

WESTCODE SEMICONDUCTORS

Series
WK-250

Isolated Base Power Modules

Available as DOUBLE THYRISTOR, THYRISTOR/DIODE, DIODE/THYRISTOR, DOUBLE DIODE. Features compression mounted ceramic units ensuring hermeticity. Isolation 2.5KV RMS using non-hazardous materials. Integral water cooled unit available.

Ratings Unless otherwise indicated $T_j = 130^\circ\text{C}$		Maximum Limits							Units
	Voltage Codes	04	06	08	10	12	14	16	
V_{DRM}	Repetitive peak off-state voltage	400	600	800	1000	1200	1400	1600	V
V_{DSM}	Non-repetitive peak off-state voltage	400	600	800	1000	1200	1400	1600	V
V_{RRM}	Repetitive peak reverse voltage	400	600	800	1000	1200	1400	1600	V
V_{RSM}	Non-repetitive peak reverse voltage	500	700	900	1100	1300	1500	1700	V

$I_{T(AV)}$	Average on-state current (thyristor)	Half sine wave $T_B = 85^\circ\text{C}$							250	A
$I_{T(AV)}$	Average on-state current (thyristor)	Half sine wave $T_B = 73^\circ\text{C}$							300	A
$I_{F(AV)}$	Average forward current (diode)	Half sine wave $T_B = 85^\circ\text{C}$							280	A
$I_{T(RMS)}$	R.M.S. on-state current	As AC switch $T_B = 85^\circ\text{C}$							555	A
$I_{T(RMS)}$	R.M.S. on-state current	As AC switch - water cooled							755/640*	A
$I_{TSM/FSM}$	Peak one-cycle surge	10ms duration, 100% V_{RRM} re-applied Thyristor/diode							7.5/11.0	KA
$I_{TSM/FSM}$	(non-repetitive) on-state and forward current	10ms duration, no voltage re-applied Thyristor/diode							9.5/12.2	KA
$I^2 t$	Maximum permissible surge energy (thyristor)	10ms duration, no voltage re-applied							451×10^3	A^2s
$I^2 t$	Maximum permissible surge energy (diode)	10ms duration, no voltage re-applied							744×10^3	A^2s
V_{RGM}	Peak reverse gate voltage								5	V
$P_{G(AV)}$	Average gate power								2	W
P_{GM}	Peak gate power	100 μs pulse width							100	W
dv/dt	Rate of rise of off-state voltage	To 80% V_{DRM} gate open-circuit							500	$\text{V}/\mu\text{s}$
di/dt	Rate of rise of on-state current - repetitive	Gate drive 20 volts, 20 ohms with $t_r \leq 1\mu\text{s}$. Anode voltage $\leq 80\% V_{DRM}$							500	$\text{A}/\mu\text{s}$
T_j	Operating temperature range								-40 to +130	$^\circ\text{C}$
T_{stg}	Storage temperature range								-40 to +130	$^\circ\text{C}$

* Inlet water 25 $^\circ\text{C}$ /45 $^\circ\text{C}$, Flow rate 4.5 L/Min

Characteristics Unless otherwise indicated $T_j = 130^\circ\text{C}$					
$V_{TM/FM}$	Peak on-state and forward voltage	At 785/880A Thyristor/diode		1.31/1.16	V
V_O	Forward conduction threshold voltage	Thyristor/diode		0.90/0.87	V
r	Forward conduction slope resistance	Thyristor/diode		0.52/0.33	$\text{m}\Omega$
I_{DRM}	Repetitive peak off-state current	At V_{DRM}		50	mA
I_{RRM}	Repetitive peak reverse current	At V_{RRM}		50	mA
I_{GT}	Maximum gate current required to fire all devices	At 25 $^\circ\text{C}$, $V_A = 10\text{V}$, $I_A = 1\text{A}$		150	mA
V_{GT}	Maximum gate voltage required to fire all devices			3.0	V
I_H	Maximum holding current			500	mA
V_{GD}	Maximum gate voltage which will not trigger any device			0.25	V
$R_{th(j-b)}$	Thermal resistance, junction to base	Per module	DC, half sine	0.0735	$^\circ\text{C}/\text{W}$
$R_{th(b-s)}$	Thermal resistance, base to heat sink	Per module		0.02	$^\circ\text{C}/\text{W}$

