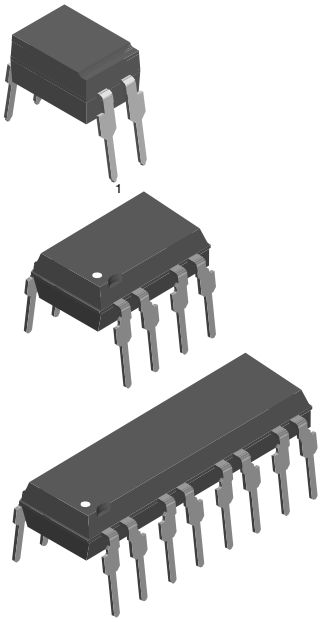
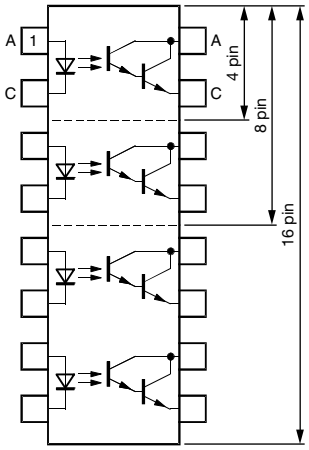
Optocoupler, Photodarlington Output





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_{RMS}
- Low temperature coefficient of CTR
- Wide ambient temperature range
- Material categorization:
  for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

APPLICATIONS

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

AGENCY APPROVALS

- UL
- cUL

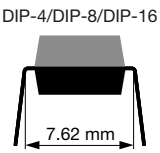
LINKS TO ADDITIONAL RESOURCES

Product Page | Design Tools | Footprints | SPICE Models

ORDERING INFORMATION

K	8	#	5	P

PART NUMBER



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

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)

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

(1) Refer to wave profile for soldering conditions for through hole devices

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT						
Forward voltage	I_F = 20 mA	V_F	-	1.2	1.4	V
Reverse current	V_R = 6 V	I_R	-	-	10	µA
OUTPUT						
Collector emitter voltage	I_C = 100 µA	V_{CEO}	35	-	-	V
Emitter collector voltage	I_E = 100 µA	V_{CEO}	7	-	-	V
Collector dark current	V_{CE} = 10 V, I_F = 0 A, E = 0	I_{CEO}	-	-	100	nA
COUPLER						
Collector emitter saturation voltage	I_C = 5 mA, I_F = 20 mA	V_{CEsat}	-	-	0.1	V
Cut-off frequency	I_F = 10 mA, V_{CE} = 5 V, R_L = 100 Ω	f_c	-	10	-	kHz
Coupling capacitance	f = 1 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.

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

SWITCHING CHARACTERISTICS						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Rise time	V_{CE} = 2 V, I_C = 10 mA, R_L = 100 Ω (see Fig. 1)	t_r	-	300	-	µs
Turn-off time	V_{CE} = 2 V, I_C = 10 mA, R_L = 100 Ω (see Fig. 1)	t_{off}	-	250	-	µs

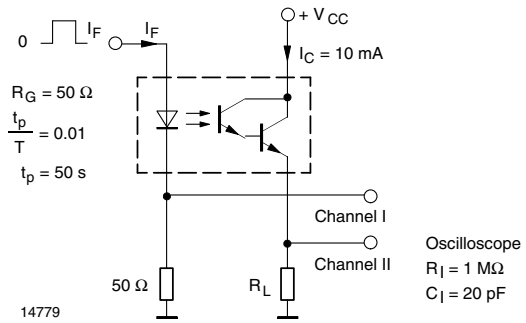


Fig. 1 - Test Circuit, Non-Saturated Operation

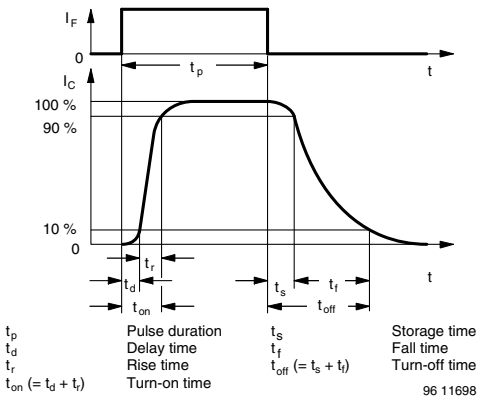


Fig. 2 - Switching Times

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 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 V, T_{amb} = 25 °C	R_{IO}	$\geq 10^{12}$	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C	R_{IO}	$\geq 10^{11}$	Ω
Output safety power		P_{SO}	400	mW
Input safety current		I_{SI}	275	mA
Safety temperature		T_S	175	°C
Creepage distance	Standard DIP-4		≥ 7	mm
Clearance distance	Standard DIP-4		≥ 7	mm
Creepage distance	400 mil DIP-4		≥ 8	mm
Clearance distance	400 mil DIP-4		≥ 8	mm
Insulation thickness		DTI	≥ 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 °C, unless otherwise specified)

