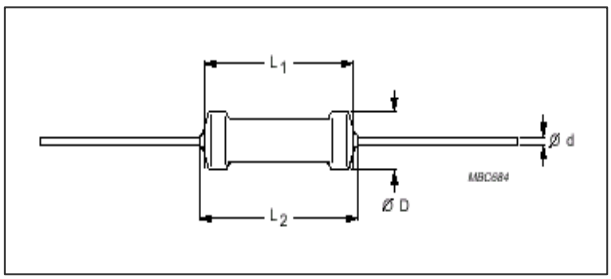
Wire wound resistors WWR 1W/2W/3W/5Ws

FEATURES

- High power dissipation in small volume
- High pulse load handling capabilities.



APPLICATIONS

- Ballast switching
- Shunt in small electric motors
- Power supplies.

DESCRIPTION

The resistor element is a resistive wire which is wound in a single layer on a ceramic rod. Metal caps are pressed over the ends of the rod. The ends of the resistance wire and the leads are connected to the caps by welding
The resistor is coated with a brown or green silicone lacquer

TYPE	Dimensions (mm)			
	D ±0.8	L1 ±0.8	L 2 Max.	d (±0.05)
WWR 1W	4.0	9.0	11.0	0.7
WWR 2W	4.0	11.0	13.0	0.8
WWR 3W	6.0	15.0	18.0	0.8
WWR 5Ws	6.0	16.5	18.5	0.8

QUICK REFERENCE DATA

DESCRIPTION		VALUE			
		WWR 1W	WWR 2W	WWR 3W	WWR 5Ws
resistance range	inductive	0.04Ω to 100Ω	0.02Ω to 100Ω	0.02Ω to 100Ω	0.1Ω to 470Ω
	non inductive	0.04Ω to 0.99Ω	0.02Ω to 0.99Ω	0.02Ω to 0.99Ω	0.1Ω to 0.99Ω
resistance tolerance		±10%, ±5%, ±2%(E24) ±1%(E48, E96) ±0.5%(R≥1Ω, E8)			
temperature coefficient R < 0.1Ω R ≥ 0.1Ω		 ± 250 ppm / ℃ ± 150 ppm / ℃			
rated dissipation at T_{amb} = 70 ℃		1 W	2 W	3W	5W
max. working voltage		150 V	200 V	250 V	400 V
basic specifications		IEC 60 115-1 and 60 115-2			
climatic category (IEC60068)		40 / 200 / 56			
stability, $\Delta R/R_{max}$ after load : 1000 hours		±5%+0.1Ω	±5%+0.1Ω	±5%+0.1Ω	±5%+0.1Ω
damp heat steady state		±3%+0.1Ω	±3%+0.1Ω	±3%+0.1Ω	±3%+0.1Ω
climatic tests		±3%+0.1Ω	±3%+0.1Ω	±3%+0.1Ω	±3%+0.1Ω
soldering		±1%+0.05Ω	±1%+0.05Ω	±1%+0.05Ω	±1%+0.05Ω

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ORDERING INFORMATION

Ordering code indicating resistor types and packing

Table 1. Inductive

Type	Bandolier width	Packing	Quantity	Resistance range	Tol. ± %	Ordering code
WWR 1W	64mm	ammo	1,000	0.04Ω to 100Ω	1	PWWR 171 1xxxx
					2	PWWR 171 21xxx
					5	PWWR 171 51xxx
	52mm				1	PWWR 171 7xxxx
					2	PWWR 171 28xxx
					5	PWWR 171 55xxx
	R-Shape		1,500	0.04Ω to 100Ω	1	PWWR 171 3xxxx
					2	PWWR 171 22xxx
					5	PWWR 171 52xxx
WWR 2W	64mm	ammo	1,000	0.02Ω to 100Ω	1	PWWR 172 1xxxx
					2	PWWR 172 21xxx
					5	PWWR 172 51xxx
WWR 3W	64mm	ammo	500	0.02Ω to 100Ω	1	PWWR 173 1xxxx
					2	PWWR 173 21xxx
					5	PWWR 173 51xxx
WWR 5Ws	64mm	ammo	500	0.1Ω to 470Ω	1	PWWR 177 1xxxx
					2	PWWR 177 21xxx
					5	PWWR 177 51xxx

