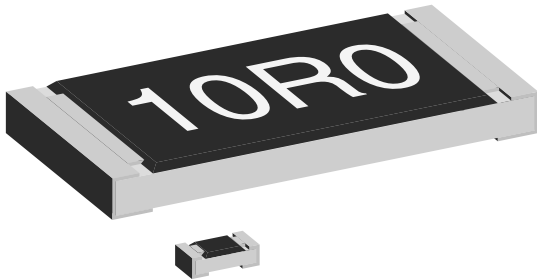


Lead (Pb)-free Thick Film, Rectangular Commodity Chip Resistors



FEATURES

- High volume product suitable for commercial applications
- Excellent stability ($\Delta R/R \leq 1\%$ for 1000 hours at 70 °C)
- Compliant with “Restriction of the use of Hazardous Substances” (RoHS) directive 2002/95/EC (issue 2004)
- Lead (Pb)-free solder contacts on Ni barrier layer
- Metal glaze on ceramic
- Protective overglaze



STANDARD ELECTRICAL SPECIFICATIONS								
MODEL	SIZE		POWER RATING $P_{70^\circ\text{C}}$ W	LIMITING ELEMENT VOLTAGE MAX V \cong	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE Ω	E-SERIES
	INCH	METRIC						
CRCW0402...C	0402	1005	0.063	50	± 100 ± 200	± 1 ± 5	1R0 - 10M	24 + 96 24
CRCW0603...C	0603	1608	0.10	75	± 100 ± 200	± 1 ± 5	1R0 - 10M	24 + 96 24
CRCW0805...C	0805	2012	0.125	150	± 100 ± 200	± 1 ± 5	1R0 - 10M	24 + 96 24
CRCW1206...C	1206	3216	0.25	200	± 100 ± 200	± 1 ± 5	1R0 - 10M	24 + 96 24

Notes:

- These resistors do not feature a limited lifetime when operated within the permissible limits. However, resistance value drift increasing over operating time may result in exceeding a limit acceptable to the specific application, thereby establishing a functional lifetime
- Marking and packaging: see appropriate catalog or web pages
- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material

TECHNICAL SPECIFICATIONS					
PARAMETER	UNIT	CRCW0402...C	CRCW0603...C	CRCW0805...C	CRCW1206...C
Rated Dissipation at 70°C ⁽³⁾	W	0.063	0.10	0.125	0.25
Limiting Element Voltage ⁽²⁾	V \cong	50	75	150	200
Insulation Voltage (1 min)	V _{peak}	> 75	> 100	> 200	> 300
Thermal Resistance ⁽¹⁾	K/W	≤ 870	≤ 550	≤ 440	≤ 220
Insulation Resistance	Ω	$> 10^9$			
Category Temperature Range	°C	- 55/+ 125 (+ 155)			
Failure Rate	h ⁻¹	0.3×10^{-9}			
Weight/1000 pieces	g	0.65	2	5.5	10

Notes:

⁽¹⁾ The measuring conditions are in acc. to EN 140401-802..

⁽²⁾ Rated voltage: $\sqrt{P \times R}$

⁽³⁾ The power dissipation on the resistor generates a temperature rise against the local ambient, depending on the heat flow support of the printed-circuit board (thermal resistance). The rated dissipation applies only if the permitted film temperature of 155 °C is not exceeded.

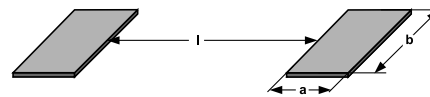
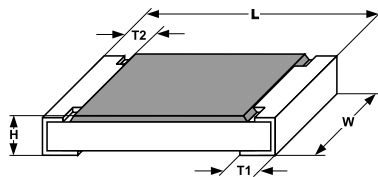
PART NUMBER AND PRODUCT DESCRIPTION																	
PART NUMBER: CRCW0603562RFKEEC ⁽¹⁾																	
C	R	C	W	0	6	0	3	5	6	2	R	F	K	E	E	C	
MODEL/SIZE				VALUE				TOLERANCE		TCR		PACKAGING ⁽²⁾			SPECIAL		
CRCW0402 CRCW0603 CRCW0805 CRCW1206				R = Decimal K = Thousand M = Million				F = ± 1.0 % J = ± 5.0 %		K = ± 100 ppm/K N = ± 200 ppm/K		EA, EB, EC, ED, EE, EF, EG, EH, EI, EK, EL, EY			up to 2 digits C = Commodity		
PRODUCT DESCRIPTION: D11/CRCW0603-C 100 562R 1 % ET6 e3																	
D11/CRCW0603-C		100		562R		1 %		ET6		e3							
MODEL		TCR		RESISTANCE VALUE		TOLERANCE		PACKAGING ⁽²⁾		LEAD (Pb)-FREE							
D10/CRCW0402-C D11/CRCW0603-C D12/CRCW0805-C D25/CRCW1206-C		± 200 ppm/K ± 100 ppm/K		10R = 10 Ω 562R = 562 Ω 10K = 10.0 kΩ 1M = 1 MΩ		± 5 % ± 1 %		ET1, ET5, ET6, ET7, EF4, E02, E67, E82, EG1, ET9, E20, E27		e3 = Pure Tin Termination Finish							

