

Feature

- Hermetic ceramics-metal stud structure
- Capacity of supporting high surge current

Typical Application

- DC motor control, Control DC power supply
- AC switch and thermal control, Synchronous motor excitation

$I_{T(AV)}$	50A
V_{DRM}/V_{RRM}	100-3000V
I_{TSM}	415A
I^2t	725 A ² s

Voltage Ratings

Type number	Voltage Code	V_{DRM}/V_{RRM} max. repetitive peak and off-state voltage (1) V	V_{RSM} non-repetitive peak voltage (2) V	I_{DRM}/I_{RRM} @ $T_J=T_J$ mA
50RIA	10	100	150	15
	20	200	300	
	40	400	500	
	60	600	700	
	80	800	900	
	100	1000	1100	
	120	1200	1300	
	140	1400	1500	
	160	1600	1700	

On-state Conduction

Symbol	Characteristic	50RIA		Units	Conditions		
		10-120	140-160				
$I_{T(AV)}$	Max. average on-state current @ Case temperature	50	50	A	180°C sinusoidal conduction		
$I_{T(RMS)}$	Max. RMS on-state current	80	80	A			
I_{TSM}	Max. peak, one-cycle non-repetitive surge current	1430	1200	A	t=10ms	No voltage reappplied	Sinusoidal half wave Initial $T_J = T_J$ Max
		1490	1257		t=8.3ms		
		1200	1010		t=10ms	100% V_{RRM} reappplied	
		1255	1057		t=8.3ms		
I^2t	Maximum I^2t for fusing	9.3	6.58	KA ² S	t=10ms	No voltage reappplied	
		10.18	7.21		t=8.3ms		
		6.56	5.10		t=10ms	100% V_{RRM} reappplied	
		7.20	4.65		t=8.3ms		
$V_{T(TO)1}$	Low level value of threshold voltage	0.94	1.02	V	$(16.7\% \times I_{T(AV)} < I < \pi \times I_{T(AV)}, T_J = T_J \text{ Max}$		
$V_{T(TO)2}$	High level value of threshold voltage	1.08	1.17		$(I > \pi \times I_{T(AV)}, T_J = T_J \text{ Max}$		
R_{t1}	Low level value of on-state slope resistance	4.08	4.78	mΩ	$(16.7\% \times I_{T(AV)} < I < \pi \times I_{T(AV)}, T_J = T_J \text{ Max}$		
R_{t2}	High level value of on-state slope resistance	3.34	3.97		$(I > \pi \times I_{T(AV)}, T_J = T_J \text{ Max}$		
V_{TM}	Max. on-state voltage	1.60	1.78	$I_{PK} = 79A, T_J = 25^\circ C$			
I_H	Maximum holding current	200		mA	$T_J = 25^\circ C$, Anode supply 6V, resistive load		
I_L	Latching current	400					

Symbol	Charteristic	50RIA	Units	Conditions
di/dt	Critical rate of rise of on-state current $V_{DRM} \leq 600V$ $V_{DRM} \leq 800V$ $V_{DRM} \leq 1000V$ $V_{DRM} \leq 1600V$	200 100	A/us	$T_J = T_J \text{ max.}, V_{DM} = V_{DRM}$ $, 15 \Omega, t_q = 6\mu s,$ $t_r = 0.1 \mu s \text{ max}$ $I_{TM} = (2 \times \text{rated di/dt}) A$
t_{qt}	Typical turn-on time	0.9	us	$T_J = 25^\circ C$ $A_t = V_{DRM} / V_{RRM}, T_J = 125^\circ C$
t_{rr}	Typical reverse recovery time	4		$T_J = T_J \text{ max},$ $I_{TM} = I_{T(AV)}, t_q > 200 \mu s, di/dt = -10 A/\mu s$
t_q	Typical turn-off time	110		$T_J = T_J \text{ max}, I_{TM} = I_{T(AV)}, t_q > 200 \mu s, V_R = 100V$ $di/dt = -10 A/\mu s, dv/dt = -20 A/\mu s, V_{DM} = 67\% V_{DRM}$ 0V-100W
dv/dt	Max. critical rate of rise of off-state voltage	200	V/us	$T_J = T_J \text{ max}, V_{DM} = 67\% V_{DRM}$
P_{GM}	Max peak gate power	10	W	$T_J = T_J \text{ max}$
$P_{G(AV)}$	Max average gate power	2.5	W	$T_J = T_J \text{ max}$
I_{GM}	Max peak pos gate current	2.5	A	$T_J = T_J \text{ max}$
$+V_{GM}$	Maximum peak positive gate voltage	20	V	
$-V_{GM}$	Maximum peak negative gate voltage	10	V	
I_{GT}	DC gate current required to trigger	250	mA	$T_J = -40^\circ C$
		100		$T_J = 25^\circ C$
		50		$T_J = 125^\circ C$
V_{GT}	DC gate voltage required to trigger	3.5	V	$T_J = -45^\circ C$
		2.5		$T_J = 25^\circ C$
I_{GD}	DC gate current not to trigger	5.0	mA	$T_J = T_J \text{ max}, V_{DRM} = 67\% V_{DRM}$
V_{GD}	DC gate voltage not to trigger	0.2	V	$T_J = T_J \text{ max}, V_{DRM} = 67\% V_{DRM}$
T_J T_{stg}	Maximum operating junction and storage temperature range	-40-125	$^\circ C$	
$R_{th(j-c)}$	Maximum thermal resistance, junction to case	0.35	K/W	
$R_{th(c-s)}$	Maximum thermal resistance, case to heatsink	0.25	K/W	
T	Allowable mounting torque	2.8	Nm	
W_t	Approximate weight	28	g	

