



# APPLICATION MATRIX

## THERMISTORS / VARISTORS



		PRODUCT TYPE / SERIES									
		NTC <sup>(1)</sup>				RTD		PTC		Varistor	
		NTCS	NTCC	NTCLE	NTCA	PTS	TFPT	PPTC	PTC	VDR	MLV
MARKET SEGMENT	APPLICATIONS										
<b>Automotive</b> Hybrid (HEV) and Full Electric (EV)  	<b>Electric Motor Drives / Inverters</b> (DC/AC)										
	<b>Battery Management Systems</b> (DC/DC)										
	<b>On- and Off-Board Charging / Plugs</b> 										
	<b>Exterior Lighting</b> (LED daylights, fog lights, headlights, signals)										
	<b>Safety Systems</b> (Airbag, ADAS, braking / stability control, tire monitoring, LiDAR)										
	<b>Body Electronics</b> (Comfort / HVAC, infotainment, interior lighting, latch controls, seating, gesture controls)										
<b>Industrial</b>  	<b>Factory Automation</b> (Motor drives, lasers, robotics, LVPS, process controls, test and instrumentation)										
	<b>Fabrication</b> (Welding, cutters, 3D printing, power tools)										
	<b>Lighting</b> (Industrial LEDs, lighting ballasts)										
	<b>Appliance</b> (HVAC, refrigeration, water heaters, pumps, drinking systems, elevators, garages)										
	<b>Meters</b> (Electrical, water, gas, payment systems)										
	<b>Detection and Initial Safety Devices</b> (Gas, fire, thermostat, liquid level, fault indication, concrete sensors, fracking detonation)										
	<b>AI Infrastructure</b> (Liquid cooling systems, server racks, power conversion / cabling, battery backup)										
<b>Healthcare</b>  	<b>Imaging Systems</b> (X-ray, CT, MRI)										
	<b>Implantable</b> (Cardiac pacing, nerve stimulation, non-life saving / sustaining)										
	<b>Portable Medical</b> (Defibrillators, CPAPs, oxygenators, irrigation tools, hypothermia devices, radiation)										
	<b>Patient Monitoring</b> (Analysis equipment, incubators, body temperature probes, sensors)										
	<b>Medical Appliances</b> (Refrigeration, heating)										
	<b>Meters</b> (Blood glucose, wearables)										

Note  
<sup>(1)</sup> Customization options available; minimums apply

**Accelerating Product Design Cycles**
Vishay's Design Tools Complemented With Excellent Technical Support Allow Engineers to Cost-Effectively Prove Out Design Concepts Through Simulation
 Design Tools
 SPICE Models
 3D Models



# APPLICATION MATRIX

## THERMISTORS / VARISTORS



		PRODUCT TYPE / SERIES								
		NTC <sup>(1)</sup>				RTD		PTC		Varistor
MARKET SEGMENT	APPLICATIONS	NTCS	NTCC	NTCLE	NTCA	PTS	TFPT	PPTC	PTC	VDR MLV
<b>Consumer</b> 	<b>Wearable / Consumer Electronics</b> (Smart watches, fitness bands, e-cigarettes, alcohol testers)									
	<b>Home Entertainment / Automation</b> (Set-top boxes, audio, security systems, smart home (thermostat, lighting, etc.))									
	<b>Toys / Outdoor Equipment</b> (Remote controlled vehicles, tools, battery packs / chargers, fish finders)									
	<b>e-Bikes / Scooters</b>									
	<b>Home Appliances</b> (HVAC, cookers, laundry, refrigeration, countertop appliances, water heaters, pools / spas)									
	<b>Robotic Appliances / Domestic Robots</b> (Robotic vacuums, lawnmowers, companions)									
	<b>Lighting</b> (LED, OLED displays, conventional lighting controls)									
<b>Alternative Energy</b> 	<b>Photovoltaic</b> (Sensor modules, junction boxes, meters, monitoring)									
	<b>Wind</b> (System control units, backup safety systems)									
	<b>Electrical Power Distribution / Grid Stabilization</b> (Smart grids)									
	<b>Thermal Systems</b>									
	<b>Battery Systems</b>									
	<b>Inverters</b>									
<b>Aerospace and Defense</b> 	<b>Satellite / GPS</b> (Electric motors, gearbox controls, battery systems, gyro navigation, communication)									
	<b>Airborne Systems</b> (Engine control units, braking, fuel / oil, battery systems, weapon fusing, radar)									
	<b>Cockpit / Avionics</b> (HVAC, flight controls, latch controls, fire control, infotainment, interior lighting)									
	<b>UAVs / Drones</b> (Engine control units, electric motors, flight controls, battery systems)									

Note  
<sup>1)</sup> Customization options available; minimums apply

**Accelerating Product Design Cycles**
Vishay's Design Tools Complemented With Excellent Technical Support Allow Engineers to Cost-Effectively Prove Out Design Concepts Through Simulation
 Design Tools
 SPICE Models
 3D Models