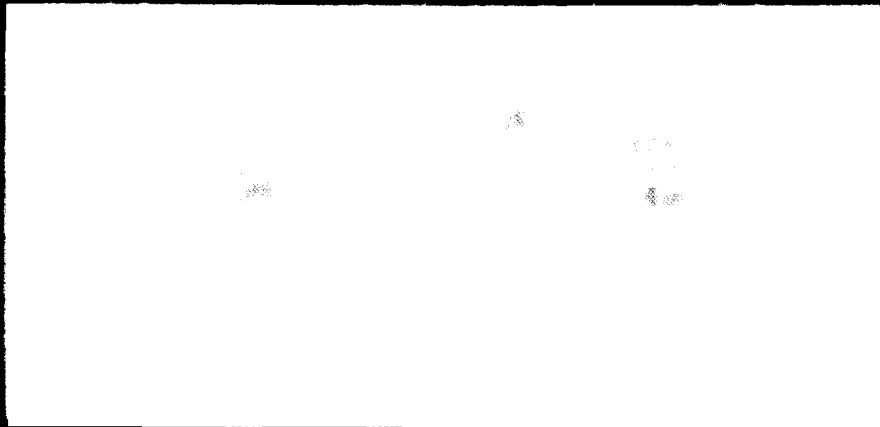


**WESTINGHOUSE
SEMICONDUCTORS**

Fast Turn-Off Thyristors



Shortform Design Guide



XWESLS003X

Westcode "P" series of fast-switching thyristors have regenerative gate structure to ensure low switching losses and high di/dt performance. Low reverse recovery charge values combined with the low forward switching losses make the "P" series particularly attractive in applications such as Inverters, D.C. Chopper Drives, Uninterruptable Power Supplies, etc.

Ordering

The full type number identifies voltage rating, dv/dt and turn-off time and an example would be: -

PO27RH	08	F	J	O
(1)	(2)	(3)	(4)	(5)

- (1) Type number selected from table opposite
- (2) Voltage grade code from table 1
- (3) dv/dt code from table 2
- (4) Turn-off time code from table 3
- (5) O (spare position)

Example is a PO27R series device with 800 Volt repetitive forward and reverse rating and a turn-off time of 25µsec with 200V/µsec commutating dv/dt.

Table 1 Voltage Code

Code	V _{DRM} and V _{RRM}	V _{RSM}
02	200	300
04	400	500
05	500	600
06	600	700
08	800	900
10	1000	1100
12	1200	1300
14	1400	1500

Table 2 dv/dt Code

dv/dt (V/µsec)	Code
20	C
50	D
100	E
200	F

Table 3 Turn-off Time Code

T _q (µsec)	Code
10	N
12	M
15	L
20	K
25	J
30	H
35	G
40	2K

Turn-off times and recovered charges shown in the table are measured at 125°C with reapplied dv/dt of 200V/µsec linear to 80% V_{DRM}. Current pulse and di/dt are as shown in Table 4. Other combinations of dv/dt and turn-off time giving shorter or longer turn-off times can be supplied subject to discussion with Westcode Sales Offices.

Table 4 Turn-off Time and Recovered Charge Conditions

Note	I _{TM}	di/dt	V _{RM}
1	50	5	50
2	200	10	50
3	300	20	50
4	550	40	50
5	800	50	50

Note 6

$$\left. \begin{aligned} I_{TSM}(8.3\text{msec}) &= I_{TSM}(10\text{msec}) \times 1.066 \\ I^2t(8.3\text{msec}) &= I^2t(10\text{msec}) \times 0.943 \end{aligned} \right\} \text{ at } T_j \text{ Max.}$$

Note 7

$$\left. \begin{aligned} V_o & \text{ Threshold voltage} \\ r & \text{ Slope resistance} \end{aligned} \right\} \text{ for conduction loss and } \left. \begin{aligned} & \text{ heatsink calculations} \end{aligned} \right\} \text{ at } T_j \text{ Max.}$$