Ordering Information (Please quote device code as explained below - 11 digits)

WK	•	-	•	•
Fixed	Variable See back page	250	Voltage Code	Water Cooled W

Example: WKT250-12, Double Thyristor, $V_{DRM/RRM}$ 1200 Volts.

Figure 1. Power Loss Characteristics - Sine Wave, per Thyristor

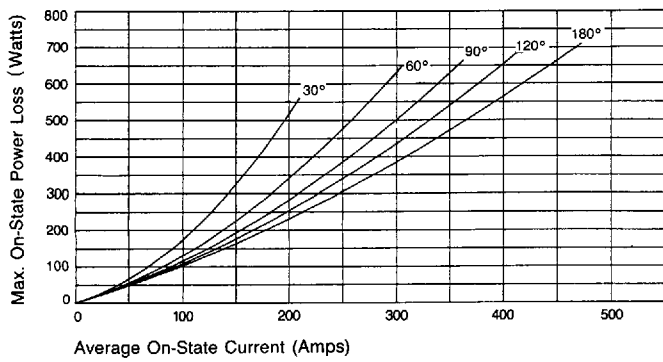


Figure 2. Base Temperature Ratings - Sine Wave, per Thyristor

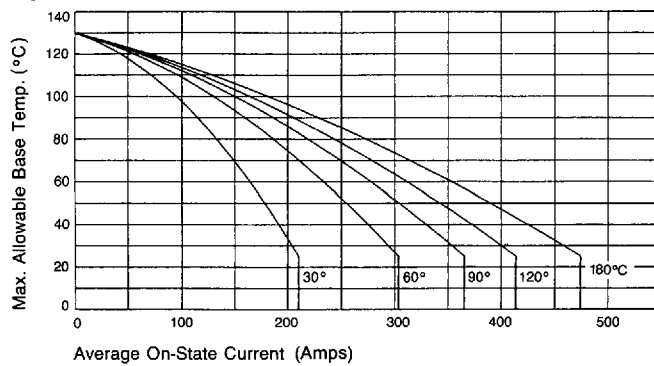


Figure 3. Power Loss Characteristics - Square Wave, per Thyristor

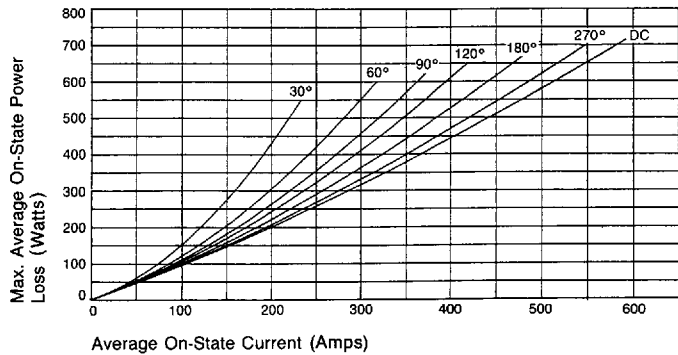


Figure 4. Base Temperature Ratings - Square Wave, per Thyristor