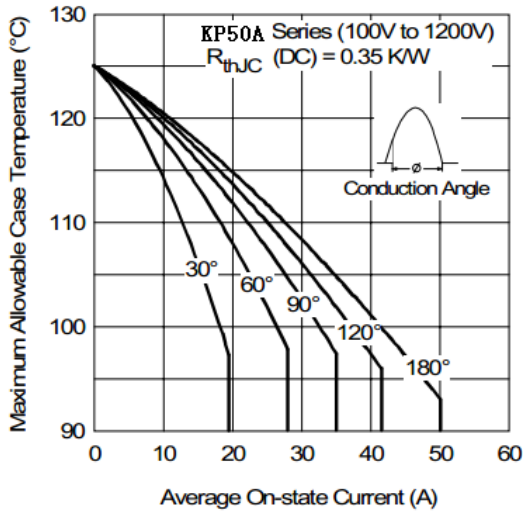


Fig. 1 - Current Ratings Characteristic

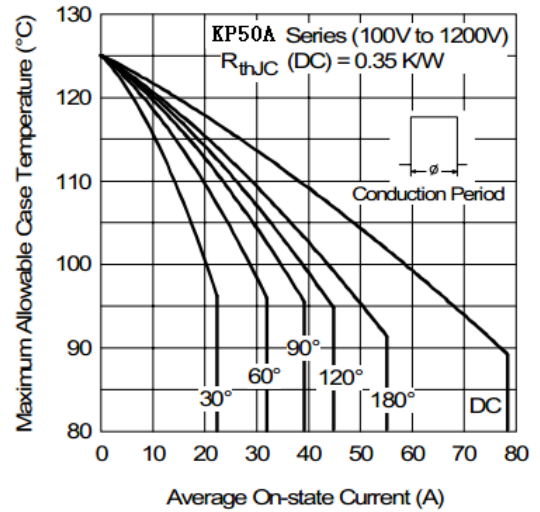


Fig. 2 - Current Ratings Characteristic

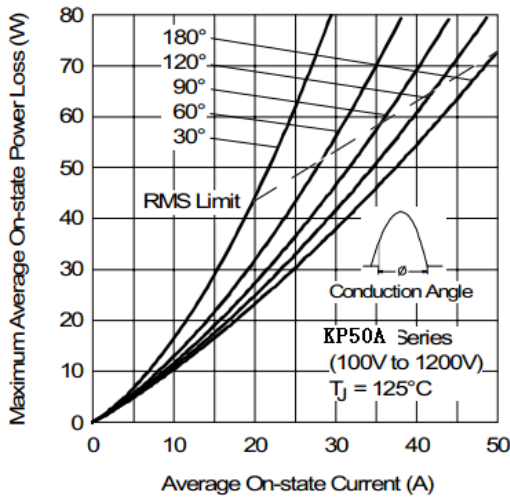


Fig. 3 - On-state Power Loss Characteristics

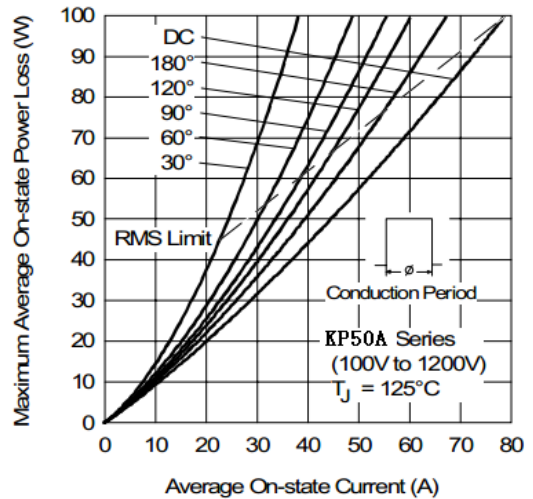


Fig. 4 - On-state Power Loss Characteristics

