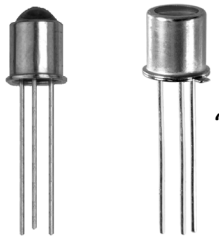
NPN Phototransistor & Photodarlington

OP804SL, OP805SL, OP830SL

OP800WSL, OP801WSL, OP802WSL, OP830WSL



Features:

- TO-18 hermetically sealed package
- Mechanically and spectrally matched to OP130 and OP230 LEDs
- TX and TXV level process available (see Hi-Rel section)
- Choice of narrow or wide receiving angle
- Variety of sensitivity ranges
- Enhanced temperature range

Description:

Each OP800 series device consists of a NPN silicon phototransistor chip mounted in a hermetically sealed TO-18 package. Each OP830 series device consists of a NPN silicon photodarlington chip mounted in a hermetically sealed TO-18 package. Each device offers high power dissipation and superior hostile environment operation. The **OP804SL, OP805SL** and **OP830SL** devices have a narrow receiving angle that provides excellent on-axis coupling and a bonded base lead that enables conventional transistor biasing. The **OP800WSL**, **OP801WSL**, **OP802WSL** and **OP830WSL** all have a wide receiving angle that provides relatively even reception over a large area.

Devices are 100% production tested using an infrared light source for close correlation with OPTEK's GaAs and GaAlAs emitters. The OP804SL and OP805SL devices are mechanically and spectrally matched to OP130 and OP230 series LEDs. The OP800WSL devices are mechanically and spectrally matched to OP130W and OP230W series devices.

Please refer to Application Bulletin 210 for additional thermal design information.

Applications:

- Space-limited applications
- Hostile environment applications
- Applications requiring high power dissipation

Part Number Guide - OPXXX

OP X X X X

Optek Component

8 – TO-18 Package

0 – Phototransistor
3 – Photodarlington

SL –Tested at 2870° K
WSL – Tested at 2870° K

Part Description:

OP80__SL	=	TO-18 dome lens, phototransistor 4 and 5 sensitivity levels tested with 2870° K light source
OP80__WSL	=	TO-18 flat lens, phototransistor 0 through 2 sensitivity levels tested with 2870° K light source
OP830SL	=	TO-18 dome lens, photodarlington tested with 2870° K light source
OP830WSL	=	TO-18 flat lens, photodarlington tested with 2870° K light source

RoHS

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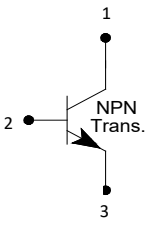
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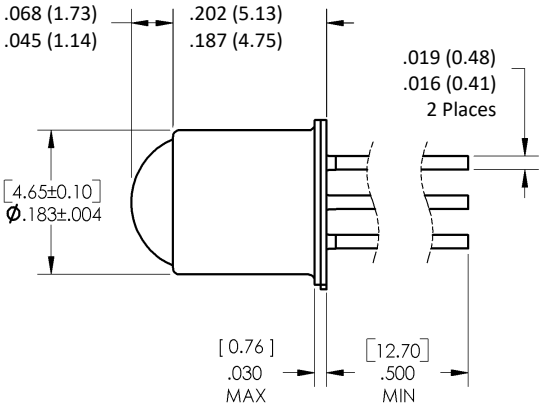
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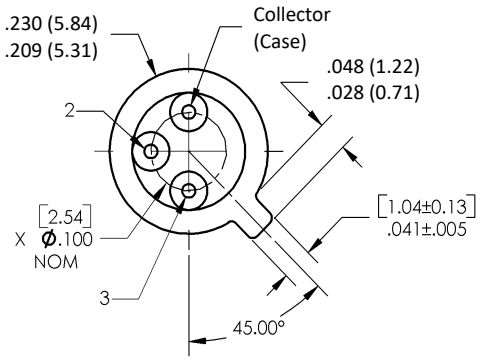
Packaging

OP800SL Series, OP830SL

OP800SL Series





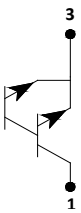


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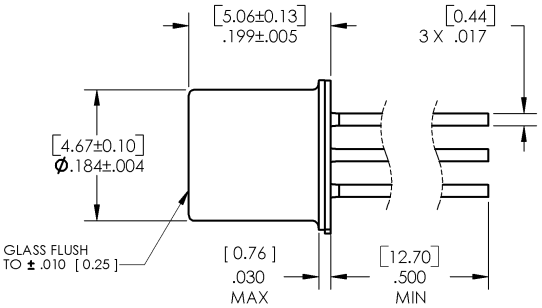
X THIS DIMENSIOIN CONTROLLED AT HOUSING SURFACE.