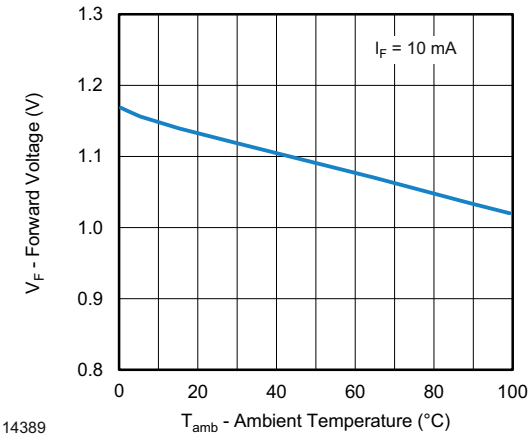


Fig. 3 - Forward Voltage vs. Ambient Temperature

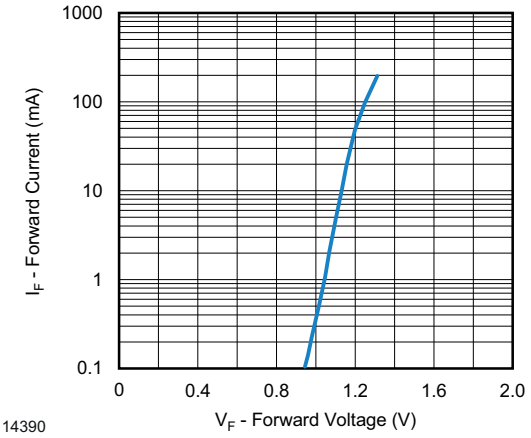


Fig. 4 - Forward Current vs. Forward Voltage

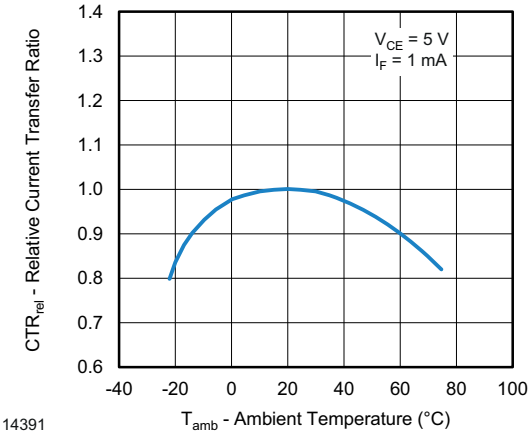


Fig. 5 - Relative Current Transfer Ratio vs. Ambient Temperature

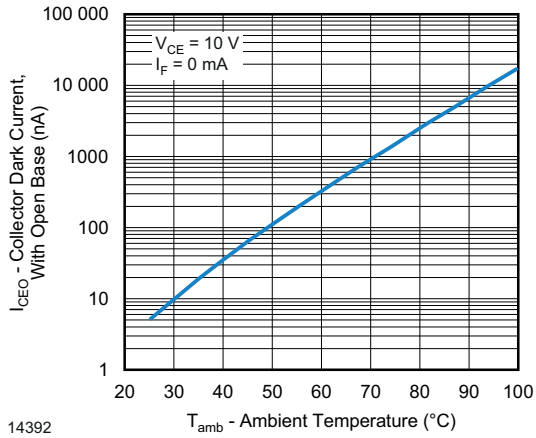


