

Silicon NPN Phototransistor



FEATURES

- Package type: surface-mount
- Package form: 0805
- Dimensions (L x W x H in mm): 2 x 1.25 x 0.7
- AEC-Q102 qualified
- Angle of half sensitivity: $\phi = \pm 50^\circ$
- Floor life: 72 h, MSL 4, according to J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization:
for definitions of compliance please see
www.vishay.com/doc?99912

AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

DESCRIPTION

VENT4210FX02 ambient light sensor is a silicon NPN epitaxial planar phototransistor in a miniature 0805 package for surface mounting. It is sensitive to visible light much like the human eye and has peak sensitivity at 560 nm.

APPLICATIONS

- Backlight dimming
- Automatic light control
- Automotive sensors

PRODUCT SUMMARY

COMPONENT	I_{ca} (μA) AT $E_v = 1000$ lx, CIE ILLUMINANT A, $V_{CE} = 5$ V	ϕ ($^\circ$)	$\lambda_{0.5}$ (nm)
VENT4210FX02	68	± 50	500 to 630

Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VENT4210FX02	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel; label with I_{ca} group on each reel; specifications of group 1, 2, 3 see table "Collector Light Current Binning"	0805

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25^\circ C$, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Collector emitter voltage		V_{CEO}	20	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	50	mA
Junction temperature		T_j	110	$^\circ C$
Temperature range		T_{amb}	-40 to +110	$^\circ C$
Storage temperature range		T_{stg}	-40 to +110	$^\circ C$
Soldering temperature	According to reflow solder profile Fig. 9	T_{sd}	260	$^\circ C$

BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Collector emitter breakdown voltage	$I_C = 1\text{ mA}$	$V_{(BR)CEO}$	20	-	-	V
Collector emitter dark current	$V_{CE} = 20\text{ V}$, $E = 0$	I_{CEO}	-	2.4	50	nA
Collector emitter capacitance	$V_{CE} = 5\text{ V}$, $f = 1\text{ MHz}$, $E = 0$	C_{CEO}	-	12	-	pF
Collector light current	$E_e = 1\text{ mW/cm}^2$, $\lambda = 530\text{ nm}$, $V_{CE} = 5\text{ V}$	I_{ca}	92	205	317	μA
	$E_v = 1000\text{ lx}$, CIE illuminant A, $V_{CE} = 5\text{ V}$		-	68	-	
	$E_v = 1000\text{ lx}$, white LED 4300K, $V_{CE} = 5\text{ V}$		25	57	89	
Angle of half sensitivity		ϕ	-	± 50	-	$^{\circ}$
Wavelength of peak sensitivity		λ_p	-	560	-	nm
Range of spectral bandwidth		$\lambda_{0.5}$	-	500 to 630	-	nm
Collector emitter saturation voltage	$E_e = 1\text{ mW/cm}^2$, $\lambda = 530\text{ nm}$, $I_C = 8\text{ }\mu\text{A}$	V_{CEsat}	-	0.12	0.4	V
Rise time	$V_{CE} = 5\text{ V}$, $I_C = 0.1\text{ mA}$, $\lambda = 530\text{ nm}$, $R_L = 100\text{ }\Omega$	t_r	-	57	-	μs
Fall time	$V_{CE} = 5\text{ V}$, $I_C = 0.1\text{ mA}$, $\lambda = 530\text{ nm}$, $R_L = 100\text{ }\Omega$	t_f	-	94	-	μs

COLLECTOR LIGHT CURRENT BINNING ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)							
PARAMETER	TEST CONDITION	SELECTION CODE	SYMBOL	MIN.	TYP.	MAX.	UNIT
Collector light current	$E_e = 1\text{ mW/cm}^2$, $\lambda = 530\text{ nm}$, $V_{CE} = 5\text{ V}$	1	I_{ca}	92	n/a	170	μA
		2		170		239	
		3		239		317	

Note

- Each reel will contain a single selection code; the label on the bag indicates the selection code; production shipments can include multiple selection codes in multiple bags

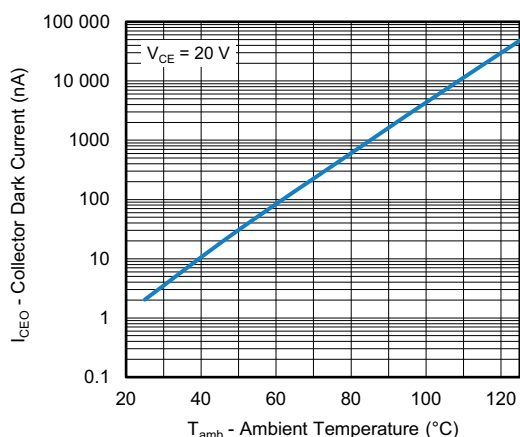
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 1 - Collector Dark Current vs. Ambient Temperature

