CEL

NEC's WIDE BAND SINGLE CONTROL CMOS SPDT SWITCH

UPD5710TK

FEATURES

- **SUPPLY VOLTAGE :**
  1.8 to 3.3 V (2.8 V TYP.)
- **SINGLE SWITCH CONTROL VOLTAGE:**
  $V_{cont\ (H)}$ = 1.8 to 3.3 V (2.8 V TYP.)
  $V_{cont\ (L)}$ = –0.2 to +0.2 V (0 V TYP.)
- **LOW INSERTION LOSS:**
  0.6 dB TYP. @ DC to 1.0 GHz
  0.8 dB TYP. @ 1.0 to 2.0 GHz
  0.95 dB TYP. @ 2.0 to 2.5 GHz
- **HIGH ISOLATION:**
  32.5 dB TYP. @ DC to 1.0 GHz
  25 dB TYP. @ 1.0 to 2.0 GHz
  22.5 dB TYP. @ 2.0 to 2.5 GHz
- **POWER HANDLING:**
  $P_{in\ (0.1\ dB)}$ = +17.0 dBm TYP. @ 1.0GHz, V_{DD} = 2.8 V
  $P_{in\ (1\ dB)}$ = +21.0 dBm TYP. @ 1.0 GHz, V_{DD} = 2.8 V
- **HIGH-DENSITY SURFACE MOUNT PACKAGE:**
  6-pin minimold package (1.5 × 1.1 × 0.55 mm)
- **Pb-FREE**

DESCRIPTION

NEC's UPD5710TK is a wide-band, single control CMOS MMIC SPDT (Single Pole Double Throw) switch for mobile communications, instrumentation, short range wireless, and general-purpose RF switching applications.

This device can operate from DC to 2.5GHz with low insertion loss and high isolation, and generally does not require blocking capacitors on the RF lines.

The UPD5710TK is housed in a Pb-Free 6-pin minimold (1511) package, suitable for high-density surface mounting.

APPLICATIONS

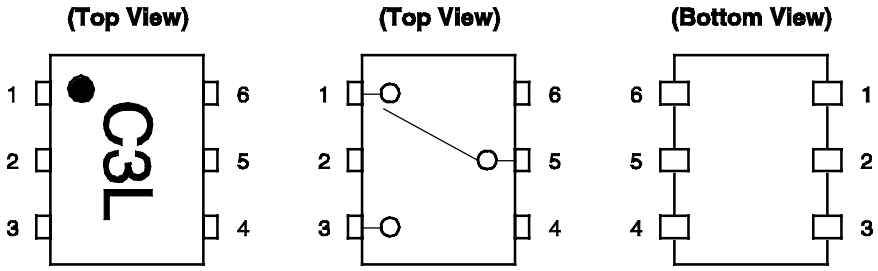
- **MOBILE COMMUNICATIONS**
- **SET TOP BOXES**
- **SHORT RANGE WIRELESS**
- **INSTRUMENTATION**

ORDERING INFORMATION

PART NUMBER	PACKAGE	MARKING	SUPPLYING FORM
μPD5710TK-E2-A	6-pinlead-less minimold (1511)	C3L	• Embossed tape 8 mm wide • Pin 1, 6 face the perforation side of the tape • Qty 5 kpcs/reel

Remark To order evaluation samples, contact your nearby sales office.
Part number for sample order: UPD5710TK-A

PIN CONNECTIONS AND INTERNAL BLOCK DIAGRAM



PIN NO.	PIN NAME
1	OUTPUT1
2	GND
3	OUTPUT2
4	V_{cont}
5	INPUT
6	V_{DD}

TRUTH TABLE

V_{CONT}	INPUT–OUTPUT1	INPUT–OUTPUT2
Low	OFF	ON
High	ON	OFF

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

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	+4.6	V
Switch Control Voltage	V_{cont}	+4.6	V
Continuous Current	I_{dc}	60	mA
Input Power	P_{in}	+23	dBm
Operating Ambient Temperature	T_A	–45 to +85	°C
Storage Temperature	T_{stg}	–65 to +150	°C

RECOMMENDED OPERATING RANGE (T_A =+25°C, unless otherwise specified)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{DD}	+1.8	+2.8	+3.3	V
Switch Control Voltage (H)	$V_{cont\ (H)}$	+1.8	+2.8	+3.3	V
Switch Control Voltage (L)	$V_{cont\ (L)}$	–0.2	0	+0.2	V

