Phicomp **YAGEO**

Chip Resistor Surface Mount YC/TC SERIES 102 to 358

SCOPE

This specification describes

YC (convex, flat) and TC (concave) series chip resistor arrays with leadfree terminations made by thick film process.

APPLICATIONS

- Terminal for SDRAM and DDRAM
- Computer applications: laptop computer, desktop computer
- Consume electronic equipments: PDAs. PNDs
- Mobile phone, telecom...

FEATURES

- AEC-Q200 gualified
- More efficient in pick & place application
- Low assembly costs
- RoHS compliant
- Products with lead free terminations meet RoHS requirements
- Pb-glass contained in electrodes
- Resistor element and glass are exempted by RoHS
- Reducing environmentally hazardous wastes
- High component and equipment reliability
- Saving of PCB space
- None forbidden-materials used in products/production
- Halogen Free Epoxy

ORDERING INFORMATION - GLOBAL PART NUMBER & 12NC

Both part numbers are identified by the series, size, tolerance, packing type, temperature coefficient, taping reel and resistance value.

YAGEO BRAND ordering code

GLOBAL PART NUMBER (PREFERSRED)

YC XXXX X X X X XX XXXX L/T Т

|--|

(I) SIZE

YC:102/104/122/124/162/164/248/324/158T/358L/358T TC: 122/124/164

(2) ARRAYS OR NETWORKS

Array YC102/104/122/124/162/164/248/324: -Network YCI58T/YC358L/YC358T: NA

(3) TOLERANCE

 $J = \pm 5\%$ (for Jumper ordering, use code of J)

(4) PACKAGING TYPE

R = Paper taping reel K = Embossed plastic tape reel

(5) TEMPERATURE COEFFICIENT OF RESISTANCE

– = Base on spec

(6) TAPING REEL

07 = 7 inch dia. Reel

13 = 13 inch dia. Reel

(7) RESISTANCE VALUE

There are 2~4 digits indicated the resistor value. Letter R/K/M is decimal point. Detailed resistance rules show in table of "Resistance rule of global part number".

(8) DEFAULT CODE

Letter L is the system default code for ordering only. (Note) Letter T is the only default code for YCI02.

ORDERING EXAMPLE

The ordering code of a YCI22 convex chip resistor array, value 1,000 Ω with ±5% tolerance, supplied in 7-inch tape reel is: YCI22-JR-07IKL.

YCI58T network, value $100,000\Omega$ with 5% tolerance, supplied in 7-inch tape reel is: YCI58TJR-07100KL

NOTE

- I. All our RSMD products meet RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
- 2. On customized label, "LFP" or specific symbol printed and the optional "L" at the end of GLOBAL PART NUMBER / 12NC can be added (both are on customer request)

Resistance rule of global part				
Resistance code rule	Example			
OR	0R = Jumper			
XRXX (Ι to 9.76 Ω)	R = Ω R5 = .5 Ω 9R76 = 9.76 Ω			
XXRX (10 to 97.6 Ω)	10R = 10 Ω 97R6 = 97.6 Ω			
XXXR (100 to 976 Ω)	100R = 100 Ω			
XKXX (I to 9.76 KΩ)	IK = 1,000 Ω 9K76 = 9760 Ω			
ΧΜ (Ι ΜΩ)	$IM = I,000,000 \Omega$			

 $F = \pm 1\%$

PHYCOMP BRAND ordering codes

Both GLOBAL PART NUMBER (preferred) and 12NC (traditional) codes are acceptable to order Phycomp brand products.

GLOBAL PART NUMBER (PREFERRED)

For detailed information of GLOBAL PART NUMBER and ordering example, please refer to page 2. TC122 series is supplied and ordered by global part number only.

