

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

OPTEK Component
8 — TO-18 Package
0 — Phototransistor
3 — Photodarlington

OP XXXX

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

General Note

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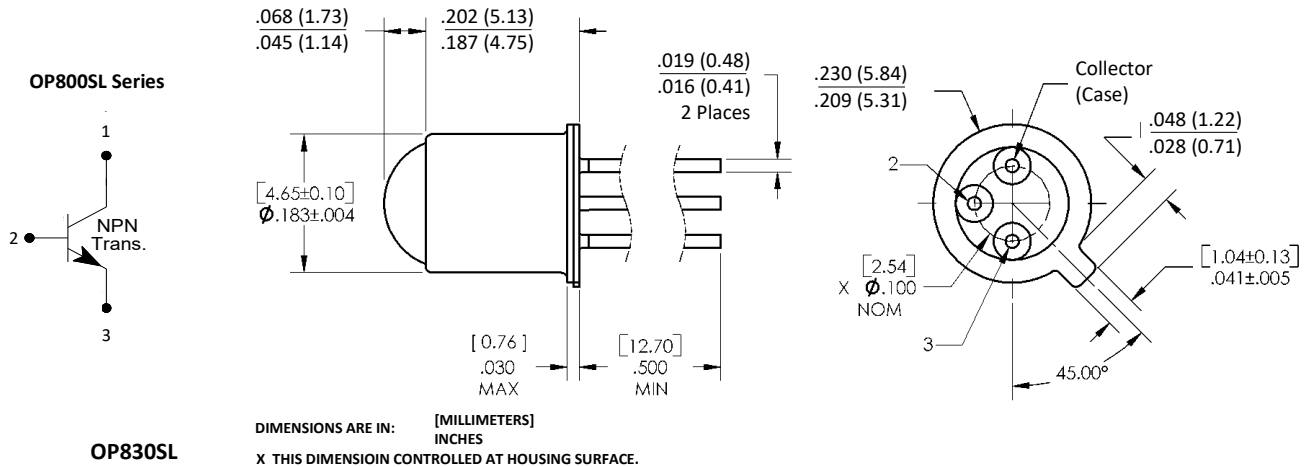
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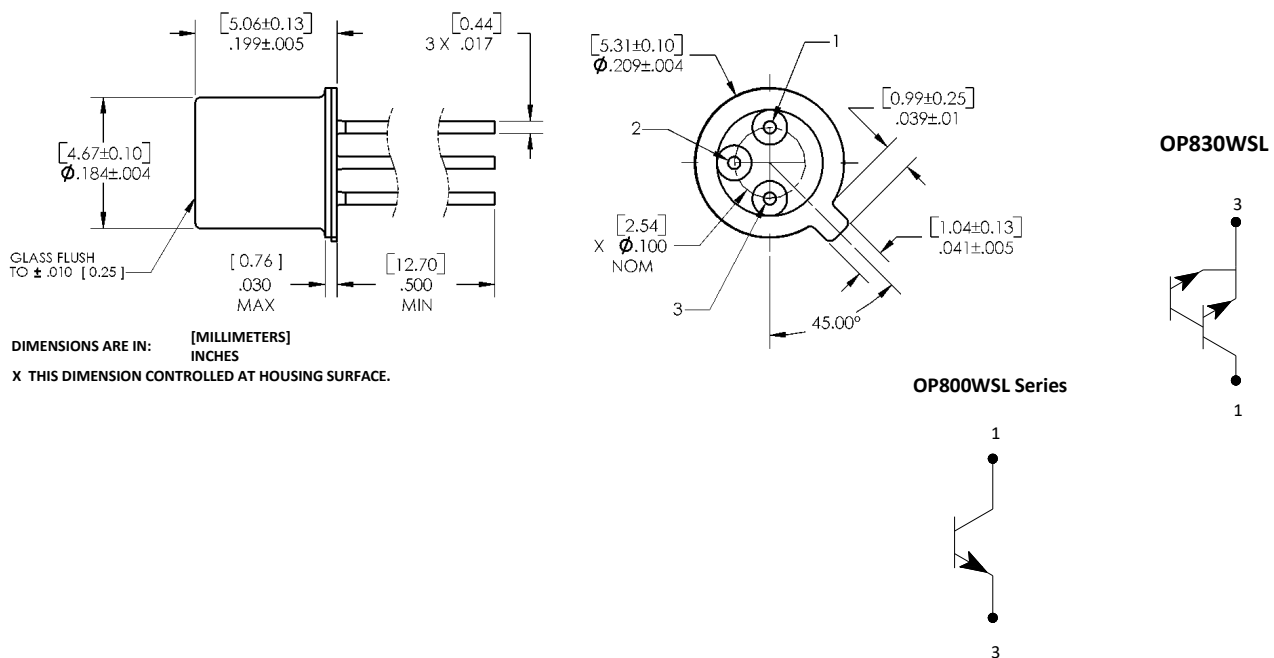


