# NEC's L-BAND 4W HIGH POWER SPDT SWITCH IC

UPG2027TQ

#### **FEATURES**

CEL

- LOW INSERTION LOSS: 0.40 dB TYP. @ 1.0 GHz 0.50 dB TYP. @ 2.0 GHz
- HIGH LINEARITY: 2f0, 3f0 = 70 dBc TYP. @ 1.0 GHz, Pin = +35 dBm 2f0, 3f0 = 70 dBc TYP. @ 2.0 GHz, Pin = +33 dBm
- HIGH-DENSITY SURFACE MOUNTING:
   10-pin plastic TSON package (2.30 × 2.55 × 0.60 mm)
- Pb FREE

#### DESCRIPTION

NEC's UPG2027TQ is a high power SPDT GaAs Switch IC for digital cellular and cordless telephone applications. This device can operate from 500 MHz to above 2.0 GHz, with low insertion loss and high linearity.

#### **APPLICATIONS**

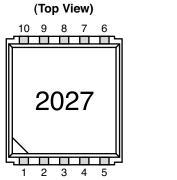
- GSM Triple / Quad Band Cellular
- Cordless Phones
- Short Range Wireless

#### **ORDERING INFORMATION**

PART NUMBER	PACKAGE	MARKING	SUPPLYING FORM
UPG2027TQ-E1-A	10-pin plastic TSON	2027	<ul> <li>Embossed tape 8 mm wide</li> <li>Pins 5, 6 face the perforation side of the tape</li> <li>Qty 3 kpcs/reel</li> </ul>

**Remark** To order evaluation samples, contact your nearby sales office. Part number for sample order: UPG2027TQ-A

### PIN CONNECTIONS AND INTERNAL BLOCK DIAGRAM



(Bottom View)					
6	7	8	9	10	
ΓU	U	U	U	Uγ	
	NC				
	4	<u></u> 3	2		

PIN NO.	PIN NAME
1	V <sub>cont2</sub>
2	NC (GND)
3	Common
4	NC (GND)
5	Vcont1
6	RF1
7	NC (GND)
8	NC (GND)
9	NC (GND)
10	RF2

#### ABSOLUTE MAXIMUM RATINGS (TA =+25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Control Voltage	Vcont	+8.0	V
Input Power	Pin	+38	dBm
Operating Ambient Temperature	TA	-45 to +85	°C
Storage Temperature	Tstg	–55 to +150	°C

### **RECOMMENDED OPERATING RANGE** (TA =+25°C)

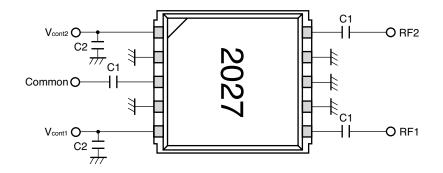
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Control Voltage (High)	Vcont (H)	+2.5	+2.7	+5.0	V
Control Voltage (Low)	Vcont (L)	0	0	+0.2	V

**ELECTRICAL CHARACTERISTICS** (TA = +25°C, V<sub>cont</sub> = +2.5 V/0 V, Z<sub>0</sub> = 50  $\Omega$ , DC blocking capacitors value: 56 pF, Each port, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Insertion Loss	Lins	f = 0.5 to 1.0 GHz	-	0.40	0.65	dB
		f = 1.0 to 2.0 GHz	-	0.50	0.75	dB
Isolation	ISL	f = 0.5 to 1.0 GHz	23	25	-	dB
		f = 1.0 to 2.0 GHz	17	18.5	-	dB
2nd Harmonics	2f0	f = 1.0 GHz, Pin = +35 dBm	65	70	-	dBc
		f = 2.0 GHz, Pin = +33 dBm	65	70	-	dBc
3rd Harmonics	3f0	f = 1.0 GHz, Pin = +35 dBm	65	70	-	dBc
		f = 2.0 GHz, Pin = +33 dBm	65	70	-	dBc
Switching Speed	tsw		-	1	5	μs
Control Current	Icont	No RF	_	-	50	μΑ

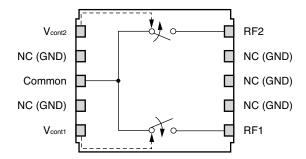
#### **EVALUATION CIRCUIT**

Off chip DC blocking capacitors value C1 = 56 pF, C2 = 1 000 pF (Bypass), using NEC standard evaluation board.



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

#### TRUTH TABLE



VCONT1	VCONT2	COMMON-RF1	COMMON-RF2
High	Low	ON	OFF
Low	High	OFF	ON

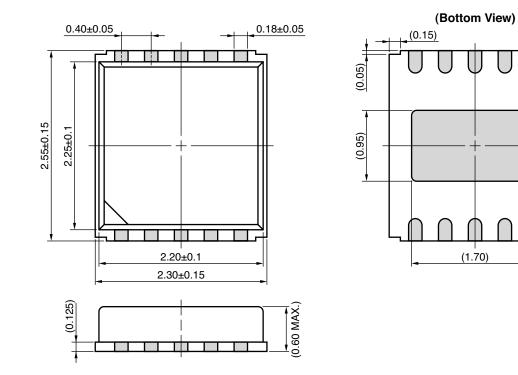
(0:30)

(1.95)

(0.30)

## PACKAGE DIMENSIONS

# 10-PIN PLASTIC TSON (UNIT:mm)



### **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).

Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

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11/12/2004



Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (\*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL's understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentratio in CEL	
Lead (Pb)	< 1000 PPM	-A -AZ Not Detected (*)	
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
РВВ	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.

In no event shall CEL's liability arising out of such information exceed the total purchase price of the CEL part(s) at issue sold by CEL to customer on an annual basis.

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