Please note that Cypress is an Infineon Technologies Company.
The document following this cover page is marked as “Cypress” document as this is the company that originally developed the product. Please note that Infineon will continue to offer the product to new and existing customers as part of the Infineon product portfolio.

Continuity of document content
The fact that Infineon offers the following product as part of the Infineon product portfolio does not lead to any changes to this document. Future revisions will occur when appropriate, and any changes will be set out on the document history page.

Continuity of ordering part numbers
Infineon continues to support existing part numbers. Please continue to use the ordering part numbers listed in the datasheet for ordering.

External Library
1.0

Features

- The library provides documentation for external components

General Description

The Off-Chip library in the Component Catalog provides a way for you to mix external and internal components on the same schematic. This makes it possible to improve documentation and better understand the internal schematic and entire design. The components in this library cover the most common components that are most likely to be placed on the periphery of a PSoC device. These components consist of resistors, capacitors, transistors, inductors, switches, and others. The library is not intended to supply every possible part, but should support a wide range of designs. You can easily create your own part or parts library if your design includes a custom or unique component.

This library consists of the following individual components. The table lists the components and the Component Catalog display name for each component defined by this document. Additional components may be added in future releases.

Component Name	Component Catalog Display Name
Battery	Off-Chip/Power/Battery
BridgeRect	Off-Chip/Diodes/Bridge Rectifier
Capacitor	Off-Chip/Passive/Capacitor
Connector20	Off-Chip/Electro-Mechanical/Connector (1-20 pins)
Crystal	Off-Chip/Passive/Crystal
Diode	Off-Chip/Diodes/Diode
ExtBuffer	Off-Chip/Active/Buffer
ExtComp	Off-Chip/Active/Comparator
ExtInverter	Off-Chip/Active/Inverter
ExtOpAmp	Off-Chip/Active/OpAmp

Component Name	Component Catalog Display Name
Fuse	Off-Chip/Passive/Fuse
GND	Off-Chip/Power/Ground
Inductor	Off-Chip/Passive/Inductor
ISource	Off-Chip/Active/Current Source
JFET_N	Off-Chip/Transistors/N-Channel JFET
JFET_P	Off-Chip/Transistors/P-Channel JFET
LED	Off-Chip/Diodes/LED
Microphone	Off-Chip/Sensors/Microphone
Motor	Off-Chip/Electro-Mechanical/Motor (DC)
Motor3PH	Off-Chip/Electro-Mechanical/Motor (3 Phase)
NFET_En	Off-Chip/Transistors/N-Channel FET (Enhancement Mode)
NFET	Off-Chip/Transistors/N-Channel FET (Depletion Mode)
NPN	Off-Chip/Transistors/NPN Transistor
PFET_En	Off-Chip/Transistors/P-Channel MOSFET (Enhancement Mode)
PFET	Off-Chip/Transistors/P-Channel FET (Depletion Mode)
PhotoDiode	Off-Chip/Diodes/Photo Diode
PhotoResistor	Off-Chip/Sensors/Photo Resistor
ProtoTrans	Off-Chip/Transistors/Photo Transistor
PNP	Off-Chip/Transistors/PNP Transistor
Potentiometer	Off-Chip/Passive/Potentiometer
Power	Off-Chip/Power/Power
Relay	Off-Chip/Electro-Mechanical/Relay

Component Name	Component Catalog Display Name
Resistor	Off-Chip/Passive/Resistor
Schottky	Off-Chip/Diodes/Schottky Diode
SCR	Off-Chip/Diodes/SCR
Speaker	Off-Chip/Electro-Mechanical/Speaker
StrainGauge	Off-Chip/Sensors/Strain Gauge
SwitchDT	Off-Chip/Electro-Mechanical/Switch (SPDT - DPDT)
SwitchSPST	Off-Chip/Electro-Mechanical/Switch (SPST)
TestPoint	Off-Chip/Electro-Mechanical/TestPoint
Thermistor	Off-Chip/Sensors/Thermistor
Thermocouple	Off-Chip/Sensors/Thermocouple
Transformer	Off-Chip/Passive/Transformer
Triac	Off-Chip/Diodes/Triac
Varactor	Off-Chip/Diodes/Varactor Diode
VREG	Off-Chip/Active/Voltage Regulator
VSource	Off-Chip/Active/Voltage Source
Zener	Off-Chip/Diodes/Zener Diode

The following diagrams show an overview of each component and its placement in the library menu.

