AUTOMOTIVE GRADE ANTI-SULFURATED CHIP RESISTOR - CAS SERIES -

FEATURES

-Special construction to prevent sulfuration in a sulfur containing environment
-AEC-Q200 Compliance

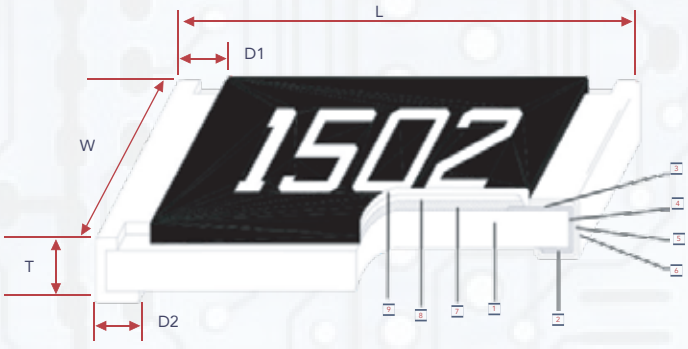
APPLICATIONS

-Automotve
-High-end Computer
-Industrial Equipment
-Automatic Equipment Controller
-Medical Equipment
-High-end Multimedia Electronics
-Outdoor Electronic Applications

PART NUMBERING GUIDE

CAS	06	F	1002	CT
TYPE	DIMENSIONS	RESISTANCE TOLERANCE	NOMINAL RESISTANCE	PACKAGING TYPE
CAS SERIES	04: 0402 06: 0603 10: 0805 12: 1206 14: 1210 20: 2010 25: 2512	D: ±0.5% F: ±1% J: ±5%	5% - 3 Digit: 1st 2 significant, 3rd is multiplier (10x) 1% & 0.5% = 4 digit 1st 3 significant, 4th is multiplier (10x)	CT: Taping Reel

CONSTRUCTION



1 Alumina Substrate	4 Edge Electrode (NiCr)	7 Resistor Layer
2 Bottom Electrode (Ag)	5 Barrier Layer (Ni)	8 Primary Overcoat (glass)
3 Top Elctrode (Ag-pd)	6 External Electrode (Sn)	9 Secondary Overcoat (Epoxy)

TYPE	SIZE INCH	L	W	T	D1	D2	WEIGHT (G) (1000 PCS)
CAS04	0402	1.00 ± 0.05	0.50 ± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.20 ± 0.10	0.620
CAS06	0603	1.60 ± 0.10	0.80 ± 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20	2.042
CAS10	0805	2.00 ± 0.10	1.25 ± 0.10	0.55 ± 0.10	0.35 ± 0.20	0.40 ± 0.20	4.368
CAS12	1206	3.10 ± 0.10	1.55 ± 0.10		0.50 ± 0.25	0.50 ± 0.20	8.947
CAS14	1210	3.10 ± 0.10	2.60 ± 0.15				15.959
CAS20	2010	5.00 ± 0.10	2.50 ± 0.15		0.60 ± 0.25		24.241
CAS25	2512	6.35 ± 0.10	3.10 ± 0.15				39.448

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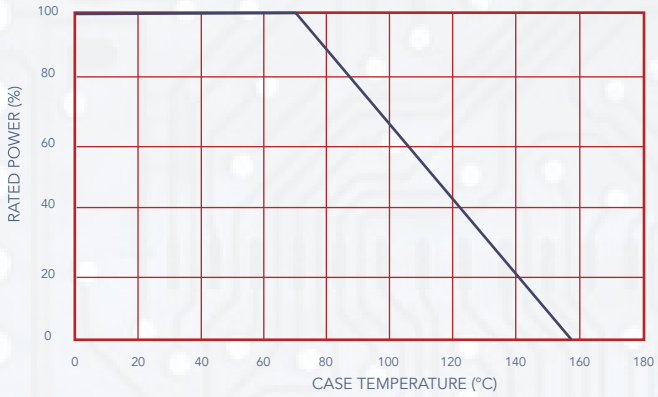
DERATING CURVE