Notes:

- (1) Preferred way for ordering products is by use of the PART NUMBER
- (2) Please refer to table PACKAGING, see below

PACKAGING											
MODEL	TAPE WIDTH	DIAMETER	PITCH	REEL					BULK		
				PIECES/ REEL	PACKAGING CODE				PIECES	PACKAGING CODE	
					PART NUMBER	PRODUCT DESC.	PART NUMBER	PRODUCT DESC.			
PAPER	BLISTER	PAPER	BLISTER	PART NUMBER	PRODUCT DESC.	PART NUMBER	PRODUCT DESC.				
CRCW0402...C	8 mm	180 mm/7" 330 mm/13"	2 mm 2 mm	10 000 50 000	ED EE		ET7 EF4		50 000	EY	E27
CRCW0603...C	8 mm	180 mm/7" 285 mm/11.25" 330 mm/13"	4 mm 4 mm 4 mm	5000 10 000 20 000	EA EB EC	EI EL	ET1 ET5 ET6	EG1 E20	25 000	EY	E27
CRCW0805...C	8 mm	180 mm/7" 285 mm/11.25" 330 mm/13"	4 mm 4 mm 4 mm	5000 10 000 20 000	EA EB EC	EI EL	ET1 ET5 ET6	EG1 E20	10 000	EY	E27
CRCW1206...C	8 mm	180 mm/7" 285 mm/11.25" 330 mm/13"	4 mm 4 mm 4 mm	5000 10 000 20 000	EA EB EC	EI EL	ET1 ET5 ET6	EG1 E20			

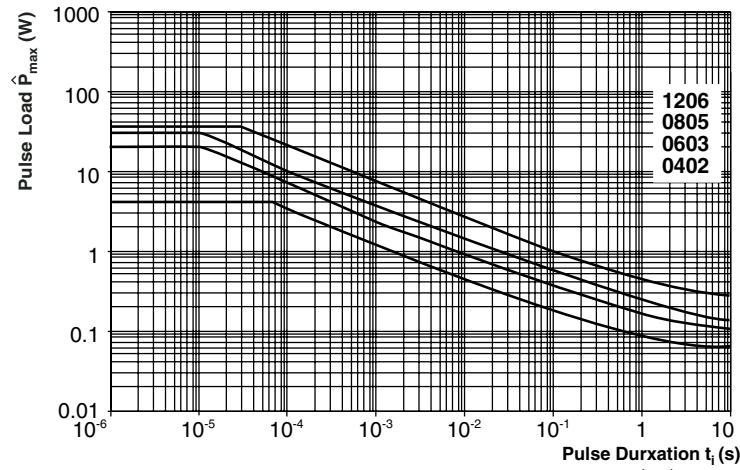
DIMENSIONS



SIZE		DIMENSIONS [in millimeters]					SOLDER PAD DIMENSIONS [in millimeters]					
							REFLOW SOLDERING			WAVE SOLDERING		
INCH	METRIC	L	W	H	T1	T2	a	b	l	a	b	l
0402	1005	1.0 ± 0.05	0.5 ± 0.05	0.35 ± 0.05	0.25 ± 0.05	0.2 ± 0.1	0.4	0.6	0.5			
0603	1608	1.55 ^{+0.10} / _{-0.05}	0.85 ± 0.1	0.45 ± 0.05	0.3 ± 0.2	0.3 ± 0.2	0.5	0.9	1.0	0.9	0.9	1.0
0805	2012	2.0 ^{+0.20} / _{-0.10}	1.25 ± 0.15	0.45 ± 0.05	0.3 ^{+0.20} / _{-0.10}	0.3 ± 0.2	0.7	1.3	1.2	0.9	1.3	1.3
1206	3216	3.2 ^{+0.10} / _{-0.20}	1.6 ± 0.15	0.55 ± 0.05	0.45 ± 0.2	0.4 ± 0.2	0.9	1.7	2.0	1.1	1.7	2.3

