

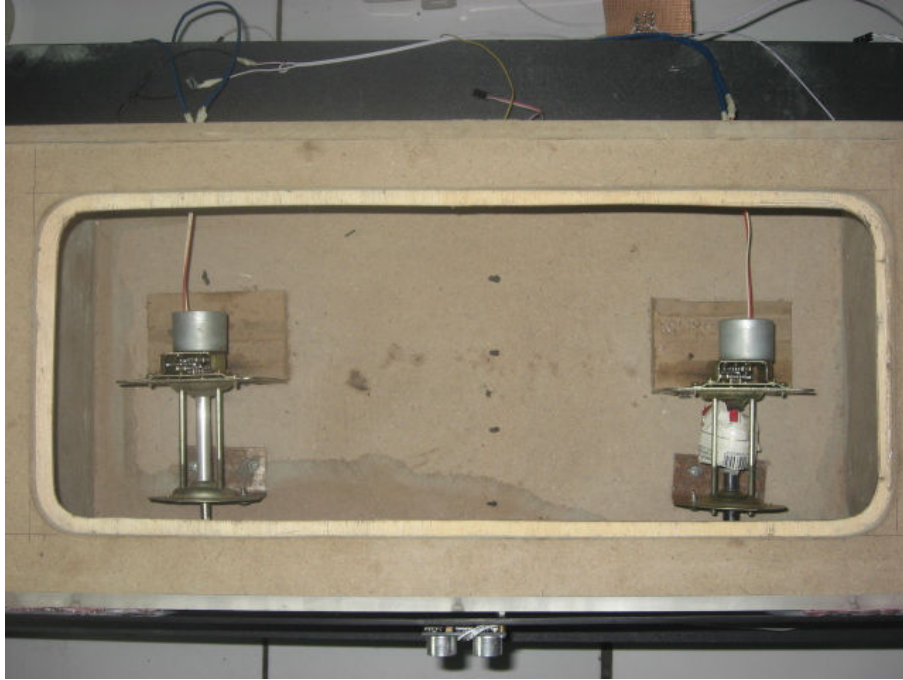
**LAMPIRAN A**

**FOTO PROTOTYPE PINTU GESER OTOMATIS**

## TAMPAK DEPAN



## TAMPAK ATAS



## TAMPAK SAMPING



**LAMPIRAN B**  
**PROGRAM PADA MIKROKONTROLER**  
**ATMEGA16**

## PROGRAM UTAMA

/\*\*\*\*\*\*

This program was produced by the  
CodeWizardAVR V2.03.3 Evaluation  
Automatic Program Generator  
Date : 28/1/2010  
Author : Freeware, for evaluation and non-commercial use only  
Chip type : ATmega16  
Program type : Application  
Clock frequency : 11.059200 MHz  
Memory model : Small  
External RAM size : 0  
Data Stack size : 512

\*\*\*\*\*/

\$regfile = "m16def.dat" ' specify the used micro  
\$crystal = 16000000 ' used crystal frequency

Config Porta = Output ' Port A = Output  
Config Portb = Output ' Port B = Output  
Config Portc = Output ' Port C = Output  
Config Portd = Output ' Port D = Output

Config Timer1 = Pwm , Pwm = 10 , Compare A Pwm = Clear Down , Compare B Pwm = Clear Down , Prescale = 1  
' Timer 1 = PWM 10 bit  
Config Lcdpin = Pin , Db4 = Portc.2 , Db5 = Portc.3 , Db6 = Portc.4 , Db7 = Portc.5 , E = Portc.1 , Rs = Portc.0 ' LCD = Port C  
Config Lcd = 16 \* 2 ' Jenis LCD  
Config Adc = Single , Prescaler = Auto , Reference = Internal

Dim X As Single  
Dim Count As Word ' Penghitung Jarak Ultrasonic  
Dim Jarak\_ultra As Single  
Dim Pwma As Word  
Dim Pwmb As Word  
Dim C As Word  
Dim B As Word  
Dim D As Single  
Dim Mati As Word  
Dim Irda As Word  
Dim Z As Word

