



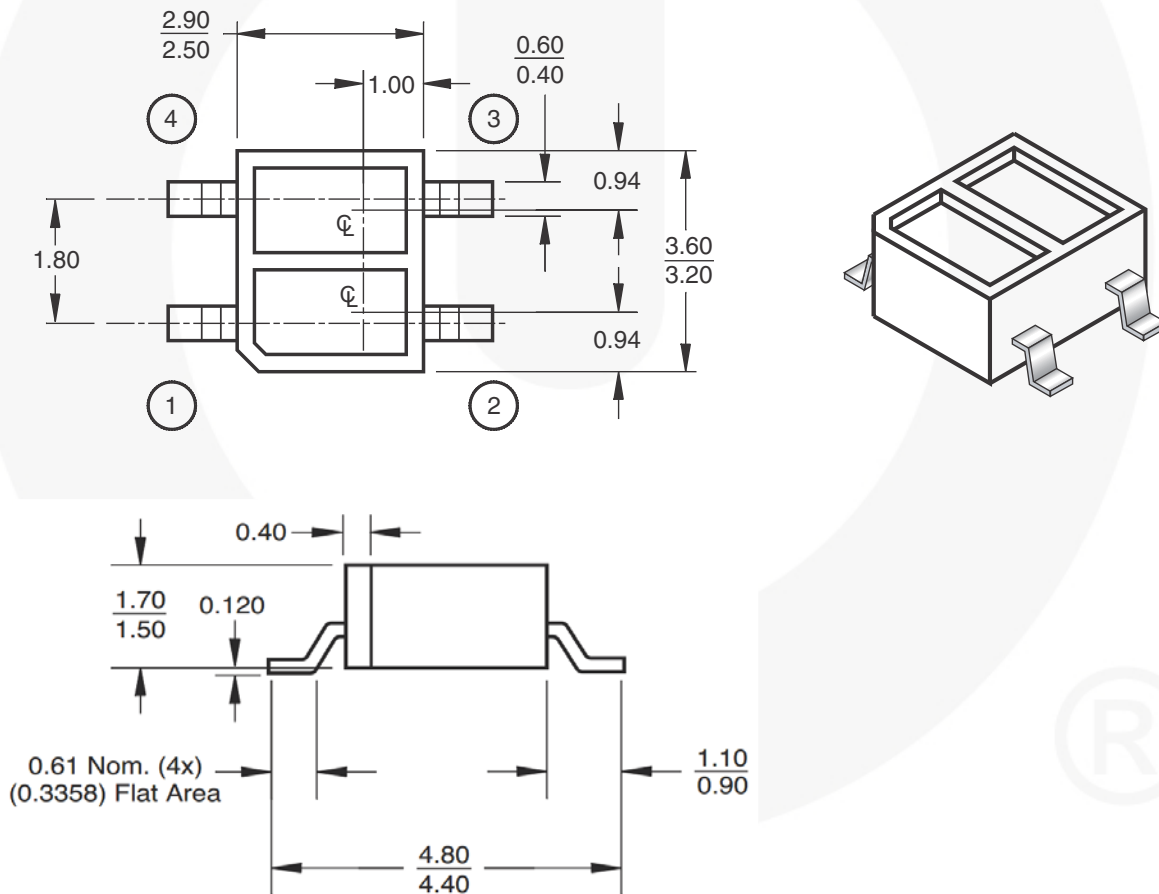
July 2015

# 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)

## QRE1113GR Package Dimensions<sup>(1, 2)</sup>

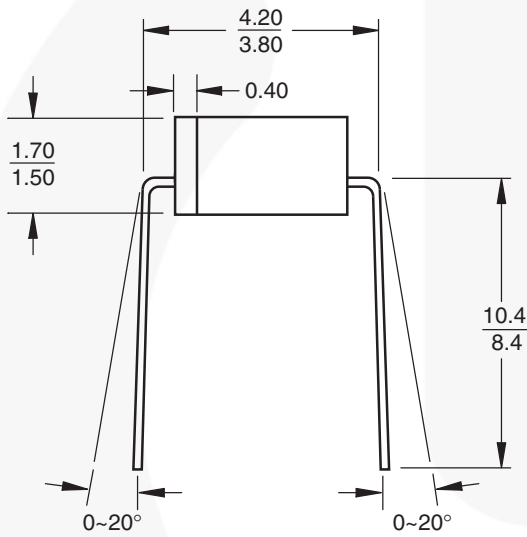
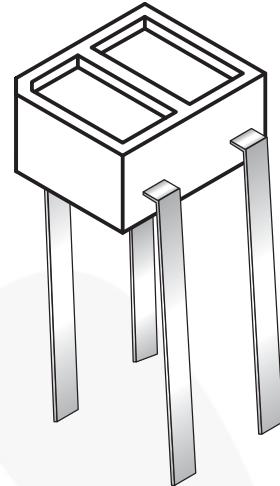
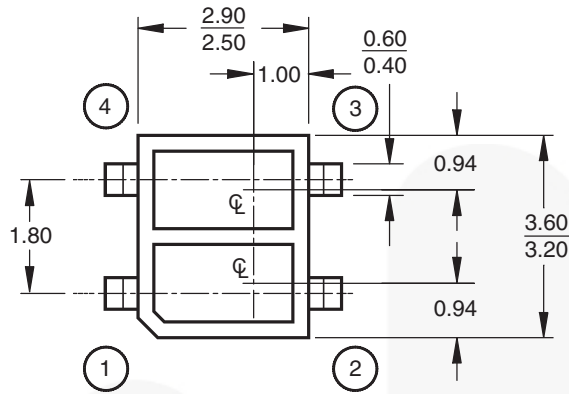


## Notes:

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

QRE1113, QRE1113GR — Miniature Reflective Object Sensor

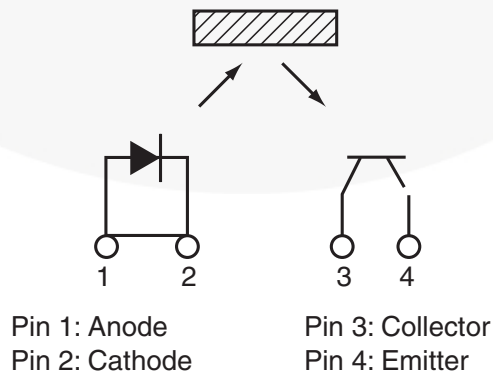
**QRE1113 Package Dimensions**<sup>(3, 4)</sup>



**Notes:**

- 3. Dimensions for all drawings are in millimeters.
- 4. Tolerance of  $\pm 0.15$  mm on all non-nominal dimensions.

**Schematic**



## 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  $T_A = 25^\circ\text{C}$  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) <sup>(6, 7, 8)</sup>	240 for 5 sec	$^\circ\text{C}$
$T_{\text{SOL-F}}$	Soldering Temperature (Flow) <sup>(7, 8)</sup>	260 for 10 sec	$^\circ\text{C}$
<b>EMITTER</b>			
$I_F$	Continuous Forward Current	50	mA
$V_R$	Reverse Voltage	5	V
$I_{\text{FP}}$	Peak Forward Current <sup>(9)</sup>	1	A
$P_D$	Power Dissipation <sup>(5)</sup>	75	mW
<b>SENSOR</b>			