Note : 0.5% : ≥1Ω

Table 2. Non Inductive

Type	Bandolier width	Packing	Quantity	Resistance range	Tol. ± %	Ordering code
WWR 1W	64mm	ammo	1,000	0.04Ω to 0.99Ω	1	PWWR 271 1xxxx
					2	PWWR 271 21xxx
					5	PWWR 271 51xxx
	52mm				1	PWWR 271 7xxxx
					2	PWWR 271 28xxx
					5	PWWR 271 55xxx
	R-Shape		1,500	0.04Ω to 0.99Ω	1	PWWR 271 3xxxx
					2	PWWR 271 22xxx
					5	PWWR 271 52xxx
WWR 2W	64mm	ammo	1,000	0.02Ω to 0.99Ω	1	PWWR 272 1xxxx
					2	PWWR 272 21xxx
					5	PWWR 272 51xxx
WWR 3W	64mm	ammo	500	0.02Ω to 0.99Ω	1	PWWR 273 1xxxx
					2	PWWR 273 21xxx
					5	PWWR 273 51xxx
WWR 5Ws	64mm	ammo	500	0.1Ω to 0.99Ω	1	PWWR 277 1xxxx
					2	PWWR 277 21xxx
					5	PWWR 277 51xxx

Ordering Example

The ordering code of a WWR1W resistor, value 0.3Ω (Non) ±5%, taped on a bandolier of 1000 units in ammopack is: PWWR 271 51300

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Limiting values

Table 3

TYPE	LIMITING VOLTAGE(1) (V)	LIMITING POWER (W)
WWR 1W	150	1
WWR 2W	200	2
WWR 3W	250	3
WWR 5Ws	400	5

Note

1. the maximum voltage that may be continuously applied to the resistor element, see "IEC publication 60 115-1"

The maximum permissible hot – spot temperature is 200℃.

Derating curve

The power that the resistor can dissipate depends on the operating temperature : Fig. 1

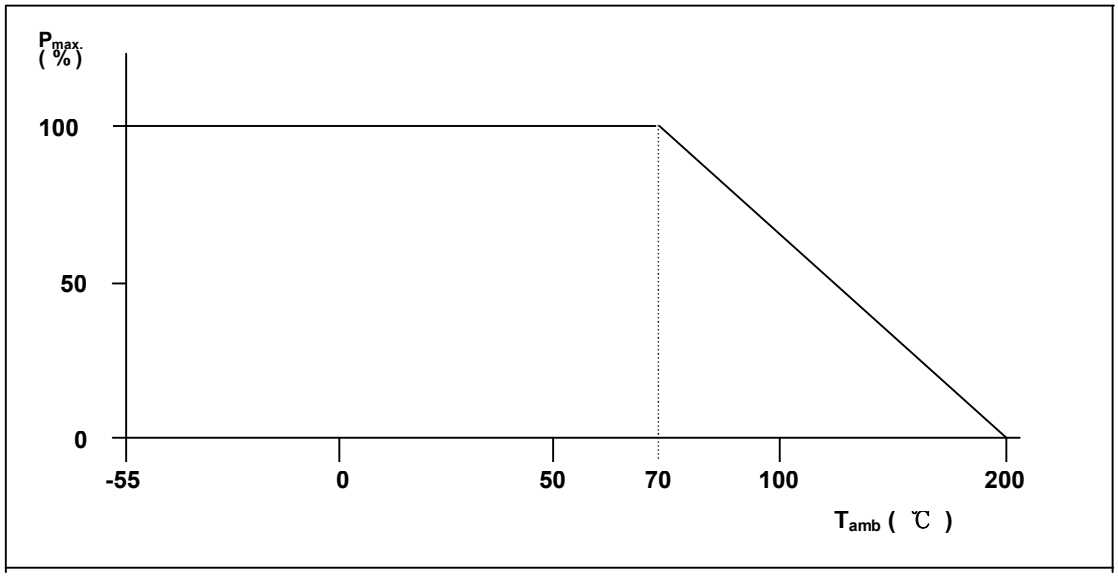

Fig. 1 Maximum dissipation (P_{max}) in percentage of rated power as a function of the ambient temperature (T_{amb})

