



# THE DATASHEET OF FOD815S



# FOD815 Series 4-Pin High Operating Temperature Photodarlington Optocoupler

## Features

- Applicable to Pb-free IR reflow soldering
- Compact 4-pin package
- High current transfer ratio: 600% minimum
- C-UL, UL, and VDE approved
- High input-output isolation voltage of 5000Vrms
- Higher operating temperature (versus H11B815)

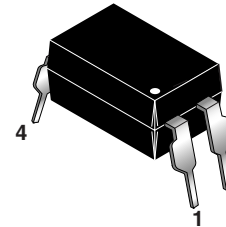
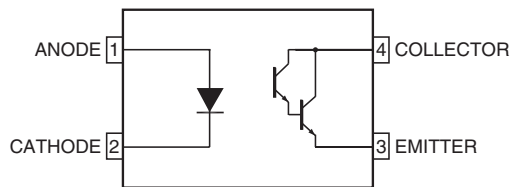
## Applications

- Power supply regulators
- Digital logic inputs
- Microprocessor inputs

## Description

The FOD815 consists of a gallium arsenide infrared emitting diode, driving a silicon photodarlington output in a 4-pin dual in-line package.

## Functional Block Diagram



## Absolute Maximum Ratings (T<sub>A</sub> = 25°C Unless otherwise specified.)

Symbol	Parameter	Value	Units
<b>TOTAL DEVICE</b>			
T <sub>STG</sub>	Storage Temperature	-55 to +125	°C
T <sub>OPR</sub>	Operating Temperature	-30 to +105	°C
T <sub>SOL</sub>	Lead Solder Temperature	260 for 10 sec	°C
P <sub>TOT</sub>	Total Power Dissipation	200	mW
<b>INPUT</b>			
I <sub>F</sub>	Forward Current	50	mA
P	Power Dissipation	70	mW
<b>OUTPUT</b>			
V <sub>CEO</sub>	Collector-Emitter Voltage	35	V
V <sub>ECO</sub>	Emitter-Collector Voltage	6	V
I <sub>C</sub>	Collector Current	80	mA
P <sub>C</sub>	Collector Power Dissipation	150	mW

**Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  Unless otherwise specified.)**Individual Component Characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
<b>INPUT</b>						
$V_F$	Forward Voltage	$I_F = 20\text{mA}$	–	1.2	1.4	V
$C_t$	Terminal Capacitance	$V = 0, f = 1\text{kHz}$	–	50	250	pF
<b>OUTPUT</b>						
$I_{CEO}$	Collector Dark Current	$V_{CE} = 10\text{V}, I_F = 0$	–	–	1	$\mu\text{A}$
$BV_{CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 0.1\text{mA}, I_F = 0$	35	–	–	V
$BV_{ECO}$	Emitter-Collector Breakdown Voltage	$I_E = 10\mu\text{A}, I_F = 0$	6	–	–	V

**Transfer Characteristics** ( $T_A = 25^\circ\text{C}$  Unless otherwise specified.)

Symbol	DC Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
$I_C$	Collector Current	$I_F = 1\text{mA}, V_{CE} = 2\text{V}$	6	–	75	mA
CTR	Current Transfer Ratio <sup>(1)</sup>		600	–	7,500	%
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_F = 20\text{mA}, I_C = 5\text{mA}$	–	0.8	1	V
$f_C$	Cut-Off Frequency	$V_{CE} = 5\text{V}, I_C = 2\text{mA}, R_L = 100\Omega, -3\text{dB}$	1	6	–	KHz
$t_r$	Response Time (Rise)	$V_{CE} = 2\text{V}, I_C = 10\text{mA}, R_L = 100\Omega$	–	60	300	$\mu\text{s}$
$t_f$	Response Time (Fall)		–	53	250	$\mu\text{s}$

