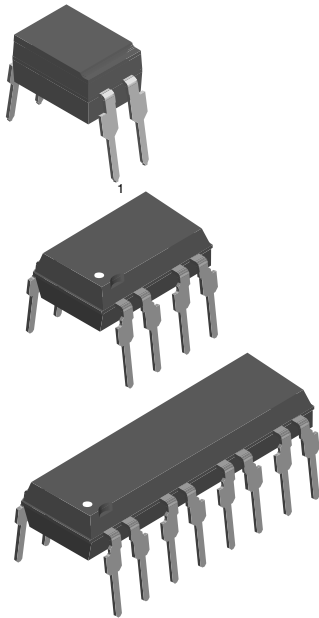




## Optocoupler, Photodarlington Output



### DESCRIPTION

In the K815P, K825P, K845P parts, each channel consist of a photodarlington optically coupled to a gallium arsenide infrared-emitting diode in an 4 pin, 8 pin, and 16 pin plastic dual inline package.

The elements are mounted on one leadframe providing a fixed distance between input and output for highest safety requirements.

### FEATURES

- Endstackable to 2.54 mm (0.1") spacing
- Isolation test voltage 5300 V<sub>RMS</sub>
- Low temperature coefficient of CTR
- Wide ambient temperature range
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



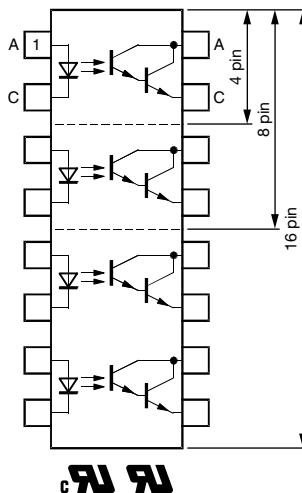
**RoHS**  
COMPLIANT

### APPLICATIONS

- Programmable logic controllers
- Modems
- Answering machines
- General applications

### AGENCY APPROVALS

- [UL](#)
- [cUL](#)



### LINKS TO ADDITIONAL RESOURCES



[Product Page](#)



[Design Tools](#)



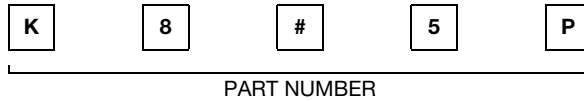
[Footprints](#)



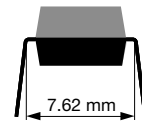
[Models](#)



## ORDERING INFORMATION



DIP-4/DIP-8/DIP-16



AGENCY CERTIFIED / PACKAGE	CTR (%)
UL, cUL	> 600
DIP-4	K815P
DIP-8	K825P
DIP-16	K845P

ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
Reverse voltage		$V_R$	6	V
Forward current		$I_F$	60	mA
Forward surge current	$t_p \leq 10\text{ }\mu\text{s}$	$I_{FSM}$	1.5	A
Power dissipation		$P_{diss}$	100	mW
Junction temperature		$T_j$	125	$^{\circ}\text{C}$
<b>OUTPUT</b>				
Collector emitter voltage		$V_{CEO}$	35	V
Emitter collector voltage		$V_{ECO}$	7	V
Collector current		$I_C$	80	mA
Collector peak current	$t_p/T = 0.5, t_p \leq 10\text{ ms}$	$I_{CM}$	100	mA
Power dissipation		$P_{diss}$	150	mW
Junction temperature		$T_j$	125	$^{\circ}\text{C}$
<b>COUPLER</b>				
Total power dissipation		$P_{tot}$	250	mW
Operating ambient temperature		$T_{amb}$	-40 to +100	$^{\circ}\text{C}$
Storage temperature range		$T_{stg}$	-55 to +125	$^{\circ}\text{C}$
Soldering temperature <sup>(1)</sup>		$T_{sld}$	260	$^{\circ}\text{C}$

## Notes

- Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

<sup>(1)</sup> Refer to wave profile for soldering conditions for through hole devices