12NC CODE

23 ! (I)			X XXXXX L (2) (3) (4)			Last di Resistance	git of 12N0 decade ⁽³⁾		Last digit
TYPE/	START	TOL.	RESISTANCE	PAPER / PE TAPE C	ON REEL (units) ⁽²⁾	0.01 to 0.0	976 Ω		0
2×0402	IN ⁽¹⁾	(%)	RANGE	10,000	50,000	0.1 to 0.97	76 Ω		7
ARV321	2350	±5%	l to l MΩ	0 3 xxx	013 12xxx	l to 9.76 <u>(</u>	2		8
ARV322	2350	±1%	0 to MΩ	0 3 2xxxx	013 3xxxx	10 to 97.6	Ω		9
Jumper	2350	_	0 Ω	013 91001	_	100 to 976	δΩ		1
			-			l to 9.76 l	KΩ		2
. ,			•	ering code starting		10 to 97.6	ΚΩ		3
. ,	kaging.	ient 4	or 5 algits indi	cate the resistor to	ierance and	100 to 976	δKΩ		4
		ng 4 o	or 3 digits repre	esent the resistance	value with the	l to 9.76 l	MΩ		5
. ,		-	• ·	as shown in the tab		10 to 97.6	MΩ		6
	st digit o is optior		C". nbol ^(Note) .			Example:	0.02 Ω	=	0200 or 200
		-					0.3 Ω	=	3007 or 307
The or	dering co	ode of	a ARV321 resi	stor, value 1,000Ω v	with ±5%		ΙΩ	=	1008 or 108
toleran	ce, supp	lied in		units per reel is: 2			33 KΩ	=	3303 or 333
or YCI	22-JR-07	TKL.					10 MΩ	=	1006 or 106

NOTE

- I. All our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
- 2. On customized label, "LFP" or specific symbol printed and the optional "L" at the end of GLOBAL PART $% \left(\mathcal{A}_{1}^{\prime}\right) =\left(\mathcal{A}_{1}^{\prime}\right) =$

NUMBER / I2NC can be added (both are on customer request)

YAGEO	Phicomp				Product specification 4
	Chip Resistor Surface Mount	YC/TC	SERIES	102 to 358	12

<u>MARKING</u>

YC102		
Fig. I	No marking	
YC122		
Fig. 2	No marking	
YC104		
Fig. 3	No marking	
YCI24 / 162 / 164 / 324		
Γ ig. 4 Jumper=0Ω	I-Digit marking	
Γ ig. 4-1 Value=240KΩ	E-24 series: 3 digits, 5% First two digits for significant figure	e and 3rd digit for number of zeros
YC248		
Fig. 5 Jumper=0Ω	I-Digit marking	
ΕΥΥ Fig. 5-1 Value=240ΚΩ	E-24 series: 3 digits, 5% First two digits for significant figure	e and 3rd digit for number of zeros
YC158T/358L/358T		
Γίg. 6 Value=24Ω	ΓΙΗ Fig. 6-1 Value=240KΩ	E-24 series: 3 digits First two digits for significant figure and 3rd digit for number of zeros
TC122		
Fig. 7	No marking	
TCI24		
Fig. 8	No marking	
Feb. 21, 2019 V.9		

_	YAGEO	Phícomp			
-		Chip Resistor Surface Mount	YC/TC	SERIES	102 to 358

TCI64

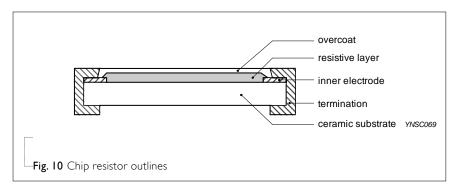
Fig. 9 Jumper=0Ω	I-Digit marking
244 Fig. 9-1 Value=240KΩ	E-24 series: 3 digits, 5% First two digits for significant figure and 3rd digit for number of zeros

For further marking information, please refer to data sheet "Chip resistors marking".

CONSTRUCTION

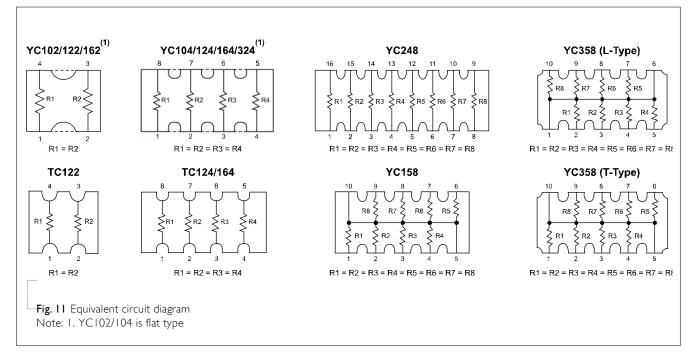
The resistor is constructed on top of a high-grade ceramic body. Internal metal electrodes are added on each end to make the contacts to the thick film resistive element. The composition of the resistive element is a noble metal imbedded into a glass and covered by a second glass to prevent environment influences. The resistor is laser trimmed to the rated resistance value. The resistor is covered with a protective epoxy coat, finally the two external terminations (matte tin on Nibarrier) are added as shown in Fig.9.

