Agilent 4N25 Phototransistor Optocoupler General Purpose Type

Data Sheet

Description

The 4N25 is an optocoupler for general purpose applications. It contains a light emitting diode optically coupled to a phototransistor. It is packaged in a 6-pin DIP package and available in wide-lead spacing option and lead bend SMD option. Response time, t_r, is typically 3 µs and minimum CTR is 20% at input current of 10 mA.

Ordering Information

Specify part number followed by Option Number (if desired).

4N25-XXX
└ Option Number

060	=	VDE0884 Option
W00	=	0.4" Lead Spacing Option
300	=	Lead Bend SMD Option
500	=	Tape and Reel Packaging Option

Features

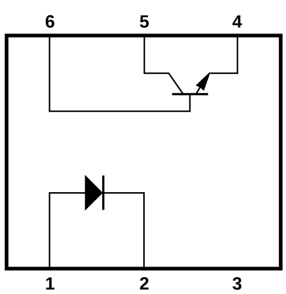
- **Response time (t_r: typ., 3 µs at V_{CE} = 10 V, I_C = 2 mA, R_L = 100 Ω)**
- **Current Transfer Ratio (CTR: min. 20% at I_F = 10 mA, V_{CE} = 10 V)**
- **Input-output isolation voltage (V_{iso} = 2500 Vrms)**
- **Dual-in-line package**
- **UL approved**
- **CSA approved**
- **VDE approved**
- **Options available:**
  - **Leads with 0.4" (10.16 mm) spacing (W00)**
  - **Leads bends for surface mounting (300)**
  - **Tape and reel for SMD (500)**
  - **VDE 0884 approvals (060)**

Applications

- **I/O interfaces for computers**
- **System appliances, measuring instruments**
- **Signal transmission between circuits of different potentials and impedances**

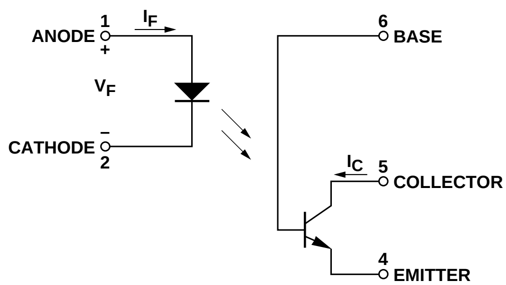
Functional Diagram

PIN NO. AND INTERNAL CONNECTION DIAGRAM



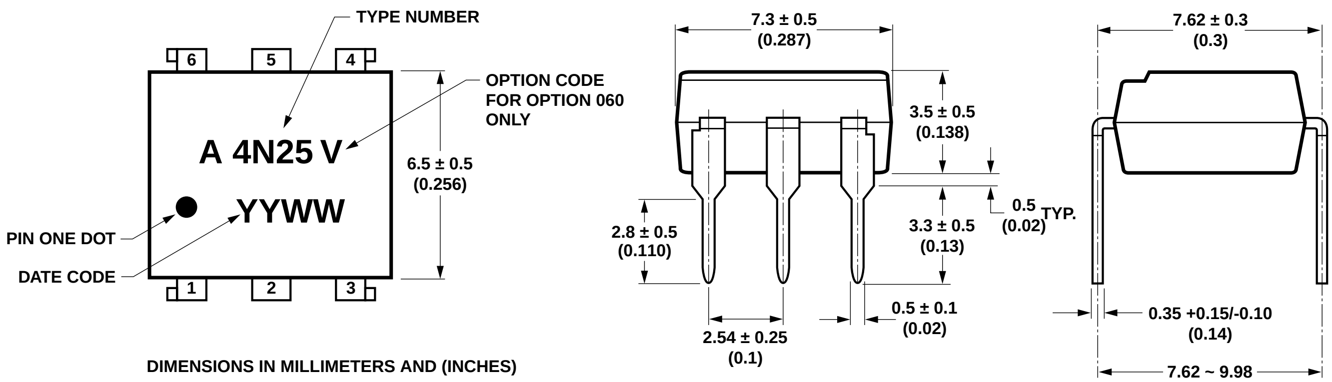
1. ANODE
2. CATHODE
3. NC
4. EMITTER
5. COLLECTOR
6. BASE