Pin #	OP80X _ _ _	OP830_ _ _
1	Collector	Collector
2	Base	—
3	Emitter	Emitter

OP830SL

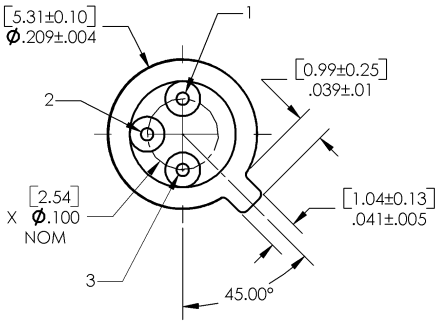


OP800WSL Series, OP830WSL

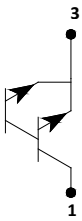


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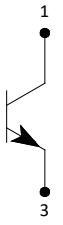
X THIS DIMENSION CONTROLLED AT HOUSING SURFACE.



OP830WSL



OP800WSL Series



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Electrical Specifications

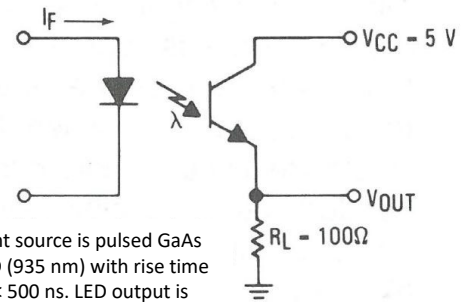
Absolute Maximum Ratings (T_A = 25° C unless otherwise noted)

Storage Temperature Range	-65° C to +150° C
Operating Temperature Range	-65° C to +125° C
Collector-**Base** Voltage (applies to OP800SL Series only - does not apply to OP800WSL Series)	30 V
Collector-Emitter Voltage OP800 (SL, WSL) Series OP830 (SL, WSL)	 30 V 15 V
Emitter-**Base** Voltage (applies to OP800 (SL, WSL) Series only)	5 V
Emitter-Collector Voltage (applies to all OP800 and OP830 devices)	5 V
Continuous Collector Current	50 mA
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 seconds with soldering iron] (1)	260° C
Power Dissipation (2)	250 mW

Notes:

(1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering. A maximum 20 grams force may be applied to the leads when soldering.
(2) Derate linearly 2.30 mW/° C above 25° C.
(3) Junction temperature maintained at 25° C.
(4) Light source is an unfiltered tungsten bulb operating at CT = 2870 K.

Switching Time Test Circuit



Light source is pulsed GaAs LED (935 nm) with rise time of < 500 ns. LED output is adjusted until I_c = 0.8 mA.