$V_{\text{CEO}}$	Collector-Emitter Voltage	30	V
$V_{\text{ECO}}$	Emitter-Collector Voltage	5	V
$I_C$	Collector Current	20	mA
$P_D$	Power Dissipation <sup>(5)</sup>	50	mW

## Electrical / Optical Characteristics

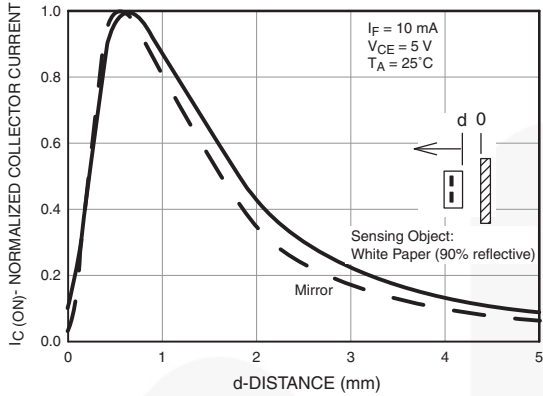
Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
<b>INPUT DIODE</b>						
$V_F$	Forward Voltage	$I_F = 20 \text{ mA}$		1.2	1.6	V
$I_R$	Reverse Leakage Current	$V_R = 5 \text{ V}$			10	$\mu\text{A}$
$\lambda_{\text{PE}}$	Peak Emission Wavelength	$I_F = 20 \text{ mA}$		940		nm
<b>OUTPUT TRANSISTOR</b>						
$I_D$	Collector-Emitter Dark Current	$I_F = 0 \text{ mA}, V_{\text{CE}} = 20 \text{ V}$			100	nA
<b>COUPLED</b>						
$I_{\text{C(ON)}}$	On-State Collector Current	$I_F = 20 \text{ mA}, V_{\text{CE}} = 5 \text{ V}^{(10)}$	0.10	0.40		mA
$I_{\text{CX}}$	Cross-Talk Collector Current	$I_F = 20 \text{ mA}, V_{\text{CE}} = 5 \text{ V}^{(11)}$			1	$\mu\text{A}$
$V_{\text{CE(SAT)}}$	Saturation Voltage				0.3	V
$t_r$	Rise Time	$V_{\text{CC}} = 5 \text{ V}, I_{\text{C(ON)}} = 100 \mu\text{A}, R_L = 100 \text{ k}\Omega$		20		$\mu\text{s}$
$t_f$	Fall Time			20		$\mu\text{s}$

