



Passive Components Product and Application Guide

Resistors for Industrial Machinery
and Electric Drives

Resistors for Industrial Machinery and Electric Drives

Wire wound

Traditional design, consisting of resistance wire wrapped around a ceramic core. Robust, cheap, and with a relatively high element mass, wire wound elements provide excellent value due to their ability for withstanding high currents and absorption of large energy pulses. These resistors are available in a variety of sizes and are suited to applications where high short term overload capacity or very high power ratings are required.

Suitable Applications:

- Braking
- Inrush Limiting
- Crowbar
- Pre-Charge
- Capacitor Discharge

Preferred Product Types:

C • CFH • CJB • CJS • ER • ES • HS/THS • LOAD BANK
MRF • R3000 • R5000 • SBC • SM • SQ • TT/TK

Thick Film

Thick Film resistive elements consist of a metal and glass films printed onto a flat or tubular ceramic surface. Offering very low inductance values, these elements can be manufactured with a wide resistance range then laser trimmed to a high degree of accuracy. Benefits of this technology are the high thermal efficiencies allowing the resistor to have a higher power density compared with conventional wire wound elements.

Suitable Applications:

- Balancing Resistors
- Snubbing

Preferred Product Types:

BDS • HB • HH • HJ • HVR • MPC • MPT • RGP
3520 • PCR • RL73 • RH73

Thin Film

A sputtered film of metal alloy deposited onto a ceramic surface. Commonly used in the manufacturing of precision resistors. Suited to high specification or technically demanding circuits whilst offering excellent thermal efficiency.

Suitable Applications:

- Inrush Limiting
- Snubbing

Preferred Product Types:

HOLCO • MPR • RGP • RP73 • RN73 • CPF • RR • ROX

Foil

The element is formed by Etching or Punching a metal alloy into a serpentine shape which is then enclosed into a Resistor package. This technology has a high element mass enabling it to withstand high energy pulses whilst offering good thermal efficiency and low inductance. Foil elements offer a robust solution but are limited in resistance value.

Suitable Applications:

- Braking
- Inrush Limiting
- Snubbing

Preferred Product Types:

BDF • HL • OS • OP • R3000 • R5000
SBL • SL • TLR • YP

Carbon Composition / Ceramic Composition

Consisting of either a bulk Carbon or Ceramic core, this technology is used when protection is required from high energy pulses.

Suitable Applications:

- Inrush Limiting
- Protection

Preferred Product Types:

CBT • CCR

Product / Application Guide

Family	Technology	Key Features	Pre-Charge / Discharge	Inrush Limiting	Crow Bar	Balancing	Current Sense	Braking	Snubber
BDF	Foil	400W Isotop							•
BDS	Thick Film	100W - 600W Isotop				•			•
C	Wirewound	3 - 4W Vitreous	•	•		•			
CBT/CCR	Carbon/Ceramic	1/4 - 2W Pulse Withstand		•					
CFH	Wirewound	350 - 2200W Aluminium Housed		•	•			•	
CJB	Wirewound	100 - 1000W Mineral Filled						•	
CJS	Wirewound	175 - 1000W Mineral Filled			•			•	
ER/ES	Wirewound	0.5 - 14W Silicone	•	•		•		•	
HB	Thick Film	High Voltage Planar				•			•
HH/HJ	Thick Film	High Voltage				•			
HL	Foil	1W Current Sense					•		
HOLCO	Thin Film	0.25 to 1W Precision		•					•
HS/THS	Wirewound	5W to 300W Aluminium Housed	•	•	•			•	
HVR	Thick Film	Up to 50KV High Voltage Tubular				•			
LOAD BANK	Wirewound	Customised Load Bank			•			•	
MRF	Wirewound	300 to 1300W Low Profile		•					
MPC	Thick Film	3 - 10W Planar		•					•
MPR	Thin Film	20W T0220 Radial				•			•
MPT	Thick Film	20W - 100W Radial		•		•			•
OP	Foil	5W Current Sense					•		
OS	Foil	Low Ohm Shunt					•		
R3000	Wirewound	1000W				•			
R5000	Wirewound/Foil	250W Low Profile						•	•
RGP	Thick Film	0.25W High Ohmic				•			•
RL73	Thick Film	SMD Current Sense					•		
RN73 / RP73	Thin Film	SMD Precision Chip		•					•
RR/ROX	Metal Film/Oxide	1 - 7W High Power	•			•			•
SBC	Wirewound	4 - 40W Ceramic Cased	•	•				•	
SBL	Foil	4 - 5W Current Sense					•		•
SL	Foil	0.25W to 2.5W Current Sense					•		
SM	Wirewound/Oxide	1 - 5W Moulded Power Chip	•	•			•		
SQ	Wirewound/Oxide	2 - 40W Ceramic Cased	•	•				•	
TLR	Foil	0.5 to 3W Current Sense					•		•
TT/TK	Wirewound	10 - 1000W Tubular	•	•	•				
YP	Wirewound	8 - 10W Capacitor Discharge	•						



