



# **JPL EEE Parts Supply Chain Challenges**

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March 2023



# Background

- Recent trend: quotes showing **longer and longer lead time**
  - most recently, 1 vendor couldn't even provide a promise date!

## **Causes mainly due to pandemic:**

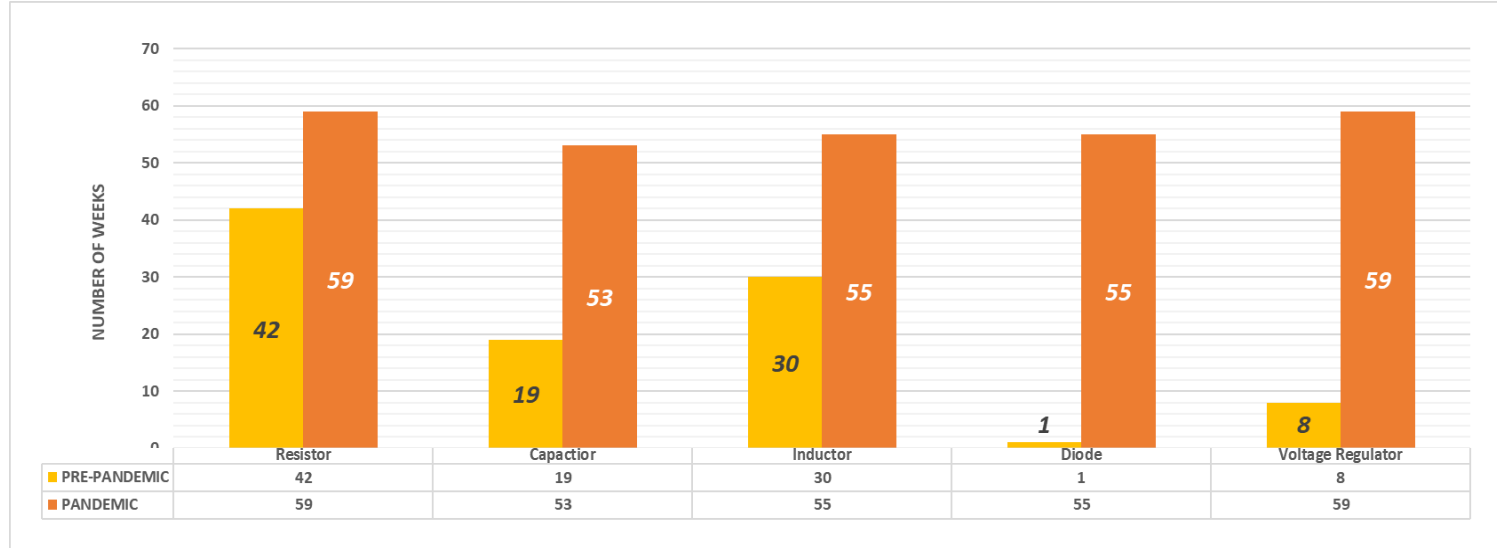
- Factories shut down
- New safety protocols affecting workforce efficiency
- Difficulty in obtaining raw materials
- Workforce and transportation shortages

# Supply Chain Issues Impact on EEE Part Lead Times

## Pre-Pandemic to Pandemic Time Period

- Microcircuits (IC, FPGA, voltage regulators, etc.) and Passives (resistors, capacitors, etc.) have seen the largest lead time increases
- **Microcircuits:** Lead time increased an average of 49 weeks (almost a year)
  - Highest increases: 46 weeks to 51 weeks
    - Voltage Regulators with a **59 week** lead time in FY20 vs. an 8 week lead time in FY18
  - Recent quote for a Buffer Driver had a **86 week** delivery in FY22
- **Passives:** Lead time increased an average of 25 weeks
  - Highest increases: 37 weeks to 42 weeks
    - Surface mount multilayer ceramic chip capacitor had a 45 week lead time in FY20 vs. 3 week lead time in FY17
  - Dec 2021 quote for a thin film resistor had a **78 week** lead time
  - Jan 2022 quote for a another thin film resistor has a **90 week** lead time

## More Examples: EEE Parts Lead Times Pre-Pandemic to Pandemic Time Period



**Now > 1 year lead time**

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## Current Mitigation Activities

- Alert the projects to **budget/plan parts procurement in earlier project phase**
  - Past/current: procurement of long lead parts in phase B and majority of parts in phase C
  - **Encourage shifting most procurement to phase B**
  - **Borrow and replace using project owned EEE parts inventory**
- **Common Stock Inventory:** now stocking 14 commonly used part numbers
  - Buy in bulk and stock early
  - **Increase FY22 & FY23 budget** in Parts Engineering Inventory service center
- JPL has setup **Blanket Purchase Agreements (BPA)** with 4 top volume suppliers:
  - Benefit of BPA: covers supplier's full catalog with pre-approved documentation, allowing for faster PO placement

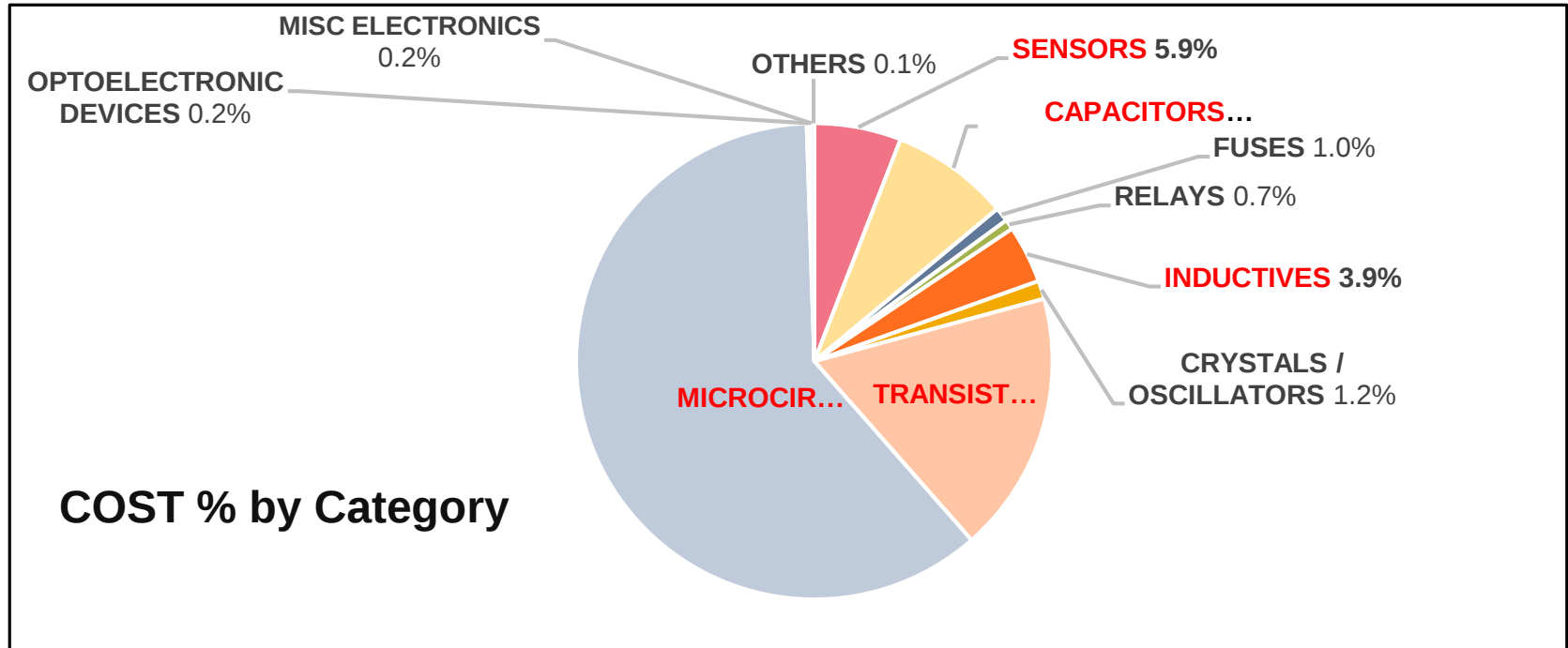
How else can help the projects?

Is this adequate?

What else can we do with our suppliers & distributors?

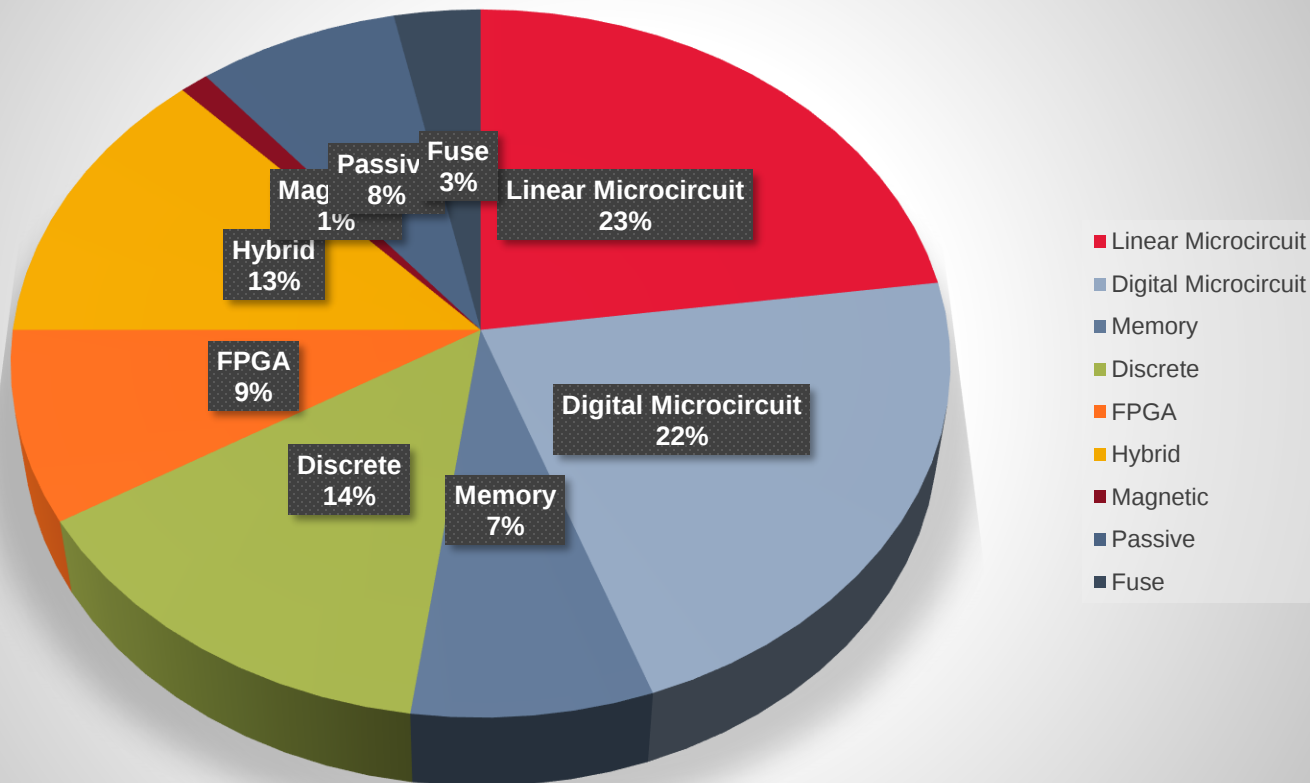
# Current JPL EEE Project Inventory Makeup

|         | SENSORS | CAPACITORS | FUSES | RELAYS | INDUCTIVES | CRYSTALS /<br>OSCILLATORS | TRANSISTORS | MICROCIRCUITS | OPTO-<br>ELECTRONIC | MISC<br>ELECTRONICS | OTHERS |
|---------|---------|------------|-------|--------|------------|---------------------------|-------------|---------------|---------------------|---------------------|--------|
| % Total | 5.9     | 8.0        | 1.0   | 0.7    | 3.9        | 1.2                       | 17.8        | 61.0          | 0.2                 | 0.2                 | 0.1    |



## New Common Stock Increase to 92 P/N

| Part Type            | P/N Count | %     |
|----------------------|-----------|-------|
| Linear Microcircuit  | 21        | 22.8% |
| Digital Microcircuit | 20        | 21.7% |
| Memory               | 7         | 7.6%  |
| Discrete             | 13        | 14.1% |
| FPGA                 | 8         | 8.7%  |
| Hybrid               | 12        | 13.0% |
| Magnetic             | 1         | 1.1%  |
| Passive              | 7         | 7.6%  |
| Fuse                 | 3         | 3.3%  |
| <b>Total</b>         | <b>92</b> |       |



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## Going Forward Plans for FY 23

- **Common Stock Inventory:** Increase the budget and scope
  - Refine the rough list of P/Ns to in synch with needs of active JPL projects
  - Acquire parts on risk for through the common stock program
  - Modify the existing common buy approach to include labor for assurance of complex microcircuits & hybrids
- **Explore options for better leveraging current EEE parts inventory** currently reserved by projects/program office
  - Limit post launch ownership of EEE parts by the projects/ Programs
  - Apply post launch part storage fee
- **Explore alternative models to BPA including holding inventory at our distributors**
  - Conduct discussions with our distributors currently under BPA
  - It is expected that the distributors will ask for financial guarantees. Use the “Common Stock Inventory” resources to support the financial components of the BPA
- **Establish proactive relationships with key suppliers**
  - Use the refined common stock P/Ns to identify key manufacturers & suppliers
  - Retool the “learn and lunch” program to prioritize discussions with our key manufacturers
  - Conduct site visits to identify high level champions at the vendor sites

## Summary

- JPL is experiencing significant delays in lead times for many EEE part types
  - We are increasing our common stock purchases to help stabilize this situation
  - JPL is establishing supply arrangement with key distributors to facilitate parts stocking
- What is your experience with EEE parts supply and what approaches/mechanisms have you found helpful in this situation?