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Electrical Specifications

Electrical Characteristics (T_A = 25° C unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
$I_{C(ON)}$ (3)(4)	On-State Collector Current				mA	V_{CE} = 5 V, E_E = 2.5 mW/cm²
	OP804SL	7.0	-	22		
	OP805SL	15	-	-		
	OP800WSL	0.3	-	3		
	OP801WSL	0.5	-	2		
	OP802WSL	2.5	-	3		
	OP830SL	15	-	-		V_{CE} = 5 V, E_E = 0.25 mW/cm²
	OP830WSL	4	-	-		
I_{CEO}	Collector Dark Current				nA	V_{CE} = 10 V, E_E = 0
	OP800 (SL, WSL) Series	-	-	100		
	OP830 (SL, WSL)	-	-	1		
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage				V	I_C = 100 µA
	OP800 (SL, WSL) Series	30	-	-		
	OP830 (SL, WSL)	15	-	-		
$V_{(BR)CBO}$	Collector-**Base** Breakdown Voltage [applies to OP800SL Series only]	30	-	-	V	I_C = 100 µA
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage	5.0	-	-	V	I_E = 100 µA
$V_{(BR)EBO}$	Emitter-**Base** Breakdown Voltage [applies to OP800SL Series only]	5.0	-	-	V	I_E = 100 µA
$V_{CE(SAT)}$ (3)(4)	Collector-Emitter Saturation Voltage				V	
	OP800WSL Series	-	-	0.4		I_C = .4 mA, E_E = 2.5 mW/cm²
	OP800SL Series	-	-	0.4		I_C = 400 µA, E_E = 2.5 mW/cm²
	OP830SL	-	-	1.2		I_C = 1 mA, E_E = 0.25 mW/cm²
	OP830WSL	-	-	1.2		I_C = 1.0 mA, E_E = 0.25 mW/cm²
t_r	Rise Time	-	7	-	µs	V_{CC} = 5 V, I_C = 0.80 mA, R_L = 100 Ω (See Test Circuit)
t_f	Fall Time	-	7	-	µs	

Notes:

(1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering. A maximum 20 grams force may be applied to the leads when soldering.

(2) Derate linearly 2.30 mW/° C above 25° C.

(3) Junction temperature maintained at 25° C.

(4) Light source is an unfiltered tungsten bulb operating at CT = 2870 K or equivalent infrared source.

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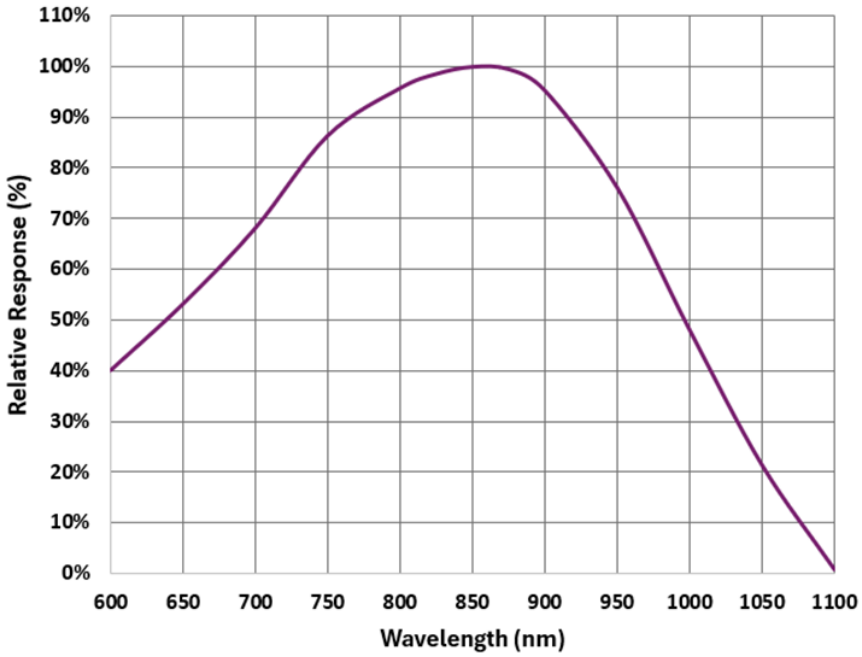
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Typical Performance

