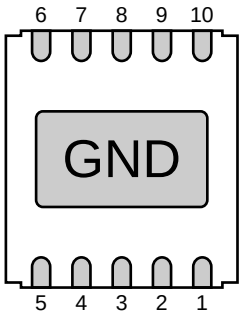
Remark To order evaluation samples, contact your nearby sales office.
Part number for sample order: UPG2024TQ-A

PIN CONNECTIONS AND INTERNAL BLOCK DIAGRAM

(Top View)



(Bottom View)



PIN NO.	PIN NAME
1	TX
2	V_{cont1}
3	V_{cont2}
4	GND
5	RX
6	ANT1
7	V_{cont3}
8	V_{cont4}
9	GND
10	ANT2

ABSOLUTE MAXIMUM RATINGS (T_A =+25ºC, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Control Voltage	V_{cont}	–6.0 to +6.0 Note 1	V
Input Power	P_{in}	+36	dBm
Total Power Dissipation	P_{tot}	0.15 Note 2	W
Operating Ambient Temperature	T_A	–45 to +85	°C
Storage Temperature	T_{stg}	–65 to +150	°C

Notes 1. Within the condition of $|V_{cont1}–V_{cont2}| \leq 6.0$ V

2. Mounted on double-sided copper-clad 50 × 50 × 1.6 mm epoxy glass PWB, T_A = +85°C

RECOMMENDED OPERATING RANGE (T_A =+25ºC)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Control Voltage (High)	$V_{cont\ (H)}$	2.7	2.8	3.3	V
Control Voltage (Low)	$V_{cont\ (L)}$	–0.2	0	+0.2	V
Operating Frequency	f	4.8	5.5	5.85	GHz
Operating Ambient Temperature	T_A	–40	+25	+85	°C

ELECTRICAL CHARACTERISTICS

(T_A = +25°C, V_{cont} = 2.8 V/0 V, Z_O = 50 Ω, DC block capacitor = 2 pF, each port)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Insertion Loss	L_{INS}	f = 4.9 GHz	–	1.2	1.5	dB
		f = 5.2 GHz	–	1.2	1.5	
		f = 5.8 GHz	–	1.5	1.7	
Isolation (Between TX and RX)	ISL	f = 4.9 GHz	20	25	–	dB
		f = 5.2 GHz	25	30	–	
		f = 5.8 GHz	20	25	–	
Input Return Loss	RL_{in}	f = 4.9 GHz	10	20	–	dB
		f = 5.2 GHz	10	20	–	
		f = 5.8 GHz	7	20	–	
Output Return Loss	RL_{out}	f = 4.9 GHz	10	20	–	dB
		f = 5.2 GHz	10	20	–	
		f = 5.8 GHz	7	20	–	
0.1 dB Gain Compression Input Power	$P_{in\ (0.1\ dB)}$	f = 4.9 GHz	30	33	–	dBm
		f = 5.2 GHz	30	32	–	
		f = 5.8 GHz	30	32	–	
Switching Speed	t_{SW}	t_{RISE}/t_{FALL} (10/90% RF)	–	20	–	ns
Control Current	I_{cont}		–	5	–	μA
Input 3rd Order Intercept Point	IIP_3		–	50	–	dBm

STANDARD CHARACTERISTICS FOR REFERENCE

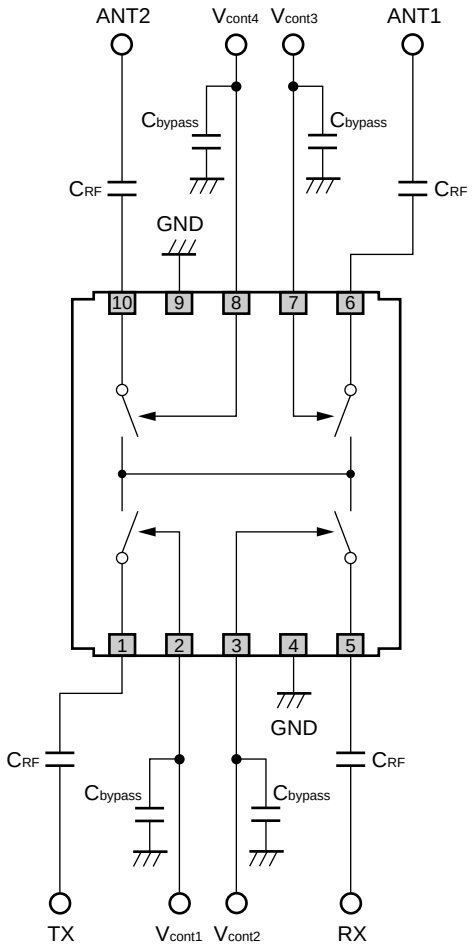
(T_A = +25°C, V_{cont} = 2.8 V/0 V, Z_O = 50 Ω, DC block capacitors = 2 pF, each port)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Isolation (Between ANT1/2 and RX/TX)	ISL	f = 4.9 GHz	–	22	–	dB
		f = 5.2 GHz	–	25	–	
		f = 5.8 GHz	–	21	–	

