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Select The Load Resistor

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Table 1 - Photoelectric Characteristics (Ta=25°C) PT-IC-GC-3-PE-520

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Photo Current	$I_{L(1)}$	V_{cc}=5V E_v=10Lux	1.2	2.5	3.6	μA
	$I_{L(2)}$	V_{cc}=5V E_v=30Lux	3.6	7.5	10.8	μA
	$I_{L(3)}$	V_{cc}=5V E_v=100Lux	12	25	36	μA
Collector Dark Current	I_D	V_{cc}=5V/85°C E_v=0Lux	-	-	0.8	μA

Binning Table 2 - PT-IC-GC-3-PE-520 Batch BINNED GROUP

Batch BINNED GROUP (T_{amb} = 25 °C, unless otherwise specified)						
Parameter	Condition	Binned Group	Symbol	Min.	Max.	Unit
Photo Current	E_V = 100 lux, CIE illuminant A, V_{CE} = 5 V	A	I_{PCE}	12	23	μA
		B	I_{PCE}	19	36	μA

Token provides ambient light sensor for photodiode and phototransistor. For a given irradiance, the phototransistor may show a batch change of the output current due to the susceptibility of the wafer and the variability of the transistor gain. The lot-to-lot change of the photoelectric sensor is significantly lower because it is only caused by the variability of photosensitivity. Token provides phototransistor output (component) for its ambient light sensor in binned groups (Table 2). These groups can not be ordered separately, but each reel is labeled A, B, or C, which allows the user to select the appropriate load resistance to compensate for these wide tolerances.

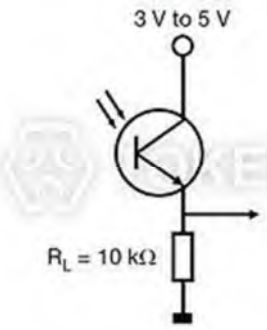

Figure 3 - Typical Optical Load Circuit

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In order to minimize the output variability of the light sensor, the load resistance (R_L) requires the selection of the component to choose the load resistance (R_L) according to the sorted standard illuminance. The ambient light sensor and the transistor output of the typical optical circuit shown in Figure 3. For the PT-IC-GC-3-PE-520, 30 lux the typical output current is 7.5 µA. At 100 lux, the typical output current is 25 µA and the output current is in the range of 12 µA to 36µA. By the previously mentioned binning components, the range of 100 lux is divided into two bins. Each bin should use a different load resistor, and the output is relatively consistent for a given lux level.

Suppose application detection ranges from 10 lux to $1000 lux. Use a 10 KΩ load resistor to produce a voltage of 0.025 V to 2.5 V. The photocurrent of the voltage is equal to 2.5 µA to 250 µA.

Table 3 - Mean of Bin

Part Number	Bin	Photocurrent, I_{PCE} at 100 lux (µA)		
		Min.	Mean	Max.
PT-IC-GC-3-PE-520	A	12	17.5	23
	B	19	27.5	36

- **The purpose of selecting the resistance is to have the same output voltage for the average of each component, Table 3.**

Table 4 - Load Resistor of Bin

Bin A	Bin B
I_{PCE} = 17.5 µA, RL = 10 kΩ **V = 17.5 µA x 10 kΩ** **V = 175 mV**	0.175 V = 0.0000275 A x RL RL = 0.175 V/0.0000275 A RL = 6.36 kΩ

- **The PT-IC-GC-3-PE-520 overall tolerance is reduced from 12 to 36 by 12 to 23 by changing the resistance value based on the bin.**