OP800SL Series & OP800WSL Series
OP830SL & OP830WSL

Typical Spectral Response



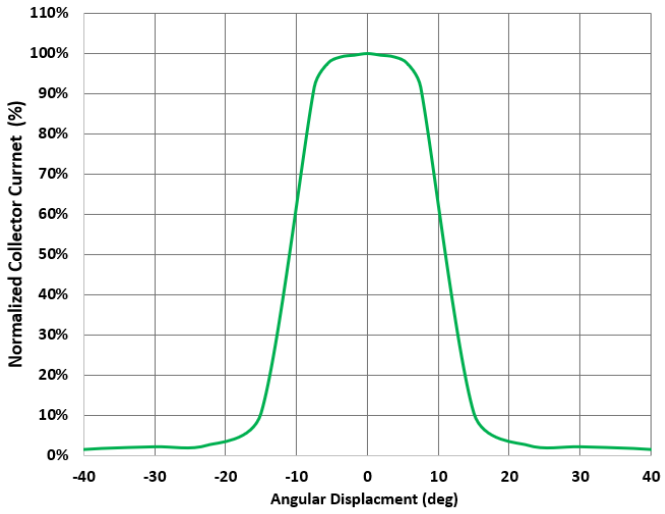
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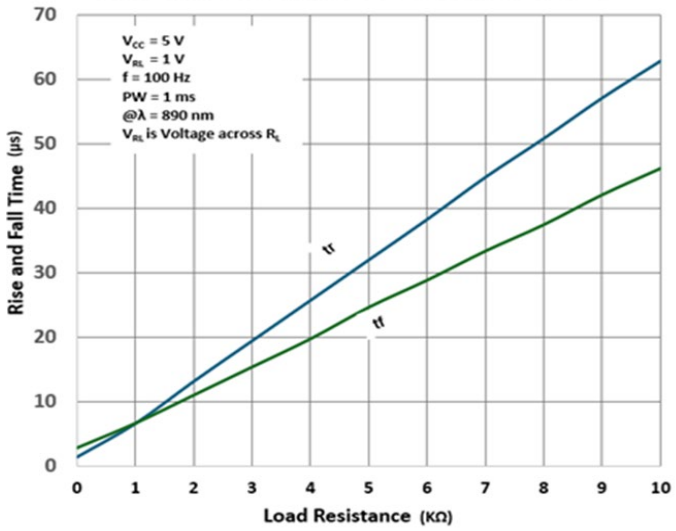
Typical Performance

OP800SL Series

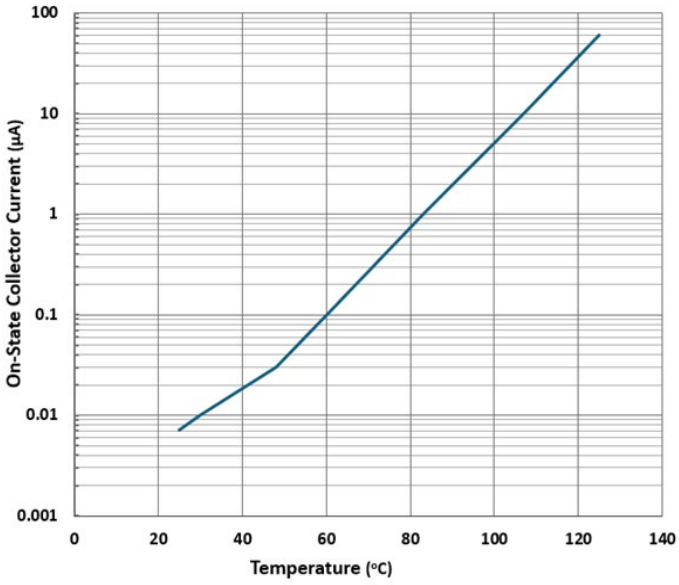
Normalized Collector Current vs Angular Displacement



