

## 阅读申明

- 1.本站收集的数据手册和产品资料都来自互联网，版权归原作者所有。如读者和版权方有任何异议请及时告之，我们将妥善解决。
- 2.本站提供的中文数据手册是英文数据手册的中文翻译，其目的是协助用户阅读，该译文无法自动跟随原稿更新，同时也可能存在翻译上的不当。建议读者以英文原稿为参考以便获得更精准的信息。
- 3.本站提供的产品资料，来自厂商的技术支持或者使用者的心得体会等，其内容可能存在描述上的差异，建议读者做出适当判断。
- 4.如需与我们联系，请发邮件到marketing@iczoom.com，主题请标有“数据手册”字样。

## Read Statement

1. The datasheets and other product information on the site are all from network reference or other public materials, and the copyright belongs to the original author and original published source. If readers and copyright owners have any objections, please contact us and we will deal with it in a timely manner.
2. The Chinese datasheets provided on the website is a Chinese translation of the English datasheets. Its purpose is for reader's learning exchange only and do not involve commercial purposes. The translation cannot be automatically updated with the original manuscript, and there may also be improper translations. Readers are advised to use the English manuscript as a reference for more accurate information.
3. All product information provided on the website refer to solutions from manufacturers' technical support or users the contents may have differences in description, and readers are advised to take the original article as the standard.
4. If you have any questions, please contact us at marketing@iczoom.com and mark the subject with "Datasheets" .

## DESCRIPTION

The 4N29, 4N30, 4N31, 4N32, 4N33 have a gallium arsenide infrared emitter optically coupled to a silicon planar photodarlington.

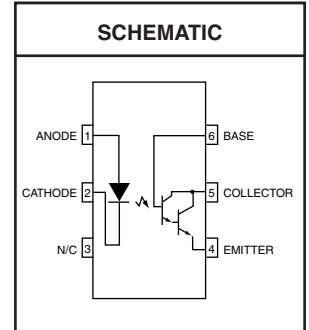
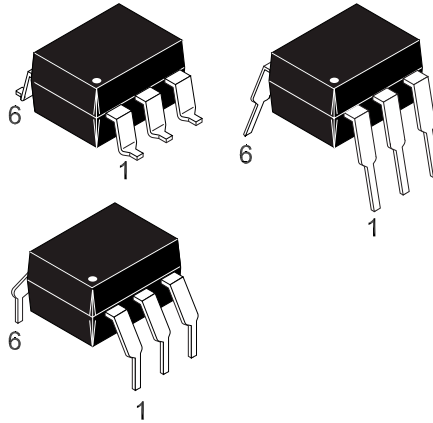
**4N29    4N30    4N31    4N32    4N33**

## FEATURES

- High sensitivity to low input drive current
- Meets or exceeds all JEDEC Registered Specifications
- VDE 0884 approval available as a test option  
-add option .300. (e.g., 4N29.300)

## APPLICATIONS

- Low power logic circuits
- Telecommunications equipment
- Portable electronics
- Solid state relays
- Interfacing coupling systems of different potentials and impedances.



<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_A = 25^\circ\text{C}$ Unless otherwise specified.)			
Parameter	Symbol	Value	Units
<b>TOTAL DEVICE</b>			
Storage Temperature	$T_{\text{STG}}$	-55 to +150	$^\circ\text{C}$
Operating Temperature	$T_{\text{OPR}}$	-55 to +100	$^\circ\text{C}$
Lead Solder Temperature	$T_{\text{SOL}}$	260 for 10 sec	$^\circ\text{C}$
Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$	$P_D$	250	mW
Derate above $25^\circ\text{C}$		3.3	mW/ $^\circ\text{C}$
<b>EMITTER</b>			
Continuous Forward Current	$I_F$	80	mA
Reverse Voltage	$V_R$	3	V
Forward Current - Peak (300 $\mu\text{s}$ , 2% Duty Cycle)	$I_F(\text{pk})$	3.0	A
LED Power Dissipation @ $T_A = 25^\circ\text{C}$	$P_D$	150	mW
Derate above $25^\circ\text{C}$		2.0	mW/ $^\circ\text{C}$
<b>DETECTOR</b>			
Collector-Emitter Breakdown Voltage	$BV_{\text{CEO}}$	30	V
Collector-Base Breakdown Voltage	$BV_{\text{CBO}}$	30	V
Emitter-Collector Breakdown Voltage	$BV_{\text{ECO}}$	5	V
Detector Power Dissipation @ $T_A = 25^\circ\text{C}$	$P_D$	150	mW
Derate above $25^\circ\text{C}$		2.0	mW/ $^\circ\text{C}$
Continuous Collector Current	$I_C$	150	mA

<b>4N29</b>	<b>4N30</b>	<b>4N31</b>	<b>4N32</b>	<b>4N33</b>
-------------	-------------	-------------	-------------	-------------

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  Unless otherwise specified.)

