2.4 ROTALED2 - Version 2 avec BP et ajustable

Projet : IUT6

Info : [DIV538]

Révision : 1 du 8 janvier 2008

Révision : 2 du 13 janvier 2008

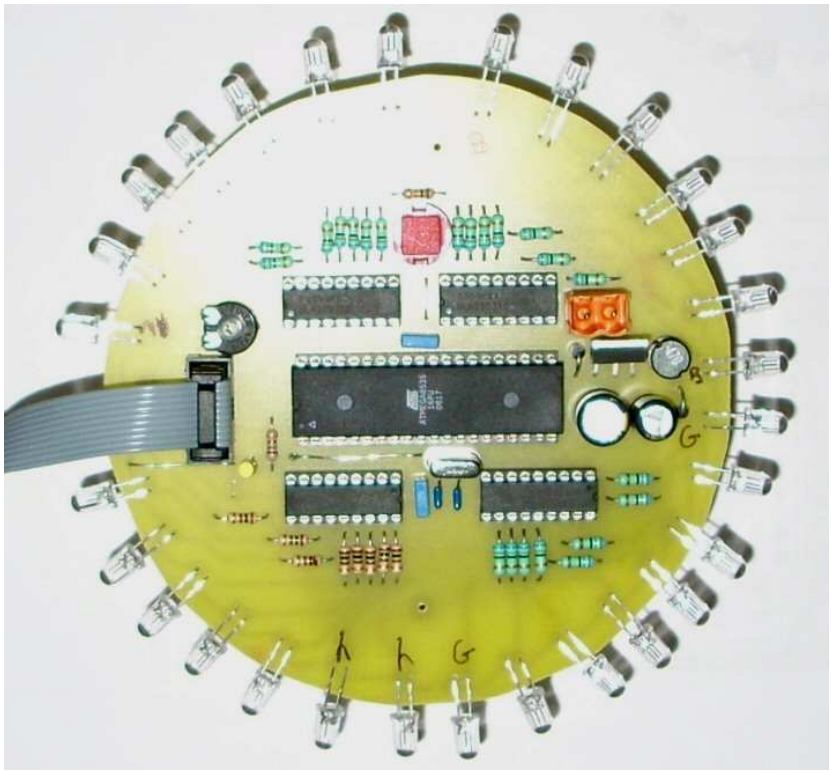


Figure 2.2. Vue de carte électronique (images-maquettes\ROTALED2-12.jpg).

2.5 Calculs des composants

Tableau 2.3. Liste de composants (Calculs-Composants.xls / 10000mcd).

Size	Couleur	Candela	Vmin	Vmax	IF	Valim	Vce sat	Rmax	Rmin	Retenu	Puissance
		k mcd	Volt	Volt	Amp.	Volt	Volt	Ohms	Ohms	Ohms	Watt
5 mm	Yellow	10-15	1,9	2,5	0,015	5	0,2	193,3	153,3	160	0,036
5 mm	Green	10-15	2,9	3,5	0,015	5	0,2	126,7	86,7	100	0,0225
5 mm	Blue	6-9	2,9	3,5	0,015	5	0,2	126,7	86,7	100	0,0225
5 mm	White	12-18	2,9	3,5	0,015	5	0,2	126,7	86,7	100	0,0225
10 mm	Red		1,9	2,5	0,025	5	0,2	116,0	92,0	120	0,075

