




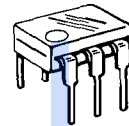
6-Pin DIP Optoisolators Transistor Output

These devices consist of a gallium arsenide infrared emitting diode optically coupled to a monolithic silicon phototransistor detector.

- Convenient Plastic Dual-In-Line Package
- High Current Transfer Ratio — 100% Minimum at Spec Conditions
- Guaranteed Switching Speeds
- High Input-Output Isolation Guaranteed — 7500 Volts Peak
- UL Recognized. File Number E54915 
- VDE approved per standard 0883/6.80 (Certificate number 41853), with additional approval to DIN IEC380/VDE0806, IEC435/VDE0805, IEC65/VDE0860, VDE0110b, covering all other standards with equal or less stringent requirements, including IEC204/VDE0113, VDE0160, VDE0832, VDE0833, etc. 
- Meets or Exceeds All JEDEC Registered Specifications 
- Special lead form available (add suffix "T" to part number) which satisfies VDE0883/6.80 requirement for 8 mm minimum creepage distance between input and output solder pads.
- Various lead form options available. Consult "Optoisolator Lead Form Options" data sheet for details.

4N35
4N36
4N37

**6-PIN DIP
 OPTOISOLATORS
 TRANSISTOR
 OUTPUT**



**CASE 730A-02
 PLASTIC**

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
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INPUT LED

Reverse Voltage	V_R	6	Volts
Forward Current — Continuous	I_F	60	mA
LED Power Dissipation ($\alpha T_A = 25^\circ\text{C}$ with Negligible Power in Output Detector Derate above 25°C)	P_D	120	mW
		1.41	mW/ $^\circ\text{C}$

OUTPUT TRANSISTOR

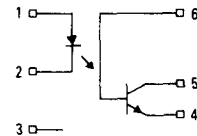
Collector-Emitter Voltage	V_{CEO}	30	Volts
Emitter-Base Voltage	V_{EBO}	7	Volts
Collector-Base Voltage	V_{CBO}	70	Volts
Collector Current — Continuous	I_C	150	mA
Detector Power Dissipation ($\alpha T_A = 25^\circ\text{C}$ with Negligible Power in Input LED Derate above 25°C)	P_D	150	mW
		1.76	mW/ $^\circ\text{C}$

TOTAL DEVICE

Isolation Source Voltage (1) (Peak ac Voltage, 60 Hz, 1 sec Duration)	V_{ISO}	7500	Vac
Total Device Power Dissipation ($\alpha T_A = 25^\circ\text{C}$ Derate above 25°C)	P_D	250 2.94	mW mW/ $^\circ\text{C}$
Ambient Operating Temperature Range	T_A	-55 to +100	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^\circ\text{C}$
Soldering Temperature (10 seconds, 1/16" from case)	—	260	$^\circ\text{C}$

(1) Isolation surge voltage is an internal device dielectric breakdown rating.
 For this test, Pins 1 and 2 are common, and Pins 4, 5 and 6 are common.

SCHEMATIC



1. LED ANODE
2. LED CATHODE
3. N.C.
4. EMITTER
5. COLLECTOR
6. BASE

4N35, 4N36, 4N37

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

Characteristic	Symbol	Min	Typ	Max	Unit
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INPUT LED

Forward Voltage (I _F = 10 mA)	T _A = 25°C T _A = -55°C T _A = 100°C	V _F	0.8	1.15	1.5	V
			0.9	1.3	1.7	
			0.7	1.05	1.4	
Reverse Leakage Current (V _R = 6 V)		I _R	—	—	10	μA
Capacitance (V = 0 V, f = 1 MHz)		C _J	—	18	—	pF

OUTPUT TRANSISTOR

Collector-Emitter Dark Current (V _{CE} = 10 V, T _A = 25°C) (V _{CE} = 30 V, T _A = 100°C)	I _{CEO}	—	1	50	nA μA
Collector-Base Dark Current (V _{CB} = 10 V) T _A = 25°C T _A = 100°C	I _{CBO}	—	0.2 100	20 —	nA
Collector-Emitter Breakdown Voltage (I _C = 1 mA)	V _{(BR)CEO}	30	45	—	V
Collector-Base Breakdown Voltage (I _C = 100 μA)	V _{(BR)CBO}	70	100	—	V
Emitter-Base Breakdown Voltage (I _E = 100 μA)	V _{(BR)EBO}	7	7.8	—	V
DC Current Gain (I _C = 2 mA, V _{CE} = 5 V)	h _{FE}	—	400	—	—
Collector-Emitter Capacitance (f = 1 MHz, V _{CE} = 0)	C _{CE}	—	7	—	pF
Collector-Base Capacitance (f = 1 MHz, V _{CB} = 0)	C _{CB}	—	19	—	pF
Emitter-Base Capacitance (f = 1 MHz, V _{EB} = 0)	C _{EB}	—	9	—	pF

