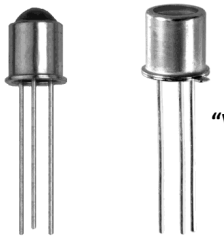
NPN Phototransistor & Photodarlington

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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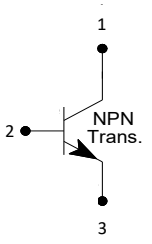
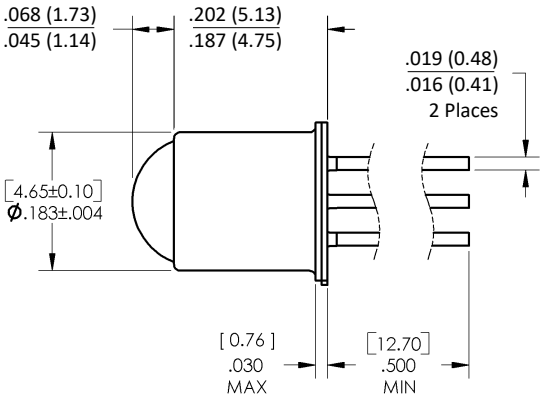
NPN Phototransistor & Photodarlington

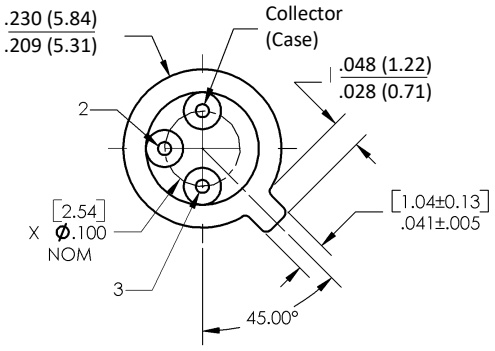
OP804SL, OP805SL, OP830SL
OP800WSL, OP801WSL, OP802WSL, OP830WSL

OP800SL Series, OP830SL

OP800SL Series







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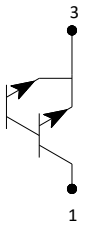
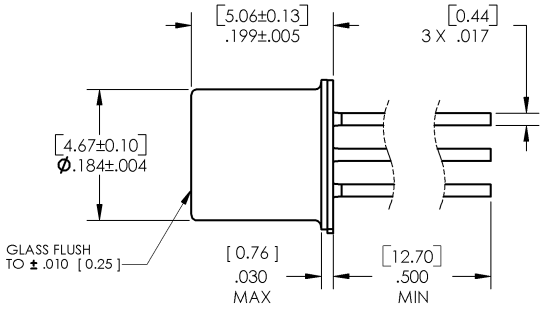
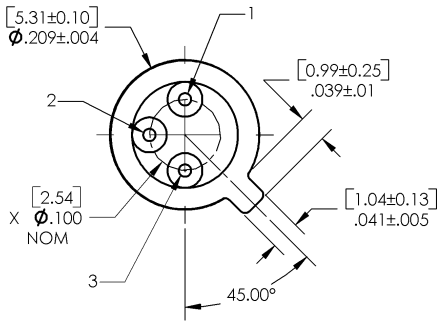
OP830SL



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

OP800WSL Series, OP830WSL





DIMENSIONS ARE IN: [MILLIMETERS] INCHES

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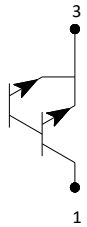
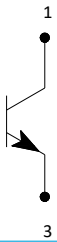
OP830WSL



OP800WSL Series



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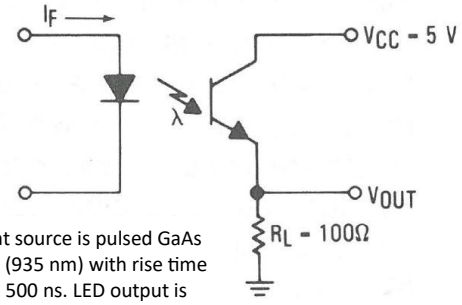
Electrical Specifications

