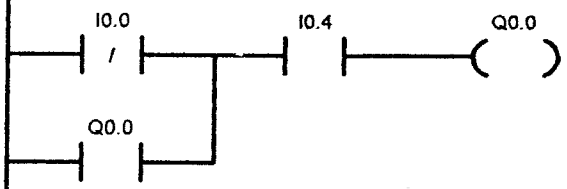
LAMPIRAN

Block: MAIN
Author:
Created: 07/24/2007 02:13:23 pm
Last Modified: 09/28/2007 12:26:54 pm

Symbol	Var Type	Data Type	Comment
	TEMP		
	TEMP		
	TEMP		
	TEMP		

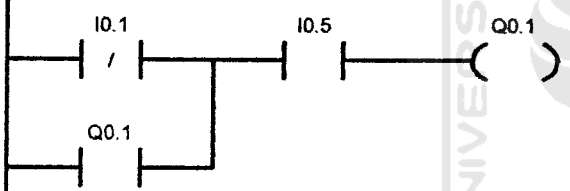
Network 1 PERANCANGAN SISTEM SCADA PADA PALANG PINTU KERETA API DUA JALUR BERBASIS PLC S7-200 DAN S7-300.

SENSOR A BEKERJA (I0.0) DAN PALANG PINTU KERETA API TERTUTUP (Q0.0) PADA DAERAH A.



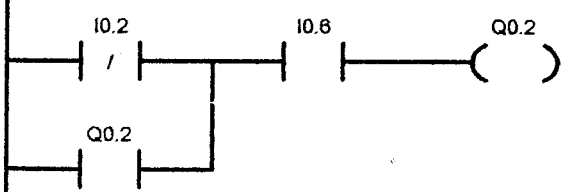
Network 2

SENSOR B BEKERJA (I0.1) DAN PALANG PINTU KERETA API TERBUKA (Q0.1) PADA DAERAH A.



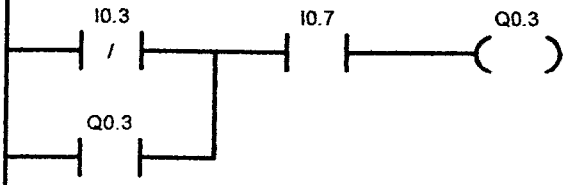
Network 3

SENSOR C BEKERJA (I0.2) DAN PALANG PINTU KERETA API TERTUTUP (Q0.2) PADA DAERAH B.



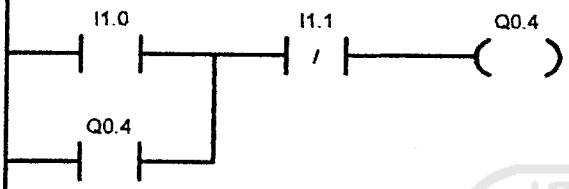
Network 4

SENSOR D BEKERJA (I0.3) DAN PALANG PINTU KERETA API TERBUKA (Q0.3) PADA DAERAH B.