OP800SL Series, OP830SL



Pin #	OP80X _ _ _	OP830 _ _ _
1	Collector	Collector
2	Base	—
3	Emitter	Emitter

OP800WSL Series, OP830WSL



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Electrical Specifications

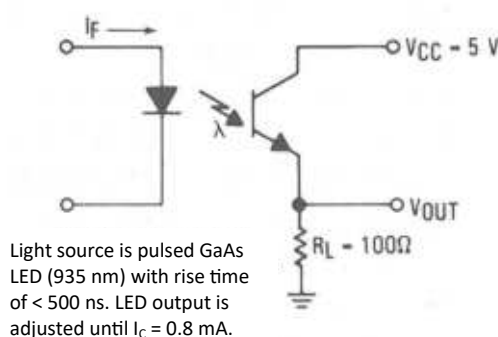
Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Storage Temperature Range	-65°C to $+150^\circ\text{C}$
Operating Temperature Range	-65°C to $+125^\circ\text{C}$
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/ $^\circ\text{C}$ above 25°C .
3. Junction temperature maintained at 25°C .
4. Light source is an unfiltered tungsten bulb operating at $CT = 2870\text{ K}$.

Switching Time Test Circuit



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Electrical Specifications

Electrical Characteristics ($T_A = 25^\circ \text{C}$ unless otherwise noted)

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

Notes:

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2. Derate linearly 2.30 mW/ $^\circ\text{C}$ above 25°C .
3. Junction temperature maintained at 25°C .
4. Light source is an unfiltered tungsten bulb operating at $CT = 2870 \text{ K}$ or equivalent infrared source.