**INDIVIDUAL COMPONENT CHARACTERISTICS**

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
<b>EMITTER</b>						
*Input Forward Voltage	( $I_F = 10\text{ mA}$ )	$V_F$		1.2	1.5	V
*Reverse Leakage Current	( $V_R = 3.0\text{ V}$ )	$I_R$		0.001	100	$\mu\text{A}$
*Capacitance	( $V_F = 0\text{ V}$ , $f = 1.0\text{ MHz}$ )	C		150		pF
<b>DETECTOR</b>						
*Collector-Emitter Breakdown Voltage	( $I_C = 100\ \mu\text{A}$ , $I_B = 0$ )	$BV_{CEO}$	30	60		
*Collector-Base Breakdown Voltage	( $I_C = 100\ \mu\text{A}$ , $I_E = 0$ )	$BV_{CBO}$	30	100		V
*Emitter-Collector Breakdown Voltage	( $I_E = 100\ \mu\text{A}$ , $I_B = 0$ )	$BV_{ECO}$	5.0	8		V
*Collector-Emitter Dark Current	( $V_{CE} = 10\text{ V}$ , Base Open)	$I_{CEO}$		1	100	nA
DC Current Gain	( $V_{CE} = 5.0\text{ V}$ , $I_C = 500\ \mu\text{A}$ )	$h_{FE}$		5000		

**TRANSFER CHARACTERISTICS**

DC Characteristic	Test Conditions	Symbol	Min	Typ	Max	Units
*Collector Output Current <sup>(1,2)</sup> (4N32, 4N33)	(I <sub>F</sub> = 10 mA, V <sub>CE</sub> = 10 V, I <sub>B</sub> = 0)	I <sub>C</sub> (CTR)	50 (500)			mA (%)
(4N29, 4N30)			10 (100)			
(4N31)			5 (50)			
*Saturation Voltage <sup>(2)</sup> (4N29, 4N30, 4N32, 4N33)	(I <sub>F</sub> = 8.0 mA, I <sub>C</sub> = 2.0 mA)	V <sub>CE(sat)</sub>			1.0	V
(4N31)					1.2	

**TRANSFER CHARACTERISTICS**

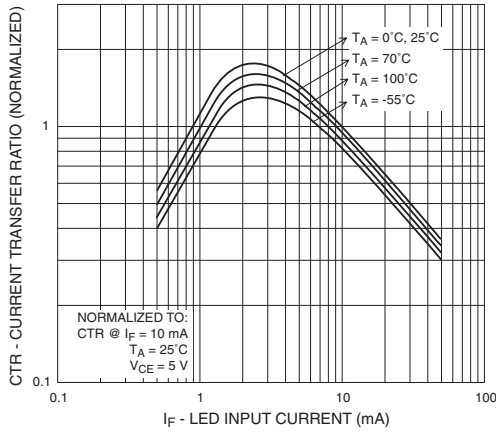
AC Characteristic	Test Conditions	Symbol	Min	Typ	Max	Units
Turn-on Time <sup>(3)</sup>	(I <sub>F</sub> = 200 mA, I <sub>C</sub> = 50 mA, V <sub>CC</sub> = 10 V) (Fig.7)	t <sub>on</sub>			5.0	$\mu\text{s}$
Turn-off Time <sup>(3)</sup> (4N32, 4N33)					100	
(4N29, 4N30, 4N31)					40	
Bandwidth <sup>(4,5)</sup>		BW		30		KHz

