Date: 10/01/01 **Name:** Rolf Winterhalder/TEE **File**: 172157	***Tally Computerdrucker GmbH***

Significant design elements for EMC
Matrix Printer Model T2265, T2280.

1 Generated Frequencies:

1.1 Power-Supply BG 47504 (T2265) or BG 47562 (T2280)

Kind	Part Nb.	Frequency	Remarks
Clock	IC3	80kHz	Clock for PWM

1.2 Control-Board BG 48555 (T2265) or BG 48500 (T2280)

Kind	Part Nb.	Frequency	Remarks
Clock	G1	15,9744MHz	Clock Processor IC5
Clock	IC15	approx 150kHz	5V DC-DC-Converter
Clock	IC7	approx 20kHz	Horizontal Motor Driver
Clock	IC26, IC28	approx 20kHz	Stepper Motor Driver
Clock	IC18	approx 20kHz	Vertical Motor Driver
Clock	IC23	approx 20kHz	Shift Motor Driver
Clock	IC16 IC17	approx. 250kHz	supply for RS232 Interface
Clock	VA10-VA15	approx 1,8kHz	Needle Driver (only T2265)
Clock	IC33-38	approx 2,2kHz	Needle Driver (only T2280)
Oscillator	V37	approx. 110kHz	Flyback Voltage Provision (only T2280)
Clock	V36	approx. 110kHz	Energy Recovery (only T2280)

1.3 Panel: BG 47809

Kind	Part Nb.	Frequency	Remarks
Clock	IC4	approx. 280kHz	Clock Panel

1.4 Shared Interface-Module Centronics and Serial interface RS 232: BG 046752

Kind	Part Nb.	Frequency	Remarks
Switching	IC4/IC5	approx. 30kHz	supply for RS232 Interface

1.5 Interface Module 20mA BG 046755

Kind	Part Nb.	Frequency	Remarks
Clock	V11	approx. 80kHz	DC/DC-Converter

1.6 Option Colour, Sheet Feed Motor Driver BG 046760

Kind	Part Nb.	Frequency	Remarks
Switching	IC2, IC5	approx 20kHz	Motor Driver

1.7 Option Paper Cut BG 046759

Kind	Part Nb.	Frequency	Remarks
Clock	IC3/IC4	approx. 20kHz	Motor driver
Clock	Q1	3MHz	Clock for Single Chip Controller IC1

1.8 Option 2. Tractor BG 047556

Kind	Part Nb.	Frequency	Remarks
Switching	IC1, IC2	approx. 20kHz	Motor Driver

2 List of Components used for EMI suppression

2.1 Power-Supply BG 47504 (T2265) or BG 47562 (T2280)

Part	Value	Name	ID-No.	Manufacturer
X-Capacitor	220nF	C16, C19	708512	~~see attached data sheets~~
Y-Capacitor	4,7nF	C23, C24	704800	~~see attached data sheets~~
Choke	2X10mF	L1	710225	~~see attached data sheets~~
Capacitor	1,5nF	C9	710088	~~see attached data sheets~~
Resistor	180Ohm	R9	708482	~~see attached data sheets~~

2.2 Control-Board BG 48555 (T2265) or BG 48500 (T2280)

Part	Value	Name	Ident.-Nr	Manufacturer
SMD-Capacitors	330pF	C128, C263*, C247, C232, C256, C261, C248, C240, C223, C262, C260, C247, C239 C231, C222, C207, C199, C264, C224, C233, C216, C249, C257, C241, C237, C253, C196, C206, C190, C221, C246, C230, C238 C259, C254, C195*, C204, C212*, C213*	710331	~~see attached data sheets~~
Capacitor	100nF	C13/C91	708660	~~see attached data sheets~~
Resistor***	100R	RA1, RA3, RA5-9, RA11, RA13, RA14**	710213	~~see attached data sheets~~
SMD-Ferrite	600R	L114*	710396	~~see attached data sheets~~
SMD-Ferrite	65R	L4, L6**	712234	see attached data sheets
SMD-Capacitors	1nF	C145, C188, C321-326	712235	see attached data sheets
PCB	4 Layers Multilayer		* 48016 ** 48498	

New components marked by ***** and used as follows:
* - T2265 only
** - T2280 only
*** - Serial Resistor in adress- and databus

2.3 Shared Interface-Module Centronics and Serial RS232 BG 046752

Part	Value	Name	ID-No.	Manufacturer
Choke	2,25uH	L1, L2	708518	see attached data sheets

2.4 Interface Module 20mA BG 046755

Part	Value	Name	ID-No.	Manufacturer
EMIFIL		L1-5	710061	see attached data sheets

2.5 Interface module RS422/SS97 BG 047144/047145

Part	Value	Name	ID-No.	Manufacturer
EMIFIL		L1-7	710061	see attached data sheets

2.6 Option Paper Cut BG 046759

Part	Value	Name	ID-No.	Manufacturer
Y-Capacitor	1,5nF			built in by manufacturer
Inductor	2,5uH			built in by manufacturer
Inductor	10uH 5A			built in by manufacturer, see attached data sheet.

