FAIRCHILD SEMICONDUCTOR®

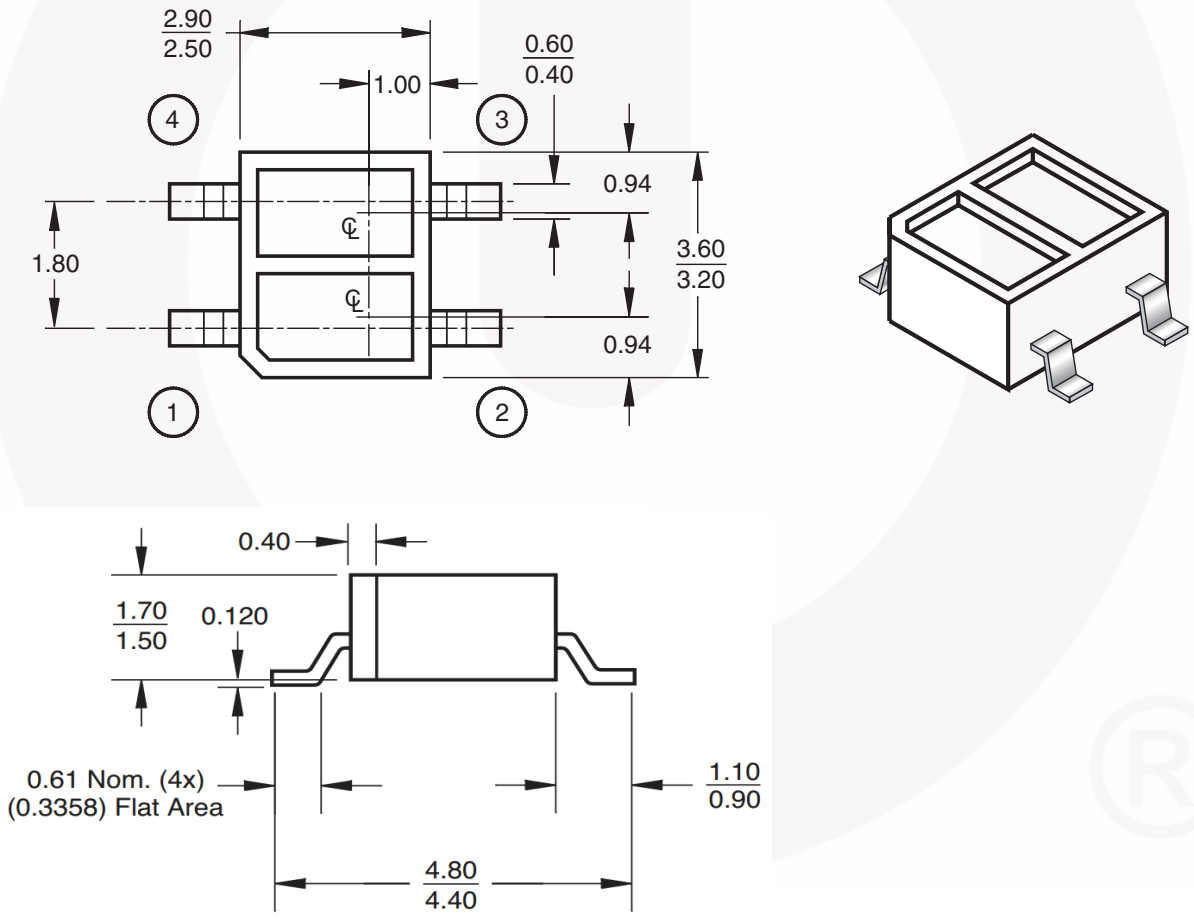
August 2011

QRE1113, QRE1113GR
Minature Reflective Object Sensor

Features

- Phototransistor output
- No contact surface sensing
- Miniature package
- Lead form style: Gull Wing
- Two leadform options: Through hole (QRE1113)
  SMT gullwing (QRE1113GR)
- Two packaging options: Tube (QRE1113)
  Tape and reel (QRE1113GR)