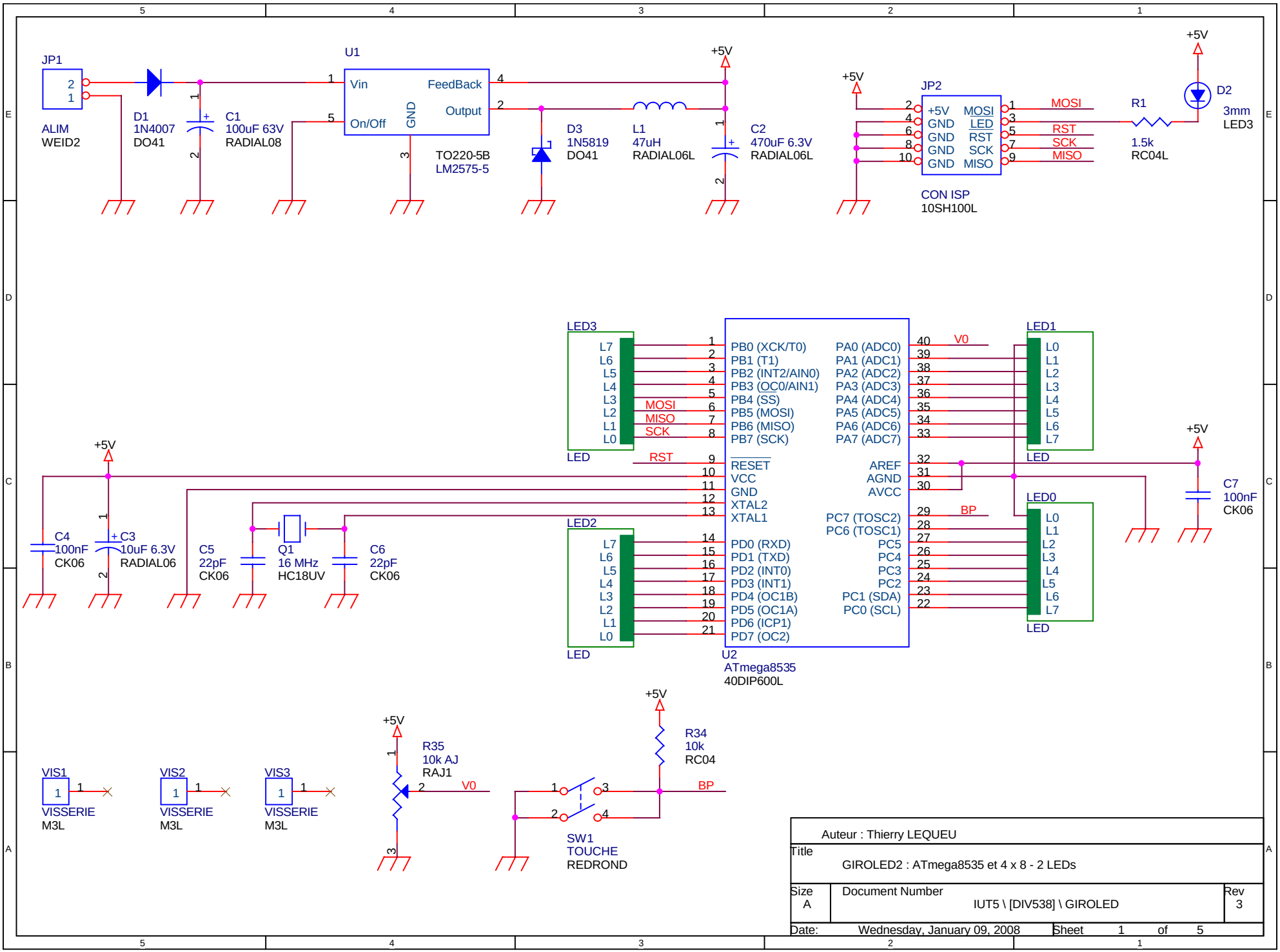
ROTALED2 : ATmega8535 et 4 x 8 LEDs

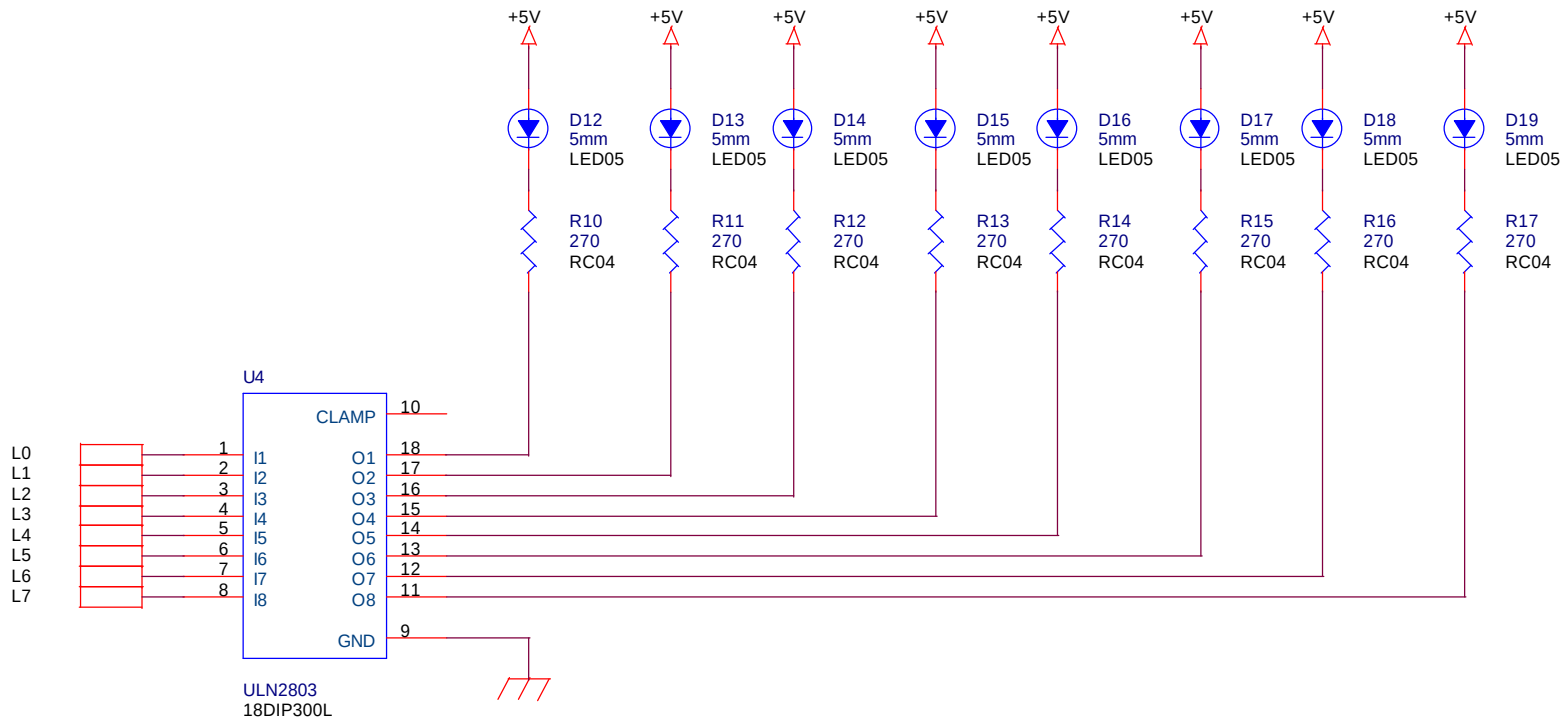
Revised: Wednesday, January 09, 2008

IUT5 \ [DIV538] \ ROTALED2 Revision: 3

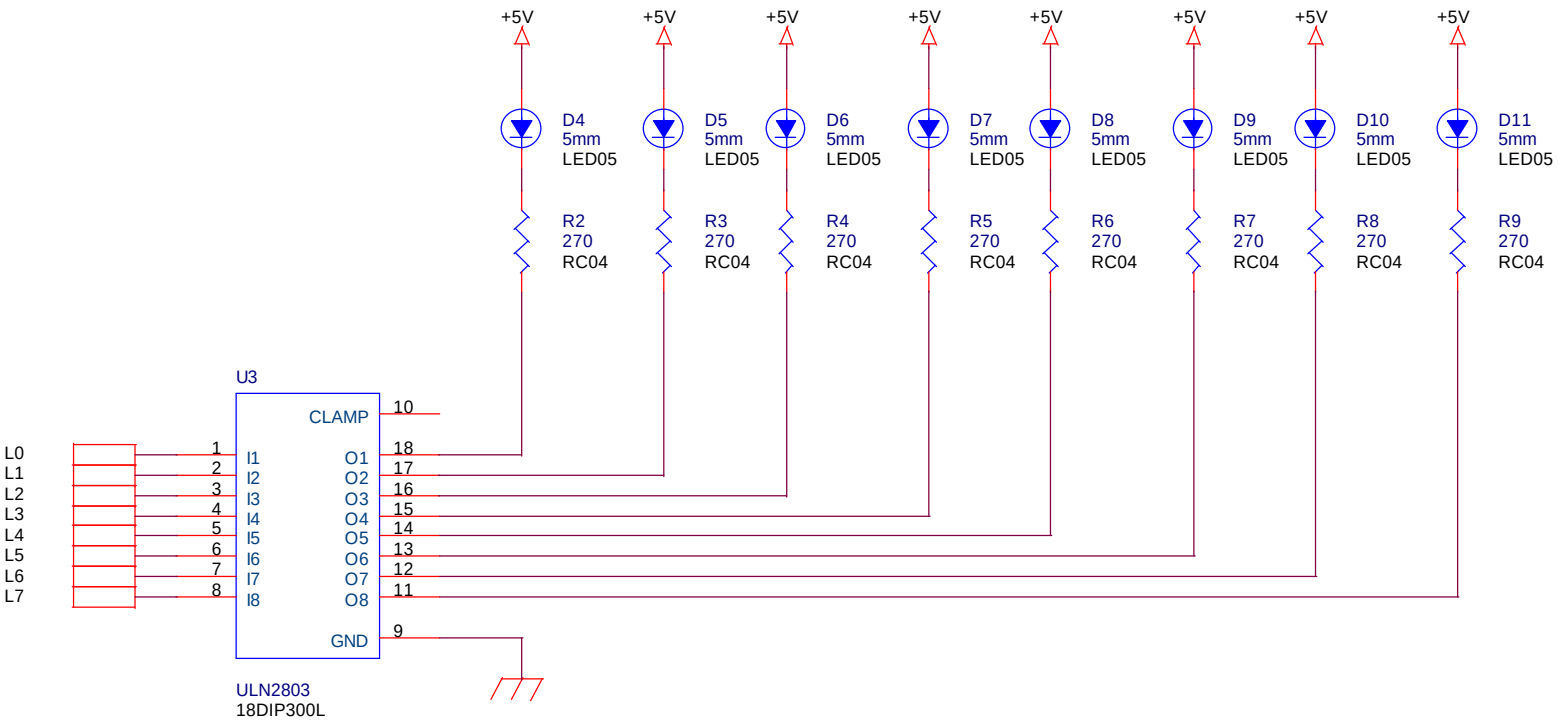
Référence	Qu.	Désignation	Fournisseur	Code Cde.	U.d.V.	Prix U.H.T.	Prix T.H.T.
C1	1	100uF 63V FC	Radiospares	315-0962	5	2,05 €	0,410 €
C2	1	470uF 6.3V FC	Radiospares	449-0845	5	1,21 €	0,242 €
C3	1	10uF 50V FC	Radiospares	315-0805	5	0,97 €	0,194 €
C4,C7	2	100nF 63V MKT	Radiospares	537-3044	10	1,36 €	0,272 €
C6,C5	2	22pF Céramique	Radiospares	405-7612	10	1,03 €	0,206 €
D1	1	1N4007	Radiospares	348-5397	1	0,13 €	0,130 €
D2	1	LED jaune 3mm 2mA	Radiospares	171-1228	10	3,44 €	0,344 €
D3	1	1N5819	Radiospares	544-4994	5	1,10 €	0,220 €
D4,…D35	32	LED 10mm 20mA	Asso e-Kart		1	0,75 €	24,000 €