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 OP804SL OP805SL OP800WSL OP801WSL OP802WSL	 7.0 15 0.3 0.5 2.5	 - - - - -	 22 - 3 2 3	mA	V_{CE} = 5 V, E_E = 2.5 mW/cm^2
	OP830SL OP830WSL	15 4	- -	- -		V_{CE} = 5 V, E_E = 0.25 mW/cm^2
I_{CEO}	Collector Dark Current OP800 (SL, WSL) Series OP830 (SL, WSL)	 - -	 - -	 100 1	nA	V_{CE} = 10 V, E_E = 0
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage OP800 (SL, WSL) Series OP830 (SL, WSL)	 30 15	 - -	 - -	V	I_C = 100 µA
$V_{(BR)CBO}$	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 OP800WSL Series OP800SL Series OP830SL OP830WSL	 - - - -	 - - - -	 0.4 0.4 1.2 1.2	V	I_C = .4 mA, E_E = 2.5 mW/cm^2 I_C = 400 µA, E_E = 2.5 mW/cm^2 I_C = 1 mA, E_E = 0.25 mW/cm^2 I_C = 1.0 mA, E_E = 0.25 mW/cm^2
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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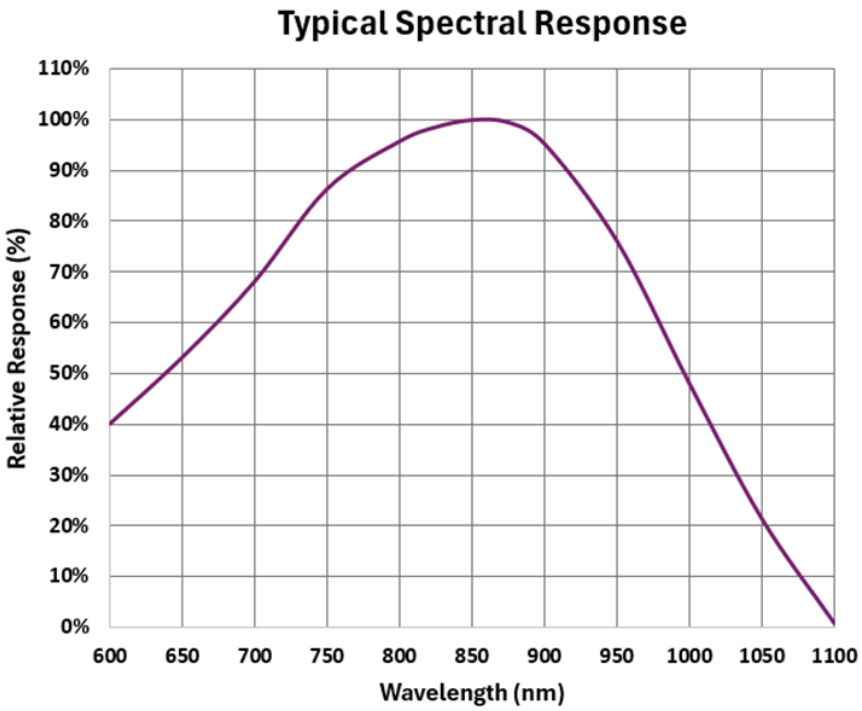
Typical Performance