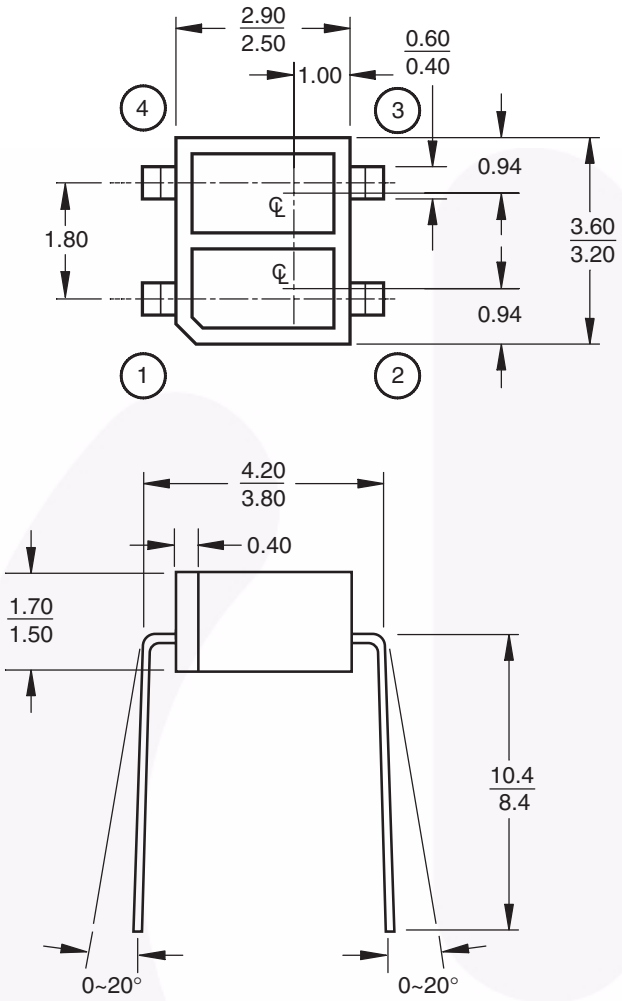
QRE1113GR Package Dimensions

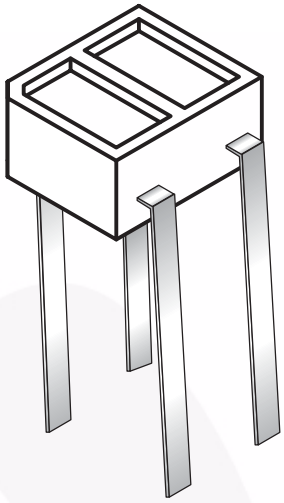


Notes:

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

QRE1113 Package Dimensions





Notes:

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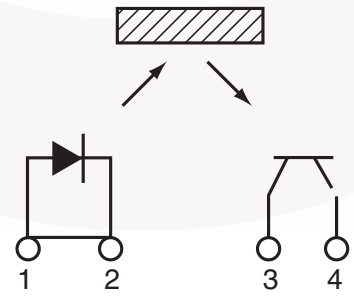
Schematic



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

Absolute Maximum Ratings (T_A = 25°C unless otherwise specified)

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.

Symbol	Parameter	Rating	Units
T_{OPR}	Operating Temperature	-40 to +85	°C
T_{STG}	Storage Temperature	-40 to +90	°C
T_{SOL-I}	Soldering Temperature (Iron)(2,3,4)	240 for 5 sec	°C
T_{SOL-F}	Soldering Temperature (Flow)(2,3)	260 for 10 sec	°C
EMITTER			
I_F	Continuous Forward Current	50	mA
V_R	Reverse Voltage	5	V
I_{FP}	Peak Forward Current(5)	1	A
P_D	Power Dissipation(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(1)	50	mW

