



Fixed Resistors

Product Data Short Form



Belief in Technology

TT electronics plc is a global electronics company. Within its electronic components group are multiple manufacturing facilities for fixed resistors and dedicated engineering teams providing custom solutions.

Welwyn Components, IRC and BI Technologies are three market leading companies within this group, each with a 70-year track record of resistive component innovation.

TT electronics offers the full spectrum of resistor technologies and a broad standard product range, in addition to providing custom engineered solutions.

Medical Application

A manufacturer of portable automatic external defibrillators (AEDs) needed a compact high voltage resistor for use in the charge regulation circuit. Standard products from other sources were proving unreliable under conditions of sustained high humidity and high voltage loading. The precision and stability with time and temperature were critical as they directly impact the tight error budget for delivered energy dosage. TT electronics engineers solved this problem with a planar resistor with optimised thick-film element design and a high integrity epoxy coating and supported the customer through their rigorous approval process.

Other innovations in this area include pulse withstanding chip resistors for monitor circuit protection and a 200J energy dump resistor based on reinforced wirewound technology to enable daily self-test diagnostic cycles.



Aerospace Application

A designer working on an anti-ice aircraft surface heating system had to meet stringent safety requirements in the event of failure of a heating circuit. The failure mode to be mitigated was an "always on" condition, and this called for a single shot disconnection switch. TT electronics engineers were contacted to help identify a solution, but nothing was available off the shelf. A set of potential solutions was proposed and the preferred option was a combination of self-switching resistive heater and thermal fuse. This was developed from concept into a fully qualified component within the required timescale. The compact format of the design also contributed significantly to the customer's mass reduction target.



Consumer Application

Safety is becoming increasingly important in consumer products and a key aspect is protection against fire by the use of fusing line input resistors. With one component it is possible to reduce inrush current, protect against power line surges and give flameproof circuit opening under fault conditions. One company working in this area had a further need for fusing to be inaudible and invisible to the consumer.

TT electronics devised a solution using a wirewound resistor with impact absorbing coating which contains the fused element without fragmenting. Other innovations include the offer of UL1412 recognised fusing resistors.



Industrial Application

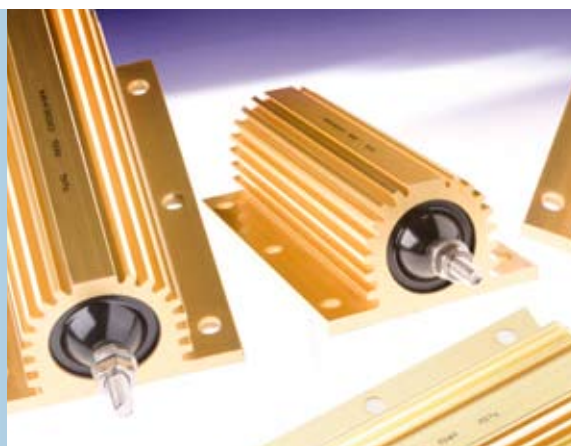
High-end industrial circuit breakers need to give reliable long-term performance under harsh conditions. In particular, transient surges caused by switching of inductive loads present a challenge. When a designer of industrial circuit breakers needed to modernise a design to SMT format, a through-hole wirewound protection resistor was proving hard to replace without filling a very large area with chip resistors. TT electronics developed a solution whereby an axial part is leadformed and packed in blister tape. The resulting “Z-form” component can be picked, placed and reflowed as an SMT part.



Using the Short Form

1. Choose the right technology - page 3
Find the best resistor technology for the set of features your design needs
2. Choose the right product series - pages 3 & 4
Use the SMT and Through Hole selector guides to identify a series which has the required ratings, precision and value range
3. Choose the right product type - pages 5 to 16
Refer to product tables to select the correct size and link to further data

Or, if you know the product series, use the Quick Find index.

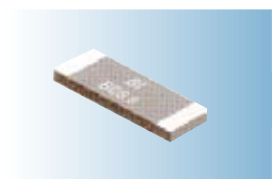


Quick Find

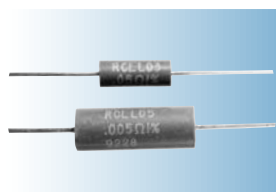
Series	Page	Series	Page	Series	Page	Series	Page
1600/1900	9	HVC	7	PFC-HF	15	ULR	6
3810	6	HVP	7	PFC-HT	15	ULW	14
4500	6	LHVC	7	PFC-A	13	VRW	8
4530	6	LOB	5	PFC-D	13	W20	11
4800	12	LRCS	5	PHVD	7	W30	9
BCS	5	LRF	5	PHVP	8	WA80Z	11
BHPR	9	LRF3W	5	PLO	6	WA84F	14
BPC	10	LRZ	16	PR	13	WBC	14
BPR	10	MAR	12	PTCR	15	WCR	16
CAR	12	MFP	10	PWC	9	WDBR	11
CC	8	MFR	15	PWRL	6	WH	11
CHP	8	MFR4P	16	RC	13	WHPC	12
CR	15	MF-S	10	RCP	13	WHVL	8
CRT	16	MH	7	RTD	15	WL4	16
DSC	9	MHP	10	SC3	10	WMO-S	12
EMC	14	OAR	5	SMHP	10	WNCR	16
F	6	OARS	5	SMP	11	WP-S	9
FCR	14	OLV	5	SOT143	13	WPYP	8
FM	14	PCF	13	SOT23	13	WRM	14
FN	14	PCFH	13	SQM	11	WSM	12
GC	7	PCFP	13	SQP	11		
GCF	16	PCR	13	T	8		
HR	7	PFC	15	TD4	15		

Current Sense

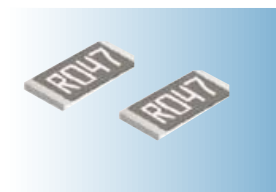
BCS Series		8W Current Sense Metal Alloy Resistors				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, h, t
BCS8	8	R0005 - R01	1, 5	-	50	12.8, 6.4, 2.5
Datasheet - http://www.bitechnologies.com/pdfs/BCS.PDF						



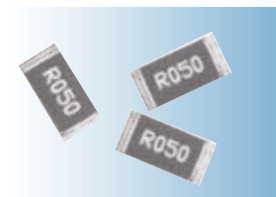
LOB Series		Low Resistance Metal Element Resistors				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, Dia
LOB-1	1	0.005 - 0.1	1 - 5	-	-	9.9, 3.6
LOB-1	1	0.005 - 0.1	1 - 5	-	-	9.9, 3.6
LOB-1	1	0.005 - 0.1	1 - 5	-	-	9.9, 3.6
Datasheet - http://www.welwyn-tt.com/pdf/datasheet/LOB.PDF						



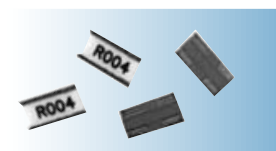
LRCS Series		Small Size Low Value Chip Resistor				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, w, h
0402	0.063	R05 - 1R0	1, 5	-	200 - 400	1, 0.5, 0.32
0603	0.1	R02 - 1R0	1, 5	-	200 - 600	1.6, 0.8, 0.45
0805	0.125, 0.25	R02 - 1R0	1, 5	-	200 - 600	2, 1.25, 0.55
Datasheet - http://www.welwyn-tt.com/pdf/datasheet/LRCS.pdf						