COUPLED

Output Collector Current (I _F = 10 mA, V _{CE} = 10 V)	T _A = 25°C T _A = -55°C T _A = 100°C	I _C	10	30	—	mA
			4	—	—	
			4	—	—	
Collector-Emitter Saturation Voltage (I _C = 5 mA, I _F = 10 mA)		V _{CE(sat)}	—	0.14	0.3	V
Turn-On Time	(I _C = 2 mA, V _{CC} = 10 V, R _L = 100 Ω, Figure 11)	t _{on}	—	7.5	10	μs
Turn-Off Time		t _{off}	—	5.7	10	
Rise Time		t _r	—	3.2	—	
Fall Time		t _f	—	4.7	—	
Isolation Voltage (f = 60 Hz, t = 1 sec)		V _{ISO}	7500	—	—	Vac(pk)
Isolation Current (V _{I-O} = 3550 Vpk)	4N35	I _{ISO}	—	—	100	μA
(V _{I-O} = 2500 Vpk)	4N36		—	—	100	
(V _{I-O} = 1500 Vpk)	4N37		—	8	100	
Isolation Resistance (V = 500 V)		R _{ISO}	10 ¹¹	—	—	Ω
Isolation Capacitance (V = 0 V, f = 1 MHz)		C _{ISO}	—	0.2	2	pF

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TYPICAL CHARACTERISTICS

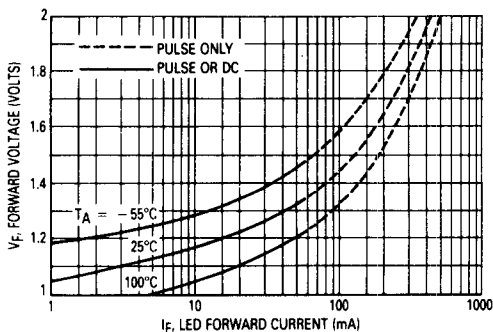


Figure 1. LED Forward Voltage versus Forward Current

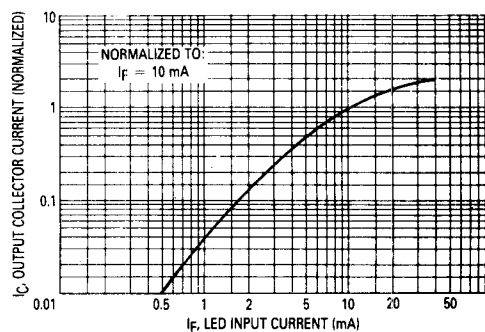


Figure 2. Output Current versus Input Current

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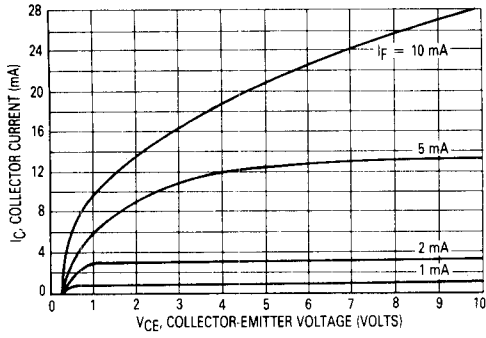