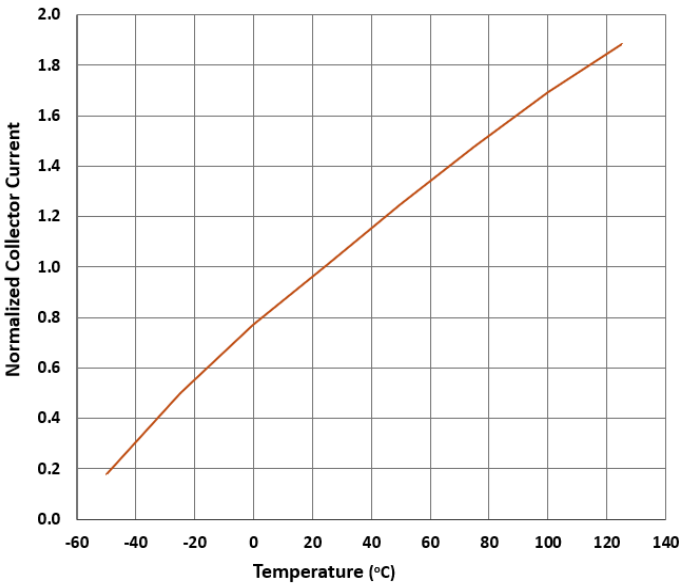
Rise and Fall Times vs Load Resistance



Collector Dark Current vs Temperature



Normalized Collector Current vs Temperature



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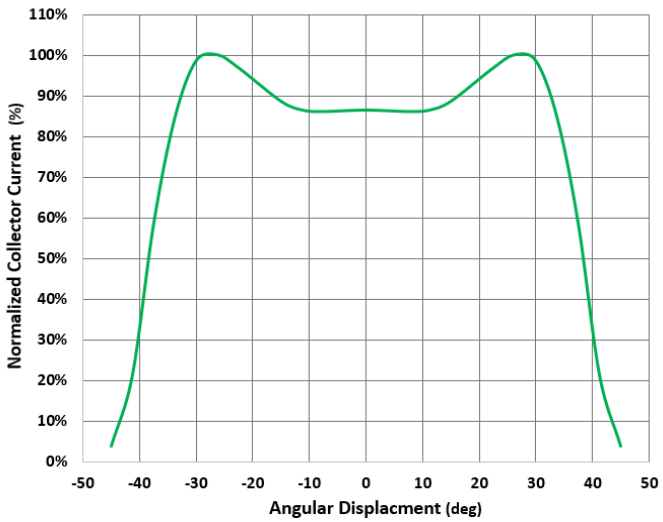
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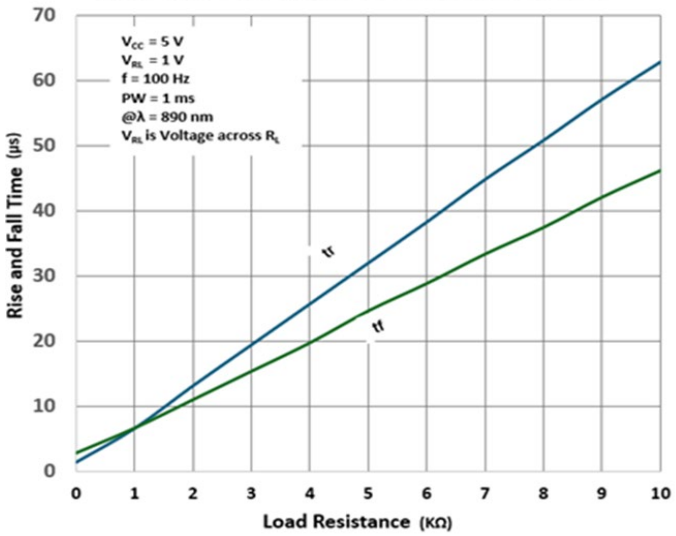
Typical Performance

OP800WSL Series

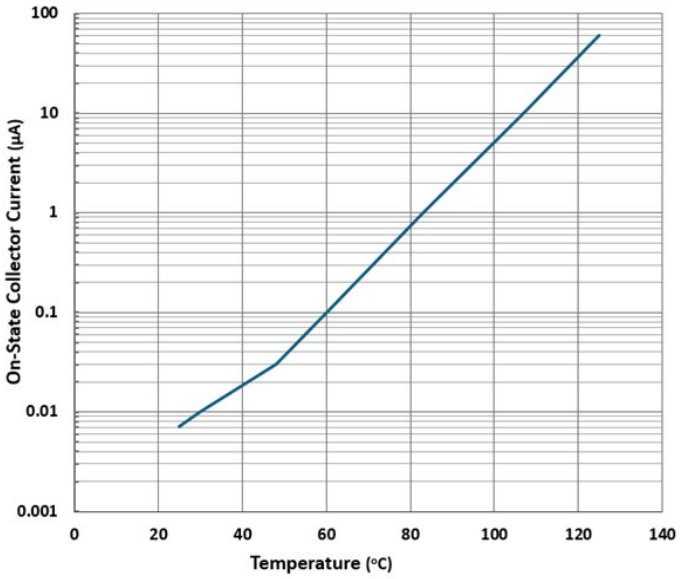
Collector Current vs Angular Displacement