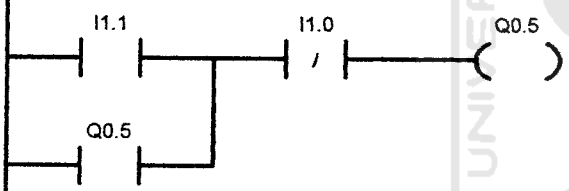
Network 5

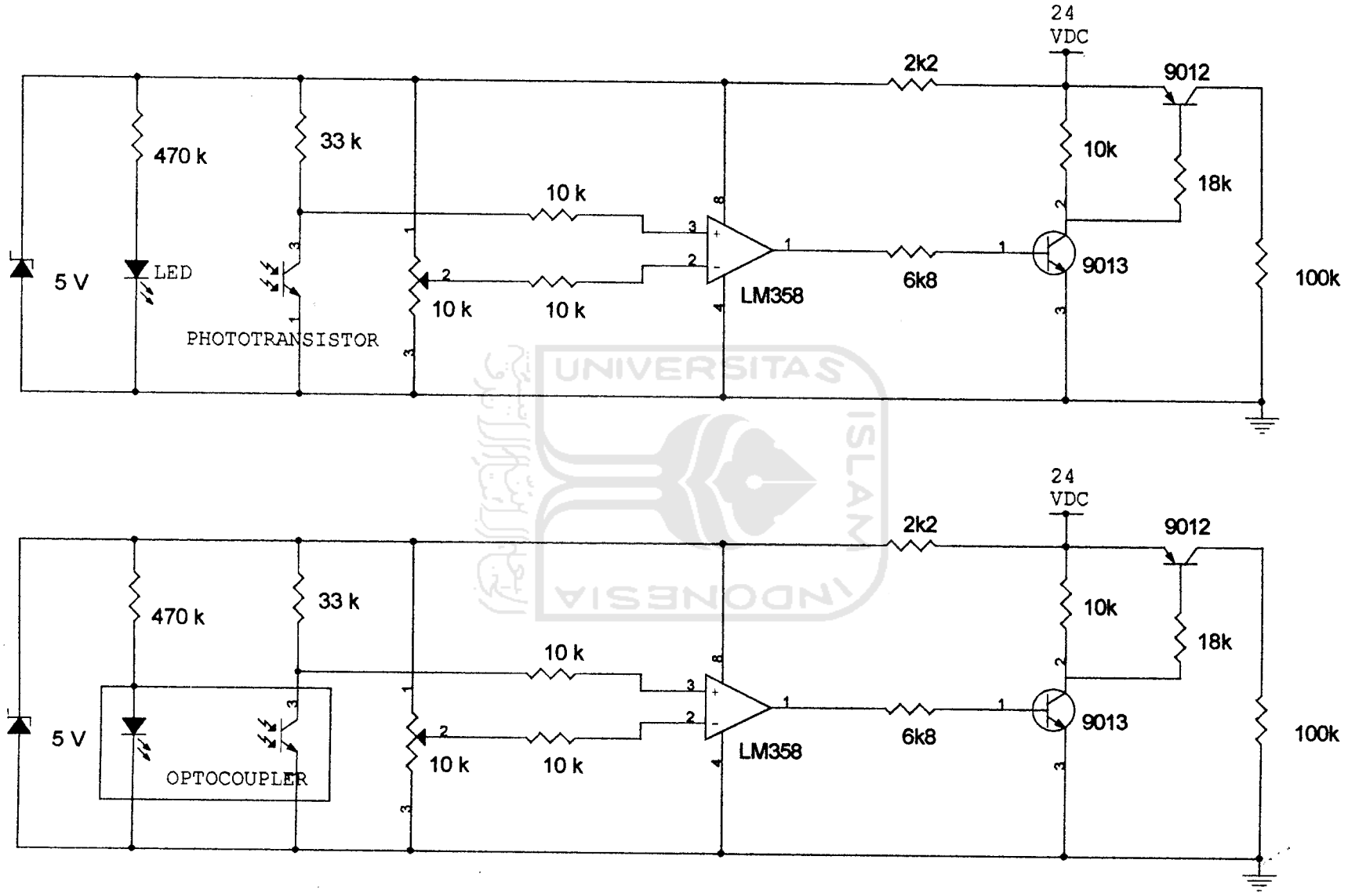
LAMPU INDIKATOR JALUR A (Q0.4) AKAN MENYALA SAAT KERETA API MELITASI LIMIT SWITCH JALUR A (I1.0) DAN SECARA OTOMATIS LAMPU INDIKATOR JALUR A AKAN MATI SAAT KERETA API MELINTASI LIMIT SWITCH JALUR B.



Network 6

LAMPU INDIKATOR JALUR B (Q0.5) AKAN MENYALA SAAT KERETA API MELITASI LIMIT SWITCH JALUR A (I1.1) DAN SECARA OTOMATIS LAMPU INDIKATOR JALUR B AKAN MATI SAAT KERETA API MELINTASI LIMIT SWITCH JALUR A.





Title	RANGKAIAN PENGUAT SINYAL PADA SENSOR DAN OPTOCOUPLER	
Size A	Document Number <Doc>	Rev <RevCode>
Date: Friday, December 07, 2007	Sheet 1 of 1	

LM358, LM258, LM2904, LM2904A, LM2904V, NCV2904

Single Supply Dual Operational Amplifiers

Utilizing the circuit designs perfected for Quad Operational Amplifiers, these dual operational amplifiers feature low power drain, a common mode input voltage range extending to ground/V_{EE}, and single supply or split supply operation. The LM358 series is equivalent to one−half of an LM324.

These amplifiers have several distinct advantages over standard operational amplifier types in single supply applications. They can operate at supply voltages as low as 3.0 V or as high as 32 V, with quiescent currents about one−fifth of those associated with the MC1741 (on a per amplifier basis). The common mode input range includes the negative supply, thereby eliminating the necessity for external biasing components in many applications. The output voltage range also includes the negative power supply voltage.

Features

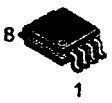
- Short Circuit Protected Outputs
- True Differential Input Stage
- Single Supply Operation: 3.0 V to 32 V
- Low Input Bias Currents
- Internally Compensated
- Common Mode Range Extends to Negative Supply
- Single and Split Supply Operation
- ESD Clamps on the Inputs Increase Ruggedness of the Device without Affecting Operation
- Pb−Free Packages are Available
- NCV Prefix for Automotive and Other Applications Requiring Site and Control Changes

ON Semiconductor®

http://onsemi.com

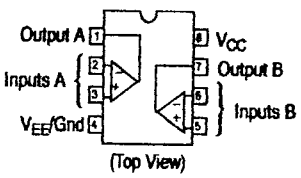
PDIP−8
N, AN, VN SUFFIX
CASE 626

SOIC−8
D, VD SUFFIX
CASE 751



Micro8™
DMR2 SUFFIX
CASE 846A

PIN CONNECTIONS



(Top View)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 10 of this data sheet.

DEVICE MARKING INFORMATION

See general marking information in the device marking section on page 11 of this data sheet.