ELECTRICAL SPECIFICATIONS

TYPE	POWER RATING AT 70°C	OPERATING TEMP. RANGE	MAX OPERATING VOLTAGE	MAX OVERLOAD VOLTAGE	RESISTANCE RANGE ±0.5%	RESISTANCE RANGE ±1%	RESISTANCE RANGE ±5%	T.C.R. (PPM / °C)
CAS04 (0402)	1/16 W	-55 ~ +155°C	50V	100V	1Ω ~ 9.76Ω 10Ω - 1MΩ 1.02MΩ - 10MΩ			±200 ±100 ±200
	Jumper: 1A				0Ω (<50MΩ)			-
CAS06 (0603)	1/10 W		50V	100V	1Ω ~ 9.76Ω 10Ω - 1MΩ 1.02MΩ - 10MΩ			±200 ±100 ±200
	Jumper: 1A				0Ω (<50MΩ)			-
CAS10 (0805)	1/8 W		150V	300V	1Ω ~ 9.76Ω 10Ω - 1MΩ 1.02MΩ - 10MΩ			±200 ±100 ±200
	Jumper: 2A				0Ω (<50MΩ)			-
CAS12 (1206)	1/4 W		200V	400V	1Ω ~ 9.76Ω 10Ω - 1MΩ 1.02MΩ - 10MΩ			±200 ±100 ±200
	Jumper: 2A				0Ω (<50MΩ)			-
CAS14 (1210)	1/3 W		200V	400V	1Ω ~ 9.76Ω 10Ω - 1MΩ 1.02MΩ - 10MΩ			±200 ±100 ±200
	Jumper: 2.5A				0Ω (<50MΩ)			-
CAS20 (2020)	3/4 W		200V	400V	1Ω ~ 9.76Ω 10Ω - 1MΩ 1.02MΩ - 10MΩ			±200 ±100 ±200
	Jumper: 3.5A				0Ω (<50MΩ)			-
CAS25 (2512)	1W		250V	500V	1Ω ~ 9.76Ω 10Ω - 1MΩ 1.02MΩ - 10MΩ			±200 ±100 ±200
	Jumper 4A				0Ω (<50MΩ)			-

Operating Voltage: $\sqrt{(P*R)}$ or Max operating voltage listed above, whichever is lower
Overload Voltage: $2.5*\sqrt{(P*R)}$ or Max overload voltage listed above, whichever is lower

CalChip is capable of manufacturing the optional spec based on customer's requirement

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ENVIRONMENTAL CHARACTERISTICS

