

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

$I_{\text{T(AV)}}$	Average on-state current (thyristor)	Half sine wave $T_B = 85^\circ\text{C}$							250	A
$I_{\text{T(AV)}}$	Average on-state current (thyristor)	Half sine wave $T_B = 73^\circ\text{C}$							300	A
$I_{\text{F(AV)}}$	Average forward current (diode)	Half sine wave $T_B = 85^\circ\text{C}$							280	A
$I_{\text{T(RMS)}}$	R.M.S. on-state current	As AC switch $T_B = 85^\circ\text{C}$							555	A
$I_{\text{T(RMS)}}$	R.M.S. on-state current	As AC switch - water cooled							755/640 *	A
$I_{\text{TSM/FSM}}$	Peak one-cycle surge	10ms duration, 100% V_{RRM} re-applied Thyristor/diode							7.5/11.0	KA
$I_{\text{TSM/FSM}}$	(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
$P_{\text{G(AV)}}$	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 $t_r \leq 1\mu\text{s}$.							500	$\text{A}/\mu\text{s}$
		Anode voltage $\leq 80\% V_{\text{DRM}}$								
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°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	mΩ
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°C, V _A = 10V, I _A = 1A	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	°C/W
R _{th(b-s)}	Thermal resistance, base to heat sink	Per module	0.02	°C/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, $V_{\text{DRM/RRM}}$ 1200 Volts.