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PULSE LOADING CAPABILTIES

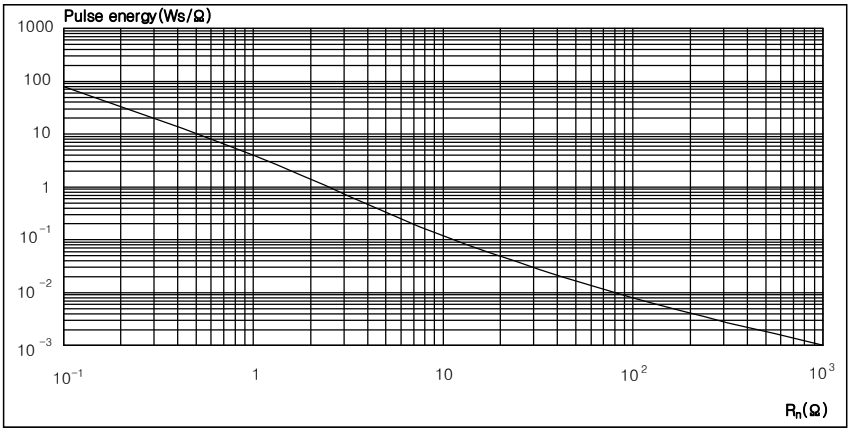

Fig. 2 Pulse capability; W_s as a function of R_n. (WWR 1W)

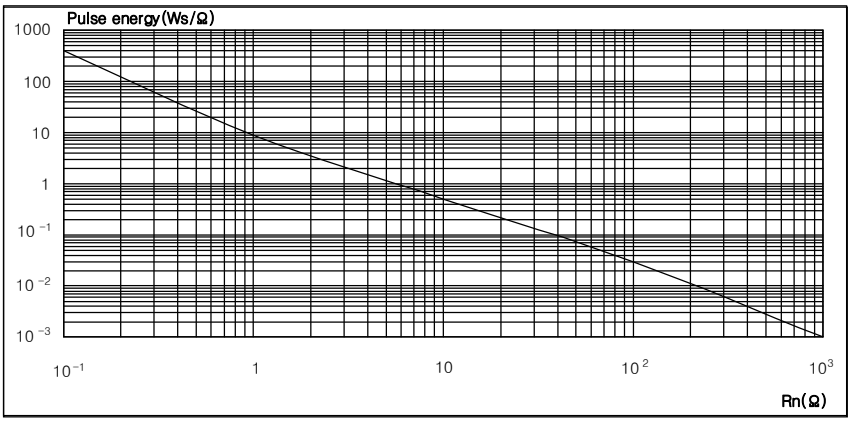

Fig. 3 Pulse capability; W_s as a function of R_n. (WWR 2W)

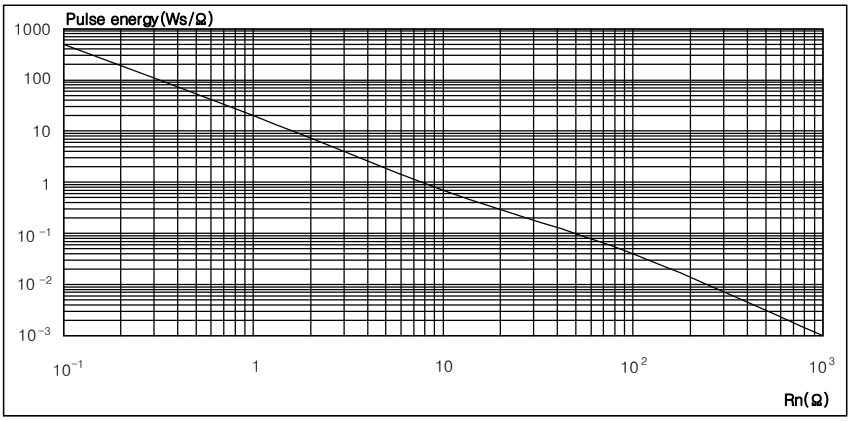

Fig. 4 Pulse capability; W_s as a function of R_n. (WWR 3W)