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
Forward voltage	$I_F = 20\text{ mA}$	$V_F$	-	1.2	1.4	V
Reverse current	$V_R = 6\text{ V}$	$I_R$	-	-	10	$\mu\text{A}$
<b>OUTPUT</b>						
Collector emitter voltage	$I_C = 100\text{ }\mu\text{A}$	$V_{CEO}$	35	-	-	V
Emitter collector voltage	$I_E = 100\text{ }\mu\text{A}$	$V_{CEO}$	7	-	-	V
Collector dark current	$V_{CE} = 10\text{ V}$ , $I_F = 0\text{ A}$ , $E = 0$	$I_{CEO}$	-	-	100	nA
<b>COUPLER</b>						
Collector emitter saturation voltage	$I_C = 5\text{ mA}$ , $I_F = 20\text{ mA}$	$V_{CEsat}$	-	-	0.1	V
Cut-off frequency	$I_F = 10\text{ mA}$ , $V_{CE} = 5\text{ V}$ , $R_L = 100\text{ }\Omega$	$f_c$	-	10	-	kHz
Coupling capacitance	$f = 1\text{ MHz}$	$C_k$	-	0.3	-	pF

**Note**

- Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

<b>CURRENT TRANSFER RATIO</b>						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
$I_C/I_F$	$I_F = 1\text{ mA}$ , $V_{CE} = 2\text{ V}$	CTR	600	800	-	%

<b>SWITCHING CHARACTERISTICS</b>						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Rise time	$V_{CE} = 2\text{ V}$ , $I_C = 10\text{ mA}$ , $R_L = 100\text{ }\Omega$ (see Fig. 1)	$t_r$	-	300	-	$\mu\text{s}$
Turn-off time	$V_{CE} = 2\text{ V}$ , $I_C = 10\text{ mA}$ , $R_L = 100\text{ }\Omega$ (see Fig. 1)	$t_{off}$	-	250	-	$\mu\text{s}$

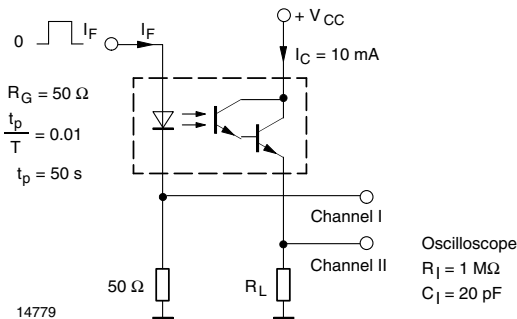


Fig. 1 - Test Circuit, Non-Saturated Operation

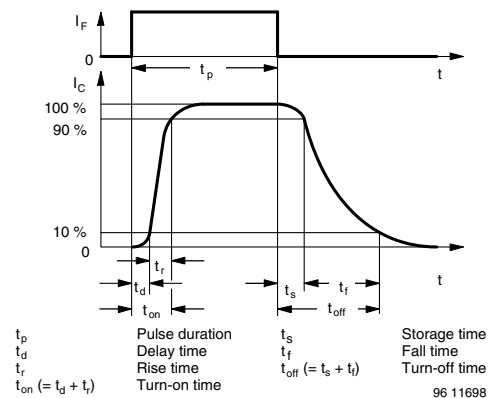


Fig. 2 - Switching Times



## SAFETY AND INSULATION RATINGS

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Climatic classification	According to IEC 68 part 1		40 / 100 / 21	
Comparative tracking index		CTI	175	
Maximum rated withstanding isolation voltage	$t = 1 \text{ min}$	$V_{ISO}$	4420	$V_{RMS}$
Maximum transient isolation voltage		$V_{IOTM}$	10 000	$V_{peak}$
Maximum repetitive peak isolation voltage		$V_{IORM}$	890	$V_{peak}$
Isolation resistance	$V_{IO} = 500 \text{ V}, T_{amb} = 25 \text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{12}$	$\Omega$
	$V_{IO} = 500 \text{ V}, T_{amb} = 100 \text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{11}$	$\Omega$
Output safety power		$P_{SO}$	400	mW
Input safety current		$I_{SI}$	275	mA
Safety temperature		$T_S$	175	$^{\circ}\text{C}$
Creepage distance	Standard DIP-4		$\geq 7$	mm
Clearance distance	Standard DIP-4		$\geq 7$	mm
Creepage distance	400 mil DIP-4		$\geq 8$	mm
Clearance distance	400 mil DIP-4		$\geq 8$	mm
Insulation thickness		DTI	$\geq 0.4$	mm

