PRODUCT / PROCESS CHANGE NOTIFICATION
PCN-000780
Date: April 8, 2022

Semtech Corporation, 200 Flynn Road, Camarillo CA 93012

Change Details

Part Number(s) Affected:	Customer Part Number(s) Affected: ☒ N/A
SX1231IMLTRT **SX1231HIMLTRT** **SX1232IMLTRT** **SX1233IMLTRT** **SX1239IMLTRT**	

Description, Purpose and Effect of Change:

For business continuity purposes, Semtech will start using qualified second-sources for assembly of the above-mentioned parts.

The assembly of these parts are currently performed at Carsem (Malaysia). Second-source assembly has been qualified at Greatek (Taiwan).

Change Classification	☒ **Major** ☐ **Minor**	**Impact to Form, Fit, Function**	☐ **Yes** ☒ **No**
Impact to Data Sheet	☐ **Yes** ☒ **No**	**New Revision or Date**	☒ **N/A**

Impact to Performance, Characteristics or Reliability:

No impact to performance, characteristics or reliability is expected as a result of this change.

Implementation Date	**July 8, 2022**	**Work Week**	**2227**
Last Time Ship (LTS) **Of unchanged product**	**N/A**	**Affecting Lot No. / Serial No. (SN)**	**N/A**
Sample Availability	**April 8, 2022 (SX1231IMLTRT, SX1232IMLTRT)**	**Qualification Report Availability**	**April 8, 2022**

Supporting Documents for Change Validation/Attachments:

- **From-To analysis**
- **Reliability qualification report available upon request.**

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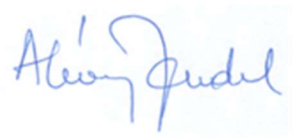
Issuing Authority		
Semtech Business Unit:	Wireless and Sensing Product Group	
Semtech Contact Info:	Anne Lévy-Mandel Sr Quality Assurance Manager, Wireless & Sensing Products Semtech Neuchâtel SA Gouttes d'Or 40 CH-2000 Neuchâtel Alevymandel@semtech.com Office: + 41 32 729 40 61 Fax: + 41 32 729 40 01	
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www.semtech.com

PCN No. 000780

Qualification of Greatek Taiwan as a second source Assembly manufacturer for LORA and ISM products

Introduction

- In order to increase the overall production capacity, Semtech is qualifying Greatek as a second source for assembly and test. Assembly is currently performed at Carsem.

- The change affect applicable to products:

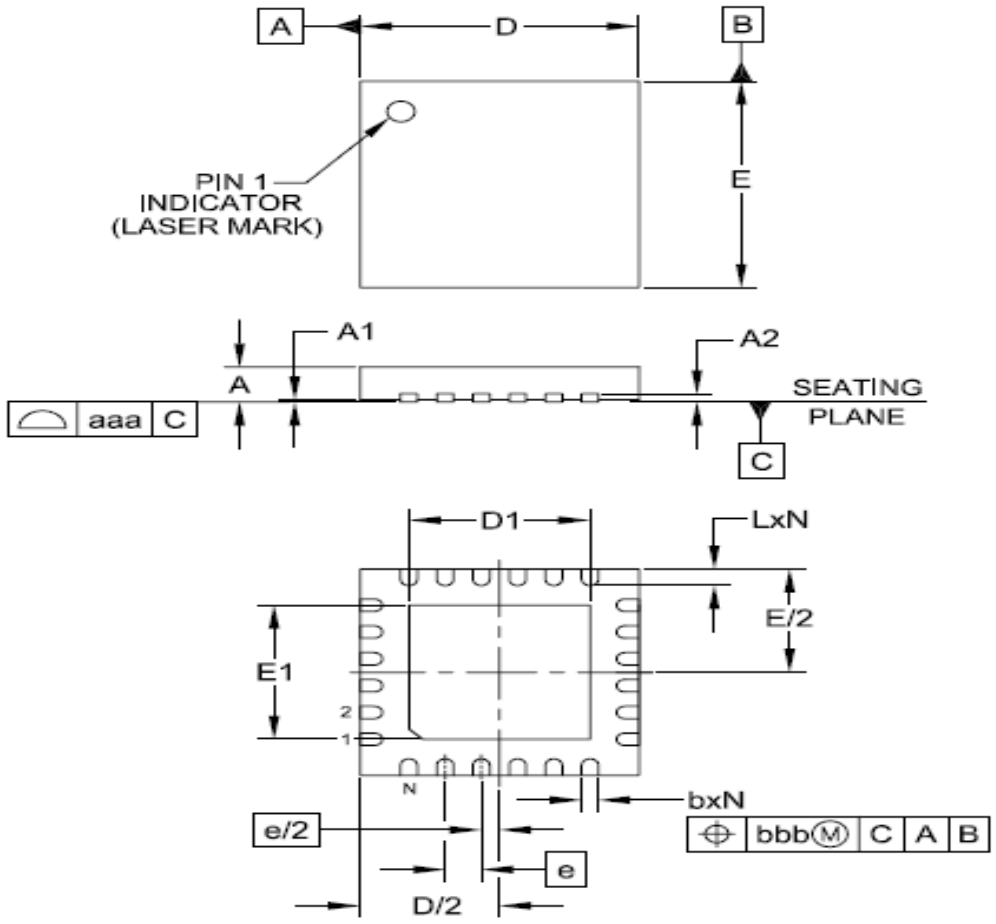
  SX1231IMLTRT & derivatives, SX1232IMLTRT, SX1233IMLTRT, SX1239IMLTRT

- Qualification Vehicle selected is SX1276IMLTRT

- Schedule for Implementation

  Passing REL qualification under Rel job# 7140.

SEMTECH Package Outline on SX1231IMLTRT/ SX1232IMLTRT/ SX1233IMLTRT/ SX1239IMLTRT (Carsem and Greatek)



DIMENSIONS			
DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.80	-	1.00
A1	0.00	-	0.05
A2	-	(0.20)	-
b	0.25	0.30	0.35
D	4.90	5.00	5.10
D1	3.20	3.25	3.30
E	4.90	5.00	5.10
E1	3.20	3.25	3.30
e	0.65 BSC		
L	0,35	0.40	0.45
N	24		
aaa	0,08		
bbb	0,10		

No Change in Package Outline.

NOTES:

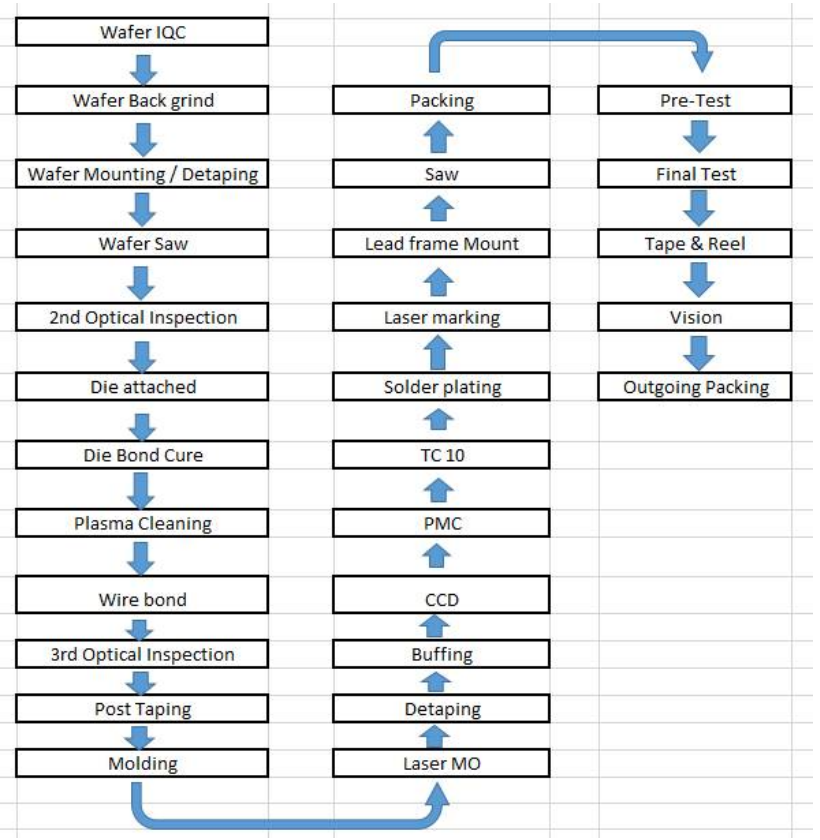
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