Electrical/Optical Characteristics (T_A = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
INPUT DIODE						
V_F	Forward Voltage	I_F = 20mA		1.2	1.6	V
I_R	Reverse Leakage Current	V_R = 5V			10	µA
λ_{PE}	Peak Emission Wavelength	I_F = 20mA		940		nm
OUTPUT TRANSISTOR						
I_D	Collector-Emitter Dark Current	I_F = 0mA, V_{CE} = 20V			100	nA
COUPLED						
$I_{C(ON)}$	On-State Collector Current	I_F = 20mA, V_{CE} = 5V(6)	0.10	0.40		mA
I_{CX}	Cross-Talk Collector Current	I_F = 20mA, V_{CE} = 5V(7)			1	µA
$V_{CE\ (SAT)}$	Saturation Voltage				0.3	V
t_r	Rise Time	V_{CC} = 5V, $I_{C(ON)}$ = 100µA, R_L = 1kΩ		20		µs
t_f	Fall Time			20		

Notes:

1. Derate power dissipation linearly 1.00mW/°C above 25°C.
2. RMA flux is recommended.
3. Methanol or isopropyl alcohols are recommended as cleaning agents.
4. Soldering iron 1/16" (1.6mm) from housing.
5. Pulse conditions: tp = 100µs; T = 10ms.
6. Measured using an aluminum alloy mirror at d = 1mm.
7. No reflective surface at close proximity.

