

Figure 3. Single-Band 11n (1x1) Transmit & Receive Diversity sSolution

## 4. Pin Assignments

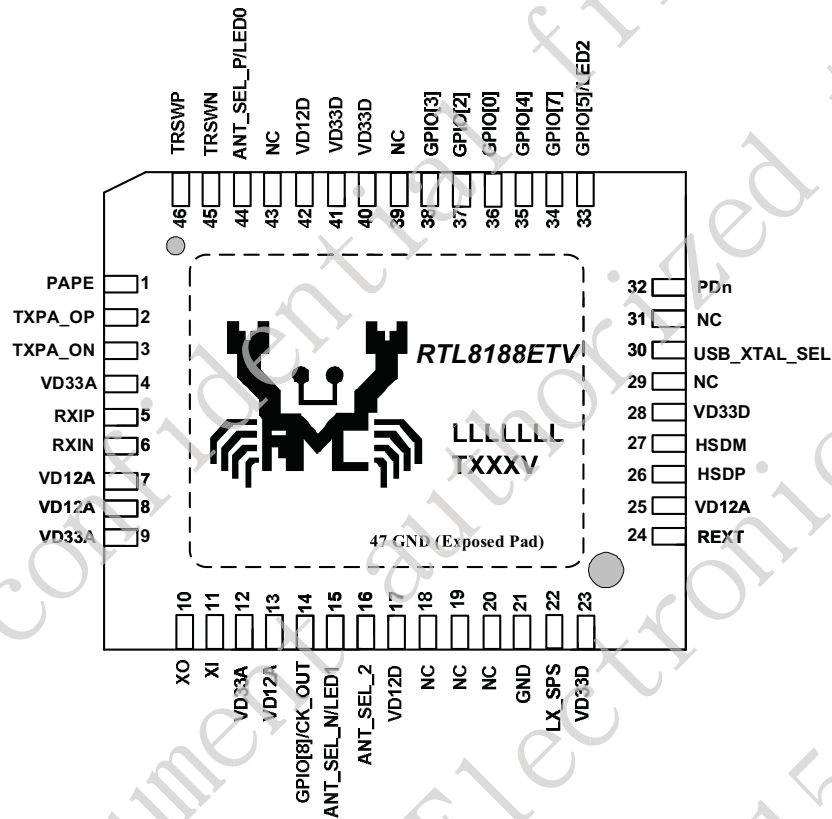


Figure 4. Pin Assignments

### 4.1. Package Identification

'Green' package is indicated by a 'G' in the location marked "T" in Figure 4.

## 5. Pin Descriptions

The following signal type codes are used in the tables:

I: Input

O: Output

T/S: Tri-State bi-directional input/output pin      S/T/S: Sustained Tri-State

O/D: Open Drain

P: Power pin

## 5.1. USB Bus Transceiver Interface

**Table 1. USB bus Transceiver Interface**

Symbol	Type	Pin No	Description
HSDM/HSDP	I	27/26	USB Receive Differential Pair

## 5.2. Power Pins

**Table 2. Power Pins**

Symbol	Type	Pin No	Description
LX_SPS	P	22	Switching Regulator Output
VD33A	P	4,9,12	VDD 3.3V for Analog
VD33D	P	23,28,40,41	VDD 3.3V for Digital
VD12A	P	7,8,13,25	Analog 1.2V Regulator Output
VD12D	P	17,42	Digital 1.2V Regulator Output
GND	P	21,47	Ground

## 5.3. RF Interface

**Table 3. RF Interface**

Symbol	Type	Pin No	Description
TRSWN	O	45	Transmit/Receive Shared with LED2, can be selected by control register
PAPE	O	1	2.4GHz Transmit Power Amplifier Power Enable 0
TRSWP	O	46	Transmit/Receive
TXPA_OP	O	2	RF TX Negative Signal
TXPA_ON	O	3	RF TX Positive Signal
RX_IP	I	5	RF RX Positive Signal
RX_IN	I	6	RF RX Negative Signal
ANT_SEL_P	O	44	Antenna Control Positive Signal Shared with LED0, can be selected by control register
ANT_SEL_N	O	15	Antenna Control Negative Signal Shared with LED1, can be selected by control register
ANT_SEL_2	O	16	Antenna Control Extend Signal