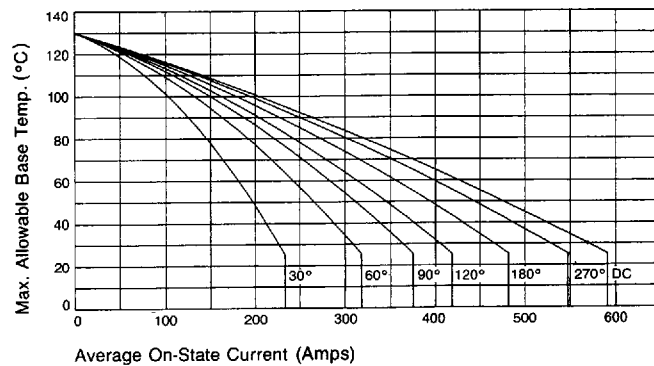


Figure 5. Power Loss Characteristics - Sine Wave, per Diode

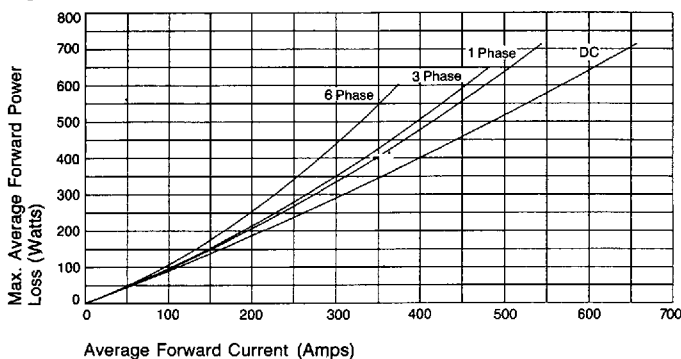


Figure 6. Base Temperature Ratings - Sine Wave, per Diode

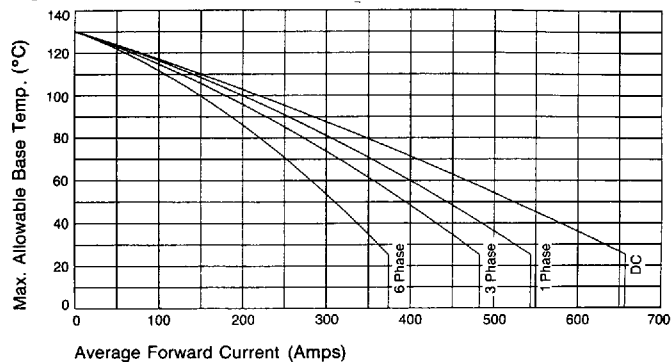


Figure 7. Maximum Instantaneous On-State Characteristics - Thyristor Tj 130°C.

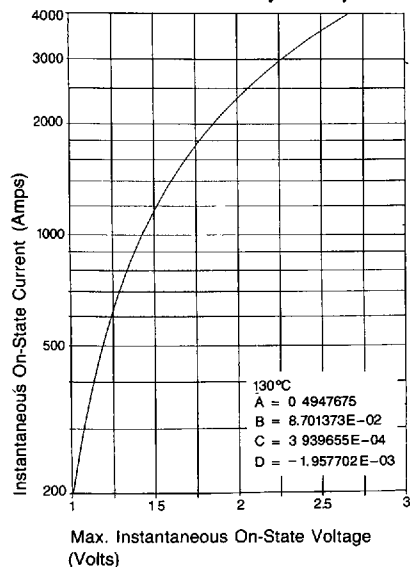


Figure 8. Maximum Instantaneous Forward Characteristics - Diode Tj 130°C.

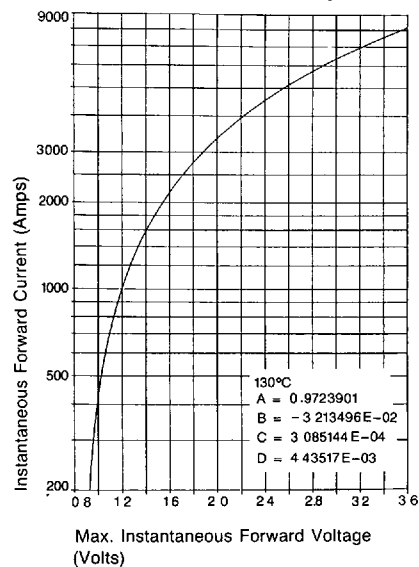


Figure 9. Transient Thermal Impedance, Junction To Base. All Types (per Path)

