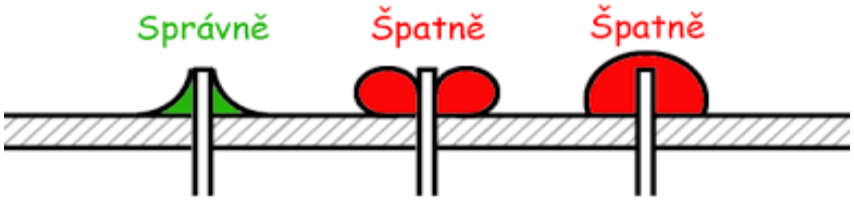
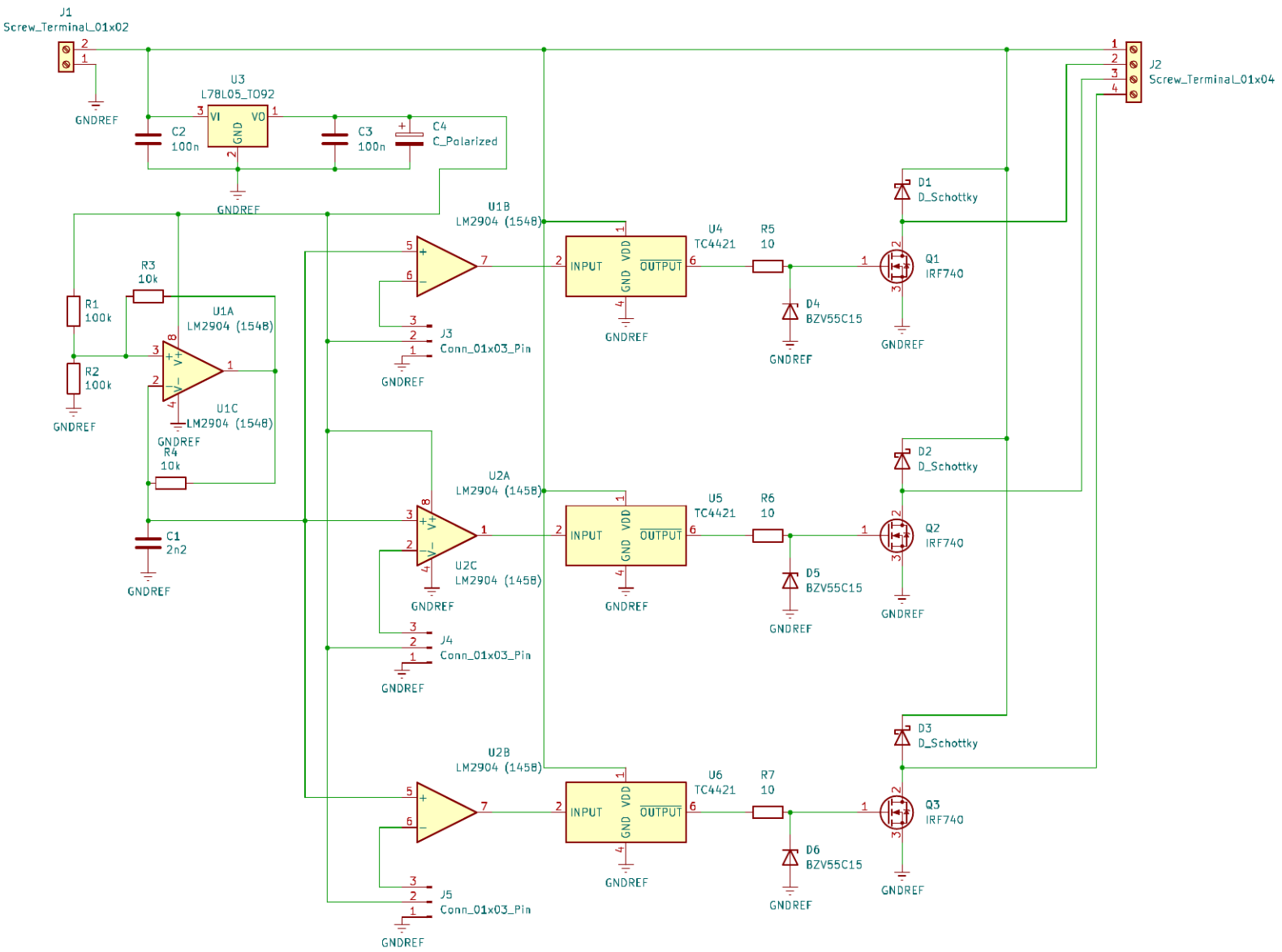
Pulsně šířková modulace (PWM)