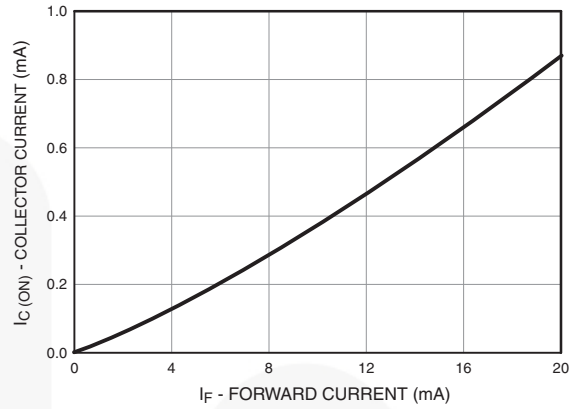
### Notes:

- Derate power dissipation linearly 1.00 mW/ $^\circ\text{C}$  above  $25^\circ\text{C}$ .
- RMA flux is recommended.
- Methanol or isopropyl alcohols are recommended as cleaning agents.
- Soldering iron 1/16" (1.6mm) from housing.
- Pulse conditions:  $t_p = 100 \mu\text{s}$ ;  $T = 10 \text{ ms}$ .
- Measured using an aluminum alloy mirror at  $d = 1 \text{ mm}$ .
- No reflective surface at close proximity.

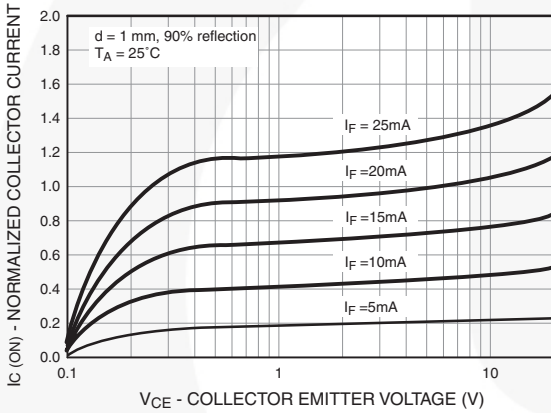
## Typical Performance Curves



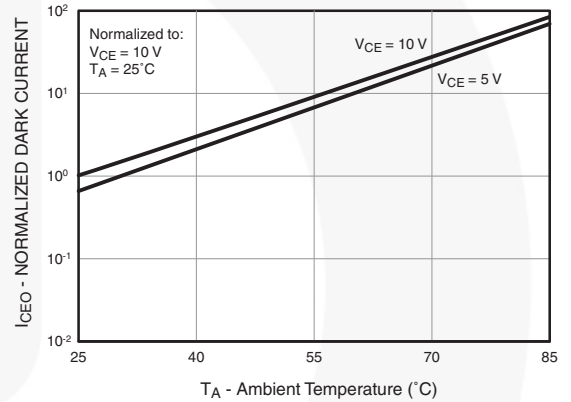
**Fig. 1 Normalized Collector Current vs. Distance between device and reflector**