Irda = 0  
Pwma = 0  
Pwmb = 0  
X = 1.4878  
Count = 0

```
//=====PROGRAM UTAMA=====
```

```
Cls  
Lcd "pintu ajaib"  
Lowerline  
Lcd "-->starting<--"  
Wait 1
```

```
Main:
```

```
  Gosub Baca_ultra
```

```
  If Jarak_ultra <= 75 Then
```

```
    If Jarak_ultra <= 71 Then
```

```
      If Jarak_ultra <= 67 Then
```

```
        If Jarak_ultra <= 63 Then
```

```
          If Jarak_ultra <= 59 Then
```

```
            If Jarak_ultra <= 55 Then
```

```
              If Jarak_ultra <= 51 Then
```

```
                If Jarak_ultra <= 47 Then
```

```
                  If Jarak_ultra <= 43 Then
```

```
                    If Jarak_ultra < 39 Then
```

```
                      If Jarak_ultra <= 35 Then
```

```
                        If Jarak_ultra <= 31 Then
```

```
                          If Jarak_ultra <= 27 Then
```

```
                            If Jarak_ultra <= 23 Then
```

```
                              If Jarak_ultra <= 19 Then
```

```
                                If Jarak_ultra <= 15 Then
```

```
                                  If Jarak_ultra <= 11 Then
```

```
                                    If Jarak_ultra <= 7 Then
```

```
                                      If Jarak_ultra <= 6 Then
```

```
                                        If Jarak_ultra <= 5 Then
```

```
                                          Pwma = 700     'motor kanan
```

```
                                          Pwmb = 660
```

```
                                          B = Jarak_ultra
```

```
                                          Gosub Motor
```

```
                                          Gosub Cek_irda
```

```
                                        Else
```

```
                                          Pwma = 750
```

```
                                          Pwmb = 710
```

```
                                          B = Jarak_ultra
```

```
                                          Gosub Motor
```

```
                                          Gosub Cek_irda
```

```
                                        End If
```

```
                            Else
```

```
                              Pwma = 800
```

```
                              Pwmb = 760
```

```
                              B = Jarak_ultra
```

```
                              Gosub Motor
```

```
                          End If
```

```
          Else
```

```

        Pwma = 880
        Pwmb = 840
        B = Jarak_ultra
        Gosub Motor

    End If
Else
    Pwma = 1023
    Pwmb = 980
    B = Jarak_ultra
    Gosub Motor

End If

Else
    Pwma = 983
    Pwmb = 943
    B = Jarak_ultra
    Gosub Motor

End If
Else
    Pwma = 964
    Pwmb = 924
    B = Jarak_ultra
    Gosub Motor
End If
Else
    Pwma = 935
    Pwmb = 795
    B = Jarak_ultra
    Gosub Motor

End If

Else
    Pwma = 906
    Pwmb = 866
    B = Jarak_ultra
    Gosub Motor

End If

Else
    Pwma = 877
    Pwmb = 837
    B = Jarak_ultra
    Gosub Motor

End If
Else
    Pwma = 858
    Pwmb = 818
    B = Jarak_ultra
    Gosub Motor
End If

```



```

Else
Pwma = 829
Pwmb = 789
B = Jarak_ultra
Gosub Motor

End If

Else
Pwma = 800
Pwmb = 760
B = Jarak_ultra
Gosub Motor

End If
Else
Pwma = 771
Pwmb = 731
B = Jarak_ultra
Gosub Motor

End If
Else
Pwma = 742
Pwmb = 702
B = Jarak_ultra
Gosub Motor

End If
Else
Pwma = 692
Pwmb = 652
B = Jarak_ultra
Gosub Motor

End If
Else
Pwma = 663
Pwmb = 623
B = Jarak_ultra
Gosub Motor
End If
Else
Pwma = 634
Pwmb = 594
B = Jarak_ultra
Gosub Motor
End If
Else
Pwma = 605
Pwmb = 565
B = Jarak_ultra
Gosub Motor
End If
Else
Pwma = 579

```

```

    Pwmb = 539
    B = Jarak_ultra
    Gosub Motor
    End If
Else

    Pwma = 550
    Pwmb = 510
    B = Jarak_ultra
    Gosub Motor

    End If
    Goto Main