Foil Technology



Wirewound Technology

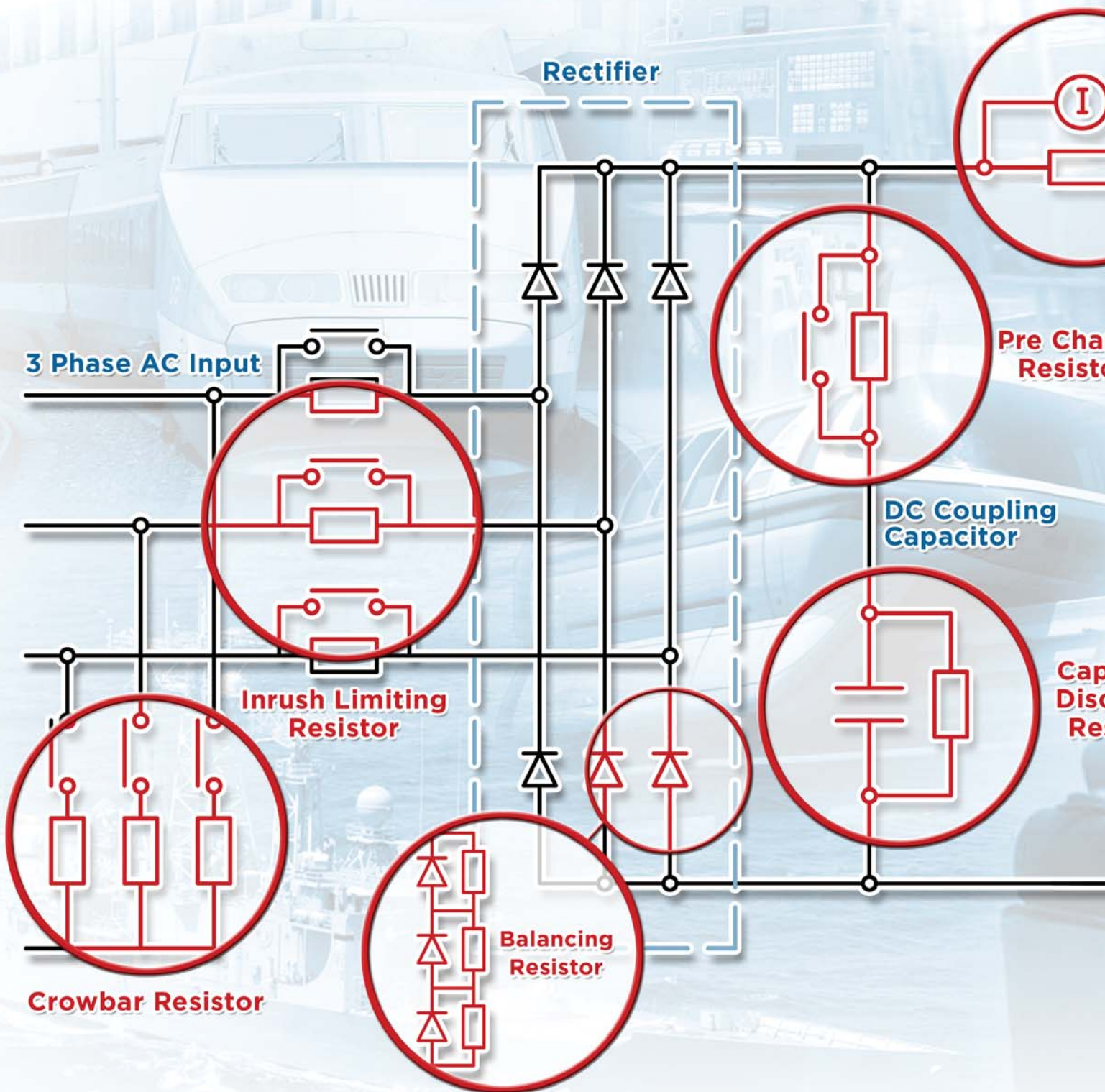


Thick Film Technology

Resistors for Industrial Ma

Electric drive circuits are used to convert alternating current into direct current, and