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OP804SL, OP805SL, OP830SL

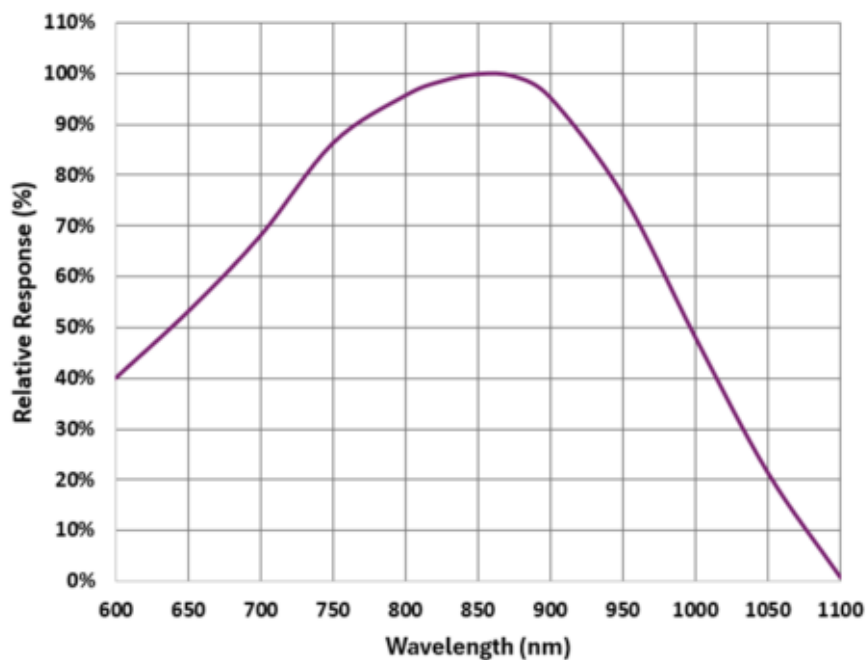
OP800WSL, OP801WSL, OP802WSL, OP830WSL



Typical Performance

OP800SL Series & OP800WSL Series
OP830SL & OP830WSL

Typical Spectral Response



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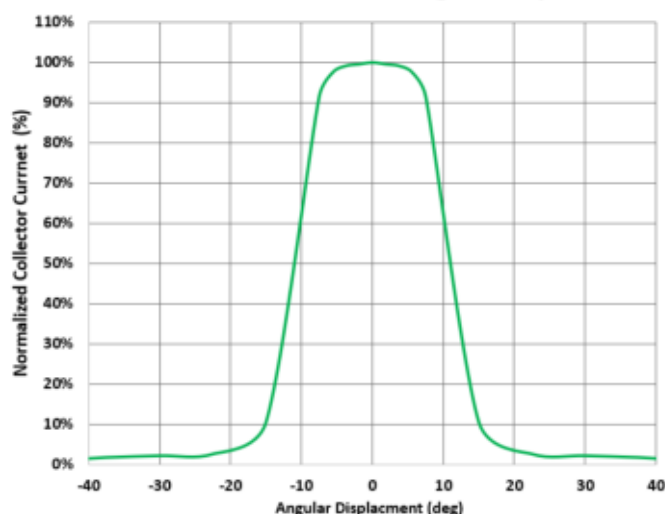
OP800WSL, OP801WSL, OP802WSL, OP830WSL



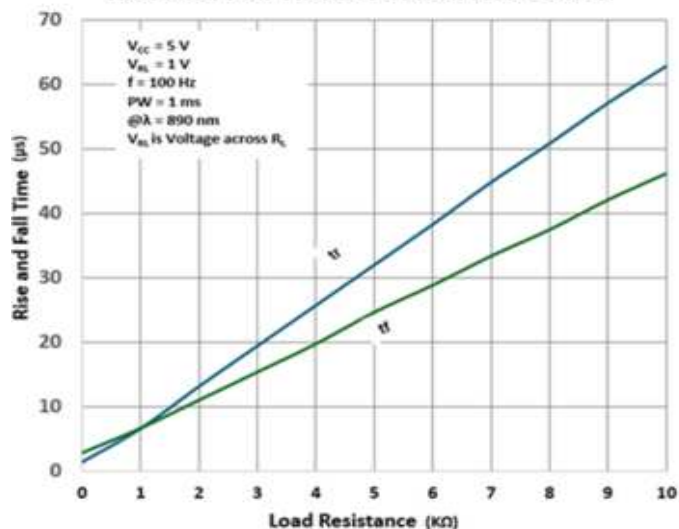
Typical Performance

OP800SL Series

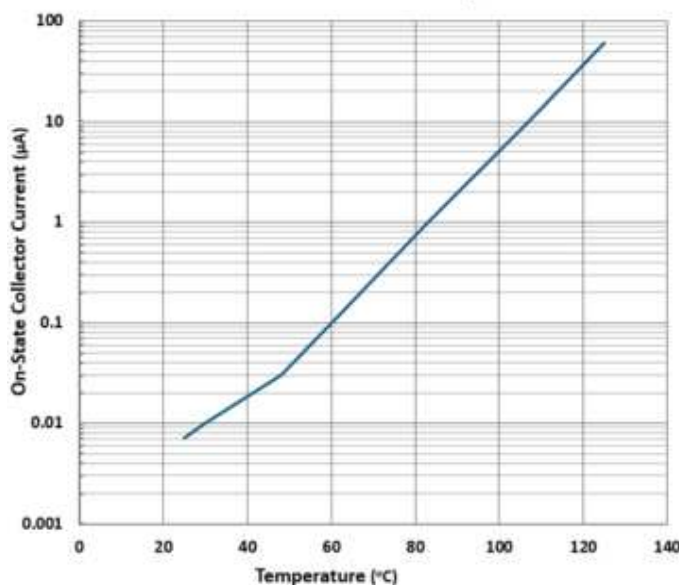
Normalized Collector Current vs Angular Displacement