```

```
//=====BACA ULTRA=====
```

```

    Count = 0
    Ddra.1 = 1
    Porta.1 = 1
    Waitus 5
    Porta.1 = 0
    Ddra.1 = 0

    While Pina.1 = 0
    Wend

    While Pina.1 = 1

        Count = Count + 1
        Waitus 55

    Wend

    Jarak_ultra = Count / X

    Waitus 200

    Return

```

```
//=====MOTOR=====
```

```

Ddra.7 = 0           'kiri
Ddra.6 = 0           'tengah
Ddra.5 = 0           'kanan

Portd.0 = 1
Portd.1 = 0
Portd.2 = 1
Portd.3 = 0

Pwm1a = Pwmb         ' Kanan
Pwm1b = Pwma
Waitms 130

```

```

If Pina.7 = 0 Then                                'switch kiri aktif

    Portd.0 = 0
    Portd.1 = 0
    Pwm1a = 0
    Waitms 10
    Portd.0 = 0
    Portd.1 = 1
    Pwm1a = 600
    Waitms 5
    Portd.0 = 0
    Portd.1 = 0
    Pwm1a = 0
    Waitms 10

While Pina.5 = 1                                'switch kanan

    Portd.2 = 1
    Portd.3 = 0
    Pwm1b = 750
    Cls
    Lcd "motor kanan lg"
    Lowerline
    Lcd "pwm=750"
    Waitms 50

Wend

    Portd.2 = 0
    Portd.3 = 0
    Pwm1b = 0
    Waitms 10
    Gosub Cekpintu
Else

    Gosub Baca_ultra                            'cek orang maju tidak????
    C = Jarak_ultra
    D = B - C
    If D < 3 Then                                'orang kondisi diam
        Mati = Mati + 1
        If Mati >= 30 Then                        '10x diam
            Gosub Berhenti
            Mati = 0
        Else
            End If
    Else
        End If

Else
    Mati = 0                                    'orang kondisi maju

End If
End If

```

```

Cls
Locate 1 , 1
Lcd "pwm=" ; Pwma
Locate 1 , 9
Lcd "mati=" ; Mati
Lowerline
Lcd "Jarak = " ; Jarak_ultra
Waitms 10

```

Return

```
//=====BERHENTI=====
```

```

    Mati = 0
    Pwma = 0
    D = 0
    C = 0
    Z = 0
    Portd.0 = 0
    Portd.1 = 0
    Portd.2 = 0
    Portd.3 = 0
    Pwm1a = 0           ' Kanan
    Pwm1b = 0           ' Kiri
    Waitms 10

```

Do

```

Gosub Baca_ultra
C = Jarak_ultra
D = B - C
If C > 75 Then

```

```
Gosub Balik
```

Else

```
If C <= 7 Then
```

```
Do
```

```
If Pina.7 = 0 Then           'switch kiri aktif
```

```
Portd.0 = 0
```

```
Portd.1 = 0
```

```
Pwm1a = 0
```

```
While Pina.5 = 1           'switch kanan
```

```
Portd.2 = 1
```

```
Portd.3 = 0
```

```
Pwm1b = 750
```

```
Waitms 10
```

```
Cls
```

```
Lcd "motor kanan lg"
```

```
Waitms 10
```

```
Wend
```

```
Portd.2 = 0
```

```
Portd.3 = 0
```

```
Pwm1b = 0
```

```

Waitms 10
Gosub Cekpintu
Else
Portd.0 = 1
Portd.1 = 0
Pwm1a = 710
Waitms 25
End If
Z = Z + 1

```

```

Loop Until Z = 100

```

```

Else
Portd.0 = 0
Portd.1 = 0
Portd.2 = 0
Portd.3 = 0
Pwm1a = 0           ' Kanan
Pwm1b = 0

```

```

Cls
Locate 1 , 1
Lcd "pwm=" ; Pwma
Locate 1 , 9
Lcd "mati=" ; Mati
Lowerline
Lcd "Jarak = " ; Jarak_ultra
Waitms 10

```

```

End If
End If
Loop Until D > 5

```

Return

```

//=====Cek_irda===== ' cek jika orang dah didepan pintu

```

```

Do
Ddra.0 = 0
Start Adc
Ird = Getadc(0)
Stop Adc

If Ird >= 200 Then

Gosub Suara

Else

If Pina.7 = 0 Then
Portd.0 = 0
Portd.1 = 0
Pwm1a = 0