## 5.4. LED Interface

**Table 4. LED Interface**

Symbol	Type	Pin No	Description
LED0	O	44	LED Pins (Active Low) Shared with ANT_SEL_P, can be selected by control register
LED1	O	15	LED Pins (Active Low) Shared with ANT_SEL_N, can be selected by control register
LED2	O	33	LED Pins (Active Low) Shared with GPIO5, can be selected by control register

## 5.5. Clock and Other Pins

**Table 5. Clock and Other Pins**

Symbol	Type	Pin No	Description
XI	I	11	25/40MHz OSC Input Input of 25/40MHz Crystal clock reference
XO	O	10	Output of 25/40MHz Crystal Clock Reference
PDn	I	32	This Pin can Externally Shutdown RTL8188CE without Extra Power Switch
REXT	O	24	Band gap. It needs to link 24k resister pull down.
USB_XTAL_SEL	I	30	Trap Function: Decide to use the 25/40Mhz crystal by this pin power on latch low or high. USB_XTAL_SEL = 1, XTAL frequency is 40MHz USB_XTAL_SEL = 0, XTAL frequency is 25MHz
GPIO0/WLAN_ACT	IO	36	General Purpose Input/Output Pin or Bluetooth Coexistence WLAN_ACT Pin The WLAN_ACT signal indicates when WLAN is either transmitting or receiving in the 2.4GHz ISM band.
GPIO2/BT_STATE	IO	37	General Purpose Input/Output Pin or Bluetooth Coexistence BT_STAT Pin The BTSTAT signal indicates when normal Bluetooth packets are being transmitted or received.
GPIO3/BT_PRI	IO	38	General Purpose Input/Output Pin or Bluetooth Coexistence BT_PRI Pin The BTPRI signal indicates when a high priority Bluetooth packet is being transmitted or received.
GPIO4	IO	35	General Purpose Input/Output Pin
GPIO5/LED2	IO	33	General Purpose Input/Output Pin Shared with LED2, can be selected by control register
GPIO7	IO	34	This pin can also support WLAN Radio off function with host interface remaining connected.
GPIO8/CK_OUT	IO	14	General Purpose Input/Output Pin Buffered 25/40M clock outputs for other peripheral IC
NC	NA	18,19,20,29,31,39,43	No connect. Let it open.

## 6. Electrical and Thermal Characteristics

### 6.1. Temperature Limit Ratings

**Table 6. Temperature Limit Ratings**

Parameter	Minimum	Maximum	Units
Storage Temperature	-55	+125	°C
Ambient Operating Temperature	0	70	°C
Junction Temperature	0	125	°C

### 6.2. DC Characteristics

#### 6.2.1. Power Supply Characteristics

**Table 7. DC Characteristics**

Symbol	Parameter	Minimum	Typical	Maximum	Units
VD33A, VD33D	3.3V I/O Supply Voltage	3.0	3.3	3.6	V
VD12A, VD12D	1.2V Core Supply Voltage	1.10	1.2	1.32	V
VD15A, VD15D	1.5V Supply Voltage	1.425	1.5	1.575	V
IDD33	3.3V Rating Current	-	-	600	mA

#### 6.2.2. Digital IO Pin DC Characteristics

**Table 8. 3.3V GPIO DC Characteristics**

Symbol	Parameter	Minimum	Normal	Maximum	Units
V <sub>IH</sub>	Input high voltage	2.0	3.3	3.6	V
V <sub>IL</sub>	Input low voltage	--	0	0.9	V
V <sub>OH</sub>	Output high voltage	2.97	--	3.3	V
V <sub>OL</sub>	Output low voltage	0	--	0.33	V