**Isolation Characteristics**

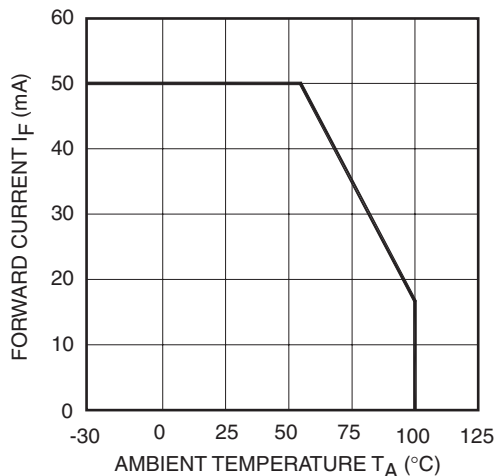
Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Units
$V_{ISO}$	Input-Output Isolation Voltage	$f = 60\text{Hz}, t = 1\text{min}, I_{I-O} \leq 2\mu\text{A}$	5000	–	–	Vac(rms)
$R_{ISO}$	Isolation Resistance	DC500V 40~60% R.H.	$5 \times 10^{10}$	$1 \times 10^{11}$	–	$\Omega$
$C_f$	Floating Capacitance	$V = 0, f = 1\text{MHz}$	–	0.6	1	pF

**Note:**

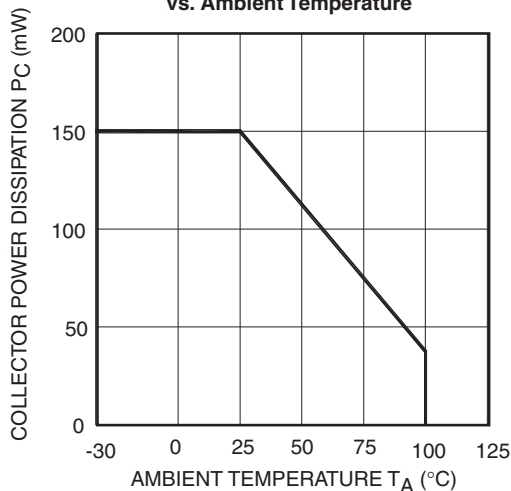
- Current Transfer Ratio (CTR) =  $I_C/I_F \times 100\%$ .

**Typical Electrical/Optical Characteristic Curves** ( $T_A = 25^\circ\text{C}$  Unless otherwise specified.)

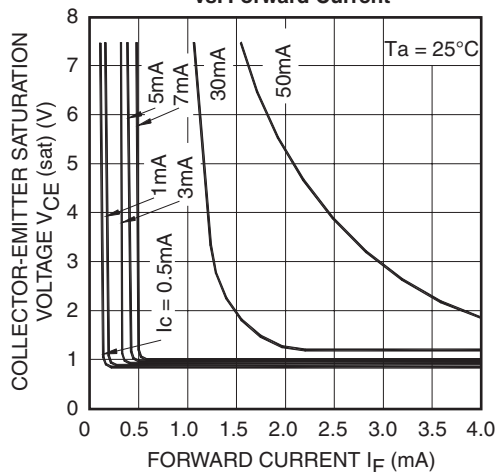
**Fig. 1 Forward Current vs. Ambient Temperature**



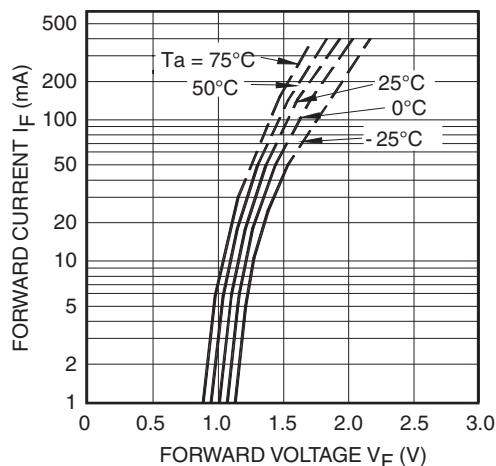
**Fig. 2 Collector Power Dissipation vs. Ambient Temperature**



