

General Description

OIT7C consists in three silicon phototransistor's monolithic arrays. The two arrays of six devices are placed on top and bottom of the device, they represent each bit of the encoder disc. A further array of four devices is placed in the center. It can be used as light sensor or as adding bits, increasing the resolution of the encoder.

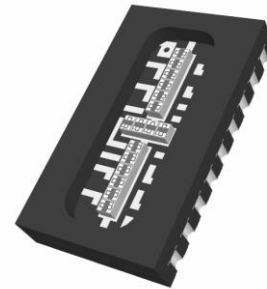
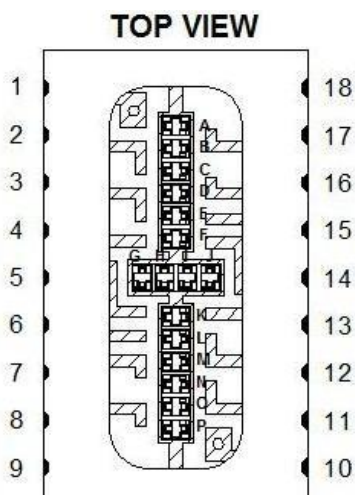
The phototransistors have a common collector, every emitter is available as a pad. The pitch of the silicon arrays is 0.6 mm, while the component electrical pitch is 1.27 mm. The active area of each element is 0.2 x 0.45 mm. The encapsulant is an high quality microelectronic transparent resin, its transmission value is 100% in the range 300-900nm.

The advantages of this product are the high uniformity of the silicon sensors, due to the monolithic construction and the high optical responsivity, due to the antireflective coating deposited on the phototransistor's areas.

The packaging method is oriented to industrial harsh applications, which means high temperature range, high stability in time and very high uniformity of the silicon cells.

Applications

- Optical encoders
- 12-13 bit absolute encoders
- Optical Receivers
- Controls/drives



Features

- High uniformity of silicon cells
- High transparency resin
- Designed to meet industrial specifications
- High gain
- Reference holes for precise mounting
- Custom design available
- 0.6 mm optical pitch (0.68 mm on request)

Pin Functions

No.	Name	Function
1	AE	Phototransistor A Emitter
2	CE	Phototransistor C Emitter
3	EE	Phototransistor E Emitter
4	HE	Phototransistor H Emitter
5	GE	Phototransistor G Emitter
6	KE	Phototransistor K Emitter
7	ME	Phototransistor M Emitter
8	OE	Phototransistor O Emitter
9	CC	Common collector
10	PE	Phototransistor P Emitter
11	NE	Phototransistor N Emitter
12	LE	Phototransistor L Emitter
13	IE	Phototransistor I Emitter
14	JE	Phototransistor J Emitter
15	FE	Phototransistor F Emitter
16	DE	Phototransistor D Emitter
17	BE	Phototransistor B Emitter
18	CC	Common collector

Ordering Information

OIT7C	16-ch. phototransistor array 0.60mm optical pitch on plastic SMD package, cross shape
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ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Min	Max	Unit
T_A	Operating Temperature Range	-40	85	°C
T_S	Storage Temperature	-40	100	°C
T_{Sol}	Lead Temperature (solder) 3s		230	°C
$V_{R(BR)}$	Breakdown Voltage Collector-Emitter @ $T_A=25^\circ\text{C}$ $I_B=100\text{nA}$ $I_C=1\text{mA}$	50		V
P_D	Power Dissipation @ $T_A=25^\circ\text{C}$		150	mW

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_D	Dark Current	$V_R=10\text{V}$		10	100	nA
R_λ	Responsivity	$V_{CE}=5\text{V}$ $\lambda=880\text{nm}$	0.5			A/W
λ_p	Peak Responsivity	$V_{CE}=5\text{V}$		750		nm
$\Delta\lambda$	Spectral Bandwidth @ 50%	$V_{CE}=5\text{V}$	500		950	nm
I_{ec0}	Emitter-Collector Current	$V_{CE}=7.7\text{V}$		0.1	100	μA
I_{ce0}	Collector-Emitter Current	$V_{CE}=52\text{V}$		0.1	100	μA
H_{FE}	Gain	$V_{CC}=5\text{V}$ $I_C=2\text{mA}$		600		
$V_{CE(sat)}$	Saturation Voltage	$I_E=2\text{mA}$ $I_B=20\mu\text{A}$		80	200	mV
$I_{C(on)}$	On-state Collector Current	$V_{CE}=5\text{V}$ $E_E=1.0\text{mW/cm}^2$		1		mA

AC SWITCHING CHARACTERISTICS

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_R	Rise Time	$V_{CC}=5\text{V}$ $I_C=1\text{mA}$ $R_1=1\text{k}\Omega$		10		μs
t_F	Fall Time	$V_{CC}=5\text{V}$ $I_C=1\text{mA}$ $R_1=1\text{k}\Omega$		11		μs

MECHANICAL CHARACTERISTICS

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
A	Phototransistor Active Area			0.09		mm^2
L	Length of the Active Area			0.2		mm
W	Width of the Active Area			0.45		mm