Figure 1. External Component Library Components

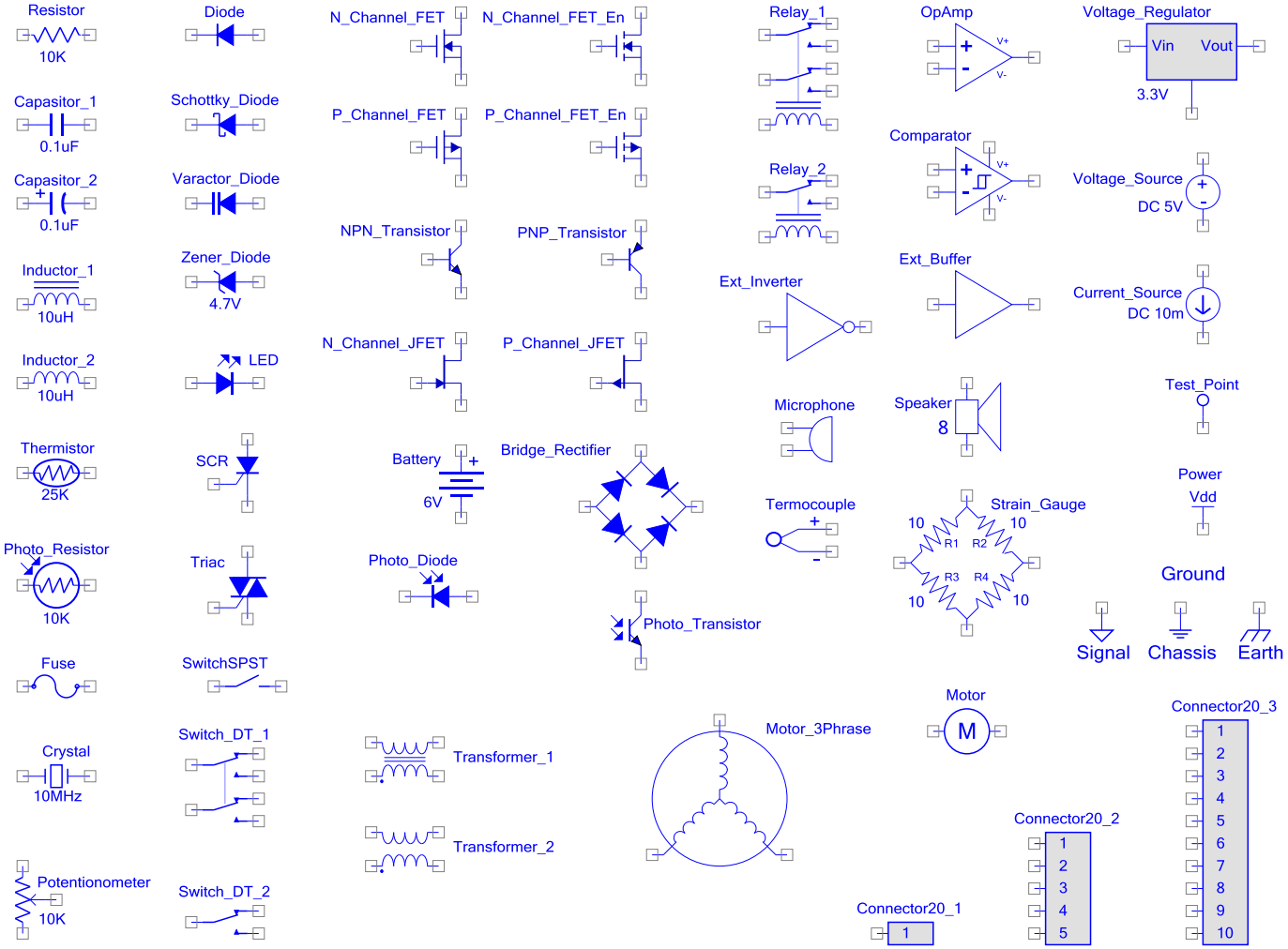
