

APPROVAL SHEET

Product Name : Power Resistor

Part No. : TWP20,TWP30H,TWP35H,TWP50,TWP100H

**Description : TO220 : 20W, 30W, 35W, 50W
TO247 : 100W**

TO-220 Power Resistor_TWP 20 Series

■ Features

- 20 watts at 25°C case temperature heat sink mounted
- TO-220 style power package
- Molded case for protection and easy to mount
- Electrically isolated case
- Non-Inductive design



■ Applications

- High Speed Switching Power Supplies
- Snubbers Circuits
- Load Resistor for Pulse Generators
- Voltage Regulation
- VHF Amplifiers

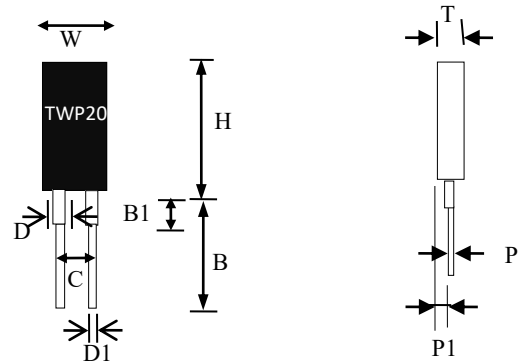
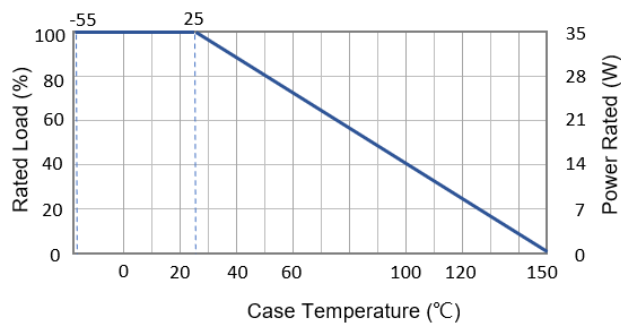
■ Construction



①	Radiator Fin	③	Lead
②	Alumina Substrate	④	Molding

■ Derating Curve

Operating Temperature Range: -55 to +150°C



■ Dimensions (Unit: mm)

Type	W	H	B	B1	C	D	D1	T	P	P1
TWP20	10.41 ±0.26	16.26 ±0.26	12.70 ±1.27	3.3 ±0.76	5.08 ±0.26	1.27 ±0.13	0.86 ±0.1	3.18 ±0.26	0.55 ±0.1	1.78 ±0.26

Part Number Explanation

TWP	20	F	B	D	1001
Product	Power	Tolerance	Packaging	TCR (PPM/°C)	Resistance
Power Resistor	20=20W	D= ±0.5% F= ±1% J= ±5% K= ±10%	D= Tube B= Bulk	D= ±50 E= ±100 F= ±200 G= ±300 “-“= No Specified	R100=100mΩ 10R0=10Ω 470R=470Ω 1001=1KΩ 1002=10KΩ

Electrical Characteristics Specifications

Type \ Item	Resistance Range				TCR (PPM/°C)
	±0.5%	±1%	±5%	±10%	
TWP 20	-	-	0.05Ω-1Ω		No Specified
	-	>1Ω-3Ω			±300
	-	>3Ω-10Ω			±100、±200
	>10Ω-10KΩ			±50、±100、±200	
	>10KΩ-1MΩ			±100、±200	

- Operating Voltage : 350V Max ;
- Dielectric Strength : 1,800VAC ;
- Insulation Resistance : 10GΩ min .
- Working Temperature Range : -65°C to +150°C.

