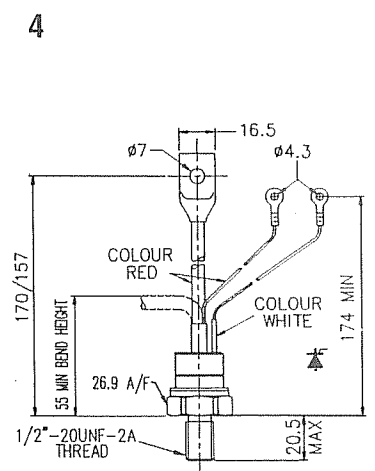
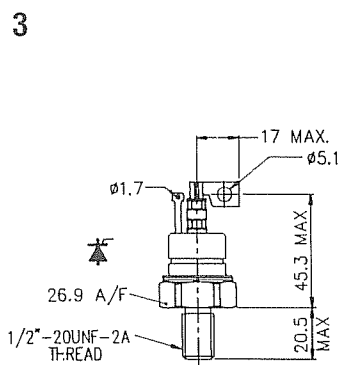
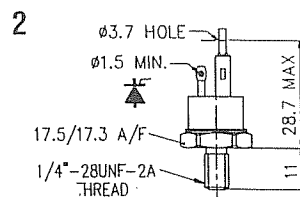
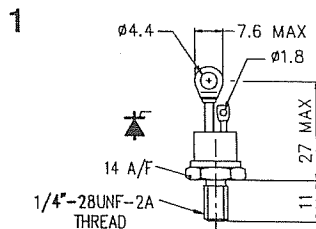


Phase Control Thyristors ~ Stud & flat base types

Type	V_{DRM} V_{RRM} Range	$I_{T(AV)}$ at T_{CASE}		$I_{T(RMS)}$ at T_{CASE} 25°C	I_T at T_{CASE} 25°C	$I_{TSM(1)}$ 10ms $V_R \leq 60\%$ V_{RRM} (Note 1) (A)	$I_{TSM(2)}$ 10ms $V_R \leq 10V$ (Note 1) (A)	$I^2t_{(2)}$ at T_{CASE} (Note 1) (A ² s)	di/dt Non- Rep/Rep (Note 4) (A/ μ s)
	(Note 5) (V)	(A)	(°C)	(A)	(A)	(A)	(A)	(A ² s)	(A/ μ s)
N018RHx	200-1500	21	(85)	40	40	210	240	290	400/200
N023RHx	200-1500	23	(85)	48	48	300	345	595	400/200
N029RHx	200-1500	30	(96)	48	48	500	575	1653	400/200
N044RHx	200-1500	45	(85)	100	100	750	863	3720	400/200
N060RHx	200-1500	63	(85)	100	100	1000	1100	6613	400/200
N086PHx N086RHx	200-1500	85	(85)	175	175	1700	1950	19 x 10 ³	1000/500
N105PHx N105RHx	200-1500	110	(90)	175	175	2450	2695	36.3 x 10 ³	1000/500
N170PHx	200-1500	196	(85)	355	355	4200	4620	107 x 10 ³	1000/500
N195PHx	200-1500	226	(85)	355	355	4650	5120	131 x 10 ³	1000/500
N275PHx	200-800	226	(94)	355	355	6000	6600	218 x 10 ³	1000/500
N260KHx †	200-3600	245*	-	550	550	5700	6270	196 x 10 ³	400/200
N330KHx †	1600-2400	324*	-	550	550	9200	10100	510 x 10 ³	500/300
N350MHx †	200-1800	350*	-	900	900	11500	12650	800 x 10 ³	1000/500
N370MHx †	200-1800	370*	-	900	900	12700	13970	975 x 10 ³	1000-500