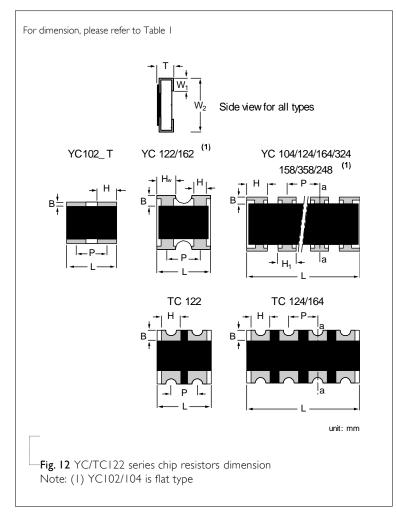
OUTLINES



Chip Resistor Surface Mount YC/TC SERIES 102 to 358

SCHEMATIC







DIMENSIONS

Table I							
TYPE	$H/H_{1}/H_{W}$	В	Р	L	Т	WI	W2
YC102	H:0.25 ± 0.10	0.15 ±0.10	0.55 ±0.10	0.80 ±0.10	0.35 ±0.10	0.15 ±0.10	0.60 ±0.10
YC104	H:0.20 ± 0.10	0.15 ±0.05	0.40 ±0.10	1.40 ±0.10	0.35 ±0.10	0.15 ±0.10	0.60 ±0.10
YCI22	H : 0.21+0.10 / -0.05 H _w : 0.35 ±0.10	0.20 ±0.10	0.67 ±0.05	1.00 ±0.10	0.30 ±0.10	0.25 ±0.10	1.00 ±0.10
YCI24	H: 0.40 ± 0.15 H ₁ : 0.30 ± 0.05	0.20 ±0.15	0.50 ±0.05	2.00 ±0.10	0.45 ±0.10	0.30 ± 0.15	1.00 ±0.10
YC162	H:0.30 ±0.10 H _w :0.65 ±0.15	0.30 ±0.10	0.80 ±0.05	1.60 ±0.10	0.40 ±0.10	0.30 ±0.10	1.60 ±0.10
YCI64	H : 0.65 ± 0.05 H ₁ : 0.50 ± 0.15	0.30 ±0.15	0.80 ±0.05	3.20 ± 0.15	0.60 ±0.10	0.30 ±0.15	1.60 ± 0.15
YC248	H : 0.45 ± 0.05 H ₁ : 0.30 ± 0.05	0.30 ± 0.15	0.50 ± 0.05	4.00 ±0.20	0.45 ±0.10	0.40 ±0.15	1.60 ± 0.15
YC324	H : 1.10 ± 0.15 H ₁ : 0.90 ± 0.15	0.50 ±0.20	1.27 ± 0.05	5.08 ±0.20	0.60 ±0.10	0.50 ± 0.15	3.20 ±0.20
TCI22	H : 0.30 ±0.05	0.25 ±0.15	0.50 ±0.05	1.00 ±0.10	0.30 ±0.10	0.25 ±0.15	1.00 ±0.10
TCI24	H:0.30 ±0.10	0.20 ±0.10	0.50 ±0.05	2.00 ±0.10	0.40 ±0.10	0.25 ±0.10	1.00 ±0.10
TCI64	H:0.50 ±0.15	0.30 ±0.15	0.80 ±0.05	3.20 ±0.15	0.60 ±0.10	0.30 ±0.15	1.60 ± 0.15
YCI58T	H : 0.45 ± 0.05 H ₁ : 0.32± 0.05	0.30 ±0.15	0.64 ± 0.05	3.20 ±0.20	0.60 ±0.10	0.35 ± 0.15	1.60 ± 0.15
YC358L YC358T	H : 1.10 ± 0.15 H ₁ : 0.90 ± 0.15	0.50 ±0.15	1.27 ± 0.05	6.40 ±0.20	0.60 ±0.10	0.50 ± 0.15	3.20 ±0.20