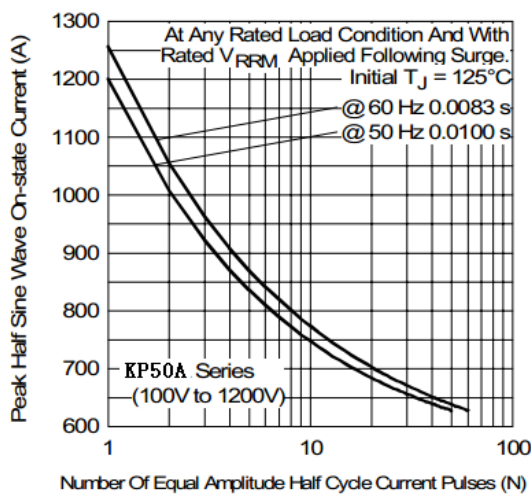


Fig. 5 - Maximum Non-Repetitive Surge Current

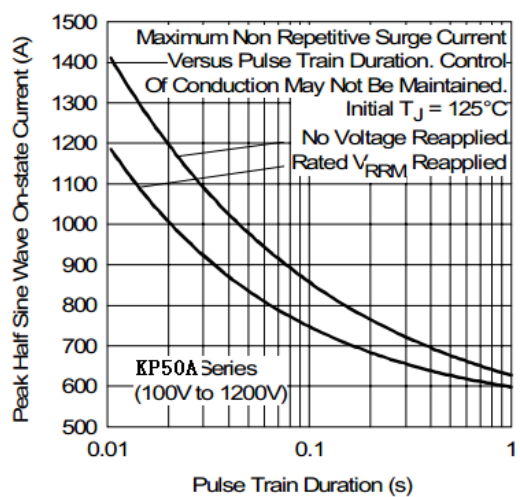


Fig. 6 - Maximum Non-Repetitive Surge Current

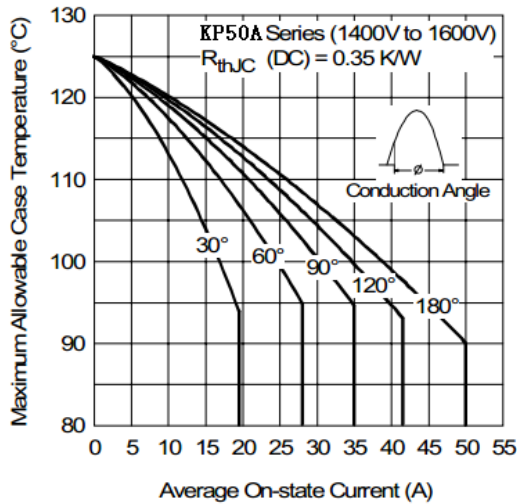


Fig. 7 - Current Ratings Characteristics

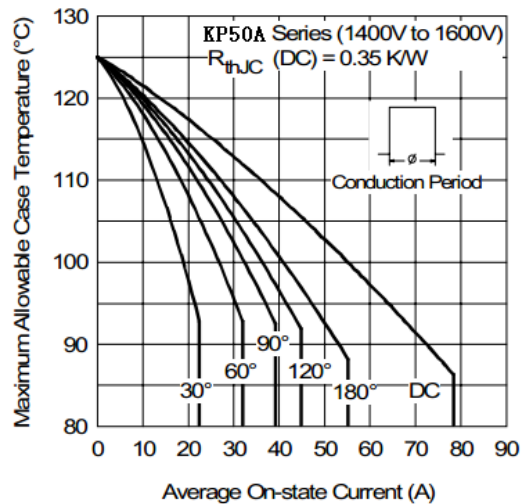