OP800SL Series & OP800WSL Series
OP830SL & OP830WSL



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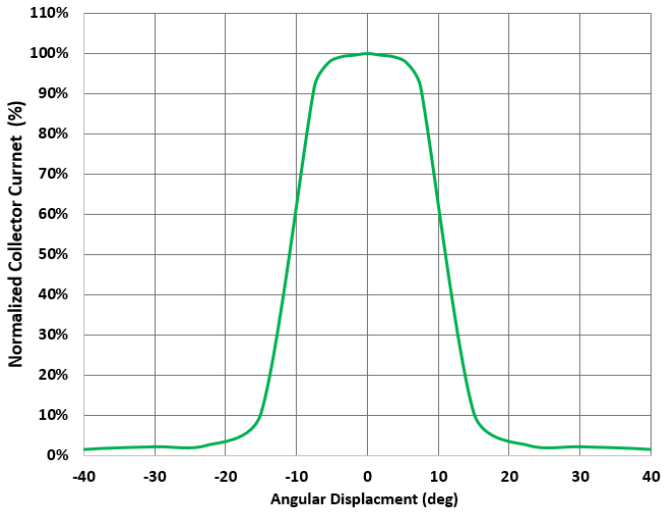
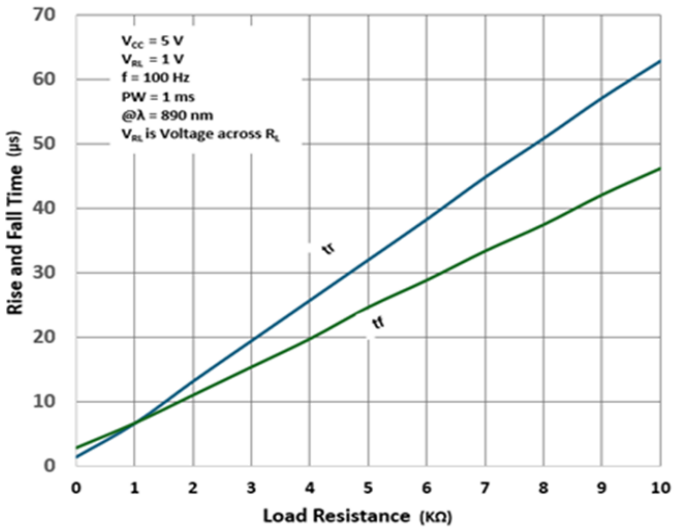
Typical Performance

OP800SL Series

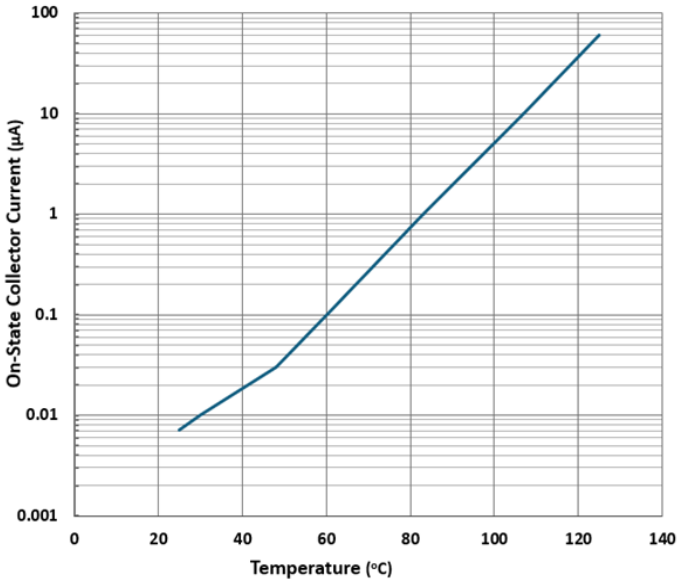
Normalized Collector Current vs Angular Displacement



