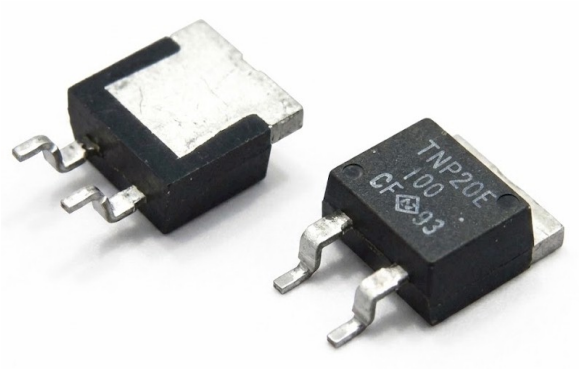
TO263 35W HIGH POWER WIDEBAND RESISTORS

Features

- 35W Power rating, TO263 (D2PAK) package
- AEC-Q200 Grade, RoHS 2 compliant
- UL94 V-0 certified material
- 175℃ maximum operating temperature
- Surface Mounting Resistor
- Supports reflow and wave soldering



Applications

- Power Supply Units
- Motor-Driven Equipment
- Inverter Circuit
- Automotive electrical equipment
- Electronic Load Device
- Testing/Measuring Equipment
- Filter / Bleeder / Snubber / UPS
- Damping Resistor

GENERAL SPECIFICATIONS

Parameter	Test Conditions	Values/Specifications
Rated Power	At a flange temperature of -55℃~+25℃	35W
Rated Power	In free-air operation	2W
Max. Operating Volt.	Maximum input current : 20A	Smaller value either 500V or √P×R

*** Note :** In some of high ohmic and low ohmic cases, the rated power cannot be input due to the limitation of the maximum operation voltage or current value. Please use under 500V in the case over 7k Ohms. Please use below 20A in the case under 0.1 Ohms.

CHARACTERISTICS

Parameter	Values/Specifications	Test Conditions
Heat Resistance	3.3 ℃/W	Between resistive material and flange *Typical value
Capacitance	1.44 pF	Between terminal and flange *Typical value
Inductance	8.38 nH	Between terminals *Typical value
Insulation Resistance	≥1,000 MΩ	Between terminal and flange
Insulation Voltage	≥2,000 VAC	Between terminal and flange, 1min.
Weight	1.5 g	-
High Temperature Exposure (Storage)	±(1.00%+0.05Ω)	AEC-Q200 No.3 +175 ℃, 1,000 hours, 77pcs
Temp. Cycle	±(1.00%+0.05Ω)	AEC-Q200 No.4 -55 ℃ 30min. +125 ℃ 30min. 77pcs 1,000 cycles
Moisture Resistance	±(1.00%+0.05Ω)	AEC-Q200 No.6 +85 ℃, 85 %RH, 1,000 hours, 0.1W, 77pcs
High Temperature Operating Life	±(1.00%+0.05Ω)	AEC-Q200 No.8 TA=125 ℃, 1,000 hours, Rated power, 77pcs
Terminal Strength	±(0.25%+0.05Ω)	AEC-Q200 No.11 30pcs