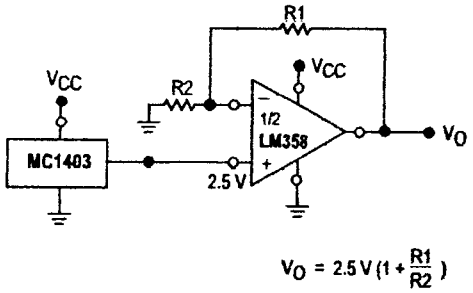
MAXIMUM RATINGS (T_A = +25°C, unless otherwise noted.)

Rating	Symbol	Value	Unit
Power Supply Voltages Single Supply Split Supplies	 V_{CC} V_{CC}, V_{EE}	 32 ±16	Vdc
Input Differential Voltage Range (Note 1)	V_{IDR}	±32	Vdc
Input Common Mode Voltage Range (Note 2)	V_{ICR}	−0.3 to 32	Vdc
Output Short Circuit Duration	t_{SC}	Continuous	
Junction Temperature	T_J	150	°C
Thermal Resistance, Junction−to−Air (Note 3)	$R_{\theta JA}$	238	°C/W
Storage Temperature Range	T_{stg}	−55 to +125	°C
ESD Protection at any Pin Human Body Model Machine Model	V_{esd}	 2000 200	V
Operating Ambient Temperature Range LM258 LM358 LM2904/LM2904A LM2904V, NCV2904 (Note 4)	T_A	 −25 to +85 0 to +70 −40 to +105 −40 to +125	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

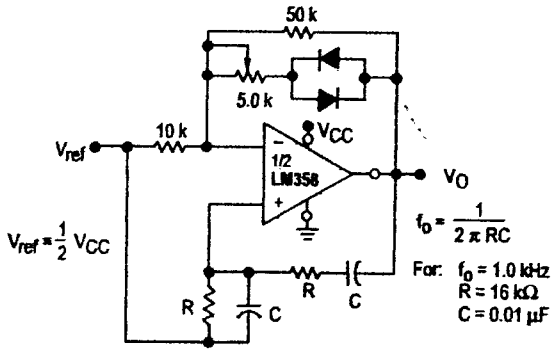
1. Split Power Supplies.
2. For Supply Voltages less than 32 V the absolute maximum input voltage is equal to the supply voltage.
3. $R_{\theta JA}$ for Case 846A.
4. *NCV2904 is qualified for automotive use.*

Figure 7. Voltage Reference



$$V_O = 2.5\,V\left(1 + \frac{R1}{R2}\right)$$

Figure 8. Wien Bridge Oscillator

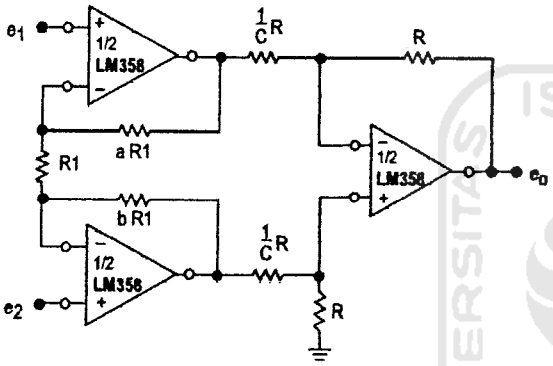


$$V_{ref} = \frac{1}{2} V_{CC}$$

$$f_o = \frac{1}{2\pi RC}$$

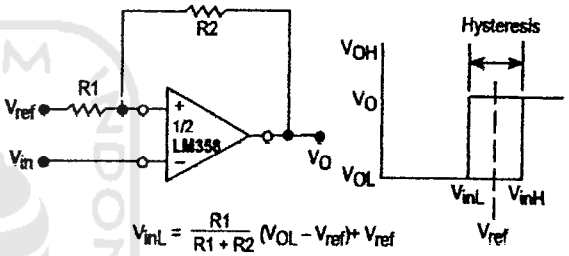
For: f_o = 1.0 kHz
R = 16 kΩ
C = 0.01 µF