Chip Resistor Surface Mount YC/TC SERIES 102 to 358

ELECTRICAL CHARACTERISTICS

Table 2	2									
TYPE	POWER P70	OPERATING TEMP. RANGE	MWV	RCOV	DWV	RESISTANCE F TOLERAI		T. C. R.	Jumper crit (unit	
YC102	1/32W	-55°C to +125°C	15V	30V	30V	E24 ±5% 10! E24/E96 ±1% 10! Jumper < (1200 /%	Rated current Max. current	0.5 1.0
YC104	1/32W	-55°C to +125°C	12.5V	25V	25V	E24 ±5% 109 E24/E96 ±1% 109 Jumper < (±200 ppm/°C-	Rated current Max. current	0.5 1.0
YCI22	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% ΙΩ E24/E96 ±1% ΙΩ Jumper < ($\Omega \le R \le M\Omega $		Rated current Max. current	0.5 1.0
YCI24	1/16W	-55°C to +155°C	25V	50V	100V	E24 ±5% ΙΩ E24/E96 ±1% ΙΩ Jumper < ($\Omega \le R \le M\Omega $	$ \Omega \le R \le 0\Omega^{-1}]$ ±250 ppm/°C $ 0\Omega \le R \le M\Omega]$ ±200 ppm/°C-	Rated current Max. current	1.0 2.0
YC162	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% ΙΩ E/24/E96 ±1% ΙΩ Jumper < ($\Omega \le R \le M\Omega $	±200 ppm/ C-	Rated current Max. current	
YC164	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% ΙΩ E24/E96 ±1% ΙΩ Jumper < ($\Omega \le R \le M\Omega $		Rated current Max. current	1.0 2.0
YC248	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% 109 E24/E96 ±1% 109 Jumper < (Rated current Max. current	
YC324	1/8W	-55°C to +155°C	200V	500V	500V	E24 ±5% 10 E24/E96 ±1% 10	$\Omega \le R \le M\Omega $ $\Omega \le R \le M\Omega $	-		
TCI22	1/16W	-55°C to +125°C	50V	100V	100V	E24 ±5% 10! E24/E96 ±1% 10! Jumper < (- ±200 ppm/°C -	Rated current Max. current	1.0 1.5
TCI24	1/16W	-55°C to +125°C	50V	100V	100V	E24 ±5% 109 E24/E96 ±1% 109 Jumper < (±200 ppm/ C-	Rated current Max. current	1.0 1.5
TCI64	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% 109 E24/E96 ±1% 109 Jumper < (-	Rated current Max. current	
YCI58T	1/16W	-55°C to +155°C	25V	50V	50V		$\Omega \leq R \leq 00 $ K Ω	-		
YC358L YC358T	1/16W	-55°C to +155°C	50V	100V	100V		$\Omega \leq R \leq 0000$	-		

FOOTPRINT AND SOLDERING PROFILES

For recommended footprint and soldering profiles, please refer to data sheet "Chip resistors mounting".

PACKING STYLE AND PACKAGING QUANTITY

Table 3 Packing style a	nd packaging quantit	У								
PACKING STYLE	PACKING STYLE	YC102/ 104	YC/TC 122	YC/TC 124	YC162	YC/TC 164	YC248	YC324	YC158T	YC358L YC358T
Paper taping reel (R)	7" (178mm)	10,000	10,000	10,000	5,000	5,000	5,000		5,000	
	13" (254mm)	50,000	50,000	40,000		20,000			20,000	
Embossed taping reel (K)	7" (178mm)						4,000	4,000		4,000

ΝΟΤΕ

Feb. 21, 2019 V.9

1. For tape and reel specification/dimensions, please refer to data sheet "Chip resistors packing".

Product specification 8 12

Chip Resistor Surface Mount YC/TC SERIES 102 to 358

FUNCTIONAL DESCRIPTION

OPERATING TEMPERATURE RANGE

YC102/104, TC122/124 Range:

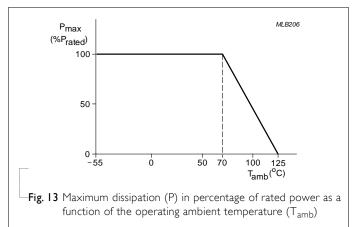
-55°C to +125°C (Fig.13)

YC122/124/162/164/248/324/158T/358L/358T, TC164 Range:

-55°C to +155°C(Fig.14)

POWER RATING

Each type rated power at 70°C YC102/104 = 1/32 W YC122/124/162/164/248/158T/358L/358T = 1/16 W YC324 = 1/8 W TC122/124/164 = 1/16 W



RATED VOLTAGE

The DC or AC (rms) continuous working voltage corresponding to the rated power is determined by the following formula:

 $V = \sqrt{(P \times R)}$

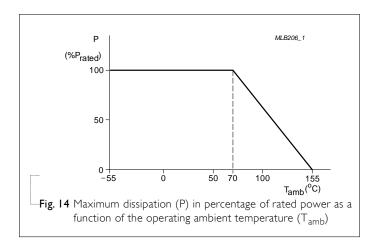
or max. working voltage whichever is less

