

MICRON SEMICONDUCTOR LIMITED

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Texas A & M University
College Station
Texas, TX 77843-3366
U.S.A.

10th November 2017

QUOTATION NO. 8377

Attention: Dr. Andrea Jedele
ajedele@tamu.edu

Subject: Silicon Detectors for NIMROD

Requirement:

-6 140um Ring 2/3
-5 300um Ring 2/3
-6 500um Ring 2/3

-2 140um Ring 4/5
-2 500um Ring 4/5

-1 140um Ring 6/7
-2 500um Ring 6/7

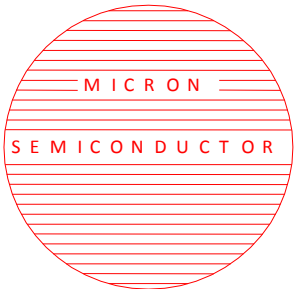
Technical

SUBJECT: CUSTOM DESIGN/ INDRA

INDRA S2/3-140, INDRA S2/3-300, INDRA S2/3-500
Detector: P-N
No of Elements: 3
Substrate: N-type
Design: Trapezoid
Thickness: a) 140um, b) 300 µm c) 500um
Full Depletion (FD): a) 30 V max b) 50max c) 100max.
Operating Voltage Range: FD to FD+30 volts
Element Capacitance: 100pF subject to thickness.
Total Current (20 °C) (FD): 200 nA typical, 500 nA max
Window: Type 2M
Junction Window: 0.7 µm
Ohmic Window: 1.0 µm
Metallising Aluminium: 3000 Å
Total Alpha Resolution (Junction): 100keV fwhm 1 µS max



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Total Alpha Resolution (Ohmic): 100 keV fwhm 1 μ S max
Package: supplied by Texas A&M designed & manufactured from GANIL drawings.
Acceptance Level: 100% (All channels meeting specification)
Measurement Data/Leakage Current/Alpha Resolution provided

PACKAGES

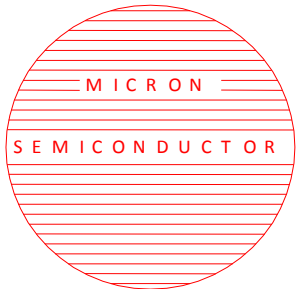
Free-issue: (must meet minimum [MIL883] wire bonding requirements) from Texas A & M (defect-free and clean) with yield (25% excess) of requirements.

INDRA Ring 2/3

NRE: Full Mask Set (mask set not previously made)				\$7,000
Supply INDRA S2/3-140 Detectors to specification				
UNIT PRICE:	\$2500	Total Qty 6		\$15,000
Supply INDRA S2/3-300 Detectors to specification				
UNIT PRICE	\$2000	Total Qty 5		\$10,000
Supply INDRA S2/3-500 Detectors to specification				
UNIT PRICE	\$2500	Total Qty 6		\$15,000
INDRA S2/3 Shipping packs	\$150 per unit			\$2,550
NRE Wire Bonding Jigs & assembly for Texas A & M packages	\$1000			\$1,000*
				<hr/>
			Total INDRA Ring 2/3 Qty 17 Detectors	\$50,550



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Detector INDRA S4 /5

INDRA S4/5 2M/2M

Detector: P-N structure with no guard ring
No of Elements: 4
Element Separation: 50 micron
Substrate: N-type
Design: Trapezoid
Thickness: 140, 300, 500 μm
Designation: a) S4/3 -140, b) S4/3 – 300, c) S4/3 - 500
Full Depletion (FD): a) 30 V, b) 50 V, c) 100 V maximum
Operating Volts: -60 V
Operating Voltage Range: FD to 2 x FD
Total Capacitance: a) 400 pF, b) 20pF, c) 12pF typical
Total Leakage Current (20 °C) (FD): 200 nA typical, 500 nA maximum
Window: Type 2M
Junction Window: 0.7 μm
Ohmic Window: 1.0 μm
Metallising Aluminium: 3000 Å
Total Alpha Resolution (Junction): 100 KeV FWHM 1 μS maximum
Total Alpha Resolution (Ohmic): 100 KeV FWHM 1 μS maximum
Chip Dimensions: 51.300 x 27.700 x 54650 micron
Distance Active Area Chip Edge 1000 micron
Acceptance Level: 100% (all channels meeting specification)

Package:

Free Issue from Texas A & M 50% excess for yielding
Ganil Package Connections: Designated G (S3) H (5I) I (N) J (S2) K S4

NRE Mask Set – in place from previous orders*
Indra Trapezoid Quadrants with Free Issue Packages

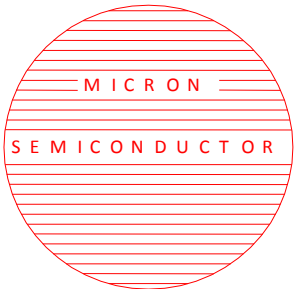
Supply Indra S4/5 – 140	Unit Price: \$2500	Qty 2	\$5,000
Supply Indra S4/5 – 300	Unit Price: \$2000		Not required
Supply Indra S4/5 – 500	Unit Price: \$2500	Qty 2	\$5,000

NRE Shipping Trays Indra S4/5	\$150 each	\$600
Wire Bonding Jigs & assembly for Texas A & M Packages	\$1000	\$1000*

Total Assembled Ring 4/5 Qty 4 Detectors **\$11,600**



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Chip Dimensions: 51.3 x 27.7 x 54.65 mms

Detectors: INDRA 6/7

Dimensions as per attached drawings (full specification to be confirmed)

NRE mask set – in place from previous order*

Indra Trapezoid Quadrants with Free Issue Packages

Supply Indra S6/7 – 140	Unit Price: \$3000	Qty 1	\$3,000
Supply Indra S6/7 – 300	Unit Price: \$2500		Not required
Supply Indra S6/7 – 500	Unit Price: \$3000	Qty 2	\$6,000
NRE Shipping Trays Indra S6/7		\$150 each	\$450
Wire Bonding Jigs & assembly for Texas A & M Packages	\$1000		\$1,000*

Total INDRA 6/7 Qty 3 Detectors \$10,450

Total Proposal: \$72,600

(Seventy two thousand six hundred dollars)

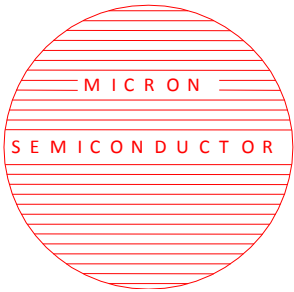
** Note NRE: prices given as shown assuming existing mask sets do not require upgrading from their 2012 format. If mask set redesign required, additional NRE may be required and will be priced accordingly*

Prices: US Dollars FOB College Station, Texas.

Delivery: Staggered delivery in shipments to a maximum value of \$25,000 per shipment:
Commencing as soon as possible with part order delivery of 140um thickness for Ring 4/5 and 6/7 from in process wafers subject to completion and final test (estimated 4 – 6 weeks from receipt and acceptance of packages)



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Wafer stocks as follows:

INDRA	140	2	M	Qty 7		2649	4/5 design
INDRA	140	2	M	Qty 5		2430	6/7 design

New wafer production of Ring 4/5 and 6/7 4 months from order receipt
Delivery of Ring 2/3 commencing 4 months from design confirmation/ acceptance by customer

* all deliveries subject to receipt of suitable packages from Texas A & M

Warranty: 12 months manufacturing/specification defects attributed to Micron Semiconductor Limited from INVOICE DATE.

Origin: UK

Quotation Validity: 31st December, 2017

Amanda Boothby
Finance



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