

# QRE1113, QRE1113GR

## Miniature Reflective Object Sensor

### Features

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

### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
$T_{\text{OPR}}$	Operating Temperature	-40 to +85	$^\circ\text{C}$
$T_{\text{STG}}$	Storage Temperature	-40 to +90	$^\circ\text{C}$
$T_{\text{SOL-I}}$	Soldering Temperature (Iron) (Notes 2, 3, 4)	240 for 5 s	$^\circ\text{C}$
$T_{\text{SOL-F}}$	Soldering Temperature (Flow) (Notes 3, 4)	260 for 10 s	$^\circ\text{C}$

### 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

$V_{\text{CEO}}$	Collector-Emitter Voltage	30	V
$V_{\text{ECO}}$	Emitter-Collector Voltage	5	V
$I_C$	Collector Current	20	mA
$P_D$	Power Dissipation (Note 1)	50	mW

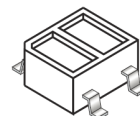
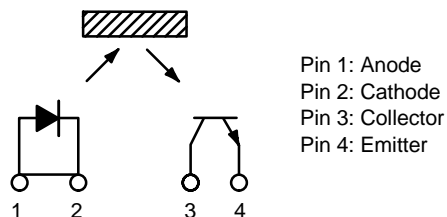
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Derate power dissipation linearly 1.00 mW/ $^\circ\text{C}$  above  $25^\circ\text{C}$ .
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:  $t_p = 100 \mu\text{s}$ ;  $T = 10 \text{ ms}$ .

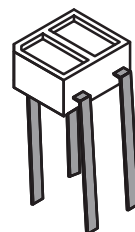


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REFLECTIVE RECTANGULAR SURFACE MOUNT  
CASE 100CY



REFLECTIVE RECTANGULAR THROUGH HOLE  
CASE 100AQ

### ORDERING INFORMATION

Device	Package	Shipping†
QRE1113	Reflector Regulator (Surface Mount)	1600 / Tube
QRE1113GR	Reflector Regulator (Through Hole)	1000 / Tape & Reel

# QRE1113, QRE1113GR

## ELECTRICAL/OPTICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
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### INPUT DIODE

$V_F$	Forward Voltage	$I_F = 20\text{ mA}$		1.2	1.6	V
$I_R$	Reverse Leakage Current	$V_R = 5\text{ V}$			10	$\mu\text{A}$
$\lambda_{PE}$	Peak Emission Wavelength	$I_F = 20\text{ mA}$		940		nm

### OUTPUT TRANSISTOR

$I_D$	Collector-Emitter Dark Current	$I_F = 0\text{ mA}$ , $V_{CE} = 20\text{ V}$			100	nA
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### COUPLED

$I_{C(ON)}$	On-State Collector Current	$I_F = 20\text{ mA}$ , $V_{CE} = 5\text{ V}$ (Note 6)	0.10	0.90		mA
$I_{CX}$	Cross-Talk Collector Current	$I_F = 20\text{ mA}$ , $V_{CE} = 5\text{ V}$ (Note 7)			1	$\mu\text{A}$
$V_{CE(SAT)}$	Saturation Voltage				0.3	V
$t_r$	Rise Time	$V_{CC} = 5\text{ V}$ , $I_{C(ON)} = 100\text{ }\mu\text{A}$ , $R_L = 100\text{ k}\Omega$		20		$\mu\text{s}$
$t_f$	Fall Time			20		$\mu\text{s}$

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  $d = 1\text{ mm}$ .