```

```

While Pina.5 = 1                                'switch kanan
Portd.2 = 1
Portd.3 = 0
Pwm1b = 750
Waitms 10
Cls
Lcd "motor kanan lg"
Waitms 10

Wend
Portd.2 = 0
Portd.3 = 0
Pwm1b = 0
Waitms 10
Gosub Cekpintu

Goto Main

Else
Portd.0 = 1
Portd.1 = 0
Pwm1a = 710
Waitms 50
End If
Z = Z + 1

Loop Until Z = 100
End If

Return

//=====BALIK=====
While Pina.6 = 1
Portd.0 = 0
Portd.1 = 1
Portd.2 = 0
Portd.3 = 1
Pwm1a = 710                                ' Kanan
Pwm1b = 750
Waitms 10
Wend
Portd.0 = 0
Portd.1 = 0
Portd.2 = 0
Portd.3 = 0
Pwm1a = 0                                ' Kanan
Pwm1b = 0
Waitms 500

Return

```

```

//=====CEK PINTU=====
Ddra.0 = 0

Irda = 0

Start Adc
Irda = Getadc(0)

Stop Adc

While Irda < 200                                'switch tengah nonaktif

Portd.0 = 0
Portd.1 = 0
Portd.2 = 0
Portd.3 = 0
Pwm1a = 0                                       'motor mati
Pwm1b = 0
  Cls
  Lcd "-->buka<--"
Start Adc
Irda = Getadc(0)
Stop Adc
Waitms 100

Wend

//=====SUARA=====
Porta.3 = 1
  Cls
  Lcd "SOUND HIDUP"
  Ddra.3 = 1                                    'sound hidup
  Porta.3 = 0
  Wait 3
  Porta.3 = 1
  Waitms 250

  Gosub Baca_ultra                              'cek ping jika ada orang lagi
  If Jarak_ultra <= 7 Then
  Gosub Cek_irda
  Else

  Do                                            'tutup pintu
  Portd.0 = 0
  Portd.1 = 1
  Portd.2 = 0
  Portd.3 = 1
  Pwm1a = 710                                  'Kanan
  Pwm1b = 750
  Waitms 10
  Cls
  Lcd "-->tutup<--"
  Loop Until Pina.6 = 0
  End If

Portd.0 = 0

```

```
Portd.1 = 0
Portd.2 = 0
Portd.3 = 0
Pwm1a = 400           'motor mati
Pwm1b = 400
Waitms 10
Cls
Lcd "-->pintu aman<--"
Lowerline
Lcd "cek sensor lagi"
Wait 2

Return

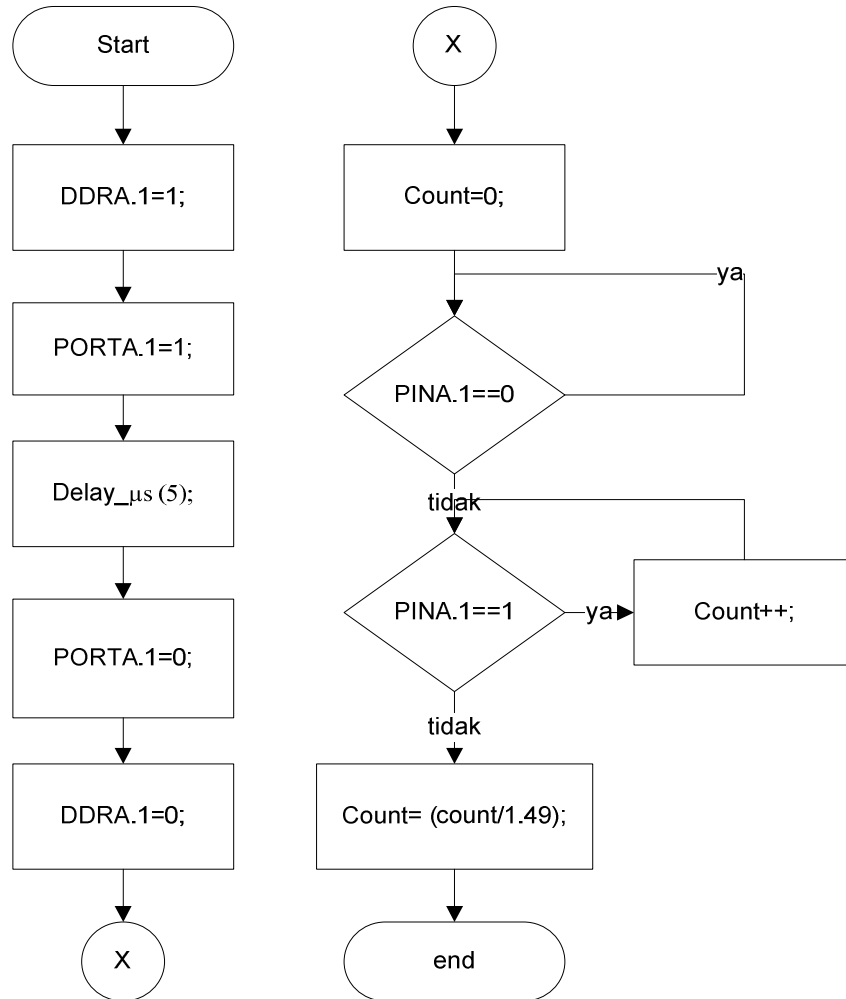
'-----
End                       'end program
```