Pájení

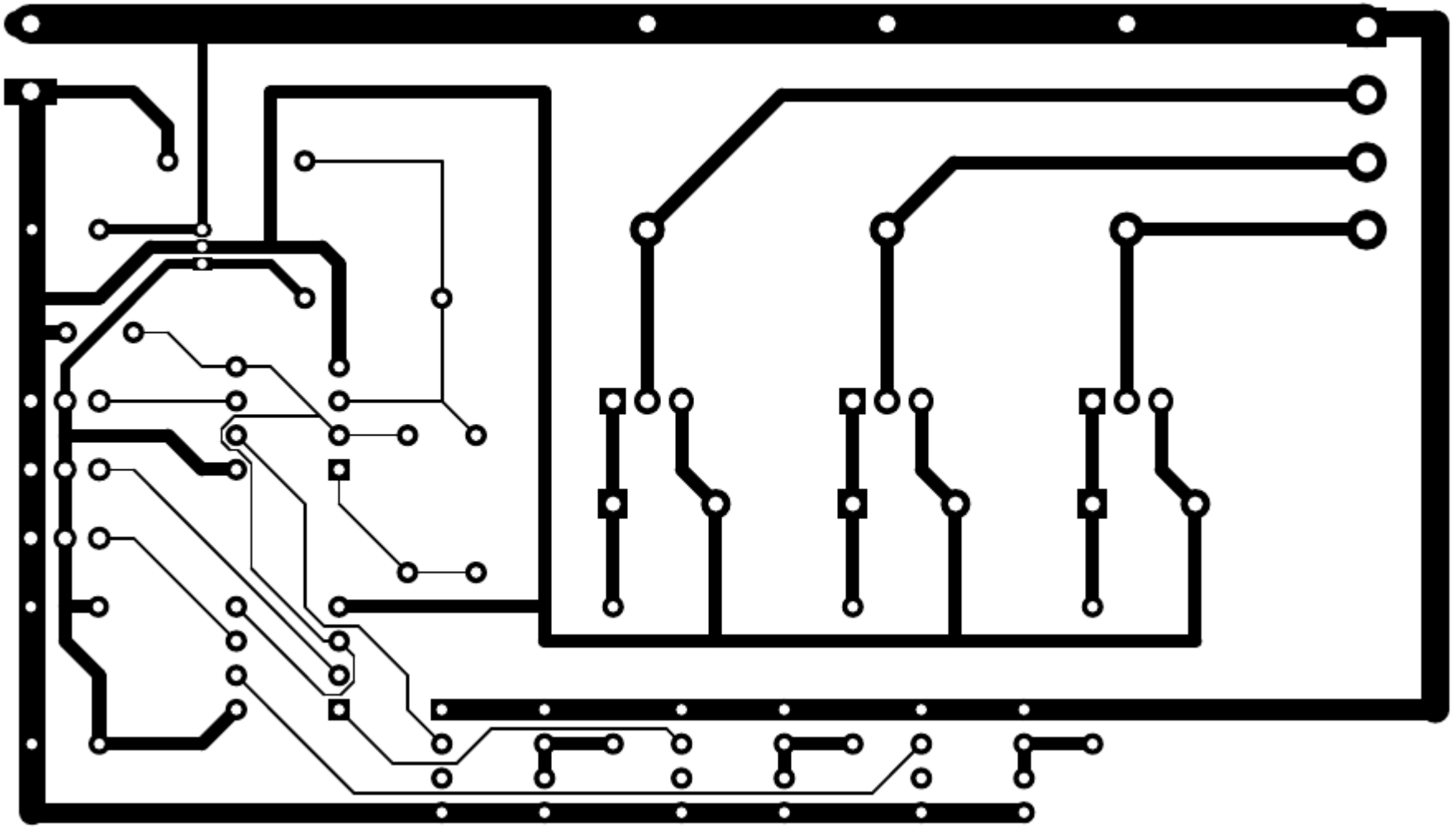


Teplota tání cca. 240°C ,
záleží na složení, doporučená teplota cca. 300 °C

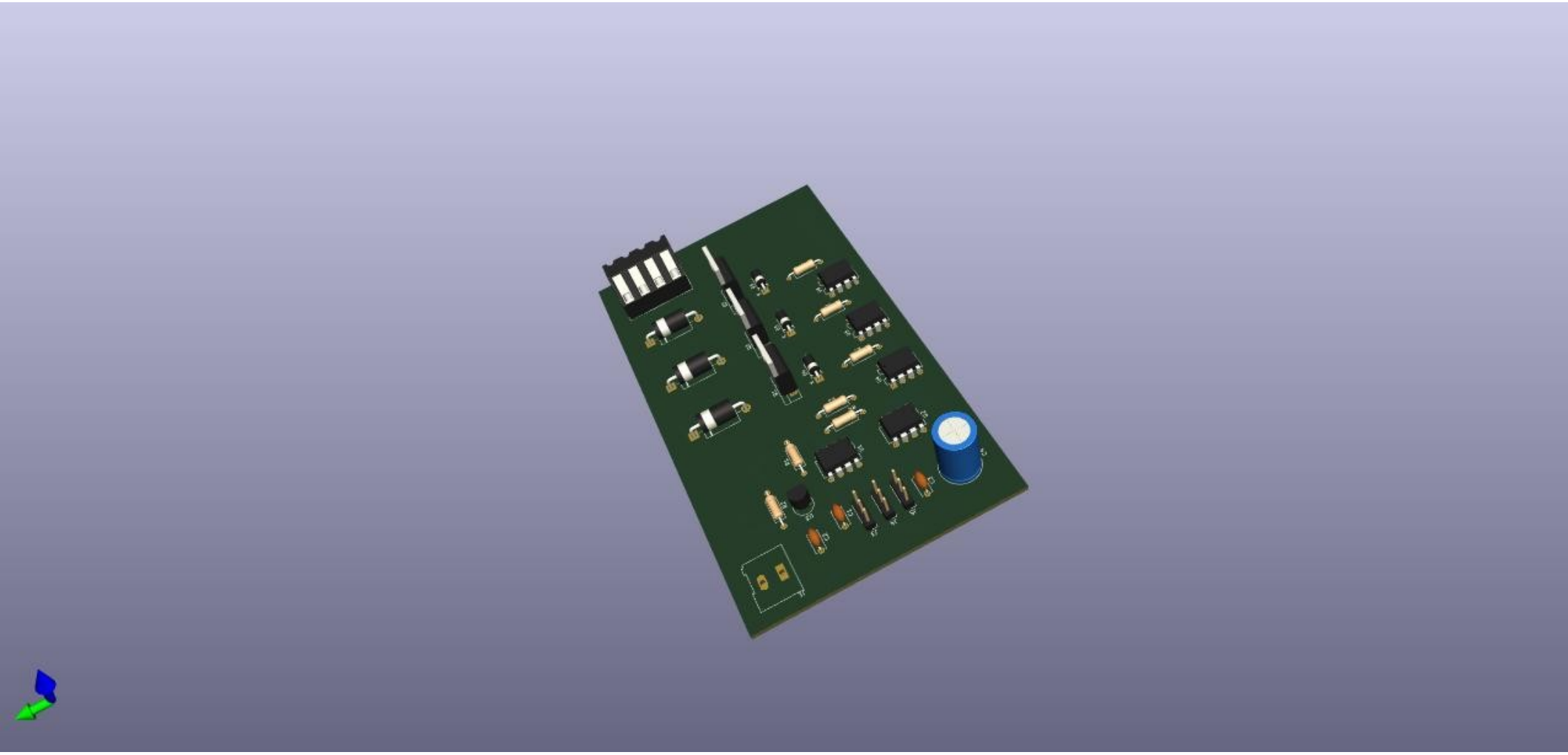
Zapojení


J1
Screw_Terminal_01x02
GNDREF
U3
L78L05_TO92
VI
GND
VO
C2
100n
C3
100n
C4
C_Polarized
GNDREF
U1B
LM2904 (1548)
R3
10k
R1
100k
U1A
LM2904 (1548)
R2
100k
GNDREF
U1C
LM2904 (1548)
GNDREF
R4
10k
C1
2n2
GNDREF
J3
Conn_01x03_Pin
GNDREF
U4
TC4421
INPUT
VDD
GND
OUTPUT
R5
10
D4
BZV55C15
GNDREF
D1
D_Schottky
Q1
IRF740
GNDREF
U2A
LM2904 (1548)
U2C
LM2904 (1548)
GNDREF
J4
Conn_01x03_Pin
GNDREF
U5
TC4421
R6
10
D5
BZV55C15
GNDREF
D2
D_Schottky
Q2
IRF740
GNDREF
U2B
LM2904 (1548)
J5
Conn_01x03_Pin
GNDREF
U6
TC4421
R7
10
D6
BZV55C15
GNDREF
D3
D_Schottky
Q3
IRF740
GNDREF
J2
Screw_Terminal_01x04