Schematic



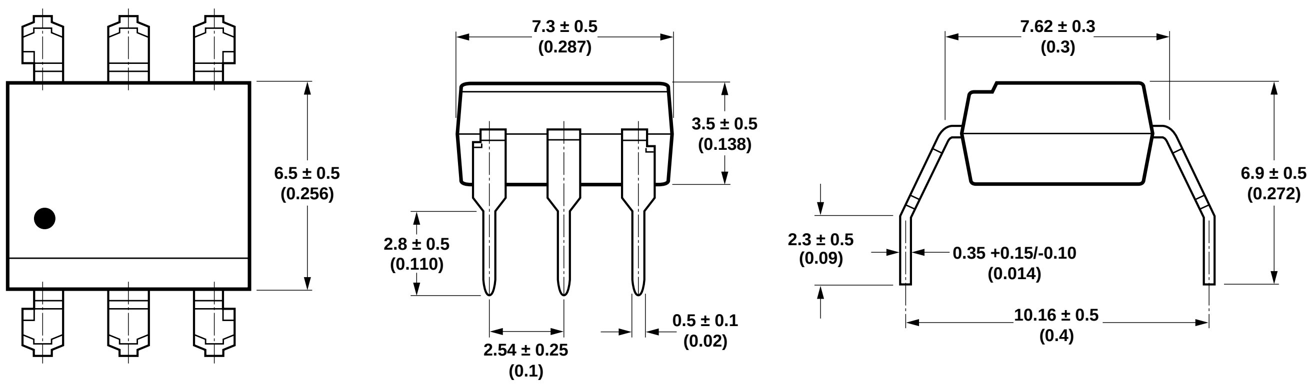
CAUTION: It is advised that normal static precautions be taken in handling and assembly of this component to prevent damage and/or degradation which may be induced by ESD.

Package Outline Drawings



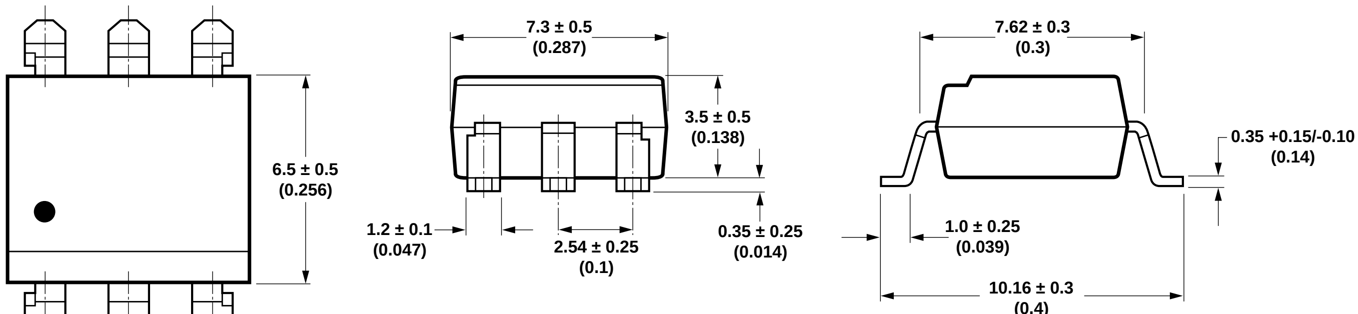
DIMENSIONS IN MILLIMETERS AND (INCHES)

Package Outline – Option W00



DIMENSIONS IN MILLIMETERS AND (INCHES)

Package Outline – Option 300



DIMENSIONS IN MILLIMETERS AND (INCHES)

Absolute Maximum Ratings

Storage Temperature, T_S	–55˚C to +150˚C
Operating Temperature, T_A	–55˚C to +100˚C
Lead Solder Temperature, max. (1.6 mm below seating plane)	260˚C for 10 s
Average Forward Current, I_F	80 mA
Reverse Input Voltage, V_R	6 V
Input Power Dissipation, P_I	150 mW
Collector Current, I_C	100 mA
Collector-Emitter Voltage, V_{CEO}	30 V
Emitter-Collector Voltage, V_{ECO}	7 V
Collector-Base Voltage, V_{CBO}	70 V
Collector Power Dissipation	150 mW
Total Power Dissipation	250 mW
Isolation Voltage, V_{iso} (AC for 1 minute, R.H. = 40 ~ 60%)	2500 Vrms

Electrical Specifications (T_A = 25˚C)