7. No reflective surface at close proximity.

## REFLOW PROFILE

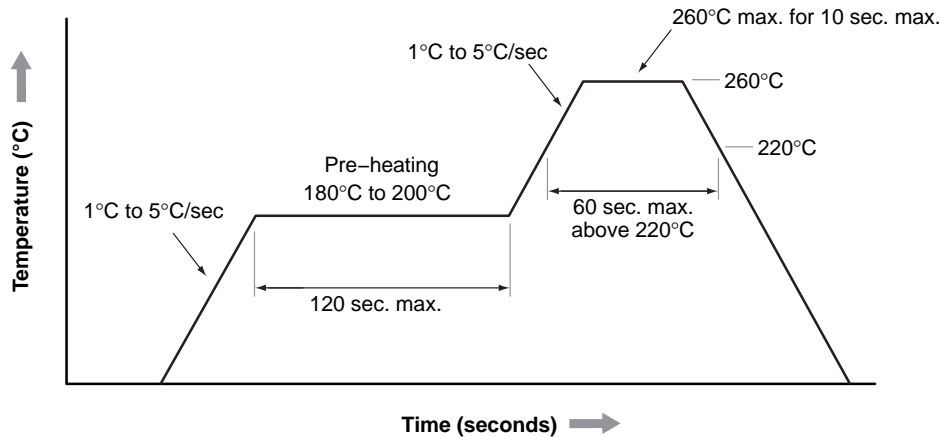


Figure 1. Reflow Profile

TYPICAL PERFORMANCE CURVES

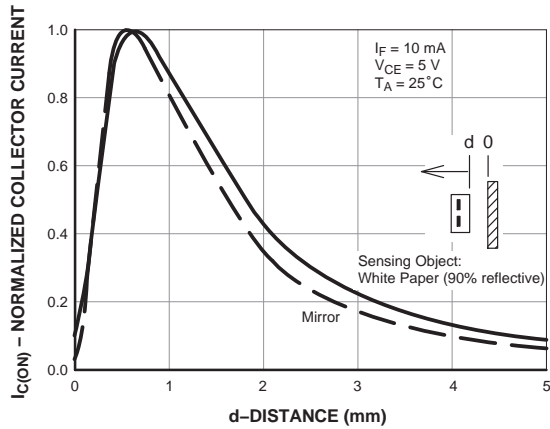


Figure 2. Normalized Collector Current vs. Distance between Device and Reflector

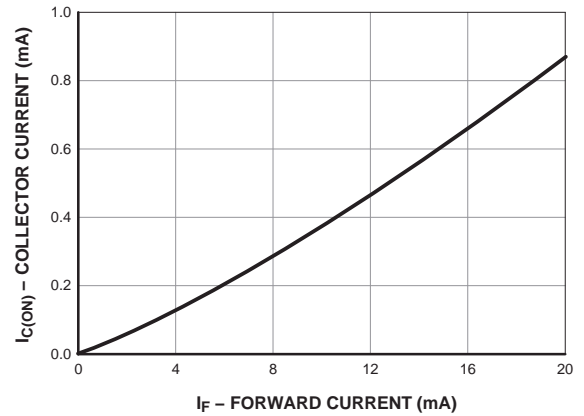


Figure 3. Collector Current vs. Forward Current

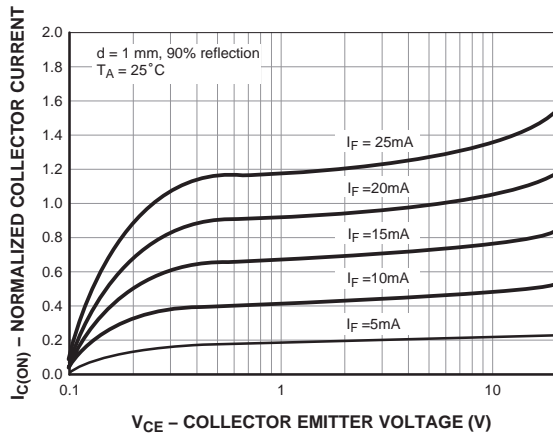


Figure 4. Normalized Collector Current vs. Collector to Emitter Voltage

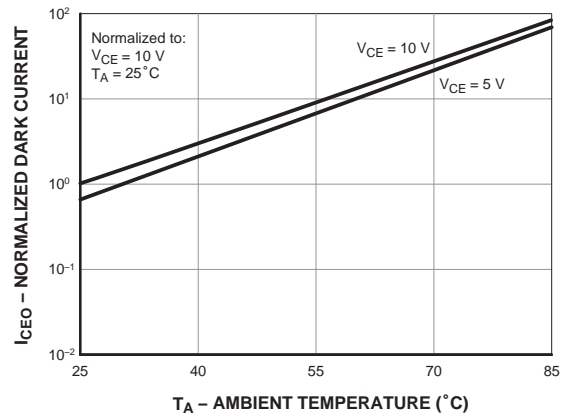


Figure 5. Collector Emitter Dark Current (Normalized) vs. Ambient Temperature

TYPICAL PERFORMANCE CURVES (Continued)