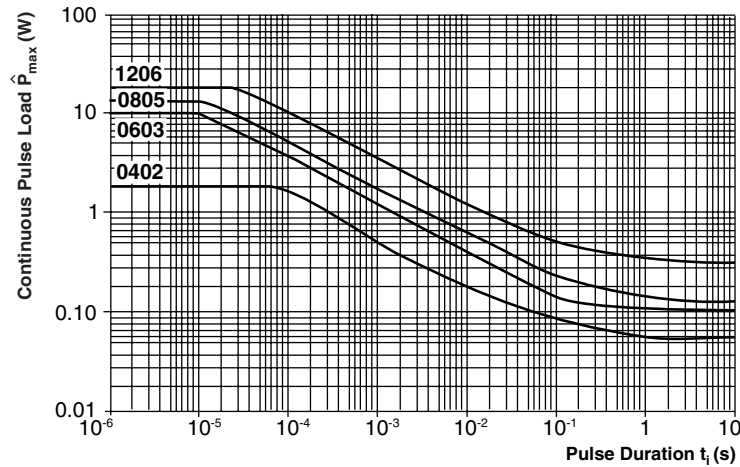
FUNCTIONAL PERFORMANCE

Single Pulse



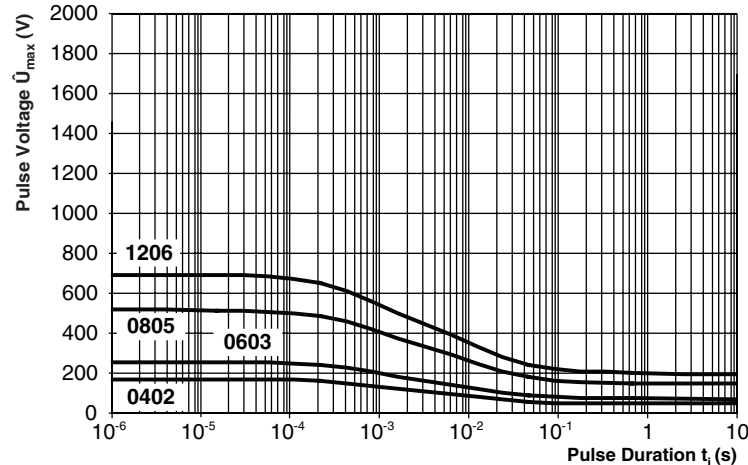
Maximum pulse load, single pulse; applicable if $\bar{P} \rightarrow 0$ and $n \leq 1000$ and $\hat{U} \leq \hat{U}_{max}$; for permissible resistance change equivalent to 8000 h operation