Stud & Flat Base Thyristors

Type	V _{DRM} V _{RRM} Range	Turn-off Time T _q at 200V/μs (Tables 3, 4)	I _{AV} Case 85°C	I _{TRMS}	I _T	I _{TSM} (1) I _{TSM} (2) I _{TSM} (3) V _R ≤ 60% V _R ≤ 10V V _{RRM} (Note 6)	I ₂ (2) 10ms (Note 6)	Q _{rr} 50% Chord 125°C Typ (Table 4)	dI/dt Non-Rep /Rep	I _{DRM} I _{RRM}	I _{GT} /V _{GT}	I _{FGM}	V _{FGM}	P _G	P _{SM}	I _H	V _{TM} at I _{TM} (T _J 125°C)	V _O (Note 7) (T _J 125°C)	r _{th(j-c)} (°C/W)	r _{th(c-h)} (°C/W)	Weight (gm)	Mounting Torque Kgm or Force	Fig	Type	
P027RH	200-600 200-1000 200-1200	10-25 (1) 20-25 (1) 30-35 (1)	34	100	100	350 400	610	10 (1)	400/200	10	100/3	5	25	1	20	400	2.57/1.05	1.52	10	0.5	0.63	33	0.41-0.48	1	P027R
P036RH	200-600 200-1000 200-1200	10-25 (1) 20-35 (1) 35 (1)	40	100	100	600 690	2390	10 (1)	400/200	10	100/3	5	25	1	20	400	2.29/1.26	1.50	6.3	0.45	0.52	33	0.41-0.48	1	P036R
P042RH	200-600	20-25 (1)	50	100	100	750	860	10 (1)	400/200	10	100/3	5	25	1	20	400	2.03/1.57	1.23	5.1	0.45	0.52	33	0.41-0.48	1	P042R
P066PH P066RH	200-1400	25-40 (2)	75	175	175	1500	1650	25 (2)	1000/500	20	200/3	14	20	1.5	60	600	2.54/2.90	1.70	3.0	0.23	0.28	130	1.45	2	P066R
P066PH P066RH	200-1200	25-40 (2)	85	175	175	1700	1950	20 (2)	1000/500	20	200/3	14	20	1.5	60	600	2.28/2.80	1.64	2.29	0.23	0.28	130	1.45	2	P066R
P095PH P095RH	200-1200	25-40 (2)	95	175	175	1850	2035	20 (2)	1000/500	20	200/3	14	20	1.5	60	600	1.92/2.90	1.35	2.04	0.23	0.28	130	1.45	2	P095R
P100PH P100RH	200-800	12-30 (2)	85	175	175	1800	1980	20 (2)	1000/500	20	200/3	14	20	1.5	60	600	2.13/2.90	1.79	1.23	0.23	0.28	130	1.45	2	P100P
P105PH P105RH	200-800	12-30 (2)	105	175	175	2200	2420	20 (2)	1000/500	20	200/3	14	20	1.5	60	600	1.71/2.90	1.32	1.39	0.23	0.28	130	1.45	2	P105P
P200PH	200-1200	25-40 (3)	160	355	355	2700	2970	25 (3)	1000/500	30	200/3	18	12	1.5	60	600	2.34/6.00	1.60	1.23	0.12	0.14	280	2.5-2.77	4	P200P
P202PH	200-1200	25-40 (3)	175	355	355	3250	3575	30 (3)	1000/500	30	200/3	18	12	1.5	60	600	2.07/6.00	1.55	0.87	0.12	0.14	280	2.5-2.77	4	P202P
P205PH	200-1200	30-40 (3)	205	355	355	3600	3960	45 (3)	1000/500	30	200/3	18	12	1.5	60	600	1.72/6.00	1.17	0.92	0.12	0.14	280	2.5-2.77	4	P205P
P214PH	200-800	15-30 (3)	195	355	355	4700	5170	20 (3)	1000/500	30	200/3	18	12	1.5	60	600	1.80/6.00	1.40	0.67	0.12	0.14	280	2.5-2.77	4	P214P
P215PH	200-800	10-30 (3)	220	355	355	5000	5500	30 (3)	1000/500	30	200/3	18	12	1.5	60	600	1.58/6.00	1.05	0.88	0.12	0.14	280	2.5-2.77	4	P215P
P270PH	200-500	10-25 (3)	226+	355	355	6500	7150	70 (3)	1000/500	30	200/3	18	12	1.5	60	600	1.18/6.00	0.95	0.377	0.12	0.14	280	2.5-2.77	4	P270P
P300KH	200-1200	20-35 (5)	300*	550	550	9500	10450	120 (5)	1000/500	75	300/3	20	23	4.0	120	1000	1.72/9.50	1.43	0.31	0.08*	0.09*	1000	1.65-2.07	5	P300K
P370KH	200-800	12-25 (5)	350*	550	550	12300	13500	90 (5)	1000/500	75	300/3	20	23	4.0	120	1000	1.51/11.00	1.20	0.28	0.08*	0.09*	1000	1.65-2.07	5	P370K

