Standard Transmissive Optoswitches

Notes On Using Slotted Switches

Effects of External Light

An IR transmitting plastic is used for the housing, providing a sealed and seamless surface in the light path. Only visible light is absorbed by the housing. Radiation with wavelengths longer than 750 nm is transmitted. Fluorescent lamps primarily produce visible light and the case provides adequate shielding for this source of stray light. However, incandescent or sunlight contains significant amounts of long wavelength light and will cause a substantial increase in collector current. For these environments, the interrupting vane should be designed to block light from the IRED, as well as shield the detector from external stray light sources. In extreme cases, the slotted photoswitch may have to be mounted in a light shielding enclosure.

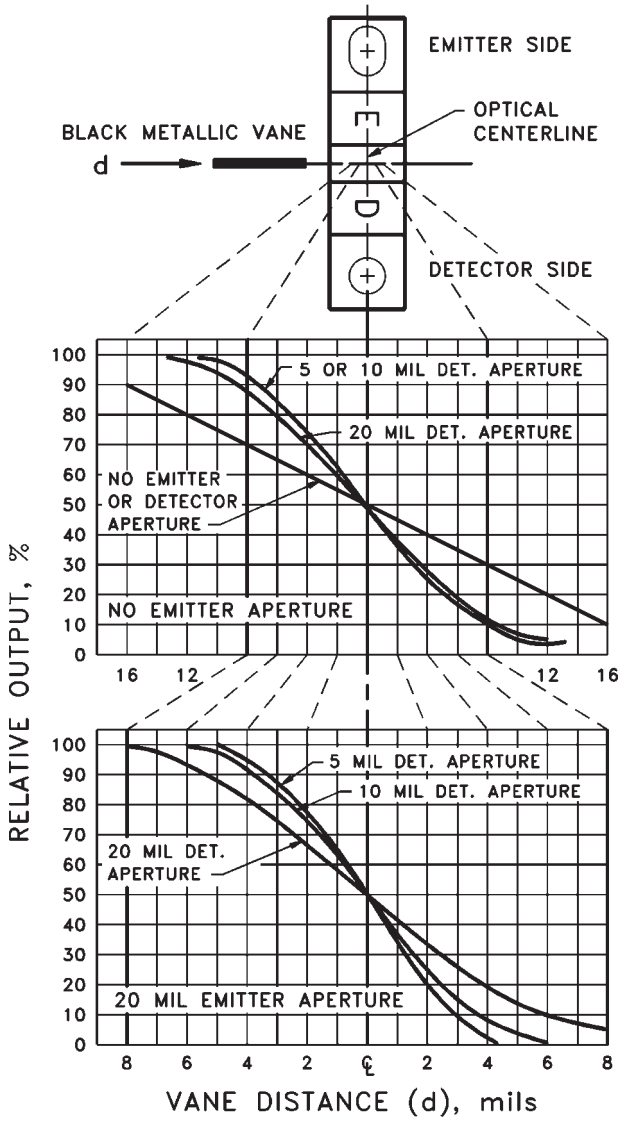
Effects of Apertures on Position Resolution

Apertures can be installed inside the case to sense vane position with higher resolution. Naturally, apertures also reduce output current signal levels. The adjacent curves show how collector current varies as a thin vane is inserted into the center of the slot of these optoswitches with no aperture, with various apertures on the detector side only, and with apertures on both emitter and detector sides.

When the vane is passed very close to the detector side, some improvement in sharpness of change in collector current is made. If the vane is close to the emitter side, performance is degraded. The major improvement in position sensitivity, $\Delta\%/\Delta d$, is obtained with apertures on both emitter and detector sides, but at the expense of decreased output signal. Position sensing resolution is only slightly increased as the aperture width is directly reduced. With very small apertures on both emitter and detector, stray light may become a significant portion of the signal. Stray light may originate from external sources or from light piping through the plastic housing. The major improvement in performance is obtained with an .020 inch aperture on the emitter side. Additional marginal improvements are obtained by adding smaller apertures on the detector side. When apertures are used on both the emitter and detector sides, performance variations as the interrupting vane or wheel wobbles from side-to-side in the slot are minimized.

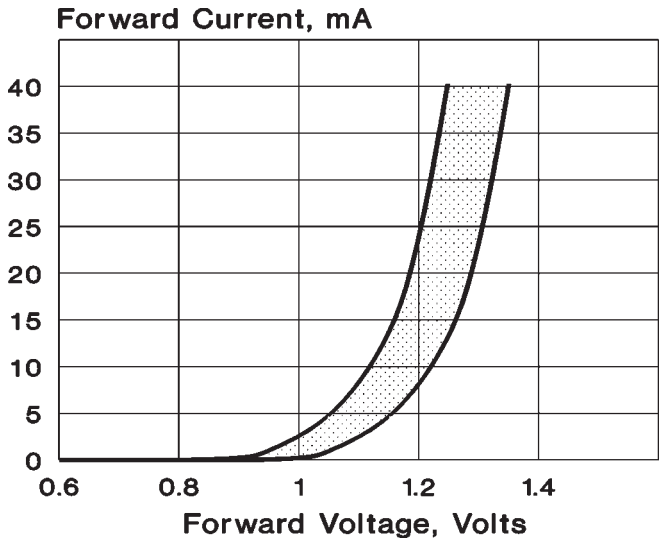
Response Time

Response time is determined by the output device. The more sensitive switches have higher sensitivity transistors which have slower response as is shown in the response time graphs. The response is much slower with high value load resistors. To provide a suitable low resistance termination for fastest response, use an external NPN transistor for current gain. Quoted response time curves are for non-saturated switching.