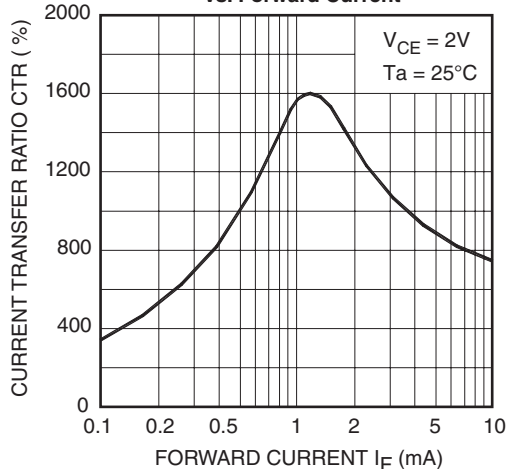
**Fig. 3 Collector-Emitter Saturation Voltage vs. Forward Current**



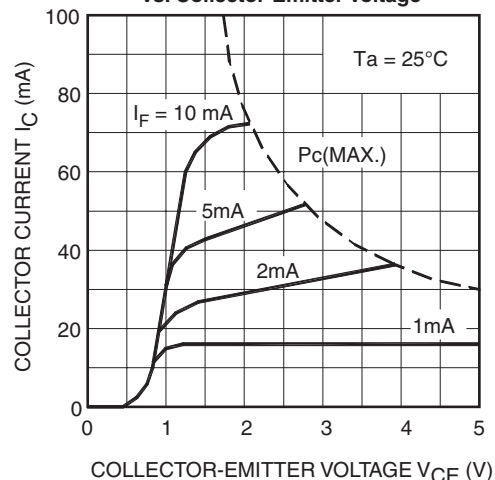
**Fig. 4 Forward Current vs. Forward Voltage**



**Fig. 5 Current Transfer Ratio vs. Forward Current**

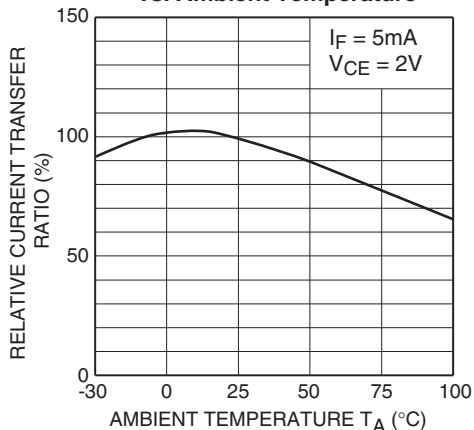


**Fig. 6 Collector Current vs. Collector-Emitter Voltage**

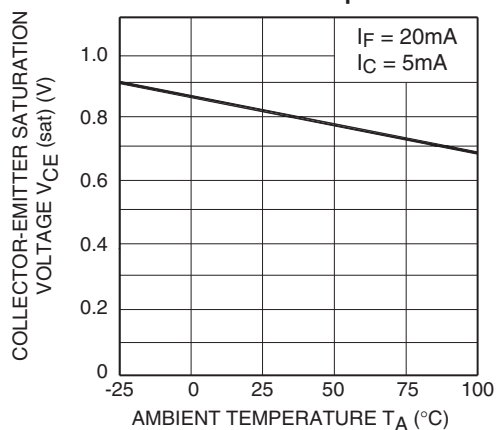


**Typical Electrical/Optical Characteristic Curves** ( $T_A = 25^\circ\text{C}$  Unless otherwise specified.)

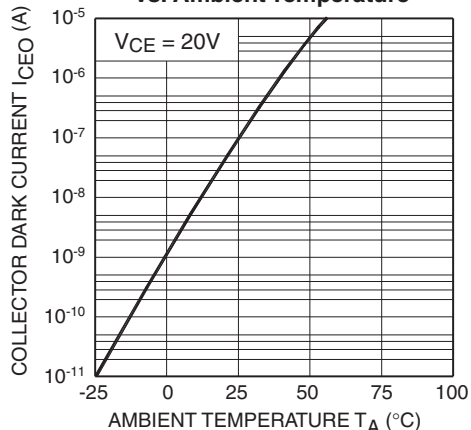
**Fig. 7. Relative Current Transfer Ratio vs. Ambient Temperature**



