

D E S C R I P T I O NPRODUCT COVERED:

Component - Electromagnetic Interference Filter, Catalog Nos. ES1-F05, -14, -23, -24, -33, -34; ES1-F08, -14, -23, -24, -33, -34; ES1-F10, -24, -33, -34; ES1-F15, -23, -24, -34; ES1-F20, -23, 7-24, -33, -34; ES1-T05, -14, -23, -24, -33, -34; ES1-T08, -14, -23, -24, -33, -34; ES1-T10, -24, -33, -34; ES1-T15, -23, -24, -34; ES1-T20-23, -24 -33, -34; ES1-T30; ES1-T40E.

ELECTRICAL RATING:

<u>Volts</u>	<u>Current</u>	<u>Frequency</u>
250 V ac	05, 08, 10, 15, 20, or 30 A	50/60 Hz

Model Nos. Suffix Numbering System

<u>ES1</u>	-	<u>(F/T)</u>	-	<u>05/08/10 15/20/30/40</u>	-	<u>1,2,3 [-(14/23/24/33/34)]</u>	-	<u>0,E,1,2,3</u>
Series Designation		Designation of in-out Tab		Designation of current rating, 10=10 A, 15=15 A etc		Suffix for option capacitor value.		Y-Capictor Code

The "E" after the Current designation indicates a Ground Choke Coil.

ENGINEERING CONSIDERATION (NOT FOR FIELD REPRESENTATIVE'S USE):

For use only in equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc.. The following are among the features which should be judged during the investigation of the equipment in which this filter is used.

This component has been judged on the basis of the required spacings Standard for Electromagnetic Interference Filters (UL 1283), which would cover that component itself is submitted for unrestricted Listing.

- 1.* Leakage current in the grounding conductor should be measured to determine compliance with the applicable requirements. Some models may exceed 0.5 mA leakage current.
2. Spacings between terminals and dead-metal parts should comply with the applicable requirements.
3. The filter should be provided with an overall enclosure suitable for the applicable and product requirements.
4. The electrical ratings specified should not be exceeded.
5. The filters have not been evaluated for use in circuit supplied from a voltage source with a potential to ground greater than 250 V.
6. The Stored Energy Test was not conducted on the unit and should be considered in the end-use product.
7. When the component operating ambient differs significantly from 25 C, the component should be subjected to a Temperature Test while installed in the end product.
8. The wiring terminals have not been investigated for use as field wiring terminals.

CONSTRUCTION DETAILS:

Spacings - At least 2.4 mm is maintained through-air and over-surface between uninsulated live metal parts of opposite polarity and between uninsulated live-metal parts and dead-metal parts.

Corrosion Protection - All ferrous metal parts painted, plated or the equivalent to protect against corrosion.

Electrical Connection - Unless otherwise specified, all electrical connections made by mechanically securing all leads and soldering.

* Marking - Company name or trademark , date code and the Catalog number. (The electrical rating is optional.)

Schematic - See ILL. 1 for schematic diagram.

MODEL ES1-T10 - FIG. 1 (S87-14036)

General - Represents Models ES1-F05, -14, -23, -24, -33, -34; ES1-F08, -14, -23, -24, -33, -34; ES1-F10, -24, -33, 34; ES1-F15, -23, -24, -34; ES1-F20, -23, -24, -33, -34; ES1-T05, -14, -23, -24, -33, -34; ES1-T08, -14, -23, -24, -33, -34; ES1-T10, -24, -33, -34; ES1-T15, -23, -24, -34; ES1-T20, -23, -24, -33, -34.

1. Capacitors (Y1 & Y2) - Two provided. R/C (FOKY2), Murata Manufacturing Co., Ltd., Type KH. Rated 3300 pF or 4700 pF, 250 V. Connected line-to-ground. One lead is mechanically secured and soldered to coil, second lead is soldered to case.

Alternate - Same as above, except R/C (FOKY2), Samsung Electro-Mechanics Co., Ltd., Type AA, rated 250 V ac.

Alternate - Same as above, except R/C (FOWX2), Daemyung Electronics Co., Ltd., Type DE, rated 250 V ac.

Alternate - Same as above, except R/C (FOKY2), New Korea Electronics Co., Ltd., Type NU, rated 250 V ac.

Alternate - Same as above, except R/C (FOWX2), Cera-Mite Corp., Type 30LV5, rated 250 V ac.

Alternate - Same as above, except R/C (FOKY2), Matsushita Electric Industrial Co., Ltd., Type RS, rated 125 V ac.

Alternate - Same as above, except R/C (FOWX2), Matsushita Electric Industrial Co. Ltd., Type NS, rated 125 V ac.

Alternate - Same as above, except R/C (FOWX2), Matsushita Electric Industrial Co. Ltd., Type TS, rated 250 V ac .

Alternate - Same as above, except R/C (FOWX2), Murata Manufacturing Co. Ltd., Type KC, rated 250 V ac.

Alternate - Same as above, except R/C (FOWX2), Dongil Electronic Co., Ltd., Type DS, rated 250 V ac.