Figure 9. High Impedance Differential Amplifier



$$e_o = C\,(1 + a + b)\,(e_2 - e_1)$$

Figure 10. Comparator with Hysteresis

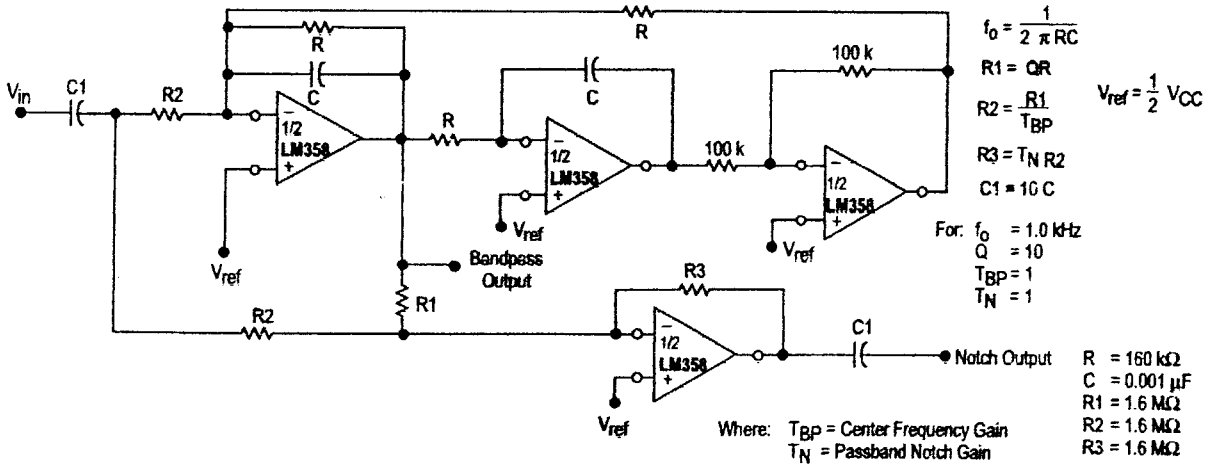


$$V_{inL} = \frac{R1}{R1 + R2}(V_{OL} - V_{ref}) + V_{ref}$$

$$V_{inH} = \frac{R1}{R1 + R2}(V_{OH} - V_{ref}) + V_{ref}$$

$$H = \frac{R1}{R1 + R2}(V_{OH} - V_{OL})$$

Figure 11. Bi-Quad Filter



$$f_o = \frac{1}{2\pi RC}$$

R1 = QR

$$R2 = \frac{R1}{T_{BP}}$$

R3 = T_N R2

C1 = 10 C

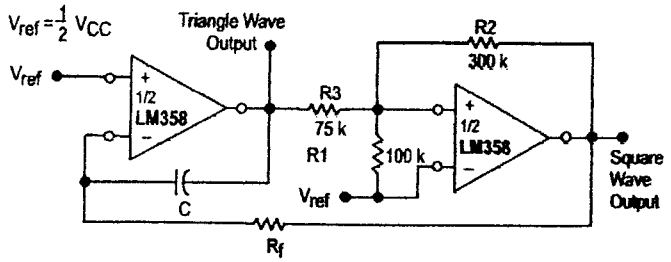
$$V_{ref} = \frac{1}{2} V_{CC}$$

For: f_o = 1.0 kHz
Q = 10
T_{BP} = 1
T_N = 1

Where: T_{BP} = Center Frequency Gain
T_N = Passband Notch Gain

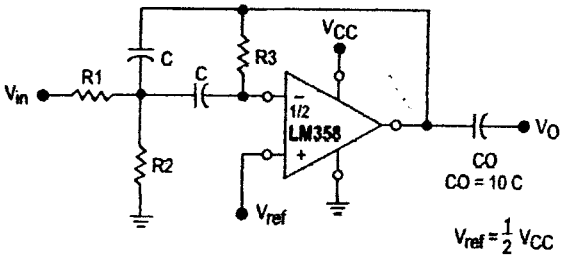
R = 160 kΩ
C = 0.001 µF
R1 = 1.6 MΩ
R2 = 1.6 MΩ
R3 = 1.6 MΩ

Figure 12. Function Generator



$$f = \frac{R1 + R_C}{4 C R_f R1} \quad \text{if, } R3 = \frac{R2\,R1}{R2 + R1}$$

Figure 13. Multiple Feedback Bandpass Filter



Given: f_0 = center frequency
$A(f_0)$ = gain at center frequency

Choose value f_o, C

Then: $R3 = \frac{Q}{\pi f_0 C}$

$R1 = \frac{R3}{2 A(f_0)}$

$R2 = \frac{R1\,R3}{4Q^2 R1 - R3}$

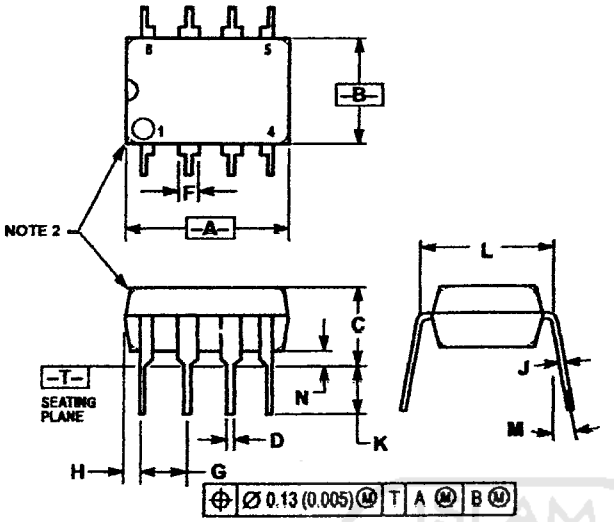
For less than 10% error from operational amplifier. $\frac{Q_0 f_0}{BW} < 0.1$

Where f_0 and BW are expressed in Hz.

If source impedance varies, filter may be preceded with voltage follower buffer to stabilize filter parameters.