**ISOLATION CHARACTERISTICS**

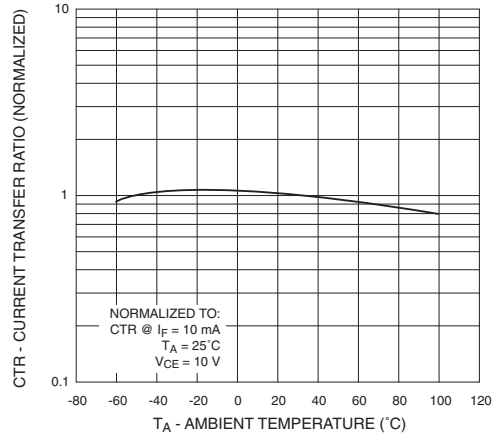
Characteristic	Test Conditions	Symbol	Min	Typ	Max	Units
Input-Output Isolation Voltage <sup>(6)</sup> (4N29, 4N30, 4N31, 4N32, 4N33)	(I <sub>I-O</sub> ≤ 1 $\mu\text{A}$ , V <sub>rms</sub> , t = 1 min.)	V <sub>ISO</sub>	5300			Vac(rms)
* (4N32)			VDC	2500		V
* (4N33)			VDC	1500		
Isolation Resistance <sup>(6)</sup>	(V <sub>I-O</sub> = 500 VDC)	R <sub>ISO</sub>		10 <sup>11</sup>		$\Omega$
Isolation Capacitance <sup>(6)</sup>	(V <sub>I-O</sub> = $\emptyset$ , f = 1 MHz)	C <sub>ISO</sub>		0.8		pf

4N29    4N30    4N31    4N32    4N33

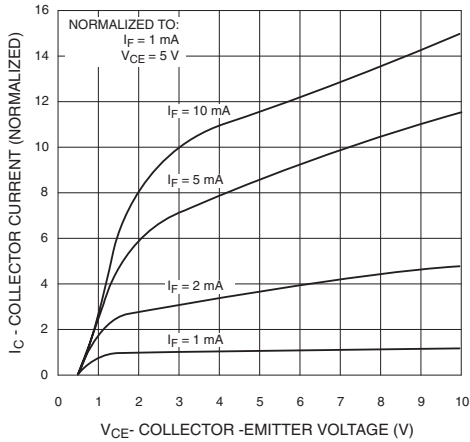
**Fig. 1 Output Current vs. Input Current**



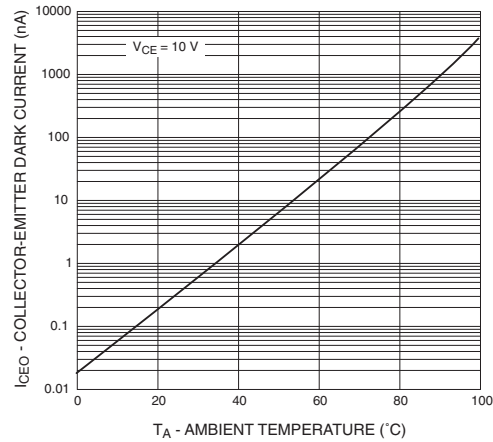
**Fig. 2 Current Transfer Ratio vs. Ambient Temperature**



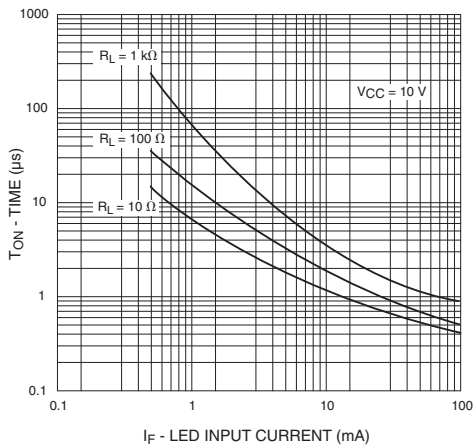
**Fig. 3 Collector Current vs. Collector-Emitter Voltage**



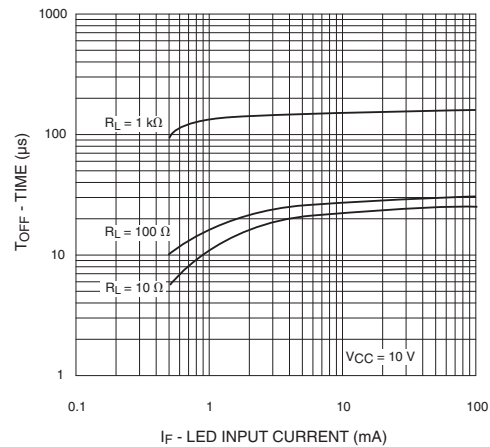
**Fig. 4 Dark Current vs. Ambient Temperature**