2.7 DC-MotorBG 047567

Part	Value	Name	ID-No.	Manufacturer
Ferrite Core	D16,5/8mm, N=1,5		710242	see attached data sheets

2.8 Cable Connection from Power Supply to Logic Board BG 047522

Part	Value	Name	ID-No.	Manufacturer
Ferrite Core	D16,5/8mm, N=2,5		710242	see attached data sheets

3 Constructive measures for EMI-suppression

3.1
Full shielded power supply. Shield built of two parts of zinc plated steel, which enclose the power supply PCB.

3.2
U-shaped sheet metal of zinc plated steel under the control board. The board is fixed with the plate by two screws and the chassis is connected to the PCB-filter capacitors. Also is the metal shield of the centronics interface connector screwed to the metal plate. The metal plate is connected to the power supply shield via 3 screws.

3.3
A contact spring, zinc plated steel, under the printer housing connects the metal plate of 3.2. with the metal shield of the additional interface module

3.4
Option additional interface: Metal cover of the additional interface module connects 3.2 and 3.3.

3.5
Option Cut: Full shielded paper cut module top of the >Printer

4 Data Sheets of new components only

Attached in Order of ID. No.:

Date: 10/01/01 **Name:** Rolf Winterhalder/TEE **File**: 172157	***Tally Computerdrucker GmbH***

Würth Elektronik GmbH & Co. KG
Verbindungstechnik
Riedenstraße 16
D-74635 Kupferzell
Telefon: (+49) (0 79 44) 91 93-0
Telefax: (+49) (0 79 44) 91 93-51

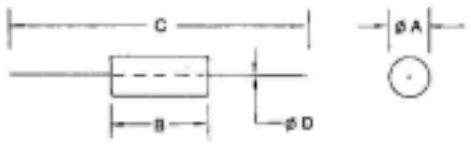
712 234

WÜRTH ELEKTRONIK

Verbindungstechnik

EMV-Komponenten

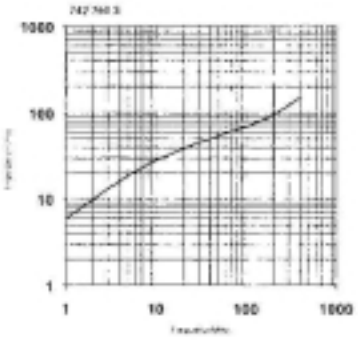
Hülsendrosseln

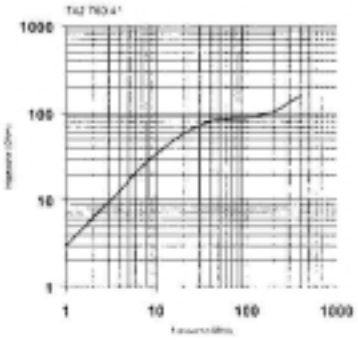


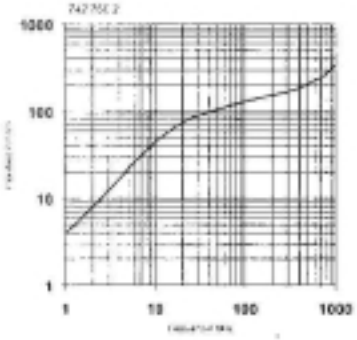
Merkmale:
- Ferritkerne zur einfachen Leiterplatten-montage.
- Als Bandware oder Schüttgut erhältlich.
- Max. Dauerstrom 3 A / 5 A kurzzeitig.