OUTLINE DIMENSIONS

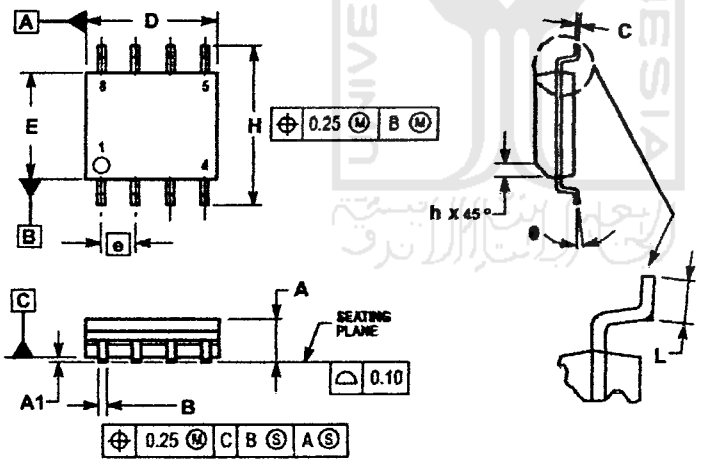
N SUFFIX
PLASTIC PACKAGE
CASE 626–05
ISSUE K



NOTES:
1. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
2. PACKAGE CONTOUR OPTIONAL (ROUND OR SQUARE CORNERS).
3. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	9.40	10.16	0.370	0.400
B	6.10	6.60	0.240	0.260
C	3.94	4.45	0.155	0.175
D	0.36	0.51	0.015	0.020
F	1.02	1.78	0.040	0.070
G	2.54 BSC		0.100 BSC	
H	0.76	1.27	0.030	0.050
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.62 BSC		0.300 BSC	
M	—	10°	—	10°
N	0.76	1.01	0.030	0.040

D SUFFIX
PLASTIC PACKAGE
CASE 751–05
(SO–8)
ISSUE R



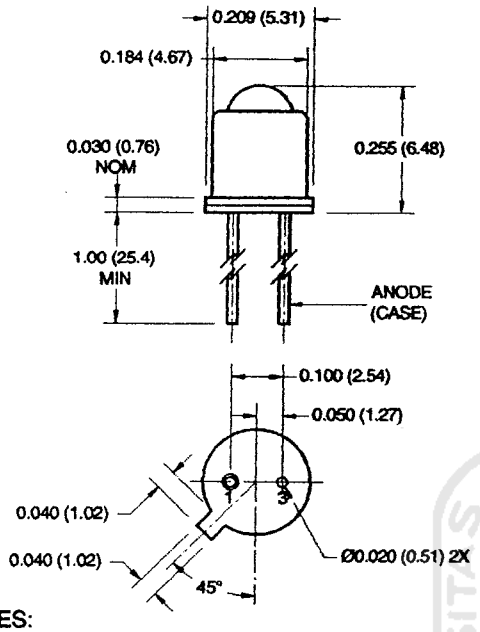
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSION D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE MOLD PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS	
DIM	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.35	0.49
C	0.18	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.25
θ	0°	7°

FAIRCHILD
SEMICONDUCTOR®

1N6264
GaAs INFRARED EMITTING DIODE

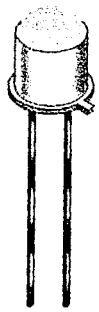
PACKAGE DIMENSIONS



NOTES:

1. Dimensions for all drawings are in inches (mm).
2. Tolerance of ± .010 (.25) on all non-nominal dimensions unless otherwise specified.

FEATURES

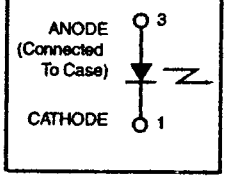


- Good optical to mechanical alignment
- Mechanically and wavelength matched to the TO-18 series phototransistor
- Hermetically sealed package
- High irradiance level
- (*) Indicates JEDEC registered values

DESCRIPTION

- The 1N6264 is a 940 nm LED in a narrow angle, TO-46 package.

SCHEMATIC



1. Derate power dissipation linearly 1.70 mW/°C above 25°C ambient.
2. Derate power dissipation linearly 13.0 mW/°C above 25°C case.
3. RMA flux is recommended.
4. Methanol or isopropyl alcohols are recommended as cleaning agents.
5. Soldering iron tip 1/16" (1.6mm) minimum from housing.
6. As long as leads are not under any stress or spring tension
7. Total power output, P_O, is the total power radiated by the device into a solid angle of 2 π steradians.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise specified)

Parameter	Symbol	Rating	Unit
* Operating Temperature	T_{OPR}	-65 to +125	°C
* Storage Temperature	T_{STG}	-65 to +150	°C
* Soldering Temperature (Iron)(3,4,5 and 6)	T_{SOL-I}	240 for 5 sec	°C
* Soldering Temperature (Flow)(3,4 and 6)	T_{SOL-F}	260 for 10 sec	°C
* Continuous Forward Current	I_F	100	mA
* Forward Current (pw, 1µs; 200Hz)	I_F	10	A
* Reverse Voltage	V_R	3	V
* Power Dissipation (T_A = 25°C)(1)	P_D	170	mW
Power Dissipation (T_C = 25°C)(2)	P_D	1.3	W

ELECTRICAL / OPTICAL CHARACTERISTICS (T_A =25°C) (All measurements made under pulse conditions)