Reliability Test and Requirement

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	Referenced to 25°C, ΔR taken at +105°C
Short Time Overload	ΔR±0.3%	2 times rated power with applied voltage not to exceed 1.5 times Maximum continuous operating voltage for 5 seconds
Load Life	ΔR±1.0%	2,000 hours at rated power
Damp Heat with Load	ΔR±0.5%	40±2°C, 90~95% R.H. Max. working voltage for 1,000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF”
Solderability	90% min. Coverage	245±5°C for 3±5 seconds
Terminal Shock	ΔR±0.3%	-65°C~150°C, 100 cycles
Terminal Strength	ΔR±0.2%	(Pull Test)2.4N
Vibration, High Frequency	ΔR±0.2%	20g peak

- Lead Material: Tinned Copper
- Without a Heat Sink,.
- When in Free Air at 25°C, the TWP20 is Rated for 3W
- The Case Temperature is to be used for the Definition of the Applied Power Limit
- The Case Temperature Measurement must be made with a Thermocouple Contacting the Center of the Component mounted on the Designed Heat Sink.
- Thermal Grease should be Applied Properly.

TO-220 Power Resistor _TWP 30H series

■ Features

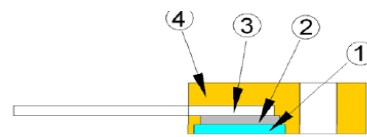
- 30 watts at 25°C case temperature heat sink mounted
- TO-220 style power package
- Single screw mounting to heat sink
- Molded case for protection and easy to mount
- Electrically isolated case
- Non-Inductive design



■ Applications

- Gate Resistors in Power Supplies
- Snubbers
- Load and Dumping in Resistors in CRT Monitors
- Automated Machine Controller
- Terminal Resistance in RF Power Amplifiers
- Voltage Regulation
- Low Energy Pulse Loading
- UPS

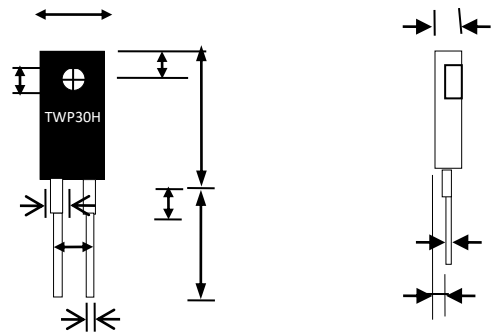
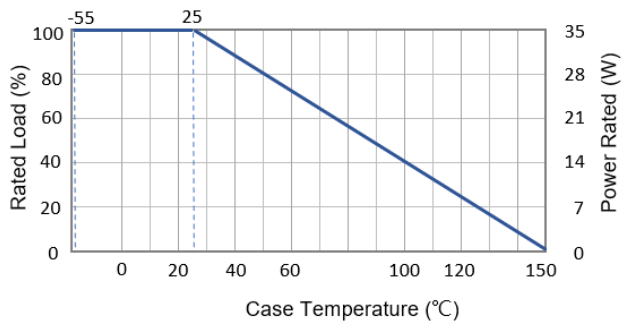
■ Construction



①	Alumina Substrate	③	Lead
②	Resistor Layer	④	Molding

■ Derating Curve

Operating Temperature Range: -55 to +150°C



■ Dimensions (Unit:mm)

Type	W	H	H1	B	B1	C	D	D1	L	T	P	P1
TWP30H	10.41 ±0.26	16..26 ±0.26	3.18 ±0.26	12.70 ±1.27	3.3 ±0.76	5.08 ±0.26	1.27 ±0.13	0.86 ±0.1	3.18 ±0.1	3.18 ±0.26	0.55 ±0.1	1.78 ±0.26

Part Number Explanation

TWP	30H	F	B	D	1001
Product	Power	Tolerance	Packaging	TCR (PPM/°C)	Resistance
Power Resistor	30H=30W (Hole)	D= ±0.5% F= ±1% J= ±5% K= ±10%	D= Tube B= Bulk	D= ±50 E= ±100 F= ±200 G= ±300 “-“= No Specified	R100=100mΩ 10R0=10Ω 470R=470Ω 1001=1KΩ 1002=10KΩ

Electrical Characteristics Specification

Type \ Item	Resistance Range				TCR (PPM/°C)
	±0.5%	±1%	±5%	±10%	
TWP30H	-	-	0.05Ω-1Ω		No Specified
	-	>1Ω-3Ω			±300
	-	>3Ω-10Ω			±100、±200
	>10Ω-10KΩ				±50、±100、±200
	>10KΩ-1MΩ				±200、±300

- Operating Voltage : 420V Max ;
- Dielectric Strength : 1,800VAC ;
- Insulation Resistance : 10GΩ min .
- Working Temperature Range : -65°C to +150°C.