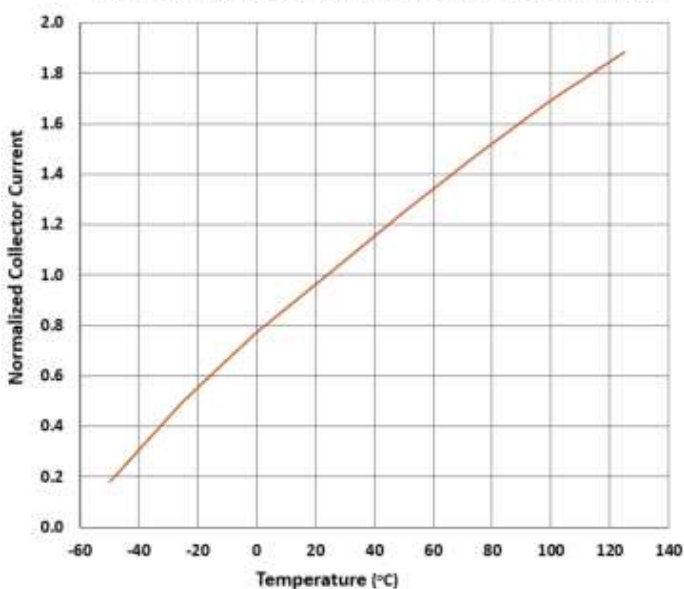
Rise and Fall Times vs Load Resistance



Collector Dark Current vs Temperature



Normalized Collector Current vs Temperature



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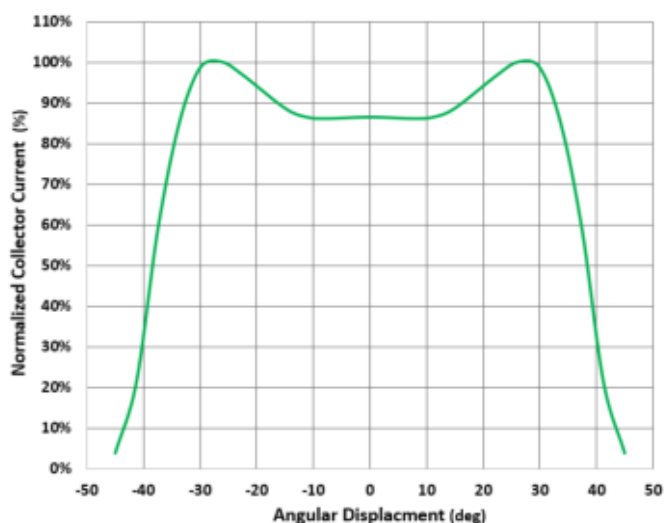
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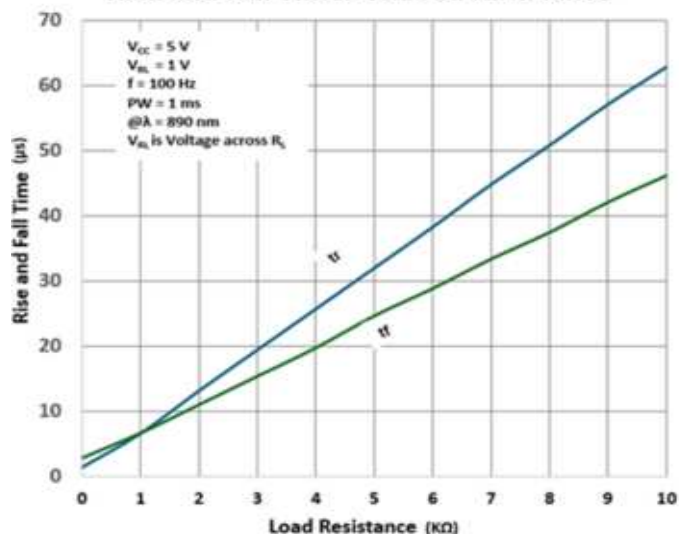
Typical Performance