† Not to be used on new designs

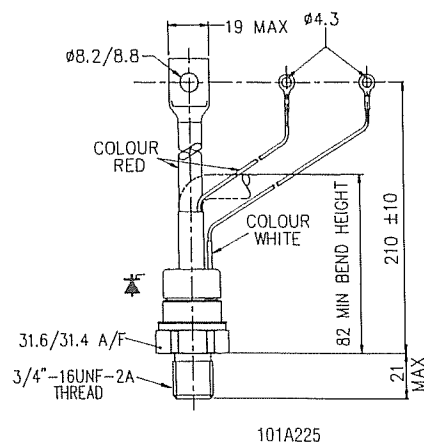
* at 85°C heatsink



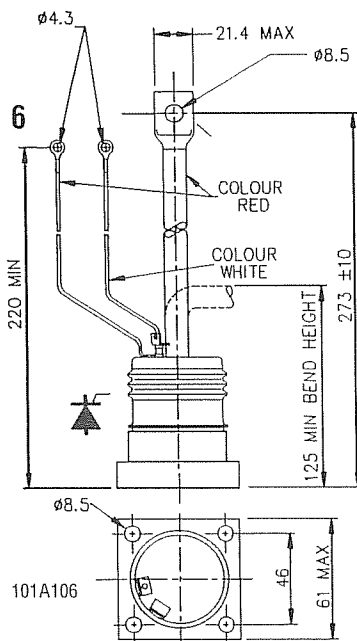
I_{GT}/V_{GT} @ 25°C (mA) (V)	I_{DRM} I_{RRM} @ 125°C @ 25°C (mA)	I_H @ 25°C (mA)	Rth j-c		Rth c-s (K/W)	V_0 r @ Tj 125°C (Note 2) (V) (mΩ)		V_{TM} at I_{TM} @ Tj 125°C (V) (A)		Wt (typ.) (g)	Mounting Torque (kgm)	Fig. No.	Type
			d.c. 180°sine (K/W)	120° Rect. (K/W)		V_0 (V)	r (mΩ)	V_{TM} (V)	I_{TM} (A)				
100/3	5	160	1.00	1.25	0.10	1.38	10.30	1.96/55	10	0.41-0.48	1	N018R	
100/3	5	160	1.00	1.25	0.10	1.20	8.30	1.80/70	10	0.41-0.48	1	N023R	
100/3	5	160	0.55	0.69	0.10	1.17	8.10	1.93/94	10	0.41-0.48	1	N029R	
100/3	10	160	0.45	0.52	0.10	1.10	7.90	2.22/140	33	0.41-0.48	2	N044R	
100/3	10	160	0.35	0.40	0.10	0.89	6.10	2.10/195	33	0.41-0.48	2	N060R	
150/3	20	600	0.23	0.28	0.08	1.57	2.29	2.29/315	130	1.15-1.45	4 3	N086P N086R	
150/3	20	600	0.23	0.28	0.08	0.90	1.79	1.46/315	130	1.15-1.45	4 3	N105P N105R	
150/3	20	600	0.12	0.14	0.04	1.08	1.30	1.98/690	280	2.50-2.77	5	N170P	
150/3	20	600	0.12	0.14	0.04	0.92	0.99	1.60/690	280	2.50-2.77	5	N195P	
150/3	20	400	0.12	0.14	0.04	0.85	0.535	1.22/690	280	2.50-2.77	5	N275P	
300/3	60	1000	0.08†	0.09†	-	1.21	1.36	2.26/770	1000	1.65-2.07	6	N260K	
300/3	60	1000	0.08†	0.09†	-	1.04	0.61	1.66/1020	1000	1.65-2.07	6	N330K	
300/3	60	1000	0.08†	0.09†	-	1.08	0.40	1.51/1100	820	1.65-2.07	7	N350M	
300/3	60	1000	0.08†	0.09†	-	1.06	0.31	1.42/1156	820	1.65-2.07	7	N370M	

† Rth j-hs

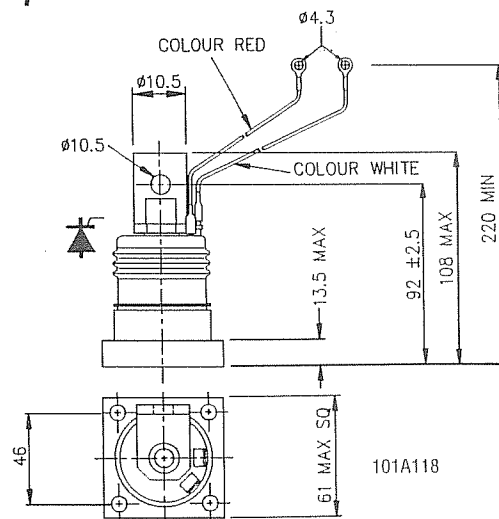
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Phase Control Thyristors ~ Notes

Ordering

The required voltage rating may be defined by substituting the appropriate voltage code number (see table 1) into the type number in place of the "x" symbol, see type list. When phase control thyristors are supplied with critical dv/dt other than 200V/μsec an additional code (see table 2) is appended to the type number.

Examples

N018RH12 : 1200 volt device with standard 200V/μsec critical dv/dt

N105PH12H00 : 1200 volt device with 400V/μsec critical dv/dt

Notes

- (1) $I_{TSM}(8.3ms) = I_{TSM}(10ms) \times 1.066$
 $I^2t(8.3ms) = I^2t(10ms) \times 0.943$
 @ initial temperature T_j 125°C
- (2) V_o Threshold voltage } for conduction loss
 r Slope resistance } and heatsink
 calculations
 (T_j = 125°C)
- (3) These outlines available with the following compressed heights :
 Outline 5 27.0 / 25.5
 Ordering code NxxxFHxx
 e.g. N560FH30
 Outline 6 25.0 / 27.00
 Ordering code NxxxDHxx
 e.g. N980DH12
- (4) di/dt ratings refer to the sum of snubber discharge and load currents.
- (5) A blocking voltage derating factor of 0.13% per deg. Celsius is applicable for T_j below 25 deg. C.
- (6) Outlines 1 and 2 - Leaded types available, code changes from RH to PH. Lead length 146mm.
 (base of hexagon to centre of lug hole)