**Fig. 5 Turn-On Time vs. Input Current**



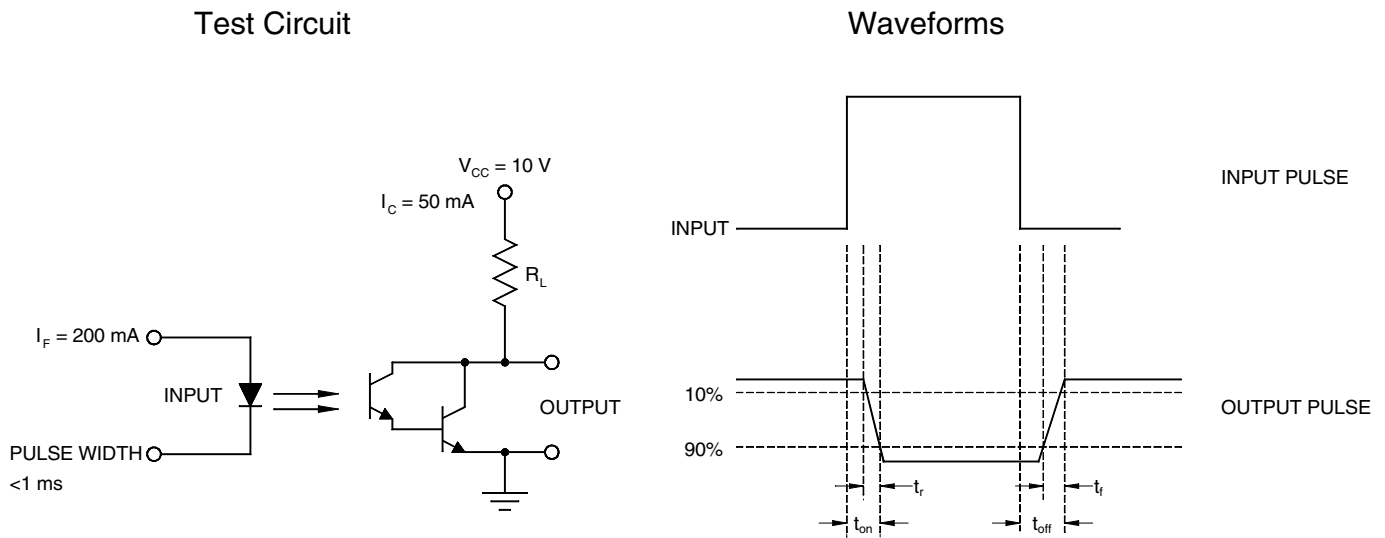
**Fig. 6 Turn-Off Time vs. Input Current**



4N29 4N30 4N31 4N32 4N33

**TYPICAL ELECTRO-OPTICAL CHARACTERISTIC CURVES**

(25°C Free air temperature unless otherwise specified) (Cont.)



**Fig. 7 Switching Time Test Circuit and Waveforms**

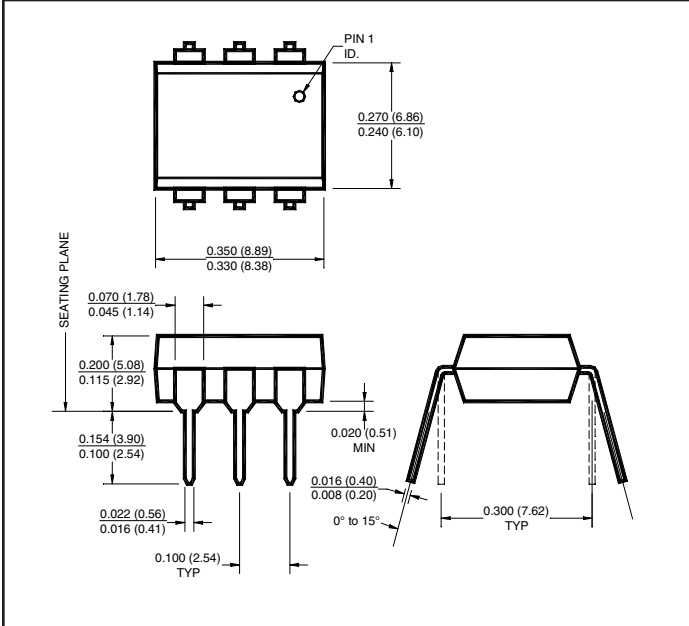
**Notes**

\* Indicates JEDEC registered data.

