

Version: 2023V1

Key Parameters

V_{DRM}	1800	V
I_{overload}	3310	A
Topology	Antiparallel	
Cooling Method	air force cooling	
Part No.	tPower-SA..KP33X18F	

Applications

- High Voltage Soft Star
- AC Switch

Remarks

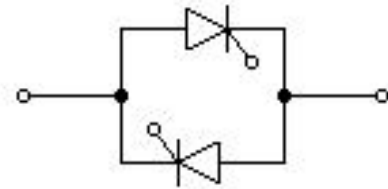
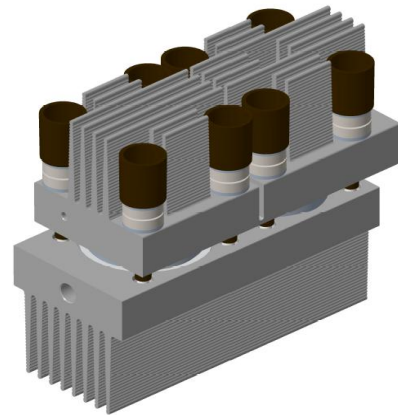
- Recommendation: The stack is suggested to be installed in cabinet with protection higher than IP54.
- It's a preliminary version, some parameters could be varied according to actual test data.

Mechanical Data

Symb.	Parameter	Value	Unit
V	Dimension	179*160*79	mm
m	Weight	3.4	kg

Characteristics

Symb.	Parameter	Condition	Min	Typ.	Max	Unit
I_{overload}	Over load current	Sin180°, 18s, $T_{\text{amb}}=40^{\circ}\text{C}$, $T_{\text{jmax}}=150^{\circ}\text{C}$,	-	-	3310	A
I_{TSM}	Surge (non-repetitive) on-state current	$T_{\text{vj}}=125^{\circ}\text{C}$, ,10ms	-	-	25	kA
I^2t	Limiting load integral	$T_{\text{vj}} \leq 125^{\circ}\text{C}$, DC Voltage	-	-	313×10^4	A^2s
$V_{\text{RRM}} \& V_{\text{DRM}}$	-	$T_{\text{vj}}=25, 125^{\circ}\text{C}$, $I_{\text{DRM}} \leq 150\text{mA}$	-	-	1800	V
$R_{\text{th(J-S)}}$	thermal resistance, junction to T-sensor(see drawing)	Per Module, DC	-	-	0.026	K/W

Topology**Outline**

Characteristics

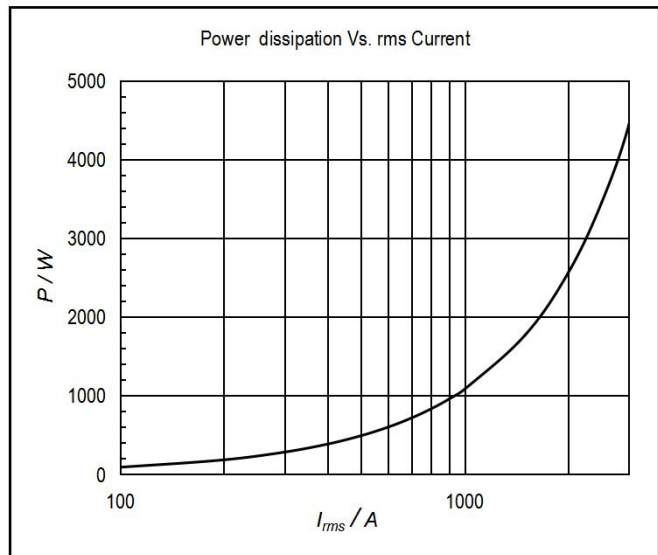
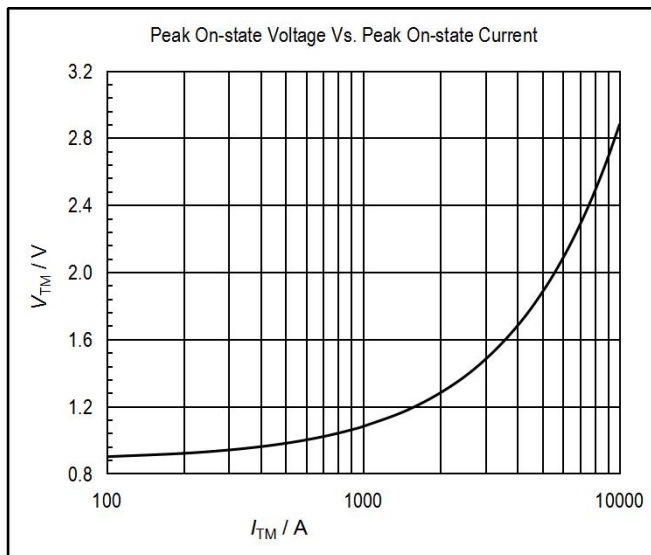
Symb.	Parameter	Condition	Min	Typ.	Max	Unit
V_{TM}	Peak on-state voltage	$T_{vj} = 25\text{ }^{\circ}\text{C}$, $I_{TM} = 3600\text{ A}$	-	-	1.68	V
I_{DRM}	Forward leakage current	$T_{vj} = 25\text{ }^{\circ}\text{C}, 125\text{ }^{\circ}\text{C}, V_{DRM}/V_{RRM}$	-	-	150	mA
I_{RRM}	Reverse leakage current		-	-		
V_{TO}	Threshold voltage	$T_{vj} = 125\text{ }^{\circ}\text{C}$	-	-	0.87	V
r_T	Slope resistance	$T_{vj} = 125\text{ }^{\circ}\text{C}$	-	-	0.2	m Ω
I_H	Holding current	$T_{vj} = 25\text{ }^{\circ}\text{C}$	-	-	200	mA
I_L	Latching current	$T_{vj} = 25\text{ }^{\circ}\text{C}$	-	-	1000	mA