**Table 9. 2.8V GPIO DC Characteristics**

Symbol	Parameter	Minimum	Normal	Maximum	Units
V <sub>IH</sub>	Input high voltage	1.8	2.8	3.1	V
V <sub>IL</sub>	Input low voltage	--	0	0.8	V
V <sub>OH</sub>	Output high voltage	2.5	--	3.1	V
V <sub>OL</sub>	Output low voltage	0	--	0.28	V

**Table 10. 1.8V GPIO DC Characteristics**

Symbol	Parameter	Minimum	Normal	Maximum	Units
V <sub>IH</sub>	Input high voltage	1.7	1.8	2.0	V
V <sub>IL</sub>	Input low voltage	--	0	0.8	V
V <sub>OH</sub>	Output high voltage	1.62	--	1.8	V
V <sub>OL</sub>	Output low voltage	0	--	0.18	V

## 7. Interface Timing Specification

### 7.1. USB Bus during Power On Sequence

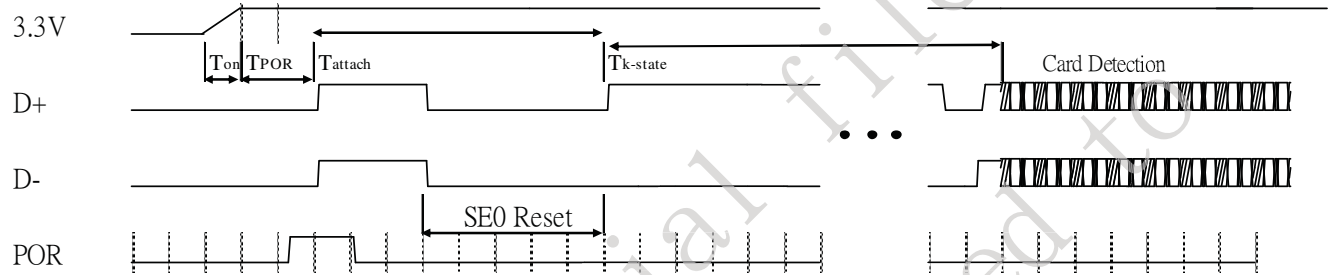


Figure 5. RTL8188ETV USB Bus Power On Sequence

**T<sub>on</sub>**: The main power ramp up duration

**T<sub>por</sub>**: The power on reset releases and power management unit executes power on tasks

**T<sub>attach</sub>**: USB attach state

**T<sub>k-state</sub>**: the duration from resistor attached to USB host starting card detection procedure

#### *The power on flow description:*

After main 3.3V ramp up, the internal power on reset is released by power ready detection circuit and the power management unit will be enabled. The power management unit enables the internal regulator and clock circuits.