Assembly Process Flow (Carsem vs. Greatek)

Assembly Process Flow:

CARSEM (Old)

GREATEK (New)



- No major Change in manufacturing Flow
- 1X IR reflow process step is applied in the assembly flow for both Carsem and Greatek.

BOM (Carsem vs Greatek)

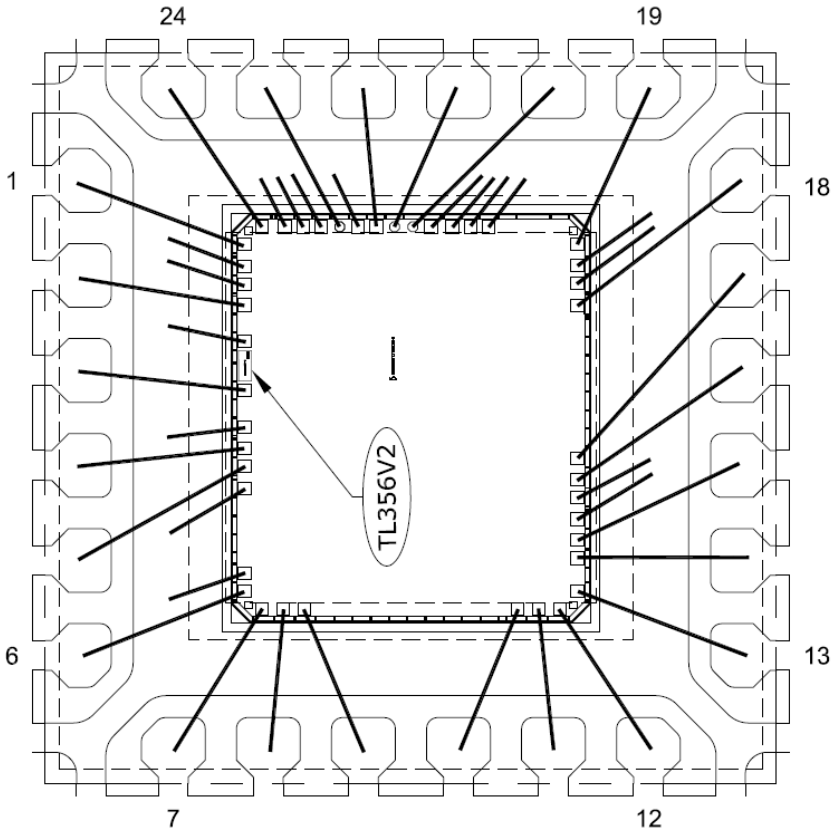
Carsem (Old)				Greatek (New)			
Epoxy	Leadframe	Wire Type	Mold compound	Epoxy	Leadframe	Wire Type	Mold compound
QMI519 Conductive epoxy	AgCu LDF	1.0 mils Au wire	G770HCD	EN-4900 Conductive epoxy	AgCu LDF	1.0 mils Au wire	G700HA

- BOM for both supplier (Greatek/Carsem) is MSL3 qualified.