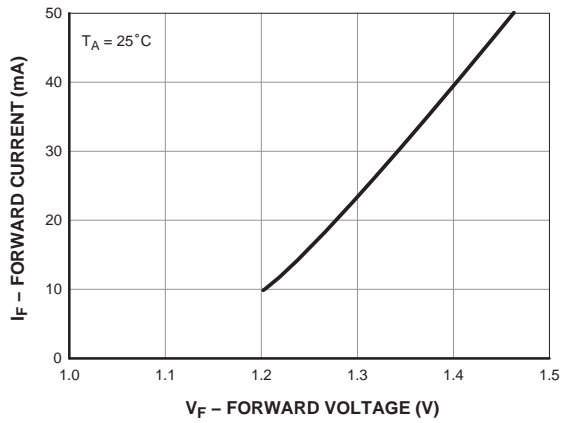


Figure 6. Forward Current vs. Forward Voltage

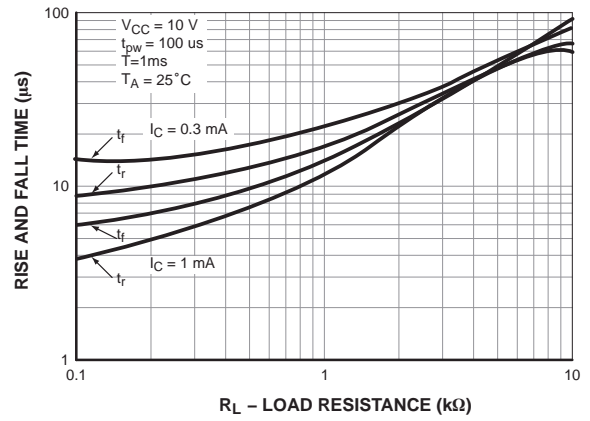


Figure 7. Rise and Fall Time vs. Load Resistance

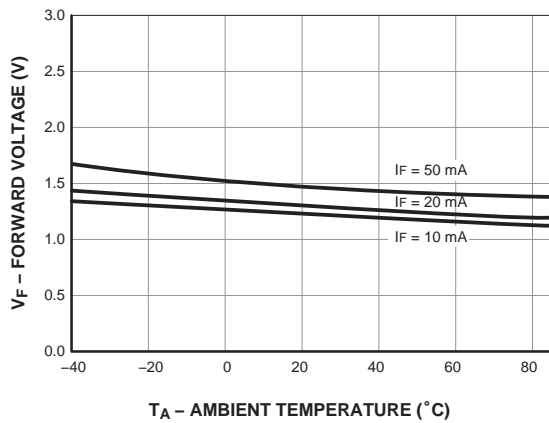


Figure 8. Forward Voltage vs. Ambient Temperature

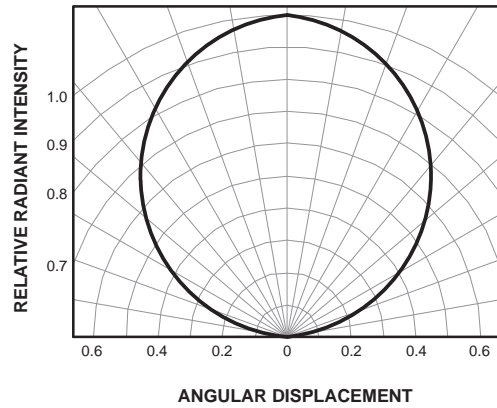


Figure 9. Radiation Diagram

# QRE1113, QRE1113GR

## TAPING DIMENSIONS FOR GR OPTION

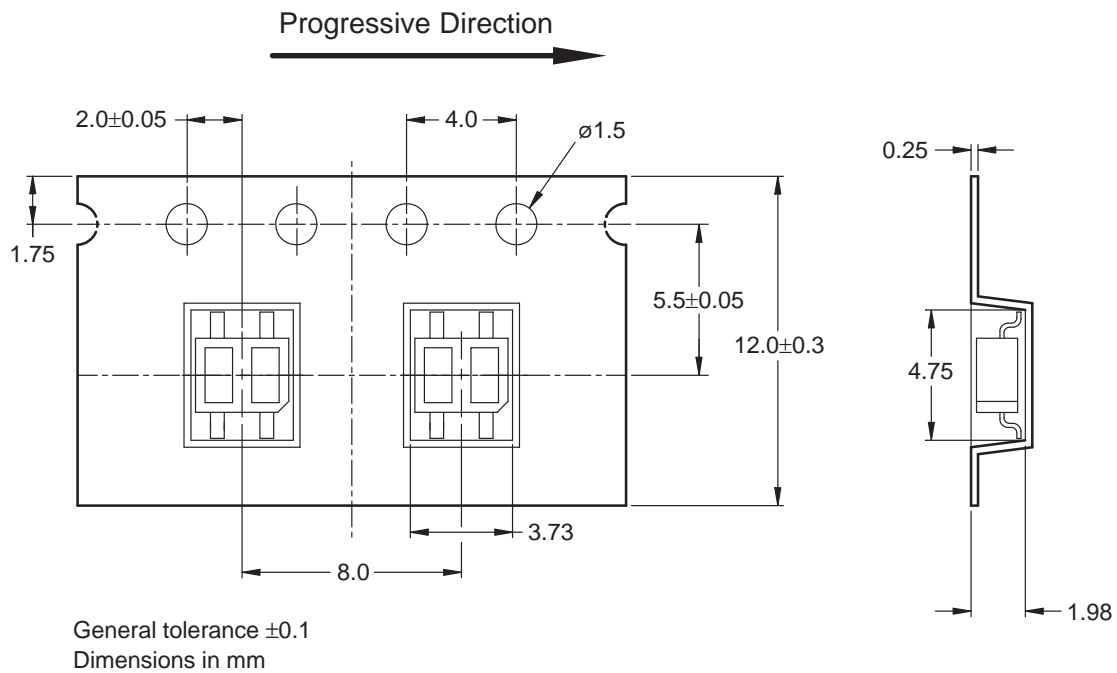