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

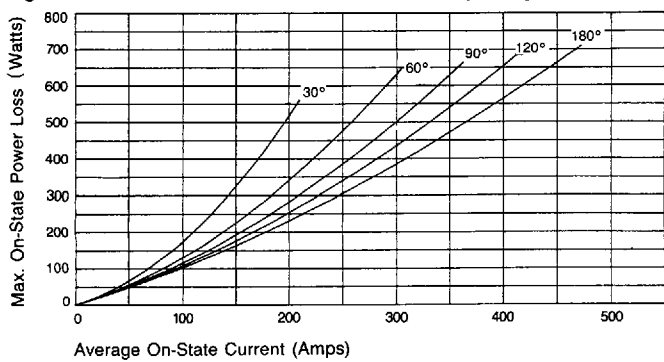


Figure 2. Base Temperature Ratings – Sine Wave, per Thyristor

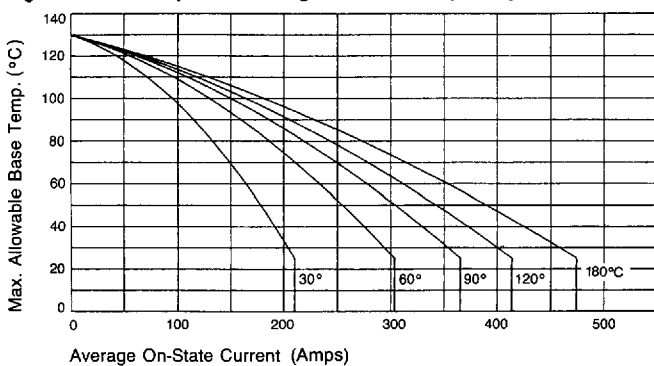


Figure 3. Power Loss Characteristics – Square Wave, per Thyristor

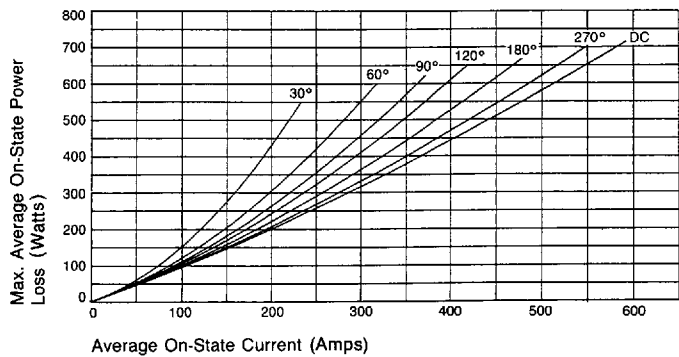


Figure 4. Base Temperature Ratings – Square Wave, per Thyristor

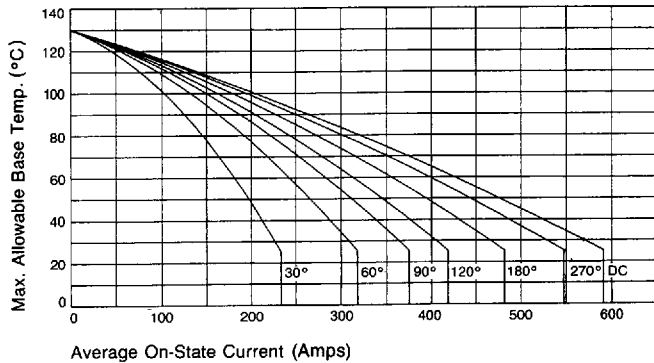


Figure 5. Power Loss Characteristics – Sine Wave, per Diode

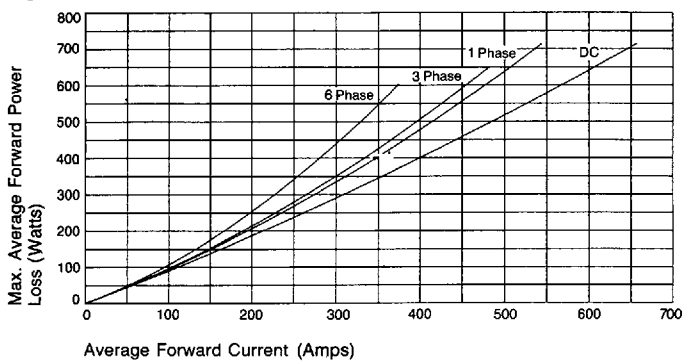


Figure 6. Base Temperature Ratings – Sine Wave, per Diode

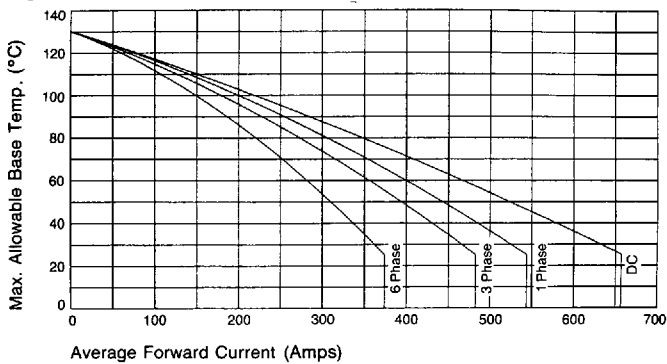


Figure 7. Maximum Instantaneous On-State Characteristics – Thyristor T_j 130°C.

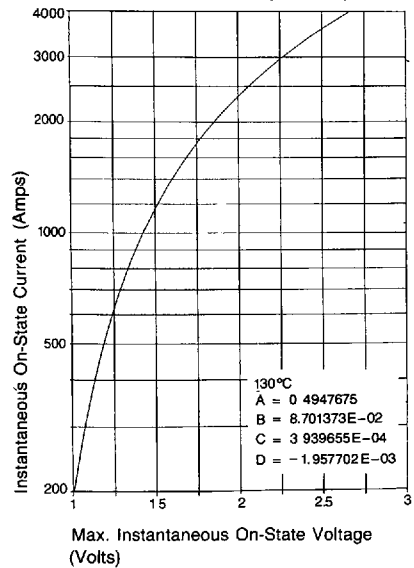


Figure 8. Maximum Instantaneous Forward Characteristics – Diode T_j 130°C.