**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)

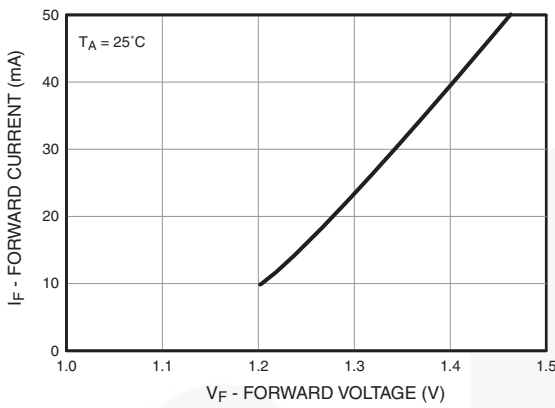


Fig. 6 Forward Current vs. Forward Voltage

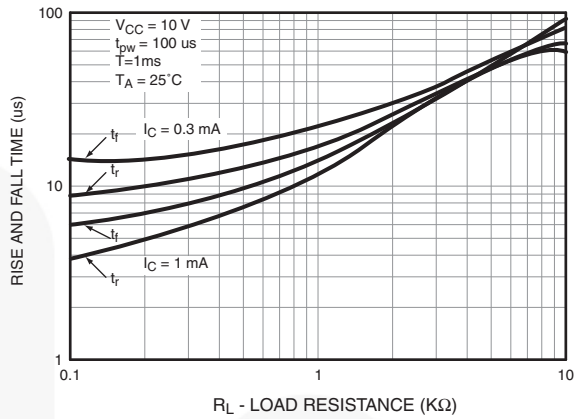


Fig. 7 Rise and Fall Time vs. Load Resistance

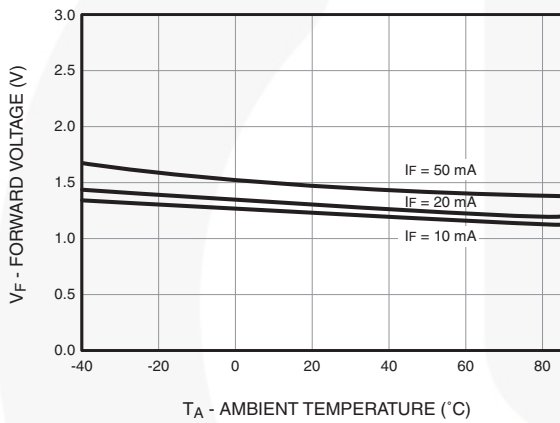


Fig. 8 Forward Voltage vs. Ambient Temperature

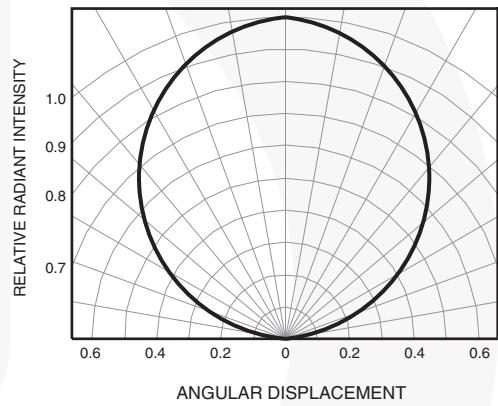
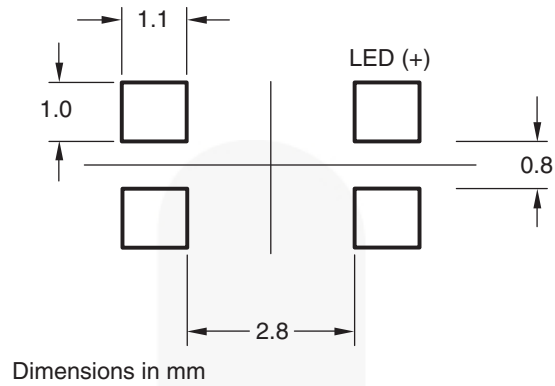
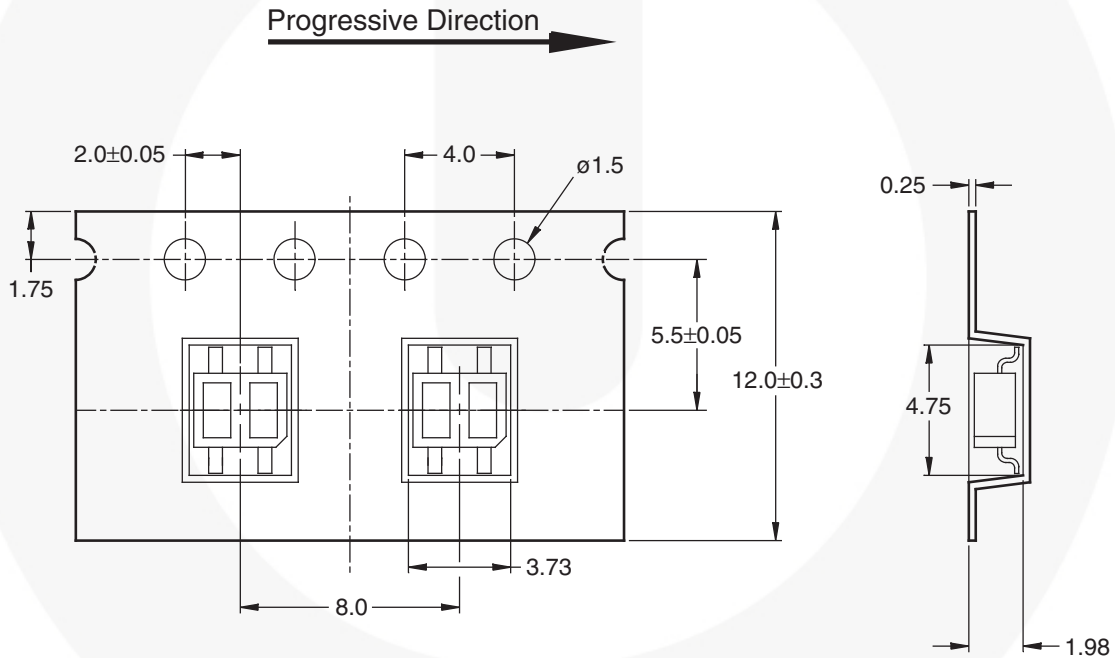


