

**ON Semiconductor®** 

# QRE1113, QRE1113GR Miniature Reflective Object Sensor

### Features

- Phototransistor Output
- No Contact Surface Sensing
- Miniature Package
- Lead Form Style: Gull Wing

Two Packaging Options: Tube (QRE1113) Tape and Reel (QRE1113GR)

Two Leadform Options: Through Hole (QRE1113)

SMT Gull Wing (QRE1113GR)









LAND PATTERN RECOMMENDATION





## Notes:

1. Dimensions for all drawings are in millimeters.

2. Tolerance of  $\pm 0.15$  mm on all non-nominal dimensions.

## Schematic





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## **Absolute Maximum Ratings**

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^{\circ}$ C unless otherwise noted.

Symbol	Parameter	Value	Unit
T <sub>OPR</sub>	Operating Temperature	-40 to +85	°C
T <sub>STG</sub>	Storage Temperature	-40 to +90	°C
T <sub>SOL-I</sub>	Soldering Temperature (Iron) <sup>(4 5, 6)</sup>	240 for 5 sec	°C
T <sub>SOL-F</sub>	Soldering Temperature (Flow) <sup>(5, 6)</sup>	260 for 10 sec	°C
EMITTER			
١ <sub>F</sub>	Continuous Forward Current	50	mA
V <sub>R</sub>	Reverse Voltage	5	V
I <sub>FP</sub>	Peak Forward Current <sup>(7)</sup>	1	А
PD	Power Dissipation <sup>(3)</sup>	75	mW
SENSOR			
V <sub>CEO</sub>	Collector-Emitter Voltage	30	V
V <sub>ECO</sub>	Emitter-Collector Voltage	5	V
Ι <sub>C</sub>	Collector Current	20	mA
PD	Power Dissipation <sup>(3)</sup>	50	mW

### **Electrical / Optical Characteristics**

Values are at  $T_A = 25^{\circ}C$  unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit			
INPUT DIODE									
V <sub>F</sub>	Forward Voltage	I <sub>F</sub> = 20 mA		1.2	1.6	V			
I <sub>R</sub>	Reverse Leakage Current	V <sub>R</sub> = 5 V			10	μΑ			
$\lambda_{PE}$	Peak Emission Wavelength	I <sub>F</sub> = 20 mA		940		nm			
OUTPUT TRANSISTOR									
۱ <sub>D</sub>	Collector-Emitter Dark Current	$I_{F} = 0 \text{ mA}, V_{CE} = 20 \text{ V}$			100	nA			
COUPLED									
I <sub>C(ON)</sub>	On-State Collector Current	I <sub>F</sub> = 20 mA, V <sub>CE</sub> = 5 V <sup>(8)</sup>	0.10	0.40		mA			
I <sub>CX</sub>	Cross-Talk Collector Current	$I_F = 20 \text{ mA}, V_{CE} = 5 \text{ V}^{(9)}$			1	μΑ			
V <sub>CE(SAT)</sub>	Saturation Voltage				0.3	V			
t <sub>r</sub>	Rise Time	$V_{CC} = 5 \text{ V}, I_{C(ON)} = 100 \ \mu\text{A},$		20		μS			
t <sub>f</sub>	Fall Time	$R_L = 100 \text{ k}\Omega$		20		μS			

#### Notes:

3. Derate power dissipation linearly 1.00 mW/°C above 25°C.

4. RMA flux is recommended.

5. Methanol or isopropyl alcohols are recommended as cleaning agents.

6. Soldering iron 1/16" (1.6mm) from housing.

7. Pulse conditions: tp = 100  $\mu$ s; T = 10 ms.

8. Measured using an aluminum alloy mirror at d = 1 mm.

9. No reflective surface at close proximity.





50

40

30

20

10

0 L 1.0

3.0

2.5

2.0

1.5

1.0

0.5

0.0

VF - FORWARD VOLTAGE (V)

IF - FORWARD CURRENT (mA)





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