Figure 10. Taping Dimensions for GR Option

## REEL DIMENSIONS

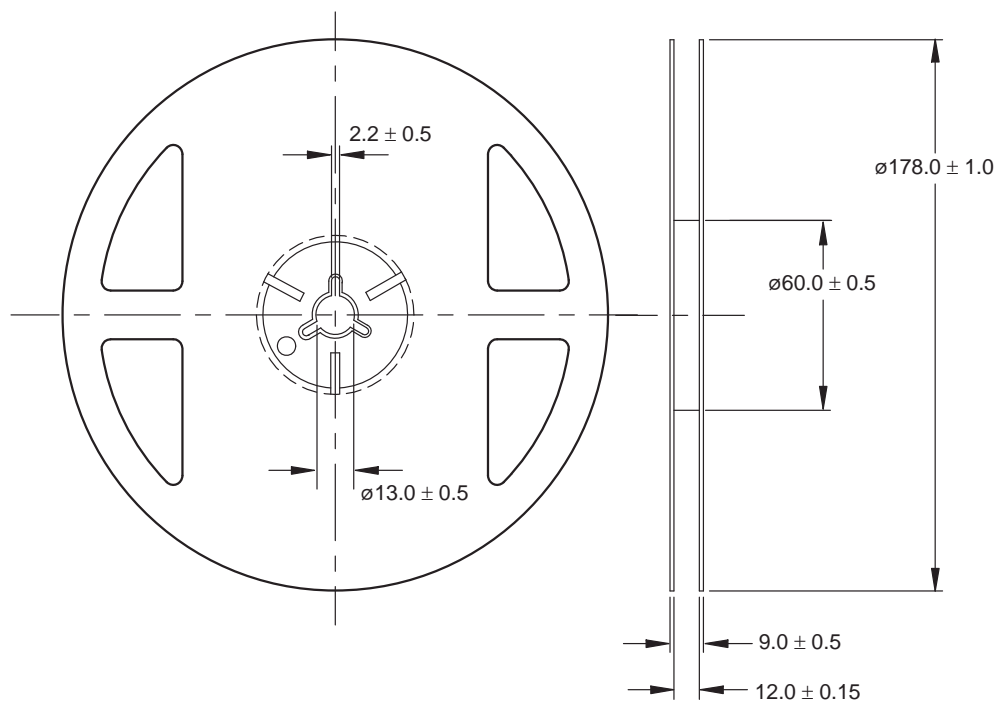


Figure 11. Reel Dimensions

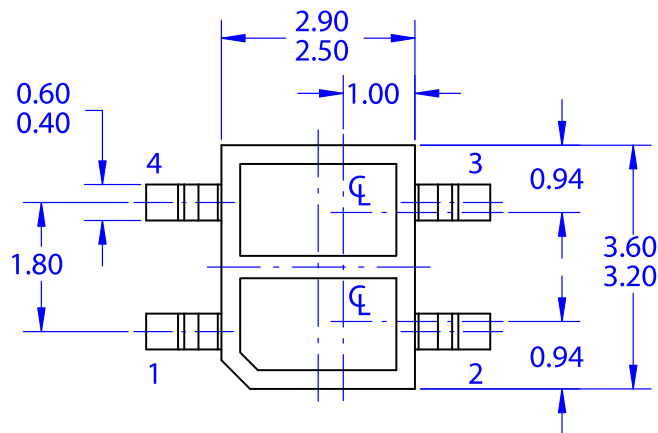
# QRE1113, QRE1113GR

## PACKAGE DIMENSIONS

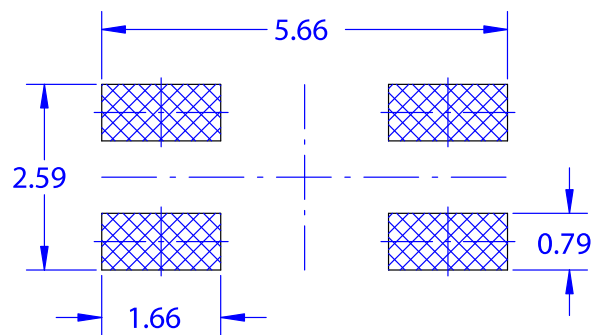
### ARUSM-313 / REFLECTIVE RECTANGULAR SURFACE MOUNT

CASE 100CY

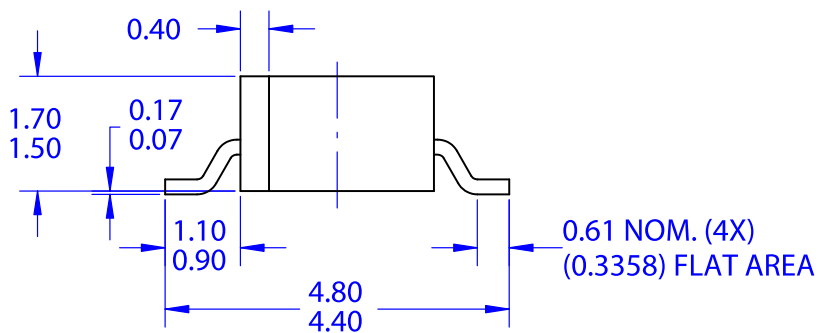
ISSUE O