Reliability Test and Requirement

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	Referenced to25°C ,△R taken at +105°C
Short Time Overload	△R±0.3%	2 times rated power with applied voltage not to exceed 1.5 times Maximum continuous operating voltage for 5 seconds
Load Life	△R±1.0%	2,000 hours at rated power
Damp Heat with Load	△R±0.5%	40±2°C, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF”
Solderability	90% min. Coverage	245±5°C for 3 seconds
Terminal Shock	△R±0.3%	-65°C~150°C, 100 cycles
Terminal Strength	△R±0.2%	(Pull Test)2.4N
Vibration, High Frequency	△R±0.2%	20g peak

- Lead Material: Tinned Copper
- Maximum Torque:0.9 N-m
- When in Free Air at 25°C, the TWP30H is Rated for 2.25W
- The Case Temperature is to be used for the Definition of the Applied Power Limit
- The Case Temperature Measurement must be made with a Thermocouple Contacting the Center of the Component mounted on the Designed Heat Sink.
- Thermal Grease should be Applied Properly.

TO-220 Power Resistor _TWP 35H series

Features

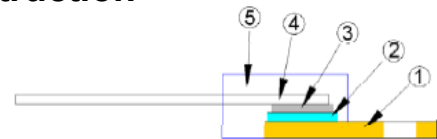
- 35 watts at 25°C case temperature heat sink mounted
- TO-220 style power package
- Single screw mounting to heat sink
- Molded case for protection and easy to mount
- Electrically isolated case
- Non-Inductive design



Applications

- Switching Power Supplies
- Snubbers Circuits
- Automated Machine Controller
- RF Power Amplifiers.
- Low Energy Pulse Loading
- UPS
- Voltage Regulation

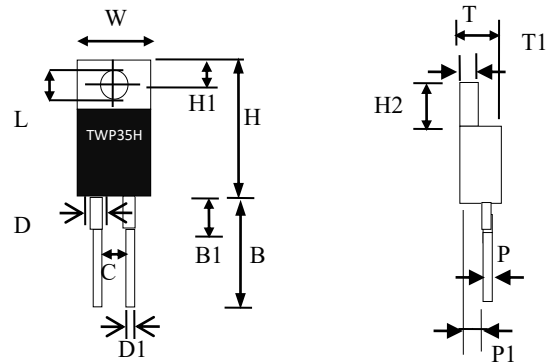
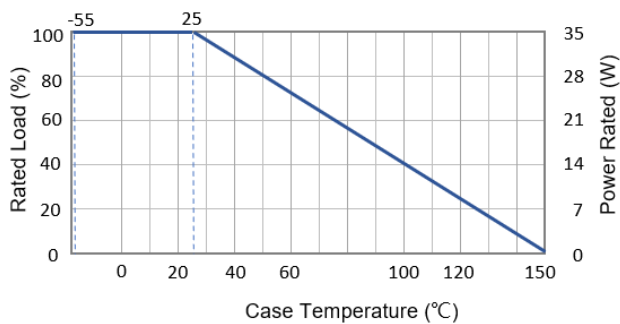
Construction



①	Radiator Fin	④	Copper Lead
②	Alumina Substrate	⑤	Molding
③	Resistor Layer		

Derating Curve

Operating Temperature Range: -55 to +150°C



Dimensions (Unit: mm)

Type	W	H	H1	B	B1	D	D1	L	C	T	T1	H2	P	P1
TWP35H	10.16 ±0.25	14.75 ±0.25	2.85 ±0.2	13.7 ±1.0	4 MAX	1.27 ±0.1	0.78 ±0.08	3.75 ±0.2	5.08 ±0.25	4.44 ±0.38	1.3 ±0.1	6.1 ±0.25	0.55 ±0.15	2.285 ±0.235