PARAMETER	TEST CONDITIONS	SYMBOL	MIN	TYP	MAX	UNITS
* Peak Emission Wavelength	I_F = 100 mA	λ_P	935	—	955	nm
Emission Angle at 1/2 Power	I_F = 100 mA	θ	—	±8	—	Deg.
* Forward Voltage	I_F = 100 mA	V_{F1}	—	—	1.7	V
* Reverse Leakage Current	V_R = 3 V	I_R	—	—	10	µA
* Total Power	I_F = 100 mA	P_O	6	—	—	mW
Rise Time 0-90% of output		t_r	—	1.0	—	µs
Fall Time 100-10% of output		t_f	—	1.0	—	µs

1N5722 THRU 1N5725
N-P-N PLANAR SILICON PHOTOTRANSISTORS

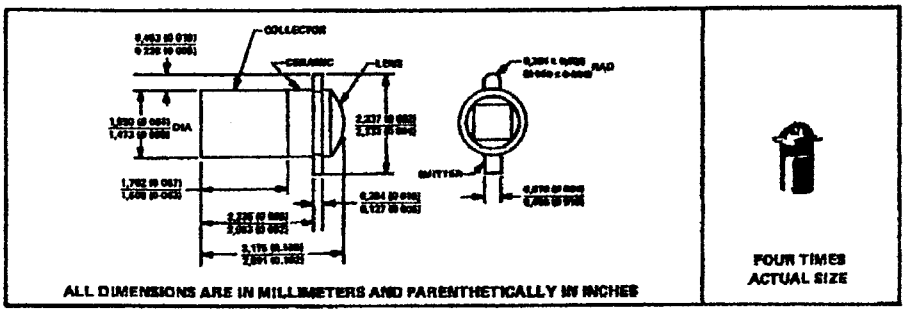
D874, MARCH 1972—REVISED APRIL 1987

T-41-61

JEDEC-REGISTERED VERSIONS OF TIL601 THRU TIL604

- Recommended for Application in Character Recognition, Tape and Card Readers, Velocity Indicators, and Encoders
- Unique Package Design Allows for Assembly into Printed Circuit Boards

*mechanical data



*absolute maximum ratings at 25°C case temperature (unless otherwise noted)

Collector-Emitter Voltage	50 V
Emitter-Collector Voltage	7 V
Continuous Device Dissipation at (or below) 25°C Case Temperature (See Note 1)	50 mW
Operating Case Temperature Range	−65°C to 125°C
Storage Temperature Range	−65°C to 150°C
Soldering Temperature (10 seconds)	240°C

*electrical characteristics at 25°C case temperature (unless otherwise noted)

PARAMETER		TEST CONDITIONS	TYPE	MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 100 μA, E_e = 0	ALL	50			V
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage	I_E = 100 μA, E_e = 0	ALL	7			V
I_D	Dark Current	V_{CE} = 30 V, E_e = 0	ALL			25	nA
		V_{CE} = 30 V, E_e = 0, T_C = 100°C	ALL		1		μA
I_L	Light Current	V_{CE} = 5 V, E_e = 20 mW/cm², See Note 2	1N5722	0.5		2	mA
			1N5723	2		5	
			1N5724	4		8	
			1N5725	7			
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 0.4 mA, E_e = 20 mW/cm², See Note 2	ALL		0.16		V

NOTES: 1. Derate linearly to 125°C at the rate of 0.5 mW/°C.
2. Irradiance (E_e) is the radiant power per unit area incident upon a surface. For this measurement the source is an unfiltered tungsten linear filament lamp operating at a color temperature of 2870 K.

*JEDEC registered data. This data sheet contains all applicable JEDEC registered data in effect at the time of publication.

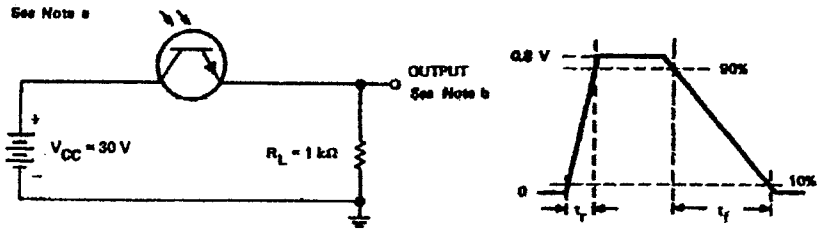
1N6722 THRU 1N5725
N-P-N PLANAR SILICON PHOTOTRANSISTORS

T-41-61

*switching characteristics at 25°C case temperature

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_r Rise Time	V_{CC} = 30 V, I_L = 800 μA,		1.5	2.5	μs
t_f Fall Time	R_L = 1 kΩ, See Figure 1		15	25	

*PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT OUTPUT VOLTAGE WAVEFORM

FIGURE 1

NOTES: a. Input irradiance is supplied by a pulsed xenon bulb source. Incident irradiation is adjusted for I_L = 800 μA.
b. Output waveform is monitored on an oscilloscope with the following characteristics: t_r ≤ 26 ns, R_{in} ≥ 1 MΩ, C_{in} ≤ 20 pF.