Figure 3. Collector Current versus Collector-Emitter Voltage

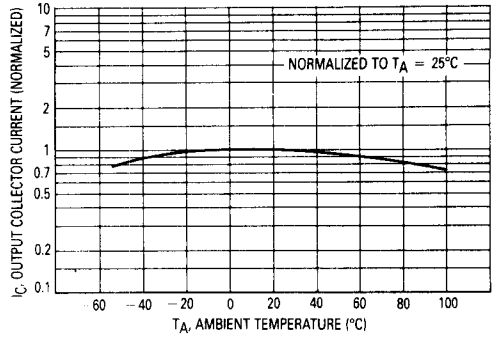


Figure 4. Output Current versus Ambient Temperature

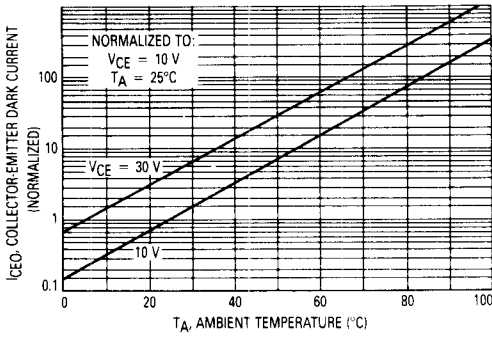


Figure 5. Dark Current versus Ambient Temperature

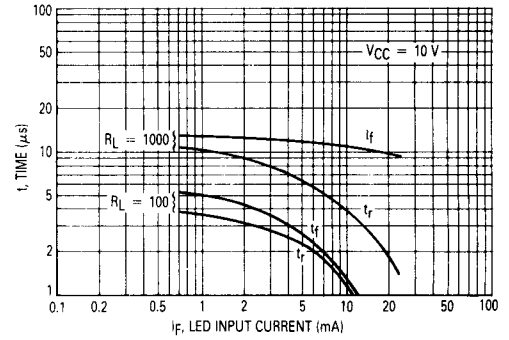


Figure 6. Rise and Fall Times

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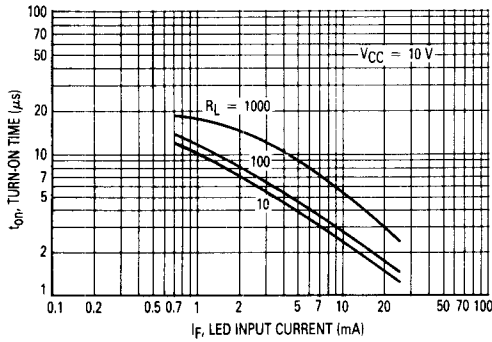


Figure 7. Turn-On Switching Times

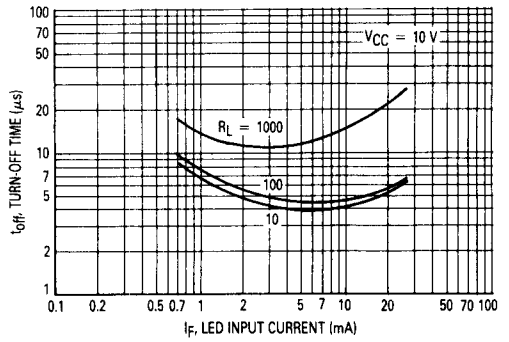


Figure 8. Turn-Off Switching Times

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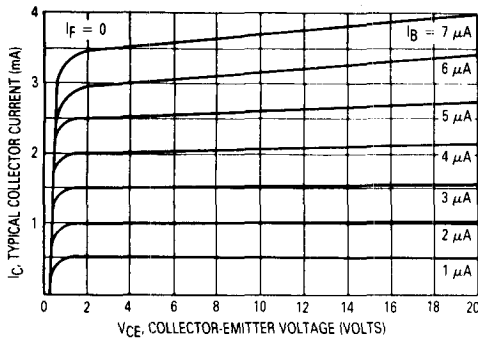


Figure 9. DC Current Gain (Detector Only)

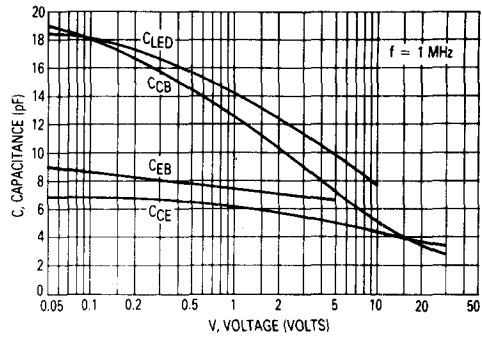


Figure 10. Capacitances versus Voltage

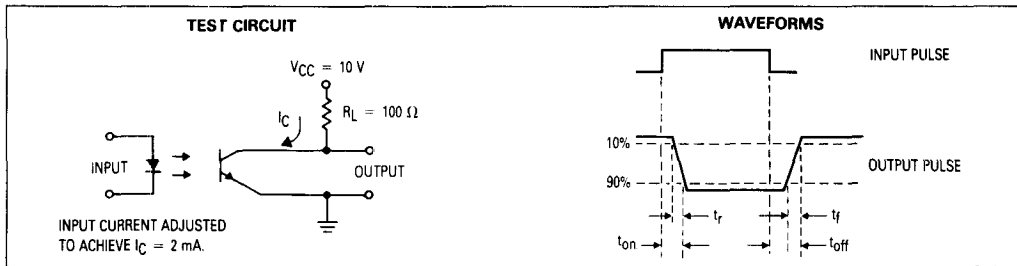


Figure 11. Switching Times

OUTLINE DIMENSIONS