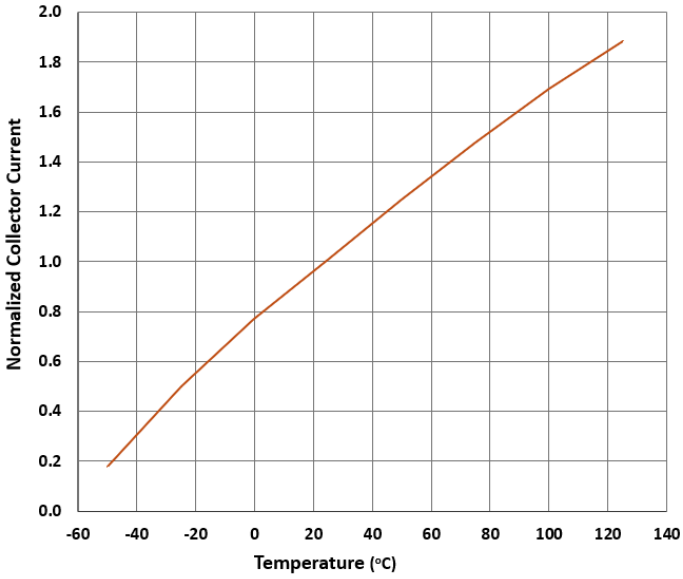
Rise and Fall Times vs Load Resistance



Collector Dark Current vs Temperature



Normalized Collector Current vs Temperature



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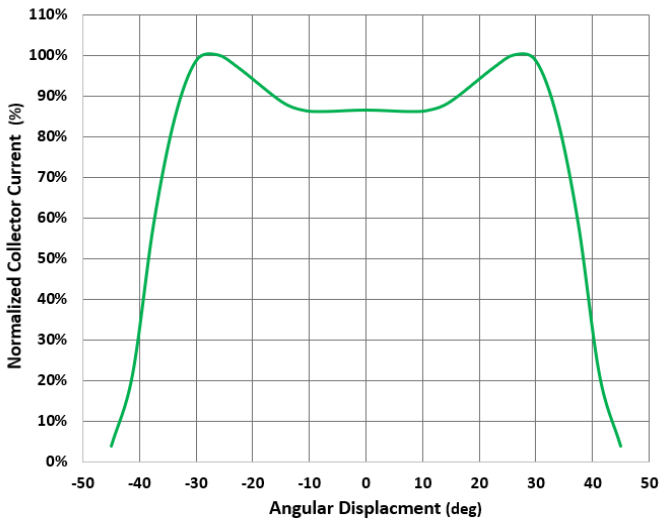
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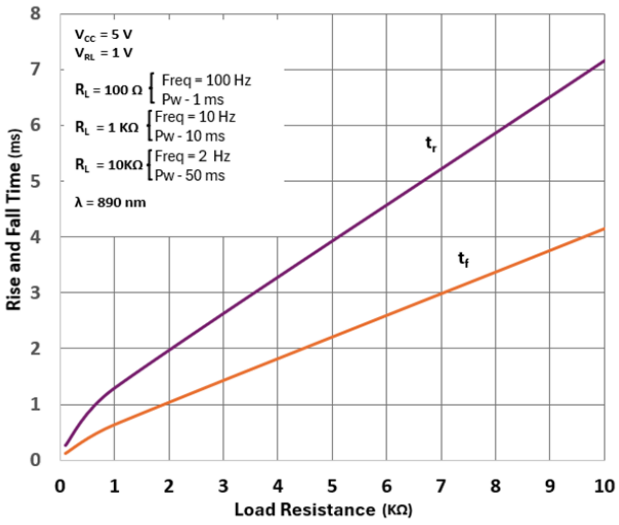
Typical Performance

