

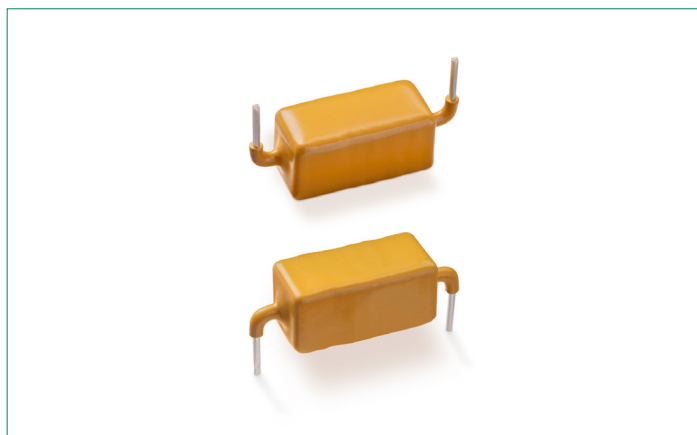
Safeguarding Aviation and eVTOL Power Systems Against DC Latch-Up Events

Overview

As aviation and eVTOL platforms increasingly utilize 270 V to 800 V DC power distribution systems, transient protection becomes a key factor in maintaining reliable operation of Solid-State Power Controllers (SSPCs) and other high-voltage semiconductor devices.

The challenge is to suppress surge-induced overvoltage without allowing clamping levels to reach conditions that can trigger latch-up. While conventional TVS devices often exhibit increasing clamping voltage with higher surge currents, FlatSuppressX™ technology delivers a more tightly controlled and stable clamping response across the surge spectrum.

By reducing transient overstress and minimizing latch-up susceptibility, FlatSuppressX™ enables designers to maximize semiconductor utilization, improve system efficiency, and maintain robust protection in next-generation aviation and eVTOL power architectures.



Features

- 6 / 8 / 10 kA (8/20 μ s pulse) surge withstand capability
- FlatSuppressX™ advanced foldback I-V technology maintains a flat, stable, and low clamping voltage
- Typical failure mode is a short condition
- Screened to MIL-STD 750 Tests and RTCA DO-160 compliance

Benefits

- Extremely high surge current protection
- Clamps voltage transients to a near-constant, low voltage, allowing designers to select lower voltage-rated semiconductors in high voltage power circuits
- No latch-up risk
- High reliability for avionic environments

Table 1. AK-FL FlatSuppressX™ HIREL TVS Products

Part Number (FlatSuppressX™ TVS)	Current Rating (kA) (8/20 μ S)	Reverse Stand off Voltage V_R (V)	Breakdown Voltage V_{BR} @ I_T (V)		Overshoot Voltage V_{ov} (V)	Maximum Clamping Voltage V_C @ I_{PP} (8/20 μ S) (V)	Test Current I_T (mA)
			Min	Max			
AK6-700C-FL	6	700	760	825	965	870	10
AK8-470C-FL	8	470	483	537	700	580	10
AK10-550C-FL	10	550	600	663	875	786	10

Applications

Product Brief

AK-FL series HI-REL TVS diodes leverage an advanced foldback/snapback I-V characteristic to maintain a near-constant, low clamping voltage during fast transients and high-energy surge events—helping designers protect sensitive power electronics while meeting the demands of modern aviation power distribution.

Figure 1. Target Applications

- Aerospace and defense 270 V–800 V DC aviation power trains
- Solid-State Power Controller (SSPC) circuits
- eVTOL and next-generation aircraft electrical systems
- DC power rail protection in high-reliability avionics



Figure 2. FlatSuppressX™ TVS Diode Transients Clamping Waveform

FlatSuppressX™ devices leverage an advanced foldback/snapback I-V characteristic to tightly control transient response while avoiding latch-up risk. This approach enables the use of lower voltage-rated components, improving design flexibility and cost efficiency.

