



# Application Guide

## Acronyms, Abbreviations & Symbols

### A

#### A

• **Symbol for:**

- ampere
- gain
- area

#### a

• **Abbreviation of:**

- atto (quintillionth), 10<sup>-18</sup>
- area
- acceleration

#### ac (AC)

- alternating current
- activated carbon

#### AEA

- American Engineering Association
- American Electronic Association

#### AF

- audio frequency

#### AFE

- analog front end

#### Ah

- ampere hour (amp hr also used)

#### AI

- artificial intelligence

#### AIEE

- American Institute of Electrical Engineers

#### ALVT

- advanced low voltage technology

#### amp

- ampere

#### AMT

- advanced manufacturing technology

#### ANSI

- American National Standards Institute



#### APEC

- advanced process equipment control

#### APM

- advanced power management

#### AQL

- acceptable quality level

#### ASCII

- American Standard Code for Information Interchange

#### ASIC

- all purpose symbolic instruction code
- application specific intergrated circuit

#### ASME

- American Society of Mechanical Engineers

#### ASQ

- American Society for Quality



#### ASSP

- application specific standard product

#### ASTM

- American Society for Testing and Materials



#### AT

- ampere turn

#### ATE

- automatic test equipment

#### ATG

- automatic test generation

#### AWG

- American wire guage
- arbitrary waveform generator

### B

#### B

• **Abbreviation of:**

- battery (BA & BAT are also used)

• **Symbol for:**

- bel
- susceptance
- flux density (magnetic field)
- base (of a transistor)

#### BABT

- British Approvals Board for Telecommunications



#### BBM

- break-before-make

Go Direct - For Product, Performance and Price

# MicroPower Direct



**BCI**

- Battery Council International

**BGA**

- ball grid array

**BI**

- backplane interconnect
- bus interconnect
- burn in

**BIPM**

- Bureau International des Poids et Mesures (International Bureau of Weights and Measures)

**BSI**

- British Standards Institute



**BTU**

- British thermal unit

**BV**

- breakdown voltage

**BW**

- band width



**C**

- **Abbreviation of:**
  - capacitance
  - Celsius
  - calorie
- **Symbol for:**
  - coulomb
  - carbon
  - collector (of a transistor)

**c**

- **Abbreviation of:**
  - centi (hundredth), 10<sup>-2</sup>
- **Symbol for:**
  - capacitance

**CAD**

- computer aided design

**CAM**

- computer aided manufacturing

**CAT**

- computer aided test

**CE**

- Certified Europe



**CC/VL**

- constant current / voltage limited power supply

**CEI**

- conducted electromagnetic interference

**CEN**

- Comité Européen de Normalisation (European Committee for Standardization)

**CFA**

- component failure analysis

**CID**

- computer integrated design

**CIE**

- computer integrated engineering

**CIM**

- computer integrated manufacturing

**CIP**

- continuous improvement program

**CIPM**

- Comité International des Poids et Mesures (International Bureau of Weights and Measures)

**CISPR**

- Comité International Spécial des Perturbations Radioélectriques (International special committee on Radio Interference)

**CISTI**

- Canadian Institute for Scientific and Technical Information

**Cm**

- centimeter

**CMOS**

- complementary metal-oxide semiconductor

**CMRR**

- common-mode rejection ratio

**CMV**

- common mode voltage

**COTS**

- commercial off the shelf

**CPS**

- cycles per second
- characters per second

**CQI**

- continuous quality improvement

**CSA**

- Canadian Standards Association



**CSIC**

- customer specific integrated circuit

**CT**

- cycle time

**CTE**

- coefficient of thermal expansion

**CW**

- continuous wave



**d**

- **Abbreviation of:**
  - deci (tenth), 10<sup>-1</sup>
  - degree
  - diameter
- **Symbol for:**
  - differential

**dA**

- differential of area

**da**

- deka (ten)

**DC**

- direct current
- direct coupled

**DCL**

- dynamic load characteristic

**dE**

- differential of voltage

**deg**

- degree

**DFM**

- design for manufacturability

**DFR**

- design for reliability

**DFT**

- design for test

**dl**

- differential of current

**DIA**

- diameter

**DIL**

- dual in line

**DIN**

- Deutsches Institut für Normung e. V. (German Institute for Standardization)