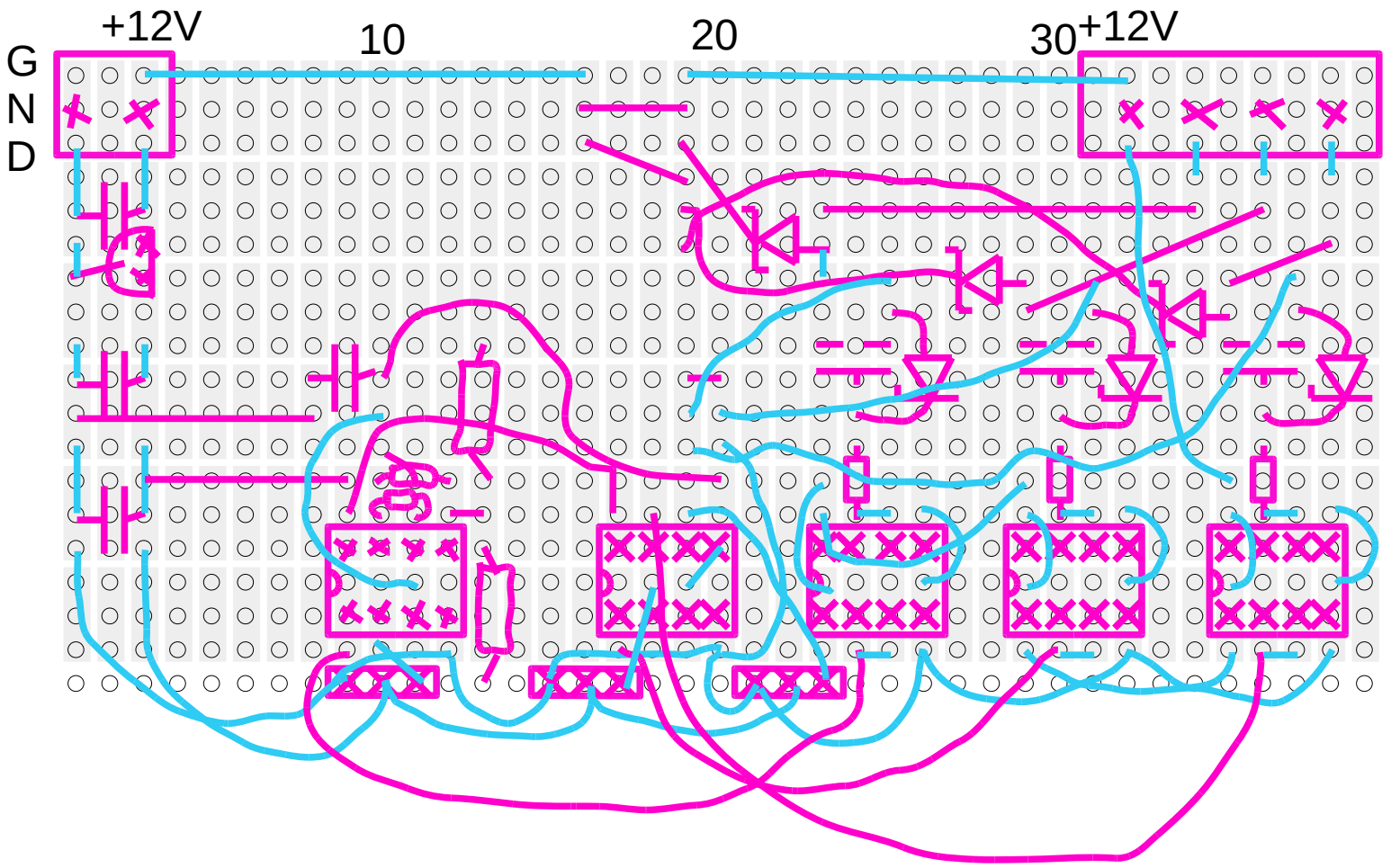
Deska plošných spojů



3D pohled osazené DPS



Univerzální deska plošných spojů



Kde se to najde?

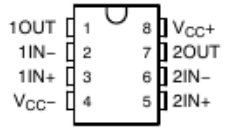
http://aldebaran.feld.cvut.cz/pwm.pdf

MC1458, MC1558
DUAL GENERAL-PURPOSE OPERATIONAL AMPLIFIERS

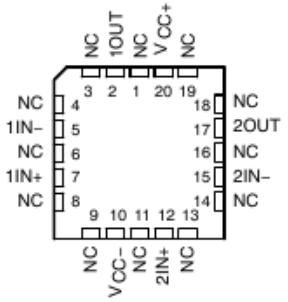
SLOS069C – FEBRUARY 1971 – REVISED AUGUST 2010

- **Short-Circuit Protection**
- **Wide Common-Mode and Differential Voltage Ranges**
- **No Frequency Compensation Required**
- **Low Power Consumption**
- **No Latch-Up**
- **Designed to Be Interchangeable With Motorola MC1558/MC1458 and Signetics S5558/N5558**

MC1458 . . . D, P, OR PS PACKAGE
MC1558 . . . JG PACKAGE
(TOP VIEW)



MC1558 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

description/ordering information

The MC1458 and MC1558 are dual general-purpose operational amplifiers, with each half electrically similar to the μA741, except that offset null capability is not provided.

The high-common-mode input voltage range and the absence of latch-up make these amplifiers ideal for voltage-follower applications. The devices are short-circuit protected and the internal frequency compensation ensures stability without external components.

ORDERING INFORMATION

T_A	V_{IO}max AT 25°C	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
0°C to 70°C	6 mV	PDIP (P)	Tube	MC1458P	MC1458P
		SOIC (D)	Tube	MC1458D	MC1458
			Tape and reel	MC1458DR	
		SOP (PS)	Tape and reel	MC1458PSR	M1458
–55°C to 125°C	5 mV	CDIP (JG)	Tube	MC1558JG	MC1558JG
		CDIP (JGB)	Tube	MC1558JGB	MC1558JGB
		LCCC (FK)	Tube	MC1558FK	MC1558FK

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

TEXAS INSTRUMENTS
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265
POST OFFICE BOX 1443 • HOUSTON, TEXAS 77251–1443