Typical Performance Curves

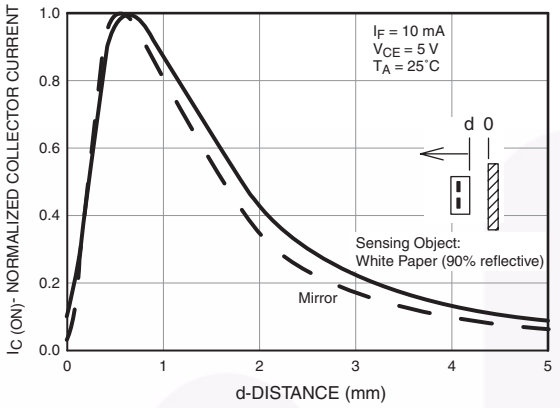


Fig. 1 Normalized Collector Current vs. Distance between device and reflector

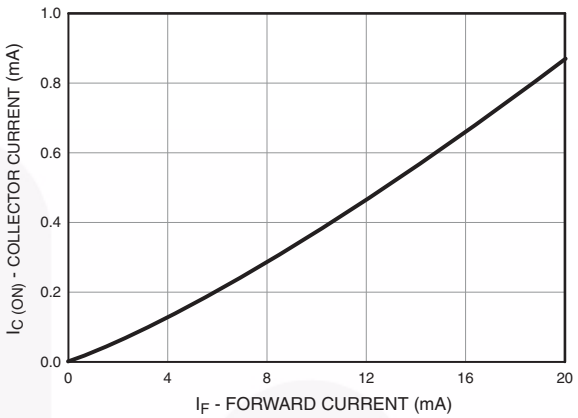


Fig. 2 Collector Current vs. Forward Current

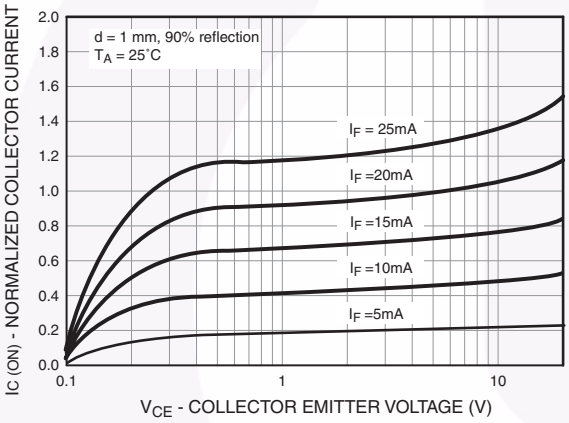


Fig. 3 Normalized Collector Current vs. Collector to Emitter Voltage

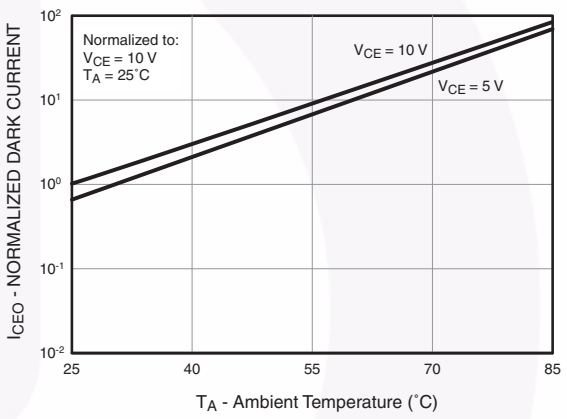


Fig. 4 Collector Emitter Dark Current (Normalized) vs. Ambient Temperature

Typical Performance Curves (Continued)