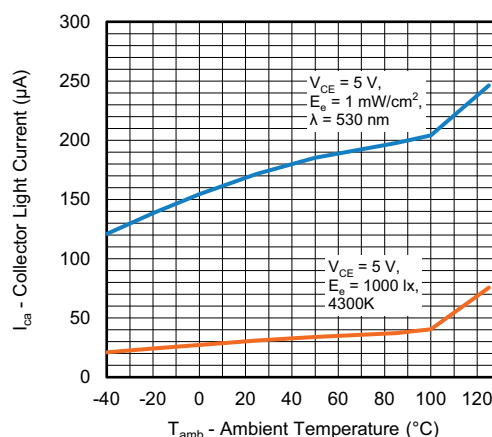


Fig. 2 - Collector Current vs. Ambient Temperature

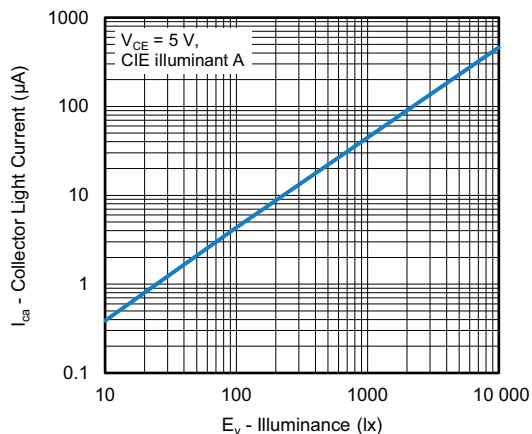


Fig. 3 - Collector Light Current vs. Illuminance

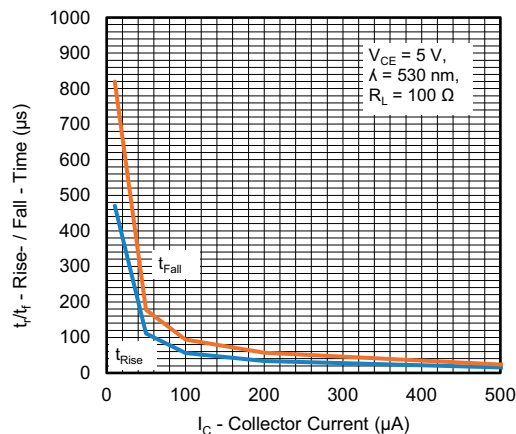


Fig. 6 - Turn-on / Turn-off Time vs. Collector Current

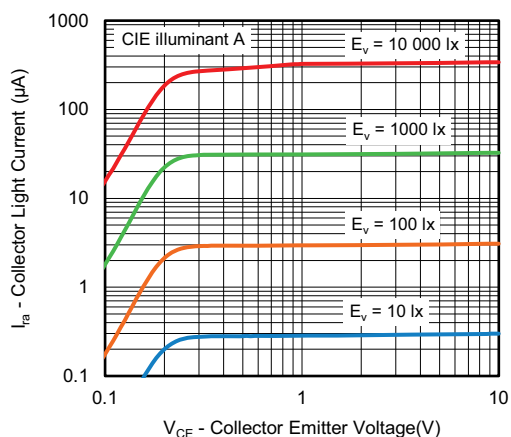