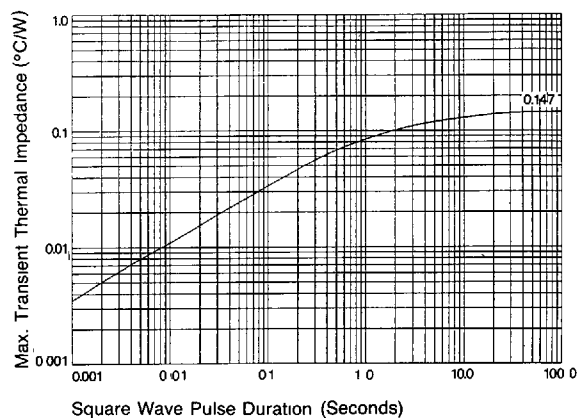


Figure 10. Non-repetitive Surge Current Ratings Thyristor $T_J, 130^\circ\text{C}$.

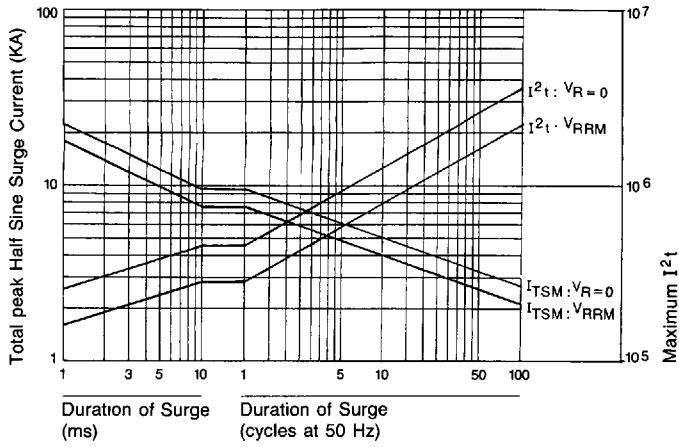


Figure 11. Non-repetitive Surge Current Ratings. Diode $T_J, 130^\circ\text{C}$.

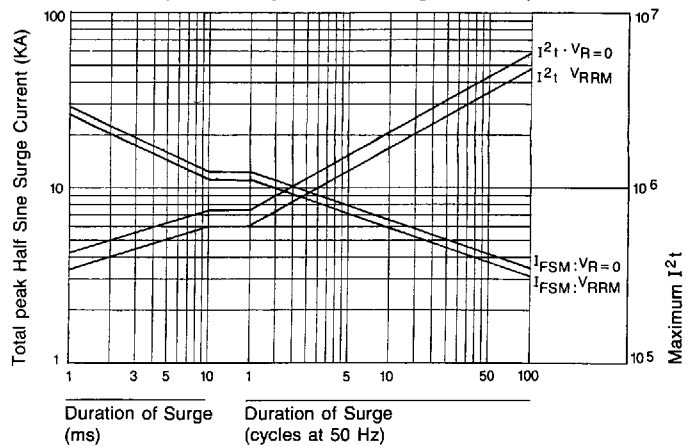


Figure 12. Gate Characteristics at $T_J, 25^\circ\text{C}$

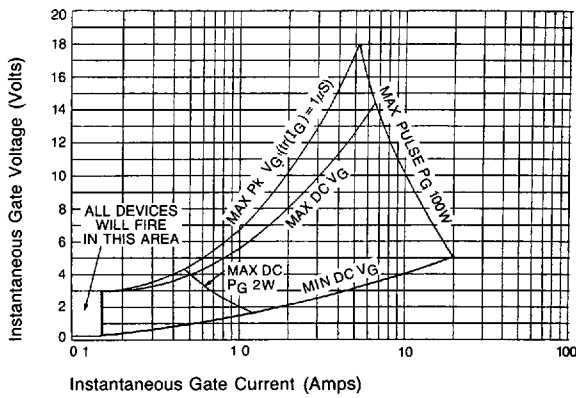


Figure 13. Gate Triggering Characteristics (Trigger points of all Thyristors lie in the areas shown)