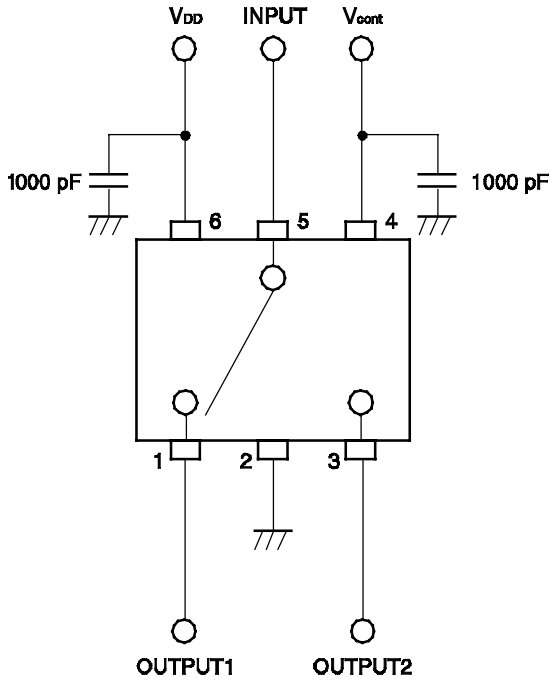
Notes 1. $| V_{cont(H)} - V_{DD} | \leq 0.1$ V

ELECTRICAL CHARACTERISTICS (T_A = +25°C, V_{DD} = 2.8V, $V_{cont(H)}$ = 2.8 V , $V_{cont(L)}$ = 0 V, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Insertion Loss 1	L_{ins1}	f = DC to 1.0 GHz	–	0.6	0.8	dB
Insertion Loss 2	L_{ins2}	f = 1.0 to 2.0 GHz	–	0.8	1.0	dB
Insertion Loss 3	L_{ins3}	f = 2.0 to 2.5 GHz	–	0.95	1.2	dB
Isolation 1	ISL1	f = DC to 1.0 GHz	30	32.5	–	dB
Isolation 2	ISL2	f = 1.0 to 2.0 GHz	22	25	–	dB
Isolation 3	ISL3	f = 2.0 to 2.5 GHz	-	22.5	–	dB
Input Return Loss	RL_{in}	f = DC to 2.5 GHz	15	20	–	dB
Output Return Loss	RL_{out}	f = DC to 2.5 GHz	15	20	–	dB
0.1 dB Loss Compression Input Power Note	$P_{in\ (0.1\ dB)}$	f = 1.0 GHz	+13.5	+17.0	–	dBm
1 dB Loss Compression Input Power Note	$P_{in\ (1\ dB)}$	f = 1.0 GHz	–	+21.0	–	dBm
Intermodulation Intercept Point	IIP_3	2 tone, 1.000/1.001GHz, 1 MHz spacing	–	+33	–	dBm
Supply Current	I_{DD}	No RF	–	0.01	1.0	μA
Switch Control Current	I_{cont}	No RF	-	0.01	1.0	μA
Switch Control Speed	t_{SW}		–	30	50	ns

