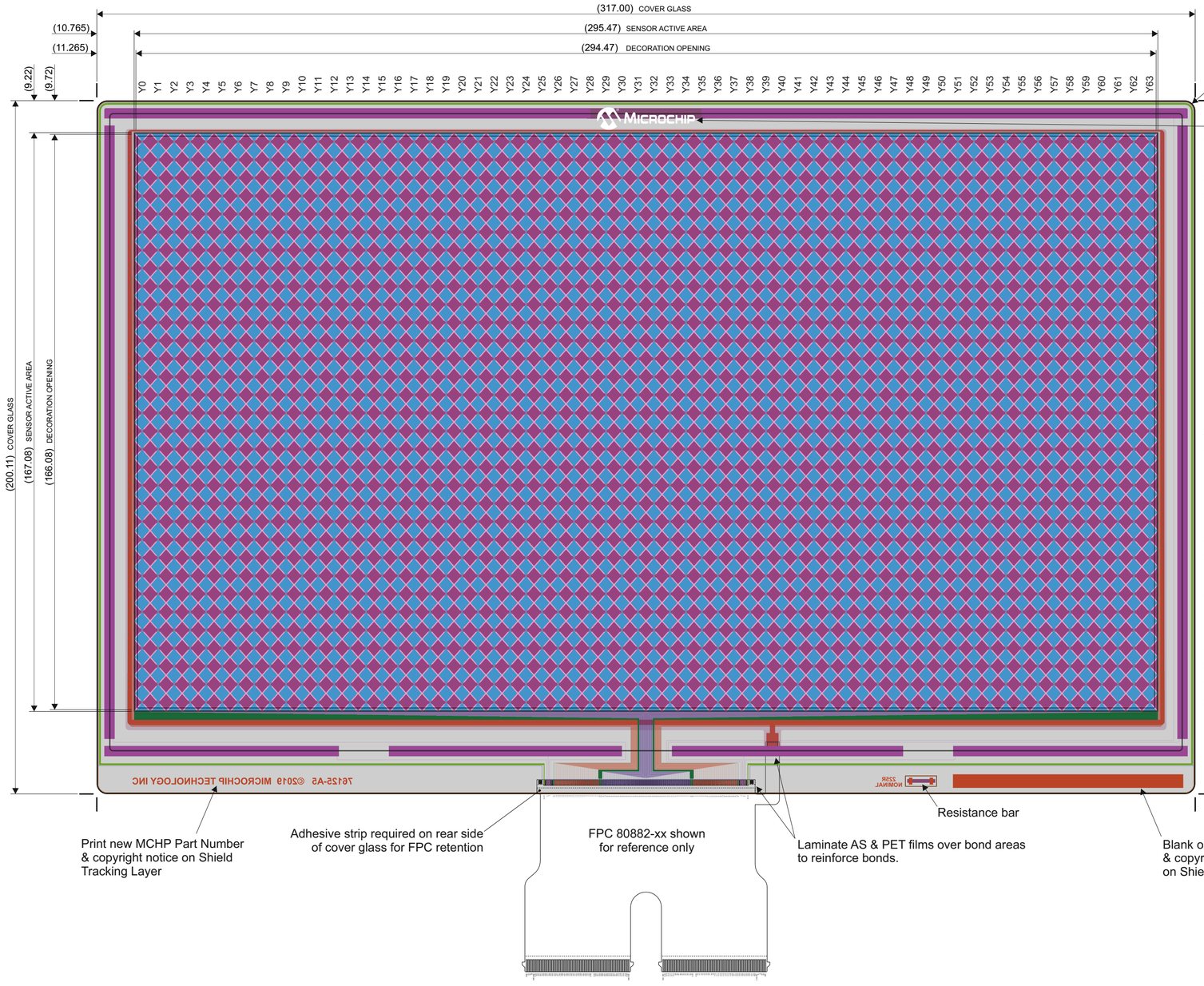
STRICTLY CONFIDENTIAL

SUBJECT TO NON-DISCLOSURE AGREEMENT

THIS DRAWING IS FOR SAMPLES & PROTOTYPES ONLY
TO BE ISSUED TO MICROCHIP APPROVED MANUFACTURERS ONLY



Artwork drawn as viewed from Touch Side

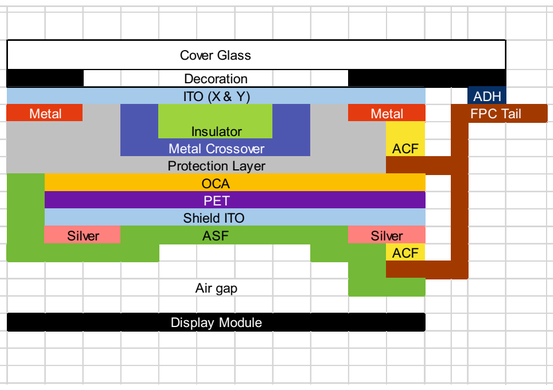
Edges of cover glass to be polished
with no sharp corners

All dimensions are in millimeters.
If In Doubt Please Ask.