**DIP**

- dual-inline-package

**DK**

- dielectric constant

- DMM**
  - digital multimeter
- dP**
  - differential of power
- DPM**
  - digital panel meter
- dT**
  - differential of temperature
  - dynamic test
- DUT**
  - device under test
- dV**
  - differential of voltage
- DVM**
  - digital volt meter
- dZ**
  - differential of impedance

# E

- E**
  - **Symbol for:**
    - voltage
    - emitter (of transistor)
    - energy
- e**
  - **Abbreviation of:**
    - exa (quintillion),  $10^{18}$
  - **Symbol for:**
    - electron charge

- ECO**
  - engineering change order

- EIA**
  - Electronic Industries Alliance



- EDI**
  - electronic data interchange

- EFI**
  - electromechanical frequency interference

- EMC**
  - electromagnetic compatibility

- EMF**
  - electromotive force

- EMI**
  - electromagnetic interference

- EMP**
  - electromagnetic power

- EOL**
  - end of life

- ESD**
  - electrostatic discharge
- ESI**
  - electrostatic interference
- ESL**
  - equivalent series inductance
- ESR**
  - equivalent series resistance
- ESS**
  - environmental stress screening
  - electronic switched systems
- eV**
  - electron volt

# F

- F**
  - **Abbreviation of:**
    - Fahrenheit
    - Farad
  - **Symbol for:**
    - force
    - fuse
- f**
  - **Abbreviation of:**
    - femto (quadrillionth),  $10^{-15}$
  - **Symbol for:**
    - frequency
    - function

- FA**
  - failure analysis

- FCS**
  - factory control system

- FE**
  - ferroelectric

- FCC**
  - Federal Communications Commission



- FIFO**
  - first in first out

- fp**
  - freezing point

- fpm**
  - feet per minute

- fps**
  - feet per second
  - foot-pound-second (British system of units)

- FRACA**
  - failure reporting analysis and corrective action

## Industry Standard Pin-Outs! Industry Leading Performance!

Don't put up with long delivery times, high prices, and poor service. Call **MPD**, the reliable source for low cost, high performance, AC/DC and DC/DC power products. Some new product families include:

### 25W Output!

#### F2500RW

This series offers up to 25% more power than competing units. Features include:



- 25W - 30W
- 18 Models
- 1MH MTBF
- 2 x 1.6" Case
- Meets EN55022
- Remote On/Off
- **Standard Pin-Out**

### 1" x 2" Case!

#### B2000RW



This series combines very compact size, high output power and low cost. Features include:

- 20W
- 1 x 2" Case
- >800 KH MTBF
- 2:1 Input Range
- Meets EN55022
- Remote On/Off
- **Standard Pin-Out**

### 2:1 Input!

#### D200RW

This 2W series provides miniature SIP packaging and many high performance features including:



- 2W
- 2:1 Input Range
- -40C to +85C
- SIP Package
- Tight Regulation
- Remote On/Off
- **Standard Pin-Out**

**MPD** offers nearly 2,000 standard, high performance power supplies.

All products are offered at the lowest cost possible. Got a problem? Call now for a quote on the "plug-in" equivalent product from **MPD**.

See Us On The WEB  
[www.micropowerdirect.com](http://www.micropowerdirect.com)



**FW**

- full wave

**FS**

- full scale



**G**

- **Abbreviation of:**
  - giga (Billion),  $10^9$
  - gauss
- **Symbol for:**
  - conductance
  - gravitational constant
  - generator
  - gate (of a semiconductor)

**g**

- **Abbreviation of:**
  - gram (gm also used)
- **Symbol for:**
  - gravity

**gen**

- generator

**gnd**

- ground

**gm**

- gram

**gr**

- grain

**GPIB**

- general purpose interface bus

**GUI**

- graphical user interface



**H**

- **Abbreviation of:**
  - heater
- **Symbol for:**
  - henry
  - magnetizing force
  - magnetic field strength
  - harmonic
  - hydrogen