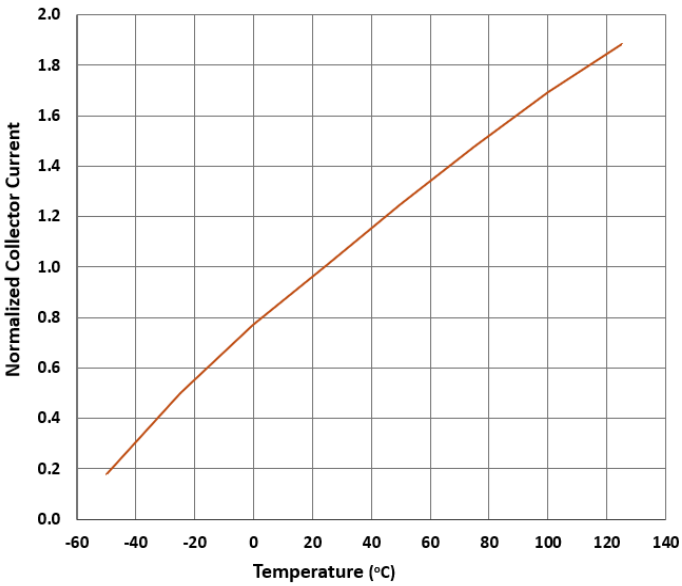
Rise and Fall Times vs Load Resistance



Collector Dark Current vs Temperature



Normalized Collector Current vs Temperature



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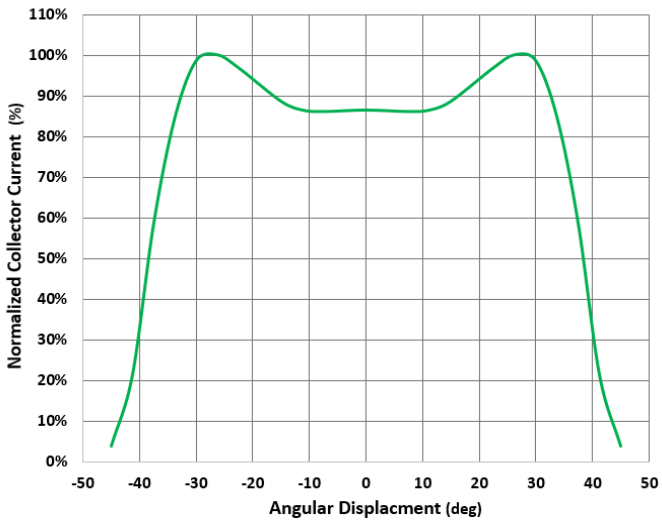
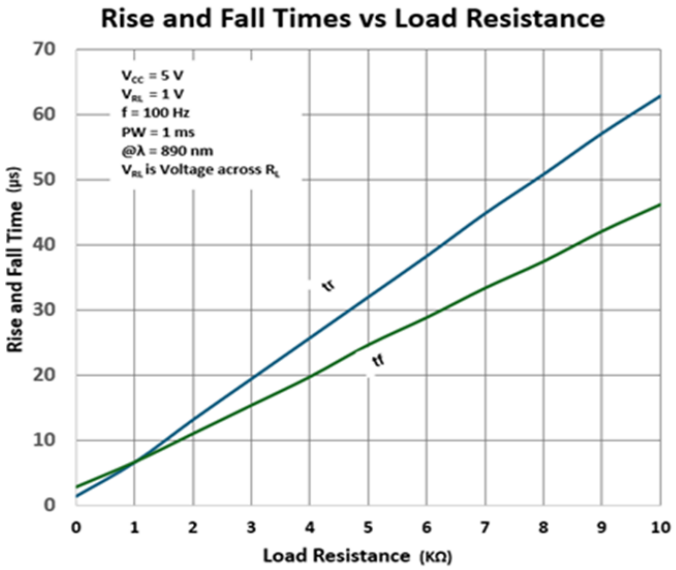
Typical Performance

OP800WSL Series

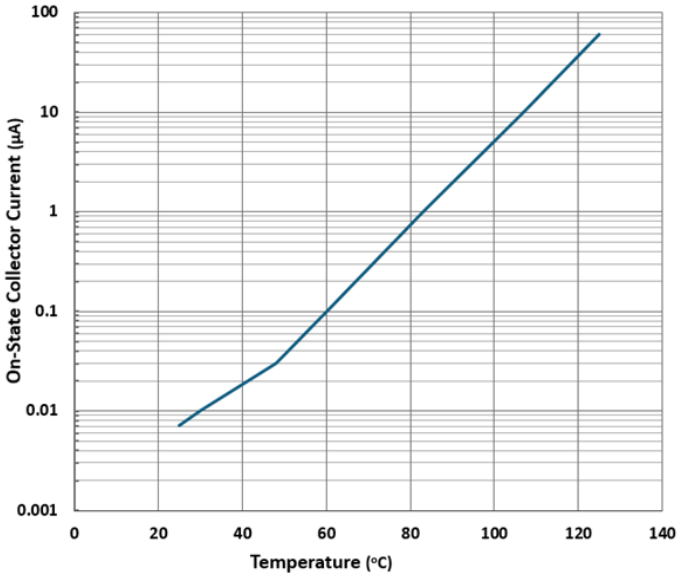
Collector Current vs Angular Displacement