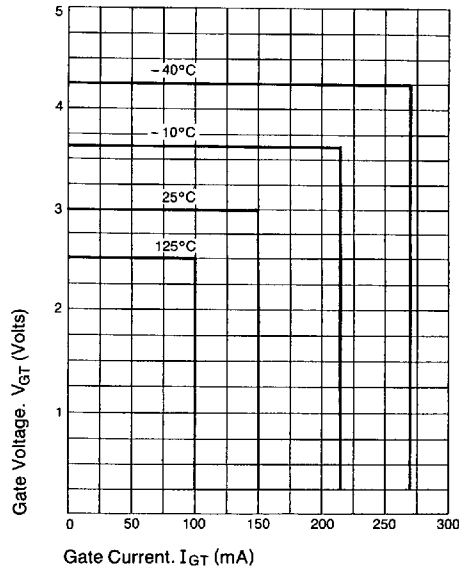


Figure 14. Water Cooled AC Switch Inlet Water at 25°C . 4.5 L/Min

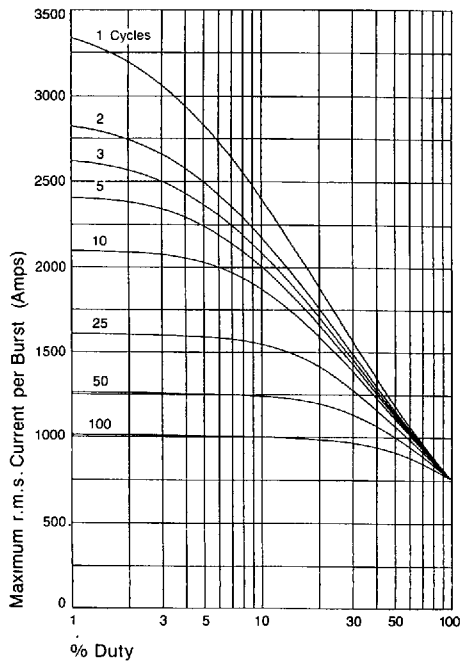
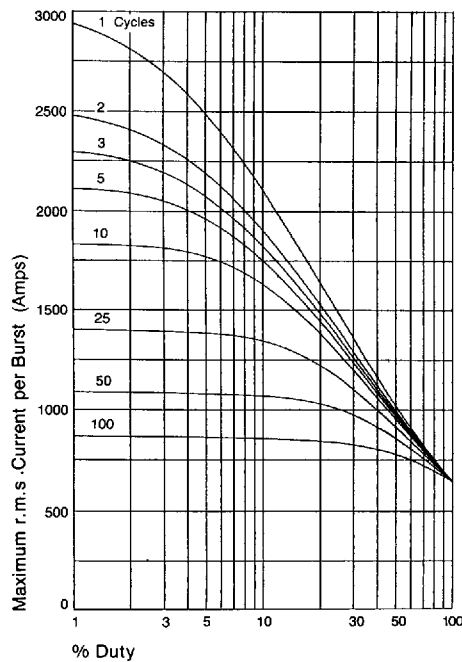


Figure 15. Water Cooled AC Switch Inlet Water at 45°C . 4.5 L/Min



Modules are available incorporating Distributed Gate or Fast turn-off thyristors and Fast Recovery diodes. Apply to your Westcode sales office for ratings.

Example:-

Thyristor R216CH12FJO with anti-parallel diode SM12CXC190.

Using R216CHxx data sheet and module thermal impedance, when operating on a trapezoidal waveform, di/dt of 100 A/μs at 1KHz, 50% duty cycle, a current of 350A (Peak) is possible at a module case temperature of 85°C and junction temperature of 125°C.