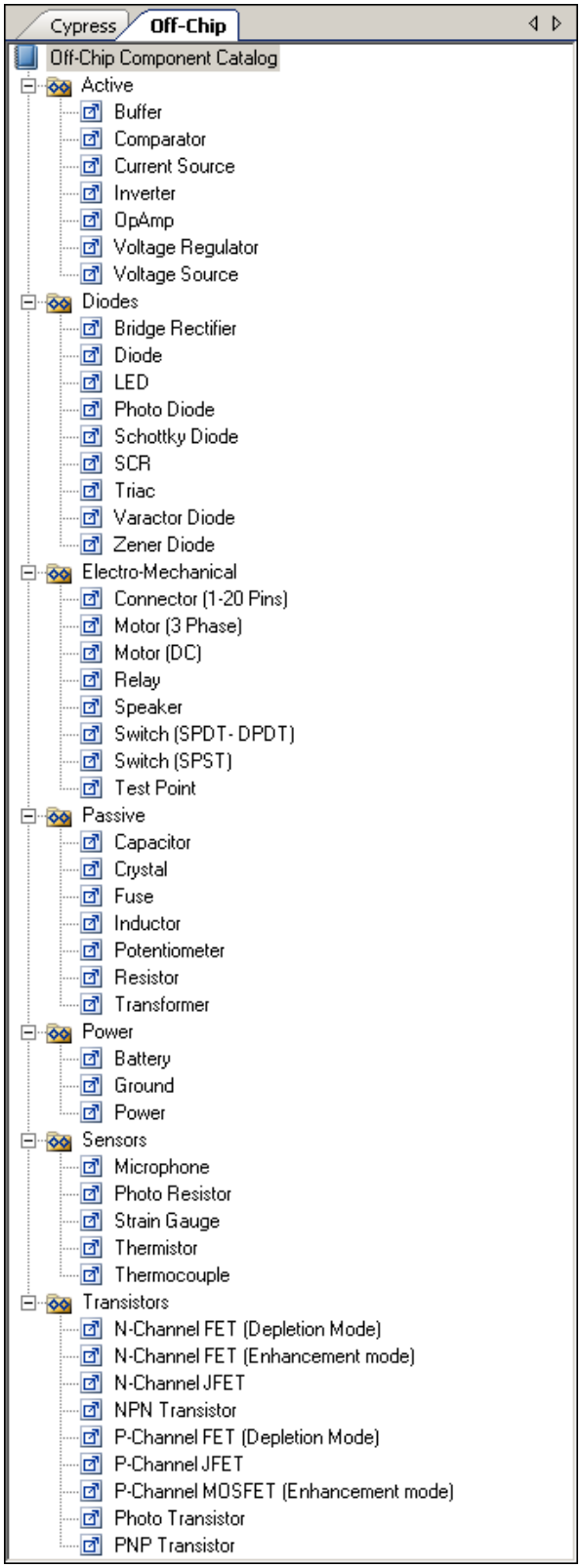
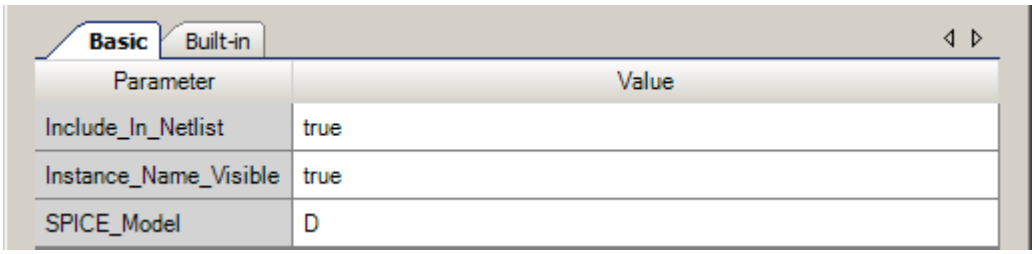