then back to alternating current again.

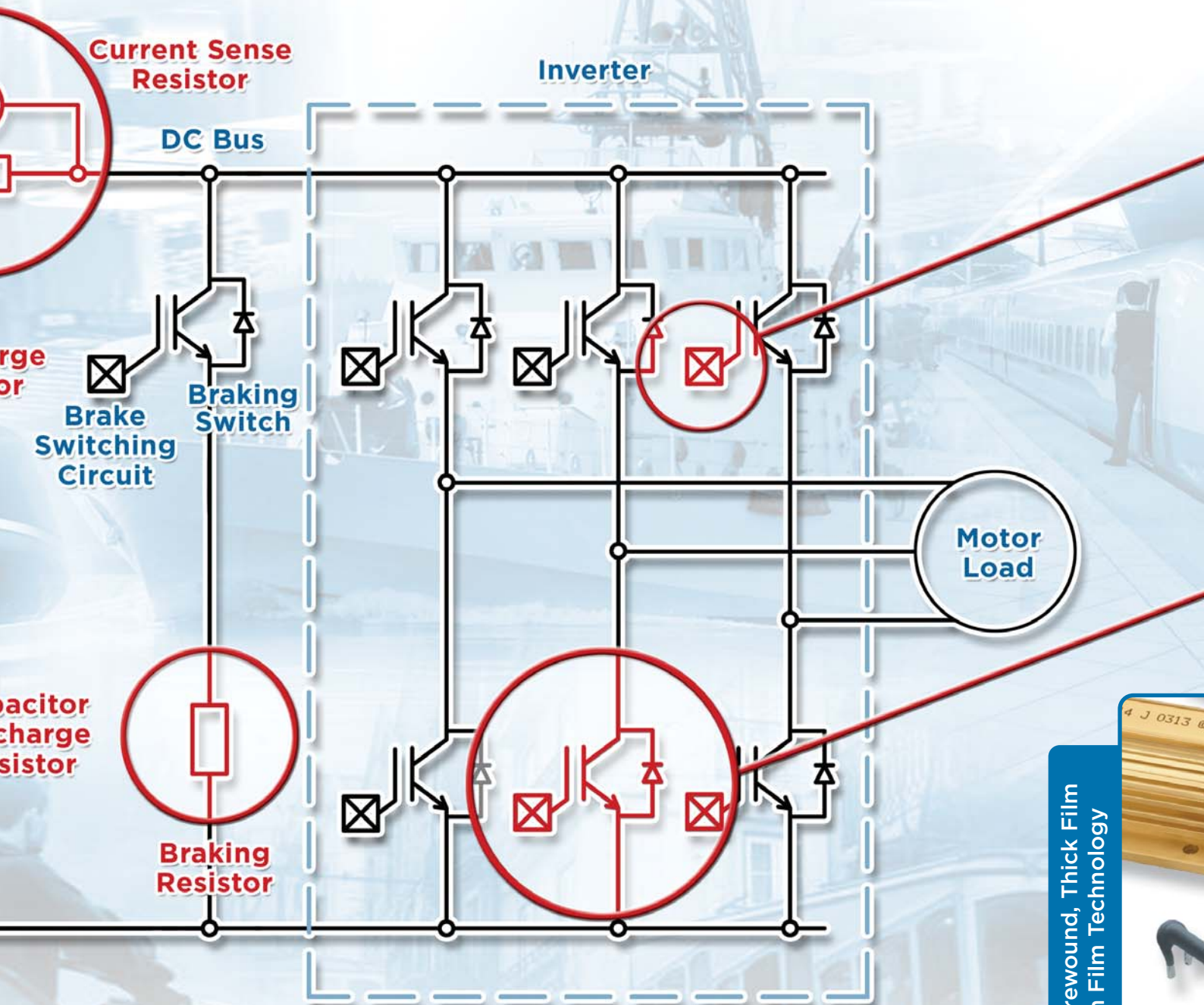
Found in a wide range of applications, they are useful when converting electric power from one frequency to another, and are especially