## Note

- As per IEC 60747-5-5, § 7.4.3.8.2, this optocoupler is suitable for “safe electrical insulation” only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

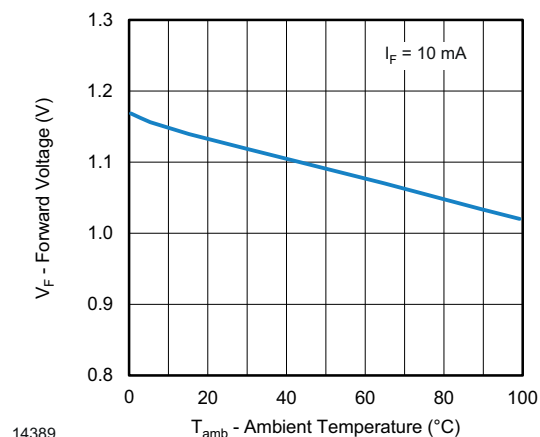
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

Fig. 3 - Forward Voltage vs. Ambient Temperature

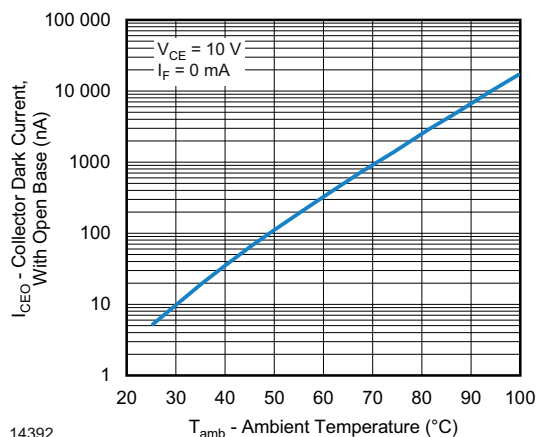


Fig. 6 - Collector Dark Current vs. Ambient Temperature

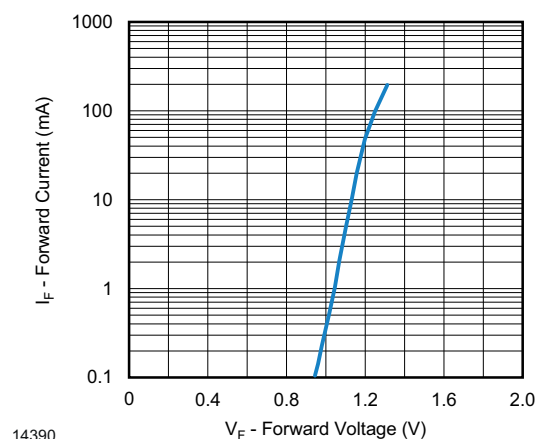


Fig. 4 - Forward Current vs. Forward Voltage

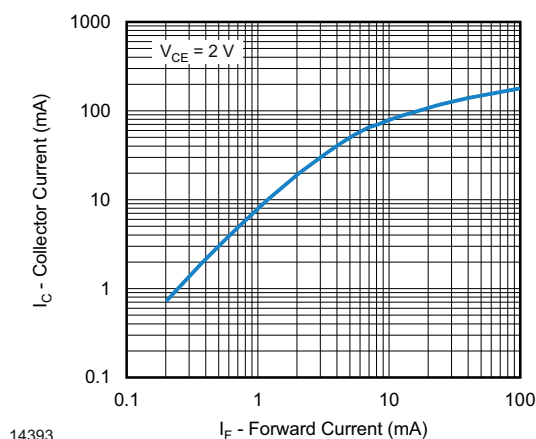


Fig. 7 - Collector Current vs. Forward Current

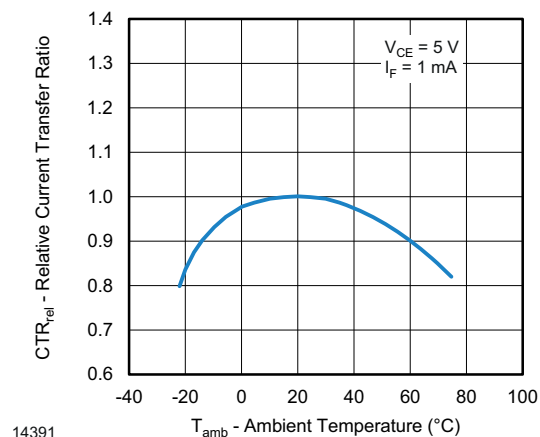