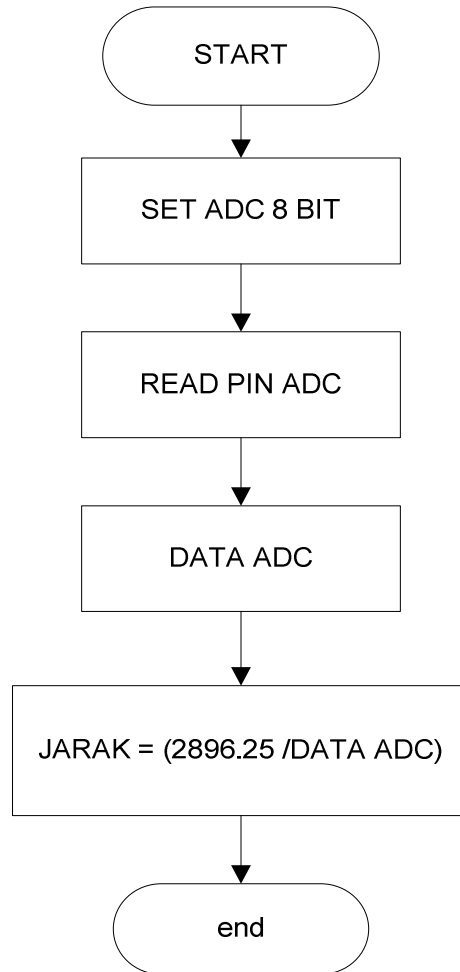
## **LAMPIRAN C**

### **DIAGRAM ALIR PROGRAM SENSOR – SENSOR**

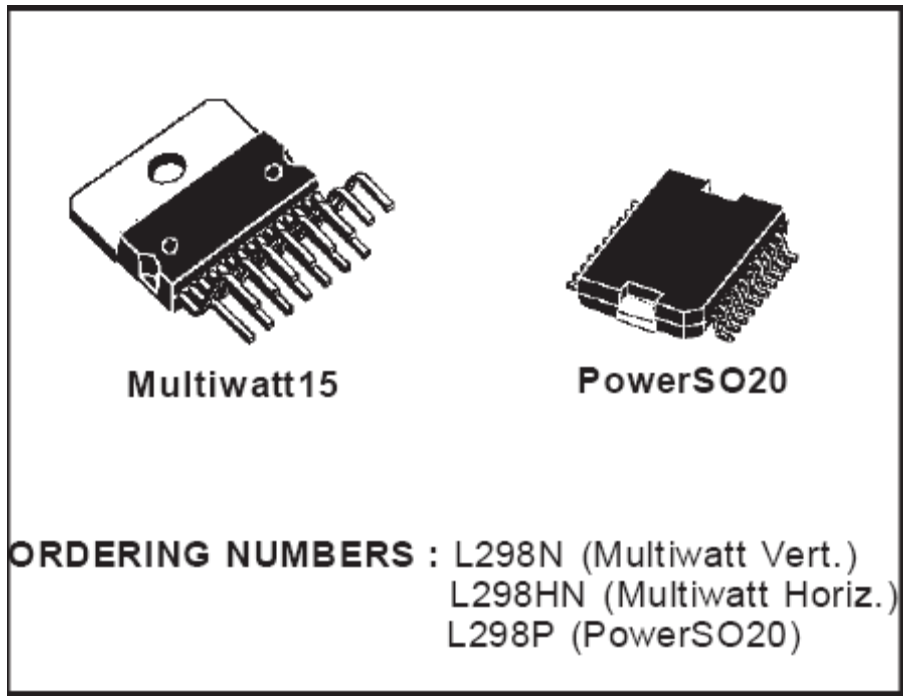
# SENSOR ULTRASONIK (PING)