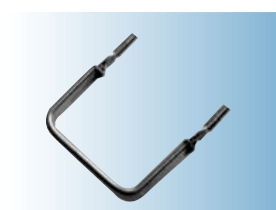
LR (F) Series		Low Value Flat Chip Resistor				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
1206	0.5	0R003 - 1R	1, 2, 5	-	±100	3.2, 1.63, .8
2010	1.0	0R003 - 1R	1, 2, 5	-	±100	5.23, 2.64, .8
2512	1.5/2.0	0R003 - 1R	1, 2, 5	-	±100	6.5, 3.25, .8
Datasheet - http://www.welwyn-tt.com/pdf/datasheet/LRC-LRF.PDF						



LRF3W Series		Low Range 3 Watt SMT Chip Resistor				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
LRF3W	3	0R003 - 1R	to ±1%	50	±100	3.25, 6.5, 0.9
Datasheet - http://www.welwyn-tt.com/pdf/datasheet/LRF3W.PDF						



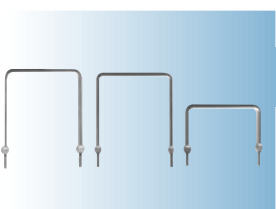
OAR Series		Open Air Sense Resistors				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
OAR-1	1	0R005 - 0.10	1, 5	-	to ±20	11.43, 1.65, 8.26
OAR-2	3	0R005 - 0.10	1, 5	-	to ±20	15.24, 1.65, 28.58
OAR-3	5	0R005 - 0.05	1, 5	-	to ±20	20.32, 1.65, 28.58
Datasheet - http://www.welwyn-tt.com/pdf/datasheet/OAR.PDF						



OARS / OARS-XP Series		Surface Mount Sense Resistors				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
OARS1	2	0R003 to 0R050	1	-	±20	11.18, 3.175, 3.05
OARSXP	4	0R001 to 0R025	1, 5	-	±20	12, 6.4, 4.6
Datasheet - http://www.welwyn-tt.com/pdf/datasheet/OARS.PDF						
Not for sale in Germany						

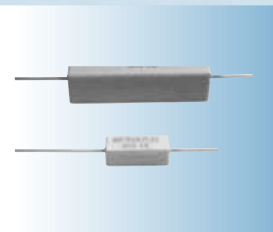


OLV Series		Alloy Wire Shunt Resistors				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Pitch, h
OLV1*	1	0R005 - 0R1	5	-	100	11.4, 7.6
OLV2*	2	0R005 - 0R1	5	-	100	12.7, 15
OLV3*	3	0R005 - 0R1	5	-	100	15.2, 22.9
* In development						



PLO Series		Low Resistance Power Wirewound Resistors				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
PLO-3	3	R005 - R18	1, 2, 3, 5, 10	-	30 - 500	22.4, 7.87, 7.87
PLO-5	5	R005 - R18	1, 2, 3, 5, 10	-	30 - 500	22.4, 9.65, 8.89
PLO-7	7	R01 - R18	1, 2, 3, 5, 10	-	30 - 500	35.3, 9.65, 8.89
PLO-10	10	R01 - R18	1, 2, 3, 5, 10	-	30 - 500	47.8, 9.65, 8.89

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/PLO.PDF>



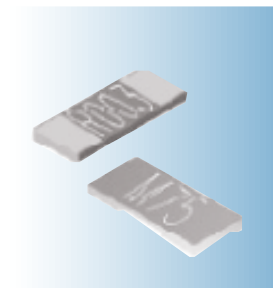
PWRL Series		Low Resistance Stand-up Power Wirewound Resistors				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
PWRL	3, 5, 7, 10	OR01 - OR18	1, 2, 3, 5, 10	-	50 - 500	25.4, 12 (3W)

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/PWRL.PDF>



ULR Series		Metal Strip Current Sense Resistors Surface Mount				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
ULR1S	1	R001 - R01	1, 5	-	50	3.2, 1.6, 0.6
ULR1	1.0	R0005 - R015	1, 5	-	50, 75, 100, 150	6.4, 3.2, 1.4
ULR15S	1.5	R001 - R01	1, 5	-	50	5.1, 2.5, 0.6
ULR2	2.0	R0005 - R01	1, 5	-	50	6.4, 3.2, 1.4
ULR25	2.5	R0035 - R006	1, 5	-	50	6.4, 3.2, 1.4
ULR3	3.0	R0005 - R003	1, 5	-	50, 75, 100	6.4, 3.2, 1.4

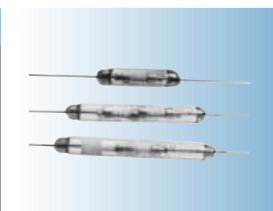
Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/ULR.PDF>



High Value / Voltage

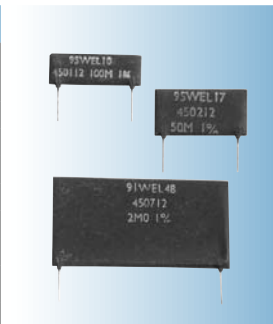
3810 Series		Ultra-High Value Precision Resistors				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
3810	-	100M - 1T	10, 20	500	-500 to -3500	25, 6
3811	-	100M - 1T	1, 2, 5, 10	1000	-500 to -3500	42.9, 6
3812	-	1T - 100T	2, 5, 10	1000	-500 to -3500	48, 6

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/3810.PDF>



4500 Series		High Voltage Planar Resistors				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
4501	1	20K - 500M	1, 2, 5	10000	100, 150	25.7, 2, 9
4502	1.7	36K - 750M	1, 2, 5	10000	100, 150	25.7, 2, 13
4503	2	36K - 750M	1, 2, 5	15000	100, 150	38.7, 2, 9
4504	3	62K - 1G	1, 2, 5	15000	100, 150	38.7, 2, 13
4505	2.8	51K - 1G	1, 2, 5	20000	100, 150	51.2, 2, 9
4506	3.6	82K - 1G	1, 2, 5	20000	100, 150	51.2, 2, 13
4507	4.5	180K - 1.5G	1, 2, 5	20000	100, 150	51.2, 2, 25.7

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/4500.PDF>



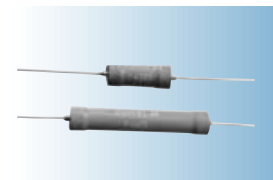
4530 Series		High Voltage Planar Dividers				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
4531	1.0	20K - 130M	1, 2, 5	6500	100	25.7, 2, 9
4532	1.7	36K - 250M	1, 2, 5	6500	100	25.7, 2, 13
4533	2.0	36K - 250M	1, 2, 5	10000	100	38.7, 2, 9
4534	3.0	62K - 450M	1, 2, 5	10000	100	38.7, 2, 13
4535	2.8	51K - 370M	1, 2, 5	15000	100	51.2, 2, 9
4536	3.6	82K - 660M	1, 2, 5	15000	100	51.2, 2, 13
4537	4.5	180K - 1.4G	1, 2, 5	15000	100	51.2, 2, 25.7

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/4530.PDF>



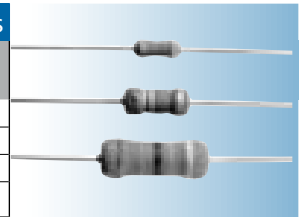
F Series		High Voltage Thick Film Resistors				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, Dia
F43	0.7	2M - 100G	2, 5, 10	4000	-2000	25.4, 8.4
F44	1.3	2M - 150G	2, 5, 10	14000	-2000	50.8, 8.4