JP1	1	Connecteur 2 points Weidmuller	Radiospares	403-932	5	2,02 €	0,404 €
JP2	1	CON ISP	Radiospares	461-742	1	1,82 €	1,820 €
L1	1	47uH 0,5A	Radiospares	432-4394	10	12,93 €	1,293 €
Q1	1	Quartz 16 MHz	Radiospares	226-1825	1	0,64 €	0,640 €
R1	1	1.5k 0,25W	IUT GEII		1	0,01 €	0,010 €
R2,…,R33	32	120 0,25W	IUT GEII		1	0,01 €	0,320 €
U1	1	LM2575T-5.0	Radiospares	534-2545	45	106,09 €	2,358 €
U2	1	ATmega8535	FARNELL	917-1444	1	1,80 €	1,800 €
U3,U4,U5,U6	4	ULN2803	Radiospares	646-6311	5	2,97 €	2,376 €
VIS2,VIS1	2	VISSERIE	IUT GEII		2	0,05 €	0,050 €
Divers	170	Circuit imprimé SF 130x130 mm	Radiospares	159-6120	600	15,95 €	4,519 €

TOTAL H.T. :	41,61 €
dont TVA : 19,60%	8,16 €
TOTAL T.T.C. :	**49,77 €**


JP1
ALIM
WEID2
D1
1N4007
DO41
C1
100uF 63V
RADIAL08
U1
Vin
FeedBack
On/Off
GND
Output
TO220-5B
LM2575-5
D3
1N5819
DO41
L1
47uH
RADIAL06L
C2
470uF 6.3V