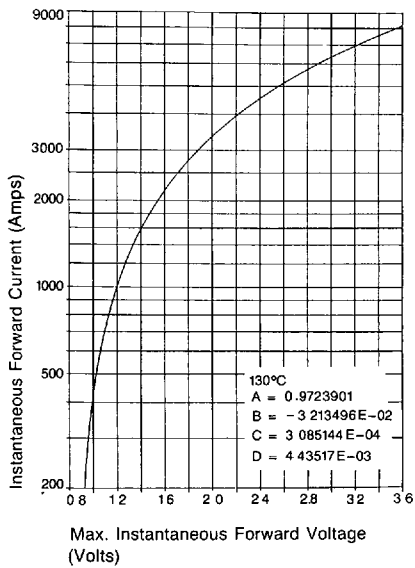


Figure 9. Transient Thermal Impedance, Junction To Base. All Types (per Path)

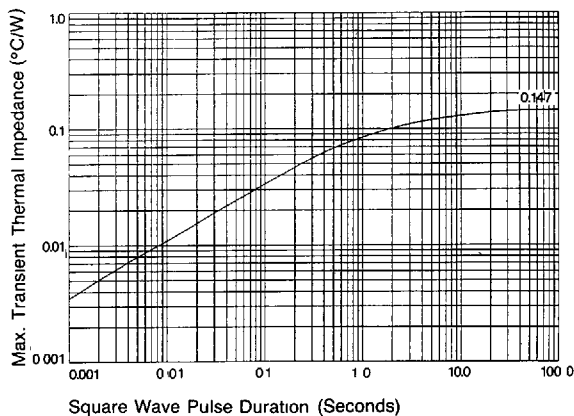


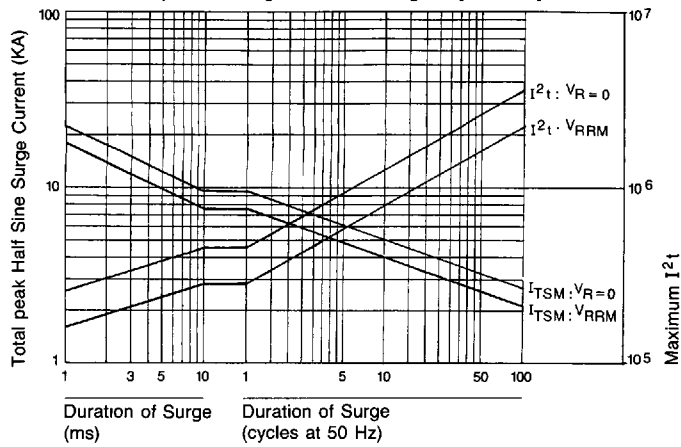
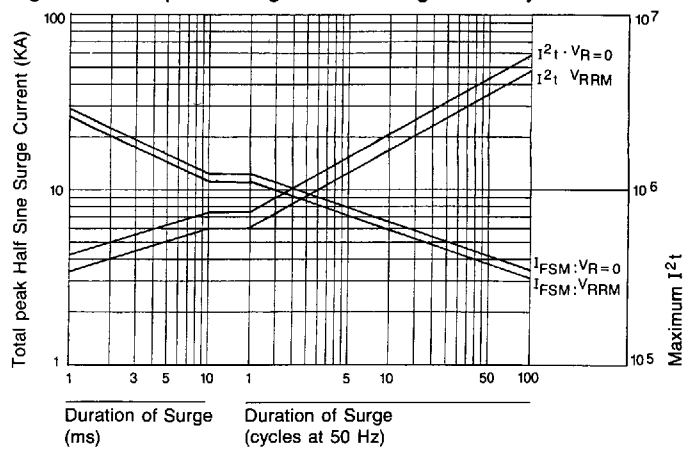
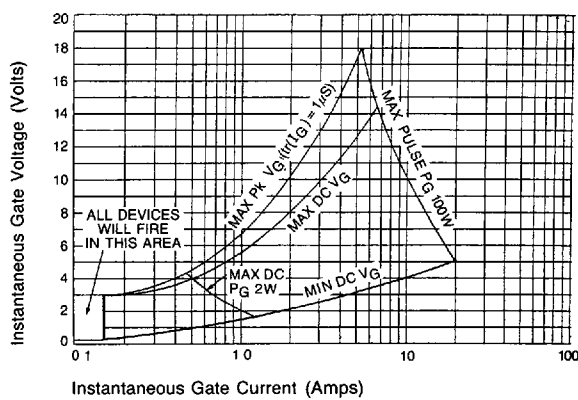
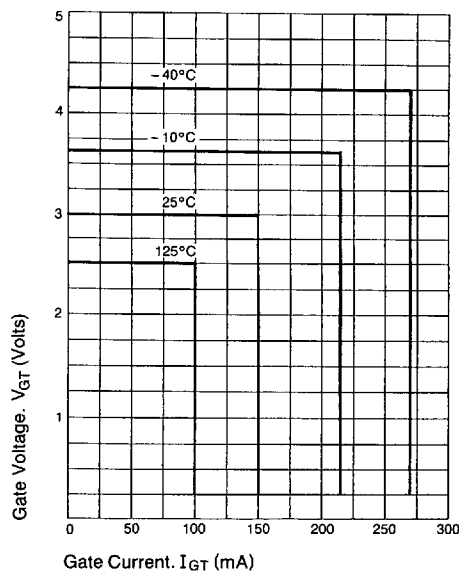
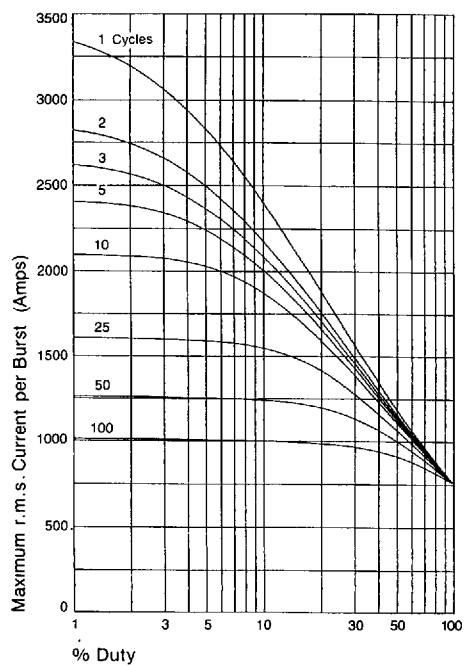