Figure 2. Placement in the Component Catalog



Common Component Parameters

Almost all external components have the following common parameters. If an external component has unique parameters, the descriptions are provided in the specific Component Parameters section.



Include_In_Netlist

This parameter is reserved for future use when the SPICE template is supported.

Instance_Name_Visible

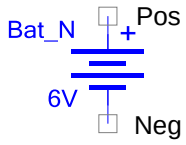
This parameter indicates whether the instance name is visible. If this parameter is set to **true** (default), the instance name is visible.

SPICE_Model

This parameter is reserved for future use when the SPICE template is supported.

Battery

Symbol Shape



Terminals

The terminals of the Battery component are:

- Pos – Positive battery terminal
- Neg – Negative battery terminal

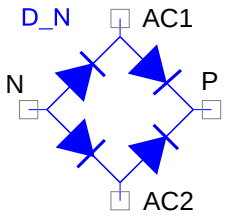
Component Parameters

Voltage

The **Voltage** parameter is displayed on the schematic next to the component. It will also be used for the SPICE template when that template is supported. Default **Voltage** value is **6V**.

Bridge Rectifier

Symbol Shape



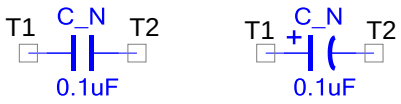
Terminals

The terminals of the Bridge Rectifier component are:

- P – Positive output of the rectifier terminal
- N – Negative output of the rectifier terminal
- AC1 – AC input terminal
- AC2 – AC input terminal

Capacitor

Symbol Shape



Terminals

The terminals of the Capacitor component are:

- T1 – Capacitor terminal (positive if polarized)
- T2 – Capacitor terminal (negative if polarized)

Component Parameters

Capacitance

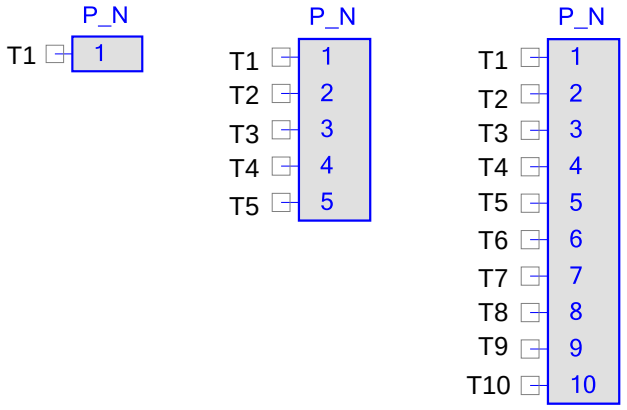
This parameter sets the capacitance of the capacitor. Default capacitance value is **0.1uF**.

Capacitor_Type

This parameter sets the type of the capacitor: **Polarized** or **Non-Polarized**. The default capacitor type is **Non-Polarized**.

Connector20

Symbol Shape



Terminals

The terminals of the Connector20 component are:

- T1 to T20 – Connector pins, up to 20 terminals

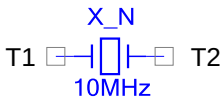
Component Parameters

Pin_Count

This parameter sets the number of available pins in the connector. This count can vary from 1 to 20. The default pin count is **5**.

Crystal

Symbol Shape



Terminals

The terminals of the Crystal component are:

- T1 – Crystal terminal 1
- T2 – Crystal terminal 2

Component Parameters

Value

This parameter sets the frequency of the crystal. Default frequency is **10MHz**.

Diode

Symbol Shape



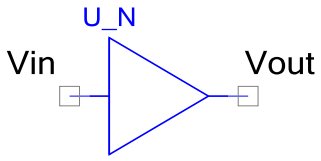
Terminals

The terminals of the Diode component are:

- A – Anode terminal
- K – Cathode terminal

ExtBuffer

Symbol Shape



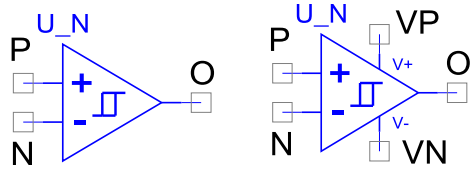
Terminals

The terminals of the Diode component are:

- Vin – Input terminal
- Vout – Output terminal

ExtComp

Symbol Shape



Terminals

The terminals of the Comparator component are:

- P – Non-Inverting input terminal

- N – Inverting input terminal
- O – Comparator output terminal
- VP (Label V+) – Positive supply terminal
- VN (Lable V-) – Negative supply terminal

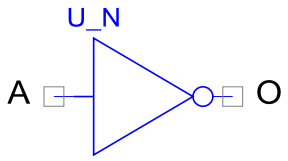
Component Parameters

Show_Power_Pins

This parameter is used to show power pins in the comparator. Setting this parameter to **true** shows the power pins. The default is **false**.