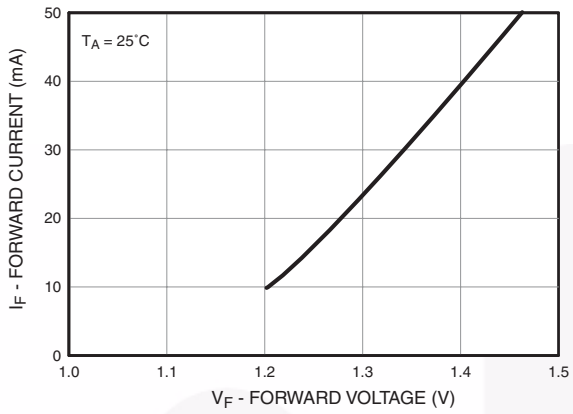


Fig. 6 Forward Current vs. Forward Voltage

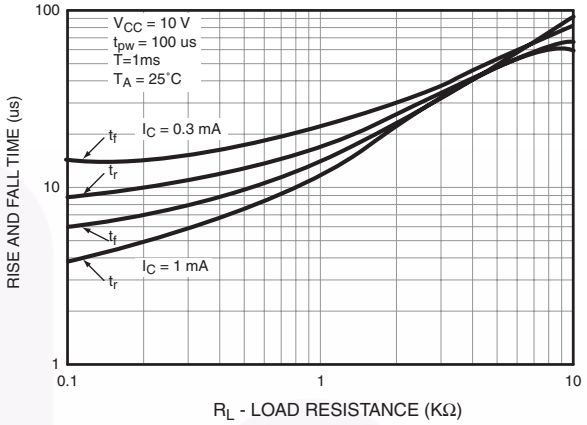


Fig. 7 Rise and Fall Time vs. Load Resistance

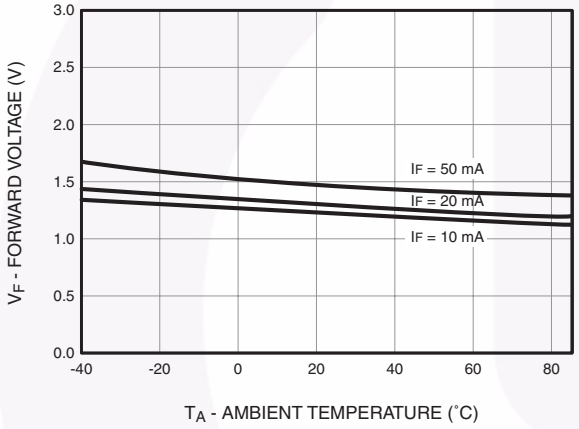


Fig. 8 Forward Voltage vs. Ambient Temperature

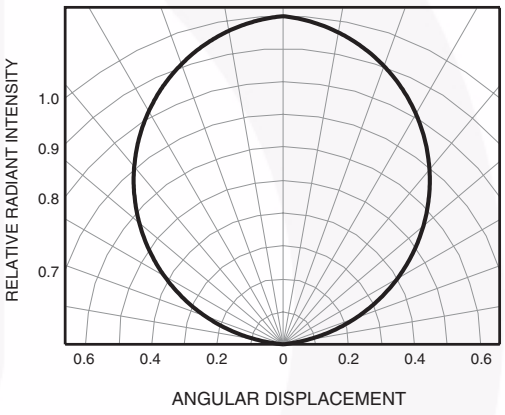
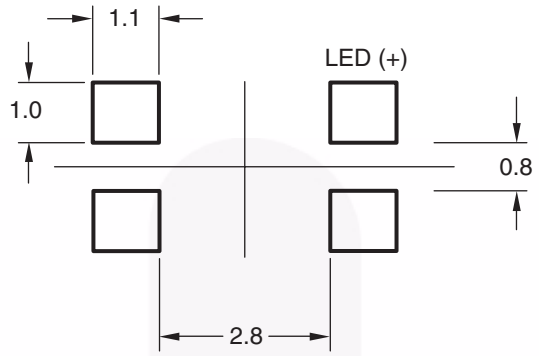


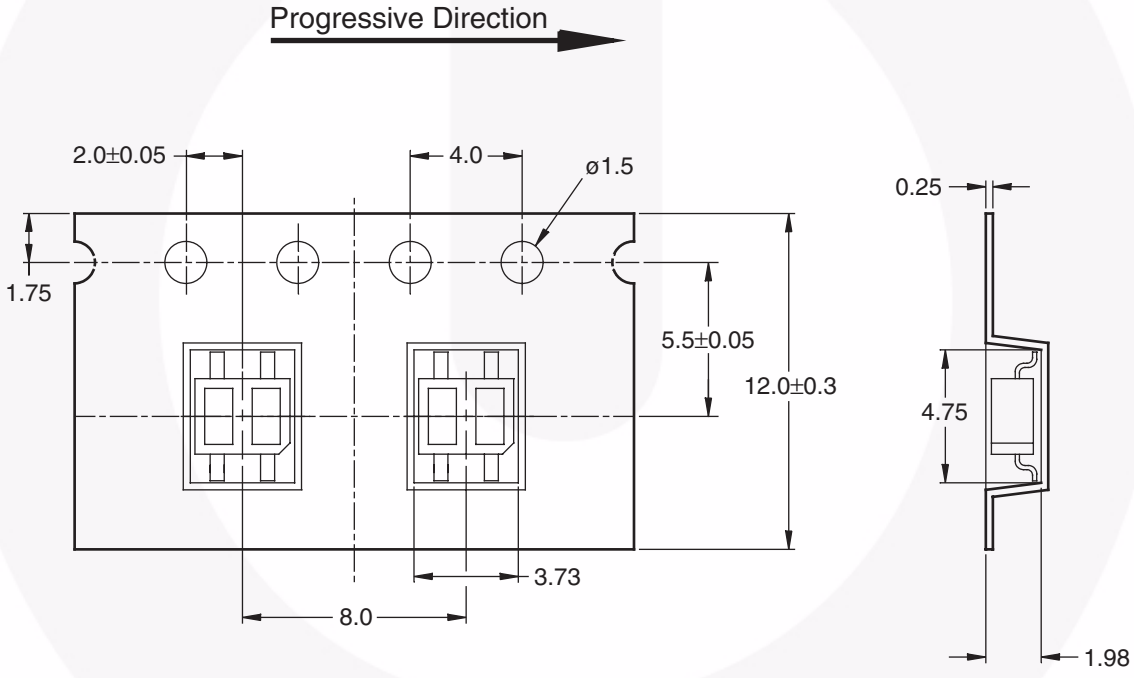
Fig. 8 Radiation Diagram

Recommended Solder Screen Pattern for GR option (for reference only)