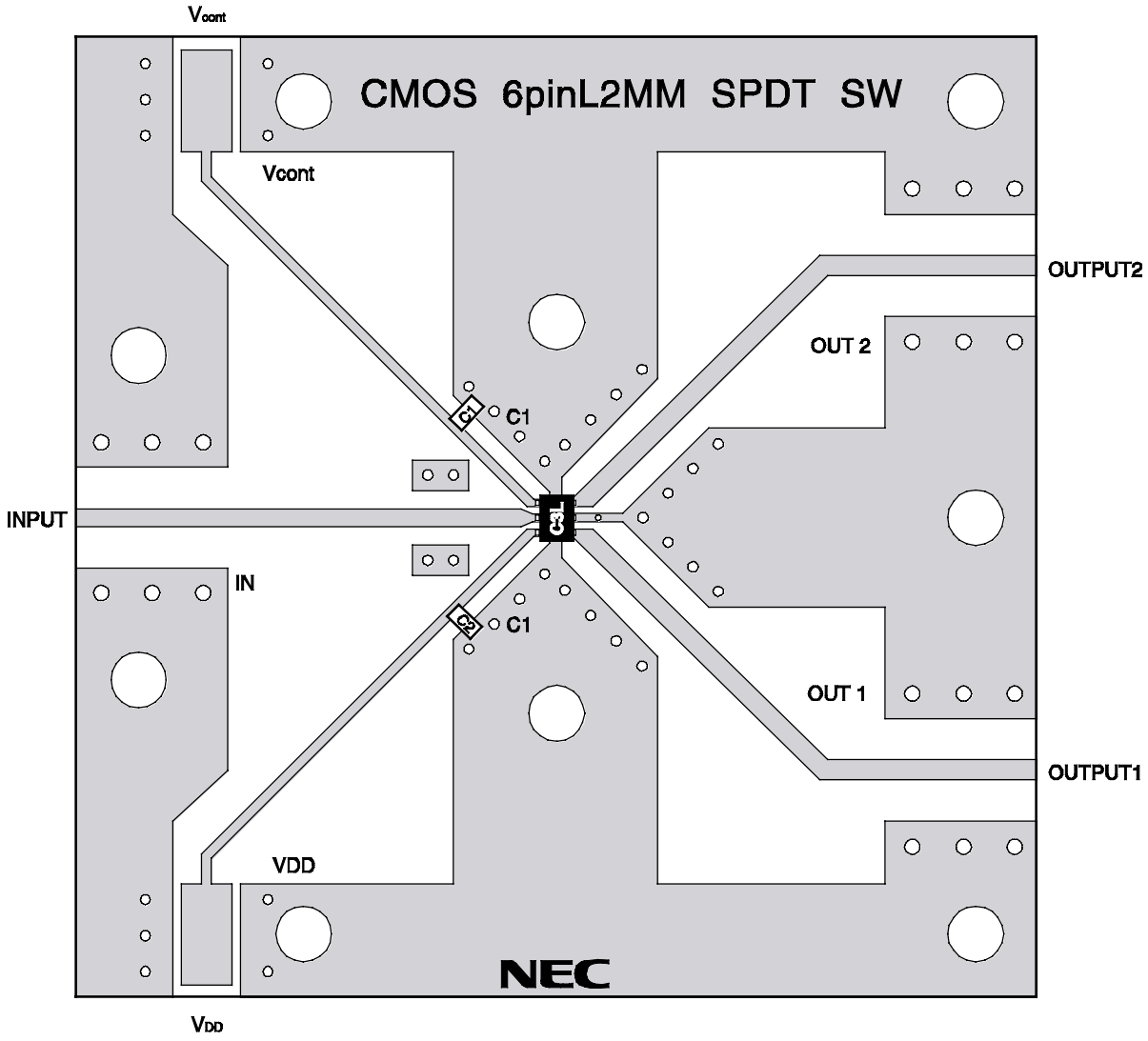
Notes . $P_{in\ (0.1\ dB)}$ or $P_{in\ (1\ dB)}$ are the measured input power level when the insertion loss increases 0.1 dB more or 1dB than that of linear range.

EVALUATION CIRCUIT



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

ILLUSTRATION OF THE TEST CIRCUIT ASSEMBLED ON EVALUATION BOARD



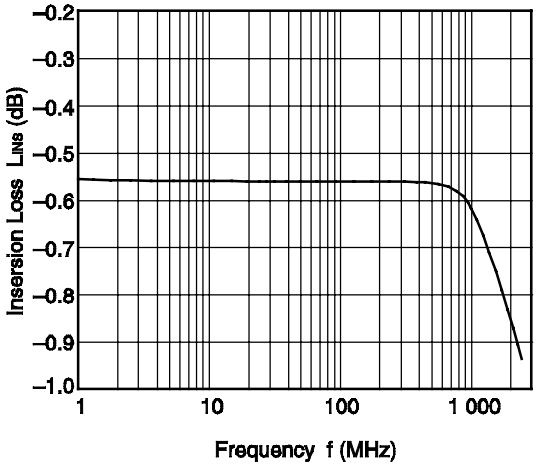
USING THE NEC EVALUATION BOARD

SYMBOL	VALUES
C1, C2	1,000 pF

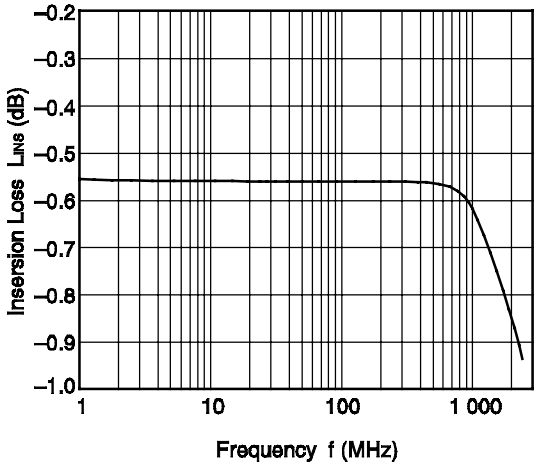
TYPICAL CHARACTERISTIC

(T_A = +25°C, V_{DD} = 2.8 V, $V_{cont\ (H)}$ = 2.8 V, $V_{cont\ (L)}$ = 0 V, unless otherwise specified)