ExtInverter

Symbol Shape



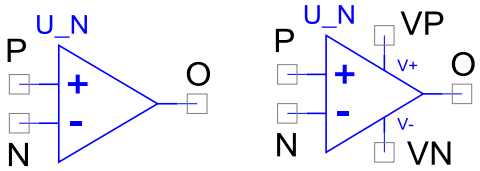
Terminals

The terminals of the Diode component are:

- A – Input terminal
- O – Output terminal

ExtOpAmp

Symbol Shape



Terminals

The terminals of the Opamp component are:

- P – Noninverting input terminal
- N – Inverting input terminal
- O – Opamp output terminal
- VP (Label V+) – Positive supply terminal
- VN (Label V-) – Negative supply terminal

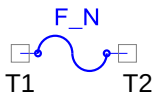
Component Parameters

Show_Power_Pins

This parameter is used to show power pins in the opamp. Setting this parameter to **true** shows the power pins. The default is **false**.

Fuse

Symbol Shape



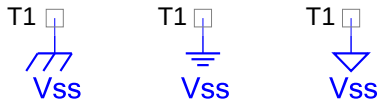
Terminals

The terminals of the Fuse component are:

- T1 – Fuse terminal 1
- T2 – Fuse terminal 2

GND

Symbol Shape



Terminals

The terminals of the Ground component are:

- T1 – Ground node connection terminal

Component Parameters

Supply_Name

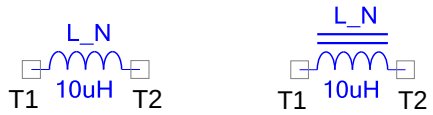
This parameter sets the ground name of the supply used. Default supply name is **Vss**.

Symbol_Type

This parameter sets the symbol type of the ground used: Signal Ground, Chassis Ground, or Earth Ground. Default symbol type is **Signal Ground**.

Inductor

Symbol Shape



Terminals

The terminals of the Inductor component are:

- T1 – Inductor terminal 1
- T2 – Inductor terminal 2

Component Parameters

Inductance

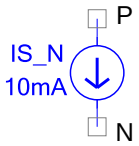
This parameter sets the inductance of the inductor used. The default is **10uH**.

Inductor Core

This parameter sets the type of the inductor core used: Iron Core or Air Core. The default is **Iron Core**.

Isource

Symbol Shape



Terminals

The terminals of the Current Source component are:

- P – Positive terminal
- N – Negative terminal

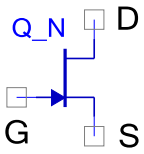
Component Parameters

Current

This parameter is used to set the current output of the current source. Default current value is **DC 10m**.

JFET_N

Symbol Shape



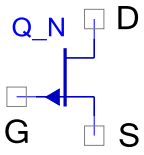
Terminals

The terminals of the Diode component are:

- D – Drain terminal
- S – Source terminal
- G – Gate terminal

JFET_P

Symbol Shape



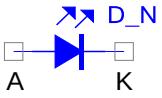
Terminals

The terminals of the Diode component are:

- D – Drain terminal
- S – Source terminal
- G – Gate terminal

LED

Symbol Shape



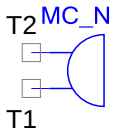
Terminals

The terminals of the LED component are:

- A – Anode terminal
- K – Cathode terminal

Microphone

Symbol Shape



Terminals

The terminals of the Microphone component are:

- T1 – Terminal 1
- T2 – Terminal 2

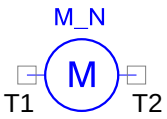
Component Parameters

Value

This parameter sets the resistance of the microphone in ohms. The default value is **10K**.

Motor

Symbol Shape



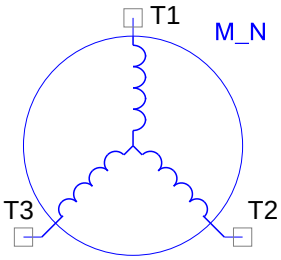
Terminals

The terminals of the Motor component are:

- T1 – Terminal 1
- T2 – Terminal 2

Motor3PH

Symbol Shape



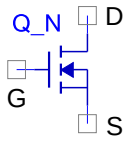
Terminals

The terminals of the Motor3PH component are:

- T1 – Terminal 1
- T2 – Terminal 2
- T3 – Terminal 3

NFET_En

Symbol Shape



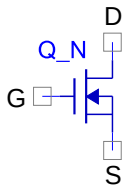
Terminals

This section describes the various terminals of the NFET_En component.