RADIAL06L
+5V
JP2
CON ISP
10SH100L
MOSI
RST
SCK
MISO
R1
1.5k
RC04L
D2
3mm
LED3
LED3
LED
LED1
LED0
LED2
U2
ATmega8535
40DIP600L
PB0 (XCK/T0)
PB1 (T1)
PB2 (INT2/AIN0)
PB3 (OC0/AIN1)
PB4 (SS)
PB5 (MOSI)
PB6 (MISO)
PB7 (SCK)
RESET
VCC
GND
XTAL2
XTAL1
PD0 (RXD)
PD1 (TXD)
PD2 (INT0)
PD3 (INT1)
PD4 (OC1B)
PD5 (OC1A)
PD6 (ICP1)
PD7 (OC2)
PA0 (ADC0)
PA1 (ADC1)
PA2 (ADC2)
PA3 (ADC3)
PA4 (ADC4)
PA5 (ADC5)
PA6 (ADC6)
PA7 (ADC7)
AREF
AGND
AVCC
PC7 (TOSC2)
PC6 (TOSC1)
PC5
PC4
PC3
PC2
PC1 (SDA)
PC0 (SCL)
V0
BP
C4
100nF
CK06
C3
10uF 6.3V
RADIAL06
C5
22pF
CK06
Q1
16 MHz
HC18UV
C6
22pF
CK06
C7
100nF
CK06
VIS1
VIS2
VIS3
VISSERIE
M3L
R35
10k AJ
RAJ1
R34
10k
RC04
SW1
TOUCHE
REDROND
Auteur : Thierry LEQUEU
Title
GIROLED2 : ATmega8535 et 4 x 8 - 2 LEDs
Size
A
Document Number
IUT5 \ [DIV538] \ GIROLED
Rev
3
Date:
Wednesday, January 09, 2008
Sheet
1
of
5