Part Number Explanation

TWP	35H	F	B	D	1001
Product	Power	Tolerance	Packaging	TCR (PPM/°C)	Resistance
Power Resistor	35H=35W (Hole)	D= ±0.5% F= ±1% J= ±5% K= ±10%	D= Tube B= Bulk	D= ±50 E= ±100 F= ±200 G= ±300 “-“= No Specified	R100=100mΩ 10R0=10Ω 470R=470Ω 1001=1KΩ 1002=10KΩ

Electrical Characteristics Specification

Type \ Item	Resistance Range				TCR (PPM/°C)
	±0.5%	±1%	±5%	±10%	
TWP35H	-	-	0.1Ω-1Ω		No Specified
	-	>1Ω-3Ω			±300
	-	>3Ω-10Ω			±100、±200
	>10Ω-10KΩ				±50、±100、±200

- Operating Voltage : 350V Max ;
- Dielectric Strength : 1,800VAC ;
- Insulation Resistance : 10GΩ min .
- Working Temperature Range : -65°C to +150°C.

Reliability Test and Requirement

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	Referenced to25°C ,ΔR taken at +105°C
Short Time Overload	ΔR±0.3%	2 times rated power with applied voltage not to exceed 1.5 times Maximum continuous operating voltage for 5 seconds
Load Life	ΔR±1.0%	2,000 hours at rated power
Damp Heat with Load	ΔR±0.5%	40±2°C, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF”
Solderability	90% min. Coverage	245±5°C for 3 seconds
Terminal Shock	ΔR±0.3%	-65°C~150°C, 100 cycles
Terminal Strength	ΔR±0.2%	(Pull Test)2.4N
Vibration,High Frequency	ΔR±0.2%	20g peak

- Lead Material: Tinned Copper
- Maximum Torque:0.9 Nm
- Without a Heat Sink,. When IN Free Air at 25°C, the TWP35H is Rated for 2.5W
- The Case Temperature is to be used for the Definition of the Applied Power Limit
- The Case Temperature Measurement must be made with a Thermocouple Contacting the Center of the Component mounted on the Designed Heat Sink.
- Thermal Grease should be Applied Properly.

TO-220 Power Resistor _TWP 50 Series

■ Features

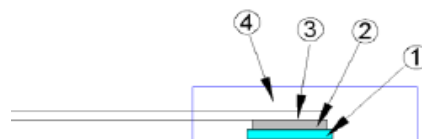
- 50 watts at 25°C case temperature heat sink mounted
- Molded case for protection and easy to mount
- Electrically isolated case
- Non-Inductive design



■ Applications

- Switching Power Supplies
- Non-inductive Design for High Frequency
- Pulsing Applications
- UPS
- Voltage Regulation

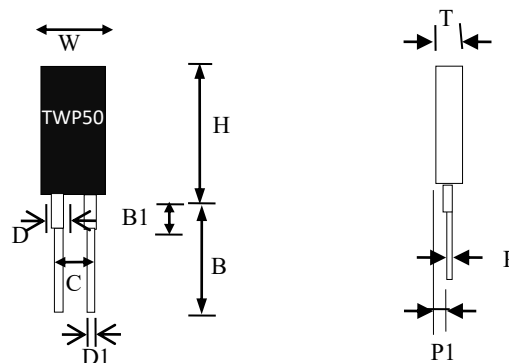
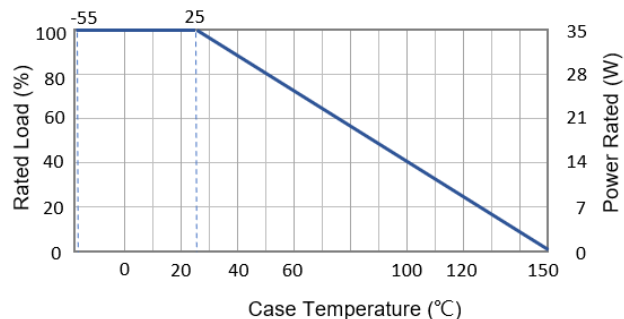
■ Construction