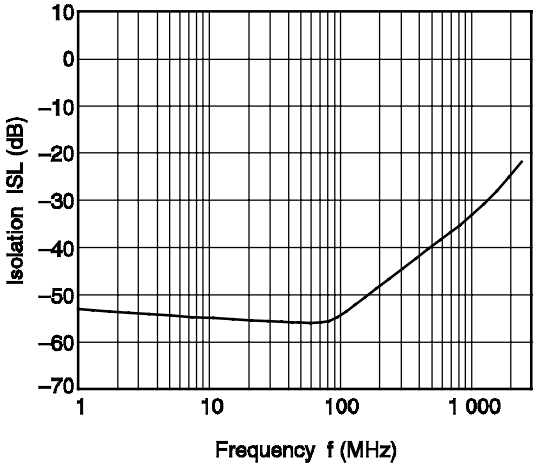
INPUT–OUTPUT1
INSERSION LOSS vs. FREQUENCY



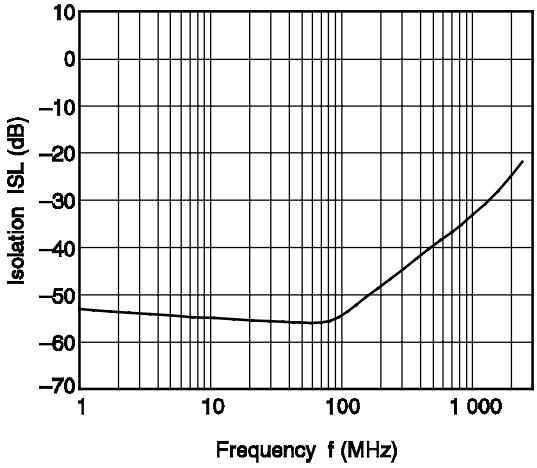
INPUT–OUTPUT2
INSERSION LOSS vs. FREQUENCY