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage, V_{CC+} (see Note 1): MC1458 . . . 18 V
MC1558 . . . 22 V
Supply voltage, V_{CC-} (see Note 1): MC1458 . . . –18 V
MC1558 . . . –22 V
Differential input voltage, V_{ID} (see Note 2) . . . ±30 V
Input voltage, V_I (either input, see Notes 1 and 3) . . . ±15 V
Duration of output short circuit (see Note 4) . . . Unlimited
Operating virtual junction temperature, T_J . . . 150°C
Package thermal impedance, θ_{JA} (see Notes 5 and 6): D package . . . 97°C/W
P package . . . 85°C/W
PS package . . . 95°C/W
Package thermal impedance, θ_{JC} (see Notes 7 and 8): FK package . . . 5.61°C/W
JG package . . . 14.5°C/W
Case temperature for 60 seconds: FK package . . . 260°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: JG package . . . 300°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: D, P, or PS package . . . 260°C
Storage temperature range, T_{stg} . . . –65°C to 150°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES:
1. All voltage values, unless otherwise noted, are with respect to the midpoint between V_{CC+} and V_{CC-}.
2. Differential voltages are at IN+ with respect to IN–.
3. The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 V, whichever is less.
4. The output can be shorted to ground or either power supply. For the MC1558 only, the unlimited duration of the short circuit applies at (or below) 125°C case temperature or 70°C free-air temperature.
5. Maximum power dissipation is a function of $T_J(max)$, θ_{JA}, and T_A. The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_J(max) - T_A)/\theta_{JA}$. Operating at the absolute maximum T_J of 150°C can affect reliability.
6. The package thermal impedance is calculated in accordance with JESD 51-7.
7. Maximum power dissipation is a function of $T_J(max)$, θ_{JC}, and T_C. The maximum allowable power dissipation at any allowable case temperature is $P_D = (T_J(max) - T_C)/\theta_{JC}$. Operating at the absolute maximum T_J of 150°C can affect reliability.
8. The package thermal impedance is calculated in accordance with MIL-STD-883.

recommended operating conditions

			MIN	MAX	UNIT
$V_{CC\pm}$	Supply voltage		±5	±15	V
T_A	Operating free-air temperature range	MC1458	0	70	°C
		MC1558	–55	125	

TC1411/TC1411N

1A High-Speed MOSFET Drivers

Features

- Latch-Up Protected: Will Withstand 500 mA Reverse Current
- Input Will Withstand Negative Inputs Up to 5V
- ESD Protected: 4 kV
- High Peak Output Current: 1A
- Wide Input Supply Voltage Operating Range:
  - 4.5V to 16V
- High Capacitive Load Drive Capability:
  - 1000 pF in 25 nsec
- Short Delay Time: 30 nsec Typ.
- Matched Delay Times
- Low Supply Current
  - With Logic '1' Input: 500 µA
  - With Logic '0' Input: 100 µA
- Low Output Impedance: 8Ω
- Available in Space-Saving 8-pin MSOP Package
- Pinout Same as TC1410/TC1412/TC1413

Applications

- Switch Mode Power Supplies
- Pulse Transformer Drive
- Line Drivers
- Relay Driver

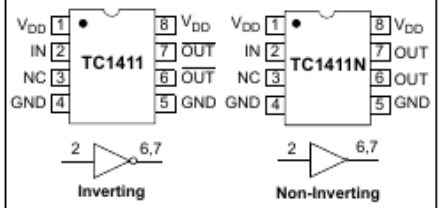
Description

The TC1411/TC1411N are 1A CMOS buffers/drivers. They will not latch-up under any conditions within their power and voltage ratings. They are not subject to damage when up to 5V of noise spiking of either polarity occurs on the ground pin. They can accept, without damage or logic upset, up to 500 mA of current of either polarity being forced back into their output. All terminals are fully protected against up to 4 kV of electrostatic discharge.

As MOSFET drivers, the TC1411/TC1411N can easily charge a 1000 pF gate capacitance in 25 nsec with matched rise and fall times, and provide low enough impedance in both the ON and the OFF states to ensure the MOSFET's intended state will not be affected, even by large transients. The leading and trailing edge propagation delay times are also matched to allow driving short-duration inputs with greater accuracy.

Package Types

8-Pin MSOP/PDIP/SOIC



NC = No Internal Connection

Note: Duplicate pins must be connected together for proper operation.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter[2]		Value	Unit
V_I	DC Input Voltage	V_O = 3.3 to 9 V	30	V
		V_O = 12 to 15 V	35	
		V_O = 18 to 24 V	40	
I_O	Output Current		100	mA
P_{tot}	Power Dissipation		Internally Limited (*)	
T_{stg}	Storage Temperature Range		-40 to 150	°C
T_{op}	Operating Junction Temperature Range	for L78L00C, L78L00AC	0 to 125	°C
		for L78L00AB	-40 to 125	