①	Radiator Fin	③	Lead
②	Alumina Substrate	④	Molding

■ Derating Curve

Operating Temperature Range: -55 to +150°C



■ Dimensions (Unit: mm)

Type	W	H	B	B1	C	D	D1	T	P	P1
TWP50	10.41 ±0.26	16.26 ±0.26	12.70 ±1.27	3.3 ±0.76	5.08 ±0.26	1.27 ±0.13	0.86 ±0.1	3.18 ±0.26	0.55 ±0.1	1.78 ±0.26

Part Number Explanation

TWP	50	F	B	D	1001
Product	Power	Tolerance	Packaging	TCR (PPM/°C)	Resistance
Power Resistor	50=50W	D= ±0.5% F= ±1% J= ±5% K= ±10%	D= Tube B= Bulk	D= ±50 E= ±100 F= ±200 G= ±300 “-“= No Specified	R100=100mΩ 10R0=10Ω 470R=470Ω 1001=1KΩ 1002=10KΩ

Electrical Characteristics Specifications

Type \ Item	Resistance Range				TCR (PPM/°C)
	±0.5%	±1%	±5%	±10%	
TWP 50	-	-	0.1Ω-1Ω		No Specified
	-	>1Ω-3Ω			±300
	-	>3Ω-10Ω			±100、±200
	>10Ω-10KΩ			±50、±100、±200	
	>10KΩ-1MΩ			±200、±300	

- Operating Voltage : 350V Max ;
- Dielectric Strength : 1,800VAC ;
- Insulation Resistance : 10GΩ min °
- Working Temperature Range : -65°C to +150°C.

Reliability Test and Requirement

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	Referenced to 25°C, ΔR taken at +105°C
Short Time Overload	ΔR±0.3%	2 times rated power with applied voltage not to exceed 1.5 times Maximum continuous operating voltage for 5 seconds.
Load Life	ΔR±1.0%	2,000 hours at rated power
Damp Heat with Load	ΔR±0.5%	40±2°C, 90~95% R.H. Max. working voltage for 1,000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Solderability	90% min. Coverage	245±5°C for 3±5 seconds
Terminal Shock	ΔR±0.3%	-65°C~+150°C, 100 cycles
Terminal Strength	ΔR±0.2%	(Pull Test)2.4N
Vibration, High Frequency	ΔR±0.2%	20g peak

- Lead Material: Tinned Copper
- Without a Heat Sink,.
- When in Free Air at 25°C, the TWP50 is Rated for 3W
- The Case Temperature is to be used for the Definition of the Applied Power Limit
- The Case Temperature Measurement must be made with a Thermocouple Contacting the Center of the Component mounted on the Designed Heat Sink.
- Thermal Grease should be Applied Properly.

TO-247 Power Resistor _TWP 100H Series

Features

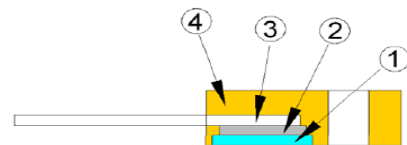
- 100 Watts at 25°C case temperature heat sink mounted
- TO-247 style power package
- Single M3 screw mounting to heat sink
- Molded case for protection and easy to mount
- Electrically isolated case
- Non-Inductive design



Application

- Gate Resistors in Power Supplies
- Snubbers
- Load and Dumping Resistors in CRT Monitors
- Terminal Resistance in RF Power Amplifier
- Voltage Regulation/UPS
- Low Energy Pulse loading