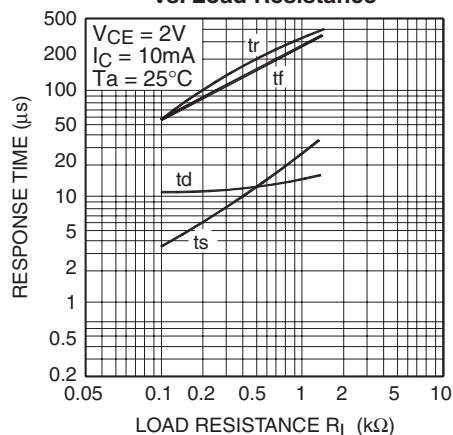
**Fig. 8 Collector-Emitter Saturation Voltage vs. Ambient Temperature**



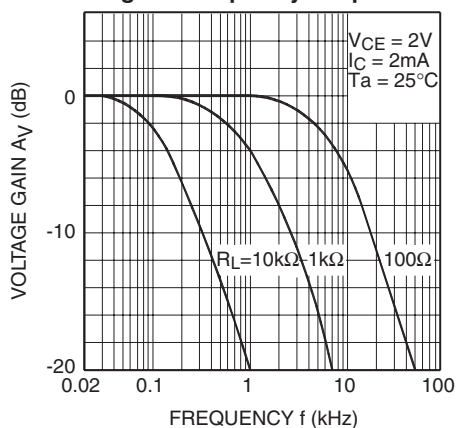
**Fig. 9 Collector Dark Current vs. Ambient Temperature**



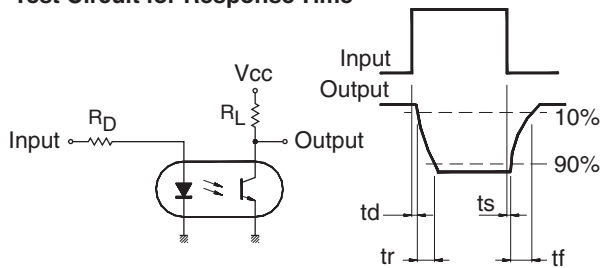
**Fig. 10. Response Time vs. Load Resistance**