Fig. 8 - Current Ratings Characteristics

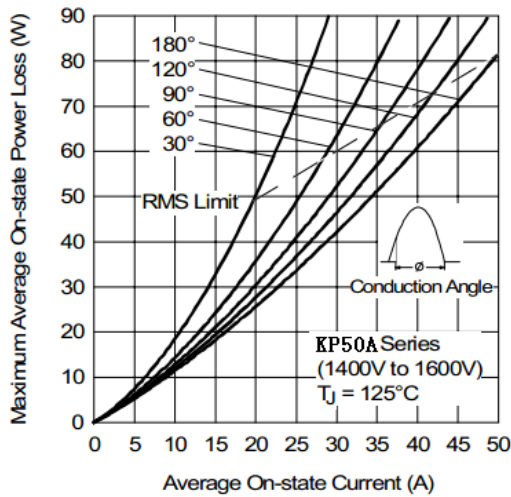


Fig. 9 - On-state Power Loss Characteristics

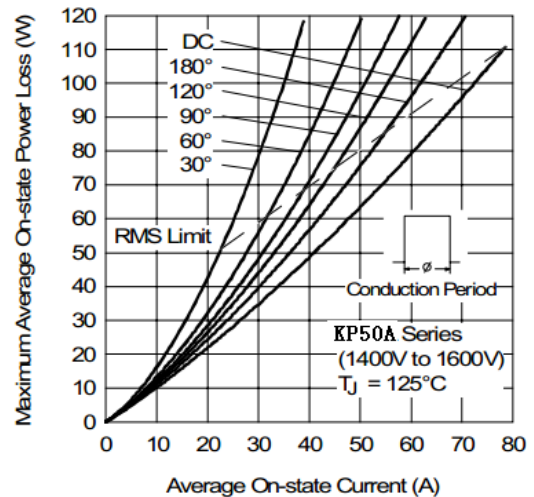


Fig. 10 - On-state Power Loss Characteristics

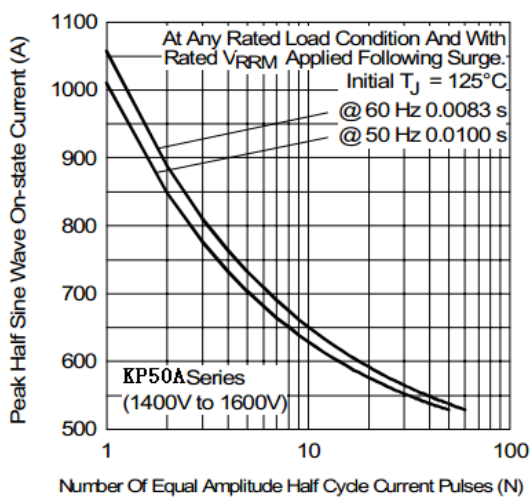


Fig. 11 - Maximum Non-Repetitive Surge Current

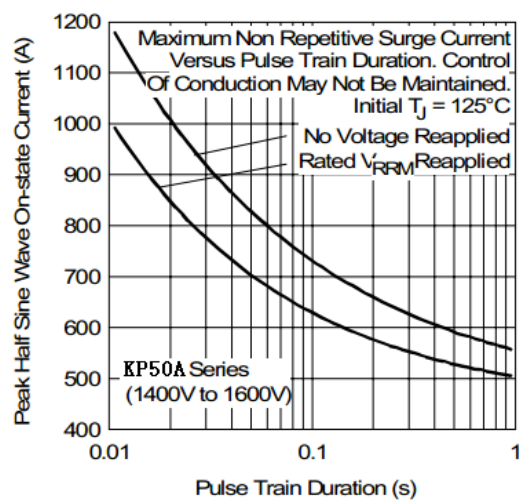