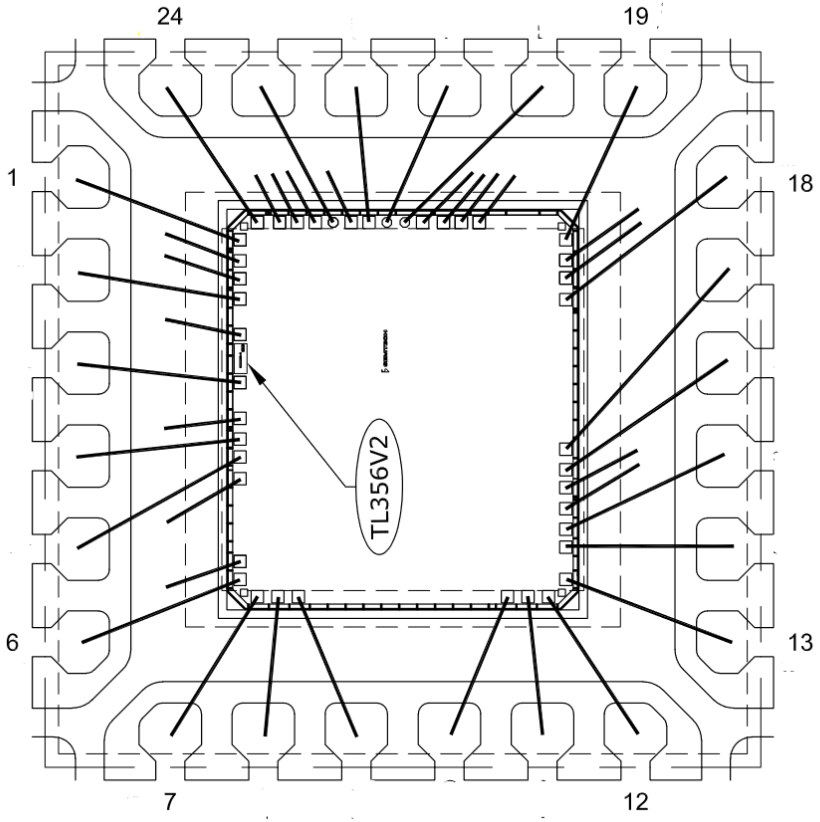
- Carsem uses conductive epoxy of QMI519. Greatek uses EN-4900 which is also conductive epoxy. Both epoxy are supplier standard BOM with proven MSL3 performance.
- Lead frame base material and finishing is identical for both supplier. These are supplier standard BOM with proven MSL1 performance.
- Wire for both supplier is identical. 1.0mils Au wire.
- Mold compound for Carsem is G770HCD and Greatek is G700HA. This is supplier standard BOM with proven MSL3 performance. Both BOM running >5years high volume production. Greatek has shipped >100Mu with G700HA on QFN/DFN products.
- BOM selection between Carsem and Greatek is to ensure each subcon use their previously qualified process. This avoids risk on new assembly process.

Wire Bonding sequence SX1232IMLTRT (Carsem vs Greatek)

Carsem (OLD)