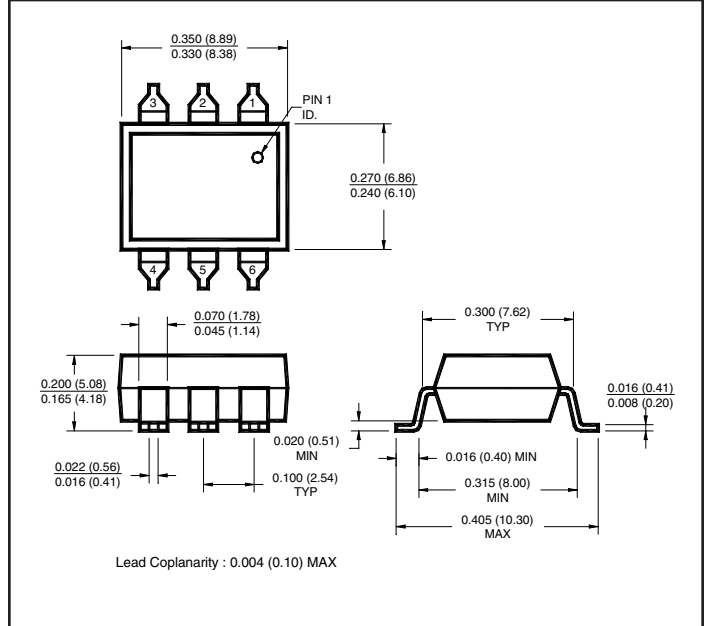
1. The current transfer ratio ( $I_C/I_F$ ) is the ratio of the detector collector current to the LED input current with  $V_{CE} @ 10 \text{ V}$ .
2. Pulse test: pulse width =  $300 \mu\text{s}$ , duty cycle  $\leq 2.0\%$ .
3. For test circuit setup and waveforms, refer to figure 7..
4.  $I_F$  adjusted to  $I_C = 2.0 \text{ mA}$  and  $I_C = 0.7 \text{ mA rms}$ .
5. The frequency at which  $I_C$  is 3dB down from the 1 KHz value.
6. For this test, LED pins 1 and 2 are common, and phototransistor pins 4,5 and 6 are common.

4N29 4N30 4N31 4N32 4N33

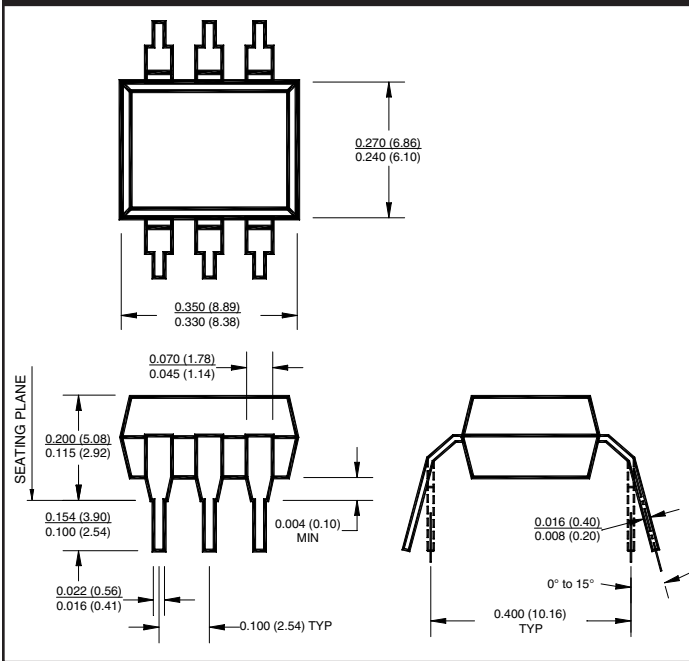
## Package Dimensions (Through Hole)



