QRE1113, QRE1113GR, QRE1114GR

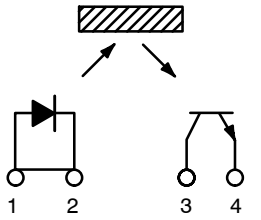
Miniature Reflective Object Sensor

ON Semiconductor®

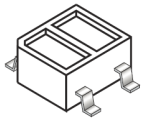
www.onsemi.com

Features

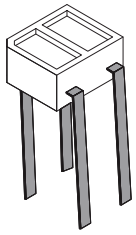
- Phototransistor Output
- No Contact Surface Sensing
- Miniature Package
- Lead Form Style: Gull Wing
- Two Leadform Options:
  - Through Hole (QRE1113)
  - SMT Gull Wing (QRE1113GR & QRE1114GR)
- Two Packaging Options:
  - Tube (QRE1113)
  - Tape and Reel (QRE1113GR & QRE1114GR)



Pin 1: Anode
Pin 2: Cathode
Pin 3: Collector
Pin 4: Emitter



REFLECTIVE RECTANGULAR SURFACE MOUNT
CASE 100CY



REFLECTIVE RECTANGULAR THROUGH HOLE
CASE 100AQ

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
T_{OPR}	Operating Temperature	−40 to +85	°C
T_{STG}	Storage Temperature	−40 to +90	°C
T_{SOL-I}	Soldering Temperature (Iron) (Notes 2, 3, 4)	240 for 5 s	°C
T_{SOL-F}	Soldering Temperature (Flow) (Notes 3, 4)	260 for 10 s	°C
EMITTER			
I_F	Continuous Forward Current	50	mA
V_R	Reverse Voltage	5	V
I_{FP}	Peak Forward Current (Note 5)	1	A
P_D	Power Dissipation (Note 1)	75	mW
SENSOR			
V_{CEO}	Collector-Emitter Voltage	30	V
V_{ECO}	Emitter-Collector Voltage	5	V
I_C	Collector Current	20	mA
P_D	Power Dissipation (Note 1)	50	mW

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Derate power dissipation linearly 1.00 mW/°C above 25°C.
2. RMA flux is recommended.
3. Methanol or isopropyl alcohols are recommended as cleaning agents.
4. Soldering iron 1/16″ (1.6 mm) from housing.
5. Pulse conditions: tp = 100 μs; T = 10 ms.

ORDERING INFORMATION

Device	Package	Shipping†
QRE1113	Reflective Rectangular (Through Hole)	1600 / Tube
QRE1113GR & QRE1114GR	Reflective Rectangular (Surface Mount)	1000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

ELECTRICAL/OPTICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
INPUT DIODE							
V_F	Forward Voltage	I_F = 20 mA			1.2	1.6	V
I_R	Reverse Leakage Current	V_R = 5 V				10	μA
λ_{PE}	Peak Emission Wavelength	I_F = 20 mA			940		nm
OUTPUT TRANSISTOR							
I_D	Collector-Emitter Dark Current	I_F = 0 mA, V_{CE} = 20 V				100	nA
COUPLED							
$I_{C(ON)}$	On-State Collector Current	I_F = 20 mA, V_{CE} = 5 V (Note 6)	QRE1113 & QRE1113GR	0.10	0.90		mA
			QRE1114GR	0.30		0.60	mA
I_{CX}	Cross-Talk Collector Current	I_F = 20 mA, V_{CE} = 5 V (Note 7)				1	μA
$V_{CE(SAT)}$	Saturation Voltage	I_F = 20 mA, I_C = 50 μA (Note 6)				0.3	V
t_r	Rise Time	V_{CC} = 5 V, $I_{C(ON)}$ = 100 μA, R_L = 1 kΩ			20		μs
t_f	Fall Time				20		μs

