Symbols

Arrangement of Symbols

Letter symbols for current, voltage and power
(according to DIN 41 785, sheet 1)
To represent current, voltage and power, a system of basic letter symbols are used. Capital letters are used for the representation of peak, mean, dc or root-mean-square values. Lower case letters are used for the representation of instantaneous values which vary with time.

Capital letters are used as subscripts to represent continuous or total values, while lower case letters are used to represent varying values.

The following table summarizes the rules given above.

Basic letter	
Upper-case	Upper-case
Instantaneous values which vary with time	Maximum (peak) average (mean) continuous (dc) or root-mean-square (RMS) values

Subscript(s)	
Upper-case	Upper-case
Varying component alone,i.e.,instantaneous, root-mean-square, maximum or average values	Continuous (without signal) or total (instantaneous, average or maximum) values

Letter symbols for impedance, admittances, two-port parameters etc.

For impedance, admittance, two-port parameters, etc., capital letters are used for the representation of external circuits of which the device is only a part.

Lower case letters are used for the representation of electrical parameters inherent in the device.

The rules are not valid for inductance and capacitance. Both these quantities are denoted with capital letters.

Capital letters are used as subscripts for the designation of static (dc) values, while lower case letters are used for the designation of small-signal values.

If more than one subscript is used (h_{FE}, h_{fe}), the letter symbols are either all capital or all lower case.

If the subscript has numeric (single, double, etc.) as well as letter symbol(s) (such as h_{21E} or h_{21e}), the differentiation between static and small-signal value is made only by a subscript letter symbol.

Other quantities (values) which deviate from the above rules are given in the list of letter symbols.

The following table summarizes the rules given above.

Basic letter	
Upper-case	Upper-case
Electrical parameters inherent in the semiconductor devices except inductances and capacitances	Electrical parameters of external circuits and of circuits in which the semiconductor device forms only a part; all inductances and capacitances

Subscript(s)	
Upper-case	Upper-case
Small-signal values	Static (dc) values

Examples:

R_G	Generator resistance
G_P	Power gain
h_{FE}	DC forward current transfer ratio in common emitter configuration
r_P	Parallel resistance, damping resistance

Example for the use of Symbols

according to 41785 and IEC 148
b) Diode

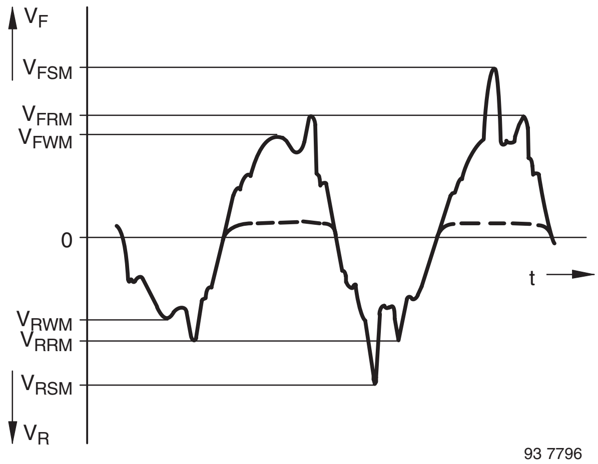

Figure 1.

V_F	Forward voltage
V_R	Reverse voltage
V_{FSM}	Surge forward voltage (non-repetitive)
V_{RSM}	Surge reverse voltage (non-repetitive)
V_{FRM}	Repetitive peak forward voltage
V_{RRM}	Repetitive peak reverse voltage
V_{FWM}	Crest working forward voltage
V_{RWM}	Crest working reverse voltage

List of Symbols

A	Anode
a	Distance (in mm)
C	Capacitance, general
C_{case}	Case capacitance
C_D	Diode capacitance
C_i	Junction capacitance
C_L	Load capacitance
C_P	Parallel capacitance
F	Noise figure
f	Frequency
f_g	Cut-off-frequency
I_F	Forward current
i_F	Forward current, instantaneous total value
I_{FAV}	Average forward current, rectified current
I_{FRM}	Repetitive peak forward current
I_{FSM}	Surge forward current, non-repetitive
I_{FWM}	Crest working forward current
I_R	Reverse current
i_R	Reverse current, instantaneous total value
I_{RAV}	Average reverse current
I_{RRM}	Repetitive peak reverse current
I_{RSM}	Non-repetitive peak reverse current
I_{RWM}	Crest working reverse current
I_S	Supply current
I_Z	Z-operating current
I_{ZM}	Z-maximum current
l	Length (in mm), (case-holder/soldering point)
LOCEP	(local epitaxy)

A registrated trade mark of Vishay for a process ofepitaxial deposition on silicon. Applications occur in planer Z-diodes. It has an advantage compared to the normal process, with reduced reverse current.

P	Power
P_{tot}	Total power dissipation
P_V	Power dissipation, general
P_{vp}	Pulse-power dissipation
Q	Quality
Q_{rr}	Reverse recovery charge
R_F	Forward resistance
r_f	Differential forward resistance
R_L	Load resistor
r_P	Parallel resistance, damping resistance
R_R	Reverse resistance
r_r	Differential reverse resistance
r_s	Series resistance
R_{thJA}	Thermal resistance between junction and ambient
R_{thJC}	Thermal reistance between junction and case
r_z	Differential Z-resistance in breakdown region (range) rz = rzj + rzth
r_{zj}	Z-resistance at constant junction temperature, inherent Z-resistance
r_{zth}	Thermal part of the Z-resistance
T	Temperature, measured in centigrade
T	Absolute temperature, Kelvin temperature
T	Period duration
T_{amb}	Ambient temperature (range)
T_{case}	Case temperature
t_{fr}	Forward recovery time
T_j	Junction temperature
T_K	Temperature coefficient
T_L	Connecting lead temperature in the holder (soldering point) at the distance/(mm) from case
t_P	Pulse duration (time)
t_p/T	Duty cycle
t_r	Rise time
t_{rr}	Reverse recovery time
t_s	Storage time
T_{sd}	Soldering temperature
T_{stg}	Storage temperature (range)
$V_{(BR)}$	Breakdown voltage
V_F	Forward voltage
V_F	Forward voltage, instantaneous total value
V_{FAV}	Average forward voltage
V_o	Rectified voltage
V_{FSM}	Surge forward voltage, non-repetitive
V_{FRM}	Repetitive peak forward voltage
V_{FWM}	Crest working forward voltage
V_R	Reverse voltage
V_R	Reverse voltage, instantaneous total value
V_{RSM}	Surge reverse voltage, non-repetitive
V_{RRM}	Repetitive peak reverse voltage
V_{RWM}	Crest working reverse voltage
V_Z	Z-operating voltage
Z_{thp}	Thermal resistance – pulse operation
η_r	Rectification efficiency
ΔC_D	Capacitance deviation