Temperature Control
An NTC thermistor can be used for temperature control (off/on) using á minimum amount of circuitry.

Temperature Compensation
In many cases, circuit precision requires that there is some sort of temperature compensation. Oscillators, LCD displays, a battery under charge and some amplifiers are some examples of circuits that may require temperature compensation.

Inrush Current Limiter
An NTC disc thermistor subjected to a change in power will experience a time lag before reaching a lower resistance. This time lag can be utilized to limit the inrush surge current (the larger the part, the greater the lag).

Fluid Level Applications
The thermistor can be used to sense the presence or absence of a liquid by using the difference in dissipation constants between a liquid and a gas.

PTC THERMISTORS

The PTC Thermistor is generally a polycrystalline ceramic material composed of oxyalate or carbonate with added dopant materials. The PTC thermistor exhibits only a slight change of resistance with temperature until the "switching point" is reached at which point an increase of several orders of magnitude in resistance occurs.

PTC THERMISTOR APPLICATIONS

Overcurrent Protection
When a fault condition occurs, the PTC thermistor will heat up causing it to switch from a low to a very high resistance.

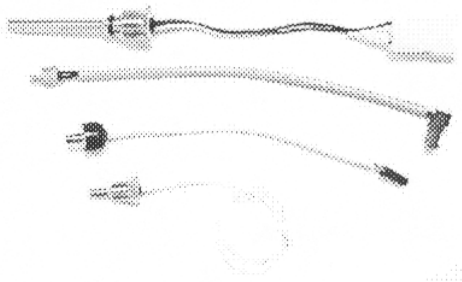
Electronic Ballast Design
PTC thermistors are used in electronic ballast systems as a time delay element when the circuit is energized.

Motor Starting
With a PTC thermistor in series with the starting windings in a single phase electronic motor, the PTC acts as a time delay.

Battery Management
As a rechargeable battery becomes fully charged, it's temperature increases and the PTC resistance increases rapidly reducing the charge to a very low level.

Linear PTC Thermistor
The relatively recent development of the linear PTC utilizes a thick film technology similar to the thick film resistor. The linear relationship between temperature and resistance simplifies the designer's task in that the characteristic non-linear curve needs no normalization.

Thermistor Assemblies
Thermistor assembly probes are available in a wide variety of configurations. The choice of assembly mounting, housing, etc., is dependent on the application. Primary factors that determine configuration of a thermistor assembly is operating environment, method of mounting and thermal time response. For specialized applications Vishay Dale offers a custom design service which allows the customer to advance from conception to design, manufacture and installation. Typical thermistor assemblies are shown below.



THERMISTOR TERMINOLOGY

Thermistor — a thermally sensitive resistor in which its primary function is to exhibit a change in electrical resistance with a change in body temperature.

Standard Reference Temperature — the thermistor body temperature at which nominal zero-power resistance is specified (25°C).

Zero-Power Resistance — is the DC resistance value of a thermistor measured at a specified temperature with a power dissipation by the thermistor low enough that any further decrease in power will result in not more than 1.0 percent (or 1/10 of the specified measurement tolerance, whichever is smaller) change in resistance.

Resistance Ratio Characteristic — identifies the ratio of the zero-power resistance of a thermistor measured at 25°C to that resistance measured at 125°C.

Negative Temperature Coefficient (NTC) — an NTC thermistor is one whose zero-power resistance *decreases* with an increase in temperature.

Positive Temperature Coefficient (PTC) — a PTC thermistor is one in which the zero-power resistance *increases* with an increase in temperature.