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

6. Measured using an aluminum alloy mirror at d = 1 mm.
7. No reflective surface at close proximity.

REFLOW PROFILE

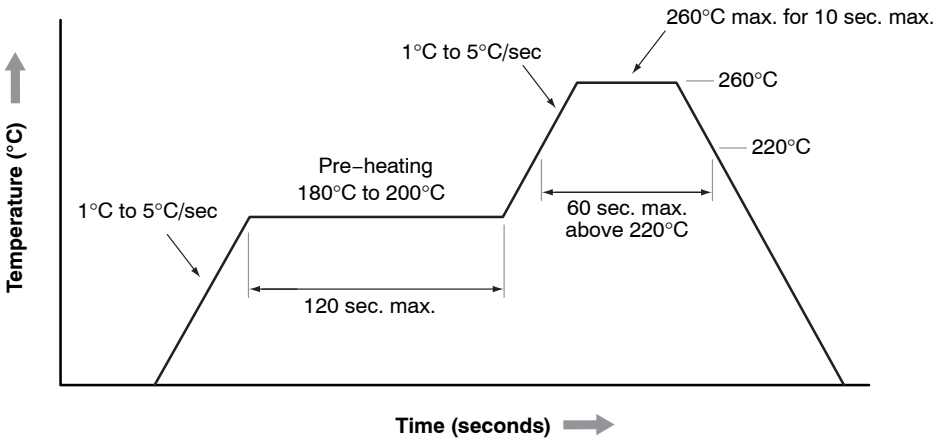


Figure 1. Reflow Profile

TYPICAL PERFORMANCE CURVES

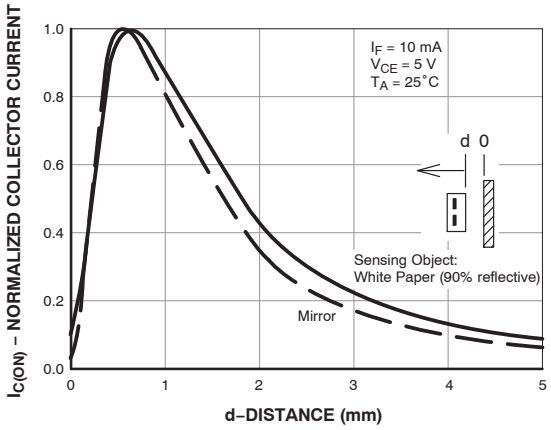


Figure 2. Normalized Collector Current vs. Distance between Device and Reflector

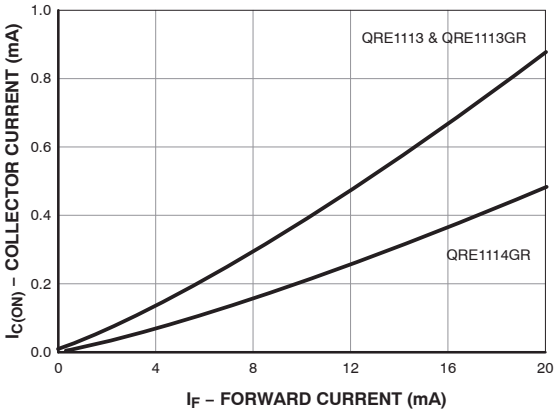


Figure 3. Collector Current vs. Forward Current

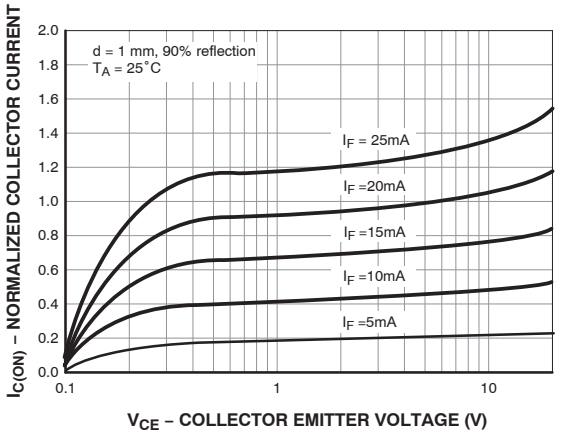


Figure 4. Normalized Collector Current vs. Collector to Emitter Voltage

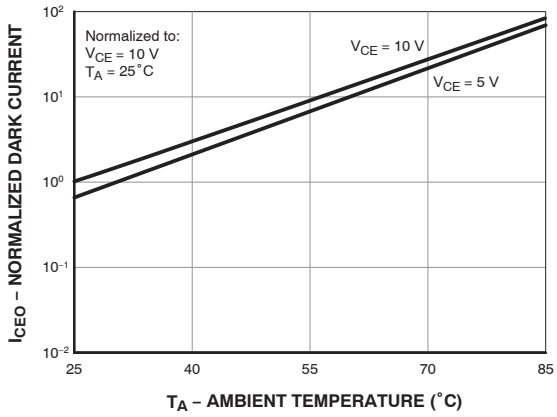


Figure 5. Collector Emitter Dark Current (Normalized) vs. Ambient Temperature

TYPICAL PERFORMANCE CURVES (Continued)