2. Coil (L) - One provided, consist of two windings of copper magnet wire wound on ferrite magnet core.

thick	Rated Current	Wire Diameter	# of turns	Core Dimensions	
				OD by	ID by
13	5 A	1.1 mm	40	30 by	19 by
13	8 A	1.4 mm	32	30 by	19 by
13	10 A	1.6 mm	23	30 by	19 by
13	15 A	1.9 mm	17	30 by	19 by
13	20 A	2.1 mm	14	30 by	19 by

3. Capacitors (X1 & X2) - Two provided. Rated 250 V ac, 0.1 uF, 0.22 uF, or 0.33 uF. Connected line-to-line. Mechanically secured and soldered to terminals. See Table below for list of capacitor models.

Type	Manufacturer	File No.	CCN's	Type	V Rating (ac)	Capacitance Rating or Range
PCX2 335	Pilkor Electronics Co., Ltd.	E165646	FOWX2	Across the Line	250	0.01 to 1.0 uF
PCX2 335M	Pilkor Electronics Co., Ltd.	E165646	FOWX2	Across the Line	250	0.01 to 1.0 uF
PCX2 337	Pilkor Electronics Co., Ltd.	E165646	FOWX2	Across the Line	250	0.01 to 1.0 uF
PCX2 339	Pilkor Electronics Co., Ltd.	E208404	FOKY2	FOKY2 Cap	305	0.001 to 3.3 uF
MKP 336 2	Vishay BC Components NV	E112471	FOWX2	Across the Line	250	0.001 to 1.0 uF
MKP 338 2	Vishay BC Components NV	E112471	FOWX2	Across the Line	250	0.001 to 1.0 uF
435D	Sun Il Electronics Industry Co., Ltd.	E199061	FOWX2	Across the Line	250	0.01 to 1.0 uF
436D	Sun Il Electronics Industry Co., Ltd.	E199061	FOWX2	Across the Line	250	0.01 to 1.0 uF

4. Resistor - One provided. Rated 0.5 M ohm, mechanically secured and soldered between the input terminal of the coil.

5. Case - 0.7 mm thick plated steel, overall 38 by 51 by 63.5 mm. Provided with two mounting flanges, one on each end. Each flange provided with one mounting hole, measuring 5 mm diameter.

Alternate - Same as above, except overall 32 by 51 by 63.5 for ES1-*05-** and ES1-*05-**.

6. Cover - (Not shown) Same as case, 0.7 mm thick. Soldered to case.

7. Potting - (Not shown) Entire filter potted with epoxy resin, Recognized Component (QMFZ2), manufactured by SNS Mould Chemical Co., Ltd, Type SM-160FA, with SM-160FB hardener.

Alternate - Same as above, except Dae Joo Electronic Materials Co., type DC-505 with DH-505 hardener.

8. Liner - Recognized Component (QMFZ2), manufactured by Sunkyong Chemical, Type SKYROL. Provided with liner of 0.25 mm thick polyester film (not shown). For additional materials, see list below

Cert	Mtl Dsg	Manufacturer	File No.	Color	Min. Thk.	UL 94 Flame Class	HWI	HAI	RTI	CTI
					mm				Elec (°C)	
R/C (QMFZ2)	FR1(E)	General Electric Co.	E61257	NC, BK	0.25	VTM-0	4	0	125	2
R/C (QMFZ2)	FR700	General Electric Co	E61257	ALL	0.23	V-0	1	0	130	3
R/C (QMFZ2)	FR60	General Electric Co.	E61257	ALL	0.23	V-0	1	0	130	3
R/C (QMTS2)	NF-77	The Toyo Fibre Co. Ltd.	E55656	ALL	0.25	V-1	0	1	90	1

MODEL ES1-T30

General - Same as Model ES1-T10 except where specifically noted. See ILL. 2.

2. Coil (L) -

<u>Rated Current</u>	<u>Wire Diameter</u>	<u># of turns</u>	Core Dimensions
			<u>OD by ID by thick</u>
30 A	2.8 mm	15	30 by 19 by 13

Core Covered - R/C (QMFZ2), Chisso Corp., Type 2527, rated 94V-0, minimum 0.7 mm thick.

Alternate - Same as above except, Kolon Industries Inc., Type KP212V0.

Alternate - Same as above, except as follows:

Cert	Material Dsg	Manufacturer	File No.	Color	Flame Class	HWI	HAI	RTI Elec. (°C)	CTI
R/C (QMFZ2)	310SE0	GE Plastics Japan Ltd	E45587	ALL	V-0	4	0	120	3

Coil Separator - Min. 0.3 mm thick. See table below for materials.