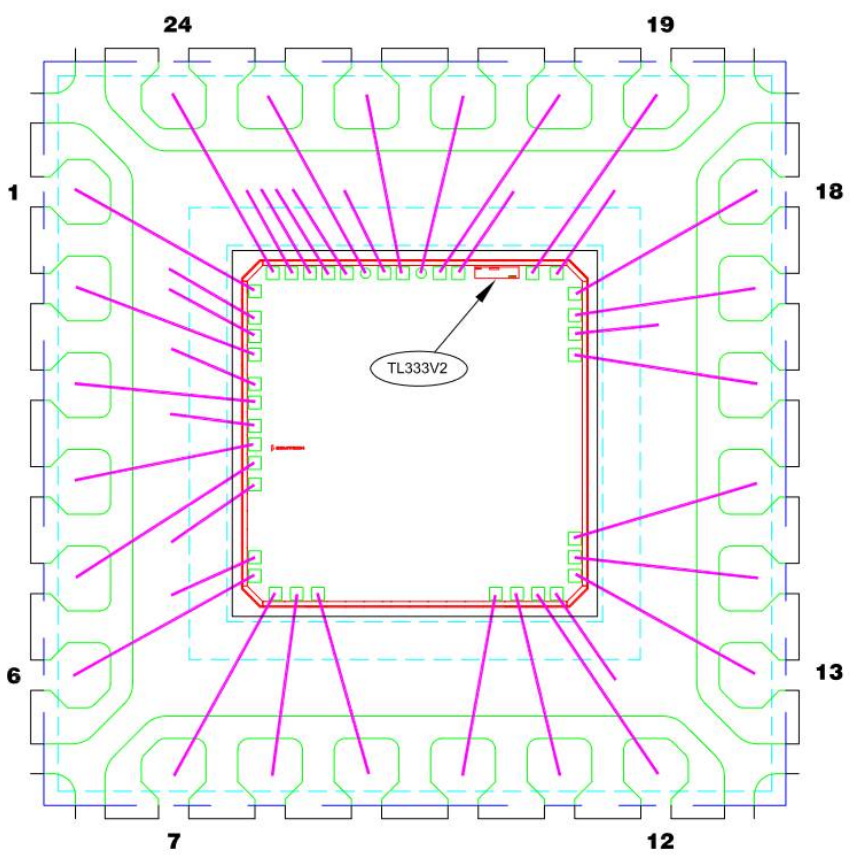
Greatek (NEW)



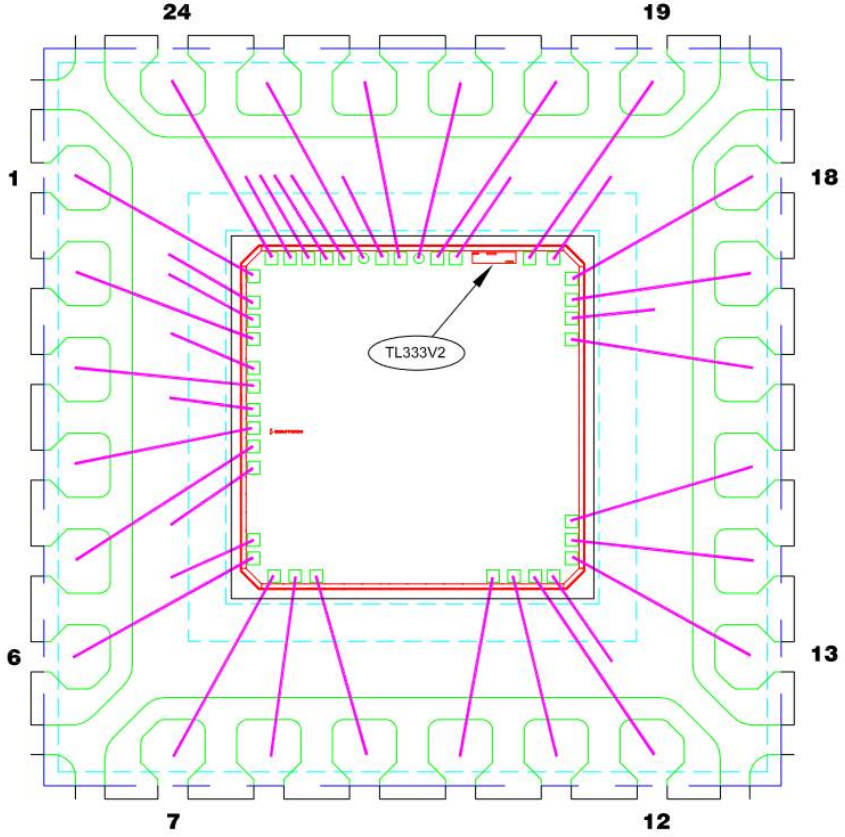
- Both supplier – Carsem and Greatek are bonding the down bond wires as 1st priority although there is some difference on its down bond sequence.
- Followed by those I/O pad wires. Although bonding on I/O pad wires were also having some differences. This would not impacted its electrical performance.