OP800WSL Series

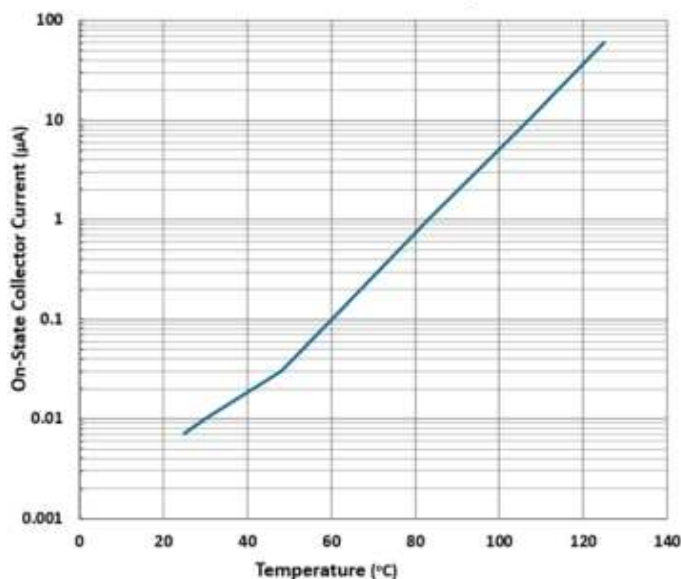
Collector Current vs Angular Displacement



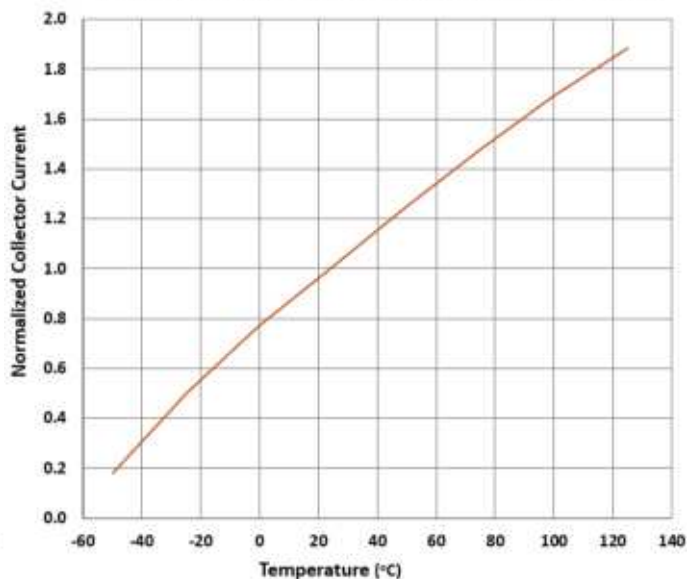
Rise and Fall Times vs Load Resistance



Collector Dark Current vs Temperature



Normalized Collector Current vs Temperature



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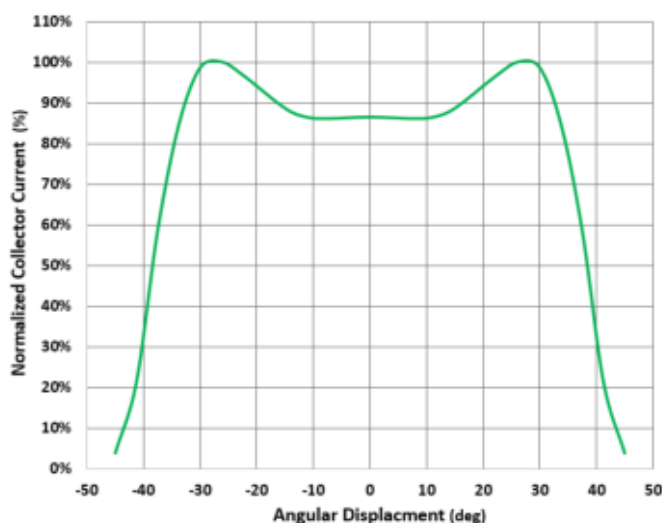
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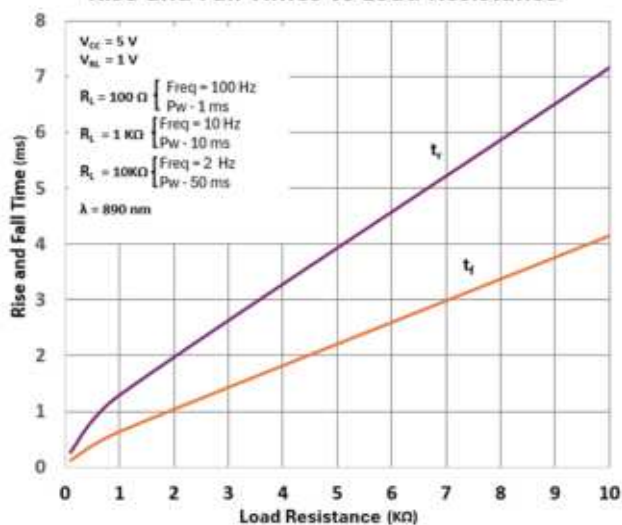
Typical Performance