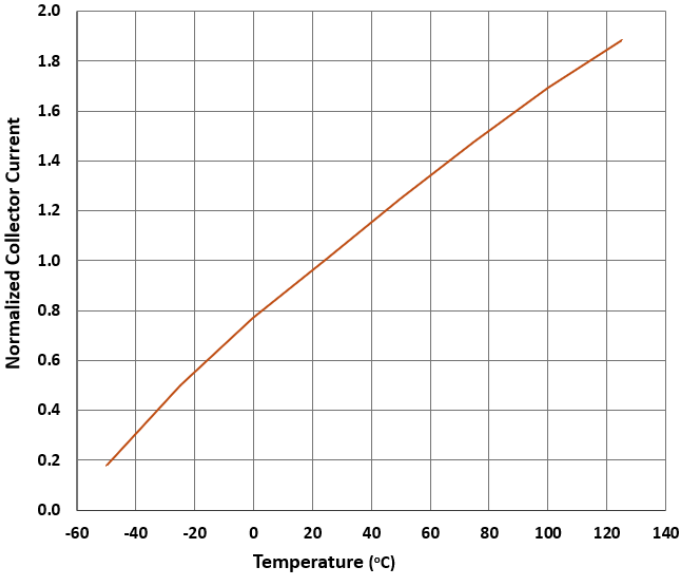
Rise and Fall Times vs Load Resistance



Collector Dark Current vs Temperature



Normalized Collector Current vs Temperature



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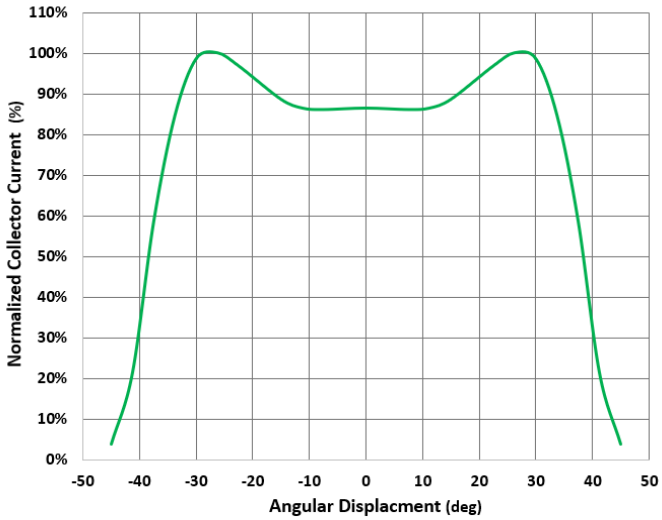
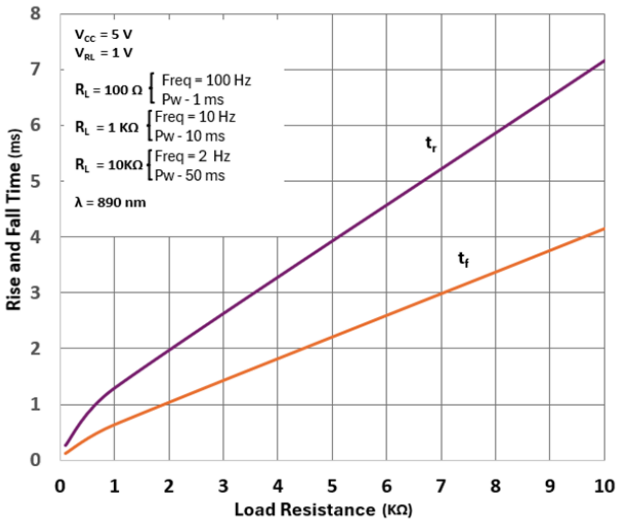
Typical Performance