Wire Bonding sequence SX1231IMLTRT, SX1233IMLTRT, SX1239IMLTRT (Carsem vs Greatek)

Carsem (OLD)



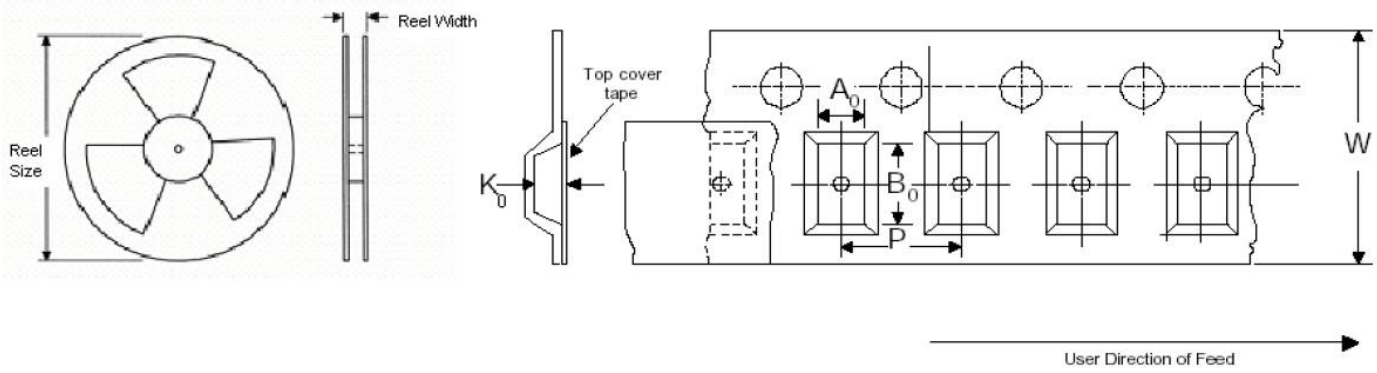
Greatek (NEW)



- Both supplier – Carsem and Greatek are bonding the down bond wires as 1st priority. – Same sequence.
- Followed by those I/O pad wires. Although bonding on I/O pad wires were having some differences. This would not impacted its electrical performance.

Carrier tape 5x5 comparison (Carsem Vs Greatek)

Carrier tape Carsem - CPAK (Old)				Carrier tape Greatek - Advantek (New)			
Ao	Bo	Ko	W	Ao	Bo	Ko	W
5.25+/- 0.1	5.25 +/- 0.1	1.1 +/- 0.1	12	5.25 +/- 0.1	5.25 +/- 0.1	1.1 +/- 0.1	12