Cert	Material Dsg	Manufacturer	File No.	Color	Flame Class	HWI	HAI	RTI Elec. (°C)	CTI
R/C (QMFZ2)	310SE0	GE Plastics Japan Ltd	E45587	ALL	V-0	4	0	120	3
R/C (QMFZ2)	FR1	General Electric Co.	E61257	NC, BK	VTM-0	4	0	125	2

4. Resistor - Rated 510 Kohm, 1/2 W. Mechanically secured and soldered between the input terminals of the coil.
5. Case - Steel, plated. Overall 105 by 98 by 52 by 1.0 mm thick. Provided with two mounting flanges, 98 by 12.5 by 1.0 mm thick mm, one on each side, provided with two oval mounting holes per flange, 7.5 by 4.5 mm. See ILL. for measurements.
6. Cover - Same as case, overall 77.7 by 91.9 by 1.0 mm thick. Soldered to case.
7. Liner - R/C (QMFZ2), General Electric Co. Ltd., Type PBT, 0.2 mm thick. Lines the interior sides, top, and bottom.

MODEL ES1-T10 & ES1-F15-23 - FIG. 2 (S87-14035)

General - Represents Models ES1-F05, -14, -23, -24, -33, -34; ES1-F08, -14, -23, -24, -33, -34; ES1-F10, -24, -33, -34; ES1-F15, -23, -24, 34; ES1-F20, -23, -24, -33, -34; ES1-T05, -14, -23, -24, -33, -34; ES1-T08, -14, -23, -24, -33, -34; ES1-T10, -24, -33, -34, ES1-T15, -23, -24, -34, ES1-T20-23, -24, -33, -34.

- Terminals - Model ES1-T, four provided. Each consists of one lock washer, two flat washers and one hex nut external to the case mounted on a 14 mm by 4 mm diameter stud. Insulated from case by insulators 4 mm thick by 13 mm diameter, see table below for list of materials.

Cert	Material Dsg	Manufacturer	File No.	Color	Flame Class	HWI	HAI	RTI Elec. (°C)	CTI
R/C (QMFZ2)	420SE0	GE Plastics Japan Ltd .	E45587	ALL	V-0	4	0	120	3
R/C (QMFZ2)	KP212G30V0	Kolon Industries Inc.	E88400	All	V-0	1	0	130	3

- Ground Terminal - Consists of spade connector 6.3 mm by 11 mm by 0.8 mm thick. Soldered to case.
- Terminals - ES1-F, four provided. Each consists of spade connector 6.3 mm by 9.6 mm minimum by 0.8 mm thick. Insulated from case by insulator 8 mm by 12 mm minimum diameter, see table below for list of materials.

Cert	Material Dsg	Manufacturer	File No.	Color	Flame Class	HWI	HAI	RTI Elec. (°C)	CTI
R/C (QMFZ2)	420SE0	GE Plastics Japan Ltd .	E45587	ALL	V-0	4	0	120	3
R/C (QMFZ2)	KP212G30V0	Kolon Industries Inc.	E88400	All	V-0	1	0	130	3

*

- Ground Terminal - Model ES1-T. Consists of one lock washer, two flat washers and one hex nut external to the case. Mounted on a 14 mm by 4 mm diameter stud.

MODEL ES1-T30

General - Same as Model ES1-T10 except where specifically noted. See ILL. 2.

- Terminals - Four provided.

Studs Assemblies - Four provided. Consisting of one hex nut, one lock washer, two flat washers, one hex nut, and one flat washer external to the case mounted on a 33 by 4.8 mm diameter stud.

Terminal Insulators - Four provided, two part. R/C (QMFZ2), Kolon Industries Inc., Type KP212G30V0. Inside part, overall 22.2 by 14.4 by 9.8 mm by 0.8 mm thick with hole 5.2 mm for stud, has octagonal shape that goes through octagonal hole in case to prevent rotation. Outside part, overall 15.3 OD by 5.2 ID by 5.4.

- Ground Terminal - Consist of one hex nut, one lock washer, two flat washers, one hex nut external to the case mounted on a 33 mm by 4.8

mm diameter stud that passes through hole in case and soldered to case.

MODEL ES1-T40E - FIG. 3 (S0200756)
- FIG. 4 (S0200757)

General - Model ES1-T40E is identical to Model ES1-T30, except where specifically noted. See ILL. 3 for schematic.

5. Coil Assembly (L2):

Model No.	Core Size OD x ID x H (mm)	Core Wire Dia. No. Wire x OD (mm)	Turns Per Coil Winding	Winding
				Barrier L x W x H (mm)
ES1-T40E	24.9 by 14.9 by 12.1	2 by 1.9	7	NA

Core - Ferrite.

Core Cover - R/C (QMFZ2), Kolon Industries Inc., Type KP212VO, rated 94V-0, minimum 0.7 mm thick.

Alternate - Same as above, except Chisso Corp., Type 2527.

Alternate - Same as above, except as follows:

Cert	Material Dsg	Manufacturer	File No.	Color	Flame Class	HWI	HAI	RTI Elec. (°C)	CTI
R/C (QMFZ2)	310SE0	GE Plastics Japan Ltd	E45587	ALL	V-0	4	0	120	3

Wire - UEW or PEW.

Heat Shrink Tubing - R/C (YDPU2), LG Cable Co., Ltd., Type GSHS-1605, rated 105°C, 600 V, VW-1. Covers body of Inductor (L2), leads to input ground terminal and output ground terminal.