ITEM	REQUIREMENT			TEST METHOD
	±1% AND BELOW	±5%	JUMPER	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.			=55°C ~ +125°C, 25°C is the reference temperature
Short Time Overload	±(1.0% + 0.05Ω)	± (2.0% + 0.05Ω)	<50Ω	2.5 times RCWV or Max. overload voltage for 5 seconds
Insulation Ressistance	≥10G			Max overland voltage for 1 minute
Endurance	± (2.0% + 0.10Ω)	± (3.0% + 0.10Ω)	<100mΩ	70 + 2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Biased Humidity	± (2.0% + 0.10Ω)	± (3.0% + 0.10Ω)	<100mΩ	1000 hrs 85°C / 85%RH 10% of operating power
High Temperature Exposure	± (1.0% + 0.05Ω)	± (1.5% + 0.10Ω)	<50mΩ	at +155°C for 1000 hrs
Bending Strength	± (1.0% + 0.05Ω)	± (1.0% + 0.05Ω)	<50mΩ	Bending once for 5 seconds 2010, 2512 sizes: 2mm Other sizes: 3mm
Thermal Shock	± (0.5% + 0.05Ω)	± (1.0% + 0.05Ω)	<50mΩ	-55C / +155°C. Note: Number of cycles required - 300, Maximum transfer time - 20 seconds, Dwell time - 15 minutes. Air-Air
Solderability	95% min coverage			245 ± 5°C for 3 seconds
Resistance to Soldering Heat	± (0.5% + 0.05Ω)	± (1.0% + 0.05Ω)	<50mΩ	260 ± 5°C for 10 seconds
Voltage Proof	No breakdown or flasover			1.42 times RCWV (RMS) for 1 minute
Leaching	Individual leaching area ≤5% Total leaching area ≤10%			260 ± 5°C for 30 seconds
Temperature Cycling	± (0.5% + 0.05Ω)	± (1.0% + 0.05Ω)	<50mΩ	-55°C to +125°C, 1000 cycles
Moisture Resistance	±(2.0% + 0.05Ω)	± (1.0% + 0.05Ω)	<50mΩ	24 hrs / cycle
Mechanical Shock	±(0.25% + 0.05Ω)	± (1.0% + 0.05Ω)	<50mΩ	Wave Form: Tolerance for half sine shock pulse. Peak vallue is 100g's. Normal duration (D) is 6.
Vibration	± (0.5% + 0.05Ω)	± (1.0% + 0.05Ω)	<50mΩ	5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000Hz
ESD	± (1% + 0.05Ω)			Human body, 2KV
Flame Retardance	Not flame			Temperature sensing at 500°C, voltage power subjected to 32VDC current clamped up to 500ADC and decreased in 1.0VDC/Hour
Resistance to Solvents	Markign Unsmeared			Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Terminal Strength	No broken			Force of 1.8kg for 60 seconds
Sulfur Test	ΔR ± 0.5%		<50mΩ	3~5ppm H2S, 50±2°C, 91~93% R.H., no power rating for 1000 hrs

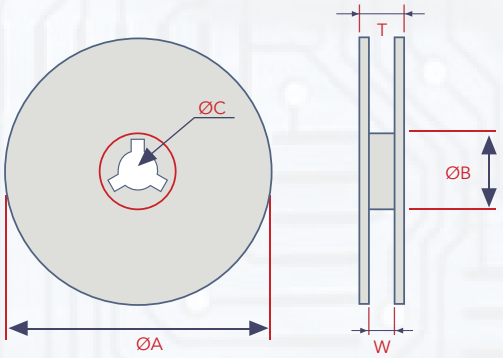
Reference Standards - IEC60115-1, 60068-2-58; JIS-C 5201-1, 6429; ASTM-B-809; AEC-Q200; MIL-STD-202; JESD22
Storage Temperature - 25±3°C; Humidity <80%RH

PACKAGING

Reel Specifications & Packaging Quantity

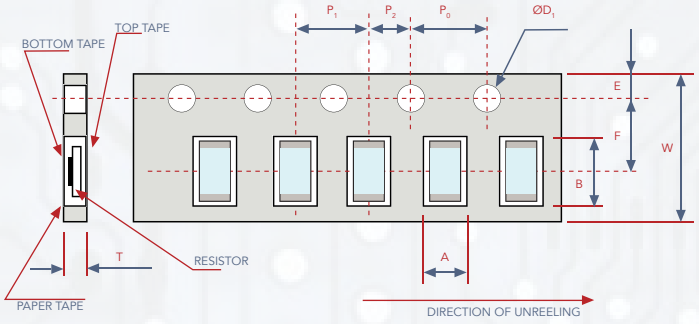
UNIT: MM

TYPE	PACKAGING QUANTITY		TYPE WIDTH	REEL DIAMETER	ØA	ØB	ØC	W	T
CAS04	Paper	10K	8mm	7 inch	178.5 ± 1.5	60 $^{+1/-0}$	13.0 ± 0.5	9.0 ± 0.5	12.5 ± 0.5
CAS06		5K							
CAS10									
CAS12									
CAS14									
CAS20	Embossed	4K	12mm	7 inch	178.5 ± 1.5	60 $^{+1/-0}$	13.0 ± 0.5	13.0 ± 0.5	15.5 ± 0.5
CAS25									