Table 1. Voltage Code

Voltage Code Number	V _{DRM} and V _{RRM}	V _{RSM}	V _{DSM}
02	200	300	200
04	400	500	400
06	600	700	600
08	800	900	800
10	1000	1100	1000
12	1200	1300	1200
14	1400	1500	1400
15	1500	1600	1500
16	1600	1700	1600
18	1800	1900	1800
20	2000	2100	2000
22	2200	2300	2200
24	2400	2500	2400
26	2600	2700	2600
28	2800	2900	2800
30	3000	3100	3000
32	3200	3300	3200
34	3400	3500	3400
36	3600	3700	3600
38	3800	3900	3800
40	4000	4100	4000
42	4200	4300	4200
44	4400	4500	4400
45	4500	4600	4500
50	5000	5100	5000
55	5500	5600	5500
60	6000	6100	6000
65	6500	6600	6500

Table 2. Critical off-state dv/dt Code
 Linear to 80% V_{DRM}

dv/dt (V/μsec)	Code
200	NO CODE
300	G00
400	H00
500	J00
750	K00
1000	L00

Mounting Procedures

It is important to observe the correct mounting procedures when using Power Semiconductors to ensure effective cooling, good current conduction and reliability. Heatsink preparation is a vital part of the procedure .

(1) ALUMINIUM HEATSINKS^(a) for CAPSULE and FLAT BASE devices:-

Apply a small amount of mounting grease^(b) to the heatsink. Scrub the heatsink area with a wire brush (a 25mm rotary wire cup brush is ideally suited); this action produces a 'slurry'. Clean the mounting surface, or surfaces, in the case of double cooling. Apply a thin film of mounting grease to the semiconductor, and clamp in position observing the clamping procedures below. Warning: a small amount of grease of approximately 0.1mm diameter should be squeezed out of the device/heatsink joint. Excessive use of grease will cause a high voltdrop across the joint and affect heat transfer.

(2) STUD BASE devices:-

Ensure that the device contact surface is clean (a scouring pad, such as 'Scotchbrite', will remove dirt effectively) then apply a thin film of mounting grease to the device ensuring that the threads are clean and free of mounting grease.

Assembly procedures are important:

(1) CAPSULE devices:-

Using 'bar' clamps, either double side or single side, it is important to ensure that all faces are parallel before tightening. The screws should be 'finger' tightened initially, then, using a suitable spanner (wrench) the nuts should be alternately tightened half a turn until the pressure indicating system shows that the required pressure has been achieved.

Using a 'box' clamp, position it over the device ensuring that the pins are correctly located. Position the square steel plate over the central rod, feed bolts (with shakeproof washer) through the clamp whilst holding it firmly in place. Screw the bolts 'finger tight', then alternately, clockwise, half a turn until the box touches the heatsink all the way round.

(2) FLAT (SQUARE) BASE devices:-

Apply mounting grease as for capsules. Ensure that no mounting grease or lubrication is on the fixing screws, then 'finger' tighten them, followed by a torque controlled spanner (wrench) to 1.66 - 2.07 Kgm torque.

(3) STUD BASE devices:-

Ensure that no mounting grease is on the screw thread. Tighten only the hexagonal base using a torque controlled spanner (wrench) to the limit stated for the device.

WESTCODE offer a range of mounting clamps for capsule devices:

<u>Pole Face dia.</u>	<u>Basic Clamp</u>	<u>Type of Clamp</u>
19mm	CMK 450B19M	Box Clamp
25mm	CMK 450x56M	Bar/single/double
25mm	CMK 450B25M	Box Clamp
29.5mm (GTO only)	CMK 550x56M	Bar/single/double
34mm	CMK 1130x76M	Bar/single/double
34mm	CMK 1500B34M	Box Clamp
47mm (GTO only)	CMK 2100x76M	Bar/single/double
47mm	CMK 2140x76M	Bar/single/double
63mm (GTO only)	CMK 2500x116M	Bar/single/double
63mm	CMK 3000x116M	Bar/single/double
75mm (GTO only)	CMK 3500x116M	Bar/single/double
73mm	CMK 4000x116M	Bar/single/double
87mm (GTO only)	CMK 5000x128M	Bar/single/double
87mm	CMK 7000x128M	Bar/single/double

NOTES :

- Recommended machining tolerances over the device mounting area – Flatness 0.03mm, Roughness 1.6µ metres Ra
- Recommended mounting grease – ILEX SCX 13 or PENETROX A-13