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Forward Voltage	V_F	–	1.2	1.5	V	I_F = 10 mA
Reverse Current	I_R	–	–	10	µA	V_R = 4 V
Terminal Capacitance	C_t	–	50	–	pF	V = 0, f = 1 KHz
Collector Dark Current	I_{CEO}	–	–	50	nA	V_{CE} = 10 V, I_F = 0
Collector-Emitter Breakdown Voltage	BV_{CEO}	30	–	–	V	I_C = 0.1 mA, I_F = 0
Emitter-Collector Breakdown Voltage	BV_{ECO}	7	–	–	V	I_E = 10 µA, I_F = 0
Collector-Base Breakdown Voltage	BV_{CBO}	70	–	–	V	I_C = 0.1 mA, I_F = 0
Collector Current	I_C	2	–	–	mA	I_F = 10 mA
*Current Transfer Ratio	CTR	20	–	–	%	V_{CE} = 10 V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	–	0.1	0.5	V	I_F = 50 mA, I_C = 2 mA
Response Time (Rise)	t_r	–	3	–	µs	V_{CE} = 10 V, I_C = 2 mA
Response Time (Fall)	t_f	–	3	–	µs	R_L = 100 Ω
Isolation Resistance	R_{iso}	5 x 10^{10}	1 x 10^{11}	–	Ω	DC 500 V 40 ~ 60% R.H.
Floating Capacitance	C_f	–	1	–	pF	V = 0, f = 1 MHz

$$* \ CTR = \frac{I_C}{I_F} \times 100\%$$

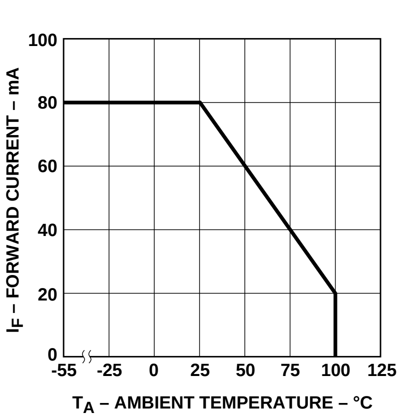


Figure 1. Forward current vs. temperature.

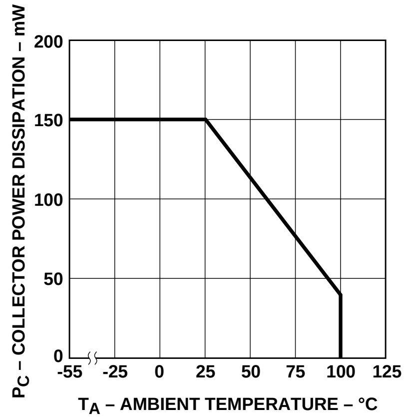


Figure 2. Collector power dissipation vs. temperature.

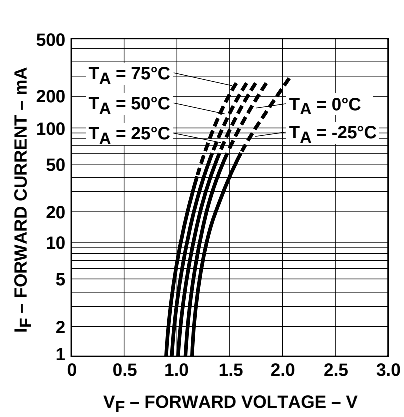


Figure 3. Forward current vs. forward voltage.

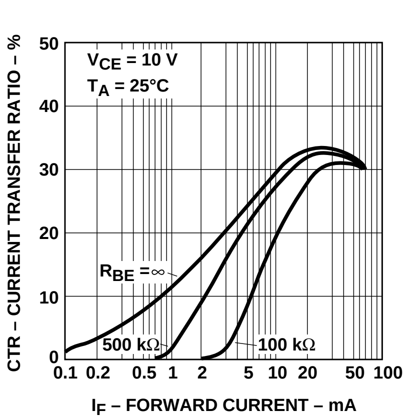


Figure 4. Current transfer ratio vs. forward current.

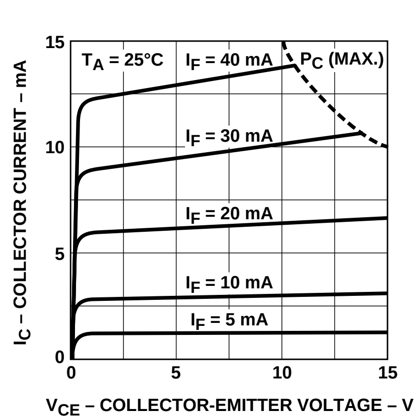


Figure 5. Collector current vs. collector-emitter voltage.

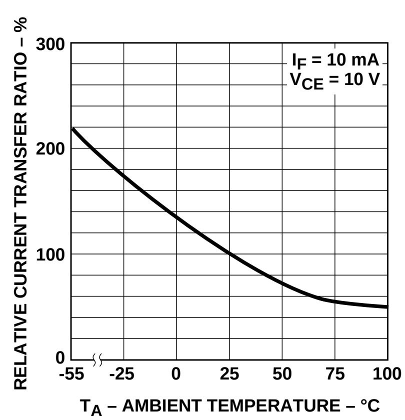


Figure 6. Relative current transfer ratio vs. temperature.