Fig. 4 - Collector Light Current vs. Collector Emitter Voltage

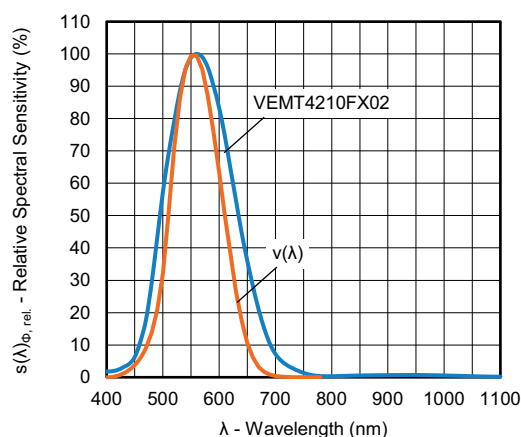


Fig. 7 - Relative Spectral Sensitivity vs. Wavelength

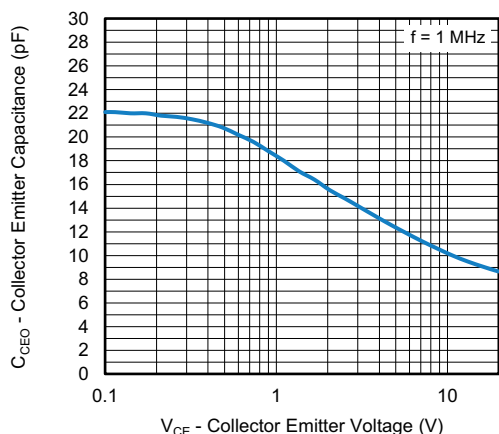


Fig. 5 - Collector Emitter Capacitance vs. Collector Emitter Voltage

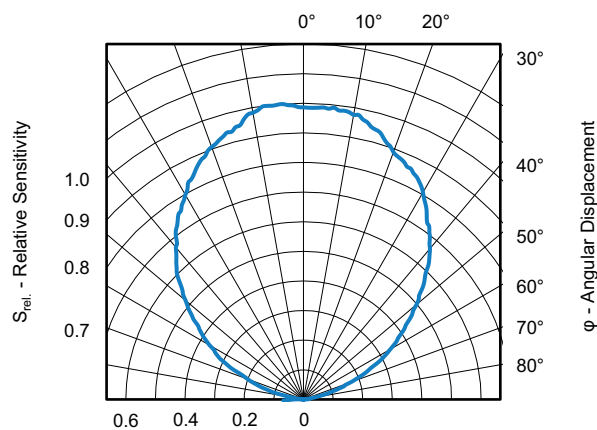
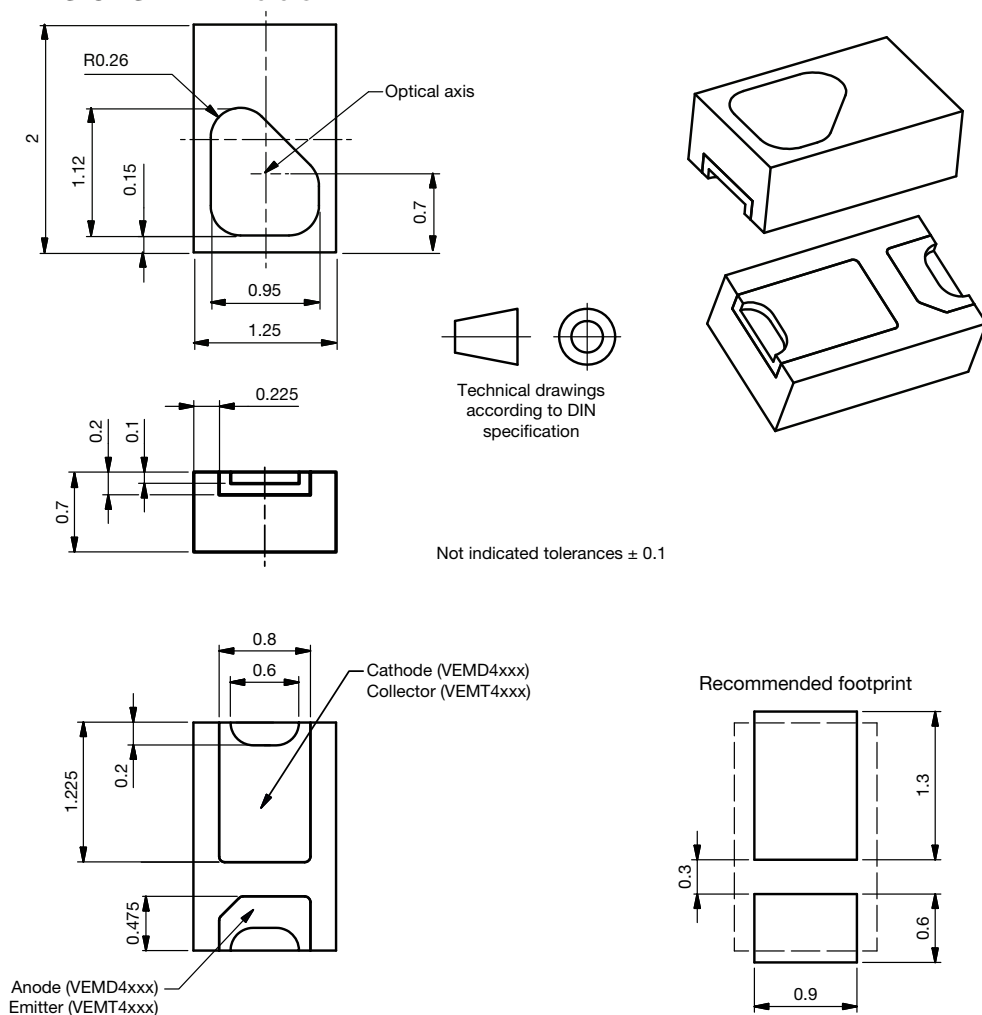