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/F.PDF>



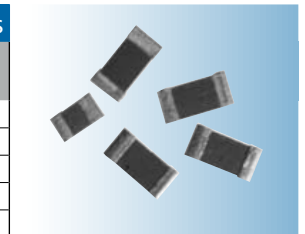
GC Series						High Value Thick Film Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
GC55	0.25	47K - 1G	1, 2, 5	1700	100	6.2, 2.5
GC65	0.5	47K - 1G	1, 2, 5	3500	100	9, 3.6
GC70	1.0	47K - 1G	1, 2, 5	10000	100	14.5, 5.3

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/GC.PDF>



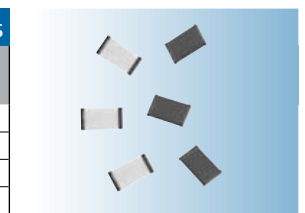
HR Series						High Value Surface Mount Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0503	-	10M - 20G	10	50	0 to -2500	1.25, .63, .5
0805	-	100M - 50G	10	100	0 to -2000	2, 1.25, .6
1005	-	100M - 50G	10	150	0 to -1500	2.5, 1.25, .7
1206	-	100M - 50G	10	200	0 to -1000	3.2, 1.6, .7

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/HR.PDF>



HVC Series						High Voltage Chip Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
1206	0.3	100K - 100M	10, 5, 2, 1	1000	100	3.2±0.4, 1.6±0.2, 0.7
2010	0.5	100K - 100M	10, 5, 2, 1	2000	100	5.1±0.3, 2.5±0.2, 0.8
2512	1	100K - 100M	10, 5, 2, 1	3000	100	6.5±0.3, 3.2±0.2, 0.8

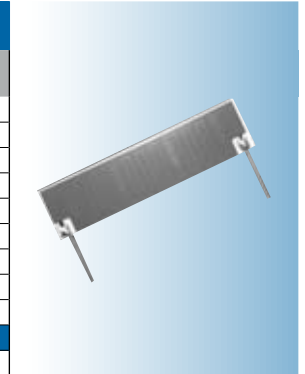
Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/HVC.PDF>



HVP Series						High Voltage Planar resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, w, h
HVP04	0.4	1K - 250M	1, 5	2000	100	10.2, 6.4, 2
HVP06	0.6	1K5 - 500M	1, 5	5000	100	12.7, 6.4, 2
HVP08	0.8	2K - 500M	1, 5	7500	100	19.1, 6.4, 2
HVP10	1	3K - 500M	1, 5	10,000	100	25.4, 6.4, 2
HVP15 *	1.5	4K - 750M	1, 5	15,000	100	38.1, 6.4, 2
HVP20 *	2	5K - 1G	1, 5	20,000	100	50.8, 6.4, 2
HVP30 *	3	10K - 1G	1, 5	20,000	100	50.8, 12.7, 2
HVP40 *	4	25K - 1G	1, 5	20,000	100	50.8, 19.1, 2
HVP50 *	5	50K - 1G5	1, 5	20,000	100	50.8, 25.4, 2

* In development

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/HVP.pdf>



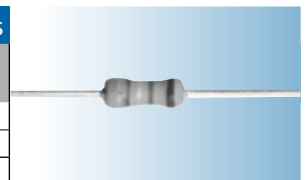
LHVC Series						Lower Range High Voltage Chip
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, w, h
0603	0.1	100K - 10M	1, 5	200	200	1.6, 0.8, 0.45
0805	0.125	100K - 10M	1, 5	400	200	2, 1.3, 0.55
1206	0.25	100K - 10M	1, 5	500	200	3.1, 1.6, 0.55
2010	0.5	50K - 10M	1, 5	1600	200	5, 2.5, 0.55
2512	1	50K - 10M	1, 5	800	200	6.4, 3.2, 0.55

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/LHVC.pdf>



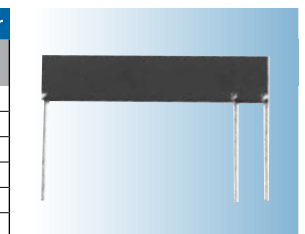
MH Series						High Voltage Metal Film Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
MH25	0.25	100K - 10M	1, 2, 5	1600	100	6.2, 2.3
MH37	0.5	100K - 1M	1, 2, 5	3500	100	9, 3.7

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/MH.PDF>



PHVD Series						Precision High Voltage Divider
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, h, w
PHVD10	0.75	1K - 7G		10,000		25.4, 7.6, 2.5
PHVD15	1.5	1K - 10G		15,000		38.1, 12.7, 2.5
PHVD20	2.5	1K - 20G	0.05, 0.1, 0.25, 0.5, 1	20,000	5, 10, 15, 25, 50	50.8, 15.2, 2.5
PHVD30	3.5	1K - 30G		30,000		76.2, 15.2, 2.5
PHVD40	4.5	1K - 40G		40,000		101.6, 15.2, 2.5

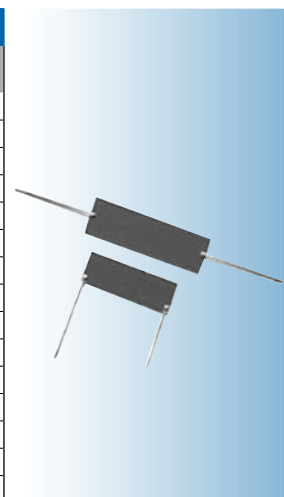
Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/PHVD.PDF>



PHVP Series Precision High Voltage Planar Resistor

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, h, w
PHVP5	1	1K - 3G		5000		12.7, 5.1, 2
PHVP7	0.8	1K - 1G		7000		20.3, 3.8, 2
PHVP7B	1	1K - 2G5		7000		20.3, 5.1, 2.5
PHVP10	1	1K - 1G5		10,000		25.4, 3.8, 2
PHVP10B	1.3	1K - 3G5		10,000		25.4, 5.1, 2.5
PHVP10C	2	1K - 7G		10,000		25.4, 7.6, 2.5
PHVP15	1.5	1K - 4G	0.05, 0.1, 0.25,	15,000	10, 15,	38.1, 3.8, 2
PHVP15B	2	1K - 5G	0.5, 1	15,000	25, 50	38.1, 5.1, 2.5
PHVP15C	3	1K - 10G		15,000		38.1, 12.7, 2.5
PHVP20	2	1K - 7G		20,000		50.8, 5.1, 2
PHVP20B	3	1K - 10G		20,000		50.8, 6.4, 2.5
PHVP20C	4.5	1K - 20G		20,000		50.8, 15.2, 2.5
PHVP30	6.5	1K - 30G		30,000		76.2, 15.2, 3
PHVP40	9	1K - 40G		40,000		101.6, 15.2, 3

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/PHVP.PDF>



T Series High Voltage Precision Thick Film Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
T43	1.5	1K - 10G	1, 2, 5	4000	25, 50, 100	25.4, 8.4
T44	3.5	1K - 50G	1, 2, 5	14000	25, 50, 100	50.8, 8.4
T48	10	1K - 50G	1, 2, 5	50000	25, 50, 100	150, 8.4

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/T.PDF>



VRW Series High Voltage Thick Film Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) L, D
VRW25	0.25	100K to 30M	1, 2, 5	1600	200	6.2, 2.5
VRW37	0.5	100K to 10M	1, 2, 5	3500	200	9.0, 3.7
VRW68	1	100K - 68M	1, 2, 5	10000	200	15.5, 5