*T_{sink} 85°C
+T_{case} 95°C

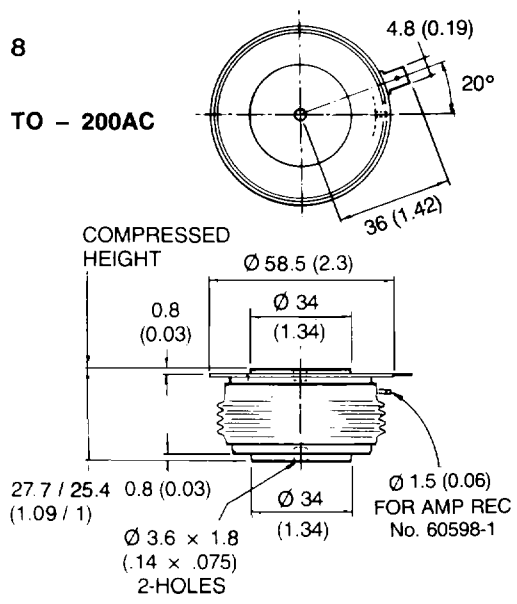
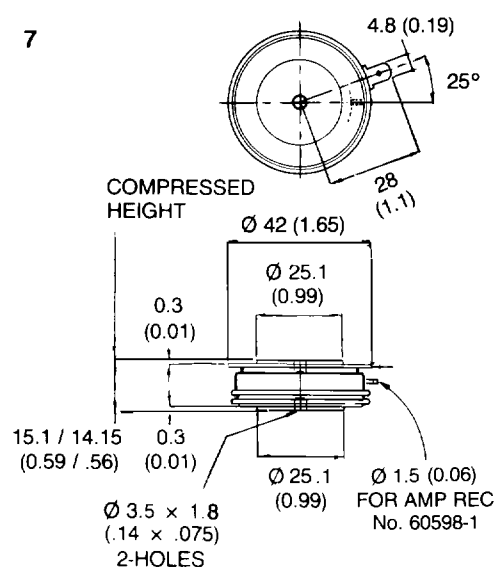
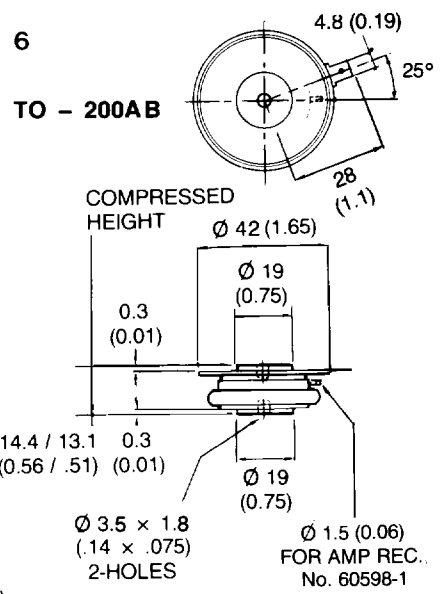
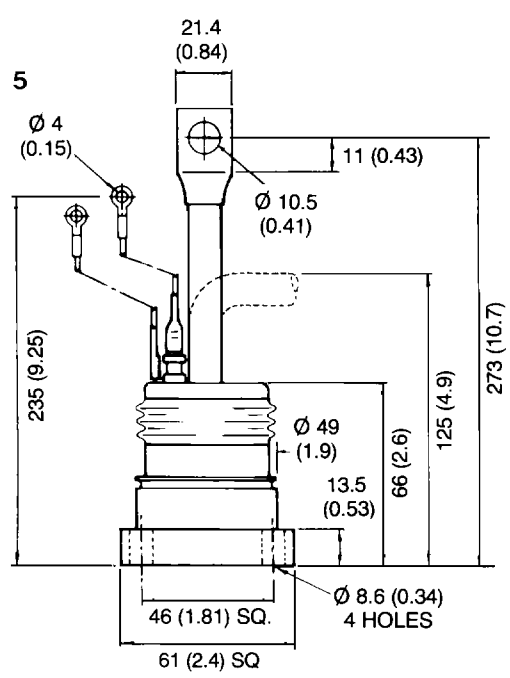
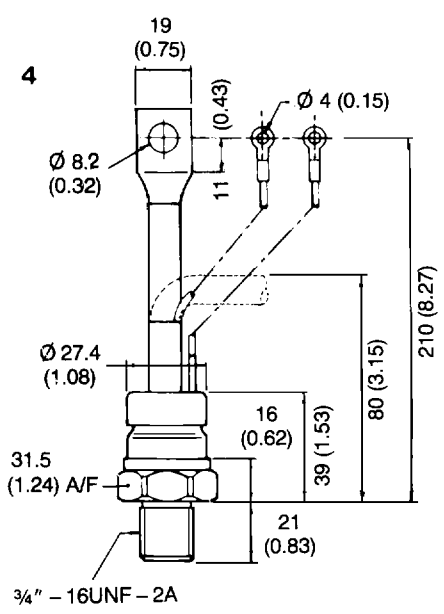
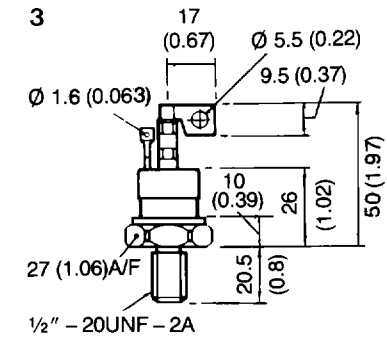
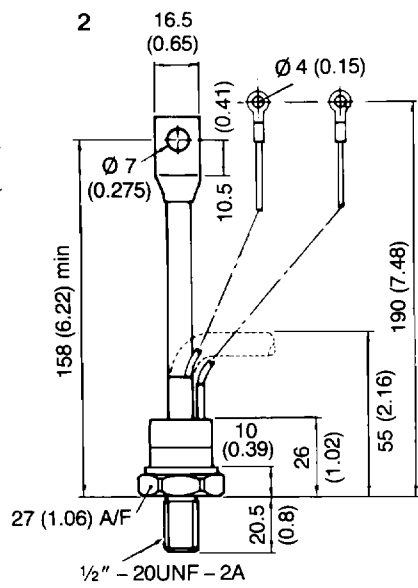
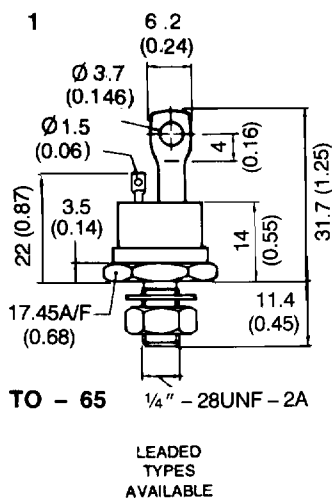
Capsule Thyristors