TRUTH TABLE

V_{cont1}	V_{cont2}	V_{cont3}	V_{cont4}	PASS
Low	High	High	Low	ANT1-RX
High	Low	Low	High	ANT2-TX
High	Low	High	Low	ANT1-TX
Low	High	Low	High	ANT2-RX

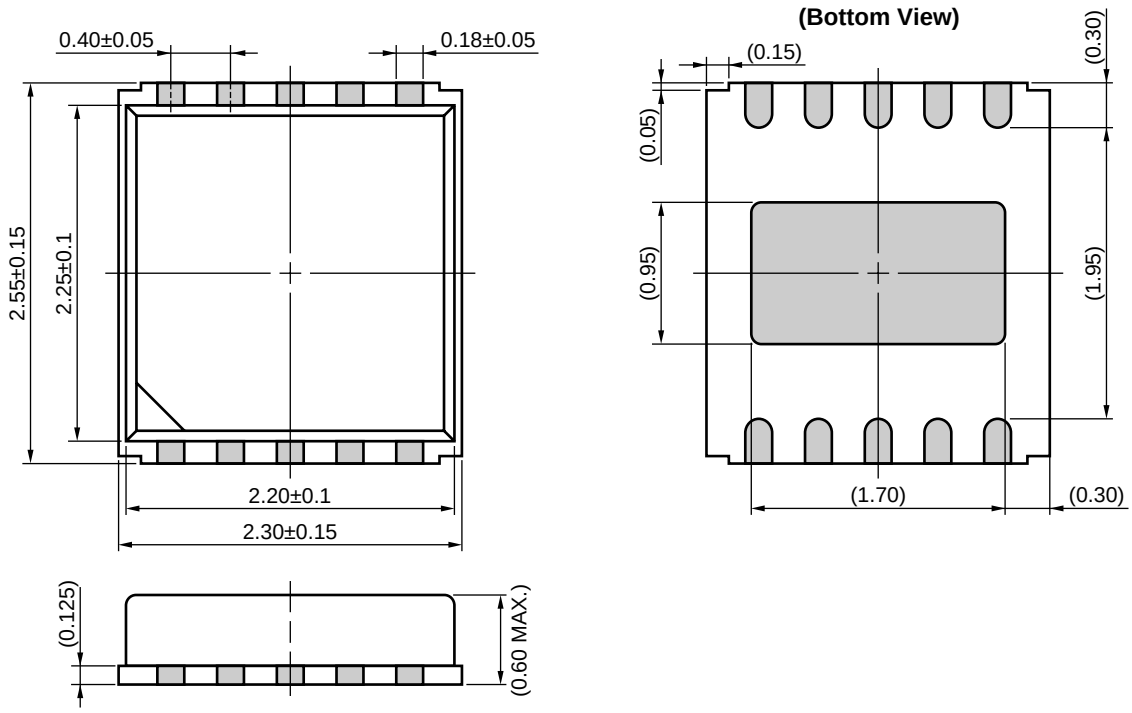
EVALUATION CIRCUIT



Remark C_{RF} : 2 pF
C_{bypass} : 1 000 pF

The application circuits and their parameters are for reference only and are not intended for use in actual design-ins.

PACKAGE DIMENSIONS
10-PIN PLASTIC TSON (UNIT:mm)



Remark ( ) : Reference value

RECOMMENDED SOLDERING CONDITIONS

This product should be soldered and mounted under the following recommended conditions. For soldering methods and conditions other than those recommended below, contact your nearby sales office.

Soldering Method	Soldering Conditions		Condition Symbol
Infrared Reflow	Peak temperature (package surface temperature)	: 260°C or below	IR260
	Time at peak temperature	: 10 seconds or less	
	Time at temperature of 220°C or higher	: 60 seconds or less	
	Preheating time at 120 to 180°C	: 120±30 seconds	
	Maximum number of reflow processes	: 3 times	
	Maximum chlorine content of rosin flux (% mass)	: 0.2%(Wt.) or below	
VPS	Peak temperature (package surface temperature)	: 215°C or below	VP215
	Time at temperature of 200°C or higher	: 25 to 40 seconds	
	Preheating time at 120 to 150°C	: 30 to 60 seconds	
	Maximum number of reflow processes	: 3 times	
	Maximum chlorine content of rosin flux (% mass)	: 0.2%(Wt.) or below	
Wave Soldering	Peak temperature (molten solder temperature)	: 260°C or below	WS260
	Time at peak temperature	: 10 seconds or less	
	Preheating temperature (package surface temperature)	: 120°C or below	
	Maximum number of flow processes	: 1 time	
	Maximum chlorine content of rosin flux (% mass)	: 0.2%(Wt.) or below	
Partial Heating	Peak temperature (pin temperature)	: 350°C or below	HS350
	Soldering time (per side of device)	: 3 seconds or less	
	Maximum chlorine content of rosin flux (% mass)	: 0.2%(Wt.) or below	

Caution **Do not use different soldering methods together (except for partial heating).**