Machinery and Electric Drives

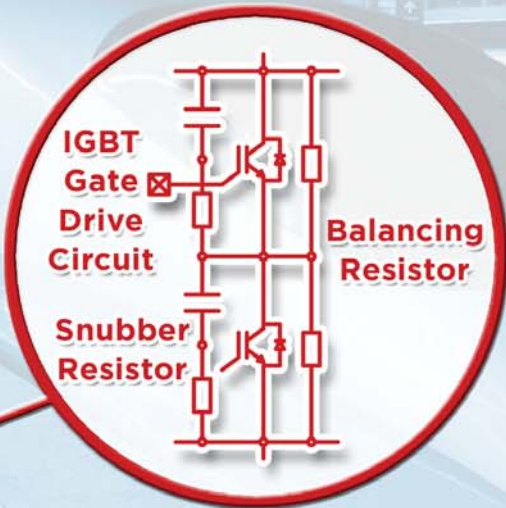
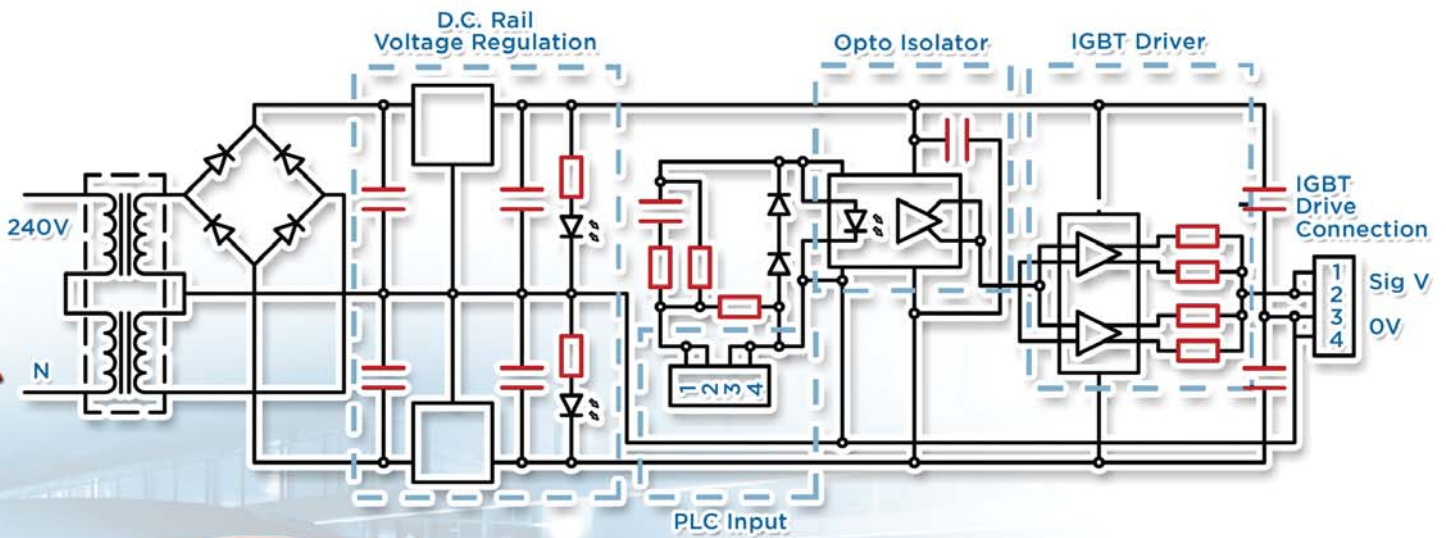
advantageous when a high degree of control over the output is required. Tyco Electronics resistors can be found in drives across the world, from the

marine environment, including Navy Warships, to trains, conveyor belts, CNC machines, electric vehicles, lifts, and much more.