Type	V _{DRM} V _{RRM} Range	Turn-off Time T _q at 200V/μs (Tables 3, 4)	I _{AV} Case 85°C	I _{TRMS}	I _T	I _{TSM} (1) I _{TSM} (2) I _{TSM} (3) V _R ≤ 60% V _R ≤ 10V V _{RRM} (Note 6)	I ₂ (2) 10ms (Note 6)	Q _{rr} 50% Chord 125°C Typ (Table 4)	dI/dt Non-Rep /Rep	I _{DRM} I _{RRM}	I _{GT} /V _{GT}	I _{FGM}	V _{FGM}	P _G	P _{SM}	I _H	V _{TM} at I _{TM} (T _J 125°C)	V _O (Note 7) (T _J 125°C)	r _{th(j-c)} (°C/W)	r _{th(c-h)} (°C/W)	Weight (gm)	Mounting Torque Kgm or Force	Fig	Type	
P080CH	200-1400	25-40 (2)	175*	350	290	1500	1650	25 (2)	1000/500	20	200/3	14	20	1.5	60	600	2.99/4.30	1.70	3.00	0.135*	0.19*	70	330-550	6	P070C
P086CH	200-1200	25-40 (2)	190*	385	315	1700	1950	20 (2)	1000/500	20	200/3	14	20	1.5	60	600	2.62/4.30	1.64	2.29	0.135*	0.19*	70	330-550	6	P086C
P095CH	200-1200	25-40 (2)	215*	428	356	1850	2035	20 (2)	1000/500	20	200/3	14	20	1.5	60	600	2.23/4.30	1.35	2.04	0.135*	0.19*	70	330-550	6	P095C
P100CH	200-800	12-30 (2)	215*	440	336	1800	1980	20 (2)	1000/500	20	200/3	14	20	1.5	60	600	2.32/4.30	1.79	1.23	0.135*	0.19*	70	330-550	6	P100C
P105CH	200-800	12-30 (2)	240*	490	395	2200	2420	20 (2)	1000/500	20	200/3	14	20	1.5	60	600	1.92/4.30	1.32	1.39	0.135*	0.19*	70	330-550	6	P105C
P140CH	200-500	10-15 (2)	354*	720	568	3280	3610	20 (2)	1000/500	30	200/3	14	12	1.5	60	600	1.23/4.30	1.00	0.535	0.095*	0.11*	70	330-550	6	P140C
P200CH	200-1200	25-40 (3)	295*	600	480	2700	2970	25 (3)	1000/500	30	200/3	18	12	1.5	60	600	2.48/7.15	1.60	1.23	0.095*	0.11*	70	330-550	6	P200C
P202CH	200-1200	25-40 (3)	330*	670	525	3250	3575	30 (3)	1000/500	30	200/3	18	12	1.5	60	600	2.17/7.15	1.55	0.87	0.095*	0.11*	70	330-550	6	P202C
P205CH	200-1200	30-40 (3)	370*	740	610	3600	3960	45 (3)	1000/500	30	200/3	18	12	1.5	60	600	1.83/7.15	1.17	0.92	0.095*	0.11*	70	330-550	6	P205C
P214CH	200-800	15-30 (3)	370*	755	690	4700	5170	20 (3)	1000/500	30	200/3	18	12	1.5	60	600	1.88/7.15	1.40	0.67	0.095*	0.11*	70	330-550	6	P214C
P215CH	200-800	10-30 (3)	390*	780	650	5000	5500	30 (3)	1000/500	30	200/3	18	12	1.5	60	600	1.68/7.15	1.05	0.88	0.095*	0.11*	70	330-550	6	P215C
P270CH	200-500	10-25 (3)	516*	1050	835	6500	7150	70 (3)	1000/500	30	200/3	18	12	1.5	60	600	1.39/11.60	0.95	0.377	0.095*	0.11*	70	330-550	6	P270C
P280CH	200-500	10-25 (4)	850*	1720	1385	8750	9625	80 (4)	1000/500	50	200/3	18	12	1.5	60	600	1.47/14.90	1.04	0.29	0.05*	0.065*	80	530-1000	7	P280C
P300CH	200-1200	20-35 (5)	745*	1535	1180	9500	10450	120 (5)	1000/500	75	300/3	20	23	4.0	120	1000	1.90/15.00	1.43	0.31	0.047*	0.06*	340	1000-2000	8	P300C
P370CH	200-800	12-30 (5)	840*	1710	1350	12300	13500	90 (5)	1000/500	75	300/3	20	23	4.0	120	1000	1.68/17.00	1.20	0.28	0.047*	0.06*	340	1000-2000	8	P370C