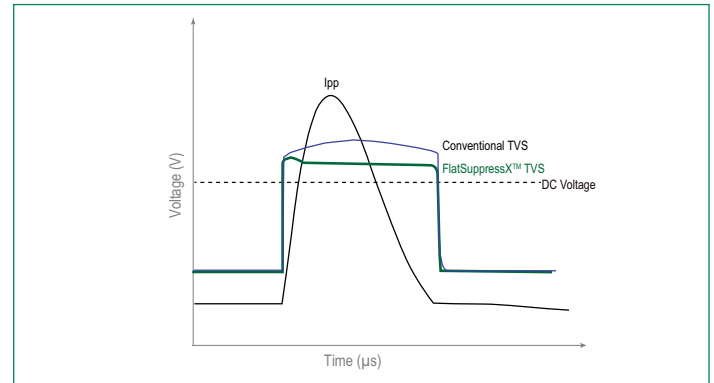
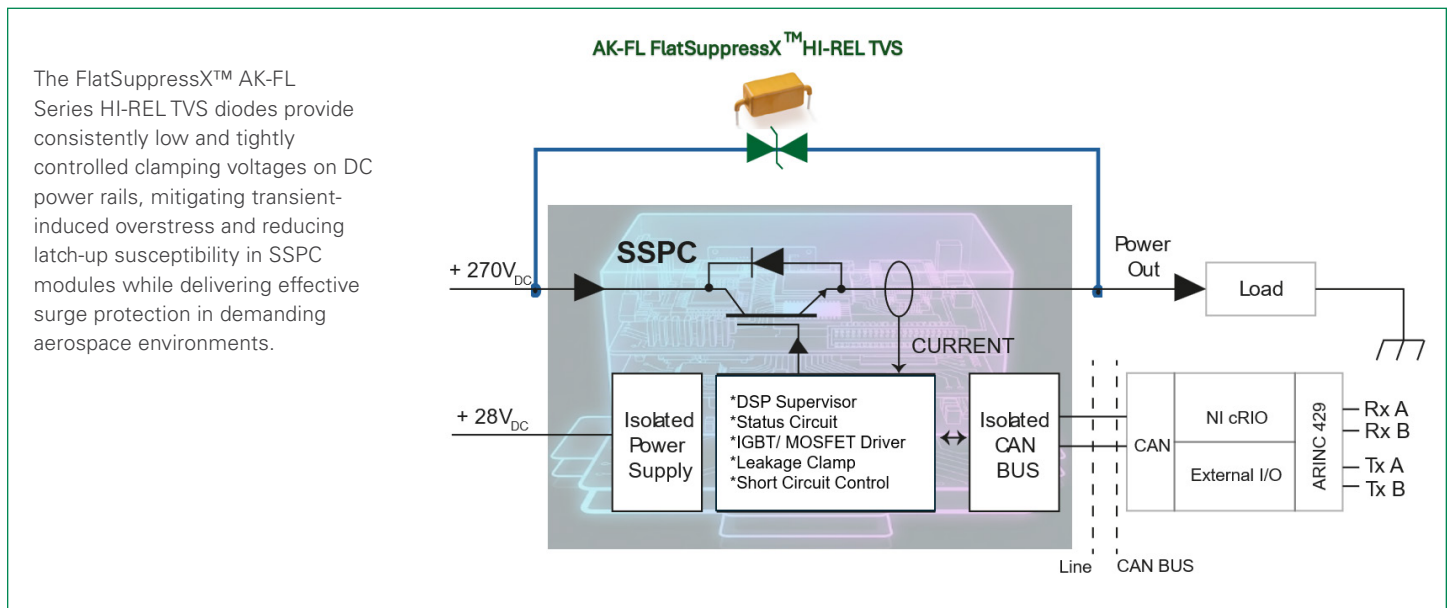


Figure 3. Example Application for SSPC Module Protection



For more information about [AK-FL](#), please reference the product datasheet on [Littelfuse.com](#).