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/VRW.PDF>

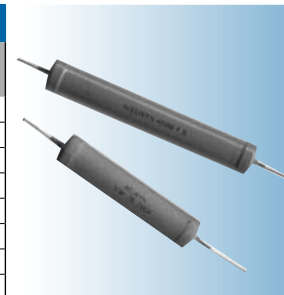


EN 60065

WHVL Series Precision Low Inductance High Voltage Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, dia
WHVL2	2.9	1K - 100G		11,000		27, 8
WHVL3	3.8	1K - 100G		14,000		37, 8
WHVL5	5.6	1K - 100G		22,000	10, 15, 25, 50,	52, 8
WHVL7	7.5	1K - 100G	0.05, 0.1, 0.25, 0.5, 1, 2, 5	33,000	100	77, 8
WHVL10	10	1K - 100G		45,000		102, 8.3
WHVL12	12	1K - 100G		54,000		122, 8.5
WHVL15	15	1K - 100G		67,000		152, 8.5

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/WHVL.PDF>



WPYP Series Capacitor Mount Balance/ Bleed Resistor

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) Pitch
WPYP8	10	1R0 - 82K	1, 2, 5	685	100	22
WPYP10	13	1R0 - 120K	1, 2, 5	940	100	31.8

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/WPYP.pdf>

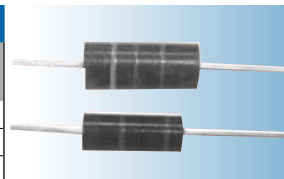


Surge / Pulse

CC Series Carbon Composition Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, dia
CC1	1	100R - 50K	10, 20	-	1000	15, 6
CC2	2	100R - 10K	10, 20	-	1000	18, 8

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/CC.pdf>



CHP Series Metal Glaze™ Surface Mount Power Resistors

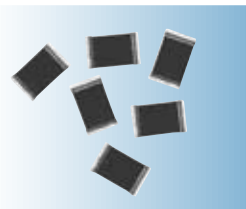
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
CHP1/8	0.25	0R1 - 1M	1, 2, 5	200	50, 100	3.25, 1.45
CHP1/2	0.5	0R1 - 350K	1, 2, 5	300	50, 100	5.08, 2.01
CHP1/2	0.5	0R1 - 350K	1, 2, 5	300	50, 100	5.08, 2.01
CHP2	1.33	0R1 - 2M2	1, 2, 5	500	50, 100	9.32, 2.67

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/CHP.PDF>



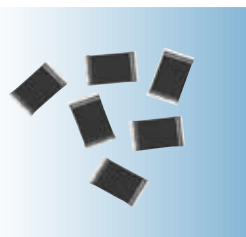
DSC Series						Double Sided Chip
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
1206	0.33	1R0 - 4M7	0.5, 1, 2, 5	200	100 - 200	3.2, 1.6, 0.7
2010	0.75	1R0 - 4M7	0.5, 1, 2, 5	400	100 - 200	5.1, 2.5, 0.8
2512	1.5	1R0 - 4M7	0.5, 1, 2, 5	500	100 - 200	6.5, 3.2, 0.8

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/DSC.PDF>



PWC Series						Pulse Withstanding Chip Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0805	0.125	1R0 - 10M	0.5, 1, 2, 5	150	100 - 200	2.0, 1.25, 2.0
1206	0.33	1R0 - 10M	0.5, 1, 2, 5	200	100 - 200	3.2, 1.6, 0.7
2010	0.75	1R0 - 10M	0.5, 1, 2, 5	400	100 - 200	5.1, 2.5, 0.8
2512	1.5	1R0 - 10M	0.5, 1, 2, 5	500	100 - 200	6.5, 3.2, 0.8

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/PWC.PDF>



W30 Series						Flameproof Wirewound Resistor
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
W31	3	R01 - 10K	<R1: 5 ≥R1: 1, 2, 5	500	100 - 1000	13, 5.6

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/W30.PDF>



WP-S Series						Compact Flameproof Power Wirewound Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
WP1S	1	R068 to 430R	<20r: 5 ≥20R: 1,2,5	50	<1R: 350 ≥1R: 200	6.2, 2.8
WP2S	2	R05 to 900R	<20r: 5 ≥20R: 1,2,5	50	<1R: 350 ≥1R: 200	9.0, 3.6
WP25S	2.5	R05 to 900R	<20r: 5 ≥20R: 1,2,5	75	<1R: 350 ≥1R: 200	12.5, 4.5
WP3S	3	R01 to 2K2	<20r: 5 ≥20R: 1,2,5	100	<1R: 350 ≥1R: 200	14.5, 5.2
WP4S	4	R01 to 10K	<R10:5 ≥R10: 1,2,5	100	<1R: 350 ≥1R: 200	13, 5.6
WP5S	5	R015 to 6K8	<20r:5 ≥20R: 1,2,5	150	<1R: 350 ≥1R: 200	16.5, 7.0

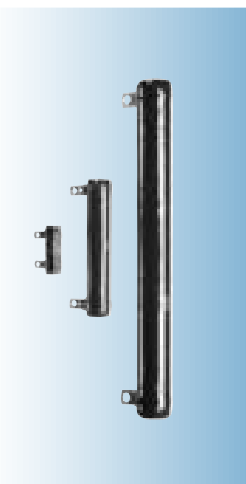
Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/WP-S.PDF>



High Power

1600/1900 Series						Tubular Vitreous Enamelled Wirewound Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
1601	11	1 - 15K	1, 2, 5, 10	250	75 - 200	33, 17.5
1905	16	1 - 30K	1, 2, 5, 10	450	75 - 200	56.1, 14.5
1600	16.5	1 - 56K	1, 2, 5, 10	600	75 - 200	61.5, 14.5
1602	17	1 - 43K	1, 2, 5, 10	500	75 - 200	51, 17.5
1906	22	1 - 50K	1, 2, 5, 10	700	75 - 200	64.3, 17.5
1603	25	1 - 83K	1, 2, 5, 10	850	75 - 200	74.5, 17.5
1604	35	1 - 100K	1, 2, 5, 10	1300	75 - 200	102, 17.5
1605	47	1 - 100K	1, 2, 5, 10	1100	75 - 150	89.5, 24
1908	54	1 - 100K	1, 2, 5, 10	1200	75 - 150	102, 24
1607	76	1 - 100K	1, 2, 5, 10	1300	75 - 150	102, 32
1606	91	1 - 160K	1, 2, 5, 10	2100	75 - 150	166, 24
1608	115	1 - 180K	1, 2, 5, 10	2100	75 - 150	152, 32
1609	165	1 - 250K	1, 2, 5, 10	3000	75 - 150	216, 32

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/1600-1900.PDF>



BHPR Series						TO-227 High Power Single/Dual Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
BHPR	150, 200, 250, 300, 550, 600	OR1 - 1K0	1, 5	-	100	38, 25, 11.8

Datasheet - <http://www.bitechnologies.com/pdfs/BHPR.PDF>



BPC Series Planar Power Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, h, t
BPC3	3	0R1 - 200K	1, 2, 5, 10	500	100	10.2, 27.7, 2.5
PBC5	5	0R1 - 200K	1, 2, 5, 10	500	100	12.7, 27.7, 2.5
BPC7	7.5	0R1 - 200K	1, 2, 5, 10	500	100	19.1, 27.7, 2.5
BPC10	10	0R1 - 200K	1, 2, 5, 10	500	100	25.4, 27.7, 2.5