**h**

- **Abbreviation of:**
  - hecto (hundred),  $10^2$
  - hour
- **Symbol for:**
  - height

**HALT**

- highly accelerated life testing

**HASS**

- highly accelerated stress screening

**HAST**

- highly accelerated stress testing

**HF**

- high frequency

**hipot**

- high potential

**hr**

- hour

**HV**

- high voltage

**Hz**

- Hertz



**I**

- **Symbol for:**
  - current

**i**

- **Symbol for:**
  - instantaneous value

**IC**

- integrated circuit
- internal connection

**ICE**

- in circuit Emulator

**ICT**

- in circuit test

**IEC**

- International Electro-technical Commission



**IEEE**

- Institute of Electrical and Electronic Engineers

**IF**

- intermediate frequency

**in**

- input
- inches

**INV**

- inverter

**I/O**

- input/output

**IPMC**

- industrial process measurement and control

**IR**

- insulation resistance

**ISO**

- International Organization for Standards



**J**

- **Symbol for:**
  - joule
  - emissive power
  - jack

**JEDEC**

- Joint Electron Device Engineering Council

**JIT**

- just in time



**K**

- **Symbol for:**
  - kelvin
  - general symbol for constant

**k**

- **Abbreviation of:**
  - kilo (thousand),  $10^3$
- **Symbol for:**
  - dielectric constant



**L**

- **Abbreviation of:**
  - low
- **Symbol for:**
  - inductance

**l**

- **Abbreviation of:**
  - lumen (lm and lum also used)
- **Symbol for:**
  - length

**lb**

- pound

**LCD**

- liquid-crystal display

**LED**

- light-emitting diode

## LFM

- linear feet per minute

## LIF

- low insertion force

## log

- logarithm

## LSI

- large scale integration

# M

## M

- **Abbreviation of:**
  - Mega (Million),  $10^6$
- **Symbol for:**
  - mutual inductance

## m

- **Abbreviation of:**
  - milli (thousandth),  $10^{-3}$
  - meter
  - mile (mi also used)
- **Symbol for:**
  - mass
  - modulation coefficient

## MA

- magnetic amplifier

## max

- maximum

## min

- minimum

## MLB

- multi layer board

## MOS

- metal-oxide semiconductor

## MTBF

- mean time between failure

## MTTF

- mean time to failure

## MTTR

- mean time to repair

# N

## N

- **Abbreviation of:**
  - number (No also used)
- **Symbol for:**
  - number
  - nitrogen
  - newton

## n

- **Abbreviation of:**
  - nano (billionth),  $10^{-9}$
- **Symbol for:**
  - symbol for a term with an assigned value

## NA (N/A)

- not available
- not applicable

## NC (N/C)

- no connection

## ND

- non destructive test

## NEMA

- National Electrical Manufacturers Association



## NG

- no good

## NP (N/P)

- no pin

## NRE

- nonrecurring engineering

## NTC

- negative temperature coefficient

# O

## O

- **Abbreviation of:**
  - output
- **Symbol for:**
  - oxygen

## o

- **Symbol for:**
  - output (out also used)
  - origin

## OAT

- operating ambient temperature

## OCV

- open circuit voltage

## OEM

- original equipment manufacturer

## OI

- opto isolator

## OVP

- overvoltage protection

## OTS

- off the shelf

# P

## P

- **Abbreviation of:**
  - pressure
  - peta (quadrillion),  $10^{15}$
- **Symbol for:**
  - power
  - permeance

