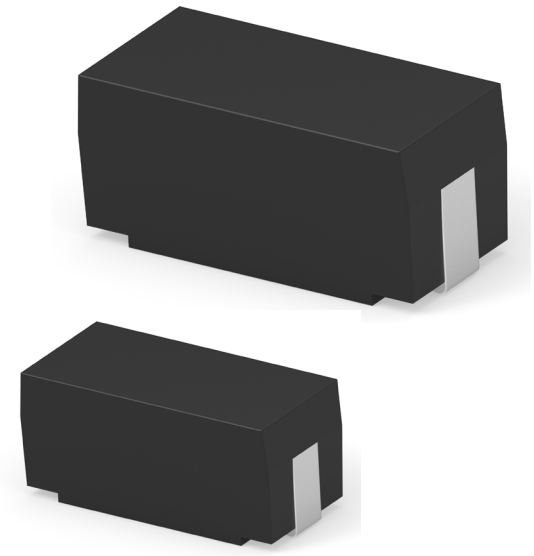
SMD MOULDED POWER RESISTOR

TYPE SMQ SERIES | AEC-Q200 QUALIFIED

INTRODUCTION

TE Connectivity (TE) introduces an AEC-Q200 qualified version of its SM series surface mount power resistor, adding UL94V0 flame resistance. Available in 3 ratings up to 3 watts and supplied on tape and reel for automatic insertion process.



FEATURES

- Available on tape
- Very wide value range
- Excellent for power circuitry
- Available in 3 ratings up to 3 watts
- Flame resistant coating UL94V0
- AEC-Q200 qualified
- Moisture sensitivity level - MSL1

APPLICATIONS

- Automotive
- Servo drives
- Factory automation
- Battery energy storage systems
- Power distribution units

Note: *SMD (Surface mount devices) resistors and inductors should be kept in their original packaging to protect them from ESD (Electrostatic Discharge). The full reels can be broken into smaller quantities, without exposing them to ESD, as long as the components are still in the plastic or paper tape. These resistors and inductors should not be removed from the plastic or paper tape unless they are in an ESD protected environment.*

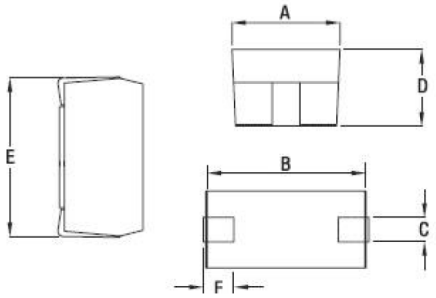
ELECTRICAL CHARACTERISTICS

	SMQ_1 – Wire	SMQ_1 – Film	SMQ_2 – Wire	SMQ_2 – Film	SMQ_3 – Wire	SMQ_3 – Film
Values SMQ_1	R10 – 200R	201R – 2M	R10 – 300R	301R – 2M	R10 – 500R	501R – 2M
Value grid	E24					
Resistance tolerance	1% or 5%					
Power rating @ 20°C	1.0 Watts	1.0 Watts	2.0 Watts	2.0 Watts	3.0 Watts	3.0 Watts
Derating	See Curve Below					
Max operating voltage SMQ_1	300 Volts	300 Volts	500 Volts			
Operating temperature range	-55 ~ 150°C					
Temperature coefficient of resistance	± 200ppm /°C	± 100ppm /°C	± 200ppm /°C	± 100ppm /°C	± 200ppm /°C	± 100ppm /°C

ENVIRONMENTAL CHARACTERISTICS

Test	Condition	SMQ – Wire	SMQ – Metal Film
Temperature coefficient of resistance	-55°C – +150°C	± 200ppm /°C	± 100ppm /°C
Rated load	Rated voltage for 30 minutes surface temp. 200°C max.	± 1%	± 1%
Short time overload	5 times of rated wattage for 5 sec.	± 1%	± 0.5%
Voltage withstand	500VAC for 60 seconds	No physical damage	
Insulation resistance	500VDC megger	10,000 MΩ	10,000 MΩ
Solderability	235°C ±5°C for 2 seconds	95% coverage	
Resistance to soldering heat	270°C ±5°C for 10 ±1 seconds	Resistance value change within ± 1%	
Temperature cycle	Step / Temp.(°C) / Time (m): 1 / -55±3 / 30; 2 / Room Temp. / 2~3; 3 / 150±3 / 30; 4 / Room Temp / 2~3; 5 Cycles	Resistance change rate within ±1%	
Load life	Rated power load 1.5 hrs ON 0.5 hrs OFF 70°C 95% RH 1000 hours	± 2%	± 1%
Humidity load life	Rated power load 1.5 hrs ON 0.5 hrs OFF 40°C 95% RH 500 hours	± 2%	± 1%

DIMENSIONS (UNIT: mm)