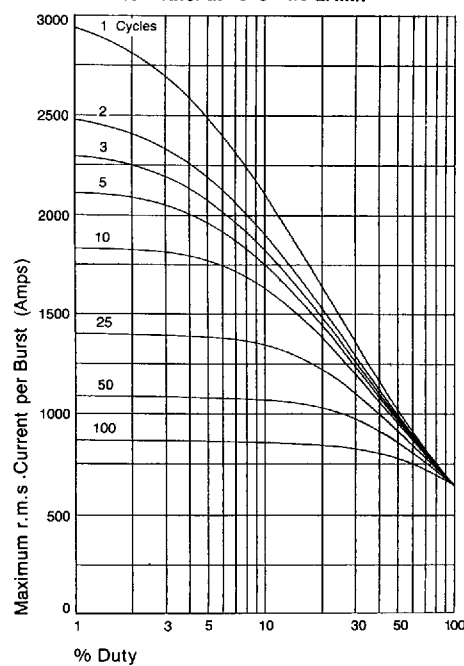
Figure 10. Non-repetitive Surge Current Ratings Thyristor $T_J 130^\circ\text{C}$.Figure 11. Non-repetitive Surge Current Ratings. Diode $T_J 130^\circ\text{C}$.Figure 12. Gate Characteristics at $T_J 25^\circ\text{C}$ 

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

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