Fig. 8 Radiation Diagram

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



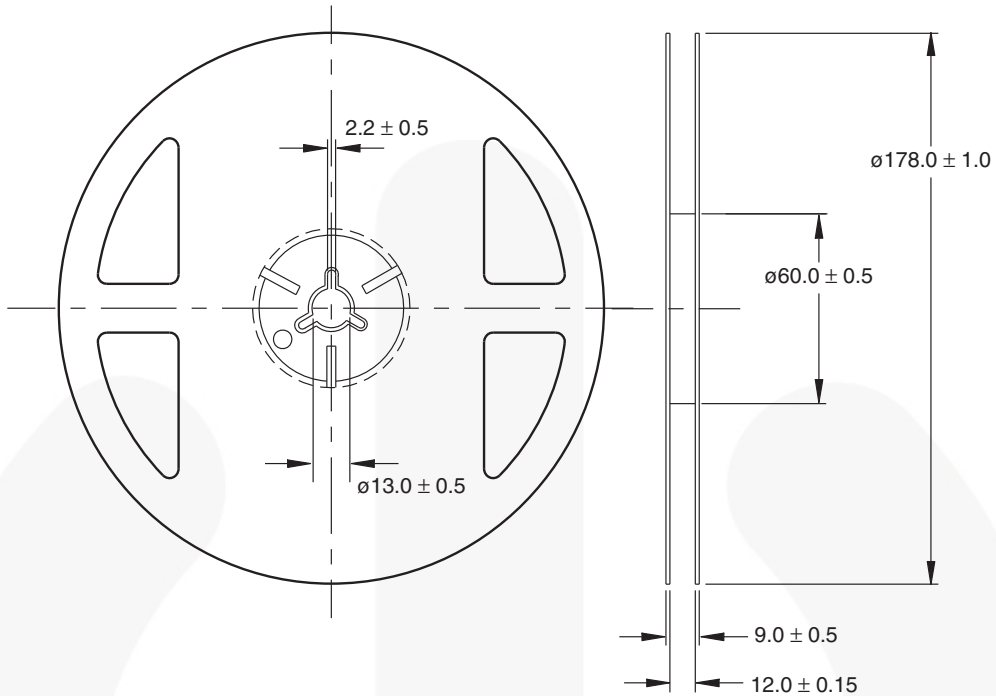
**Taping Dimensions for GR option**



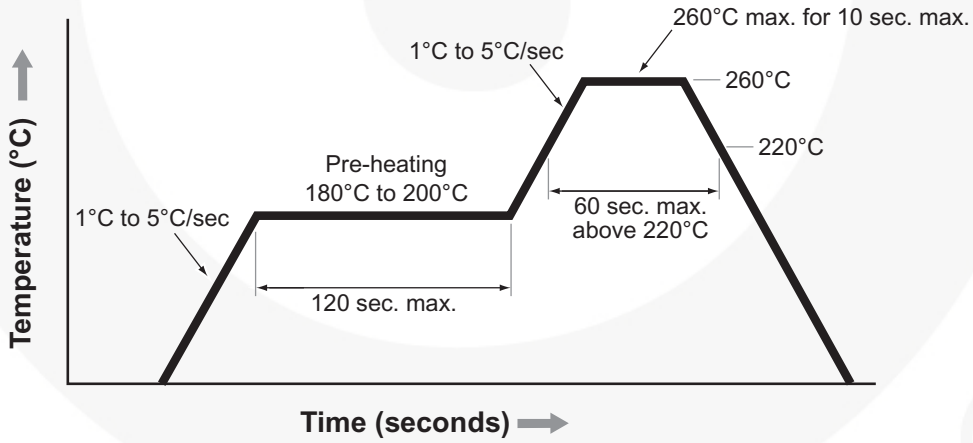
General tolerance  $\pm 0.1$   
Dimensions in mm



**Reel Dimensions**



**Reflow Profile**




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





**TRADEMARKS**

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

AccuPower™  
 AttitudeEngine™  
 Awinda®  
 AX-CAP®  
 BitSiC™  
 Build it Now™  
 CorePLUS™  
 CorePOWER™  
 CROSSVOLT™  
 CTL™  
 Current Transfer Logic™  
 DEUXPEED®  
 Dual Cool™  
 EcoSPARK®  
 EfficientMax™  
 ESBC™  
  
 Fairchild®  
 Fairchild Semiconductor®  
 FACT Quiet Series™  
 FACT®  
 FAST®  
 FastvCore™  
 FETBench™  
 FPS™

F-PFS™  
 FRFET®  
 Global Power Resource<sup>SM</sup>  
 GreenBridge™  
 Green FPS™  
 Green FPS™ e-Series™  
 Gmax™  
 GTO™  
 IntelliMAX™  
 ISOPLANAR™  
 Making Small Speakers Sound Louder and Better™  
 MegaBuck™  
 MICROCOUPLER™  
 MicroFET™  
 MicroPak™  
 MicroPak2™  
 MillerDrive™  
 MotionMax™  
 MotionGrid®  
 MTi®  
 MTx®  
 MVN®  
 mWSaver®  
 OptoHiT™  
 OPTOLOGIC®

OPTOPLANAR®  
  
 Power Supply WebDesigner™  
 PowerTrench®  
 PowerXS™  
 Programmable Active Droop™  
 QFET®  
 QS™  
 Quiet Series™  
 RapidConfigure™  
  
 Saving our world, 1mW/W/kW at a time™  
 SignalWise™  
 SmartMax™  
 SMART START™  
 Solutions for Your Success™  
 SPM®  
 STEALTH™  
 SuperFET®  
 SuperSOT™-3  
 SuperSOT™-6  
 SuperSOT™-8  
 SupreMOS®  
 SyncFET™  
 Sync-Lock™

 SYSTEM GENERAL®  
 TinyBoost®  
 TinyBuck®  
 TinyCalc™  
 TinyLogic®  
 TINYOPTO™  
 TinyPower™  
 TinyPWM™  
 TinyWire™  
 TranSiC™  
 TriFault Detect™  
 TRUECURRENT®\*  
 μSerDes™  
  