## SENSOR INFRA MERAH (GP2D120)

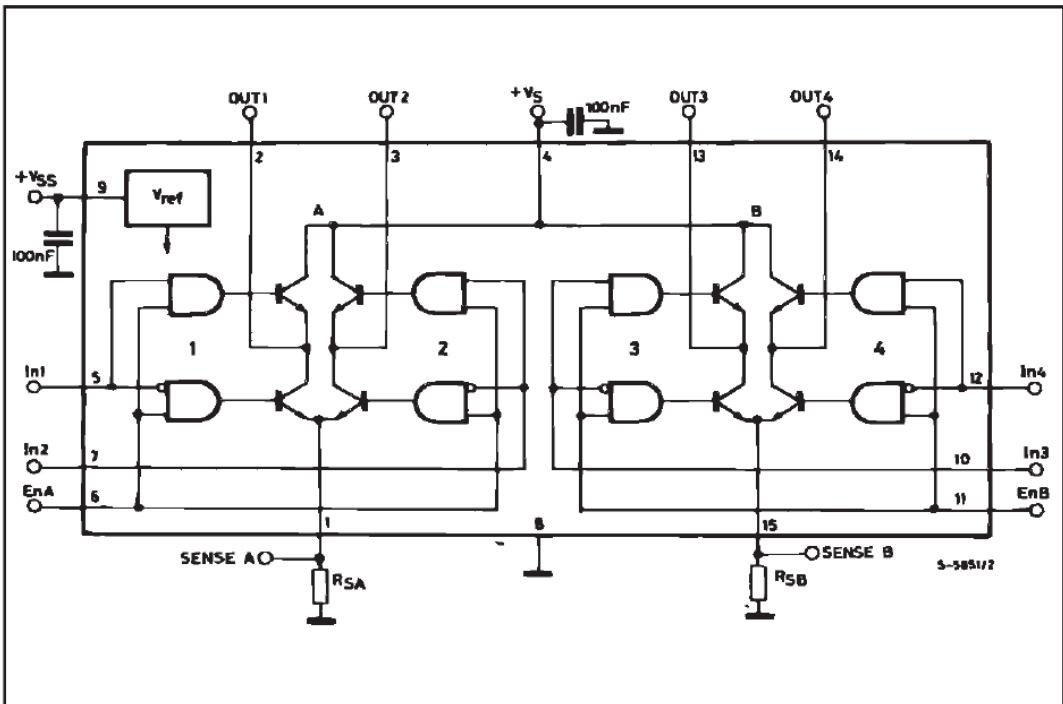


**LAMPIRAN D**  
**DATA SHEET DRIVER MOTOR L298N**



- OPERATING SUPPLY VOLTAGE UP TO 46 V
- TOTAL DC CURRENT UP TO 4 A
- LOW SATURATION VOLTAGE
- OVERTEMPERATURE PROTECTION
- LOGICAL "0" INPUT VOLTAGE UP TO 1.5 V (HIGH NOISE IMMUNITY)