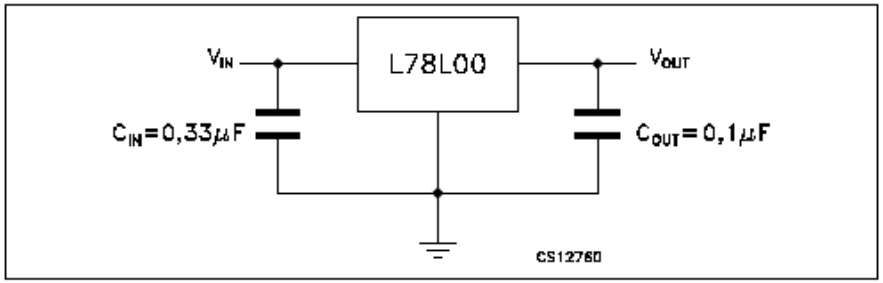
(*) Our SO-8 package used for Voltage Regulators is modified internally to have pins 2, 3, 6 and 7 electrically communed to the die attach flag. This particular frame decreases the total thermal resistance of the package and increases its ability to dissipate power when an appropriate area of copper on the printed circuit board is available for heat-sinking. The external dimensions are the same as for the standard SO-8.

THERMAL DATA

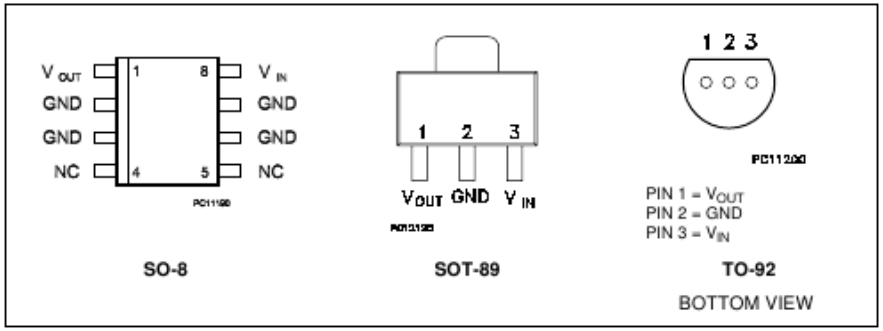
Symbol	Parameter		SO-8	TO-92	SOT-89	Unit
$R_{thj\text{-}case}$	Thermal Resistance Junction-case	Max	20		15	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-ambient	Max	55 (*)	200		°C/W

(*) Considering 6 cm^2 of copper Board heat-sink

TEST CIRCUITS



CONNECTION DIAGRAM (top view)



SO-8 SOT-89 TO-92

BOTTOM VIEW

ELECTRICAL CHARACTERISTICS OF L78L33C (refer to the test circuits, T_J = 0 to 125°C, V_I = 8.3V, I_O = 40 mA, C_I = 0.33 µF, C_O = 0.1 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	T_J = 25°C	3.036	3.3	3.564	V
V_O	Output Voltage	I_O = 1 to 40 mA V_I = 5.3 to 20 V	2.97		3.63	V
		I_O = 1 to 70 mA V_I = 8.3 V	2.97		3.63	
ΔV_O	Line Regulation	V_I = 5.3 to 20 V T_J = 25°C			150	mV
		V_I = 6.3 to 20 V T_J = 25°C			100	
ΔV_O	Load Regulation	I_O = 1 to 100 mA T_J = 25°C			60	mV
		I_O = 1 to 40 mA T_J = 25°C			30	
I_d	Quiescent Current	T_J = 25°C			6	mA
		T_J = 125°C			5.5	mA
ΔI_d	Quiescent Current Change	I_O = 1 to 40 mA			0.2	mA
		V_I = 6.3 to 20 V			1.5	
eN	Output Noise Voltage	B =10Hz to 100KHz T_J = 25°C		40		µV
SVR	Supply Voltage Rejection	V_I = 6.3 to 16.3 V f = 120Hz I_O = 40 mA T_J = 25°C	41	49		dB
V_d	Dropout Voltage			1.7		V

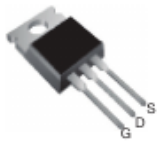
ELECTRICAL CHARACTERISTICS OF L78L05C (refer to the test circuits, T_J = 0 to 125°C, V_I = 10V, I_O = 40 mA, C_I = 0.33 µF, C_O = 0.1 µF unless otherwise specified).

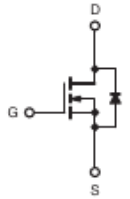
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	T_J = 25°C	4.6	5	5.4	V
V_O	Output Voltage	I_O = 1 to 40 mA V_I =7 to 20 V	4.5		5.5	V
		I_O = 1 to 70 mA V_I = 10 V	4.5		5.5	
ΔV_O	Line Regulation	V_I = 8.5 to 20 V T_J = 25°C			200	mV
		V_I = 9 to 20 V T_J = 25°C			150	
ΔV_O	Load Regulation	I_O = 1 to 100 mA T_J = 25°C			60	mV
		I_O = 1 to 40 mA T_J = 25°C			30	
I_d	Quiescent Current	T_J = 25°C			6	mA
		T_J = 125°C			5.5	mA
ΔI_d	Quiescent Current Change	I_O = 1 to 40 mA			0.2	mA
		V_I = 8 to 20 V			1.5	
eN	Output Noise Voltage	B =10Hz to 100KHz T_J = 25°C		40		µV
SVR	Supply Voltage Rejection	V_I = 9 to 20 V f = 120Hz I_O = 40 mA T_J = 25°C	40	49		dB
V_d	Dropout Voltage			1.7		V