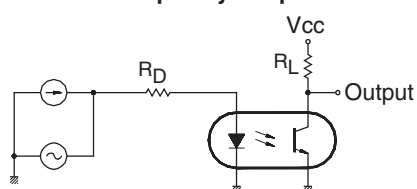
**Fig. 11. Frequency Response**



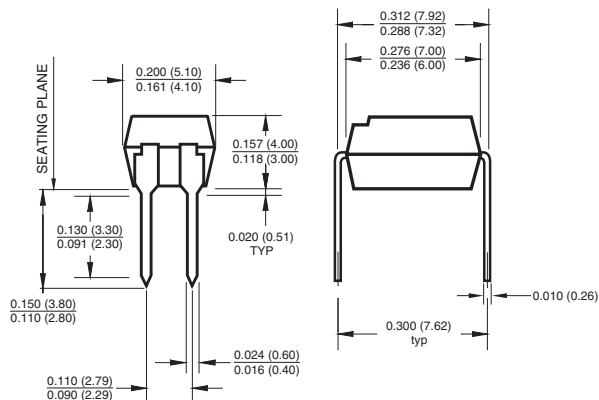
**Test Circuit for Response Time**



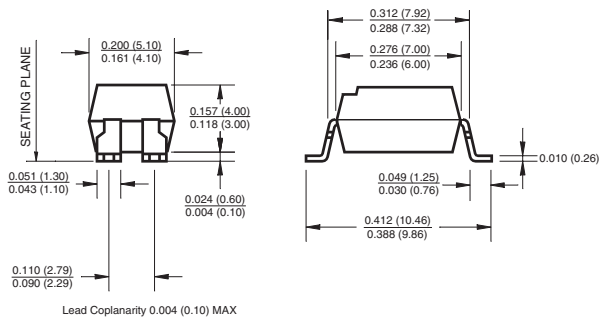
**Test Circuit for Frequency Response**



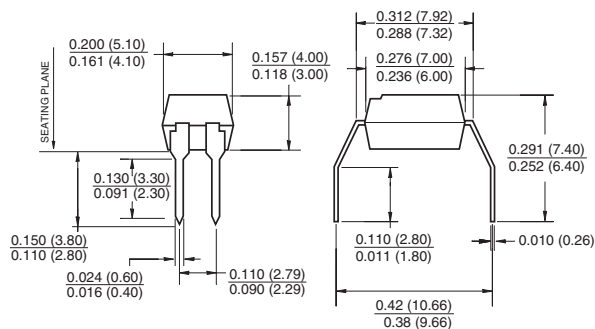
### Package Dimensions (Through Hole)



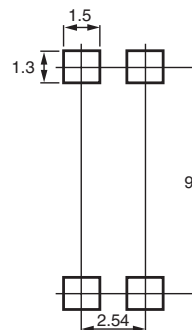
### Package Dimensions (Surface Mount)



### Package Dimensions (0.4" Lead Spacing)



### Footprint Dimensions (Surface Mount)

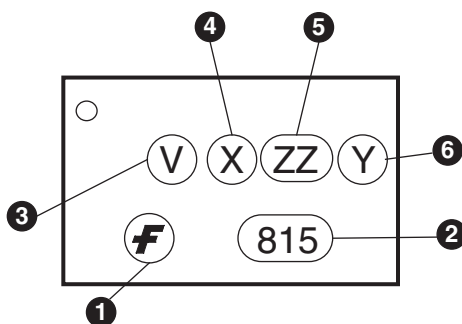


**Note:**  
All dimensions are in inches (millimeters)

### Ordering Information

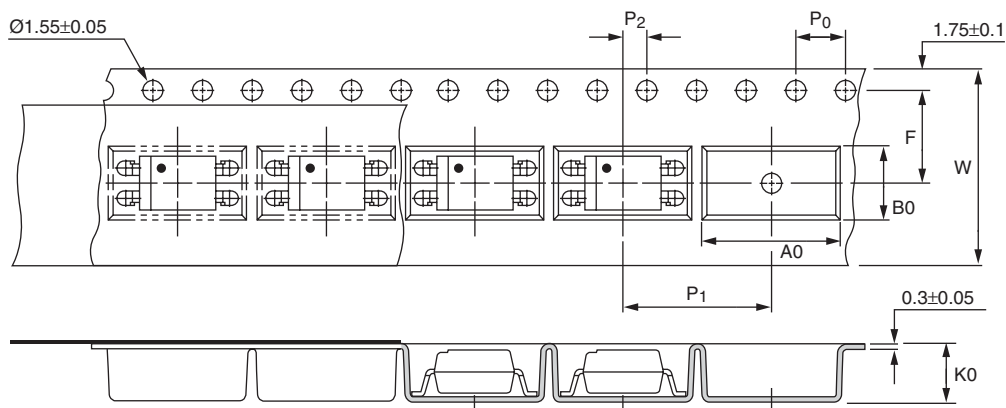
Option	Order Entry Identifier	Description
S	.S	Surface Mount Lead Bend
SD	.SD	Surface Mount; Tape and reel
W	.W	0.4" Lead Spacing
300	.300	VDE Approved
300W	.300W	VDE Approved, 0.4" Lead Spacing
3S	.3S	VDE Approved, Surface Mount
3SD	.3SD	VDE Approved, Surface Mount, Tape & Reel