- D – Drain terminal
- S – Source terminal
- G – Gate terminal

NFET

Symbol Shape



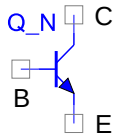
Terminals

The terminals of the NFET (Depletion Mode) component are:

- D – Drain terminal
- S – Source terminal
- G – Gate terminal

NPN Transistor

Symbol Shape



Terminals

The terminals of the NPN Transistor component are:

- E – Emitter terminal
- B – Base terminal
- C – Collector terminal

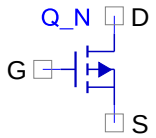
Component Parameters

Model

This parameter sets the model number of the transistor being used: 2N2222, 2N3904, FZT849, ZTX849, ZTX1048A, 2N4124, 2N3391A, 2N5089, 2N5210, 2N2219A, 2N4401, 2N5550, 2N2369, 2N5769, 2N3055. Default is **2N3391A.**

PFET_En

Symbol Shape



Terminals

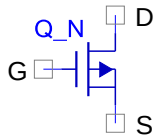
The terminals of the PFET_En component are:

- D – Drain terminal

- S – Source terminal
- G – Gate terminal

PFET

Symbol Shape



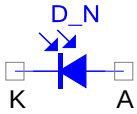
Terminals

The terminals of the PFET (Depletion Mode) component are:

- D – Drain terminal
- S – Source terminal
- G – Gate terminal

Photo Diode

Symbol Shape



Terminals

The terminals of the Photo Diode component are:

- A – Anode terminal
- K – Cathode terminal

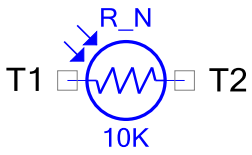
Component Parameters

Current

This parameter sets the maximum current that can be passed through the diode. The default value is **1mA**.

Photo Resistor

Symbol Shape



Terminals

The terminals of the Photo Diode component are:

- T1 – Terminal 1
- T2 – Terminal 2

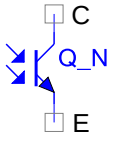
Component Parameters

Value

Sets the resistance. The default value is **10K**.

Photo Transistor

Symbol Shape



Terminals

The terminals of the Photo Transistor component are:

- E – Emitter terminal
- C – Collector terminal

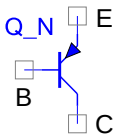
Component Parameters

Current

This parameter sets the maximum current that can be passed through the photo transistor. The default value is **10mA**.

PNP Transistor

Symbol Shape



Terminals

The terminals of the PNP Transistor component are:

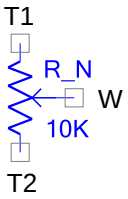
- E – Emitter terminal
- B – Base terminal
- C – Collector terminal

Component Parameters

This parameter sets the model number of the transistor being used: AN2907, 2N3906, 2N4126, 2N5087, 2N2905, 2N4403, 2N5401, 2N5771. Default is **AN2907**.

Potentiometer

Symbol Shape



Terminals

The terminals of the Potentiometer component are:

- T1 – Terminal 1(CW)
- T2 – Terminal 2(CW)
- W – Wiper terminal

Component Parameters

Value

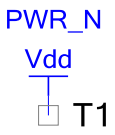
This parameter sets the resistance of the potentiometer in ohms. The default is **10K**.

Wiper_Position

This parameter sets the position of the wiper in potentiometer in range 0 to 100. The default is **50**.

Power

Symbol Shape



Terminals

The terminals of the Power component are:

- T1 – Power node connection terminal

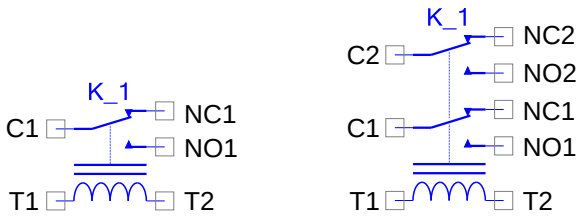
Component Parameters

Supply_Name

This parameter sets the name of the power supply used. The default is **Vdd**.