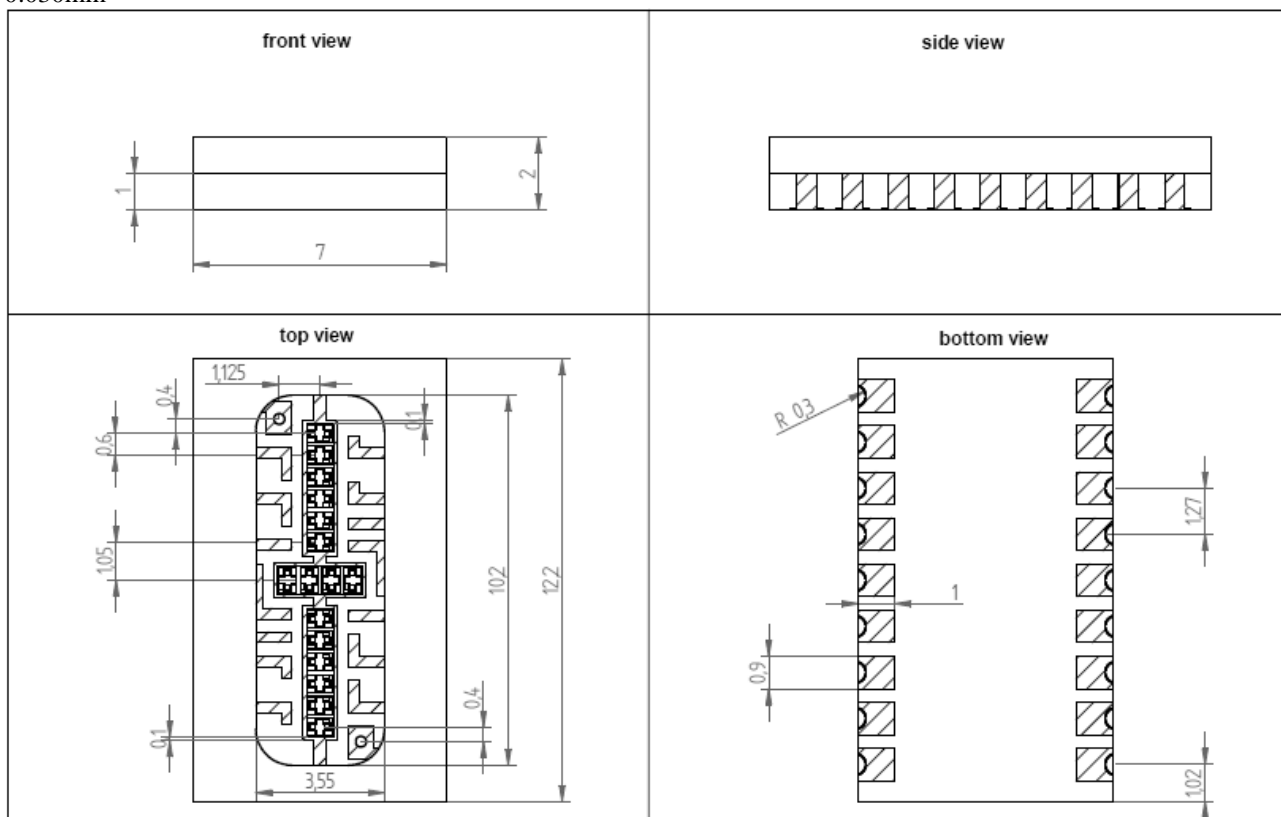
PACKAGE CHARACTERISTICS

Symbol	Parameter	Value	Unit
S_F	Pad Surface Finishing	GOLD	
S_L	Pad Shelf Life	6	months
MSL	Moisture Sensitive Level †	3	level

† According to Jedec standard J-STD-020D.1

MECHANICAL DIMENSIONS

Units=mm Mechanical tolerance=+/-0.2mm Die positioning tolerance=+/-0.030mm



TYPICAL PERFORMANCE CURVES

Figure 1 – Output voltage Vs Temperature

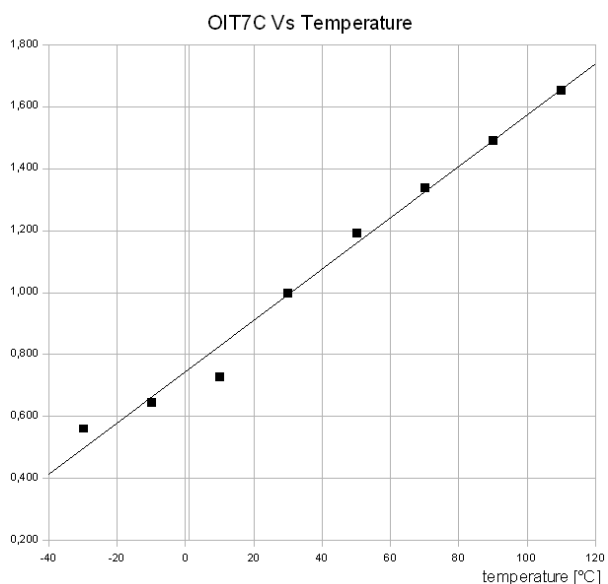


Figure 2 – Normalized spectral responsivity