Auteur : Thierry LEQUEU		
Title: GIROLED : ATmega8535 et 4 x 8 LEDs		
Size: A	Document Number: IUT5 \ [DIV538] \ GIROLED \ LED	Rev: 1
Date: Thursday, November 22, 2007	Sheet 3 of 5	



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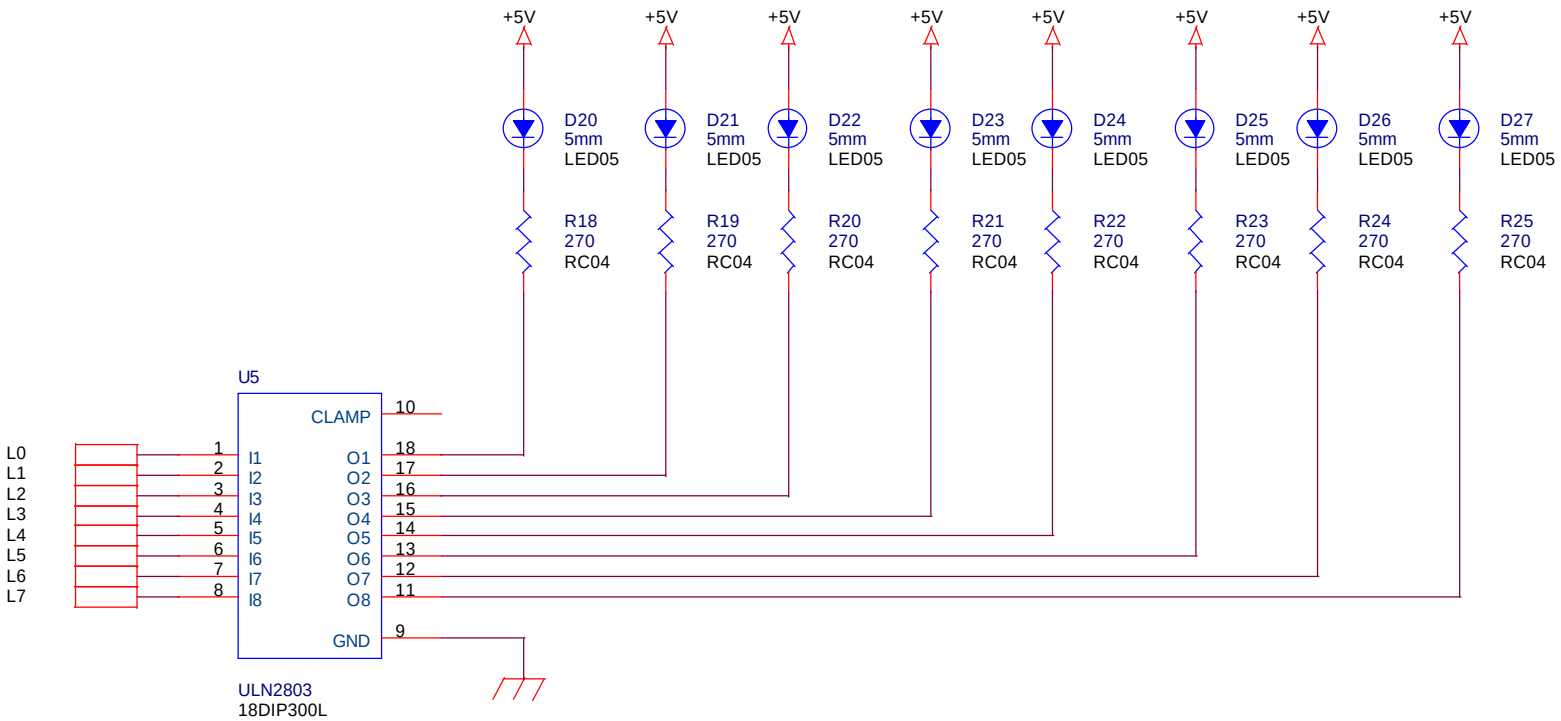

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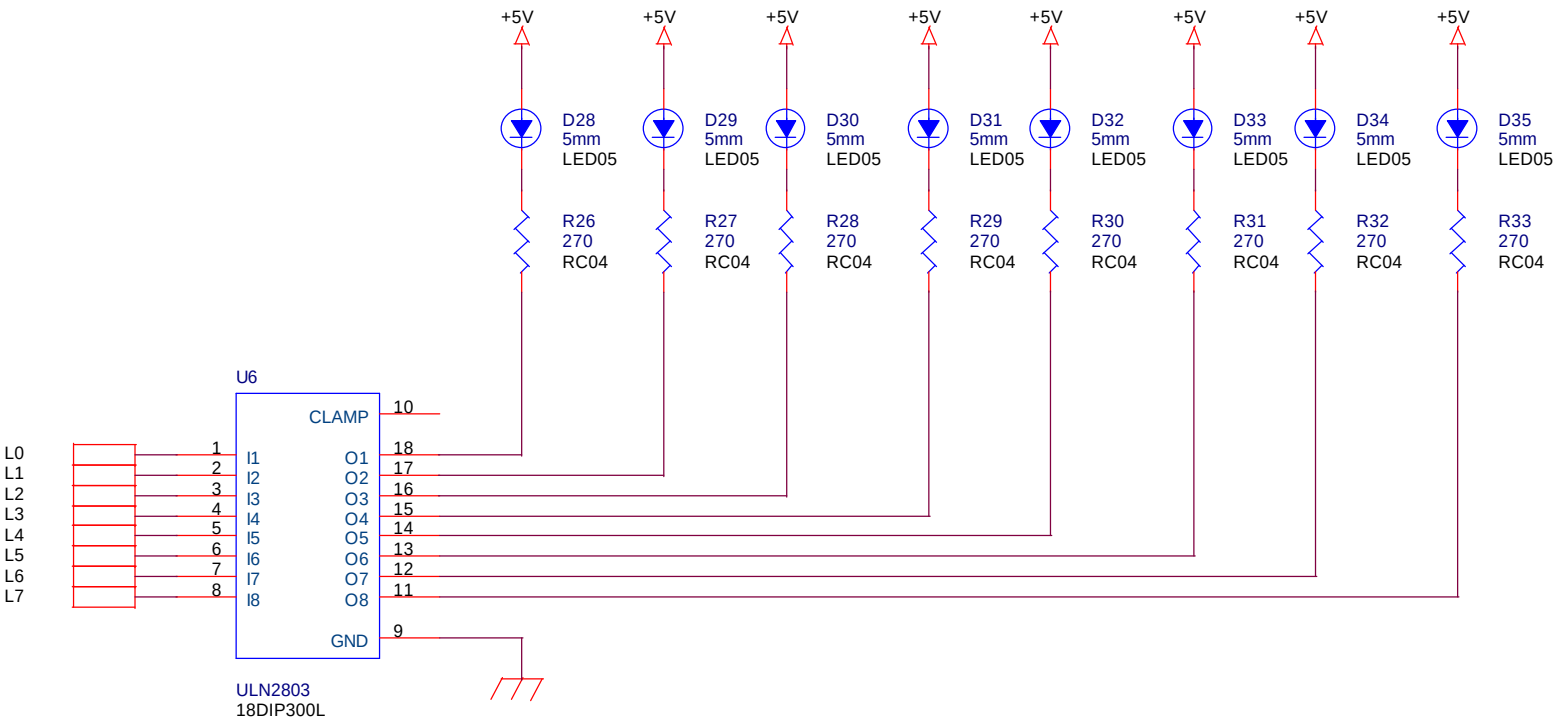
Size: A	Document Number: IUT5 \ [DIV538] \ GIROLED \ LED	Rev: 1
Date: Thursday, November 22, 2007	Sheet 4 of 5	