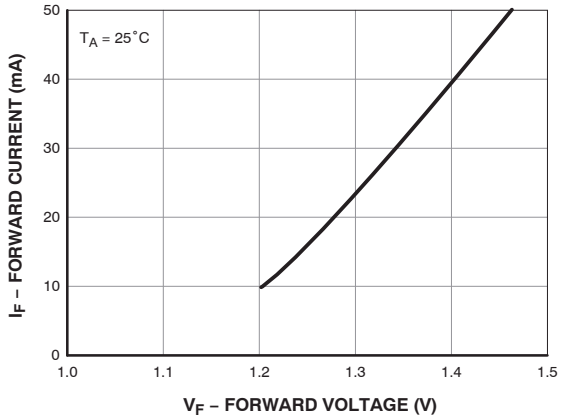


Figure 6. Forward Current vs. Forward Voltage

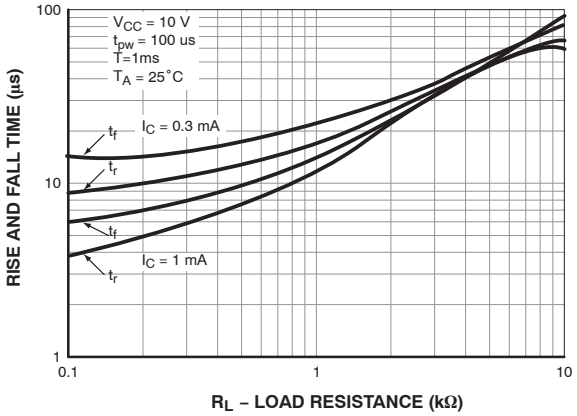


Figure 7. Rise and Fall Time vs. Load Resistance

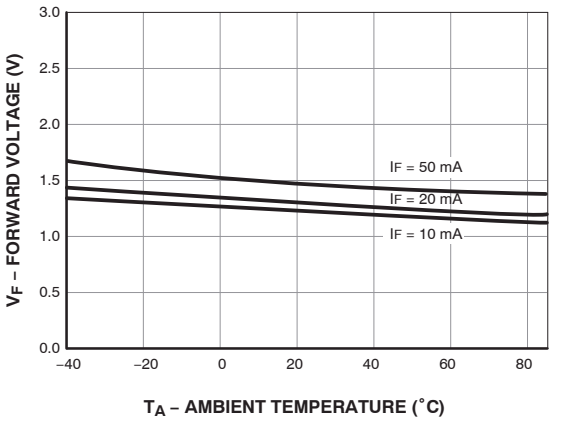


Figure 8. Forward Voltage vs. Ambient Temperature

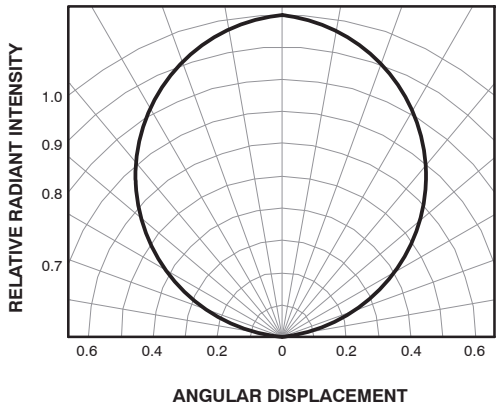


Figure 9. Radiation Diagram

TAPING DIMENSIONS FOR GR OPTION

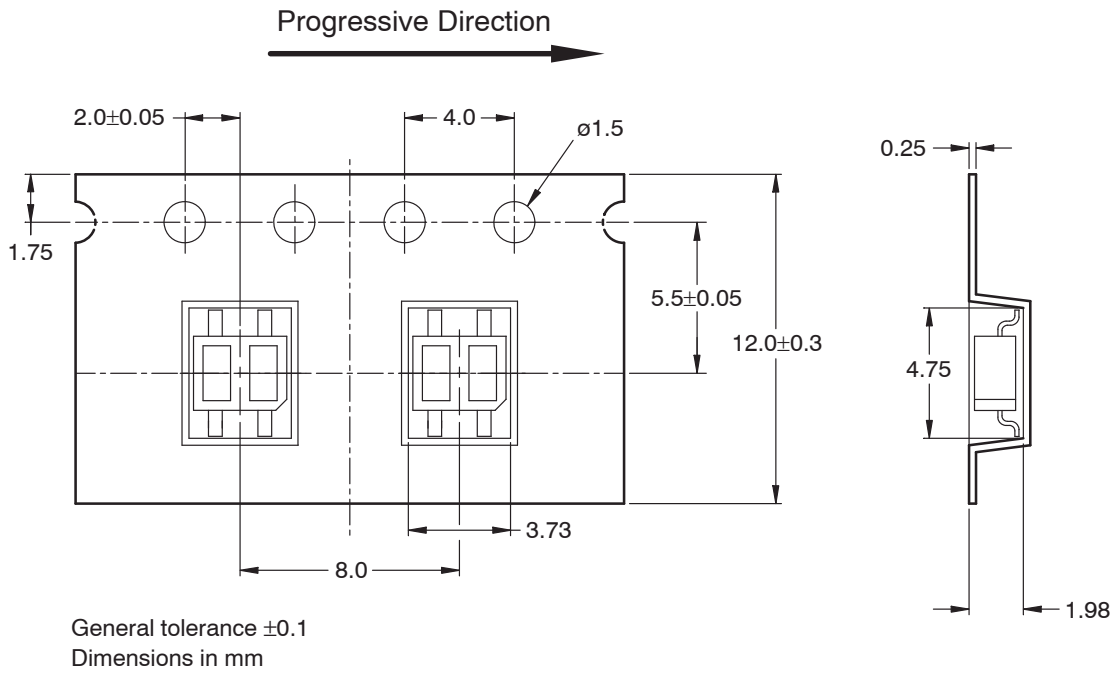


Figure 10. Taping Dimensions for GR Option

REEL DIMENSIONS

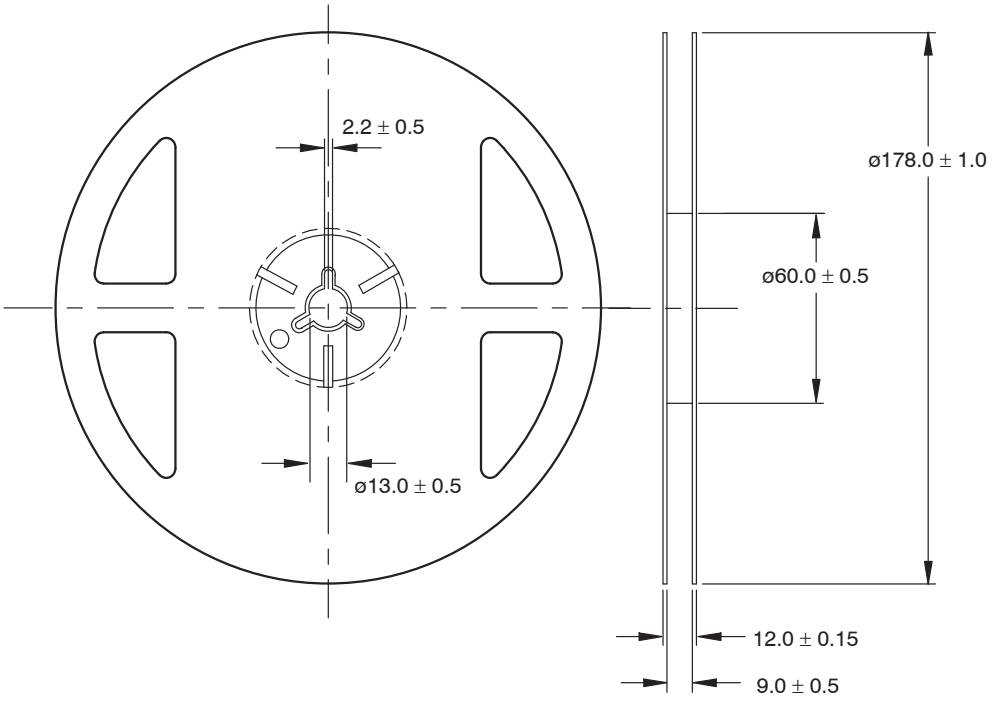


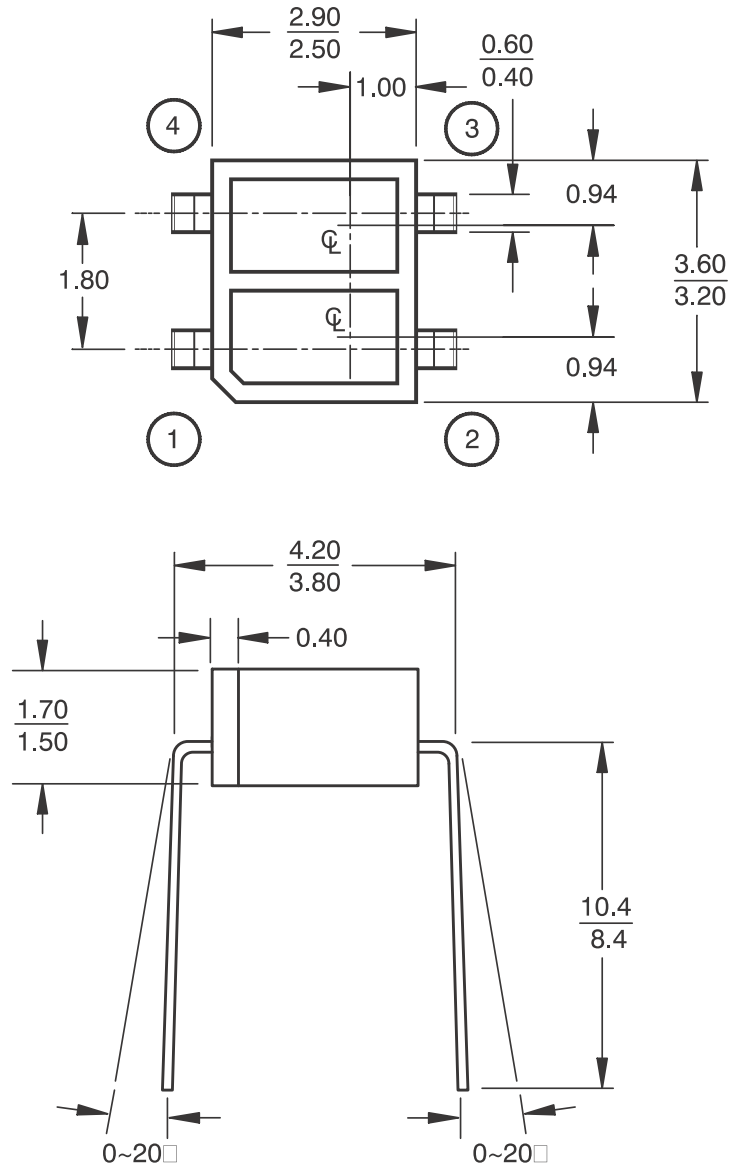