OP830WSL

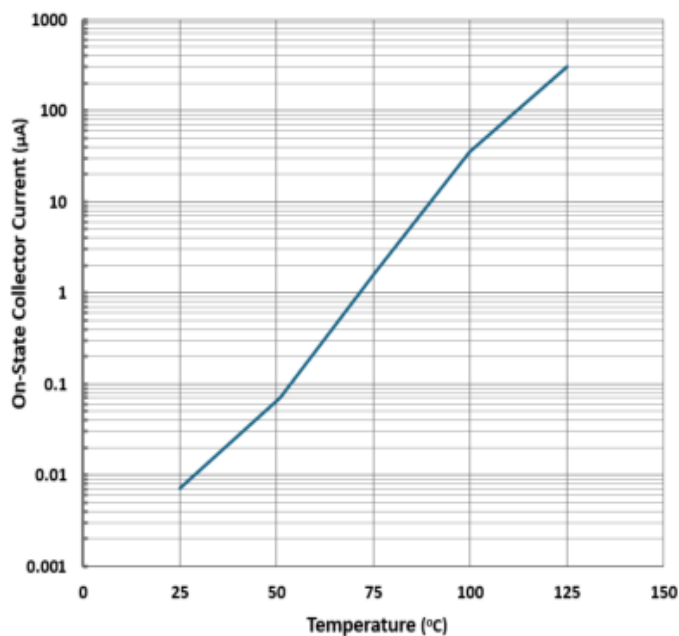
Collector Current vs Angular Displacement



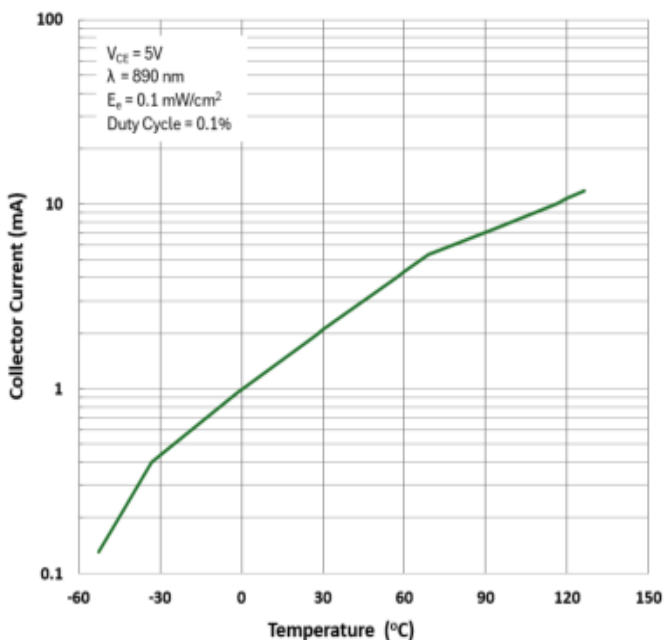
Rise and Fall Times vs Load Resistance



Collector Dark Current vs Temperature



Collector Current vs Temperature



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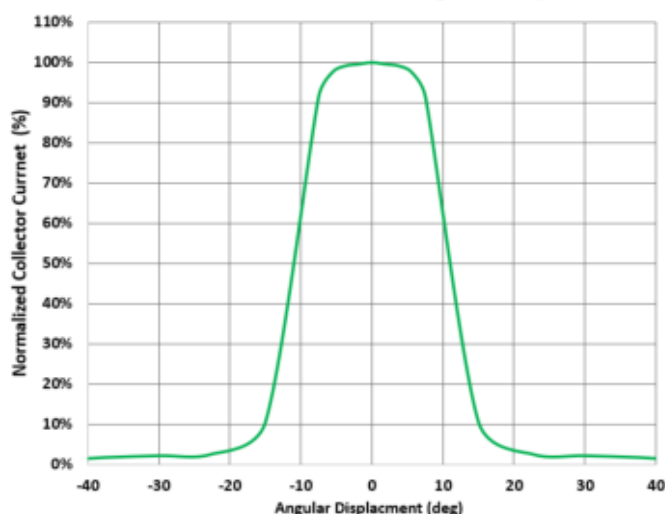
OP800WSL, OP801WSL, OP802WSL, OP830WSL