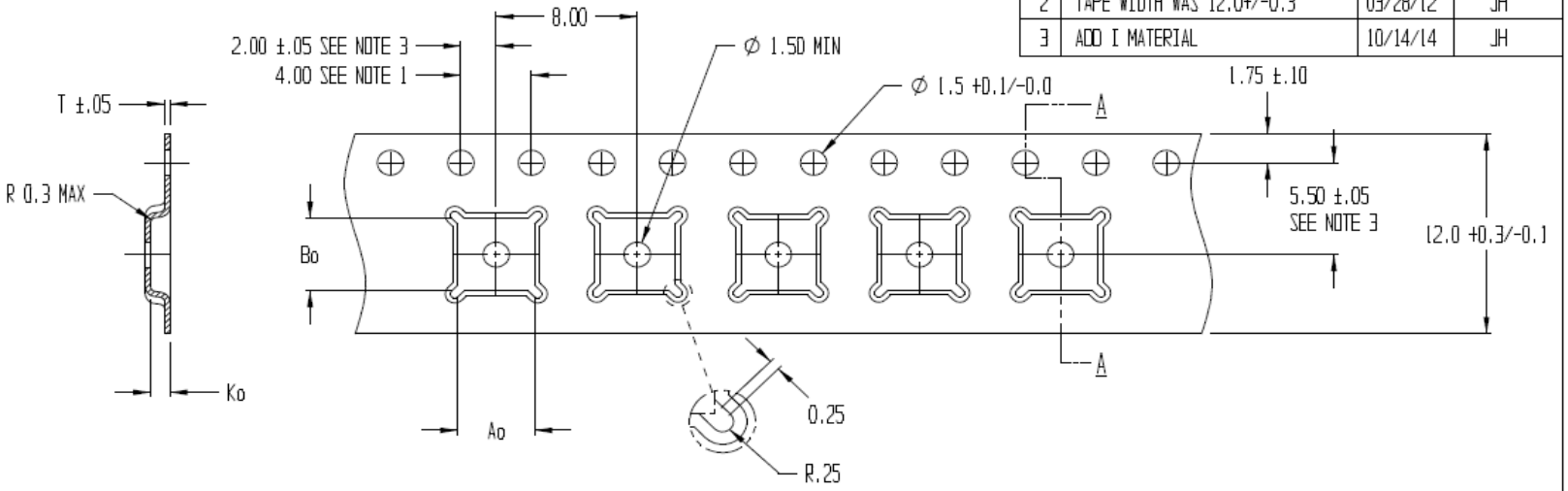


Pkg size	Carrier tape (mm)					Reel				
	Tape Width (W)	Pocket Pitch (P)	Ao	Bo	Ko	Reel Size (in)	Reel Width (mm)	Minimum Trailer Length (mm)	Minimum Leader Length (mm)	QTY per Reel
5x5	12	8	5.25	5.25	1.10	7/13	12.4	200/400	400	500/3000

Although carrier tape supplier were different but critical dimension were no difference.

Carrier tape for Greatek 5x5 (New)

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
1	DRAWING FORMAT CHANGE	7/24/01	BTH
2	TAPE WIDTH WAS 12.0+/-0.3	03/28/12	JH
3	ADD I MATERIAL	10/14/14	JH



SECTION A - A

Ao = 5.25
Bo = 5.25
Ko = 1.10

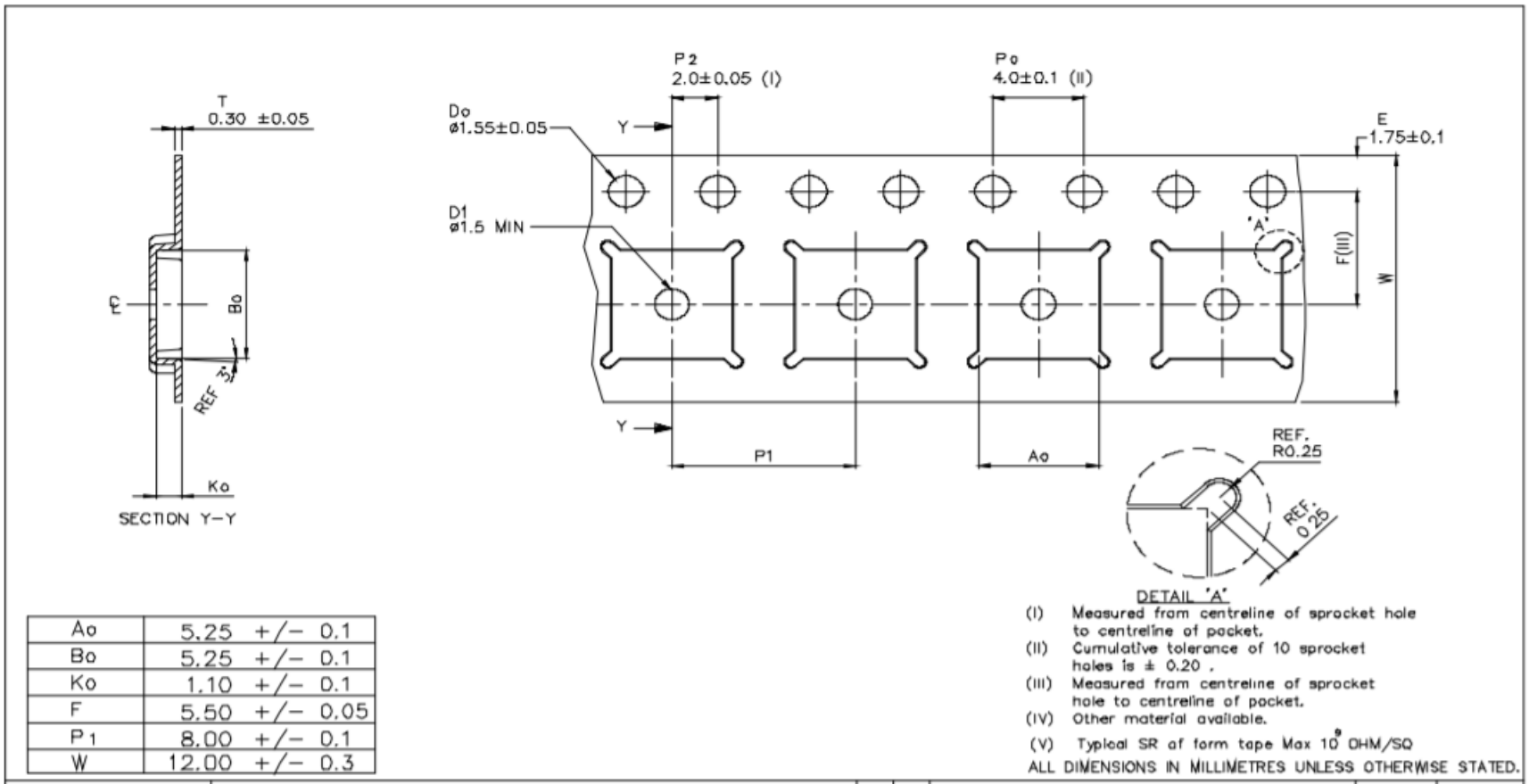
PART#	T	MATERIAL	DRAWING NO.
ML0505-AC	0.30	PS+C	T102531AT
ML0505-AD	0.30	PS+C	T108759BT
ML0505-AI	0.25	PS+C	T111798BT

