



Open-loop faults cause the output voltage to exceed the specified maximum value. A simple latching shutdown function performed by VR1, R12 and the V pin keeps output voltage from exceeding the specified maximum. If the voltage across C10 reaches approximately 22 V, VR1 conducts and allows current to flow into the V pin. This shuts the supply down and keeps it in a latched condition until the energy stored in the bulk capacitor discharges to less than approximately 20 V.

The TOPSwitch-HX has an integrated, accurate hysteretic thermal-overload protection feature. If the junction temperature reaches +142 °C (during a fault condition), the TOP256EN shuts down. It automatically recovers once the junction temperature has decreased by approximately 75 °C.

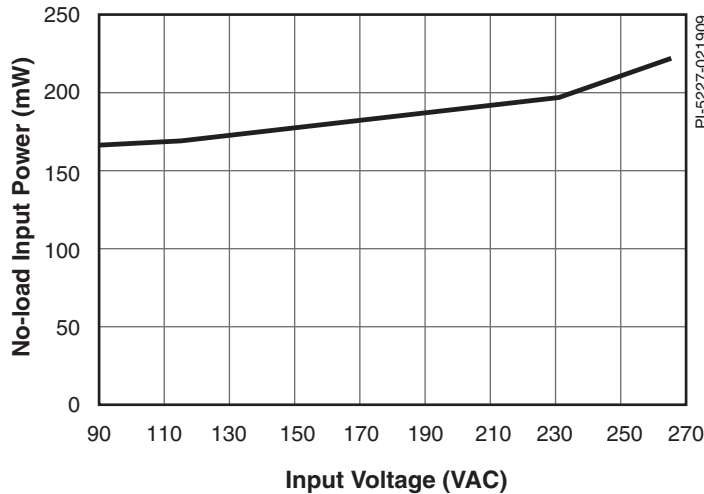


Figure 2: No-load Power Consumption.

### Key Design Points

- Power limit is independent of line voltage (via R3, R4, R9) and meets limited power source (LPS) requirements without additional circuitry.
- Maximized use of TOPSwitch-HX protection features dramatically reduces component count.
- Using a resistor with a value greater than 5 kΩ in the R12 position changes the shutdown from latching to hysteretic.

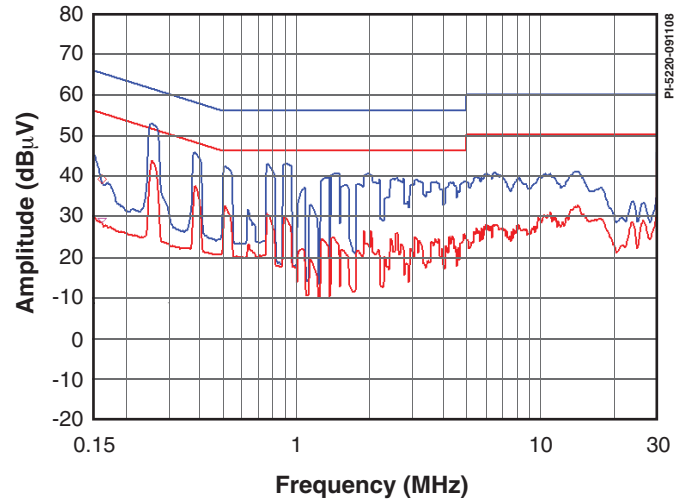


Figure 3: Conducted EMI, EN55022 B Limits: 230 VAC Input, 10 Ω Resistive Load, Output Return Connected to PE.

### Transformer Parameters

|                                   |  |
|-----------------------------------|--|
| <b>Core Material</b>              | EE25, gapped for ALG of 180 nH/t <sup>2</sup>  |
| <b>Bobbin</b>                     | EE25, 5–5 pins, Vertical   |
| <b>Winding Details</b>            | Primary 1st Half: 23T, 26 AWG<br>Shield 1: 1T, Cu foil<br>Secondary: 8T × 2, 25 TIW<br>Shield 2: 1T, Cu foil<br>Primary 2nd Half: 23T, 26 AWG<br>Feedback/Bias: 5T, 26 AWG |
| <b>Winding Order</b>              | Primary 1st (1–3), Shield (2), Secondary (9–7),<br>Shield (2), Primary 2nd Half (3–1),<br>Feedback/Bias (4–5)  |
| <b>Primary Inductance</b>         | 369 μH–406 μH  |
| <b>Primary Resonant Frequency</b> | 1000 kHz (minimum)   |
| <b>Leakage Inductance</b>         | 6 μH (maximum)   |

Table 1. Transformer Parameters. (AWG = American Wire Gauge, TIW = Triple Insulated Wire)

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