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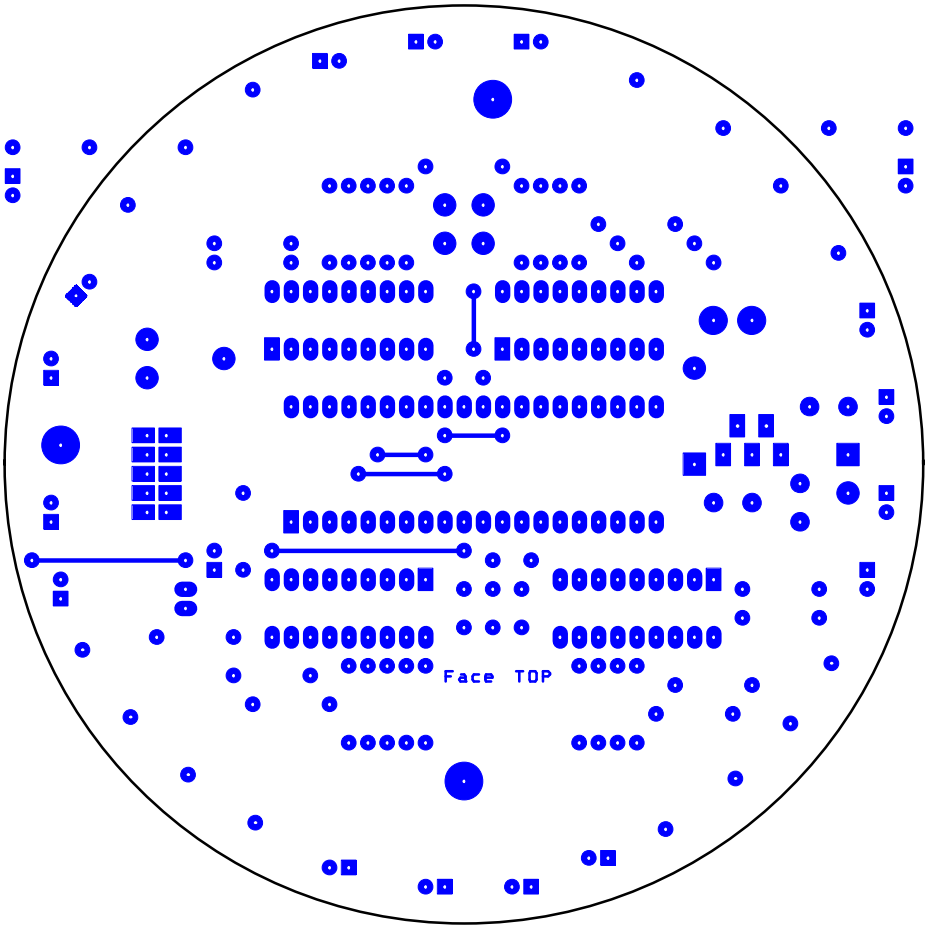
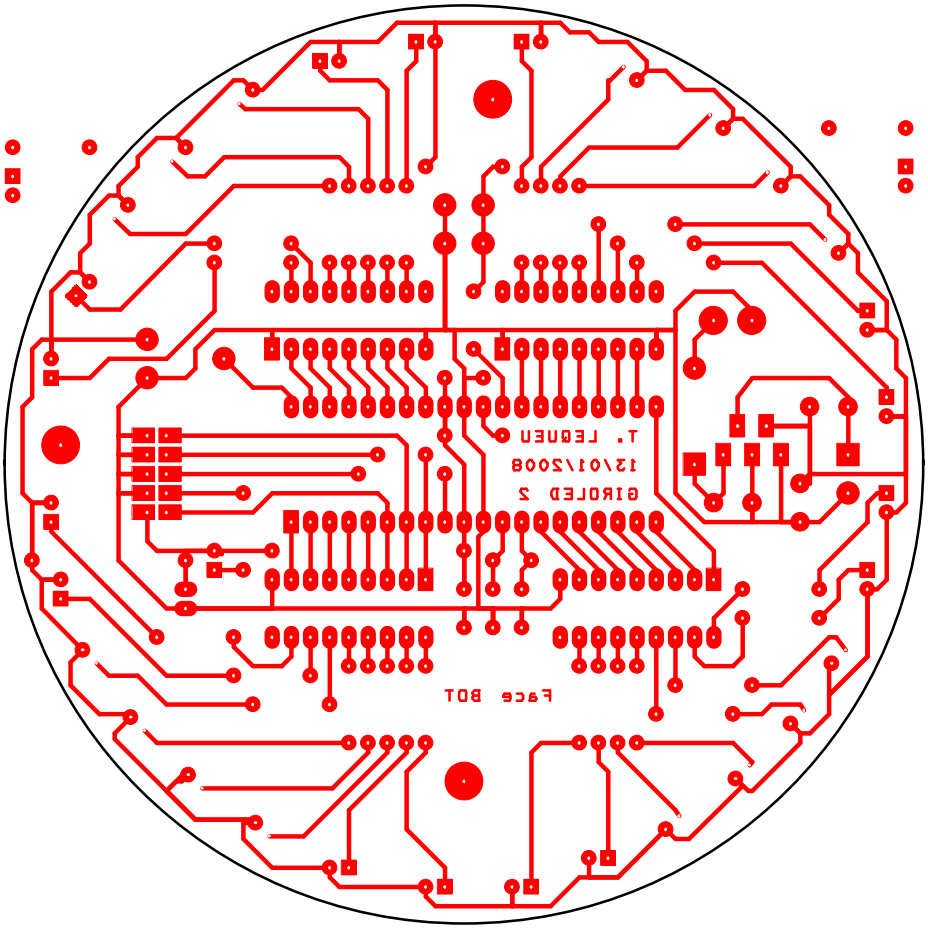
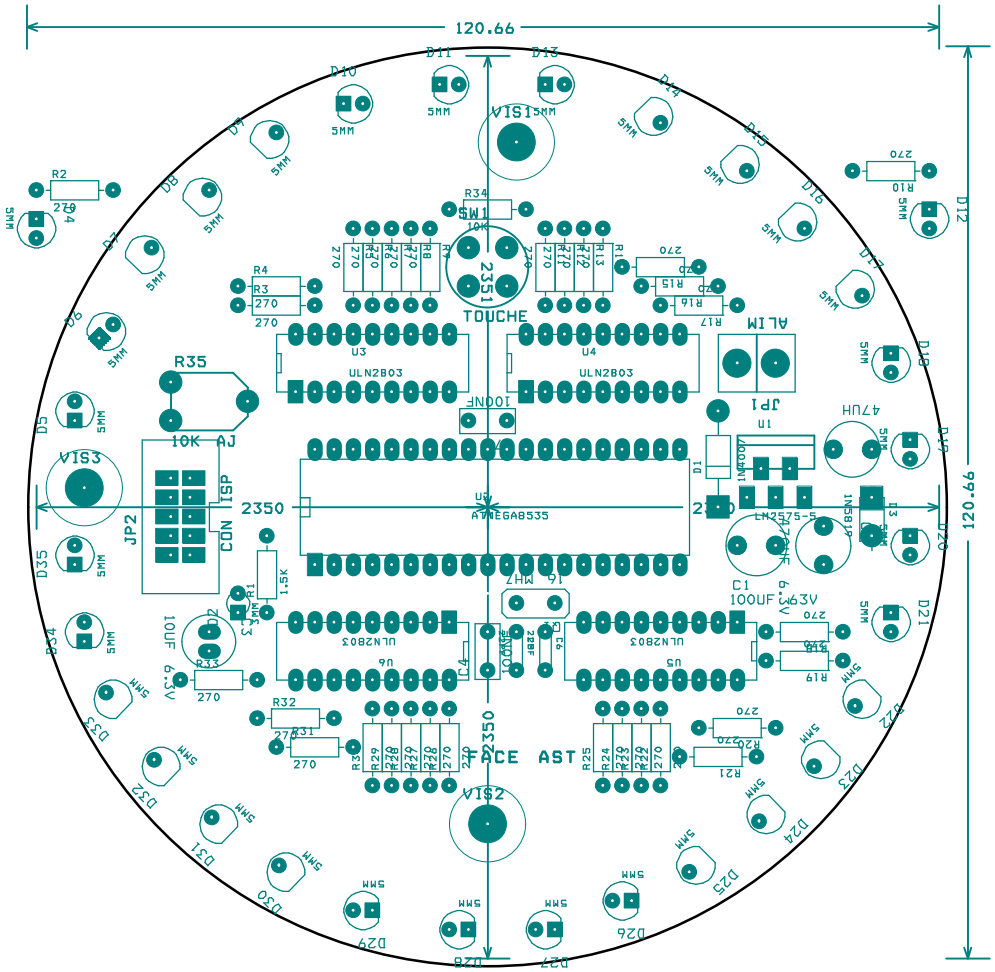
Title: GIROLED : ATmega8535 et 4 x 8 LEDs		
Size: A	Document Number: IUT5 \ [DIV538] \ GIROLED \ LED	Rev: 1
Date: Thursday, November 22, 2007	Sheet 5 of 5	