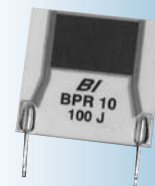
Datasheet - <http://www.bitechnologies.com/pdfs/BPC.PDF>



BPR Series Vibration-proof Planar Power Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, h, t
BPR3	3	0R1 - 200K	1, 2, 5	500	100	12.7, 17, 6.1
PBR5	5	0R1 - 200K	1, 2, 5	500	100	12.7, 27.2, 6.1
BPR7	7	0R1 - 200K	1, 2, 5	500	100	25.4, 20.8, 6.1
BPR10	10	0R1 - 200K	1, 2, 5	500	100	25.4, 27.2, 6.1
BPR20	20	0R1 - 200K	1, 2, 5	500	100	50.8, 27.2, 6.1
BPR30	30	0R1 - 200K	1, 2, 5	500	100	53.3, 37.3, 6.1
BPR40	40	0R1 - 200K	1, 2, 5	500	100	53.3, 50.0, 6.1
BPR50	50	0R1 - 200K	1, 2, 5	500	100	53.3, 57.7, 6.1

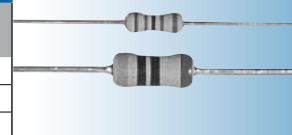
Datasheet - <http://www.bitechnologies.com/pdfs/BPR.PDF>



MFP Series Flameproof Power Metal Film Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
MFP1	1	0R1 - 1M	1, 2, 5	350	100, 200, 300	6.2, 2.5
MFP2	2	1R0 - 1M	1, 2, 5	350	100	10, 4

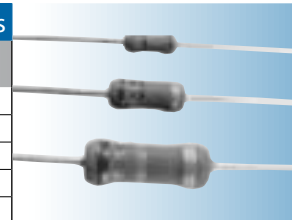
Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/MFP.PDF>



MF-S Series Power Metal Film Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
MF1/2S	0.5	0R1 - 1M	1, 2, 5, 10	350	150 - 350	6.2, 2.5
MF1S	1.0	0R1 - 1M	1, 2, 5, 10	350	150 - 350	9, 3.6
MF2S	2.0	0R1 - 470K	1, 2, 5, 10	350	150 - 350	12.5, 4.2
MF3S	3.0	0R1 - 470K	1, 2, 5, 10	350	150 - 350	14.5, 5.3

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/MF-S.PDF>



MHP Family Heatsink Mount Packaged Power Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Package
MHP20S	20	R01 - 51K	1, 5	-	50 - 250	TO-126
MHP20	20	R01 - 51K	1, 5	500	50 - 250	TO-220
MHP35	35	R01 - 51K	1, 5	500	50 - 250	TO-220
MHP50	50	R01 - 51K	1, 5	500	50 - 250	TO-220
MHP100	100	R01 - 51K	1, 5	700	50 - 250	TO-247
MHP140	140	R01 - 51K	1, 5	700	50 - 250	TO-247

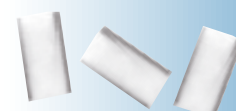
Datasheets - <http://www.bitechnologies.com/power/index.htm>



SC3 Series High Power Chip Resistor

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
SC3	3	1R0 - 10K	1, 2, 5	50	100	3.25, 6.5,

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/SC3.PDF>



SMHP Series TO-263 Packaged Power Resistors

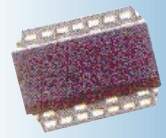
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
SMHP	20	R01 - 51K	1, 5	500	50 - 250	10.3, 10.1, 4.5

Datasheet - <http://www.bitechnologies.com/pdfs/SMHP.PDF>



SMP Series			SOIC Packaged Power Resistors			
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w,
SMP	10	10R - 10K	1, 5	500	100	11.3, 8.4

Datasheet - <http://www.bitechtechnologies.com/pdfs/SMP.PDF>



SQM Series			Ceramic Case Pluggable Resistor			
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) h, w, d
SQM2	2	0R1 - 33K	5	150	350, 400	20, 11.5, 7.5
SQM3	3	0R1 - 56K	5	300	350, 400	25, 12.5, 8.5
SQM5	5	0R1 - 100K	5	350	350, 400	25, 12.5, 9
SQM7	7	0R1 - 200K	5	500	350, 400	38, 12.5, 9
SQM10	10	0R1 - 200K	5	750	350, 400	50, 12.5, 9

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/SQM.pdf>



SQP Series			Ceramic Case Resistors - Wirewound / Metal Oxide			
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
SQP2	2	0R1-47K	5	150	WW types, <0R68, 1700ppm; ≥0R68, 200ppm: MO types all values 350ppm	18, 7, 7
SQP3	3	0R1-47K	5	300		22, 8, 8
SQP5	5	0R1 - 47K	5	350		22, 10, 10
SQP7	7	0R1 - 47K	5	500		35, 10, 10
SQP10	10	0R1 - 68K	5	750		48, 10, 10
SQP15	15	0R1 - 68k	5	1000		48, 13, 13
QP20	20	0R1-100K	5	1000	60, 14.5, 14.5	

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/SQP.PDF>



W20 Series			Vitreous Enamelled Wirewound Resistors			
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
W21	3.0	0R1 - 10K	1, 2, 5	100	+75 to 200	12.7, 5.6
W215	5.0	0R1 - 15K	1, 2, 5	160	+75 to 200	22, 7
W22	7.0	0R1 - 22K	1, 2, 5	200	+75 to 200	22, 8
W23	10.0	0R15 - 60K	1, 2, 5	500	+75 to 200	38, 8
W24	14.0	0R2 - 100K	1, 2, 5	750	+75 to 200	53.5, 8

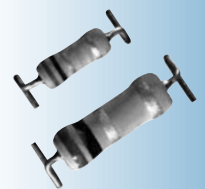
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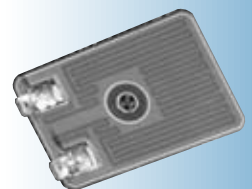
WA80Z Series			Cement Coated Surface Mount Wirewound Resistors			
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
WA83Z	2	0.05 - 900R	<0R1:5,10	50	<1R: 350 1R: 200	13.4±0.2, 3.6, 6.2
WA84Z	3	0.01 - 2K2	≥0R1:1,2,5,10	100	<1R: 350 1R: 200	18.7±0.2, 5.2, 7.0
WA85Z	5	0.015 - 6K8	1, 2, 5, 10	150	<1R: 350 1R: 200	18.7, 7.0, 7.9

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/WA80Z.PDF>



WDBR Series			Ultra Low Profile Dynamic Braking Resistors			
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w
WDBR1/2	300	22R - 100R	10	-	+500 - +600	31.9, 28.1
WDBR1	700	12R - 150R	10	-	+500 - +600	49.3, 35.9
WDBR2	780	12R - 150R	10	-	+500 - +600	61, 40.6
WDBR3	900	12R - 150R	10	-	+500 - +600	102, 70
WDBR5	1000	12R - 150R	10	-	+500 - +600	122, 70
WDBR7	1490	47R - 150R	10	-	+500 - +600	152, 102

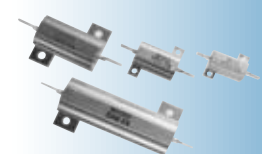
Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/WDBR.PDF>