OP830WSL

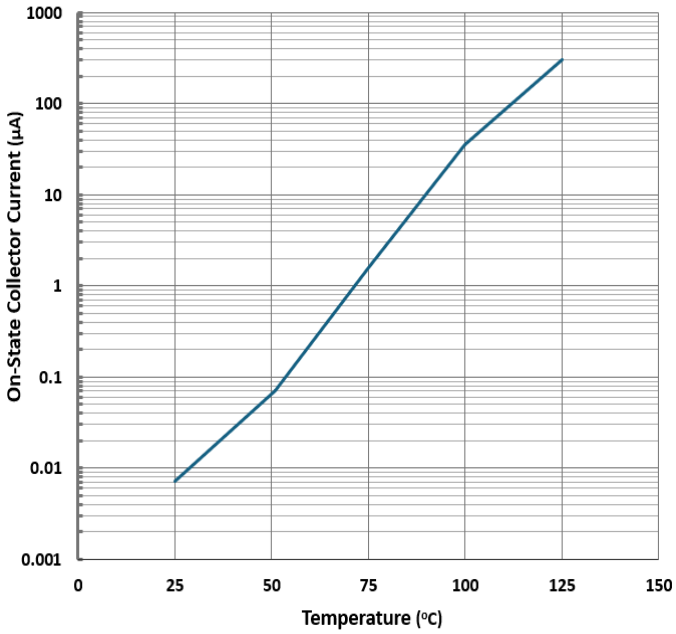
Collector Current vs Angular Displacement



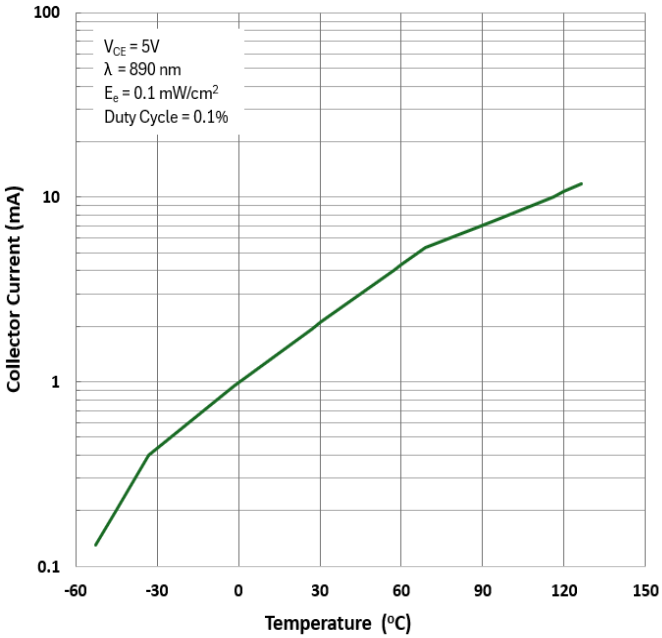
Rise and Fall Times vs Load Resistance



Collector Dark Current vs Temperature



Collector Current vs Temperature



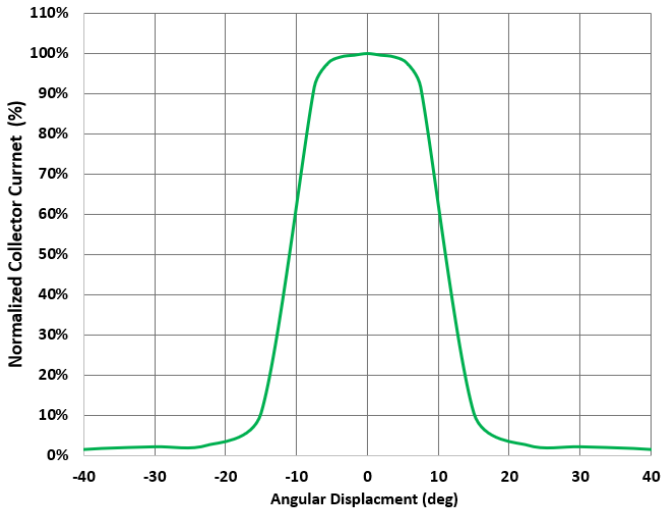
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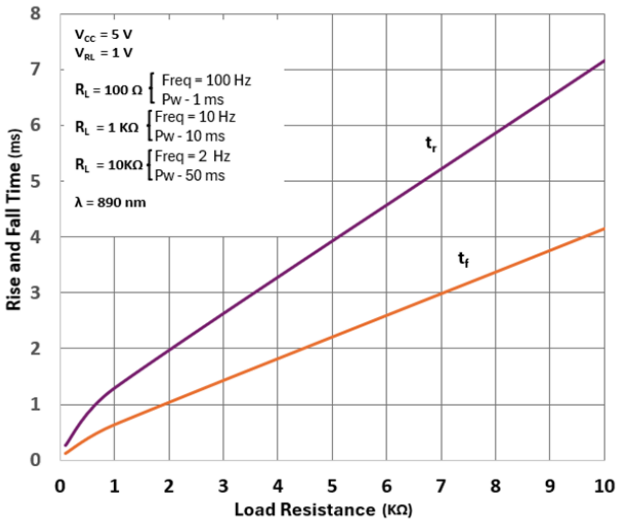
Typical Performance