OP830WSL

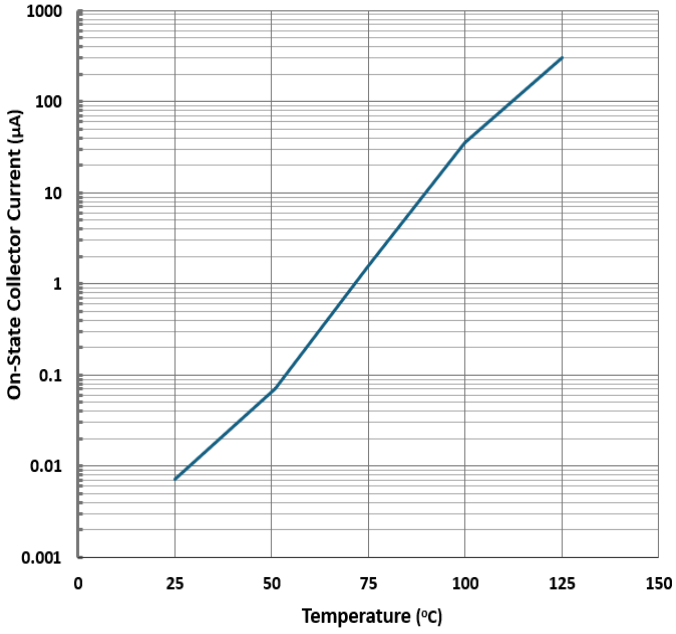
Collector Current vs Angular Displacement



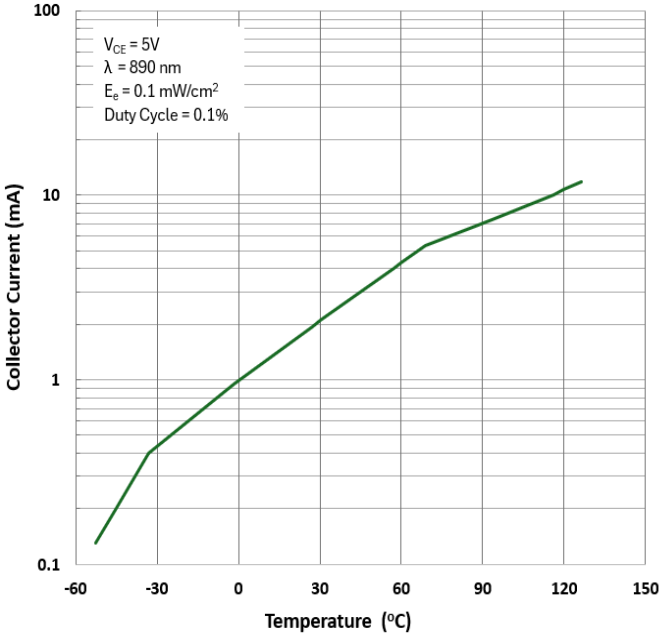
Rise and Fall Times vs Load Resistance



Collector Dark Current vs Temperature



Collector Current vs Temperature



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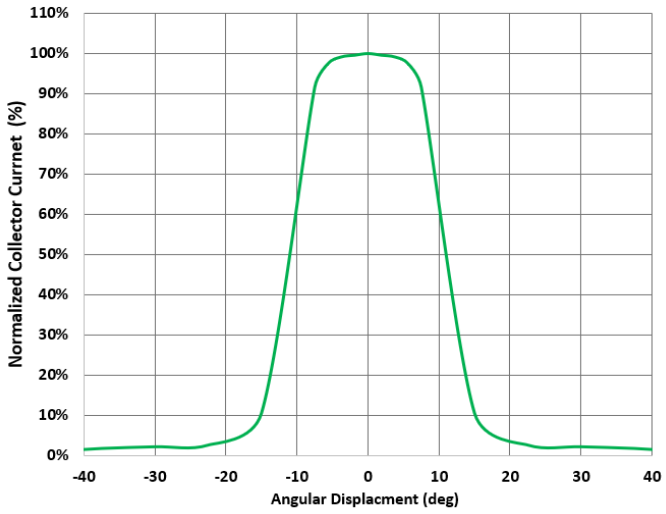
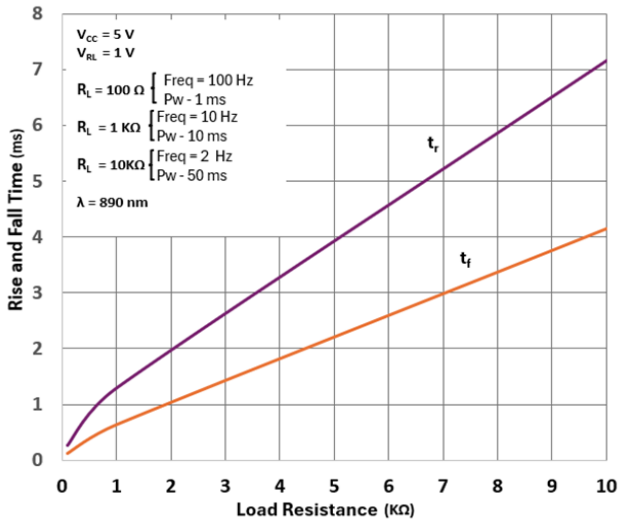
Typical Performance