WH Series			Aluminium Housed Wirewound Resistors			
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
WH5	10	0R01 - 10K	1, 2, 5, 10	150	50, 100	30, 17, 9
WH10	15	0R01 - 20K	1, 2, 5, 10	250	50, 100	36.5, 21, 11
WH25	25	0R01 - 44K	1, 2, 5, 10	500	50, 100	51, 28, 15
WH50	50	0R015 - 120K	1, 2, 5, 10	1250	50, 100	72.5, 30, 16
WH100	100	0R01 - 70K	1, 2, 5, 10	1900	25, 100	88, 47.5, 24.1
WH200	200	0R01 - 50K	1, 2, 5, 10	1900	25, 100	146, 72.5, 41.8
WH300	300	0R01 - 68K	1, 2, 5, 10	2500	25, 100	184, 72.5, 41.8

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/WH.PDF>

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WHPC Series						High Power Chip
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, w, h
1206	0.5	1R – 10M	1, 5	200	100 – 200	3.1, 1.6, 0.55
0612	0.5	1R – 1M	1, 5	200	100 - 400	1.6, 3.2, 0.55
2010	1	1R – 10M	1, 5	200	100 - 200	5, 2.5, 0.55
1020	1	1R – 1M	1, 5	200	100 - 400	2.5, 5, 0.55
1218	1	1R – 1M	1, 5	200	100 - 400	3.1, 4.6, 0.55
1225	1.5	1R – 1M	1, 5	200	100 - 400	3.1, 6.3, 0.55

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/WHPC.pdf>



WMO-S Series					Flameproof Metal Oxide Resistors	
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
WMO1/2S	0.5	10R -100K	5	250	350	7.5, 3
WMO1S	1.0	10R - 120K	5	350	350	10, 4.5
WMO1S	1.0	10R - 150K	5	350	350	10, 4.5
WMO3S	3.0	10R - 150K	5	350	350	16, 5.5
WMO5S	5.0	10R - 180K	5	500	350	26, 8.5
WMO7S	7	20R - 150K	5	750	350	32, 8.5

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/WMO-S.PDF>



WSM Series						Moulded Surface Mount Wirewound Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
WSM1	1	OR01 - 1K	1, 2, 5, 10	100	20 - 100	7.9, 7, 3.94
WSM2	2	OR01 - 2K	1, 2, 5, 10	100	20 - 100	12, 10.5, 5.5
WSM3	3	OR01 - 3K	1, 2, 5, 10	100	20 - 200	18, 16, 6.5

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/WSM.PDF>

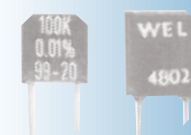


Precision

4800 Series						Ultra Precision Bulk Metal Foil Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
4802/12/32	0.5	1R0 to 100K	0.005, 0.01	200	5	8.9, 10.2, 3.8, 7.5, 8, 2.5 9.7 5.4 9.7
4804	1	OR5 to 200k	0.02, 0.05	350	5	15.2, 13.2, 3.8
4805	1.5	33R0 to 300K	0.01, 0.25, 0.5, 1	500	5	22.6, 13.2, 3.8

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/4800.PDF>

CECC 40302-002



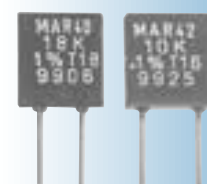
CAR Series						Ultra Precision Metal Film Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
CAR5	0.25	10R0 - 3M	0.01, 0.02,	250	5, 10,	7.2, 2.5
CAR6	0.33	10R0 - 5M	0.05, 0.1,	350	15, 25,	10, 3.7
CAR7	0.5	10R0 - 10M	1.0	500	50	15.5, 5.5

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/CAR.PDF>



MAR 40/42 Series						Ultra Precision Metal Film Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
MAR 40	0.3	20R0 - 400K	0.005, 0.01	250	2, 5	7.75, 3.3, 8.64
MAR 42			0.01, 0.25, 0.5,			

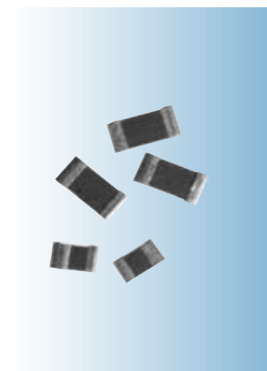
Datasheet - http://www.welwyn-tt.com/pdf/datasheet/MAR_40-42.PDF



PCF Series				Precision Surface Mount Resistor		
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0201	0.05	50R - 33K	0.5, 1	15	25, 50	0.6, 0.3, 0.26
0402	0.063	10R - 205K	0.01 - 0.5	25	5 - 50	1, 0.5, 0.4
0603	0.063	2R - 1M	0.01 - 0.5	75	5 - 50	1.6, 0.8, 0.55
0805	0.1	1R - 2M	0.01 - 0.5	100	5 - 50	2, 1.3, 0.65
1206	0.125	1R - 2M5	0.01 - 0.5	150	5 - 50	3.2, 1.6, 0.65
1210	0.25	51R - 2M	0.1, 0.5	200	5 - 25	3.2, 2.6, 0.5
2010	0.25	1R - 3M	0.01 - 0.5	150	5 - 50	4.9, 2.4, 0.65
2512	0.5	1R - 3M	0.01 - 0.5	150	5 - 50	6.3, 3.1, 0.65

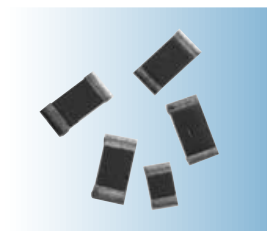
High Power (PCFH) and Passivated (PCFP) versions available

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/PCF.pdf>



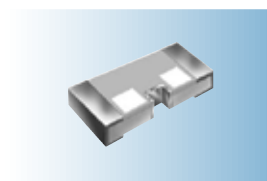
PCR Series				Precision Thick Film Surface Mount Resistors		
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0805	0.1	10R - 1M	0.1 - 1	100	50	2, 1.25, .6
1005	0.125	10R - 1M	0.1 - 1	150	50	2.5, 1.25, .7
1206	0.25	10R - 1M	0.1 - 1	200	50	3.2, 1.6, .7

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/PCR.PDF>



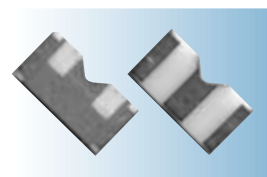
PFC-A Series				TaNFilm® Precision Chip Attenuator		
Type	Power (watts)	Atten, Range (dB)	impedance (ohms)	Tolerance (dB)	Dim.(mm) l, w, h	
1206	0.125	1 -20	50, 75	0.3	3.2, 1.6 0.6	

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/PFC-A.pdf>



PFC-D Series				Precision 1206 Resistive Dividers		
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, t
PFC-D	0.25	10R - 200K	0.05, 0.1, 0.5, 1	100	25, 50, 100	3.2, 1.6, 0.6

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/PFC-DIVIDER.PDF>



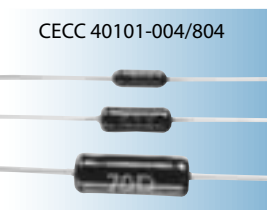
PR Series				Precision Metal Film Resistors		
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
PR4	0.25	100R - 1M	0.1, 0.25,	250	15, 25, 50	6.2, 2.5
PR5	0.5	100R - 1M	0.5, 1	350	15, 25, 50	9, 3.6

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/PR.PDF>



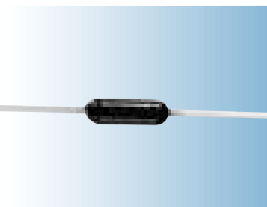
RC Series				Precision Metal Film Resistors		
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
RC55	0.25	5R - 2M		350	5, 10,	7.2, 2.5
RC65	0.5	5R - 2M	0.05, 0.1, 0.25	350	15, 25,	10, 3.7
RC70	1.0	10R - 5M		500		15.5, 5.5