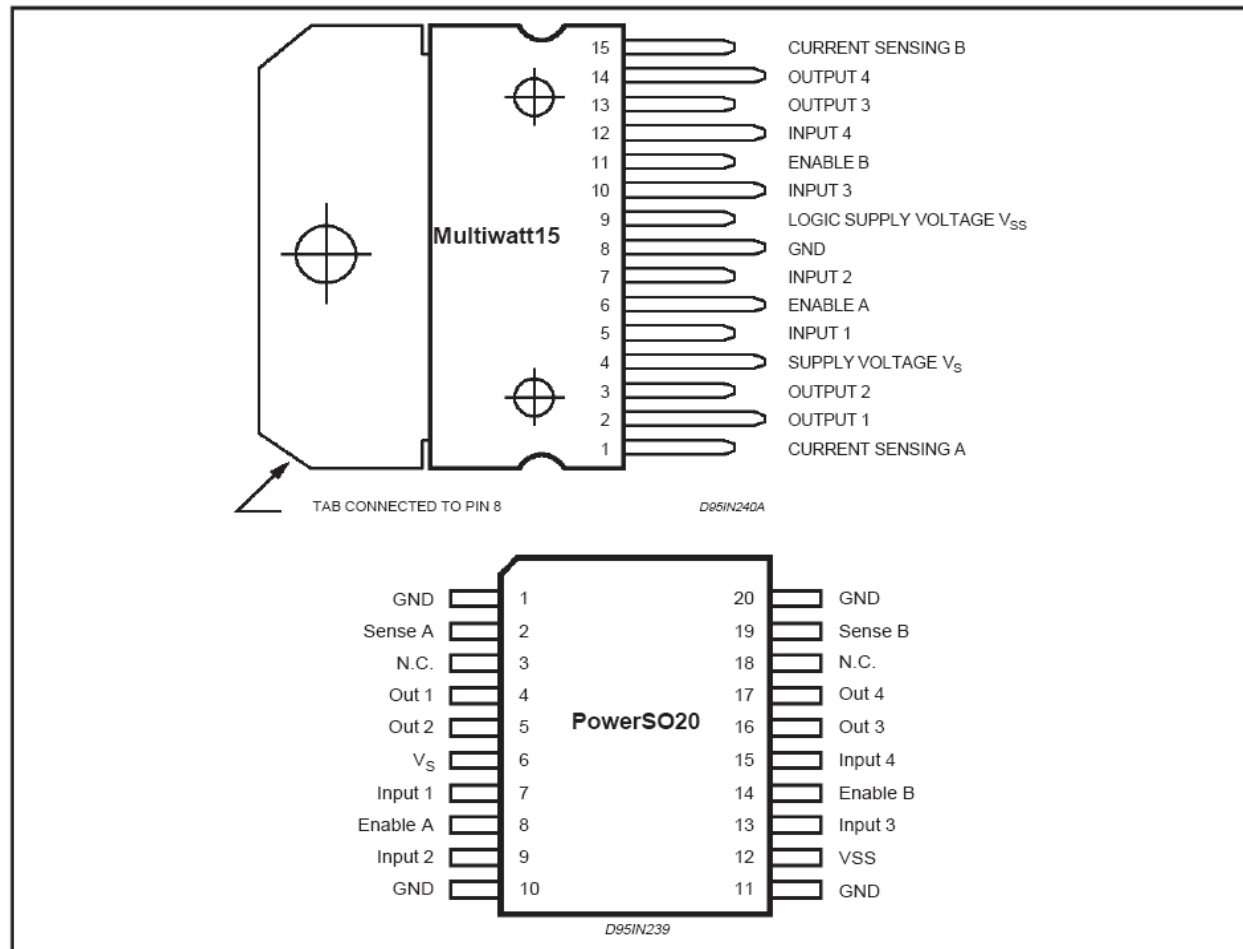
**BLOCK DIAGRAM**



## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_S$	Power Supply	50	V
$V_{SS}$	Logic Supply Voltage	7	V
$V_i, V_{en}$	Input and Enable Voltage	-0.3 to 7	V
$I_O$	Peak Output Current (each Channel)		
	– Non Repetitive (t = 100 $\mu$ s)	3	A
	– Repetitive (80% on –20% off; t <sub>on</sub> = 10ms)	2.5	A
	–DC Operation	2	A
$V_{sens}$	Sensing Voltage	-1 to 2.3	V
$P_{tot}$	Total Power Dissipation (T <sub>case</sub> = 75°C)	25	W
$T_{op}$	Junction Operating Temperature	-25 to 130	°C
$T_{stg}, T_j$	Storage and Junction Temperature	-40 to 150	°C