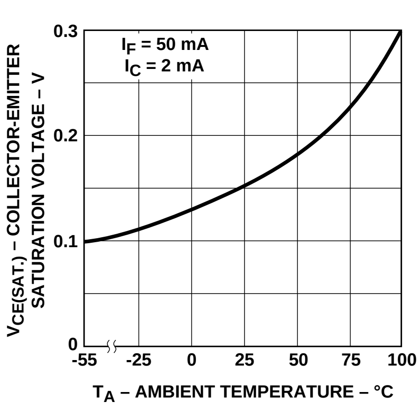


Figure 7. Collector-emitter saturation voltage vs. temperature.

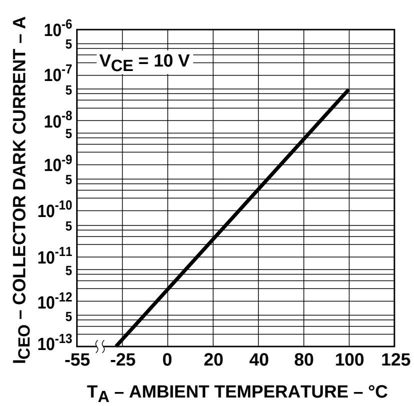


Figure 8. Collector dark current vs. temperature.

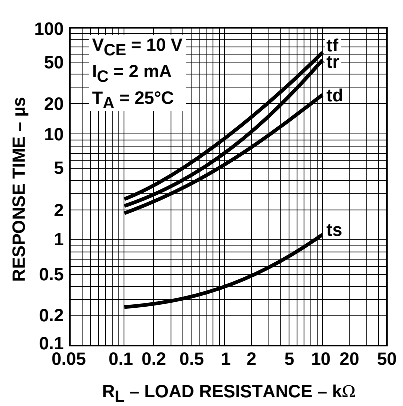


Figure 9. Response time vs. load resistance.

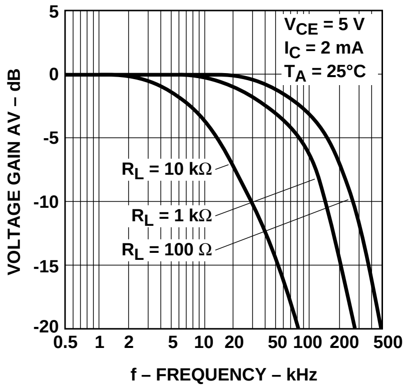


Figure 10. Frequency response.

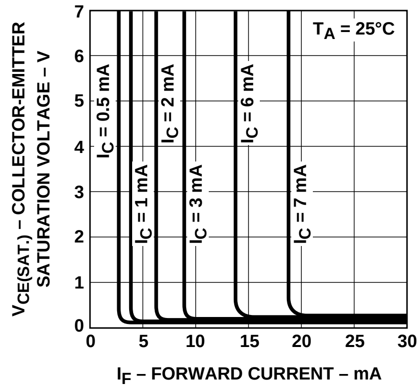
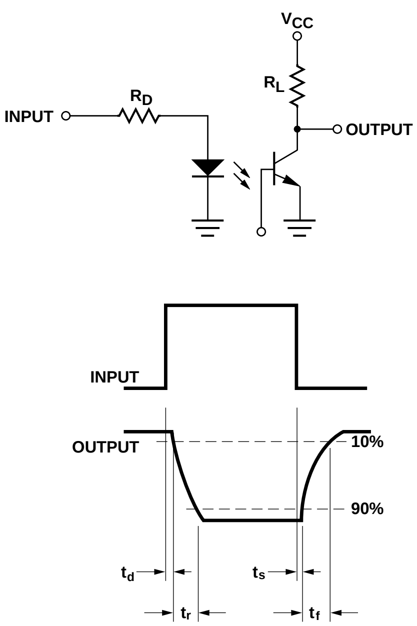
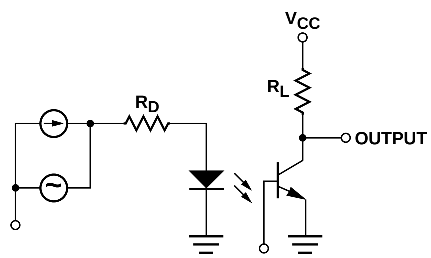


Figure 11. Collector-emitter saturation voltage vs. forward current.

Test Circuit for Response Time



Test Circuit for Frequency Response



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