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APPLICATION NOTE 4519

Simple and Easy Power-OK Indicator Detects Under- and Over-Voltage

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Abstract: Undervoltage/overvoltage (UV/OV) indicators, also called Power-OK (POK) indicators, can notify portable-equipment users when the battery voltage is too low or the battery is being overcharged. POK indicators usually control an external FET to block the supply voltage during such faults. They're also useful as shown, as simple indicators without the FET.

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A Power-OK (POK) indicator lights an LED when the power is on and within a specified range. Also known as an undervoltage/overvoltage (UV/OV) indicator, the indicator notifies portable-equipment users when the battery voltage is too low or the battery is being overcharged.

Though it's not difficult to design a circuit for this purpose using a logic gate, two comparators, three bypass capacitors, an LED, and five resistors, the **Figure 1** circuit saves board space while lowering cost.

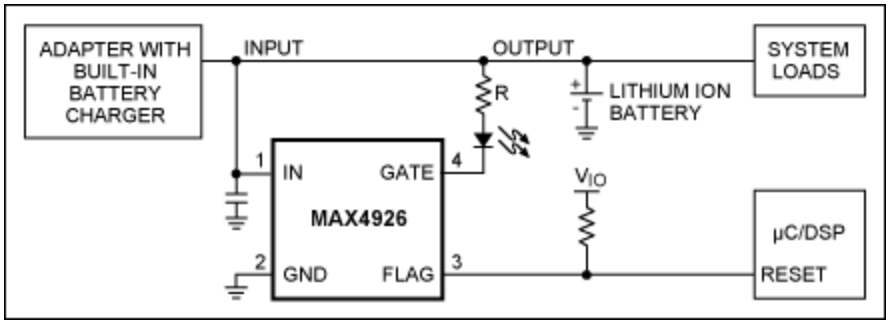

Figure 1. Residing in a 1.0mm x 1.5mm µDFN package, this IC illuminates the LED as long as the power is OK. When an under- or over-voltage condition appears, it turns off the LED and issues a warning to the µC.

Overvoltage protectors of the MAX4923–MAX4926 family usually connect the power source and load through an external p-channel FET, which is normally ON as long as the power is OK. The devices come with factory-preset voltage thresholds as listed in **Table 1**.

Table 1. UV and OV Thresholds for MAX4923–MAX4926 Protectors

Device	Package	OV Threshold (V)	UV Threshold (V)

MAX4923ELT+*	6 pin µDFN	7.18	2.44
MAX4924ELT+	6 pin µDFN	6.16	2.44
MAX4925ELT+	6 pin µDFN	5.65	2.44
MAX4926ELT+	6 pin µDFN	4.46	2.44

*Future product—contact factory for availability.

These ICs, however, can also serve as simple power-OK indicators. Use the following equation to calculate R in Figure 1: $R = \frac{V_{IN} - V_{DIODE}}{I} - R_{ON}$, where (for example) I ≤ 10mA, the typical R_{ON} at 25°C is 160Ω, and V_{IN} is the applied source voltage.

Related Parts		
MAX4926	Overvoltage Protectors with External pFET	Free Samples

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