Relay

Symbol Shape



Terminals

The terminals of the Relay component are:

- T1 – Coil Terminal 1
- T2 – Coil Terminal 2
- C1 – Common terminal for pole 1
- NO1 – Normally open terminal for pole 1
- NC1 – Normally closed terminal for pole 1
- C2 – Common terminal for pole 2
- NO2 – Normally open terminal for pole 2
- NC2 – Normally closed terminal for pole 2

Component Parameters

Coil_Resistance

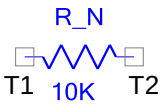
This parameter sets the resistance of the coil in relay. Default resistance value is **50 ohms**.

Relay_Type

This parameter sets the type of the relay used: SPDT or DPDT. Default relay type is **DPDT**.

Resistor

Symbol Shape



Terminals

The terminals of the Resistor component are:

- T1 – Terminal 1
- T2 – Terminal 2

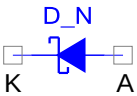
Component Parameters

Value

This parameter sets the resistance of the resistor used in ohms. Default resistance value is **10K**.

Schottky Diode

Symbol Shape



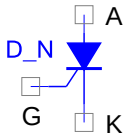
Terminals

The terminals of the Schottky Diode component are:

- A – Anode terminal
- K – Cathode terminal

SCR

Symbol Shape



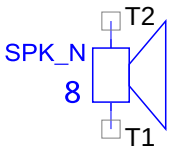
Terminals

The terminals of the SCR component are:

- A – Anode terminal
- K – Cathode terminal
- G – Gate terminal

Speaker

Symbol Shape



Terminals

The terminals of the Speaker component are:

- T1 – Terminal 1
- T2 – Terminal 2

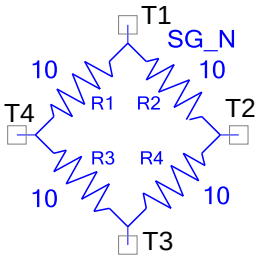
Component Parameters

Coil_Resistance

This parameter sets the coil resistance of the speaker in ohms. The default is **8**.

Strain Gauge

Symbol Shape



Terminals

The terminals of the StrainGauge component are:

- T1 – Top terminal
- T2 – Right terminal
- T3 – Bottom terminal
- T4 – Left terminal

Component Parameters

Resistance_R1

This parameter sets the resistance R1 in StrainGauge. Default value is **10**.

Resistance_R2

This parameter sets the resistance R2 in StrainGauge. Default value is **10**.

Resistance_R3

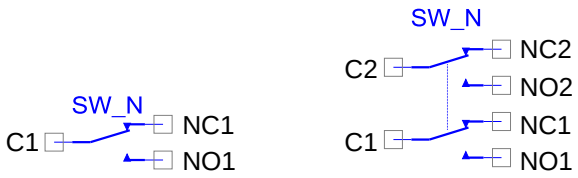
This parameter sets the resistance R3 in StrainGauge. Default value is **10**.

Resistance_R4

This parameter sets the resistance R4 in StrainGauge. Default value is **10**.

SwitchDT

Symbol Shape



Terminals

The terminals of the SwitchDT component are:

- C1 – Common terminal for pole 1
- NO1 – Normally open terminal for pole 1
- NC1 – Normally closed terminal for pole 1
- C2 – Common terminal for pole 2
- NO2 – Normally open terminal for pole 2
- NC2 – Normally closed terminal for pole 2

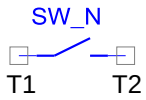
Component Parameters

Switch_Type

This parameter sets the type of switch used, **DPDT** or **SPDT**. The default is **DPDT**.

SwitchSPST

Symbol Shape



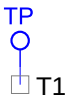
Terminals

The terminals of the SwitchSPST component are:

- T1 – Switch terminal 1
- T2 – Switch terminal 2

Test Point

Symbol Shape



Terminals

The terminals of the Test Point component are:

- T1 – Net node connection terminal

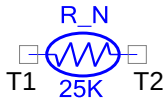
Component Parameters

Net_Name

This parameter sets the net name of the test point used. The default name is **TP**.