PACKAGING

Paper Tape Specifications

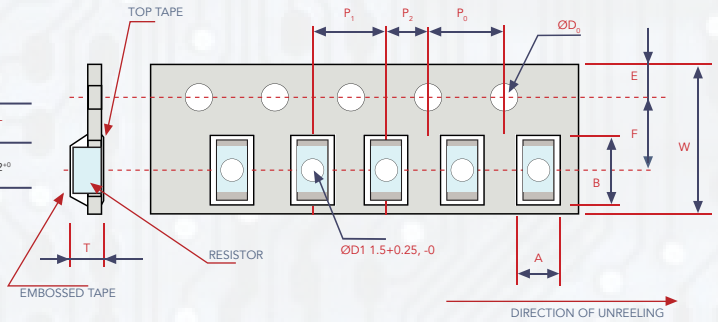


UNIT: MM

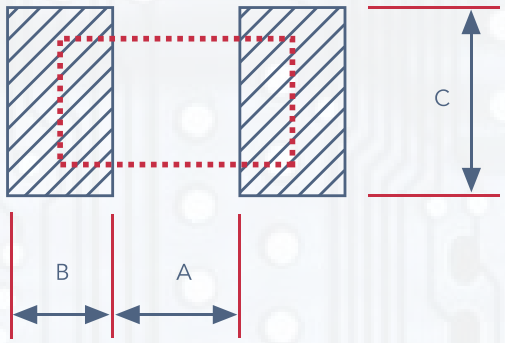
TYPE	A	B	W	E	F	P_0	P_1	P_2	$ØD_0$	T
CAS04	0.65±0.10	1.15±0.10	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.50+0.1,-0	0.45±0.10
CAS06	1.10±0.10	1.90±0.10								0.70±0.10
CAS10	1.60±0.10	2.40±0.20					4.00±0.05			0.85±0.10
CAS12	1.90±0.10	3.50±0.20								
CAS14	2.90±0.10	3.50±0.20								

Embossed Tape Specifications

TYPE	A	B	W	E	F	P_0	P_1	P_2	$ØD_0$	T
CAS20	2.8±0.10	5.5±0.10	12.0±0.30	1.75±0.10	5.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.1,-0	1.2^{+0}
CAS25	3.5±0.10	6.7±0.10								

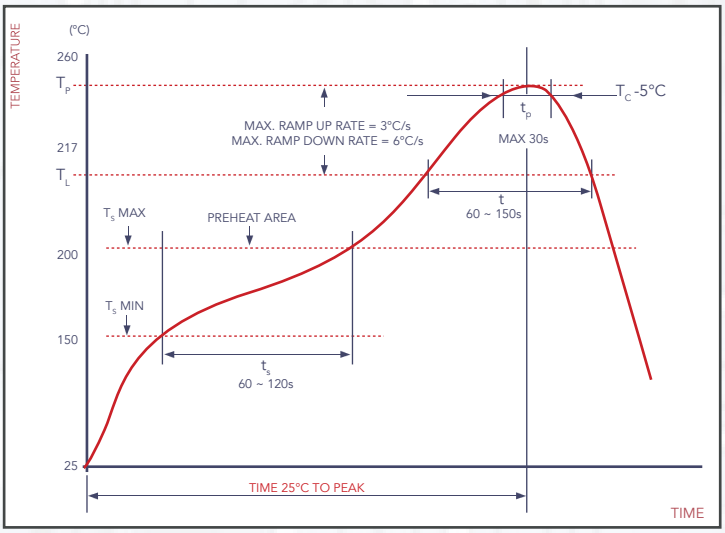


RECOMMENDED LAND PATTERN



TYPE	A	B	C
CAS04	0.50	0.45	0.60
CAS06	0.90	0.60	0.90
CAS10	1.20	0.70	1.30
CAS12	2.00	0.90	1.60
CAS14	2.00	0.90	2.80
CAS20	3.80	0.90	2.80
CAS25	3.80	1.60	3.50

SOLDERING CONDITION



RoHS Pb HF

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