OP830SL

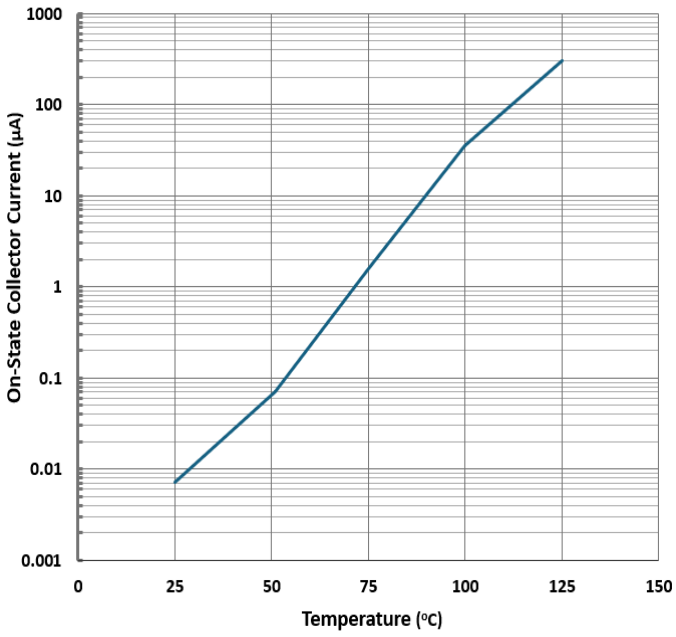
Normalized Collector Current vs Angular Displacement



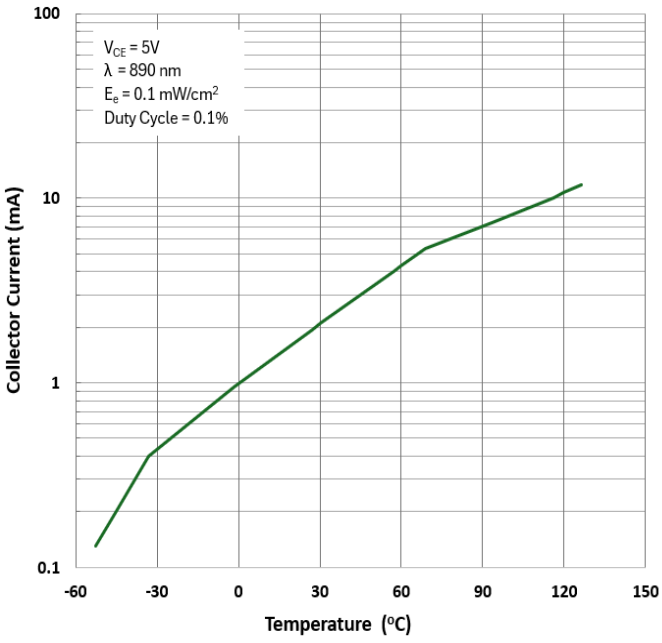
Rise and Fall Times vs Load Resistance



Collector Dark Current vs Temperature



Collector Current vs Temperature



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