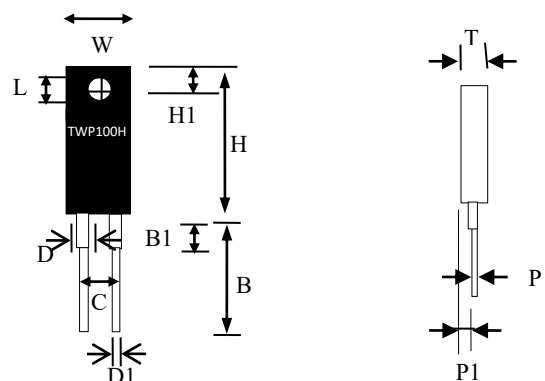
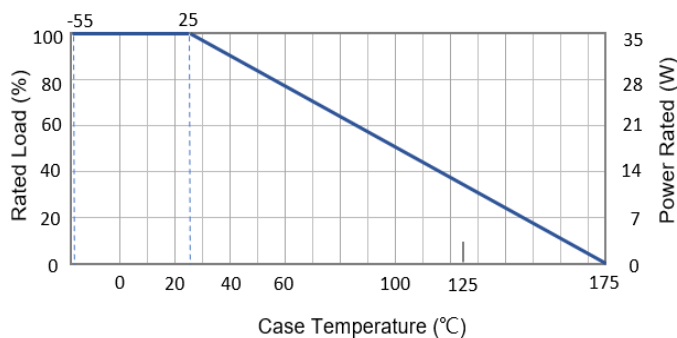
Construction



①	Alumina Substrate	③	Lead
②	Resistor Layer	④	Molding

Derating Curve

Operating Temperature Range: -55 to +175°C



Dimension (Unit: mm)

Type	W	H	H1	B	B1	D	D1	L	C	T	P	P1
TWP100H	15.75 ±0.26	20.7 ±0.26	5.33 ±0.26	14.48 ±1.27	2.79 ±0.76	3.63 ±0.18	1.52 ±0.1	3.63 ±0.1	10.16 ±0.26	4.95 ±0.26	0.81 ±0.26	2.41 ±0.26

Part Number Explanation

TWP	100H	F	B	D	1001
Product	Power	Tolerance	Packaging	TCR (PPM/°C)	Resistance
Power Resistor	100H=100W (Hole)	F= ±1% J= ±5% K= ±10%	D= Tube B= Bulk	D= ±50 E= ±100 F= ±200 G= ±300 “-“= No Specified	R100=100mΩ 10R0=10Ω 470R=470Ω 1001=1KΩ 1002=10KΩ

Electrical Characteristics Specifications

Type	Item	Resistance Range			TCR (PPM/°C)
		±1%	±5%	±10%	
TWP100H	-	0.2Ω-1Ω			No Specified
	>1Ω-3Ω				±300
	>3Ω-10Ω				±100、±200
	>10Ω-10KΩ				±50、±100、±200
	>10KΩ-1MΩ				±200、±300

- Operating Voltage : 700V Max.
- Dielectric Strength : 1,800VAC.
- Insulation Resistor : 10GΩ min .
- Working Temperature Range : -65°C to +175°C.

Reliability Test and Requirement

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec..	Referenced to25°C,+△R taken at +105°C
Load Life	△R±1.0%	Rated power,2,000 hours
Solderability	90%min. coverage	245±5°C for 3 seconds
Momentary Overload	△R±0.3%	1.5 times rated power and V(dc)≤1.5V Max.. for 5 seconds
Dielectric strength	△R±0.15%	1,800V AC,60 seconds
Moisture resistance	△R±0.5%	-10°C~+65°C, RH>90% cycle 240 hours
Thermal Shock	△R±0.3%	-65°C~150°C, 100 cycles
Terminal Strength	△R±0.2%	(Pull Test)2.4N
Vibration, High Frequency	△R±0.2%	20g peak

- Lead Material : Tinned Copper
- Maximum Torque : 0.9Nm
- When in Free Air at 25°C · the TWP100H is Rated for 3.5W
- The case Temperature is to be used for the Definition of the Applied Power Limit
- The case Temperature Measurement must be made with a Thermocouple Contacting of the Component mounted on the Designed Heat Sink
- Thermal Grease should be Applied Properly.