TNP series

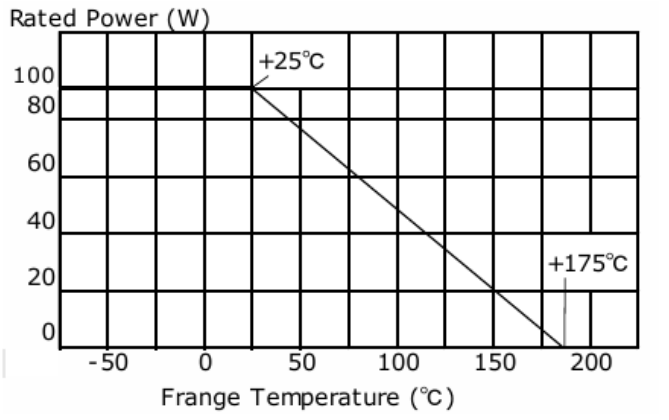
AEC Q200

RoHS2 COMPLIANT

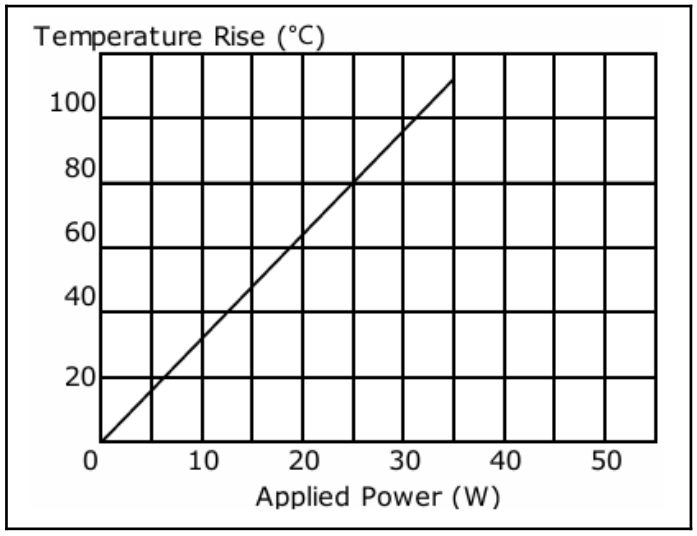
CHARACTERISTICS

Parameter	Values/Specifications	Test Conditions
Vibration	±(1.00%+0.05Ω)	AEC-Q200 No.14 10~2,000 Hz, 30pcs
Solder ability	≥ 95 %	JIS C 60068-2-20 4.2.1 Pb-free solder, 245±5 ℃, 3sec. 22pcs
Soldering Heat	± 0.1 %	JIS C 60068-2-20 5.2.1 Pb-free solder, 260±5 ℃, 10sec. 44pcs