*T_{sink} 55°C

^R_{th} (cm)

Note: Specified turn-off times available for 'N' type phase control thyristors.



DIMENSIONS NOMINAL, HOLE SIZES MINIMUM

Australia

Westinghouse Brake and Signal Co. (Aust.) Limited,
Signal Division,
P.O. Box 4, Newport,
Victoria 3015.
Telephone: (03) 391-1300 Fax: (03) 391-6607

Austria

IGI Intern, Gesellschaft fur Industriebedarf,
Eisgrubengasse 2, 2334 Voessendorf-Sued, Vienna.
Telephone: 691636 Telex: 116089 Fax: 222 691638

Belgium

Promethe Electronics S.P.R.L.,
Rue des Mulets, 34, 6111 Montigny-Le-Tilleul.
Telephone and Fax: 071/515280

Brazil

Corotec Do Brazil Ind E Com LTDA,
R.Prof. Crispim De Oliveira, 150,
02710, Sao Paulo SP.
Telephone: (011) 8573837 Fax: (011) 8573862
Telex: 82794

Canada

Iconopower Limited,
5489 Canotek Road, Gloucester, Ontario K1J 9G7
Telephone: (613) 744 3670 Fax: (613) 744 8452

Denmark

IMC Component ApS,
Symfonivej 18, DK2730 Herlev.
Telephone: 44 92 12 22 Fax: 44 92 16 05

France

Arnould Electro Industrie,
62 bis Avenue Gabriel Peri,
93407 SAINT-OUEN, Paris.
Telephone: 14011 11 33 Telex: 234240
Fax: 14012 9100

E.P.S.

1 Bis Rue Marcel Paul,
Z.I. De La Bonde,
91.300 Massy.
Tel: (1) 69204055 Fax: (1) 69200061

Promethe Electronics S.A.R.L.,
La Chauv.,
Arlebosc,
07410 Saint Felicien.
Tel: T.B.A. Fax: T.B.A.