### Marking Information



Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One digit year code
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

## Carrier Tape Specifications

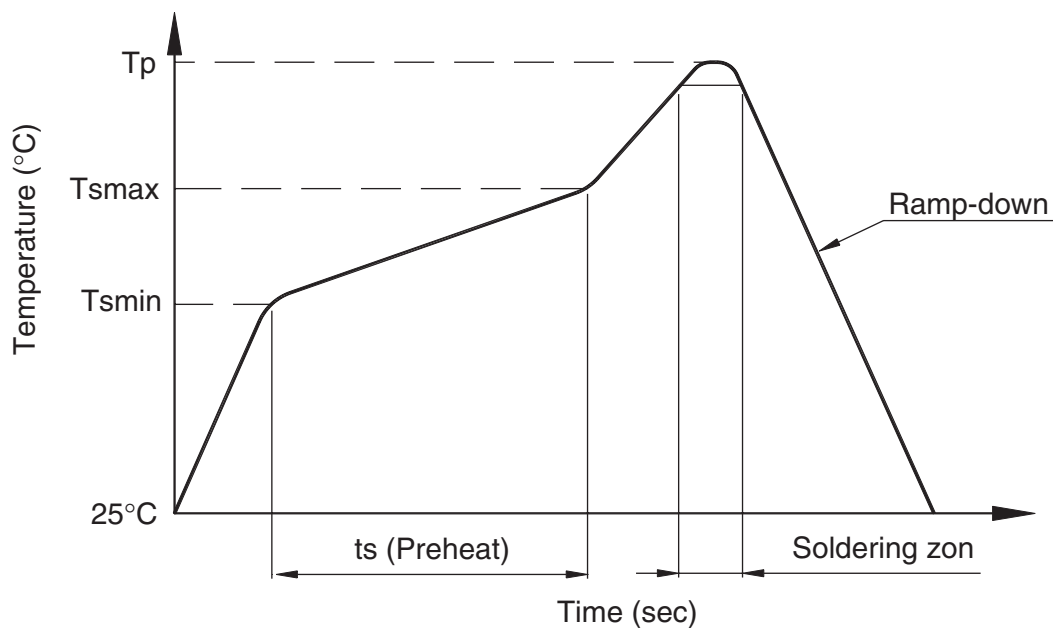


**Note:**

All dimensions are in millimeters.

Description	Symbol	Dimensions in mm (inches)
Tape wide	W	$16 \pm 0.3$ (.63)
Pitch of sprocket holes	$P_0$	$4 \pm 0.1$ (.15)
Distance of compartment	F	$7.5 \pm 0.1$ (.295)
	$P_2$	$2 \pm 0.1$ (.079)
Distance of compartment to compartment	$P_1$	$12 \pm 0.1$ (.472)
Compartment	$A_0$	$10.45 \pm 0.1$ (.411)
	$B_0$	$5.30 \pm 0.1$ (.209)
	$K_0$	$4.25 \pm 0.1$ (.167)

### Lead Free Recommended IR Reflow Condition



Profile Feature	Pb-Sn solder assembly	Lead Free assembly
Preheat condition (Tsmín-Tsmáx / ts)	100°C ~ 150°C 60 ~ 120 sec	150°C ~ 200°C 60 ~ 120 sec
Melt soldering zone	183°C 60 ~ 120 sec	217°C 30 ~ 90 sec
Peak temperature (Tp)	240 +0/-5°C	260 +0/-5°C
Ramp-down rate	6°C/sec max.	6°C/sec max.

### Recommended Wave Soldering condition

Profile Feature	For all solder assembly
Peak temperature (Tp)	Max 260°C for 10 sec

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E <sup>2</sup> CMOST™	i-Lo™	OCX™	RapidConnect™	TruTranslation™
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FACT Quiet Series™		OPTOPLANAR™	SILENT SWITCHER®	UltraFET®
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## PRODUCT STATUS DEFINITIONS



### Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
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