Fig. 5 - Relative Current Transfer Ratio vs. Ambient Temperature

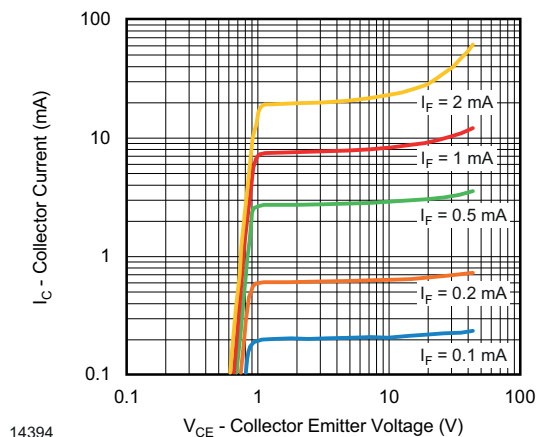


Fig. 8 - Collector Current vs. Collector Emitter Voltage

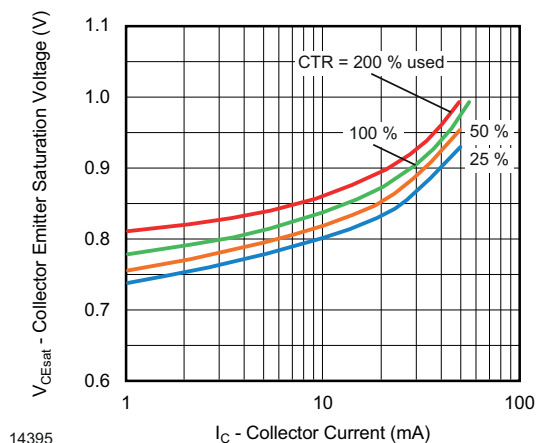


Fig. 9 - Collector Emitter Saturation Voltage vs. Collector Current

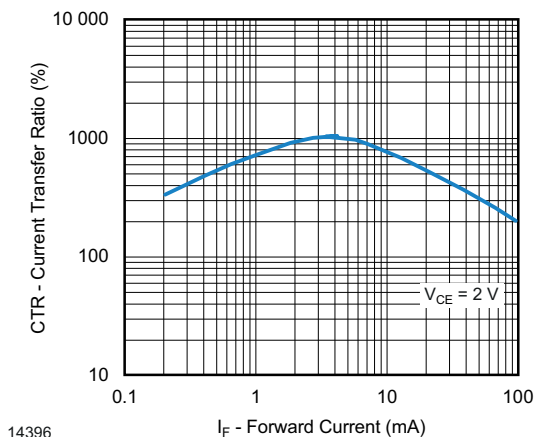
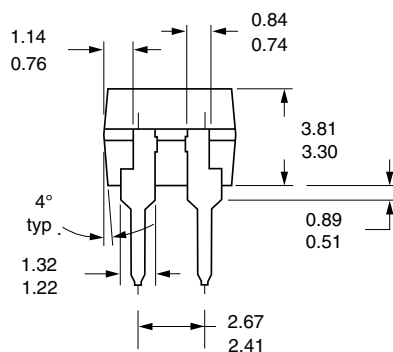
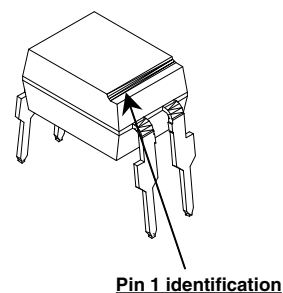
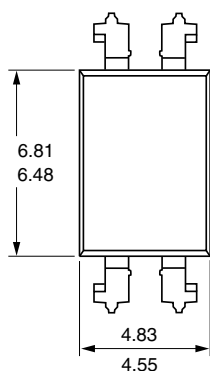
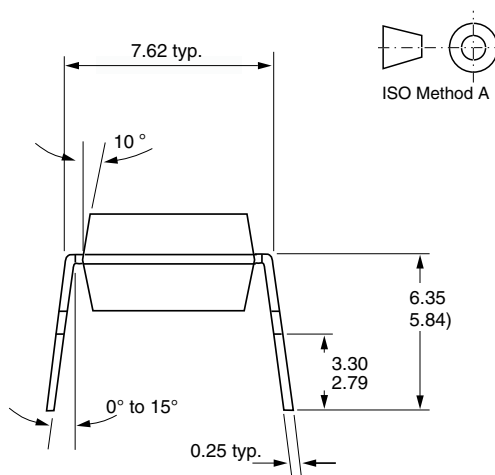
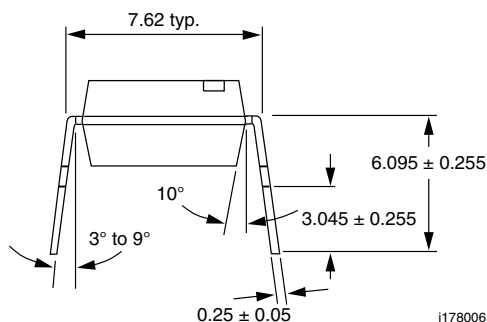
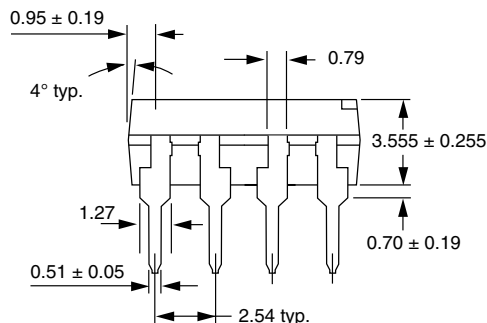
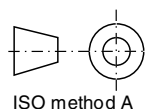
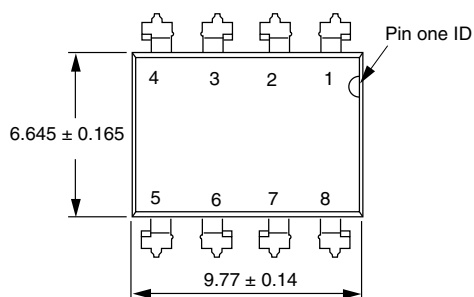