Thermistor

Symbol Shape



Terminals

The terminals of the Thermistor component are:

- T1 – Terminal 1
- T2 – Terminal 2

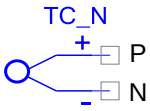
Component Parameters

Value

This parameter sets the resistance of the thermistor. The default is **25K**.

Thermocouple

Symbol Shape



Terminals

The terminals of the Thermocouple component are:

- P – Positive terminal
- N – Negative terminal

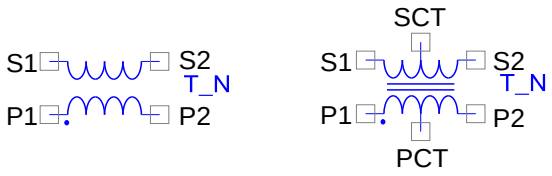
Component Parameters

Voltage

This parameter sets the voltage of the thermocouple. Default voltage is **10mV**.

Transformer

Symbol Shape



Terminals

The terminals of the Transformer component are:

- P1 – Primary winding terminal 1
- P2 – Primary winding terminal 2
- PCT – Primary winding center tap
- S1 – Secondary winding terminal 1
- S2 – Secondary winding terminal 2
- SCT – Secondary winding center tap

Component Parameters

Center_Tap

This parameter sets whether a center tap is present in the transformer. If this parameter is set to **false** (default), a center tap is absent.

Core_Type

This parameter sets the type of the core used in the transformer, **Iron Core** or **Air Core**. **Iron Core** is the default setting.

Primary Inductance

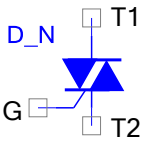
This parameter sets the inductance of the primary coil in the transformer. Default is **10uH**.

Secondary inductance

This parameter sets the inductance of the secondary coil in the transformer. Default is **10uH**.

Triac

Symbol Shape



Terminals

The terminals of the Triac component are:

- T1 – Terminal 1
- T2 – Terminal 2
- G – Gate terminal

Varactor

Symbol Shape



Terminals

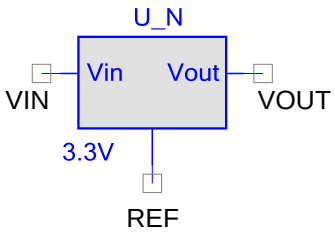
The terminals of the Varactor component are:

- A – Anode terminal

- K – Cathode terminal

VREG

Symbol Shape



Terminals

The terminals of the Voltage Regulator component are:

- VIN – Input Voltage terminal
- VOUT – Output Voltage terminal
- REF – Reference terminal

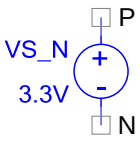
Component Parameters

Voltage

This parameter sets the regulated output voltage of the Voltage Regulator. Default value is **3.3V**.

VSource

Symbol Shape



Terminals

The terminals of the Voltage Source component are:

- P – Positive terminal
- N – Negative terminal

Component Parameters

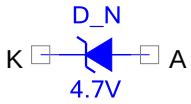
Voltage

This parameter sets the output voltage of the voltage source. Default is **DC 5V**.

Voltage source is not specific to AC or DC. You can specify Voltage source type using Voltage parameter. You can set value of Voltage parameter e.g. to "3V DC" or "3Vpp AC 1kHz" to specify AC or DC source.

Zener

Symbol Shape



Terminals

The terminals of the Zener Diode component are:

A – Anode terminal

K – Cathode terminal

Component Parameters

Voltage

This parameter sets the voltage of the Zener used in the circuit. Default Zener voltage value is **4.7V**.

Component Changes

Version	Change
Rev. *D	Minor datasheet edits.
Rev. *C	Minor datasheet edits.
Rev. *B	The word “Annotation” was changed to “External” and “Off-Chip” to reflect that these components do not implement actual functionality but do document the design on the context of the target board. The version of these components was not changed. Likewise, the library file name was not changed to maintain compatibility with previous versions of PSoC Creator.
	Added External Inverter, External Buffer, Photo Resistor, N-Channel and P-Channel JFETs components.
	Added list of available components with Component Catalog display name for each component.
	Added overview diagrams for each component and its placement in the Component Catalog.
	Moved Common Component Parameters to one section.

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