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/RC.PDF>



RCP Series				Precision Metal Film Resistors		
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
RC55P	0.5	5R - 2M		350		7.2, 2.5
RC65P	1.0	5R - 2M	0.05, 0.1, 0.25	500	5, 10, 15, 25	10, 3.7
RC70P	1.5	10R - 5M		500		15.5, 5.5

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/RCP.PDF>



SOT143 Series				4 Pin SMT Package		
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
SOT	0.25	10R - 100K	0.05	100	Track ±5	2.9, 1.3, 1

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/SOT143.pdf>



SOT23 Series				Surface Mount Divider Network		
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
SOT	0.25	10R - 100K	0.05	100	Track ±5	2.9, 1.3, 1

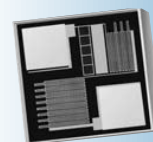
Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/SOT23.pdf>



WBC Series TaNSil® Wire Bondable Silicon Chip Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0202	0.25	10R - 100K	to 0.05	100	±25	0.51, 0.51
0303	0.25	10R - 100K	to 0.05	100	Track 2	0.76, 0.76

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/WBC.PDF>



WRM Series Mini Melf Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
0102	0.2	R22 - 2M21	0.1, 0.25,	150	15, 25, 50	2.2, 1.1
0204	0.25	R22 - 5M1	0.5, 1, 2, 5	200	5, 15, 25, 50	3.6, 1.4
0207	0.4	R16 - 10M		250	25, 50	6, 2.2

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/WRM.PDF>

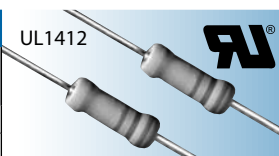


Fusible

EMC Series Pulse Withstanding Fusible Flameproof Metal Film Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
EMC2	2	4R7 - 68R	10, 20	-	100	10, 4

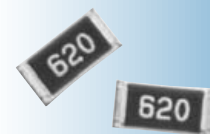
Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/EMC.PDF>



FCR Series Fusing Surface Mount Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0603	0.063	5R6 - 33R	±5	-	±500	1.6, 0.8, 0.7
0805	0.1	10R - 82R	±5	-	±500	2, 1.3, 0.7
1206	0.125	10R - 82R	±5	-	±500	3.2, 1.6, 0.7
1210	0.25	10R - 300R	±5	-	±500	3.2, 2.6, 0.70
2010	0.5	10R - 100R	±5	-	±500	5, 2.5, 0.71

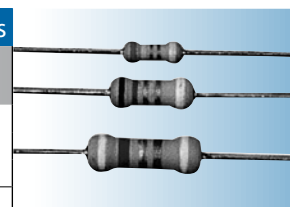
Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/FCR.PDF>



FM Series Fusible Metal Film Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
FM1/4	0.25	0R1 - 10K	5	250	250	6.2, 2.3
FM1/2	0.5	0R1 - 27K	5	350	250	9, 3.4
FM1	1	0R2 - 1K5	5	350	250	12.5, 4.2

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/FM.PDF>



FN Series (Not for New Designs) Fusible Nickel Film Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
FN4	0.4	0R1 - 0R91	5, 10, 20	-	+5000	6.2, 2.5

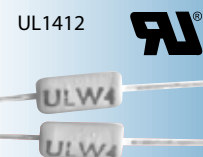
Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/FN.PDF>



ULW Series UL1412 Wirewound Mains Input Resistor

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, dia
ULW2	2	22R - 100R	5	-	200	9, 3.6
ULW3	3	10R - 100R	5	-	200	14.5, 5.2
ULW4	4	10R	5	-	200	13, 5.6

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/ULW.pdf>



WA84F Series Fusible Wirewound Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
WA84F	1.6	0R2 - 30R	5	100	100 - 350	14.5, 5.2

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/WA84F.PDF>

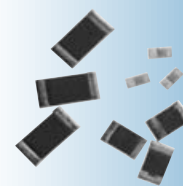


High Reliability

CR Series						Surface Mount Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0503	0.063	1R - 10M	0.1 - 5	50	100	1.25, .63, .5
0805	0.125	1R - 100M	0.1 - 5	100	100	2, 1.25, .6
1005	0.125	1R - 100M	0.1 - 5	150	100	2.5, 1.25, .7
1206	0.25	1R - 100M	0.1 - 5	200	100	3.2, 1.6, .7
2010	0.5	1 - 1M	0.1 - 5	400	100	5.1, 2.5, .7
2512	1.0	1 - 1M	0.1 - 5	500	100	6.5, 3.2, .7

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/CR.PDF>

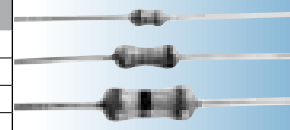
CECC 40401-003/004/008



MFR Series						Metal Film Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
MFR3	0.4	1R0 - 1M	1	200	50	3.5, 1.8
MFR4	0.5	1R0 - 10M	0.5, 1	350	50	6.2, 2.5
MFR5	0.75	1R0 - 1M	0.5,	350	100 - 150	9, 3.6

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/MFR.PDF>

CECC 40101-019/803



PFC Series						TaNFilm® Precision Chip Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0402	0.05	50R - 30K	0.1 - 5	75	25 - 100	1, 0.5, 0.3
0603	0.1	5R - 100K	0.02 - 5	75	10 - 100	1.6, 0.8, 0.5
0805	0.25	5R - 267K	0.02 - 5	100	10 - 100	2.1, 1.3, 0.5
1206	0.33	5R - 1M	0.02 - 5	200	10 - 100	3.2, 1.6, 0.6
1505	0.35	5R - 1M	0.02 - 5	100	25 - 100	3.9, 1.3, 0.6
2010	0.8	5R - 1M	0.02 - 5	175	25 - 100	5.2, 2.6, 0.6
2512	1	5R - 1M	0.02 - 5	200	25 - 100	6.5, 3.1, 0.6

MIL-PRF-55342



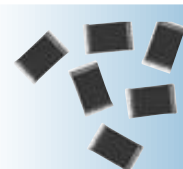
High Temperature (PFC-HT) and High Frequency (PFC-HF) versions available

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/PFC.pdf>
 Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/PFC-HT.pdf>
 Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/PFC-HF.pdf>

Temperature Sense

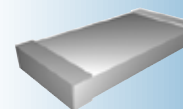
PTCR Series						PTC Thermistor Chip
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim (mm) l, w, h
0805	0.1	10R - 400R	2, 5, 10	100	2200 - 3500	2, 1.25, 0.6
1206	0.2	10R - 800R	2, 5, 10	200	2200 - 3500	3.2, 1.6, 0.7

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/PTCR.PDF>



RTD Series						Platinum Film Temperature Sensors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, t
0603	-	100R	0.5, 1, 2, 5	-	+3850	1.6, 0.8, 0.5
0805	-	100R	0.5, 1, 2, 5	-	+3850	2.1, 1.3, 0.5
1206	-	100R & 1K0	0.5, 1, 2, 5	-	+3850	3.2, 1.6, 0.6

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/RTD.PDF>



TD4 Series						Nickel Film Temperature Sensor
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
TD4	-	20R - 1K	1.0, 2.0, 4.0	-	6000	7.2, 2.5