OP830SL

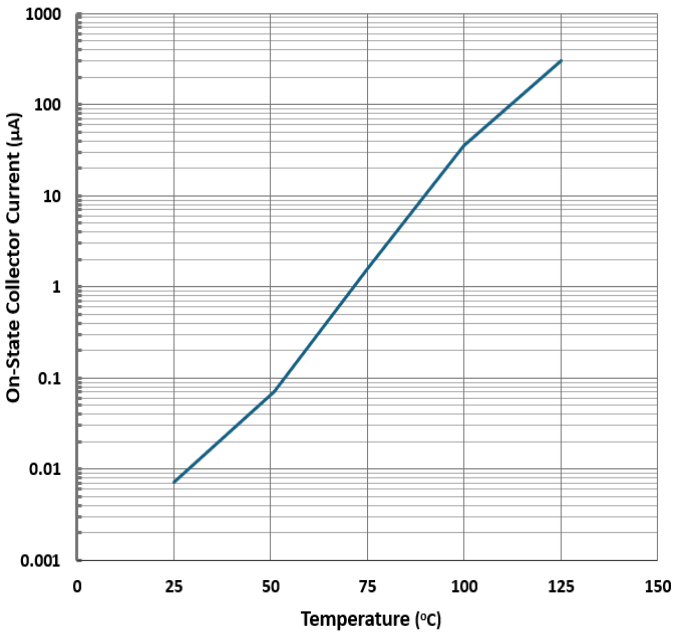
Normalized Collector Current vs Angular Displacement



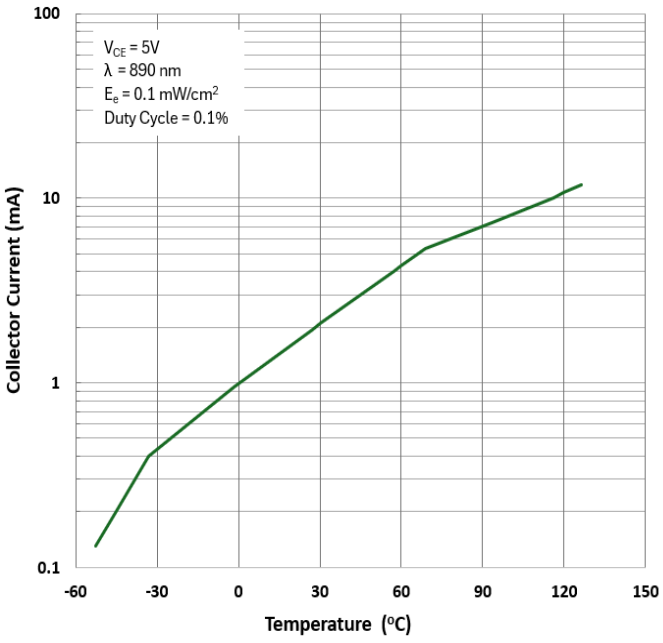
Rise and Fall Times vs Load Resistance



Collector Dark Current vs Temperature



Collector Current vs Temperature



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