Continuous Pulse

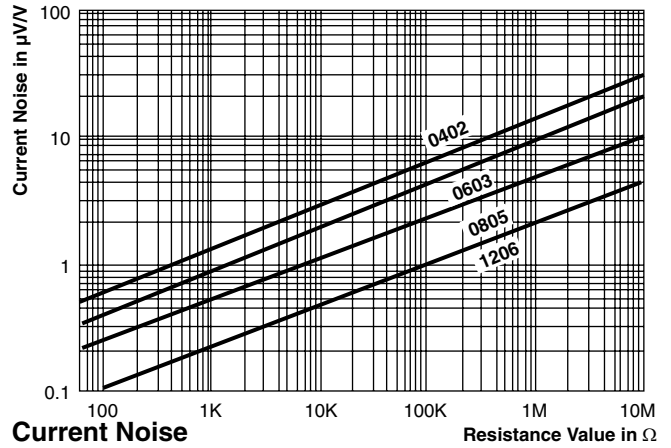
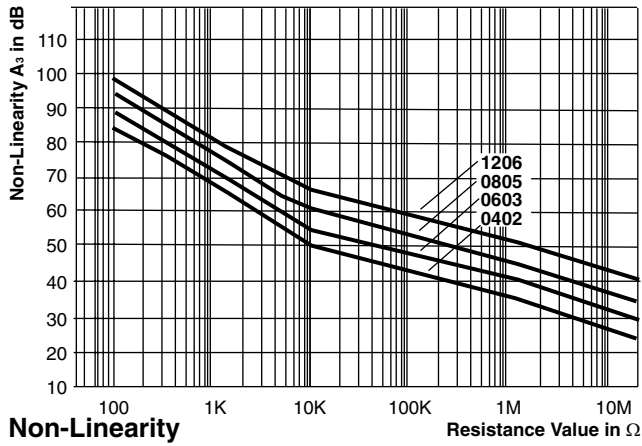
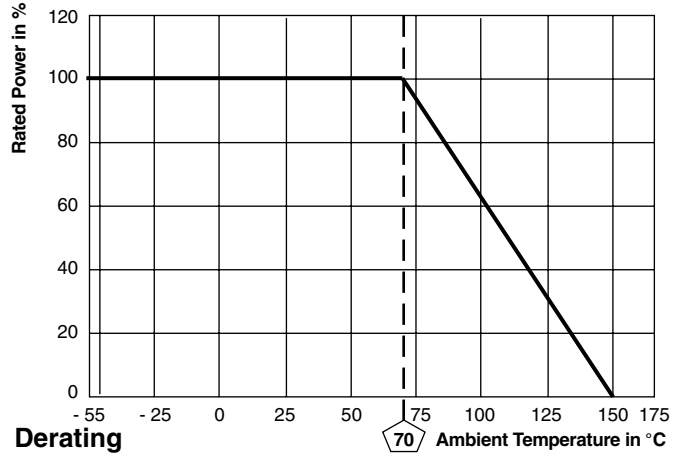
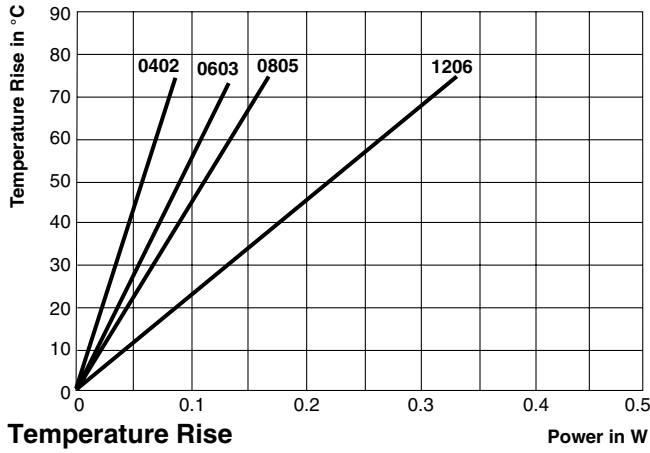