NOTES:
1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.2
2. CAMBER IN COMPLIANCE WITH EIA 481
3. POCKET POSITION RELATIVE TO SPROCKET HOLE MEASURED AS TRUE POSITION OF POCKET, NOT POCKET HOLE

ADVANTEK

TITLE	ADVANTEK PART DRAWING NUMBER ML0505-A CARRIER TAPE		
TOLERANCES - UNLESS NOTED 1PL ±.2 2PL ±.10	MATERIAL SEE TABLE		
	ALL DIMENSIONS IN MILLIMETERS	DWG SIZE B	
DRAWN BY TMD/BTH	DATE 10/07/99	SCALE 4:1	SHEET 1 OF 1
REFERENCE NO. T-9204	DWG NO. SEE TABLE		REV 3

Carrier tape for Carsem 5x5 (Old)



Ao	5.25 +/− 0.1
Bo	5.25 +/− 0.1
Ko	1.10 +/− 0.1
F	5.50 +/− 0.05
P1	8.00 +/− 0.1
W	12.00 +/− 0.3

(I) Measured from centreline of sprocket hole to centreline of pocket.
(II) Cumulative tolerance of 10 sprocket holes is ± 0.20 .
(III) Measured from centreline of sprocket hole to centreline of pocket.
(IV) Other material available.
(V) Typical SR of form tape Max 10^9 OHM/SQ
ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.

C-PAK PTE LTD

MATERIAL: CONDUCTIVE POLYSTYRENE (IV) — 1st Angle / 3rd Angle
DRAWN: W.M.LEE — GENERAL TOLERANCE ±0.2
DRAWING NO: CP400/07-0 — SCALE: NTS
TITLE: OPEN TOOL EMBOSSED CARRIER TAPE DIMENSIONS MLP 5X5 (QFN0500X0500A)

REV	DESCRIPTION	DATE	APPROVED
0	NEW DRAWING	31.07.07	W.M.LEE
1	TOLERANCE FOR P2 & F WAS +/−0.10	24.08.07	W.M.LEE