Germany

Westcode Semiconductors Limited,
Franz Schubert Strasse 6A,
D-3501 Fuldabrueck - Dennhausen.
Telephone: 0561 471666 Telex: 99761 Fax: 0561 473343

Solcomp GmbH

Elbestr 26, 8192 Geretsried 1, W. Germany.
Telephone: 08171/60031-32 Telex: 527989 Soli
Fax: 08171 63238

Greece

Ebeh A. Kypriotis S.A.,
P.O. Box 9, Koropi-Attiki.
Telephone: 6624 581 - 6624 681 Telex: 21-4755
Fax: 6624568

India

Chaitra Associates,
405, 1st Cross,
3rd Block, Jayanagar,
Bangalore 560 011.
Telephone: 647753 Telex: 0845 2851
Fax: (812) 648476

Italy

Italwest.
Via Crimea, 27,
10093 Collegno (Torino)
Telephone: 011-4033864 (R.A.) Fax: 011-4033857
Telex: 224581 ITALWE

Japan

Pioneer Trading Co. Limited,
Dai-ichi Chuo Building,
14-7 Hacho-bori 4 chome, Chuo-ku, Tokyo 104.
Telephone: 033 555 8271 Fax: 033 555 8272

Korea

Mainsail Mercantile Limited,
1 - 29 Gahoe - Dong,
Chongro - Ku, Seoul 110 - 260, Korea.
Telephone: 745-2761 Telex: K33143 Fax: 745-2766

New Zealand

McKenzie & Holland Limited,
197 Rata Street, Naenae, Lower Hutt.
Telephone: (04) 5677 016 Fax: (04) 5671555

Norway

SEMITECH A/S,
Bjornerudveien 11,
1266 Oslo.
Telephone: 22 624210 Fax: 22 610034

Singapore (S.E. Asia)

Convergent Systems (S) Private Limited,
1 Rochor Canal Road,
06-12 Sim Lim Square,
Singapore 0718.
Telephone: 3370177 Telex: RS 28102 Fax: 3362247

South Africa

Advanced Product Technology (Pty) Limited,
P.O. Box 91565,
Auckland Park,
2006.
Telephone: 011 792 6010 Fax: 011 792 6386

Spain

INELEC, S.A.,
C/Bocangel, 38, 28028 Madrid.
Telephone: 34 1 7263500 Telex: 48788 Fax: 34 1 7263334

Switzerland

Gebert A.G.,
Esslingerstrasse 1-3, CH-8133 Esslingen.
Telephone: 01/9843088 Telex: 825715 Fax: 01/9843067

Taiwan

Sinhtec Co. Ltd,
Room 11 - 3, 381, Sec 2,
Fuhsing Road, Taipei, Taiwan, ROC.
Telephone: (02) 7383600 Fax: (02) 7351646

Thailand

A.P.T. Advance Protech Co. Ltd,
419/258 Tipawan, Soi 14,
Teparak Road, Samrongse,
Samutprakarn.
Tel: (662) 2819304 Fax: (662) 2812574

Turkey

Eruz Elektrik Sanayi ve Ticaret A.S.,
Necatibey Caddesi No. 41/43 Demirbag Han,
Kat 1 264/80003 Karakoy, Istanbul,
Turkey.
Telephone: 2446036, 2433480 Fax: 2445156

U.K.

Consort Electronics Limited,
Rosebank Parade, Reading Road, Yateley,
Nr Camberley, Surrey, GU17 7RN.
Telephone: 0252 878222 Telex: 858809
Fax: 0252 871388

Harmsworth Townley Limited,
Harehill, Todmorden, Lancs. OL14 5JY.
Telephone: 070 681 4931 Telex: 635091 ATTN.
Harmsworth. Fax: 0706 812382

ESD Electronic Services,
Edinburgh Way, Harlow Essex, CM20 2DF.
Telephone: 0279 626777 Telex: 818801
Fax: 0279 441687

USA

WESTCODE Semiconductors Inc.,
3270 Cherry Avenue, Long Beach, California 90807.
Telephone: 310-595-6971 Fax: 310-595-8182

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WESTCODE SEMICONDUCTORS LIMITED
P.O.Box 57, Chippenham, Wiltshire, England SN15 1JL
Telephone (Sales): (0249) 444524. Telex: 44751.
Telefax: (0249) 659448