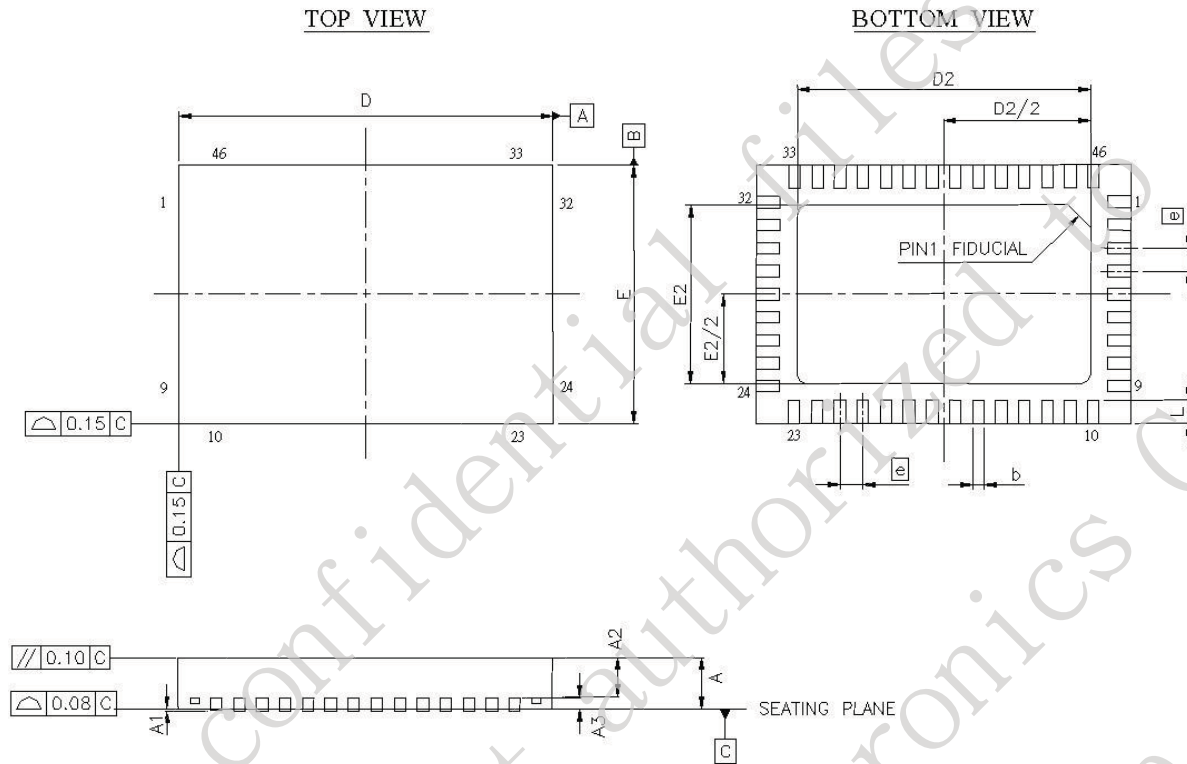
The power management unit also enables the USB circuits.

USB analog circuits attach resistors to indicate the insertion of the USB device

Table 11. The typical timing range

	Unit	Min	Typical	Max
<b>T<sub>on</sub></b>	ms	--	1.5	5
<b>T<sub>por</sub></b>	ms	--	2	10
<b>T<sub>attach</sub></b>	ms	2	7	15
<b>T<sub>k-state</sub></b>	ms	50	250	--

## 8. Mechanical Dimensions



### 8.1. Mechanical Dimensions Notes

Symbol	Dimension in mm			Dimension in inch		
	Min	Nom	Max	Min	Nom	Max
A	0.75	0.85	1.00	0.030	0.034	0.039
A <sub>1</sub>	0.00	0.035	0.05	0.000	0.001	0.002
A <sub>2</sub>	0.55	0.65	0.80	0.022	0.026	0.032
A <sub>3</sub>	0.20 REF			0.008 REF		
b	0.15	0.20	0.25	0.006	0.008	0.010
D	6.50BSC			0.256BSC		
D2	4.85	5.1	5.35	0.191	0.201	0.211
E	4.5BSC			0.177BSC		
E2	2.25	2.5	2.75	0.088	0.098	0.108
e	0.40BSC			0.016BSC		
L	0.30	0.40	0.50	0.012	0.016	0.020

Notes :

1. CONTROLLING DIMENSION : MILLIMETER(mm).
2. REFERENCE DOCUMENTL : JEDEC MO-220.



## 9. Ordering Information

**Table 12. Ordering Information**

Part Number	Package	Status
RTL8188ETV-CG	QFN-46, 'Green' Package	Engineering Samples

*Note: See page 7 for package identification.*

*This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

*Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.*

*NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:*

- Reorient or relocate the receiving antenna.*
- Increase the separation between the equipment and receiver.*
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- Consult the dealer or an experienced radio/TV technician for help.*

*FCC Radiation Exposure Statement*

*The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device, for example, USB dongle like transmitters is forbidden.*

*This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.*

*If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: 2AE35-RTL8188ETV Or*

*Contains FCC ID: 2AE35-RTL8188ETV "*

*when the module is installed inside another device, the user manual of this device must contain below warning statements;*

*1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:*

*(1) This device may not cause harmful interference.*

*(2) This device must accept any interference received, including interference that may cause undesired operation.*

*2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.*

*The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product*

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