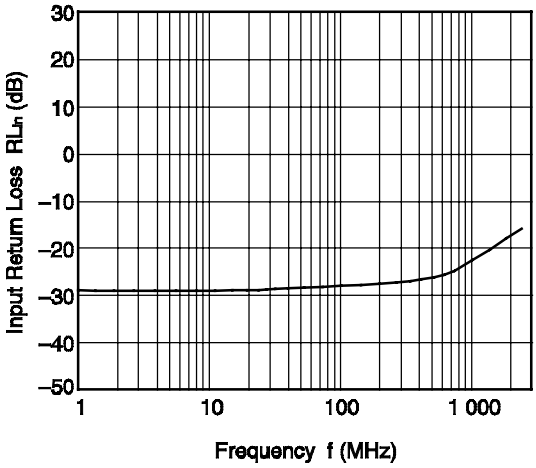
INPUT–OUTPUT1
ISOLATION vs. FREQUENCY



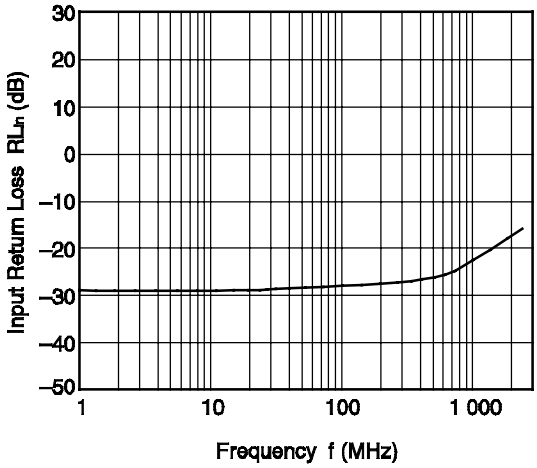
INPUT–OUTPUT2
ISOLATION vs. FREQUENCY



INPUT–OUTPUT1
INPUT RETURN LOSS vs. FREQUENCY



INPUT–OUTPUT2
INPUT RETURN LOSS vs. FREQUENCY

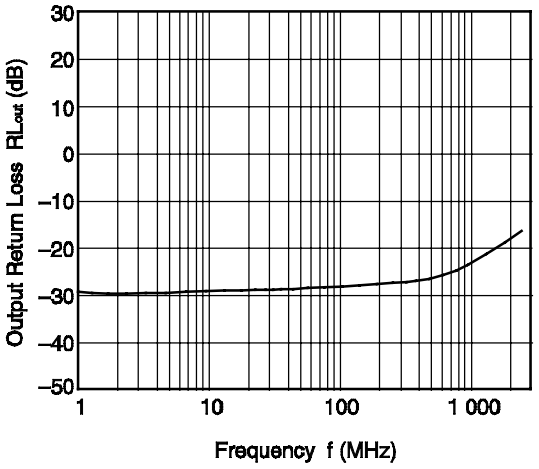


Remark The graphs indicate nominal characteristics.

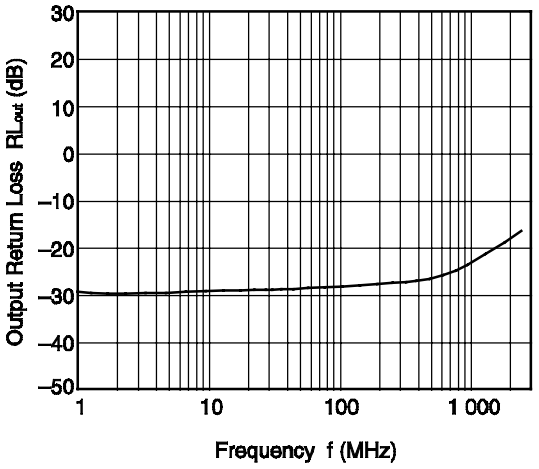
TYPICAL CHARACTERISTIC

(T_A = +25°C, V_{DD} = 2.8 V, $V_{cont\ (H)}$ = 2.8 V, $V_{cont\ (L)}$ = 0 V, unless otherwise specified)

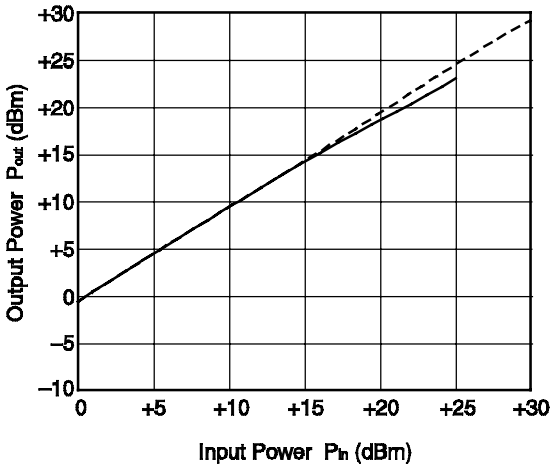
INPUT–OUTPUT1
OUTPUT RETURN LOSS vs. FREQUENCY



INPUT–OUTPUT2
OUTPUT RETURN LOSS vs. FREQUENCY



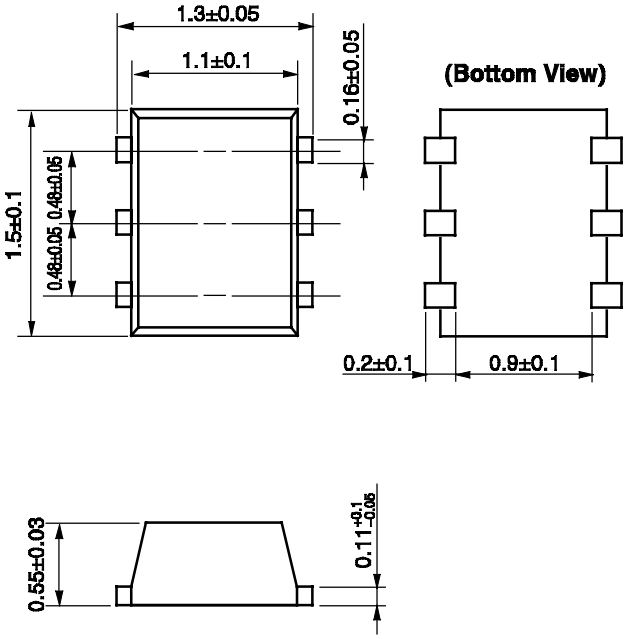
OUTPUT POWER vs. INPUT POWER



Remark The graphs indicate nominal characteristics.

PACKAGE DIMENSIONS

6-PIN LEAD-LESS MINIMOLD (1511) (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).**

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

CEL:

UPD5710TK-A UPD5710TK-E2-A