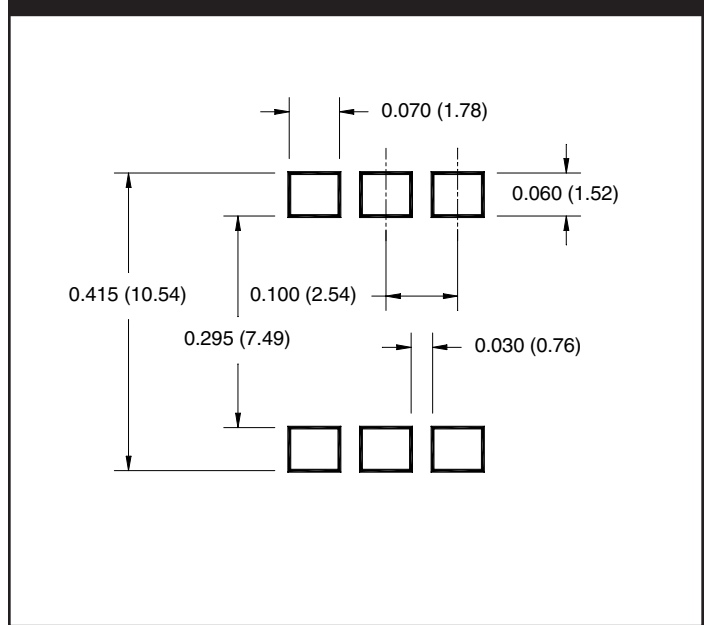
## Package Dimensions (Surface Mount)



## Package Dimensions (0.4" Lead Spacing)



## Recommended Pad Layout for Surface Mount Leadform



**NOTE**

All dimensions are in inches (millimeters)

Call QT Optoelectronics for more information or the phone number of your nearest distributor.

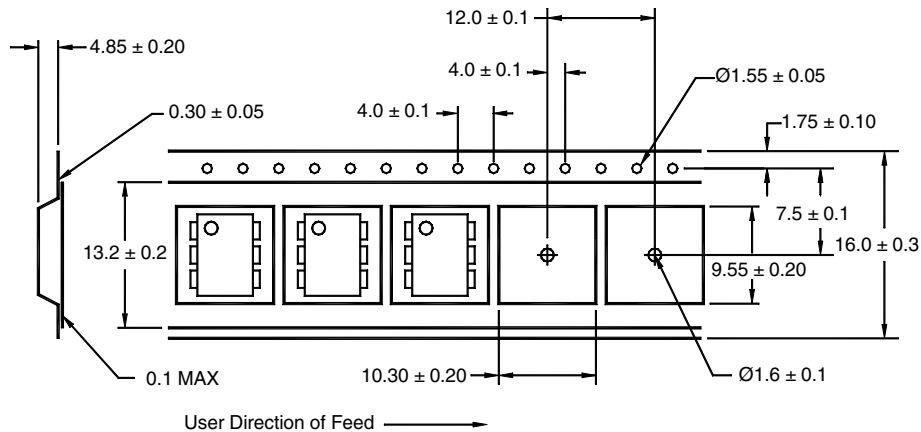
United States 800-533-6786 • France 33 [0] 1.45.18.78.78 • Germany 49 [0] 89/96.30.51 • United Kingdom 44 [0] 1296 394499 • Asia/Pacific 603-7248193

4N29 4N30 4N31 4N32 4N33

## ORDERING INFORMATION

Option	Order Entry Identifier	Description
S	.S	Surface Mount Lead Bend
SD	.SD	Surface Mount; Tape and reel
W	.W	0.4" Lead Spacing
300	.300	VDE 0884
300W	.300W	VDE 0884, 0.4" Lead Spacing
3S	.3S	VDE 0884, Surface Mount
3SD	.3SD	VDE 0884, Surface Mount, Tape & Reel

## QT Carrier Tape Specifications ("D" Taping Orientation)



### NOTE

All dimensions are in millimeters

**Call QT Optoelectronics for more information or the phone number of your nearest distributor.**

United States 800-533-6786 • France 33 [0] 1.45.18.78.78 • Germany 49 [0] 89/96.30.51 • United Kingdom 44 [0] 1296 394499 • Asia/Pacific 603-7248793

[www.qtopto.com](http://www.qtopto.com)

## DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. 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.

## LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.