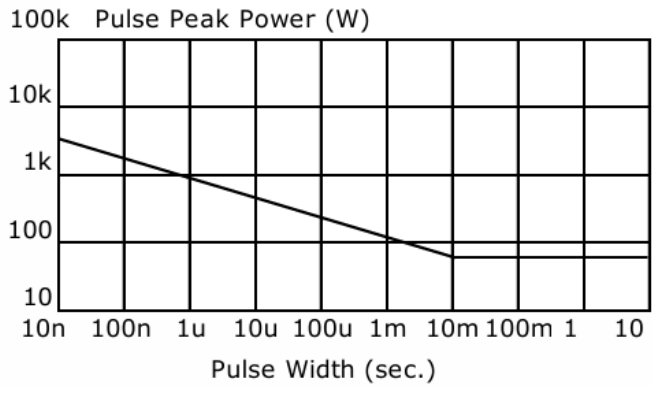
DERATING



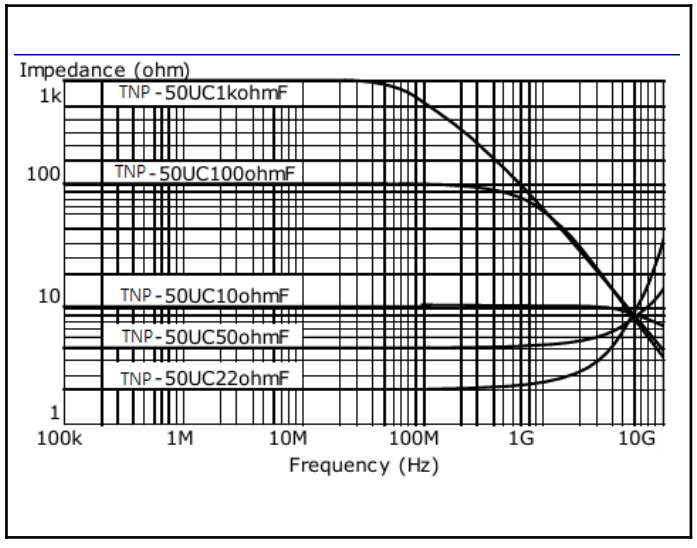
TEMPERATURE RISE



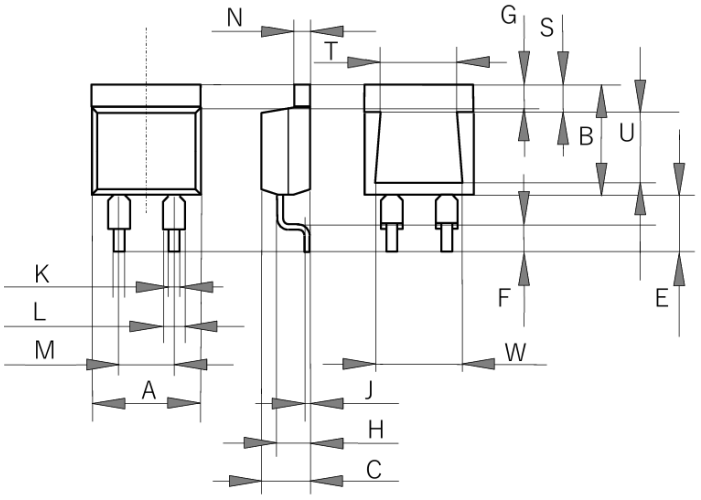
PULSE ENERGY DURABILITY



FREQUENCY CHARACTERISTICS

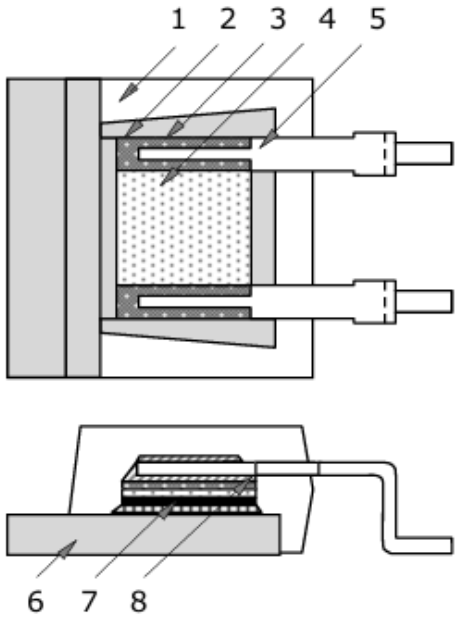


DIMENSIONAL SPECIFICATIONS [mm]



A	10.1±0.2	K	0.75±0.05
B	103±0.2	L	1.5±0.05
C	4.5±0.2	M	5.08±0.1
E	5.0±0.5	N	1.5±0.05
F	2.5±0.25	T	7.0±0.1
G	2.2±0.2	U	5.8±0.1
H	2.75±0.2	W	7.6±0.1
J	0.5±0.05		

STRUCTURE AND MATERIAL



No.	Part	Material	Remark
1	Exterior resin	Epoxy resin	UL94V-0
2	Substrate	Alumina	-
3	Electrode	Thin-film : Cu Thick-film : Ag-Pd	- -
4-1	Resistive material	Thin-film : NiCr Thick-film : RuO	- -
4-2	Internal protective layer	Epoxy resin	-
5	Terminal	Cu-Sn plating	-
6	Flange	Cu-Sn plating Cu-Ni plating	20E, 20F 20D
7	Flange joint	Sn 97% solder –Ag-Cu Pb 90% solder –Sn-Ag	20D, 20E 20F
8	Terminal joint	Pb 90% solder –Sn-Ag	-

* Thin-film : 10-51kΩ, Thick-film : 0.01-1MΩ

* 4 : Layering in order as 4-1, 4-2

ORDERING PROCEDURE EXAMPLE

Model#	TCR*	Resistance	Tolerance	Package
TNP-20D	C 50 ppm/℃	10Ω~51kΩ	F ±1%	Z01 : TAPE REEL
TNP-20E	A 100 ppm/℃	0.1Ω~510kΩ	J ±5%	Z03 : PVC STICK
TNP-20F	P 150 ppm/℃	560kΩ~1MΩ		
	H 250 ppm/℃	0.01Ω~0.09Ω		

Resistance value (*) is available following modified E24, +24.

1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2	2.4	2.5	2.7	3.0	3.3
3.6	3.9	4.0	4.3	4.7	5.0	5.1	5.6	6.2	6.8	7.5	8.0	8.2	9.1

*TCR and tolerance are determined by the resistance value.

NOTES

(1) The resistance value and the tolerance are selectable not only from E24 as customization.
(2) Flange is insulated from the internal resistive elements.
(3) Resistance value is defined at the lead-crank section as the measurement point.
(4) TCR value of low resistance values depend on the TCR of copper terminals. The TCR will show the following values : 300ppm/0.02ohm, 200ppm/0.05ohm, 140ppm/0.1ohm, 80ppm/0.2ohm
(5) Tentative continuous-pulse power allowance at duty 0.01.

INSTRUCTIONS FOR USE

(1) If the resistor is not mounted on a heatsink, please operate it at 2 W or less in ambient room temperature.
(2) This product is not designed for use in the special environments listed below.
■ Direct sunlight, outdoor exposure, or dusty environments
■ Areas with corrosive gases such as sea breeze, Cl_2, NO_2, NH_3, H_2S, or SO_2
■ Environments with strong electrostatic discharge or electromagnetic interference
■ Installation in close proximity to heat-generating components
■ Mounting methods where the product is isolated from the heat-dissipation system and encapsulated or coated with resin
■ Environments with continuous condensation
(3) Please handle the product with care, as it may be damaged if subjected to impacts such as dropping.
(4) This product is not designed for radiation-resistant operation or for use in vacuum environments.
(5) Please verify the product's performance and reliability when it is mounted in the actual equipment. In particular, when transient loads such as pulses are applied, be sure to confirm performance and reliability.
(6) Any failure caused by operating the product beyond the conditions stated in the datasheet is excluded from our warranty.