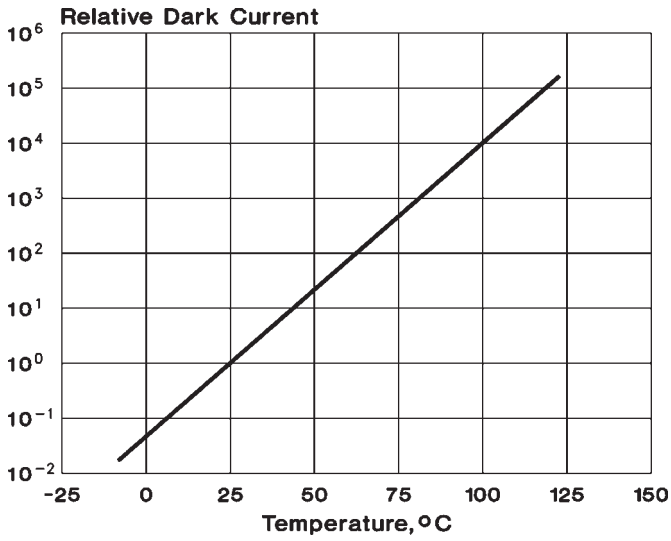
Typical Performance Curves

LED Forward Voltage Drop



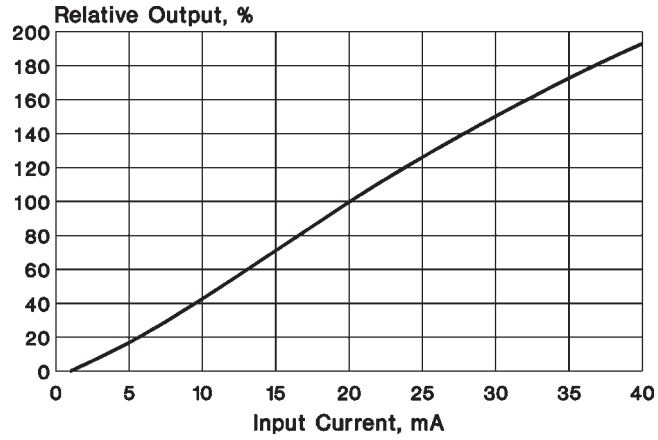
Dark Current vs. Temperature

(Referred TO 25°C)



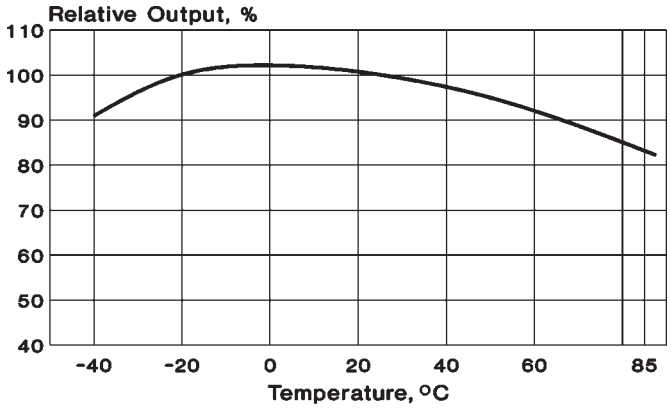
Relative Output vs. Input Current

(Referred TO 20 mA Input Current)



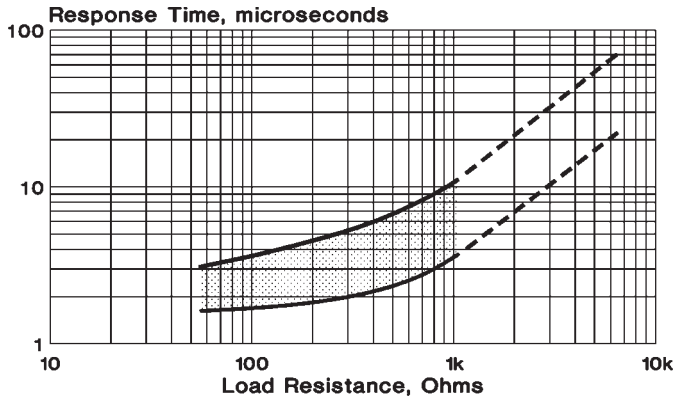
Output Current vs. Temperature

(Referred TO 25°C)



Typical Performance Curves (cont.)

Response Time vs. Load Resistance (VTL11D & VTL13D)



Response Time vs. Load Resistance (VTL23D)