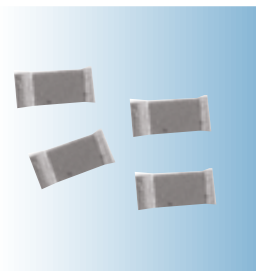
Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/TD4.PDF>



Zero-Ohm Jumper

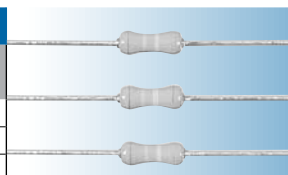
LRZ Series		High Current Jumper Chip				
Type	Current (amps)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, t
0805	15	0.003 max	-	-	-	2.0, 1.25, 0.61
1206	20	0.003 max	-	-	-	3.2, 1.25, 0.61
2010	30	0.003 max	-	-	-	5.23, 2.64, 0.74
2512	35	0.003 max	-	-	-	6.5, 3.25, 0.74

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/LRZ.pdf>



WL4 Series		Jumper Resistors				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
WL4	-	0.012 max	-	-	-	6.2, 2.3
WLT	Wire link taped, 0.6 / 0.7 / 0.8mm dia x 52mm					

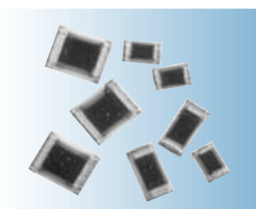
Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/WL4.PDF>



General Purpose

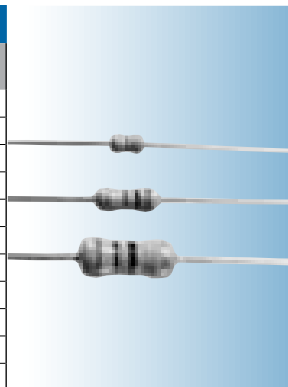
CRT Series		Trimable Surface Mount Resistors				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0805	0.1	10R - 1M	±20	100	250	2, 1.25, .5
1206	0.125	10R - 1M	±20	200	250	3.2, 1.6, .55
1210	0.25	10R - 1M	±20	200	250	3.2, 2.6, .55

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/CRT.PDF>



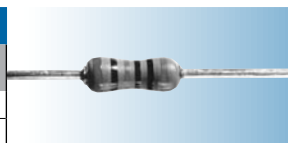
GCF Series		General Purpose Carbon Film Resistors				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
GCF1/8	0.125	1R0 - 10M	5	200	<10R : 0 ±350 10R ~ <60K : 0 ~ -500 60K ~ <200K : 0 ~ -700 200K ~ <1M0 : 0 ~ -1000 1M0 ~ 10M : 0 ~ -1500	3.5, 1.85
GCF1/4	0.25	1R0 - 10M	5	250		6.8, 2.5,
GCF1/4S	0.25	1R0 - 10M	5	200		3.5, 1.85
GCF1/2	0.5	1R0 - 10M	5	350		10, 3.5
GCF1/2S	0.5	1R0 - 10M	5	250		6.8, 3
GCF1	1.0	1R0 - 10M	5	500		16, 5.5
GCF1S	1.0	1R0 - 10M	5	400		12, 5
GCF2	2.0	1R0 - 10M	5	500		17.5, 6.5
GCF2S	2.0	1R0 - 10M	5	500		16, 5.5
GCF3S	3.0	1R0 - 10M	5	500		17.5, 6.5

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/GCF.PDF>



MFR4P Series		Metal Film Resistors				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
MFR4P	0.6	R22 - 1M	1, 2, 5,	250	50	6.2, 2.5

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/MFR4P.PDF>



WCR Series		General Purpose Surface Mounted Resistors				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0201	0.05	10R - 1M	1	25	250	0.6, 0.3, 0.23
0402	0.1	10R - 1M	1	50	100	1, .5, .35
0603	0.063	1R - 10M	1	50	100	1.6, .8, .5
0805	0.125	1R - 10M	1	150	100	2, 1.25, .5
1206	0.25	1R - 10M	1	200	100	3.2, 1.6, .55
1210	0.25	1R - 10M	1	200	100	3.2, 2.6, 0.55
2010	0.5	1R - 10M	1	200	200	5, 2.5, .56
2512	1.0	1R - 10M	1	200	200	6.3, 3.2, .56

Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/WCR.PDF>



WNCR Series		Resistor Array				
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
WNCR	0.063	10 - 1M	±5	50	±200	3.2, 1.6, .45

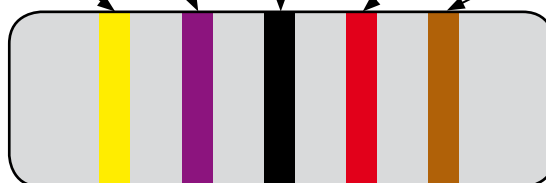
Datasheet - <http://www.welwyn-tt.com/pdf/datasheet/WNCR.PDF>



Colour Code for Band-marked Resistors

		Value 1	Value 2	Value 3	Multiplier	Tolerance	
Silver					x 0.01	10%	K
Gold					x 0.1	5%	J
Black		0	0	0	x 1	1%	F
Brown		1	1	1	x 10	2%	G
Red		2	2	2	x 100		
Orange		3	3	3	x 1K		
Yellow		4	4	4	x 10K		
Green		5	5	5	x 100K	0.5%	D
Blue		6	6	6	x 1M	0.25%	C
Violet		7	7	7	x 10M	0.1%	B
Grey		8	8	8	x 100M	0.05%	A
White		9	9	9	x 1G		
Blank						20%	M

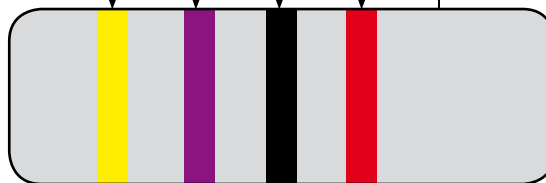
Example 1
5-Band Marking
E24/E96 values



4 7 0 x100 1% = 47K 1%

E.g. MFR4 E96

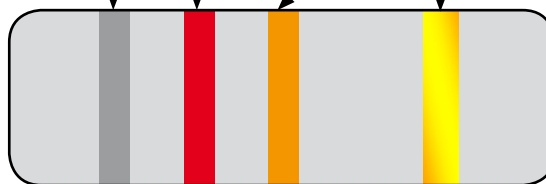
Example 2
4-Band Marking
E24/E96 values
without tolerance



4 7 0 x100 = 47K

E.g. WRM0204 E96

Example 3
4-Band Marking
E24 values



8 2 x1K 5% = 82K 5%

E.g. WMO3S E24

Further Technical Information

Application Notes for current sense, circuit protection, pulse and overload ratings, energy metering, lighting, medical, automotive, high voltage design and more	http://www.welwyn-tt.com/literature.asp
Parametric Search for selection of products by parameters, package, technology and application	http://www.welwyn-tt.com/products/resistors/resistors.asp
Calculation Tools for pulse loading, temperature derating, critical resistance, capacitor bleed and more	http://www.welwyn-tt.com/products/resistors/calculation-tools.asp
Product Compliance Matrix for RoHS and REACH SVHC status, termination finish, obsolescence data, SnPb availability and more	http://www.welwyn-tt.com/downloads/pbfree/rohs-compliance-matrix.pdf
Tin Whisker Report test report on tin whisker qualification of Pb-free finishes	http://www.welwyn-tt.com/downloads/pbfree/sn-whisker-report.pdf



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