Face TOP


T. LEDUEU
12\01\2008
GIROLED 2
Face BOT


120.66
120.66
VIS1
VIS2
VIS3
TOUCHE
ALIM
JP1
JP2
CON ISP
10K AJ
ULN2803
ATMEGA8535
LM2575-5
1N5819
1N4007
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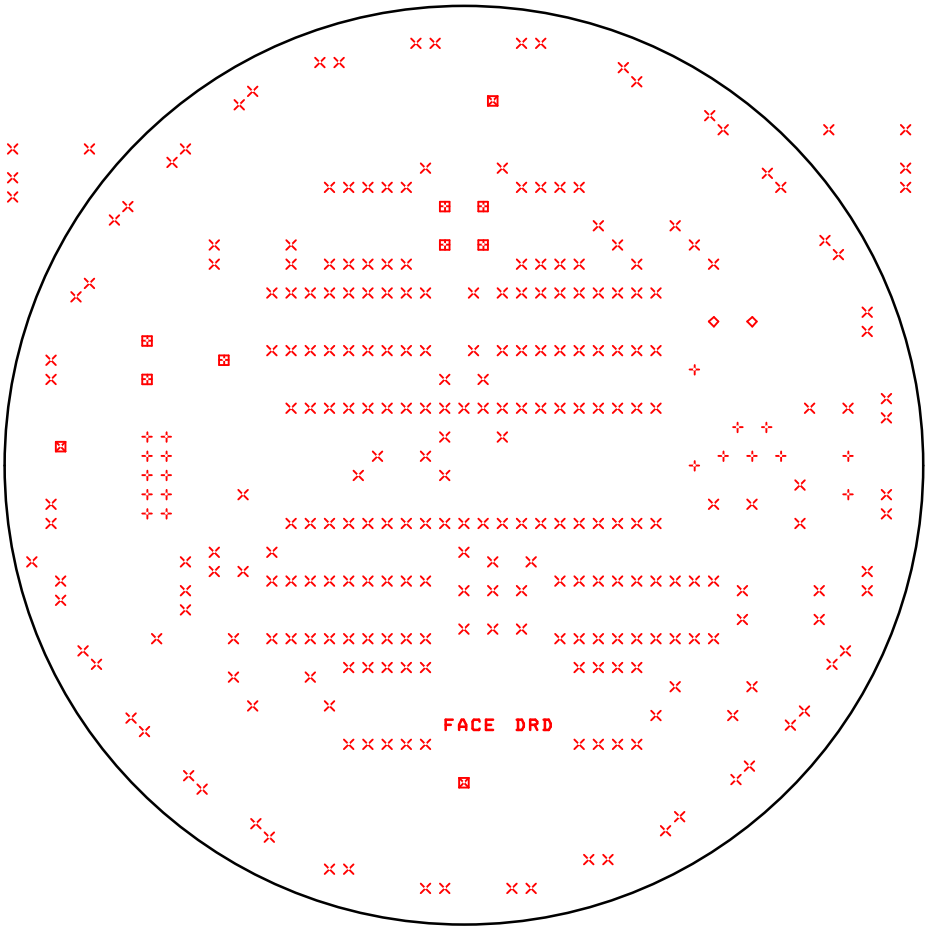
10UF 6.3V
100NF
1.5K
16 MHZ
2351
2350
PCE AST
5MM
270



DRILL CHART				
SYM	DIAM	TOL	QTY	NOTE
×	0.787 mm		276	
+	0.991 mm		19	
◇	1.000 mm		2	
⊞	1.194 mm		7	
⊠	1.499 mm		3	
TOTAL			307	

Features

- High-performance, Low-power AVR® 8-bit Microcontroller
- Advanced RISC Architecture
  - 130 Powerful Instructions – Most Single Clock Cycle Execution
  - 32 x 8 General Purpose Working Registers
  - Fully Static Operation
  - Up to 16 MIPS Throughput at 16 MHz
  - On-chip 2-cycle Multiplier
- Nonvolatile Program and Data Memories
  - 8K Bytes of In-System Self-Programmable Flash
    Endurance: 10,000 Write/Erase Cycles
  - Optional Boot Code Section with Independent Lock Bits
    In-System Programming by On-chip Boot Program
    True Read-While-Write Operation
  - 512 Bytes EEPROM
    Endurance: 100,000 Write/Erase Cycles
  - 512 Bytes Internal SRAM
  - Programming Lock for Software Security
- Peripheral Features
  - Two 8-bit Timer/Counters with Separate Prescalers and Compare Modes
  - One 16-bit Timer/Counter with Separate Prescaler, Compare Mode, and Capture Mode
  - Real Time Counter with Separate Oscillator
  - Four PWM Channels
  - 8-channel, 10-bit ADC
    8 Single-ended Channels
    7 Differential Channels for TQFP Package Only
    2 Differential Channels with Programmable Gain at 1x, 10x, or 200x for TQFP Package Only
  - Byte-oriented Two-wire Serial Interface
  - Programmable Serial USART
  - Master/Slave SPI Serial Interface
  - Programmable Watchdog Timer with Separate On-chip Oscillator
  - On-chip Analog Comparator
- Special Microcontroller Features
  - Power-on Reset and Programmable Brown-out Detection
  - Internal Calibrated RC Oscillator
  - External and Internal Interrupt Sources
  - Six Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, Standby and Extended Standby
- I/O and Packages
  - 32 Programmable I/O Lines
  - 40-pin PDIP, 44-lead TQFP, 44-lead PLCC, and 44-pad MLF
- Operating Voltages
  - 2.7 - 5.5V for ATmega8535L
  - 4.5 - 5.5V for ATmega8535
- Speed Grades
  - 0 - 8 MHz for ATmega8535L
  - 0 - 16 MHz for ATmega8535

8-bit AVR® Microcontroller with 8K Bytes In-System Programmable Flash

ATmega8535
ATmega8535L

Advance Information

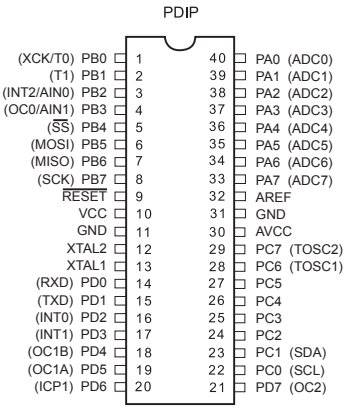
Summary

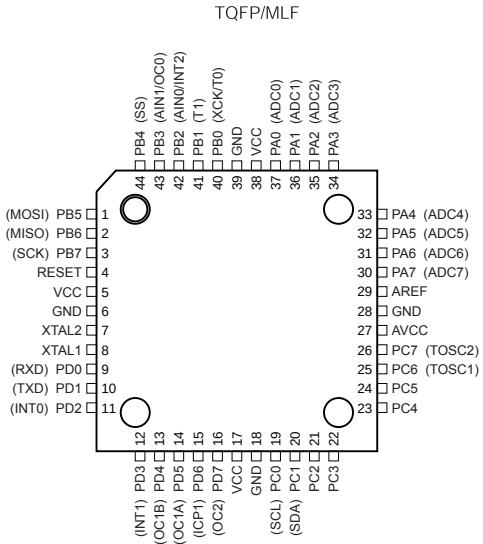
Rev. 2502CS–AVR–04/03

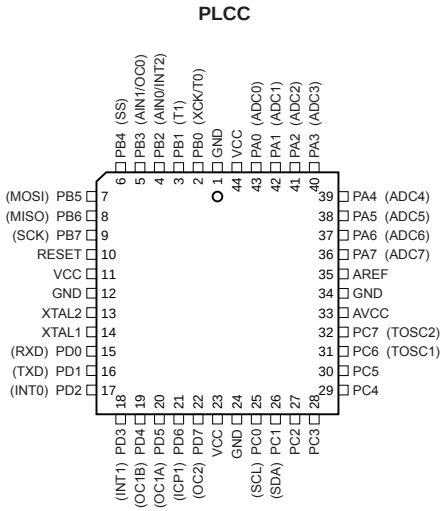
Note: This is a summary document. A complete document is available on our web site at *www.atmel.com*.