 UHC®  
 Ultra FRFET™  
 UniFET™  
 VCX™  
 VisualMax™  
 VoltagePlus™  
 XS™  
 Xsens™  
 仙童™

\* Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

**DISCLAIMER**

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. TO OBTAIN THE LATEST, MOST UP-TO-DATE DATASHEET AND PRODUCT INFORMATION, VISIT OUR WEBSITE AT [HTTP://WWW.FAIRCHILDSEMI.COM](http://www.fairchildsemi.com). FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

**AUTHORIZED USE**

Unless otherwise specified in this data sheet, this product is a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability. This product may not be used in the following applications, unless specifically approved in writing by a Fairchild officer: (1) automotive or other transportation, (2) military/aerospace, (3) any safety critical application – including life critical medical equipment – where the failure of the Fairchild product reasonably would be expected to result in personal injury, death or property damage. Customer's use of this product is subject to agreement of this Authorized Use policy. In the event of an unauthorized use of Fairchild's product, Fairchild accepts no liability in the event of product failure. In other respects, this product shall be subject to Fairchild's Worldwide Terms and Conditions of Sale, unless a separate agreement has been signed by both Parties.

**ANTI-COUNTERFEITING POLICY**

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, [www.fairchildsemi.com](http://www.fairchildsemi.com), under Terms of Use

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

**PRODUCT STATUS DEFINITIONS**

**Definition of Terms**

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I75





Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.