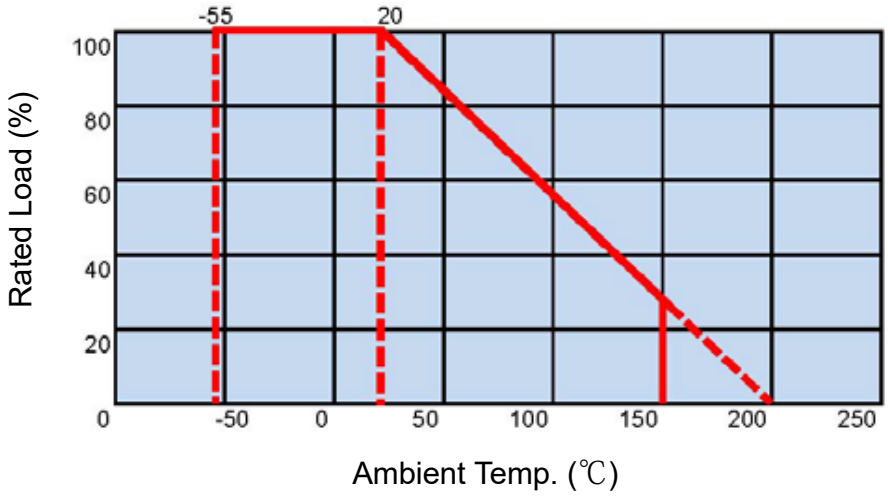


	A±0.3	B±0.3	C±0.3	D±0.3	E Max.	F±0.3	Reel Qty
SMQ 1W	4.0	6.7	1.4	3.55	7.9	1.5	2000
SMQ 2W	5.5	10.5	1.7	5.0	12.0	2.3	1000
SMQ 3W	7.3	13.5	1.7	6.8	17.0	2.5	500

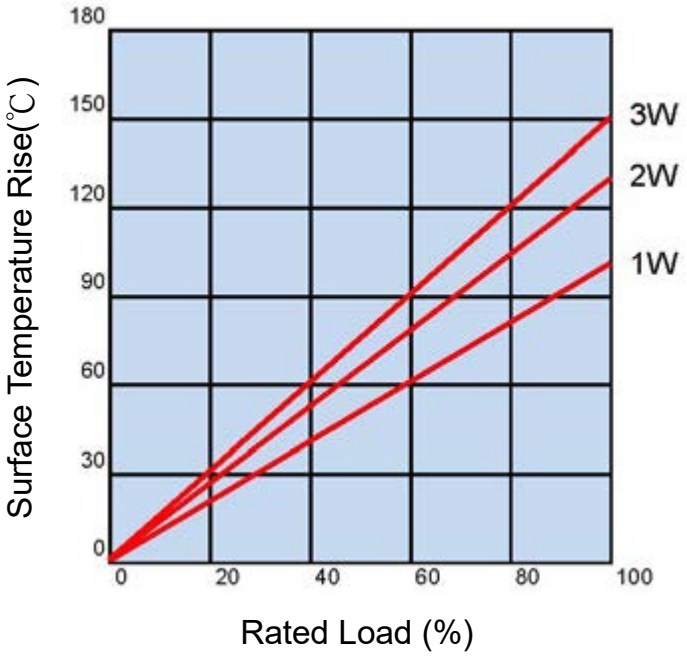
PERFORMANCE CHARACTERISTICS

Test	Condition	SMQ – Wire	SMQ – Metal Film
High temperature exposure	125°C ±3°C, 1000 hrs without load. **MIL-STD-202 method 108**	≤±0.5%	
Temperature cycling	1000 cycles (-55°C – +125°C) measurement at 24±4 hours after test conclusion. 30 min maximum dwell time at each temperature extreme. 1 min. maximum transition time. **JESD22 Method JA-104**	≤±1%	
Moisture resistance	85°C±2°C, 85%RH 1000 hours without load	≤±0.5%	
Biased humidity	1000 hours 85%RH. Note: Specified conditions: 10% of operating power. Measurement at 24 ±4 hours after test conclusion. **MIL-STD-202 Method 103**	≤±2%	≤±1%
Operational life	Steady state TA=125°C at rated power. Measurement at 24±4 hours after test conclusion. **MIL-STD-202 Method 108**	≤±2%	≤±1%
Physical dimension	Verify physical dimensions to the applicable device detail specification. Note: User and suppliers spec. **JESD22 Method JB-100**	Electrical test not required.	
Resistance to solvents	Note: Add Aqueous wash chemical – OKEM clean or equivalent. Do not use banned solvents. **MIL-STD-202 Method 215**	No abnormality on appearance	
Vibration	5 g's for 20 min., 12 cycles each of 3 orientations. Test from 10-2000 Hz. **MIL-STD-202 Method 204**	≤±0.5%	
Resistance to soldering heat	Solder bath temp. 270±10°C for 10s. **MIL-STD-202 Method 210**	≤±1%	
Mechanical shock	Pulse form: Half sine / Acceleration: 100g±20% Peak duration: 6ms±30% / Number of shocks 3 per direction Shock direction: ±X, ±Y, ±Z / Total shocks: 18 **MIL-STD-202 Method 213**	≤±0.5%	
ESD	Cd=150pf Rd=2000Ω Voltage: 2KV **AEC-Q200-002**	≤±0.5% HBM: +1 pos. +1 neg. discharge 2KV	
Solderability	Solder bath temperature: 235±5°C Dipping time: 2s **J-STD-002**	95% coverage	
Temperature coefficient of resistance	T.C (ppm/°C) = [(R2-R1)÷R1] x [1÷(T2–T1)]x10^6 R1: resistance value at reference temperature R2: resistance value at test temp. T1: reference temp. (usu. 25°C) T2: test temp. (about 125°C)	± 200ppm /°C	± 100ppm /°C