*JEDEC registered data

TYPICAL CHARACTERISTICS

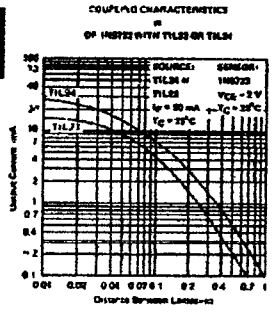


FIGURE 2

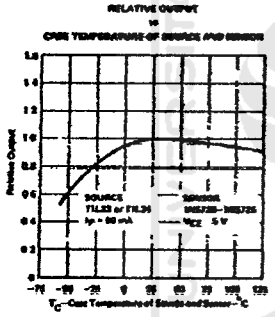


FIGURE 3

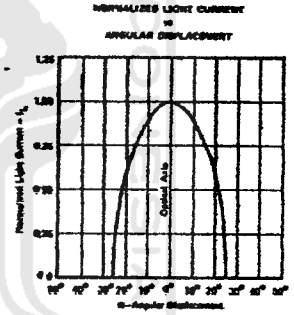
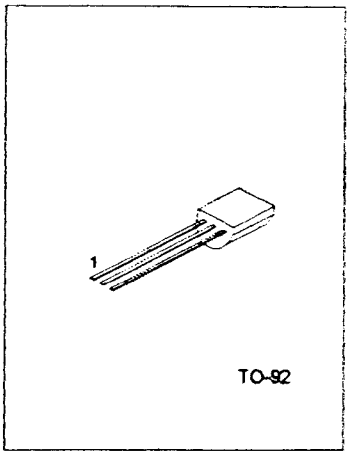


FIGURE 4

TEXAS INSTRUMENTS
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

UTC 9012 PNP EPITAXIAL SILICON TRANSISTOR

1W OUTPUT AMPLIFIER OF POTABLE RADIOS IN CLASS B PUSH-PULL OPERATION



1:EMITTER 2:BASE 3:COLLECTOR

FEATURES

*High total power dissipation. (625mW)
*High collector current. (-500mA)
*Excellent hFE linearity
*Complementary to UTC 9013

ABSOLUTE MAXIMUM RATINGS (Ta=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATING	UNIT
Collector-base voltage	V_{CBO}	-40	V
Collector-emitter voltage	V_{CEO}	-20	V
Emitter-base voltage	V_{EBO}	-5	V
Collector current	I_C	-500	mA
Collector dissipation	P_C	625	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{STG}	-55 ~ +150	°C

ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise specified)

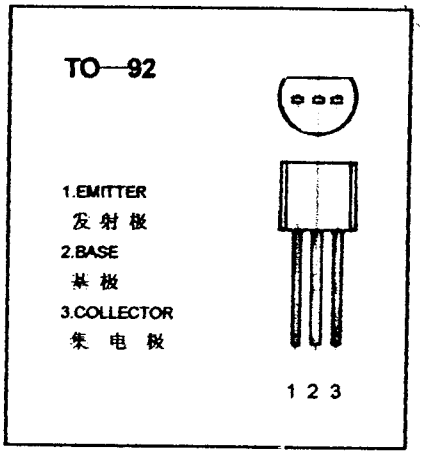
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-base breakdown voltage	BV_{CBO}	I_C=-100μA,I_E=0	-40			V
Collector-emitter breakdown voltage	BV_{CEO}	I_C=-1mA,I_B=0	-20			V
Emitter-base breakdown voltage	BV_{EBO}	I_E=-100μA, I_C=0	-5			V
Collector cutoff current	I_{CBO}	V_{CB}=-25V,I_E=0			-100	nA
Emitter cutoff current	I_{EBO}	V_{EB}=-3V,I_C=0			-100	nA
DC current gain	hFE1	V_{CE}=-1V,I_C=-50mA	64	120	300	
	hFE2	V_{CE}=-1V,I_C=-500mA	40	90		
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C=-500mA,I_B=-50mA		-0.18	-0.6	V
Base-emitter saturation voltage	$V_{BE(sat)}$	I_C=-500mA,I_B=-50mA		-0.95	-1.2	V
Base-emitter on voltage	$V_{BE(on)}$	V_{CE}=-1V,I_C=-10mA	-0.6	-0.67	-0.7	V

CLASSIFICATION OF hFE1

RANK	D	E	F	G	H	I
RANGE	64-91	78-112	96-135	112-166	144-202	190-300

9013

NPN SILICON TRANSISTOR



FEATURES

特　　征

Power dissipation　　(最大耗散功率)

P_{CM} : 0.625 W (Tamb=25℃)

Collector current　　(最大集电极电流)

I_{CM} : 0.5 A

Collector-base voltage　　(集电极-基极击穿电压)

$V_{(BR)CBO}$: 45 V

ELECTRICAL CHARACTERISTICS (Tamb=25℃ unless otherwise specified)

电　　特　　性　　(环境温度　　除　非　另　有　规　定)