## PIN CONNECTIONS (top view)



## THERMAL DATA

Symbol	Parameter	PowerSO20	Multiwatt15	Unit
$R_{th\ j-case}$	Thermal Resistance Junction-case	Max.	3	°C/W
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max.	13 (*)	°C/W

**PIN FUNCTIONS** (refer to the block diagram)

MW.15	PowerSO	Name	Function
1;15	2;19	Sense A; Sense B	Between this pin and ground is connected the sense resistor to control the current of the load.
2;3	4;5	Out 1; Out 2	Outputs of the Bridge A; the current that flows through the load connected between these two pins is monitored at pin 1.
4	6	V <sub>S</sub>	Supply Voltage for the Power Output Stages. A non-inductive 100nF capacitor must be connected between this pin and ground.
5;7	7;9	Input 1; Input 2	TTL Compatible Inputs of the Bridge A.
6;11	8;14	Enable A; Enable B	TTL Compatible Enable Input: the L state disables the bridge A (enable A) and/or the bridge B (enable B).
8	1,10,11,20	GND	Ground.
9	12	V <sub>SS</sub>	Supply Voltage for the Logic Blocks. A 100nF capacitor must be connected between this pin and ground.
10; 12	13;15	Input 3; Input 4	TTL Compatible Inputs of the Bridge B.
13; 14	16;17	Out 3; Out 4	Outputs of the Bridge B. The current that flows through the load connected between these two pins is monitored at pin 15.
–	3;18	N.C.	Not Connected

**ELECTRICAL CHARACTERISTICS** (V<sub>S</sub> = 42V; V<sub>SS</sub> = 5V, T<sub>j</sub> = 25°C; unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>S</sub>	Supply Voltage (pin 4)	Operative Condition	V <sub>IH</sub> +2.5		46	V
V <sub>SS</sub>	Logic Supply Voltage (pin 9)		4.5	5	7	V
I <sub>S</sub>	Quiescent Supply Current (pin 4)	V <sub>en</sub> = H; I <sub>L</sub> = 0 V <sub>i</sub> = L V <sub>i</sub> = H		13 50	22 70	mA mA
		V <sub>en</sub> = L V <sub>i</sub> = X			4	mA
I <sub>SS</sub>	Quiescent Current from V <sub>SS</sub> (pin 9)	V <sub>en</sub> = H; I <sub>L</sub> = 0 V <sub>i</sub> = L V <sub>i</sub> = H		24 7	36 12	mA mA
		V <sub>en</sub> = L V <sub>i</sub> = X			6	mA
V <sub>iL</sub>	Input Low Voltage (pins 5, 7, 10, 12)		–0.3		1.5	V
V <sub>iH</sub>	Input High Voltage (pins 5, 7, 10, 12)		2.3		V <sub>SS</sub>	V
I <sub>iL</sub>	Low Voltage Input Current (pins 5, 7, 10, 12)	V <sub>i</sub> = L			–10	μA
I <sub>iH</sub>	High Voltage Input Current (pins 5, 7, 10, 12)	V <sub>i</sub> = H ≤ V <sub>SS</sub> –0.6V		30	100	μA
V <sub>en</sub> = L	Enable Low Voltage (pins 6, 11)		–0.3		1.5	V
V <sub>en</sub> = H	Enable High Voltage (pins 6, 11)		2.3		V <sub>SS</sub>	V
I <sub>en</sub> = L	Low Voltage Enable Current (pins 6, 11)	V <sub>en</sub> = L			–10	μA
I <sub>en</sub> = H	High Voltage Enable Current (pins 6, 11)	V <sub>en</sub> = H ≤ V <sub>SS</sub> –0.6V		30	100	μA
V <sub>CEsat(H)</sub>	Source Saturation Voltage	I <sub>L</sub> = 1A I <sub>L</sub> = 2A	0.95	1.35 2	1.7 2.7	V V
V <sub>CEsat(L)</sub>	Sink Saturation Voltage	I <sub>L</sub> = 1A (5) I <sub>L</sub> = 2A (5)	0.85	1.2 1.7	1.6 2.3	V V
V <sub>CEsat</sub>	Total Drop	I <sub>L</sub> = 1A (5) I <sub>L</sub> = 2A (5)	1.80		3.2 4.9	V V
V <sub>sens</sub>	Sensing Voltage (pins 1, 15)		–1 (1)		2	V