Fig. 10 - Current Transfer Ratio vs. Forward Current

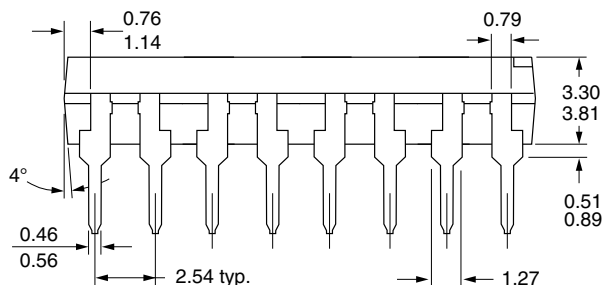
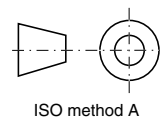
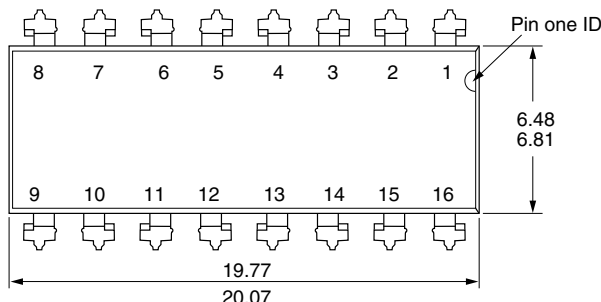
**PACKAGE DIMENSIONS** (in millimeters)

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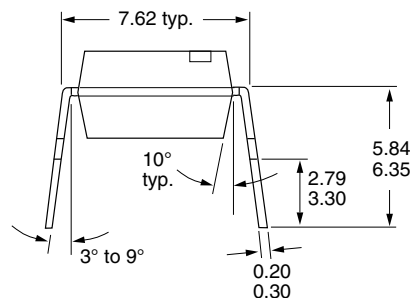




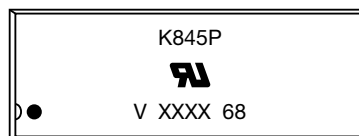
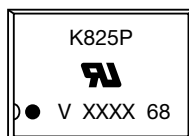
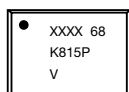
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## PACKAGE MARKING



## Note

- XXXX = LMC (lot marking code)



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