Fig. 8 - Relative Sensitivity vs. Angular Displacement

PACKAGE DIMENSIONS in millimeters


Drawing-No.: 6.550-5363.01-4
Issue: 2; 01.07.2020

SOLDER PROFILE

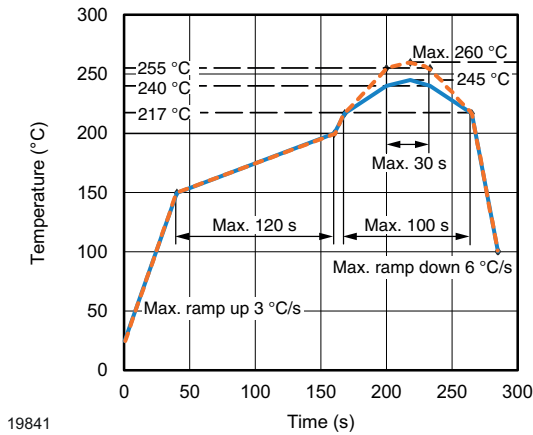


Fig. 9 - Lead (Pb)-free Reflow Solder Profile
According to J-STD-020

DRYPACK

Devices are packed in moisture barrier bags (MBB) to prevent the products from moisture absorption during transportation and storage. Each bag contains a desiccant.

FLOOR LIFE

Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:

Floor life: 72 h

Conditions: $T_{amb} < 30\text{ °C}$, $RH < 60\%$

Moisture sensitivity level 4, according to J-STD-020.

DRYING

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at 40 °C ($+5\text{ °C}$), $RH < 5\%$.