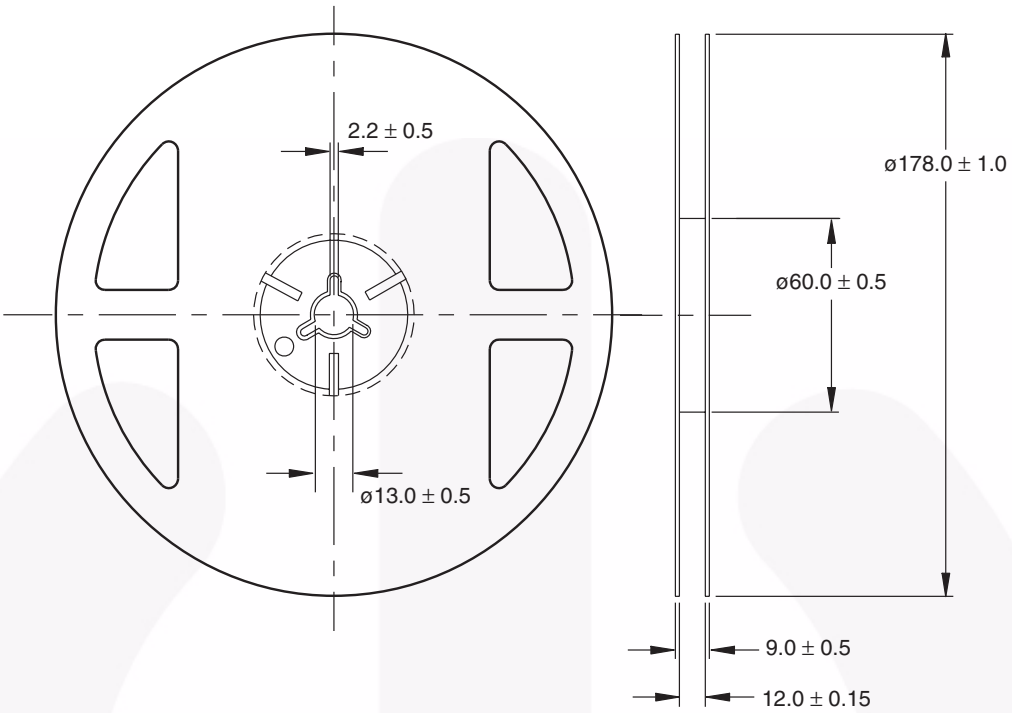
Dimensions in mm

Taping Dimensions for GR option

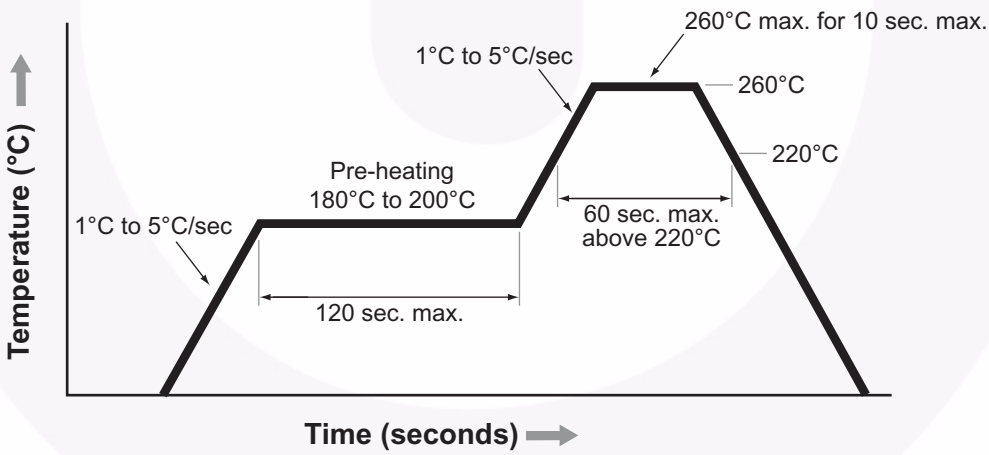


General tolerance ±0.1
Dimensions in mm

Reel Dimensions



Reflow Profile



Note: Reflow soldering should not be done more than twice.

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