## p

- **Abbreviation of:**
  - pico (trillionth),  $10^{-12}$
  - pound

## par

- parallel

## PARD

- periodic and random deviation

## PCB

- printed circuit board

## PF

- power factor

## PFC

- power factor correction

## PIV

- peak inverse voltage

## pos

- positive

## pot

- potentiometer
- potential

## ppb

- parts per billion

## ppm

- parts per million
- pulses per minute

## ppt

- parts per thousand

## pri

- primary

## ps

- power supply

## PSRR

- power supply rejection ratio

## PTC

- positive temperature coefficient

## PWM

- pulse width modulation
- pulse width modulator

**pwr**  
 • power

# Q

**Q**  
 • **Symbol for:**  
 • electrical charge

**q**  
 • **Symbol for:**  
 • quantity of electricity (in coulombs)

**QA**  
 • quality assurance

**QC**  
 • quality control

**QCL**  
 • qualified component list

**QIS**  
 • quality information system

**QCL**  
 • qualified component list

**QoS**  
 • quality of service

**QPL**  
 • qualified product list

**QVL**  
 • qualified vendor list

# R

**R**  
 • **Symbol for:**  
 • resistance

**r**  
 • **Abbreviation of:**  
 • radius

**rac**  
 • rectified alternating current

**RC**  
 • remote control  
 • resistance capacitance

**R&D**  
 • research and development

**rect**  
 • rectifier (rectification)

**ref**  
 • reference

**res**  
 • resistance

**RFI**  
 • radio frequency interference

**RT**  
 • room temperature

**RY**  
 • relay

# S

**S**  
 • **Abbreviation of:**  
 • sine

• **Symbol for:**  
 • switch  
 • secondary

**s**  
 • **Abbreviation of:**  
 • second

• **Symbol for:**  
 • distance (or displacement)  
 • standard deviation

**sat**  
 • saturate

**sec**  
 • second  
 • secondary

**SELV**  
 • safety extra low voltage

**ser**  
 • series  
 • serial

**SIC**  
 • Standard Industrial Classification

**sig**  
 • signal

**SIP**  
 • single inline package

**SMC**  
 • surface-mount components

**SMD**  
 • surface-mount devices

**SMPS**  
 • switch-mode power supply

**SMT**  
 • surface-mount technology

**SPC**  
 • statistical process control

**SPS**  
 • samples per second

**spec**  
 • specification

**RFQ**  
 • request for quote

**rh**  
 • relative humidity

**RMA**  
 • returned material authorization

**rms**  
 • root mean square

**RoHS**  
 • Restriction of Hazardous Substances

**ROW**  
 • rest of the world

**rpm**  
 • revolutions per minute

**rps**  
 • revolutions per second

**RS**  
 • recommended standard

**rps**  
 • revolutions per second

**GO DIRECT For The Lowest Cost Power Converters!**

Don't bust your budget on expensive power conversion products. Go direct, **MicroPower Direct**, for our new "Budget Saver" product families. These high performance DC/DC converters offer a unique combination of economy, product selection, and field reliability. Standard features available include:

- **1W to 10W Output Power** **A800ERW**
- **Miniature Packaging** **New 8W DIP!**
- **Regulated & Unregulated Models**
- **Input/Output Isolation**
- **Industry Standard Pin-Out**

Got a problem? Tight budget? Check out our extensive line of standard power converters then call for a surprisingly fast and low cost quotation from **MPD**.

**MicroPower Direct**

TEL: (781) 344-8226 FAX: (781) 344-8481  
 WEB: www.micropowerelectronics.com  
 E-Mail: sales@micropowerelectronics.com



## SQC

- statistical quality control

## std

- standard

## STP

- shielded twisted pair

## STRIFE

- stress and life (testing)

## SVP

- surge voltage protector

## sync

- synchronizing signal

## sym

- symmetrical

## sys

- system

# T

## T

- **Abbreviation of:**
  - Tera (trillion),  $10^{12}$
  - ton (also t and tn)
- **Symbol for:**
  - transformer
  - period (time)
  - true (logic)

## t

- **Abbreviation of:**
  - target
  - tension
- **Symbol for:**
  - time

## Ta

- tantalum

## TCE

- temperature coefficient of expansion
- thermal coefficient of expansion

## THD

- total harmonic distortion

## THE

- Technical Help to Exporters

## TQ

- total quality

## TQC

- total quality control

## TUV

- Technischer Überwachungsverein (Technical Inspection Association)



# U

## U

- **Abbreviation of:**
  - unit
- **Symbol for:**
  - universal set

## UL

- Underwriters Laboratories

## UPS

- uninterruptible power supply

## UTP

- unshielded twisted pair

# V

## V

- **Abbreviation of:**
  - volt
- **Symbol for:**
  - voltage
  - reluctance

## v

- **Abbreviation of:**
  - velocity
  - vector

## VA

- volt-ampere

## VAC

- vacuum
- volts alternating current

## VD

- voltage drop

## VDC

- volts direct current

## VDE

- Verband der Elektrotechnik, Elektronik und Informationstechnik (Association for Electrical, Electronic & Information Technologies)