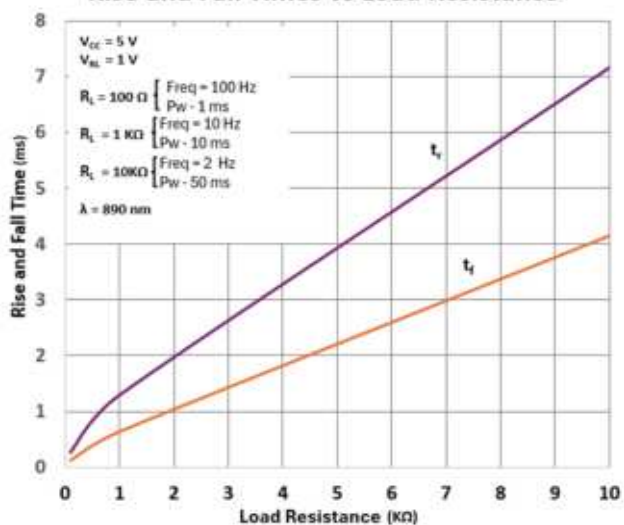
Typical Performance

OP830SL

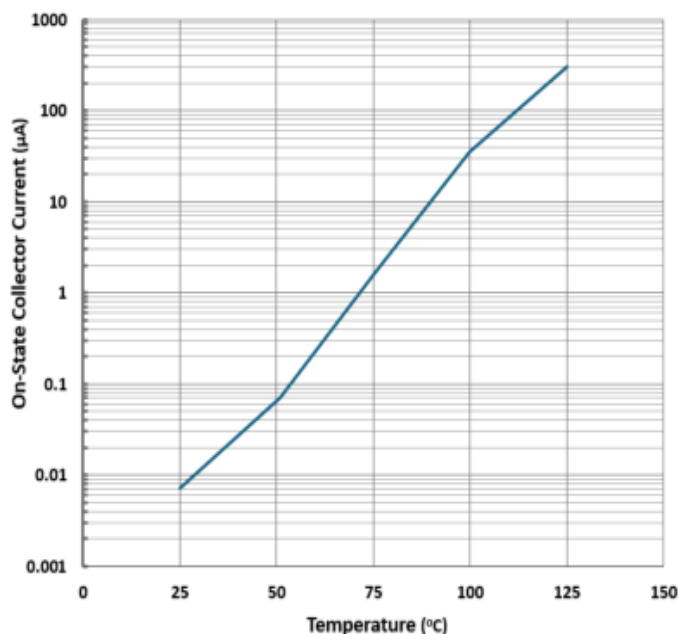
Normalized Collector Current vs Angular Displacement



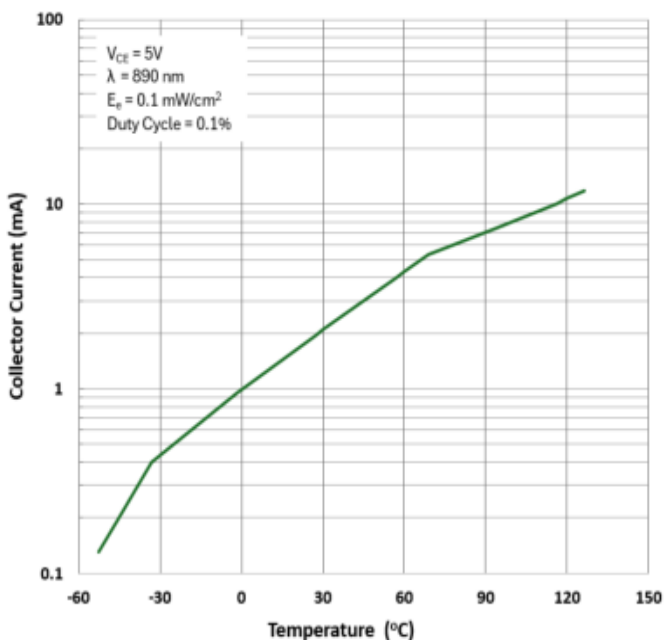
Rise and Fall Times vs Load Resistance



Collector Dark Current vs Temperature



Collector Current vs Temperature



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