Fig. 12 - Maximum Non-Repetitive Surge Current

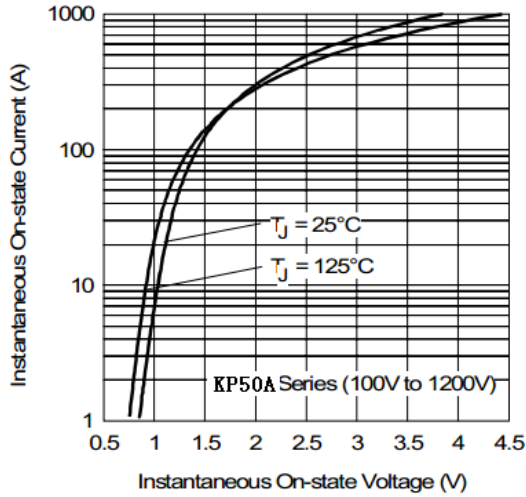


Fig. 13 - Forward Voltage Drop Characteristics

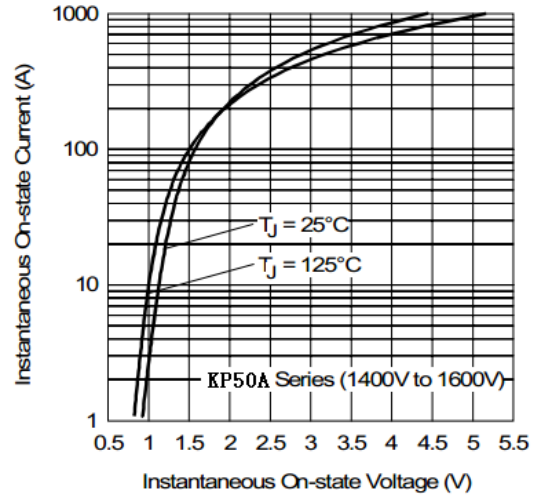


Fig. 14 - Forward Voltage Drop Characteristics

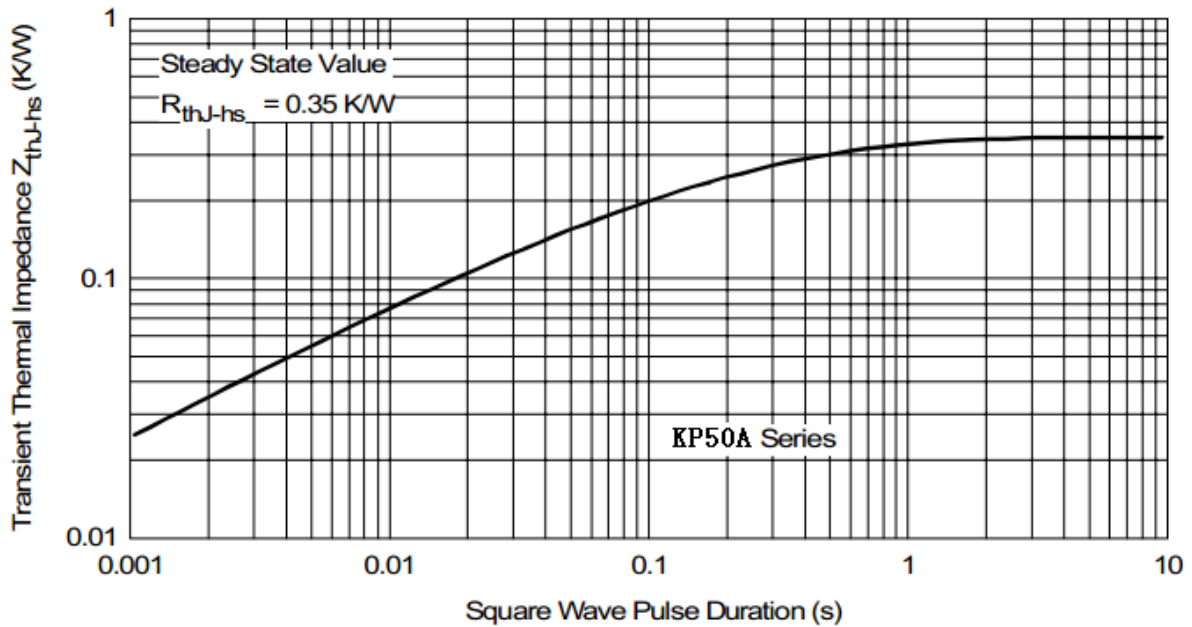


Fig. 15 - Thermal Impedance Z_{thJC} Characteristics