Foil, Wirewound, Thick Film
& Thin Film Technology

Product / Application Guide



Gate Circuit Component Guide

Family	Technology	Key Features
3520	Thick Film	1W SMD Power
C	Wirewound	3 - 14W Vitreous
CBT/CCR	Carbon/Ceramic	1/4 - 2W Pulse Withstand
CPF	Thin Film	SMD Semi Precision Chip
ER/ES	Wirewound	0.5 - 14W Silicone
HL	Foil	1W Current Sense
HOLCO	Thin Film	0.25 to 1W Precision
HS/THS	Wirewound	5W to 300W Aluminium Housed
MPC	Thick Film	3 - 10W Planar
MPR	Thin Film	20W T0220 Radial
MPT	Thick Film	20W - 100W Radial
OP	Foil	5W Current Sense
OS	Foil	Low Ohm Shunt
PCR	Thick Film	SMD Pulse Withstand
RGP	Thick Film	0.25W High Ohmic
RH73	Thick Film	SMD High Ohmic Chip
RL73	Thick Film	SMD Current Sense
RN73 / RP73	Thin Film	SMD Precision Chip
RR/ROX	Metal Film/Oxide	1- 7W High Power
SBC	Wirewound	4 - 40W Ceramic Cased
SBL	Foil	4 - 5W Current Sense
SL	Foil	0.25W to 2.5W Current Sense
SM	Wirewound/Oxide	1- 5W Moulded Power Chip
SQ	Wirewound/Oxide	2 - 40W Ceramic Cased
TLR	Foil	0.5 to 3W Current Sense
TT/TK	Wirewound	10 - 1000W Tubular
TYT / TYE	Capacitors	Tantalum / Aluminium Electrolytic



As a leading manufacturer of passive components, Tyco Electronics serves a wide range of sectors with both standard and custom-designed solutions. Core markets are industrial machinery, instrumentation, medical and commercial building equipment. Key technologies are thick film, thin film, wire-wound and foil technology.

These core processes can be adapted to achieve solutions both as standard components or specific to a customer's design requirements.

Tyco Electronics Passives core product offering for the industrial machinery market include:

Precision Resistors

- SMD and leaded high reliability and stability products
- Thin Film and Wirewound technologies
- SMD range of products is a market leader
- Flexibility in MOQ and pack size
- Quick Turnaround (Typical lead time <6 weeks)
- Accuracy to +/- 0.01% and 5ppm

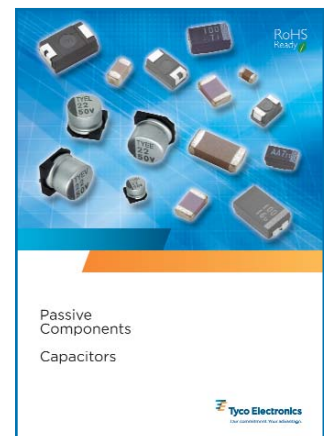
Power Resistors

- Power ratings from 1W to > 1KW
- Range of technologies including - Wirewound, Thick and Thin Film, Foil, Carbon and Ceramic Composition
- In house Design and Test facilities for development of specification driven products
- Customisation capabilities of standard products
- Supported by wide range of commodity Power Resistors
- Capabilities for current Sensing across a wide range of products/technologies
- Current Sense resistors from 0.5 milliohm, TCR's and Tolerances of 50ppm and 1%
- New SMD product series (TLR) offer power ratings to 3W

The experienced design team works closely with our customers' engineering personnel to design advanced products meeting their exact requirements. We also offer 3D visualisation of the product so our customers' engineers have an understanding of what the product will look like from the start of the project.

The customisation and development programme includes in-house product testing in our own R & D laboratory. Tests can be designed in conjunction with customer specifications to include cyclic rated power and overload testing, adiabatic (single shot and frequency) testing, environmental, mechanical and repetitive pulse testing. Qualification testing is carried out to a proven procedure and the product development stages are well documented and approved by a design approval team.

Related Literature



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