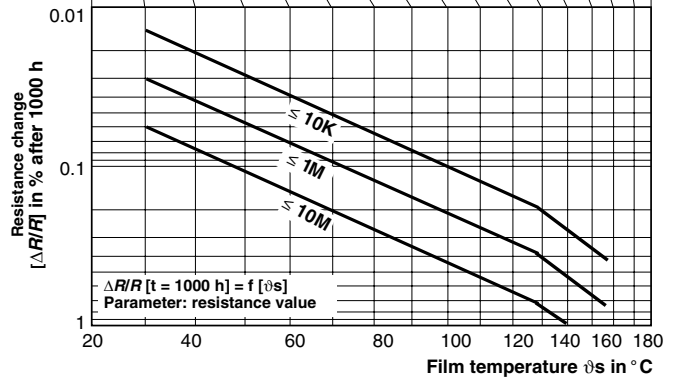
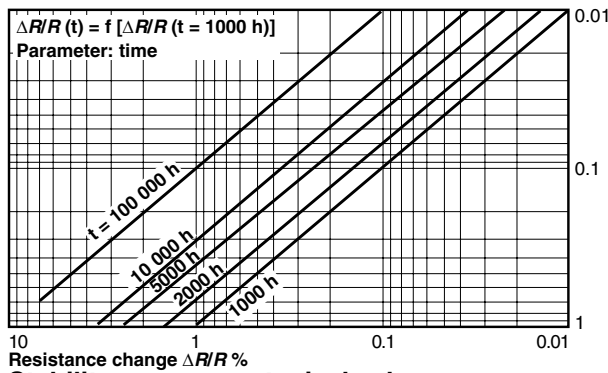
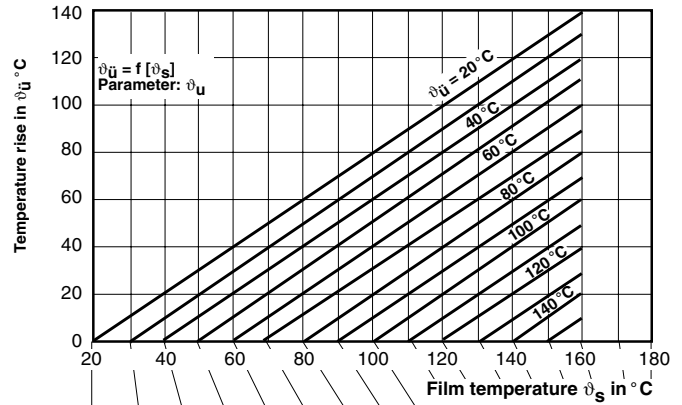
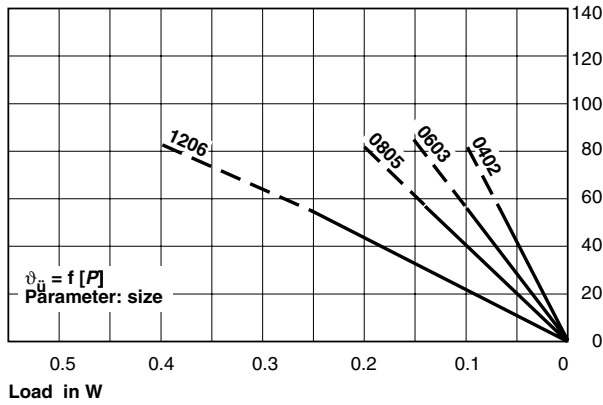
Maximum pulse load, continuous pulses; applicable if $\bar{P} \leq P(3_{amb})$ and $\hat{U} \leq \hat{U}_{max}$; for permissible resistance change equivalent to 8000 h operation

Pulse Voltage

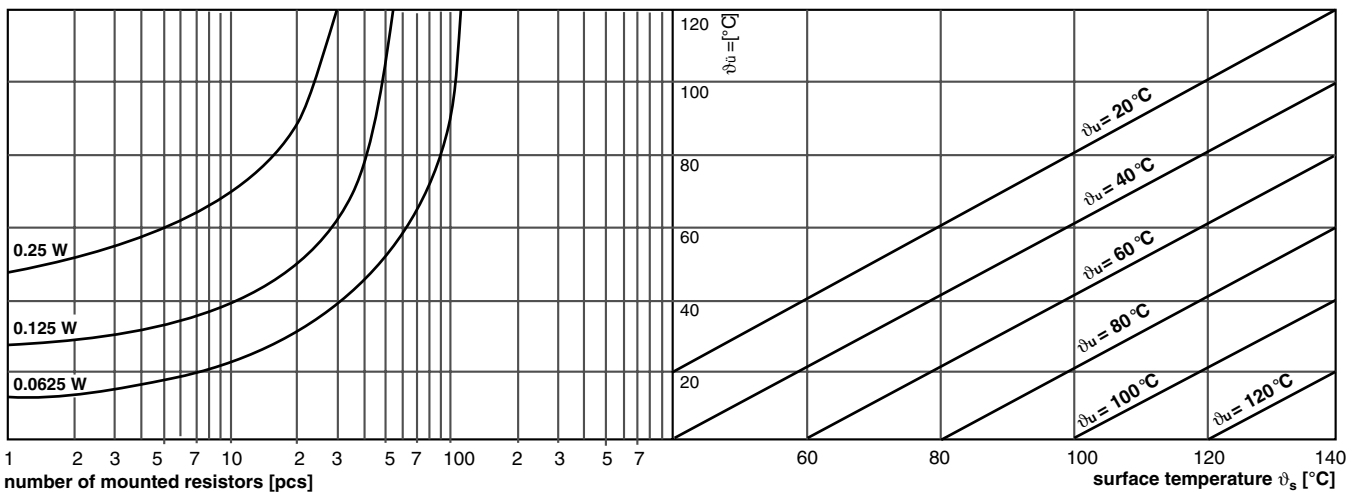


Maximum pulse voltage, single and continuous pulses; applicable if $\hat{P} \leq \hat{P}_{max}$; for permissible resistance change equivalent to 8000 h operation