Where

V=Continuous rated DC or AC (rms) working voltage (V)

P=Rated power (W)

R=Resistance value (Ω)



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	Chip Resistor Surface Mount	YC/TC	SERIES	102 to 358

TESTS AND REQUIREMENTS

Table 4 Test condition, procedure and requirements

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Life/	MIL-STD-202-method 108	1,000 hours at 70±5 °C applied RCWV	±(2%+0.05 Ω)
Operational Life/ Endurance	IEC 60115-1 4.25.1	1.5 hours on, 0.5 hour off, still air required	<100 m Ω for Jumper
	JIS C 5202-7.10		
High Temperature	MIL-STD-202-method 108	1,000 hours at maximum operating	±(1%+0.05 Ω)
Exposure/ Endurance at	IEC 60115-1 4.25.3	temperature depending on specification, unpowered	$<$ 50 m Ω for Jumper
Upper Category Temperature	JIS C 5202-7.11	No direct impingement of forced air to the parts	
		Tolerances: 125±3 °C	
Moisture	MIL-STD-202-method 106	Each temperature / humidity cycle is defined at	±(2%+0.05 Ω)
Resistance	IEC 60115-1 4.24.2	8 hours (method 106F), 3 cycles / 24 hours for 10d with 25 °C / 65 °C 95% R.H, without steps 7a & 7b, unpowered	< 100 m Ω for Jumper
		Parts mounted on test-boards, without condensation on parts	
		Measurement at 24±2 hours after test conclusion	
Thermal Shock	MIL-STD-202-method 107	-55/+125 °C	±(1%+0.05 Ω)
		Note: Number of cycles required is 300. Devices mounted	${<}50~\text{m}\Omega$ for Jumper
		Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	
Short Time	MIL-R-55342-para 4.7.5	2.5 times RCWV or maximum overload	±(2%+0.05 Ω)
Overload	IEC60115-14.13	voltage whichever is less for 5 sec at room temperature	$<\!50~\text{m}\Omega$ for Jumper
		temperature	No visible damage
Board Flex/	IEC60115-1 4.33	Device mounted on PCB test board as	±(1%+0.05 Ω)
Bending		described, only I board bending required	$<$ 50 m Ω for Jumper
		3 mm bending	No visible damage
		Bending time: 60±5 seconds	

Chip Resistor Surface Mount YC/TC SERIES 102 to 358

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Solderability - Wetting	J-STD-002 test	Electrical Test not required Magnification 50X SMD conditions: I st step: method B, aging 4 hours at 155 °C dry heat 2 nd step: leadfree solder bath at 245±3 °C Dipping time: 3±0.5 seconds	Well tinned (≥95% covered) No visible damage
- Leaching	J-STD-002 test	Leadfree solder, 260 °C, 30 seconds immersion time	No visible damage
- Resistance to Soldering Heat	MIL-STD-202-method 210	Condition B, no pre-heat of samples Leadfree solder, 260 °C, 10 seconds immersion time Procedure 2 for SMD: devices fluxed and cleaned with isopropanol	±(1%+0.05 Ω) <50 mΩ for Jumper No visible damage
Biased Humidity	AEC-Q200 Test 7 MIL-STD-202-Method 103	I,000 hours; 85 °C / 85% RH I 0% of operating power Measurement at 24± 4 hours after test conclusion.	± (5.0%+0.05 Ω)

Chip Resistor Surface Mount YC/TC SERIES 102 to 358

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 9	Feb.19, 2019	-	- Update H dimension for YCI24
Version 8	Dec. 24. 2018	-	- Update AEC-Q200 qualified
Version 7	Aug. 22, 2017	-	- Correct the typo for YCI58T/358L/358T, Marking, "240" is 240hm
Version 6	Jun. I, 2017	-	- Update ordering information for networks YC158T/YC358L/YC358T
Version 5	Feb. 14, 2017	-	- Update YCI58 and 358 part number to YCI58T , YC358L and YC358T
Version 4	Dec. 22, 2016	-	- Delete YC102 default code L type
Version 3	Apr. 29, 2016	-	- Update YC series and TC164 dimension
Version 2	Dec. 11, 2015	-	- Update Operating Temperature
Version I	Feb. 04, 2015	-	- Update YCI02 to flat type
Version 0	Nov. 14, 2014	-	- First issue of this specification

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