Power MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	60	
$R_{DS(on)}$ (Ω)	V_{GS} = 10 V	0.20
Q_g (Max.) (nC)	11	
Q_{gs} (nC)	3.1	
Q_{gd} (nC)	5.8	
Configuration	Single	

TO-220AB





N-Channel MOSFET

FEATURES

- Dynamic dV/dt Rating
- 175 °C Operating Temperature
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements
- Compliant to RoHS Directive 2002/95/EC

Pb Available

RoHS* COMPLIANT

DESCRIPTION

Third generation Power MOSFETs from Vishay provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-220AB package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50 W. The low thermal resistance and low package cost of the TO-220AB contribute to its wide acceptance throughout the industry.

ORDERING INFORMATION	
Package	TO-220AB
Lead (Pb)-free	IRFZ14PbF
	SiHFZ14-E3
SnPb	IRFZ14
	SiHFZ14

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)

PARAMETER			SYMBOL	LIMIT	UNIT
Drain-Source Voltage[f]			V_{DS}	60	V
Gate-Source Voltage[f]			V_{GS}	± 20	
Continuous Drain Current	V_{GS} at 10 V	T_C = 25 °C	I_D	10	A
		T_C = 100 °C		7.2	
Pulsed Drain Current[a]			I_{DM}	40	
Linear Derating Factor				0.29	W/°C
Single Pulse Avalanche Energy[b]			E_{AS}	47	mJ
Maximum Power Dissipation	T_C = 25 °C		P_D	43	W
Peak Diode Recovery dV/dt[c]			dV/dt	4.5	V/ns
Operating Junction and Storage Temperature Range			T_J, T_{stg}	- 55 to + 175	°C
Soldering Recommendations (Peak Temperature)	for 10 s			300[d]	
Mounting Torque	6-32 or M3 screw			10	lbf · in
				1.1	N · m

Notes

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

b. V_{DD} = 25 V; starting T_J = 25 °C, L = 1.47 mH, R_g = 25 Ω, I_{AS} = 8 A (see fig. 12).

c. I_{SD} ≤ 10 A, dI/dt ≤ 90 A/µs, V_{DD} ≤ V_{DS}, T_J ≤ 175 °C.

d. 1.6 mm from case.

* Pb containing terminations are not RoHS compliant, exemptions may apply

THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	R_{thJA}	-	62	°C/W
Case-to-Sink, Flat, Greased Surface	R_{thCS}	0.50	-	
Maximum Junction-to-Case (Drain)	R_{thJC}	-	3.5	

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	60	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to 25 °C, I_D = 1 mA	-	0.063	-	V/°C
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	2.0	-	4.0	V
Gate-Source Leakage	I_{GSS}	V_{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V	-	-	25	µA
		V_{DS} = 48 V, V_{GS} = 0 V, T_J = 150 °C	-	-	250	
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 6.0 A[b]	-	-	0.20	Ω
Forward Transconductance	g_{fs}	V_{DS} = 25 V, I_D = 6.0 A[b]	2.4	-	-	S
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1.0 MHz, see fig. 5	-	300	-	pF
Output Capacitance	C_{oss}		-	160	-	
Reverse Transfer Capacitance	C_{rss}		-	29	-	
Total Gate Charge	Q_g	V_{GS} = 10 V, I_D = 10 A, V_{DS} = 48 V, see fig. 6 and 13[b]	-	-	11	nC
Gate-Source Charge	Q_{gs}		-	-	3.1	
Gate-Drain Charge	Q_{gd}		-	-	5.8	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 30 V, I_D = 10 A, R_g = 24 Ω, R_D = 2.7 Ω, see fig. 10[b]	-	10	-	ns
Rise Time	t_r		-	50	-	
Turn-Off Delay Time	$t_{d(off)}$		-	13	-	
Fall Time	t_f		-	19	-	
Internal Drain Inductance	L_D	Between lead, 6 mm (0.25") from package and center of die contact 	-	4.5	-	nH
Internal Source Inductance	L_S		-	7.5	-	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode 	-	-	10	A
Pulsed Diode Forward Current[a]	I_{SM}		-	-	40	
Body Diode Voltage	V_{SD}	T_J = 25 °C, I_S = 10 A, V_{GS} = 0 V[b]	-	-	1.6	V
Body Diode Reverse Recovery Time	t_{rr}	T_J = 25 °C, I_F = 10 A, dI/dt = 100 A/µs[b]	-	70	140	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	0.20	0.40	µC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L_S and L_D)				

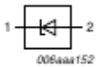
Notes

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

b. Pulse width ≤ 300 µs; duty cycle ≤ 2 %.