Dimensionen

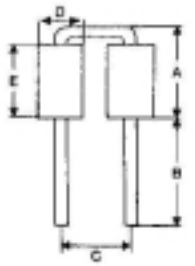
Artikel-Nr.	ø A mm	B mm	C mm	ø D mm	Impedanz (Ω) 10 MHz	Impedanz (Ω) 100 MHz	Material
742 760 3	3,5 ±0,2	4,5 ±0,3	63 ±1	0,65	28	70	3 W 800
742 760 31		4,5 ±0,3			20	80	3 W 300
742 760 4		6,0 ±0,3			32	82	3 W 800
742 760 41		6,0 ±0,3			35	89	3 W 300
742 760 5		7,5 ±0,3			50	100	3 W 800
742 760 51		7,8 ±0,3			43	100	3 W 300
742 760 2		8,3 ±0,3			45	130	3 W 300
* 742 760 6		9,0 ±0,3			65	130	3 W 800



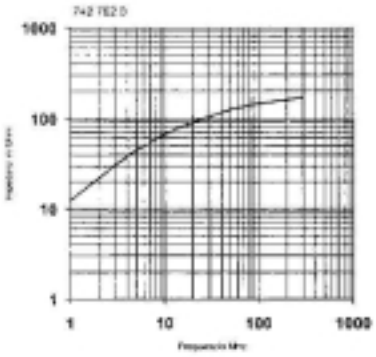




742 762 0



(in mm)
A = 7
B = 25
C = 5
D = 3,5
E = 4,5



Artikel-Nr.	Impedanz (Ω) 10 MHz	Impedanz (Ω) 100 MHz
742 762 0	98	130

Date: 10/01/01 **Name:** Rolf Winterhalder/TEE **File**: 172157	***Tally Computerdrucker GmbH***

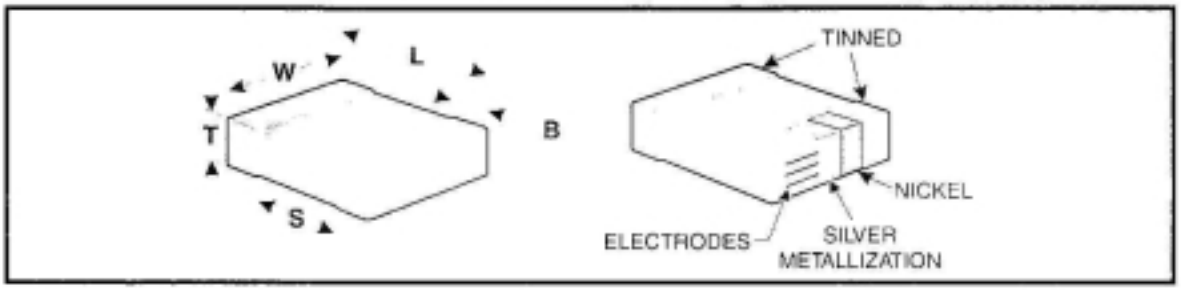
KEMET CERAMIC CHIP/STANDARD

712 235

FEATURES

- C0G (NP0), X7R, Z5U and Y5V Dielectrics
- 10, 16, 25, 50, 100 and 200 Volts
- Standard End Metalization-tin-plated nickel barrier
- Available Capacitance Tolerance: ±0.10 pF; ±0.25 pF; ±0.5 pF; ±1%; ±2%; ±5%; ±10%; ±20%; and +80%-20%
- Tape and reel packaging per EIA481-1. (See page 51 for specific tape and reel information.) Bulk Cassette packaging (0402, 0603, 0805 only) per IEC286-6 and EIAJ 7201.

CAPACITOR OUTLINE DRAWINGS



DIMENSIONS—MILLIMETERS AND (INCHES)

METRIC SIZE CODE	EIA SIZE CODE	L LENGTH	W WIDTH	T (EIA) THICKNESS MAX.	B BANDWIDTH	S MIN. SEPARATION	MOUNTING TECHNIQUE
1005	0402*	1.0 (.04) ± .05 (.002)	0.5 (.02) ± .05 (.002)	0.55 (.022)	0.20 (0.008)-0.40 (0.016)	0.3 (.012)	Solder Reflow
1608	0603*	1.6 (.063) ± 0.15 (.006)	0.8 (.032) ± 0.15 (.006)	0.8 (.035)	0.35 (.014) ±0.15 (.006)	0.7 (.028)	Solder Wave or Solder Reflow
2012	0805*	2.0 (.079) ± 0.2 (.008)	1.25 (.049) ± 0.2 (.008)	1.3 (.051)*	0.5 (.02) ± .25 (.010)	0.75 (.030)	
3216	1206*	3.2 (.126) ± 0.2 (.008)	1.6 (.063) ± 0.2 (.008)	1.5 (.059)	0.5 (.02) ± .25 (.010)	N/A	
3225	1210*	3.2 (.126) ± 0.2 (.008)	2.5 (.098) ± 0.2 (.008)	1.7 (.067)	0.5 (.02) ± .25 (.010)	N/A	
4532	1812*	4.5 (.177) ± 0.3 (.012)	3.2 (.126) ± 0.3 (.012)	1.7 (.067)	0.6 (.024) ± .35 (.014)	N/A	Solder Reflow
4564	1825*	4.5 (.177) ± 0.3 (.012)	6.4 (.252) ± 0.4 (.016)	1.7 (.067)	0.6 (.024) ± .35 (.014)	N/A	
5650	2220	5.6 (.220) ± 0.4 (.016)	5.0 (.197) ± 0.4 (.016)	1.8 (.071)	0.6 (.024) ± .35 (.014)	N/A	
5664	2225	5.6 (.220) ± 0.4 (.016)	6.3 (.248) ± 0.4 (.016)	2.0 (.079)	0.6 (.024) ± .35 (.014)	N/A	