Parameter 参　数	Symbol 符　号	Test conditions 测　试　条　件	MIN 最小值	TYP 典型值	MAX 最大值	UNIT 单位
Collector-base breakdown voltage 集电极--基极击穿电压	$V(BR)_{CBO}$	Ic= 100 μA, I_E=0	45			V
Collector-emitter breakdown voltage 集电极--发射极击穿电压	$V(BR)_{CEO}$	Ic= 0.1 mA, I_B=0	25			V
Emitter-base breakdown voltage 发射极--基极击穿电压	$V(BR)_{EBO}$	I_E= 100 μA, I_C=0	5			V
Collector cut-off current 集电极--基极截止电流	I_{CBO}	V_{CB}= 40 V I_E=0			0.1	μA
Collector cut-off current 集电极--发射极截止电流	I_{CEO}	V_{CE}= 20 V I_B=0			0.1	μA
Emitter cut-off current 发射极--基极截止电流	I_{EBO}	V_{EB}= 5 V, I_C=0			0.1	μA
DC current gain(note) 直流电流增益	$H_{FE(1)}$	V_{CE}= 1 V, I_C= 50 mA	64		300	
	$H_{FE(2)}$	V_{CE}= 1V, I_C=500 mA	40			
Collector-emitter saturation voltage 集电极--发射极饱和压降	V_{CE}(sat)	I_C= 500 mA, I_B=50 mA			0.6	V
Base-emitter saturation voltage 基极-发射极饱和压降	V_{BE}(sat)	I_C= 500mA, I_B= 50 mA			1.2	V
Base-emitter voltage 基极--发射极正向电压	V_{BE}	I_E=100mA			1.4	V
Transition frequency 特　征　频　率	f_T	V_{CE}= 6 V, I_C= 20 mA f =30MHz	150			MHz

CLASSIFICATION OF $H_{FE(1)}$　　(分类)

Rank 档次	D	E	F	G	H	I
Range 范围	64-91	78-112	96-135	112-166	144-220	190-300

Wing Shing Computer Components Co., (H.K.)Ltd.　Tel:(852)2341 9276　Fax:(852)2797 8153
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MOTOROLA

MC7800, MC7800A, LM340, LM340A Series

Three-Terminal Positive Voltage Regulators

THREE–TERMINAL POSITIVE FIXED VOLTAGE REGULATORS

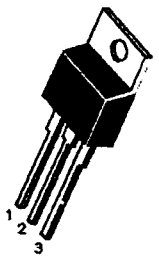
SEMICONDUCTOR TECHNICAL DATA

These voltage regulators are monolithic integrated circuits designed as fixed–voltage regulators for a wide variety of applications including local, on–card regulation. These regulators employ internal current limiting, thermal shutdown, and safe–area compensation. With adequate heatsinking they can deliver output currents in excess of 1.0 A. Although designed primarily as a fixed voltage regulator, these devices can be used with external components to obtain adjustable voltages and currents.

- Output Current in Excess of 1.0 A
- No External Components Required
- Internal Thermal Overload Protection
- Internal Short Circuit Current Limiting
- Output Transistor Safe–Area Compensation
- Output Voltage Offered in 2% and 4% Tolerance
- Available in Surface Mount D^2PAK and Standard 3–Lead Transistor Packages
- Previous Commercial Temperature Range has been Extended to a Junction Temperature Range of –40°C to +125°C

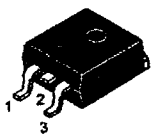
T SUFFIX
PLASTIC PACKAGE
CASE 221A

Heatsink surface connected to Pin 2.



Pin 1. Input
2. Ground
3. Output

D2T SUFFIX
PLASTIC PACKAGE
CASE 936
(D^2PAK)

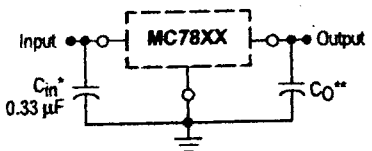


Heatsink surface (shown as terminal 4 in case outline drawing) is connected to Pin 2.

DEVICE TYPE/NOMINAL OUTPUT VOLTAGE

MC7805AC LM340AT–5 MC7805C LM340T–5	5.0 V	MC7812C LM340T–12	12 V
MC7806AC MC7806C	6.0 V	MC7815AC LM340AT–15 MC7815C LM340T–15	15 V
MC7808AC MC7808C	8.0 V	MC7818AC MC7818C	18 V
MC7809C	9.0 V	MC7824AC MC7824C	24 V
MC7812AC LM340AT–12	12 V		

STANDARD APPLICATION



A common ground is required between the input and the output voltages. The input voltage must remain typically 2.0 V above the output voltage even during the low point on the input ripple voltage.

XX, These two digits of the type number indicate nominal voltage.

* C_{in} is required if regulator is located an appreciable distance from power supply filter.

** C_O is not needed for stability; however, it does improve transient response. Values of less than 0.1 µF could cause instability.

ORDERING INFORMATION

Device	Output Voltage Tolerance	Operating Temperature Range	Package
MC78XXACT	2%	T_J = –40° to +125°C	Insertion Mount
LM340AT–XX			
MC78XXACD2T			Surface Mount
MC78XXCT	4%		Insertion Mount
LM340T–XX			
MC78XXCD2T			Surface Mount

XX indicates nominal voltage.