## VFO

- variable-frequency oscillator

## VHF

- very high frequency

## VHR

- very high resistance

## VHSIC

- very high speed IC

## VLSI

- very-large-scale integration



# W

## W

- **Abbreviation of:**
  - Watt
  - width
- **Symbol for:**
  - energy
  - work

## w

- **Abbreviation of:**
  - weight (wt also used)

## WG

- wire gauge

## WH

- watt-hour

## WIP

- work in progress

## ww

- wirewound

# X

## X

- **Symbol for:**
  - reactance
  - no connection
  - unknown quantity

## Xc

- capacitive reactance

## Xl

- inductive reactance

# Y

## Y

- **Symbol for:**
  - admittance

## y

- **Abbreviation of:**
  - year (yr also used)
  - yard (yd also used)

# Z

## Z

- **Symbol for:**
  - impedance

## z

- **Abbreviation of:**
  - zero
  - zone

# Go Direct For: Product Performance & Price

At **MicroPower Direct** we have the product you need at the best price and right performance level. With nearly 2,000 standard DC/DC converter models and thousands of standard enclosed & open frame AC/DC power supplies, one is sure to offer the right solution for your application. New product families include:

### A800ERW!

Low Cost 8W DIP  
This "Budget Saver" offers miniature size, high performance & low cost. Features include:

- 8W Output Power
- 1.5 kV I/O Isolation
- 2:1 Input Range
- Miniature DIP Case
- Standard Pin-Outs
- Single /Dual Outputs
- **Lowest Cost**



### AC/DC Power Supplies!

**MPD** offers a full line of enclosed & open frame AC/DC power supplies. Ranging from 10W to 300W, these compact supplies meet international standards while offering a wide selection of models and low cost. Features include:

- 10W to 300W
- 1 to 4 Outputs
- Universal AC Input
- Meet EN60950
- Meet EN55022 B
- Compact Size
- **Low Cost**

### B3000RW!

30W in 1 x 2" Case  
**MPD** offers a wide variety of low cost standard DC/DC converters. These units offer many high performance features including:

- 30W Output Power
- 2:1 Input
- 1" x 2" x 0.4" Case
- 1.5 kV I/O Isolation
- RoHS Compliant
- Meet EN60950
- **Industry Standard Pin-Outs**



**MPD** offers one of the widest selections of standard AC/DC and DC/DC power supplies in the industry. *All are offered at the lowest cost possible.*

When you need Power Supplies?

Go Direct!

[www.micropowdirect.com](http://www.micropowdirect.com)



See Us On The WEB!!

# SYMBOLS

## A

- Ampere

## a

- alpha (lowercase) current gain of a common base bipolar transistor stage

## β

- beta (lowercase) current gain of a common emitter bipolar transistor stage

## Δ

- Delta (upper case) A change or differential in measured values

## δ

- Delta (lower case) deflection

## E

- voltage

## ε

- electromotive force

## η

- eta (lower case) efficiency

## Γ

- gamma (upper case) gamma function

## γ

- gamma (lower case) angle

## I

- current

## Λ

- lambda (upper case) equivalent conductivity

## λ

- lambda (lower case) wavelength

## ν

- nu (lower case) reluctivity

## μ

- mu (lowercase) micro

## Ω

- omega (uppercase) ohms

## ω

- omega (lowercase) angular velocity

## Φ

- phi (uppercase) magnetic flux

## φ or ϕ

- phi (lowercase) angle

## π

- Pi (lower case) mathematical constant Pi

## ψ

- psi (lower case) phase difference

## ρ

- rho (lower case) thermal resistivity

## σ

- sigma (lower case) conductivity

## τ

- Tau (lower case) torque, time constant in an RC circuit

## Θ

- theta (upper case) phase angle

## θ

- theta (lower case) thermal resistance

## W

- watt

## X

- Chi (lower case) electric susceptibility, magnetic susceptibility

## Z

- impedance