TAPE AND REEL

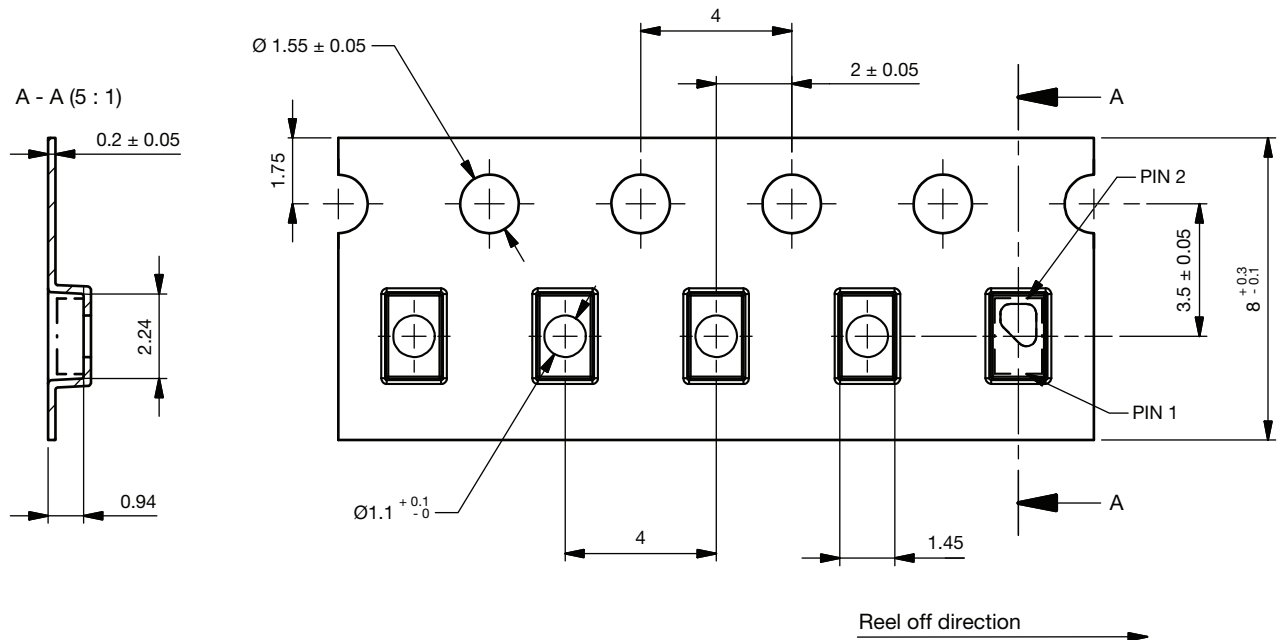


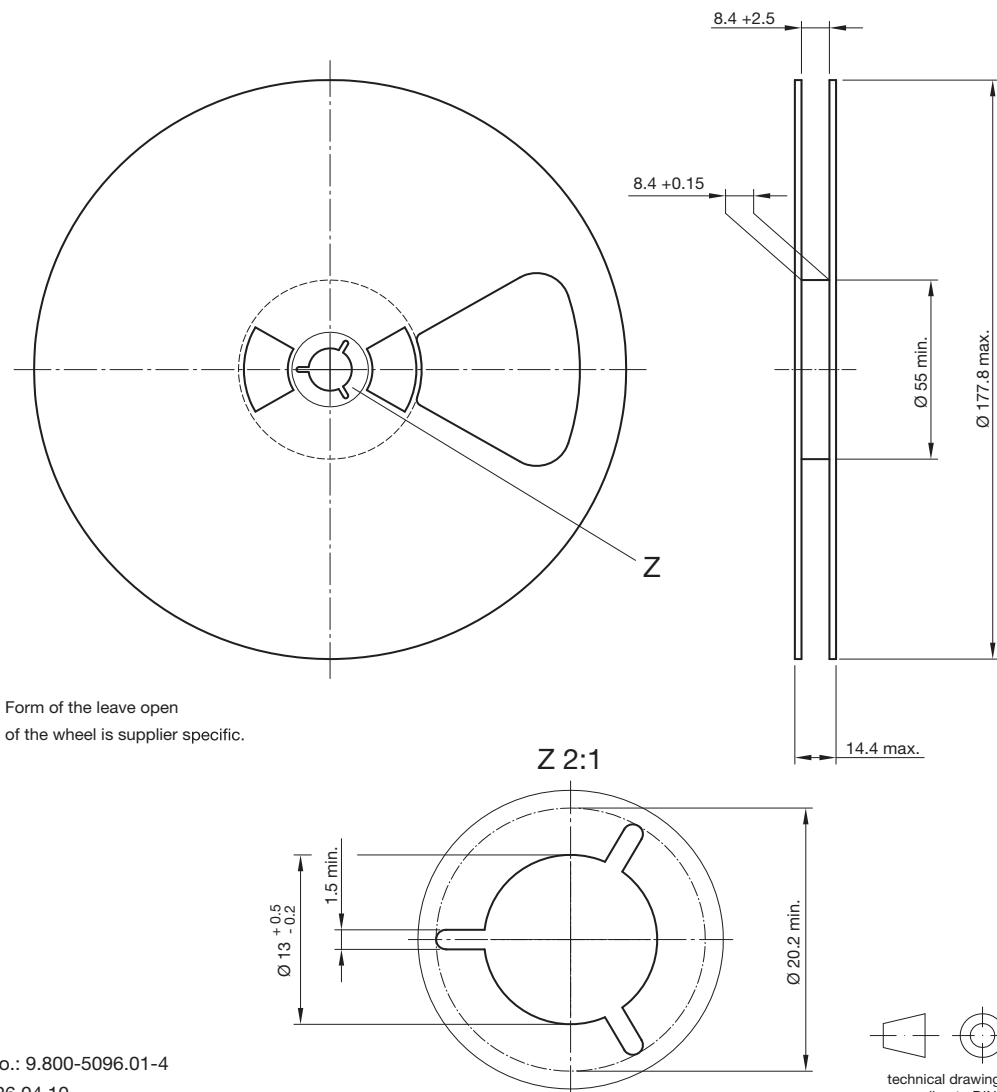
Tabelle		
TYPE	PIN 1	PIN 2
VEMD4xxx	Anode	Cathode
VENT4xxx	Emitter	Collector

Fig. 10 - Blister Tape

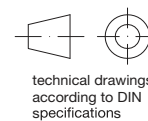
Drawing-No.: 9.700-5411.0-4
Issue: 2; 18.10.2022



REEL DIMENSIONS in millimeters



Drawing-No.: 9.800-5096.01-4
Issue: 2; 26.04.10
20875





REVISION HISTORY		
DATASHEET VERSION	REVISION DATE	CHANGE
1.0	25-Sep-2026	Initial datasheet release



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