2. Pinning information

Table 2. Pinning

Pin	Description		Simplified outline	Graphic symbol
1	cathode	[1]		
2	anode			

[1] The marking band indicates the cathode.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BZV85 series[1]	-	hermetically sealed glass package; axial leaded; 2 leads	SOD66

[1] The series consists of 33 types with nominal working voltages from 3.3 V to 75 V.

4. Marking

Table 4. Marking codes

Type number	Marking code
BZV85 series	The diodes are type branded.

5. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
I_F	forward current			-	500	mA
I_{ZSM}	non-repetitive peak reverse current	square wave; t_p = 100 µs	[1]	-	see Table 8	
		half sine wave; t_p = 10 ms	[1]	-	see Table 8	
P_{tot}	total power dissipation					
		T_{amb} = 25 °C; lead length 10 mm	[2]	-	1	W
			[3]	-	1.3	W
P_{ZSM}	non-repetitive peak reverse power dissipation	square wave; t_p = 100 µs	[1]	-	60	W
T_j	junction temperature			-	200	°C
T_{stg}	storage temperature			−65	+200	°C

[1] T_j = 25 °C prior to surge

[2] Device mounted on a PCB with 1 cm^2 copper area per lead.

[3] If the leads are kept at T_{sp} = 55 °C at 4 mm from body.

Diotec Semiconductor

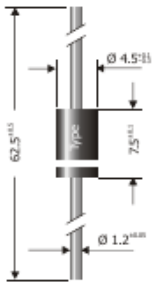
SB560-3G

Schottky Barrier Rectifier Diodes 3rd Generation
Schottky-Gleichrichterdioden 3. Generation

I_{FAV} = 5.0 A V_{RRM} = 60 V
V_F < 0.55 V I_{FSM} = 200/220 A
T_{jmax} = 150°C

Version 2020-04-30

~ DO-201



Dimensions - Maße [mm]

Typical Applications
Output Rectification in DC/DC Converters, Polarity Protection, Free-wheeling diodes
Commercial grade
Suffix -Q: AEC-Q101 compliant [1]
Suffix -AQ: in AEC-Q101 qualification [1]

Typische Anwendungen
Ausgangsgleichrichtung in Gleichstromwandlern, Verpolschutz, Freilaufdioden
Standardausführung
Suffix -Q: AEC-Q101 konform [1]
Suffix -AQ: in AEC-Q101 Qualifikation [1]

Features
V_F as low as comparable 45V types
Low reverse leakage current
Compliant to RoHS, REACH, Conflict Minerals 1)

Besonderheiten
V_F wie vergleichbare 45V Typen
Niedriger Sperrstrom
Konform zu RoHS, REACH, Konfliktmineralien [1]

Mechanical Data [1]

Taped in ammo pack	1700	Gegurtet in Ammo-Pack
Weight approx.	1 g	Gewicht ca.
Case material	UL 94V-0	Gehäusematerial
Solder & assembly conditions	260°C/10s MSL N/A	Löt- und Einbaubedingungen

Mechanische Daten [1]

Maximum ratings [2] **Grenzwerte [2]**

Type Typ	Repetitive peak reverse voltage Periodische Spitzensperrspannung V_{RRM} [V]	Surge peak reverse voltage Stoßspitzensperrspannung V_{RSM} [V]
SB560-3G	60	60

Max. average forward rectified current, R-load Dauergrenzstrom in Einwegschaltung mit R-Last		T_A = 50°C	I_{FAV}	5 A
Repetitive peak forward current – Periodischer Spitzenstrom	f > 15 Hz	T_A = 50°C	I_{FRM}	40 A
Peak forward surge current Stoßstrom in Fluss-Richtung	Half sine-wave Sinus-Halbwelle	50 Hz (10 ms) 60 Hz (8.3 ms)	I_{FSM}	200 A 220 A
Rating for fusing Grenzlastintegral		t < 10 ms	i^2t	200 A^2s
Operating junction temperature – Sperrschichttemperatur Storage temperature – Lagerungstemperatur			T_j T_s	-50...+150°C -50...+175°C

1 Please note the detailed information on our website or at the beginning of the data book
Bitte beachten Sie die detaillierten Hinweise auf unserer Internetseite bzw. am Anfang des Datenbuches
2 T_A = 25°C unless otherwise specified – T_A = 25°C wenn nicht anders angegeben

Wisvalighting

RGB

HH-SRGB60F010W12-3535

FEATURES

- Mercury free, no UV or IR emissions.
- DC12V
- 12watts/m
- 5000Hrs LED life time
- Dimmable, RGB color changing
- CE,Rohs,UL,cUL

SPECIFICATIONS

Length	5 meters/Roll
Power	12watts/m
Width	10mm
LED Qty	60LED/m
Input Voltage	12VDC
Lumen	18-20lm/LED
PCB	2, 3 ,4 OZ
CRI	-
Waterproof	IP20/IP54/IP65/IP67/IP68

STRUCTURE