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  $\pm 0.15$ MM ON ALL NON-NOMINAL DIMENSIONS

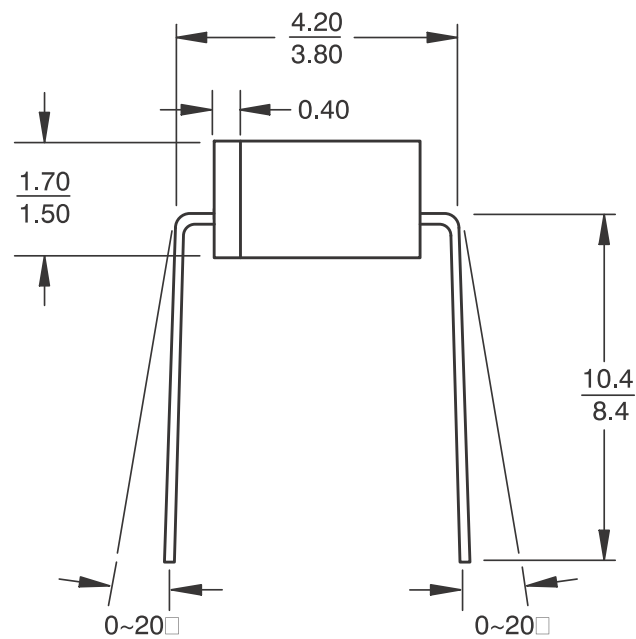
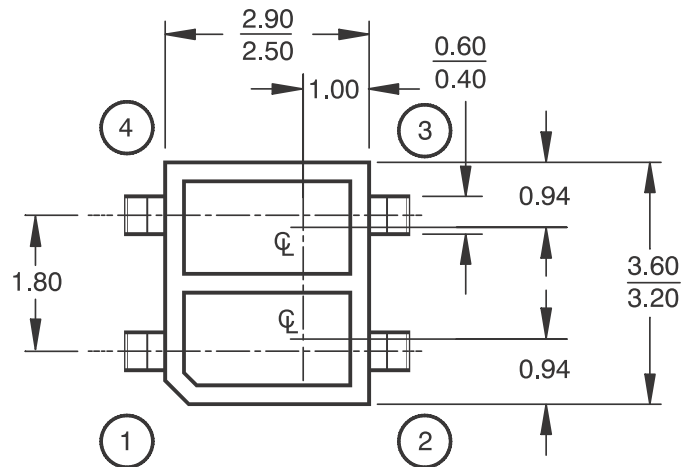
# QRE1113, QRE1113GR

## PACKAGE DIMENSIONS

### REFLECTIVE RECTANGULAR THROUGH HOLE


CASE 100AQ

ISSUE O



#### Notes:

1. Dimensions for all drawings are in millimeters.
2. Tolerance of  $\pm 0.15\text{mm}$  on all non-nominal dimensions

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