Layers (top to bottom)

Cover glass
ITO Pattern 55 ohm/sq
Insulator
Metal crossovers 0.4 ohm/sq
Metal tracks 0.4 ohm/sq
Protection layer
OCA
PET Film
ITO Shield 75 ohm/sq
Silver track 0.15 ohm/sq
Anti-splinter film

Touchscreen Build Stack



	Material	Thickness (mm)
	Dragontrail glass	1.10
	Decoration print	0.02
	ITO 55±10 Ohm/sq	-
	Metal tracking 0.4 Ohm/sq	-
	Insulator	-
	Metal Crossover 0.4 Ohm/sq	-
	Insulator	0.003
	OCA	0.25
	PET film	0.125
	ITO 75±15 Ohm/sq	-
	Silver tracking 0.15 Ohm/sq	-
	Anti-splinter film	0.079
	Touchscreen Thickness	**1.577**
	Air	0.3
	Display module	-
	Hot Bar Bond Heatseal / ACF	0.005
	FPC Tail	0.09

Crossover Detail
insulator thickness = 1.25um
under track width = 70um
ITO resistance = 55±10 Ohm/sq
crossover track width = 12um
crossover metal track resistance = 0.4 Ohm/sq
crossover track resistive length = 200 um

Preliminary Drawing
Not for Manufacture

All components and materials used must be RoHS compliant as described in European Parliament Directive 2002/95/EC

Iss	Notes	ECN	Drn	Date
A5	Silver trace added to ITO shield layer. OCA & PET film thicknesses changed.	N/A	PFC	1st Feb 2019
A4	Shield ITO, PET film & AS film changed, metal 3D electrode geometry updated	N/A	PFC	6th Feb 2018
A3	Shield & OCA profiles changed	N/A	PFC	15th Sept 2017
A2	Profile changed, logo printing amended	N/A	PFC	30th Aug 2017
A1	ITO shield layer added	N/A	PFC	21st Aug 2017
A0	First Issue	N/A	PFC	15th Aug 2017

Title: 13.3" ITO on Glass TS Single Diamond G2 32X 64Y			Project: mXT2113TDAT
Number: 76125	CAD Check:	Engr Check:	
Filename: 76125.cdr		Approved:	
Sheet 1 of 2	Drawn: P Cassidy		

MICROCHIP

Material Specifications

	Material	Thickness	Specification	design rules
Main ITO	ITO	0.03um	55 Ohms/sq ± 10 Ohms	Minimum track / gap = 30um ± 10%
Insulator	Insulator	1.25um ± 0.25um	Er = 3.60	
Metal crossovers	Metal	0.3um	0.4 Ohms/sq ± 10%	Minimum track width 12um
Metal tracks	Metal	0.3um	0.4 Ohms/sq ± 10%	Minimum track / gap = 30um ± 10%
Protection Layer	Insulator	3um ± 0.25um	Er = 3.60	
OCA	Optically clear adhesive	0.25mm ± 10%	Er = 4.60	
PET	PET film	0.125mm ± 10%	Er = 3.00	
Shield ITO	ITO	0.03um	75 Ohms/sq ± 15 Ohms	
Silver tracks	Silver	8um ± 10%	0.15 Ohms/sq ± 10%	Minimum track width 500um
Anti-splinter film	PET/OCA	0.079mm ± 10%	Er = 3.00	
FPC interconnect	ACF / ACP / ACA	<20um	Pad contact resistance <1 Ohm, Peel strength >5N/cm	Pads 0.20 x 1.8mm on 0.4mm pitch

Alignment Tolerances	
Layer to Layer Alignment	± 15um
Print to Edge of Glass	± 200um
Metal to ITO	± 15um

Assumptions			
Cover Glass	Dragontrail Glass or similar	1.10mm ± 10%	Er = 7.37
Decoration	Black Pantone EC non-conductive ink Logo white non-conductive ink	20um ± 5um	Er = 3
Airgap to display	Air	0.30mm ± 10%	Er = 1.01

Performance Calculations	
Charge Time	2.73us
Worst case touch separation in X	10.96mm
Worst case touch separation in Y	9.70mm
Touch separation difference	1.27mm

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