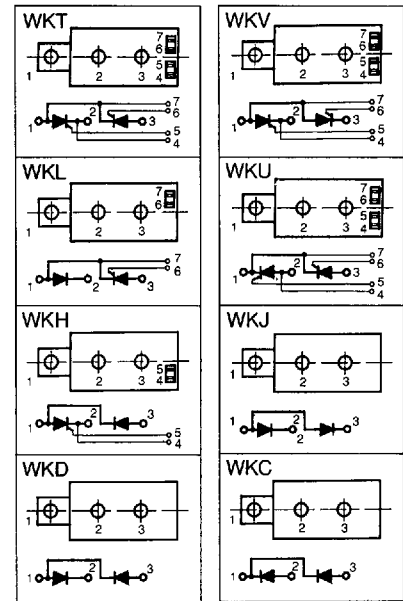
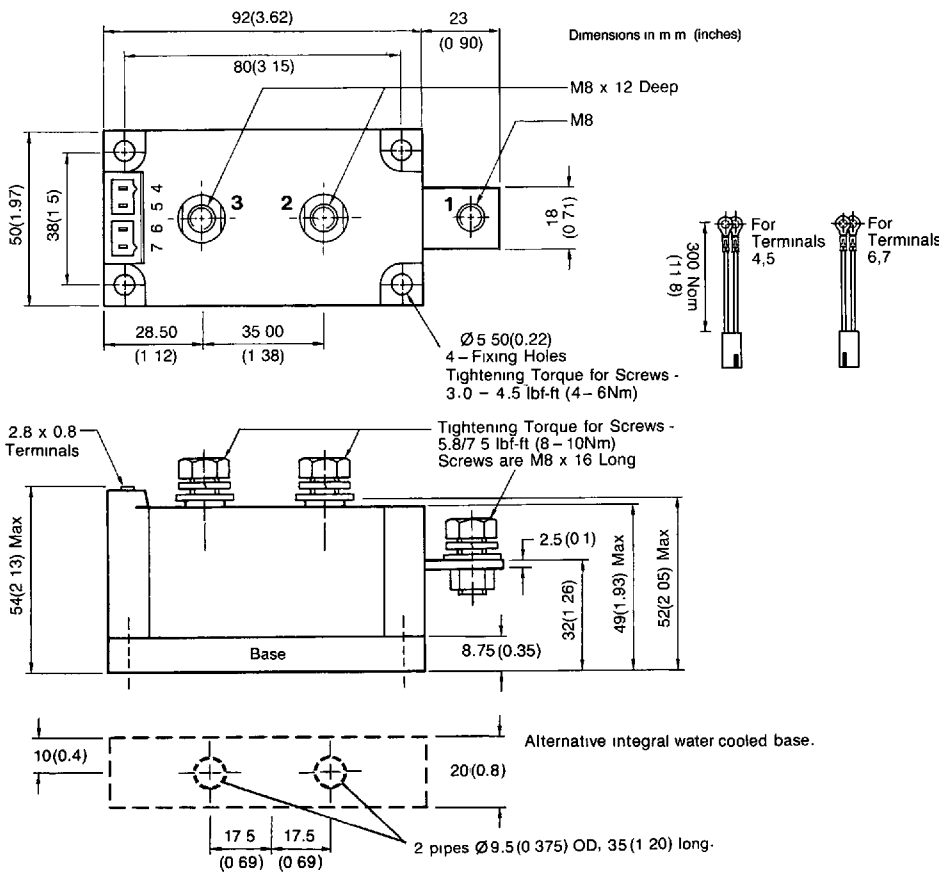
For specific applications contact the nearest Westcode Semiconductor sales office.

Connections made using busbars must be restrained during tightening. Using cable lugs or sockets is not recommended.

Terminal 1 should be supported by a spanner on the fixed nut (under the terminal), during tightening.

Terminal screws should be lubricated e.g. Molycote.

A mounting compound e.g. Bicconix X13 should be used (only a thin smear).



Weight.
910 grams.
1310 grams - Integral water cooled unit

In the interest of product improvement, Westcode reserves the right to change specifications at any time without notice. © Westcode Semiconductors Ltd.



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