Fig. 6 - Collector Dark Current vs. Ambient Temperature

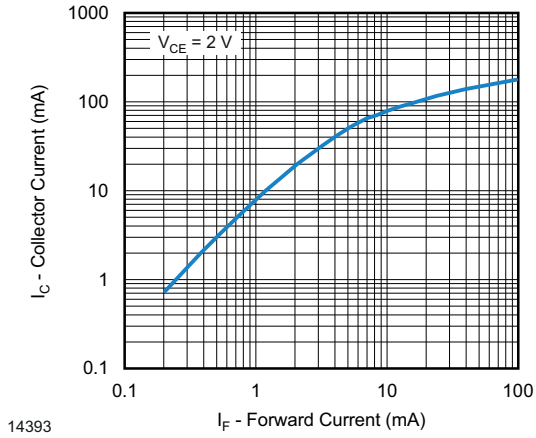


Fig. 7 - Collector Current vs. Forward Current

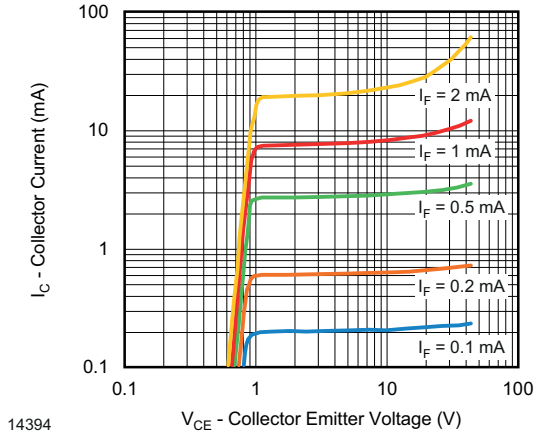


Fig. 8 - Collector Current vs. Collector Emitter Voltage

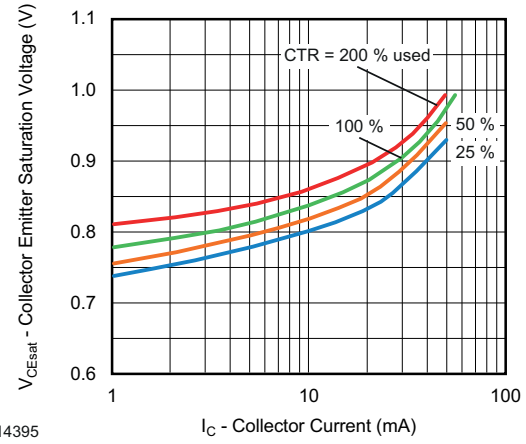


Fig. 9 - Collector Emitter Saturation Voltage vs. Collector Current