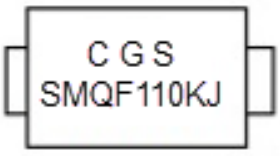
DERATING CURVE



SURFACE TEMPERATURE RISE



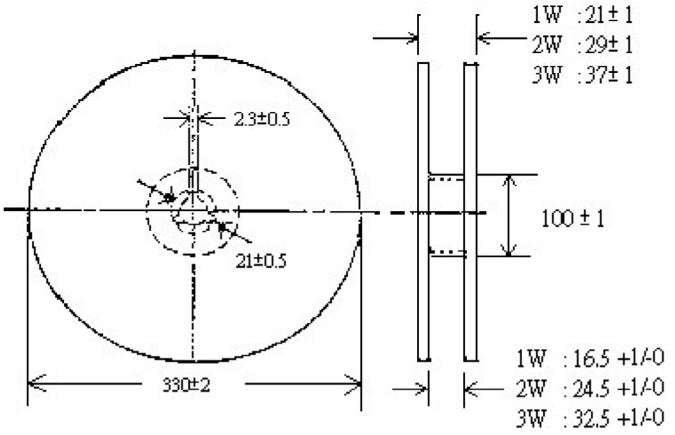
MARKING



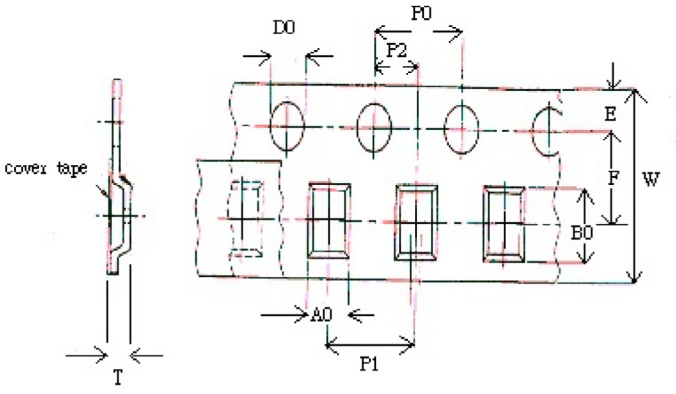
PACKAGING (UNIT: mm)

SMQ 1W – 3W

REEL

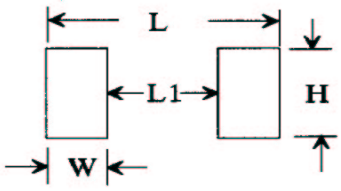


TAPE



Rated Power	B0 ± 0.2	A0 ± 0.2	P1 ± 0.1	P2 ± 0.1	P0 ± 0.1	D0 ± 0.1	E ± 0.1	F ± 0.1	W ± 0.3	T ± 0.1	pcs/reel
1W	8	4.3	8	2	4	1.5	1.75	7.5	16	4.15	2000
2W	11.8	5.8	12	2	4	1.5	1.75	11.5	24	5.8	1000
3W	17.5	7.8	16	2	4	1.5	1.75	14.2	32	7.5	500

RECOMMENDED LAND PATTERN

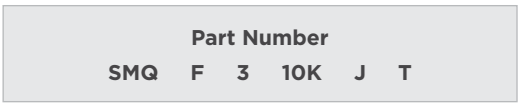


Rated Power	Dimension (mm)			
	W	H	L	L1
1W	2.6	2.0	9.2	4.0
2W	4.0	3.4	14	6.0
3W	4.5	3.4	18	9.0

STORAGE CONDITIONS

Product to be stored at a temperature between 5°C and 35°C and a relative humidity between 40% and 75%, in a chemical and dust free atmosphere

ORDERING INFORMATION



Common part

SMQ

Type

W	Wirewound
F	Metal film

Case size

1	1 Watts
2	2 Watts
3	3 Watts

Resistance value

0.1 ohm (100 milli ohms)	R10
1 ohm	1R0
100 ohm	100R
1K ohm (1000 ohms)	1K0
100K ohm (100,000 ohms)	100K

Tolerance

J	±5%
F	±1%

Pack style

T	Tape & Reel

te.com

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