Figure 11. Reel Dimensions

Precautionary Notes

1. Refer to application note AND8003/D, “Storage and Handling of Dry Packed Surface Mounted Devices” for details of handling procedure.
2. Product soldering terminals are silver plated and oxidization may occur with prolonged exposure to ambient environment. Oxidized terminal may have poor solderability performance. Keep unsealed devices in moisture barrier bag sealed with desiccant or in dry cabinet at <5% relative humidity.
3. Store PCB in sealed moisture barrier bag together with desiccant or store in dry cabinet at <5% relative humidity. Mounted device that has been exposed to ambient environment for long period of time may suffer moisture related damage if PCB is subjected to subsequent high temperature processes.

REFLECTIVE RECTANGULAR THROUGH HOLE
CASE 100AQ
ISSUE O

DATE 30 SEP 2016



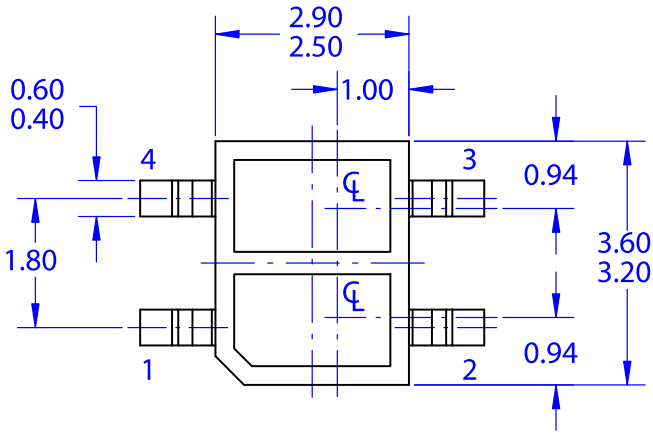
Notes:

1. Dimensions for all drawings are in millimeters.
2. Tolerance of ±0.15mm on all non−nominal dimensions

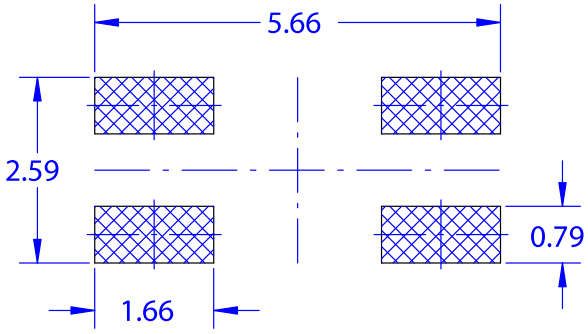
DOCUMENT NUMBER:	**98AON13409G**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	**REFLECTIVE RECTANGULAR THROUGH HOLE**	**PAGE 1 OF 1**