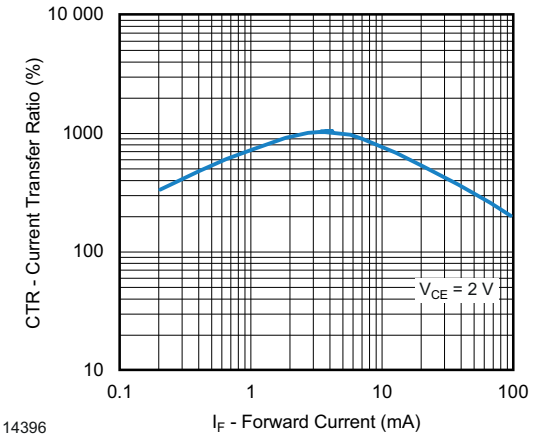
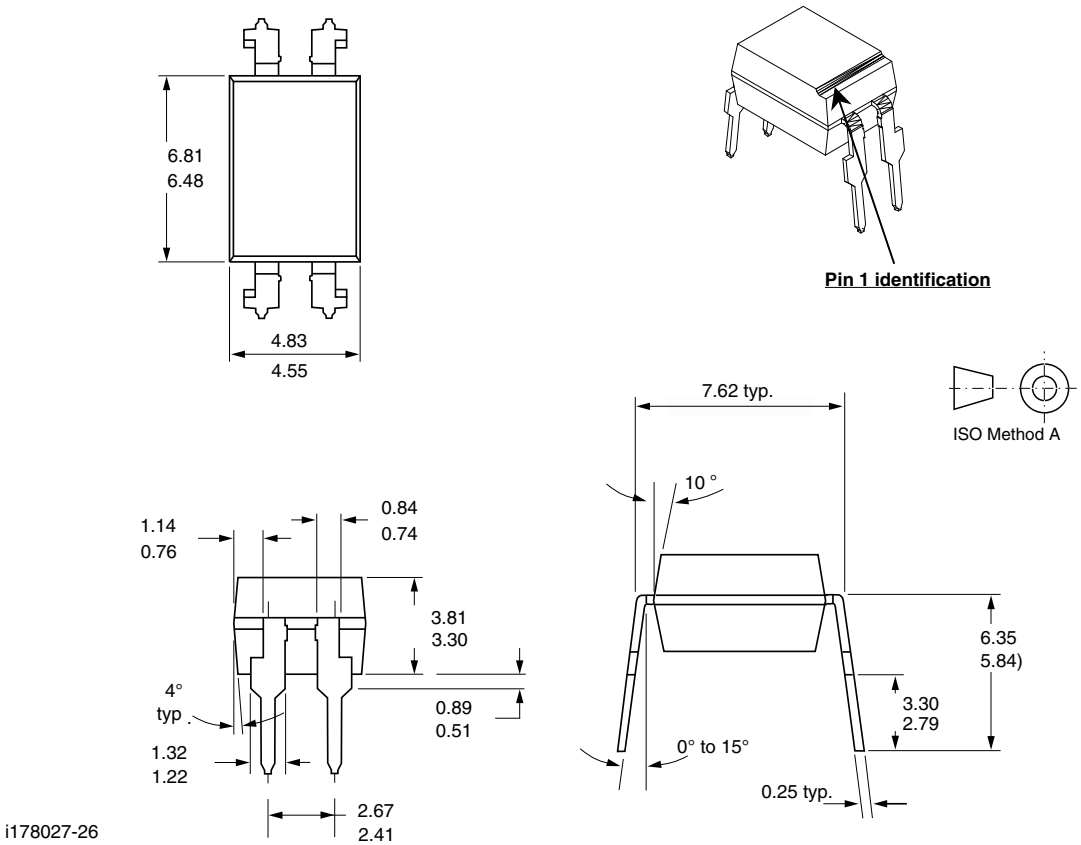
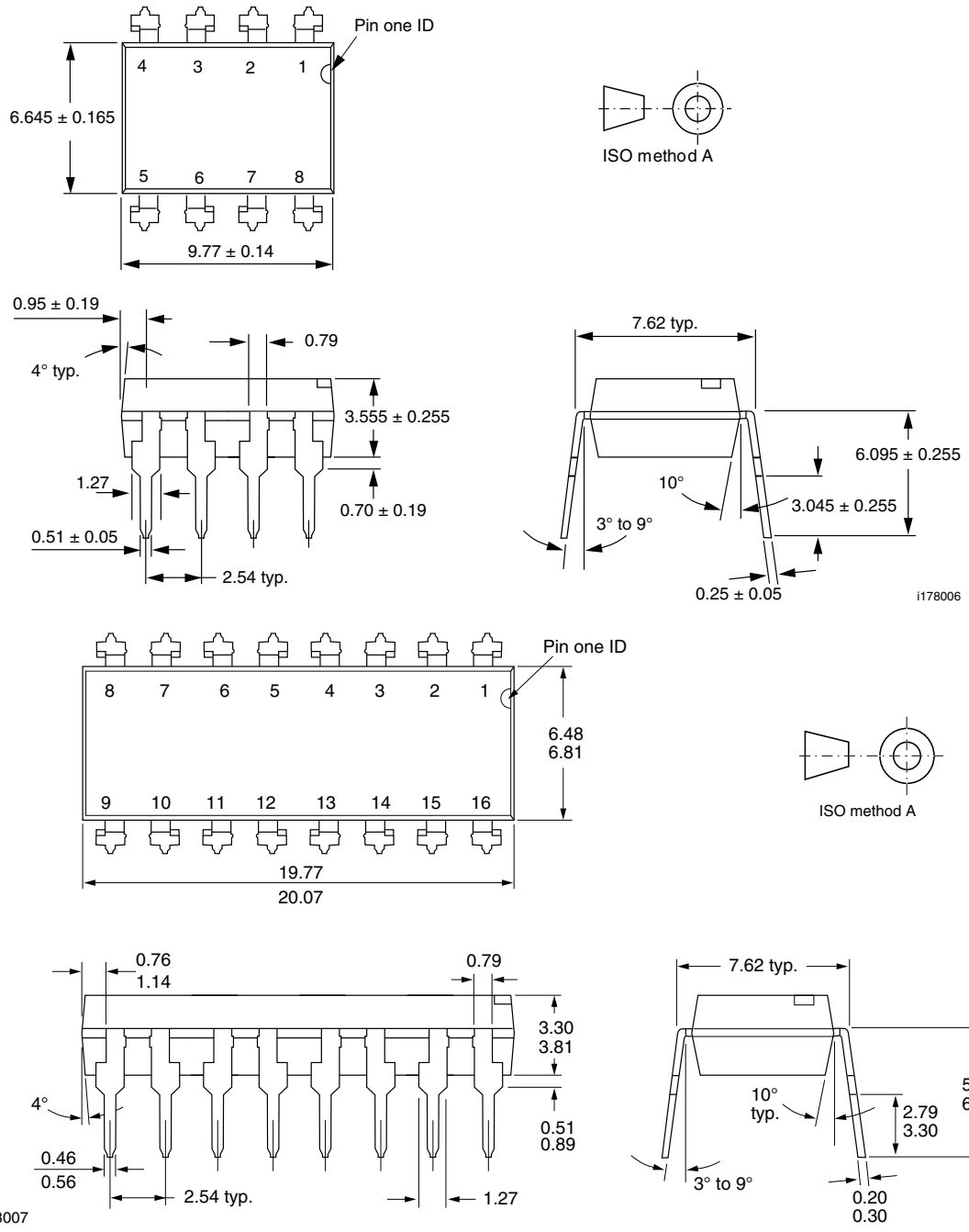


Fig. 10 - Current Transfer Ratio vs. Forward Current

PACKAGE DIMENSIONS (in millimeters)





PACKAGE MARKING

Note

- XXXX = LMC (lot marking code)

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