Extended value Maximum thickness 1.3 (.051).
Metric size code given for reference only.
* Indicates EIA Preferred Case Sizes

C 0805 C 102 J 1G A C TO

CAPACITOR ORDERING INFORMATION

C 0805 C 103 K 5 R A C*

CERAMIC

EIA SIZE CODE

SPECIFICATION
C - Standard

CAPACITANCE CODE
Expressed in Picofarads (pF)
First two digits represent significant figures.
Third digit specifies number of zeros. (Use 9 for 1.0 thru 9.9pF. Use 8 for 0.5 through 0.99pF)
(Example: 2.2pF = 229 or 0.50 pF = 508)

CAPACITANCE TOLERANCE
B – ±0.10pF J – ±5%
C – ±0.25pF K – ±10%
D – ±0.5pF M – ±20%
F – ±1% P – (GMV)
G – ±2% Z – +80%, -20%

END METALLIZATION
C-Standard
(Tin-plated nickel barrier)

FAILURE RATE LEVEL
A- Not Applicable
(Military Product Only, see page 48.)

TEMPERATURE CHARACTERISTIC
Designated by Capacitance Change Over Temperature Range
G – C0G (NP0) (±30 PPM/°C)
R – X7R (±15%)
U – Z5U (+22%, -56%)
V – Y5V (+22%, -82%)

VOLTAGE
1 - 100V 3 - 25V
2 - 200V 4 - 16V
5 - 50V 8 - 10V

*** Part Number Example: C0805C103K5RAC (14 digits - no spaces)**

Date: 10/01/01 **Name:** Rolf Winterhalder/TEE **File**: 172157	***Tally Computerdrucker GmbH***