Stability nomogram typical values
(for handling see general explanations)



Power rating as a function of packaging density (guideline)

TEST PROCEDURES AND REQUIREMENTS			
EN 60115-1			
TEST (clause)	CONDITIONS OF TEST	REQUIREMENTS PERMISSIBLE CHANGE ($\Delta R/R$)	
		STABILITY CLASS 1 OR BETTER	STABILITY CLASS 2 OR BETTER
	stability for product types: CRCW... C e3	1 Ω to 10 M Ω	1 Ω to 10 M Ω
Resistance (4.5)	-	$\pm 1 \%$	$\pm 5 \%$
Temperature coefficient (4.8.4.2)	20/- 55/20 $^{\circ}\text{C}$ and 20/125/20 $^{\circ}\text{C}$	± 100 ppm/K	± 200 ppm/K
Overload (4.13)	$U = 2.5 \times (P_{70} \times R)^{1/2}$ $\leq 2 \times U_{\text{max}}$; Duration: according to the style	$\pm (0.25 \% R + 0.05 \Omega)$	$\pm (0.5 \% R + 0.05 \Omega)$
Solderability (4.17.5)	Aging 4 hours at 155 $^{\circ}\text{C}$, dryheat Solder bath method; 235 $^{\circ}\text{C}$; 2 seconds Visual examination	Good tinning ($\geq 95 \%$ covered) no visible damage	
Resistance to soldering heat (4.18.2)	Solder bath method; (260 ± 5) $^{\circ}\text{C}$; (10 ± 1) seconds	$\pm (0.25 \% R + 0.05 \Omega)$	$\pm (0.5 \% R + 0.05 \Omega)$
Rapid change of temperature (4.19)	30 minutes at LCT = - 55 $^{\circ}\text{C}$; 30 minutes at UCT = 125 $^{\circ}\text{C}$; 5 cycles	$\pm (0.25 \% R + 0.05 \Omega)$	$\pm (0.5 \% R + 0.05 \Omega)$
Damp heat, steady state (4.24)	(40 ± 2) $^{\circ}\text{C}$; 56 days; (93 ± 3) % RH	$\pm (1 \% R + 0.05 \Omega)$	$\pm (2 \% R + 0.1 \Omega)$
Climatic sequence (4.23)	16 hours at UCT = 125 $^{\circ}\text{C}$; 1 cycle at 55 $^{\circ}\text{C}$; 2 hours at LCT = - 55 $^{\circ}\text{C}$; 1 hour/1 kPa at 15 $^{\circ}\text{C}$ to 35 $^{\circ}\text{C}$; 5 cycles at 55 $^{\circ}\text{C}$ $U = (P_{70} \times R)^{1/2}$ $U = U_{\text{max}}$; whichever is less severe	$\pm (1 \% R + 0.05 \Omega)$	$\pm (2 \% R + 0.1 \Omega)$
Endurance at 70 $^{\circ}\text{C}$ (4.25.1)	$U = (P_{70} \times R)^{1/2}$ $U = U_{\text{max}}$; whichever is less severe 1.5 hours ON; 0.5 hours OFF; 70 $^{\circ}\text{C}$; 1000 hours	$\pm (1 \% R + 0.05 \Omega)$	$\pm (2 \% R + 0.1 \Omega)$
Extended endurance (4.25.1.8)	Duration extended to 8000 hours	$\pm (2 \% R + 0.1 \Omega)$	$\pm (4 \% R + 0.1 \Omega)$
Endurance at upper category temperature (4.25.3)	UCT = 125 $^{\circ}\text{C}$; 1000 hours	$\pm (1 \% R + 0.05 \Omega)$	$\pm (2 \% R + 0.1 \Omega)$

APPLICABLE SPECIFICATIONS	
• EN 60115-1	Generic Specification
• EN 140400	Sectional Specification
• EN 140401-802	Detail Specification
• IEC 60068-2-X	Variety of environmental test procedures
• IEC 60286-3	Packaging of SMD components