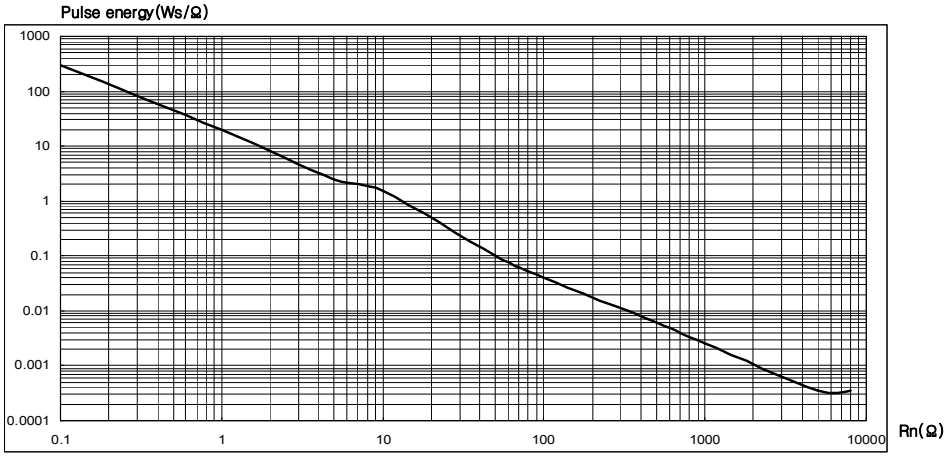

Fig. 5 Pulse capability; W_s as a function of R_n. (WWR 5Ws)

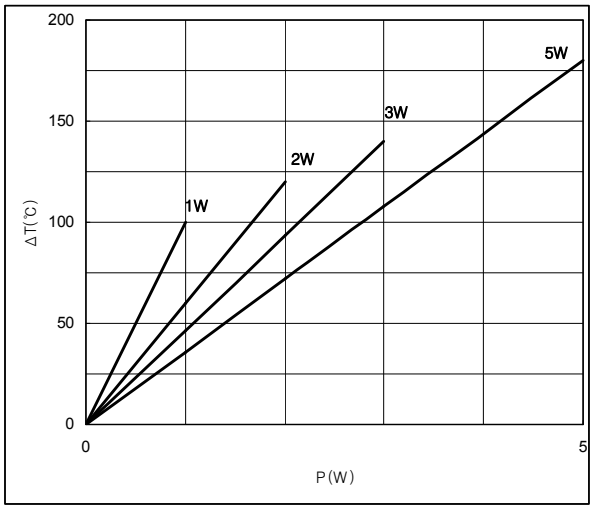

Fig. 7 Hot – spot temperature rise (Δ T) as a function of dissipated power

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MECHANICAL DATA

Table 4. Mass per 100 units

TYPE	MASS (g)
WWR 1W	55
WWR 2W	72
WWR 3W	133
WWR 5Ws	171

MARKING

The nominal resistance and tolerance are marked on the resistor using four or five colored bands in accordance with IEC publication 60062 “color codes for fixed resistors”

Table 5. BODY COLORS

TYPE	COLORS	
	Non inductive	Inductive
WWR 1W	Light brown	Light green
WWR 2W	Light brown	Light green
WWR 3W	Light brown	Light green
WWR 5Ws	Light brown	Light green

TEST AND REQUIREMENTS

Table 6. Test procedures and requirements

TEST	PROCEDURE	REQUIREMENTS
terminal strength	Load : 4.5Kg ; 10s	No evidence of mechanical damage or loosening terminals.
bending half number of samples	load : 0.5Kg ; 4x90°	no damage
torsion other half of samples	3x360° in opposite directions	no damage $\Delta R/R_{max}$: ±0.25%+0.05Ω
solderability	5s; 260℃	good tinning ; ≥95%
resistance to soldering heat	thermal shock : 3s; 350℃; 2.5mm from body	$\Delta R/R_{max}$: ±2%+0.05Ω
rapid change of temperature	30minutes at –40℃ and 30minutes at +200℃; 5cycles	$\Delta R/R_{max}$: ±2%+0.05Ω
damp heat (steady state)	56days; 40℃; 90 to 95% RH; dissipation ≤0.01 P_n	$\Delta R/R_{max}$: ±3.0%+0.1Ω
endurance	1000hours at 70℃; P_n or V_{max} 1.5 hours on and 0.5 hours off	$\Delta R/R_{max}$: ±5.0%+0.1Ω
endurance at upper category temperature	1000 hours; 200℃; no load	$\Delta R/R_{max}$: ±5.0%+0.1Ω
temperature coefficient	between –40℃ and +200℃ (TC x 10^{-6}/K)	R < 0.1R : ±250ppm / °C R ≥ 0.1R : ±150ppm / °C
insulation resistance	500V_{DC} during 1minute; V-block method	$R_{ins\ min}$: 1000 MΩ
short time overload	rated voltage x 2.5, 5s on 45s off 5cycles (V ≤ V_{max})	$\Delta R/R_{max}$: ±2.0%+0.05Ω
dielectric withstanding voltage	500V_{RMS} during 1minute; V-block method	no breakdown