Pin Configurations

Figure 1. Pinout ATmega8535







Disclaimer

Typical values contained in this data sheet are based on simulations and characterization of other AVR microcontrollers manufactured on the same process technology. Min and Max values will be available after the device is characterized.

MOTOROLA

Octal High Voltage, High Current Darlington Transistor Arrays

The eight NPN Darlington connected transistors in this family of arrays are ideally suited for interfacing between low logic level digital circuitry (such as TTL, CMOS or PMOS/NMOS) and the higher current/voltage requirements of lamps, relays, printer hammers or other similar loads for a broad range of computer, industrial, and consumer applications. All devices feature open–collector outputs and free wheeling clamp diodes for transient suppression.

The ULN2803 is designed to be compatible with standard TTL families while the ULN2804 is optimized for 6 to 15 volt high level CMOS or PMOS.

MAXIMUM RATINGS (T_A = 25°C and rating apply to any one device in the package, unless otherwise noted.)

Rating	Symbol	Value	Unit
Output Voltage	V_O	50	V
Input Voltage (Except ULN2801)	V_I	30	V
Collector Current – Continuous	I_C	500	mA
Base Current – Continuous	I_B	25	mA
Operating Ambient Temperature Range	T_A	0 to +70	°C
Storage Temperature Range	T_{stg}	–55 to +150	°C
Junction Temperature	T_J	125	°C

$R_{\theta JA}$ = 55°C/W
Do not exceed maximum current limit per driver.

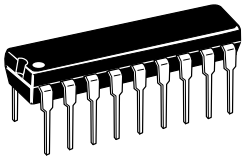
ORDERING INFORMATION

Device	Characteristics		
	Input Compatibility	V_{CE}(Max)/I_C(Max)	Operating Temperature Range
ULN2803A ULN2804A	TTL, 5.0 V CMOS 6 to 15 V CMOS, PMOS	50 V/500 mA	T_A = 0 to + 70°C

ULN2803
ULN2804

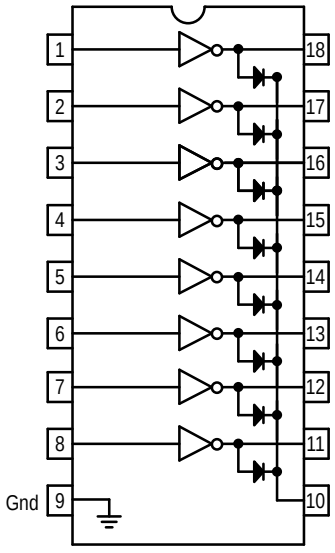
OCTAL PERIPHERAL DRIVER ARRAYS

SEMICONDUCTOR TECHNICAL DATA



A SUFFIX
PLASTIC PACKAGE
CASE 707

PIN CONNECTIONS



ELECTRICAL CHARACTERISTICS (T_A = 25°C, unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Output Leakage Current (Figure 1)		I_{CEX}				μA
(V_O = 50 V, T_A = +70°C)	All Types		–	–	100	
(V_O = 50 V, T_A = +25°C)	All Types		–	–	50	
(V_O = 50 V, T_A = +70°C, V_I = 6.0 V)	ULN2802		–	–	500	
(V_O = 50 V, T_A = +70°C, V_I = 1.0 V)	ULN2804		–	–	500	
Collector–Emitter Saturation Voltage (Figure 2)		$V_{CE(sat)}$				V
(I_C = 350 mA, I_B = 500 μA)	All Types		–	1.1	1.6	
(I_C = 200 mA, I_B = 350 μA)	All Types		–	0.95	1.3	
(I_C = 100 mA, I_B = 250 μA)	All Types		–	0.85	1.1	
Input Current – On Condition (Figure 4)		$I_{I(on)}$				mA
(V_I = 17 V)	ULN2802		–	0.82	1.25	
(V_I = 3.85 V)	ULN2803		–	0.93	1.35	
(V_I = 5.0 V)	ULN2804		–	0.35	0.5	
(V_I = 12 V)	ULN2804		–	1.0	1.45	
Input Voltage – On Condition (Figure 5)		$V_{I(on)}$				V
(V_{CE} = 2.0 V, I_C = 300 mA)	ULN2802		–	–	13	
(V_{CE} = 2.0 V, I_C = 200 mA)	ULN2803		–	–	2.4	
(V_{CE} = 2.0 V, I_C = 250 mA)	ULN2803		–	–	2.7	
(V_{CE} = 2.0 V, I_C = 300 mA)	ULN2803		–	–	3.0	
(V_{CE} = 2.0 V, I_C = 125 mA)	ULN2804		–	–	5.0	
(V_{CE} = 2.0 V, I_C = 200 mA)	ULN2804		–	–	6.0	
(V_{CE} = 2.0 V, I_C = 275 mA)	ULN2804		–	–	7.0	
(V_{CE} = 2.0 V, I_C = 350 mA)	ULN2804		–	–	8.0	
Input Current – Off Condition (Figure 3) (I_C = 500 μA, T_A = +70°C)	All Types	$I_{I(off)}$	50	100	–	μA
DC Current Gain (Figure 2) (V_{CE} = 2.0 V, I_C = 350 mA)	ULN2801	h_{FE}	1000	–	–	–
Input Capacitance		C_I	–	15	25	pF
Turn–On Delay Time (50% E_I to 50% E_O)		t_{on}	–	0.25	1.0	μs
Turn–Off Delay Time (50% E_I to 50% E_O)		t_{off}	–	0.25	1.0	μs
Clamp Diode Leakage Current (Figure 6) (V_R = 50 V)	T_A = +25°C T_A = +70°C	I_R	–	–	50 100	μA
Clamp Diode Forward Voltage (Figure 7) (I_F = 350 mA)		V_F	–	1.5	2.0	V