ARUSM−313 / REFLECTIVE RECTANGULAR SURFACE MOUNT
CASE 100CY
ISSUE O

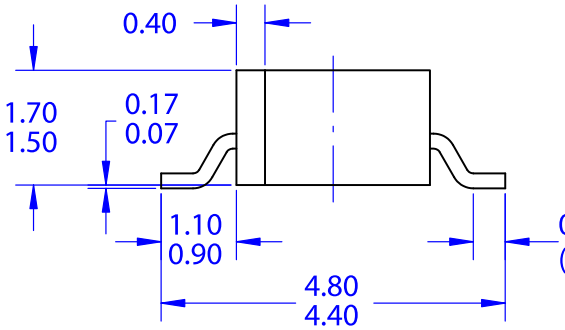
DATE 31 JAN 2017



TOP VIEW



LAND PATTERN RECOMMENDATION



SIDE VIEW

NOTES:
A. NO INDUSTRY STANDARD APPLIES TO THIS PACKAGE
B. ALL DIMENSIONS ARE IN MILLIMETERS
C. TOLERANCE OF ±0.15MM ON ALL NON-NOMINAL DIMENSIONS

DOCUMENT NUMBER:	**98AON13407G**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	**ARUSM−313 / REFLECTIVE RECTANGULAR SURFACE MOUNT**	**PAGE 1 OF 1**

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales