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AN6708
Storage and Handling of Dynex Press-Pack Bipolar Semiconductor Devices

Application Note

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Abstract— This application note provides recommended practices for the storage, transportation, inspection, and handling of Dynex press-pack bipolar semiconductor devices. Appropriate storage and handling are essential to maintain device condition, prevent mechanical or environmental damage, and ensure reliable performance during installation and operation.

1 Introduction

Press-pack bipolar semiconductor devices are designed to deliver high electrical and thermal performance and are constructed to achieve a long operational lifetime.

The semiconductor device is housed within a hermetically sealed ceramic package, with nickel-plated copper pole faces providing low-resistance electrical connections and efficient heat transfer to the cooling system.

The ceramic housing provides mechanical protection for the internal components while ensuring electrical isolation between the pole faces.

The package is backfilled with nitrogen to protect the semiconductor device and internal contacts from moisture, oxidation, and other environmental contaminants.

Due to their robust construction and the long operational lifetimes typically expected from press-pack devices, proper storage, transportation, and handling of press-pack devices are essential to maintain performance and reliability throughout the product lifecycle.

Improper storage, transportation, or handling can result in damage to the pole faces, ceramic housing, or internal components, particularly if the integrity of the hermetic seal is compromised.

This application note provides guidance for the storage, transportation, inspection, and handling of press-pack diodes, thyristors, GTOs, and IGCTs.

Adherence to these recommendations will help preserve device condition during storage and transportation, ensure suitability for installation and operation, and maximise reliability throughout the service life of the device.

2 Key Recommendations

The key recommendations for storage and handling of press-pack bipolar semiconductor devices are summarised in **Table 1**.

Table 1. Summary of the key recommendations for storage and handling of press-pack bipolar devices.

Area	Recommendation	Avoid
Storage Environment	✓ Store in original device packaging in a clean, dry indoor environment.	× Exposure to dirt, moisture, corrosive atmospheres or direct sunlight.
Temperature	✓ Store between 5°C and 35°C.	× Extreme temperatures and rapid temperature cycling.
Humidity	✓ Relative humidity below 75%, non-condensing.	× Condensation and prolonged high humidity.
Condensation Prevention	✓ Allow devices to reach the local ambient temperature before unpacking or installing.	× Assembly or operation in high-moisture environments.
Transportation	✓ Transport devices using original packaging where possible. ✓ Ensure devices are protected from impact, vibration and excessive movement within the packaging.	× Unsecured transport of devices outside of their original packaging. × Dropping or exposure to excessive shock.
Handling	✓ Use clean gloves and support the device using the ceramic part where possible.	× Lifting the device using terminals or leads (where fitted).
Pole Faces	✓ Keep pole faces clean and free of contamination.	× Touching pole faces unnecessarily, especially with bare hands.
Pole Face Damage	✓ Protect pole faces from scratches, dents and corrosion.	× Contact with hard objects or hard work surfaces.
Pole Face Cleaning	✓ Use IPA (isopropyl alcohol) and a clean lint-free cloth.	× Use of abrasives, wire brushes or aggressive solvents.
Ceramic Housing	✓ Inspect for cracks, chips and other mechanical damage.	× Installing devices with damaged housings in a system.
Long-Term Storage	✓ Periodically inspect the packaging and device condition.	× Using devices stored for a long time without inspection.
Pre-Installation Inspection	✓ Verify correct part number, condition of contact surfaces, integrity of housing and condition of terminals/leads (where fitted).	× Installing devices with visible damage or contamination.

3 Pre-Installation Inspection

Before installation, devices should be visually inspected for signs of mechanical damage, contamination, corrosion, cracked ceramic housings, or damaged terminals or leads (where fitted).

Table 2 shows examples of damage seen during failure analysis of returned Dynex devices, with images and explanations of how the damage was caused. Following the recommendations of this application note will prevent similar damage.

If any signs of damage are identified during the pre-installation inspection, please contact your local Dynex representative for advice before installing the device.

4 Summary

Correct storage, transportation and handling practices help maintain the condition and reliability of press-pack semiconductor devices.

Particular attention should be given to protecting the pole faces, preventing moisture ingress and contamination, and avoiding mechanical damage to the ceramic housing, terminals and leads.

Table 2. Examples of damage seen during failure analysis of returned Dynex devices.

Damage and explanation	Example image
Pole face corrosion The black marks are corrosion caused by storing in an excessively humid environment.	
Bent device flange The flange of the device is bent due to improper handling. Such damage may compromise the integrity of the hermetic seal.	
Cracked ceramic housing Cracks are visible in the ceramic housing due to mechanical damage caused during storage or handling.	

Damage and explanation	Example image
Damaged terminals The gate pin has been bent due to mechanical damage. The device was not stored in its original packaging.	
Damaged terminals and leads The gate lead has been damaged, and the terminal has been pulled out of the housing due to the device being held by the leads.	

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