712 235

C0G CAPACITANCE RANGE – 0402, 0603, 0805, 1206

CAP. PF	CAP. TOL.	C0402*				C0603*			C0805*			C1206*		
		10V	16V	25V	50V	50V	100V	200V	50V	100V	200V	50V	100V	200V
.50	C D	508	508	508	508	508	508	508	508	508	508			
.75	C D	758	758	758	758	758	758	758	758	758	758			
1.0	C D	109	109	109	109	109	109	109	109	109	109	109	109	109
1.1	C D	119	119	119	119	119	119	119	119	119	119	119	119	119
1.2	C D	129	129	129	129	129	129	129	129	129	129	129	129	129
1.3	C D	139	139	139	139	139	139	139	139	139	139	139	139	139
1.5	C D	159	159	159	159	159	159	159	159	159	159	159	159	159
1.6	C D	169	169	169	169	169	169	169	169	169	169	169	169	169
1.8	C D	189	189	189	189	189	189	189	189	189	189	189	189	189
2.0	C D	209	209	209	209	209	209	209	209	209	209	209	209	209
2.2	C D	229	229	229	229	229	229	229	229	229	229	229	229	229
2.4	C D	249	249	249	249	249	249	249	249	249	249	249	249	249
2.7	C D K	279	279	279	279	279	279	279	279	279	279	279	279	279
3.0	C D K	309	309	309	309	309	309	309	309	309	309	309	309	309
3.3	C D K	339	339	339	339	339	339	339	339	339	339	339	339	339
3.6	C D K	369	369	369	369	369	369	369	369	369	369	369	369	369
3.9	C D K	399	399	399	399	399	399	399	399	399	399	399	399	399
4.3	C D K	439	439	439	439	439	439	439	439	439	439	439	439	439
4.7	C D K	479	479	479	479	479	479	479	479	479	479	479	479	479
5.1	C D K	519	519	519	519	519	519	519	519	519	519	519	519	519
5.6	C D J K	569	569	569	569	569	569	569	569	569	569	569	569	569
6.2	C D J K	629	629	629	629	629	629	629	629	629	629	629	629	629
6.8	C D J K	689	689	689	689	689	689	689	689	689	689	689	689	689
7.5	C D J K	759	759	759	759	759	759	759	759	759	759	759	759	759
8.2	C D J K	829	829	829	829	829	829	829	829	829	829	829	829	829
9.1	C D J K	919	919	919	919	919	919	919	919	919	919	919	919	919
10.0	C D J K	100	100	100	100	100	100	100	100	100	100	100	100	100
11.0	C D J K	110	110	110	110	110	110	110	110	110	110	110	110	110
12.0	C D J K	120	120	120	120	120	120	120	120	120	120	120	120	120
13.0	C D J K	130	130	130	130	130	130	130	130	130	130	130	130	130
15.0	C D G J K	150	150	150	150	150	150	150	150	150	150	150	150	150
16.0	C D G J K	160	160	160	160	160	160	160	160	160	160	160	160	160
18.0	C D G J K	180	180	180	180	180	180	180	180	180	180	180	180	180
20.0	C D G J K	200	200	200	200	200	200	200	200	200	200	200	200	200
22.0	C D G J K	220	220	220	220	220	220	220	220	220	220	220	220	220
24.0	C D G J K	240	240	240	240	240	240	240	240	240	240	240	240	240
27.0	D F G J K	270	270	270	270	270	270	270	270	270	270	270	270	270
30.0	D F G J K	300	300	300	300	300	300	300	300	300	300	300	300	300
33.0	D F G J K	330	330	330	330	330	330	330	330	330	330	330	330	330
36.0	D F G J K	360	360	360	360	360	360	360	360	360	360	360	360	360
39.0	D F G J K	390	390	390	390	390	390	390	390	390	390	390	390	390
43.0	D F G J K	430	430	430	430	430	430	430	430	430	430	430	430	430
47.0	D F G J K	470	470	470	470	470	470	470	470	470	470	470	470	470
51.0	D F G J K	510	510	510	510	510	510	510	510	510	510	510	510	510
56.0	F G J K	560	560	560	560	560	560	560	560	560	560	560	560	560
62.0	F G J K	620	620	620	620	620	620	620	620	620	620	620	620	620
68.0	F G J K	680	680	680	680	680	680	680	680	680	680	680	680	680
75.0	F G J K	750	750	750		750	750	750	750	750	750	750	750	750
82.0	F G J K	820	820	820		820	820	820	820	820	820	820	820	820
91.0	F G J K	910	910	910		910	910		910	910	910	910	910	910
100.0	F G J K	101	101	101		101	101		101	101	101	101	101	101
110.0	F G J K					111	111		111	111	111	111	111	111
120.0	F G J K					121	121		121	121	121	121	121	121
130.0	F G J K					131	131		131	131	131	131	131	131
150.0	F G J K					151	151		151	151	151	151	151	151
160.0	F G J K					161	161		161	161	161	161	161	161
180.0	F G J K					181	181		181	181	181	181	181	181
200.0	F G J K					201			201	201	201	201	201	201
220.0	F G J K					221			221	221	221	221	221	221
240.0	F G J K					241			241	241	241	241	241	241
270.0	F G J K					271			271	271	271	271	271	271
300.0	F G J K					301			301	301	301	301	301	301
330.0	F G J K					331			331	331	331*	331	331	331
360.0	F G J K					361			361	361	361*	361	361	361
390.0	F G J K					391			391	391	391*	391	391	391
430.0	F G J K					431			431	431	431*	431	431	431
470.0	F G J K					471			471	471	471*	471	471	471
510.0	F G J K					511			511	511		511	511	511
560.0	F G J K								561	561		561	561	561
620.0	F G J K								621	621		621	621	621
680.0	F G J K								681	681*		681	681	681
750.0	F G J K								751	751*		751	751	751
820.0	F G J K								821	821*		821	821	821
910.0	F G J K								911	911*		911	911	911
1000.0	F G J K								102	102*		102	102	102
1100.0	F G J K								112	112		112	112	112
1200.0	F G J K								122	122		122	122	122
1300.0	F G J K								132	132		132	132	132
1500.0	F G J K								152	152		152	152	152
1600.0	F G J K								162	162		162	162	162
1800.0	F G J K								182	182		182	182	182
2000.0	F G J K											202	202	
2200.0	F G J K											222	222	
2400.0	F G J K											242	242	
2700.0	F G J K											272	272	
3000.0	F G J K											302	302	
3300.0	F G J K											332	332	
3600.0	F G J K											362	362	
3900.0	F G J K											392	392	
4300.0	F G J K											432		
4700.0	F G J K											472		
5100.0	F G J K											512		
5600.0	F G J K											562		

* Indicates EIA preferred chip sizes.
NOTE: For non-standard capacitance values or voltages, contact your local KEMET sales representative.
50 Volt Ceramic Chips can be used for 63 volt applications.