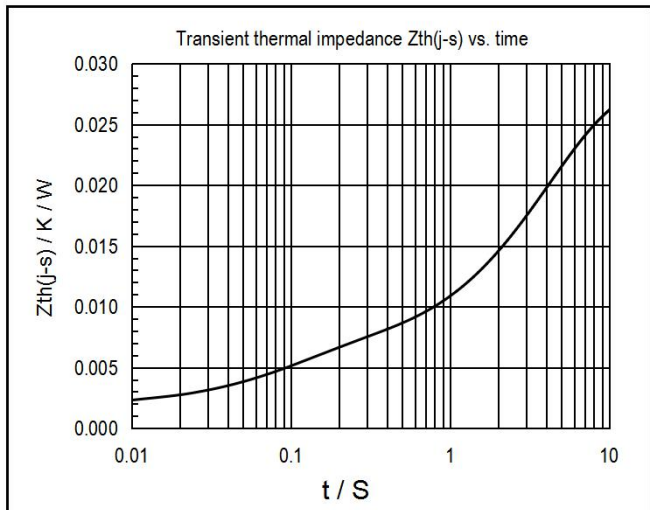
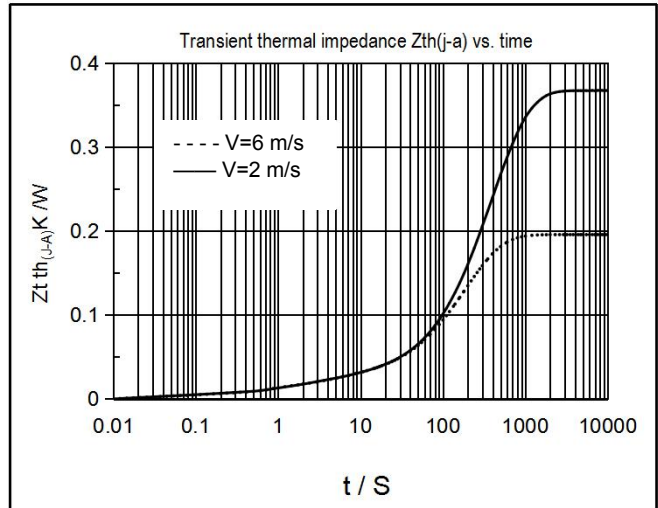
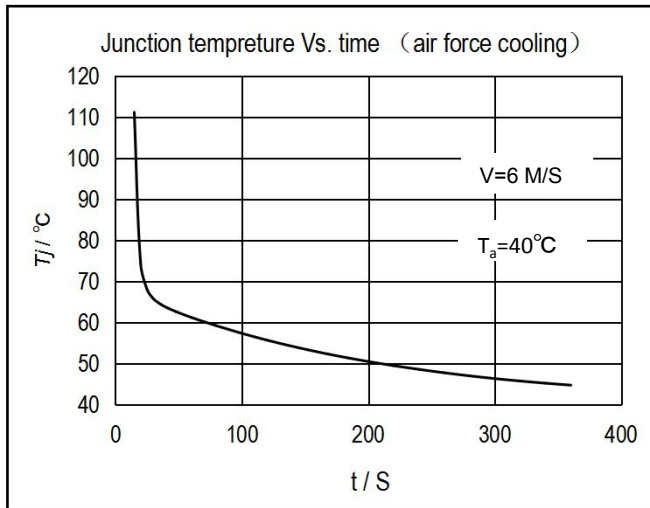
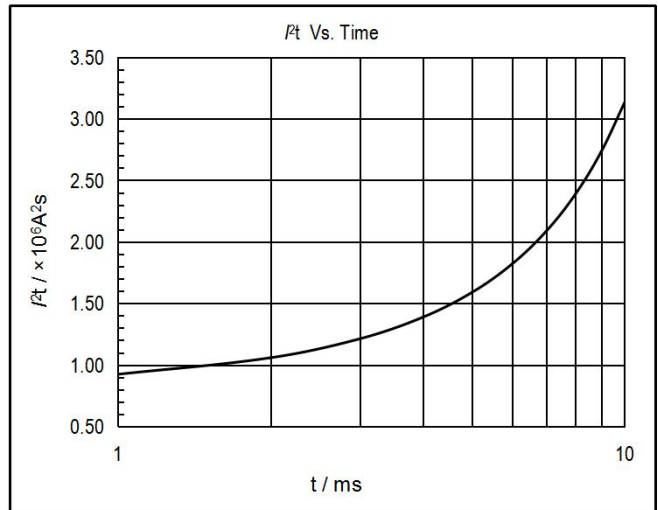
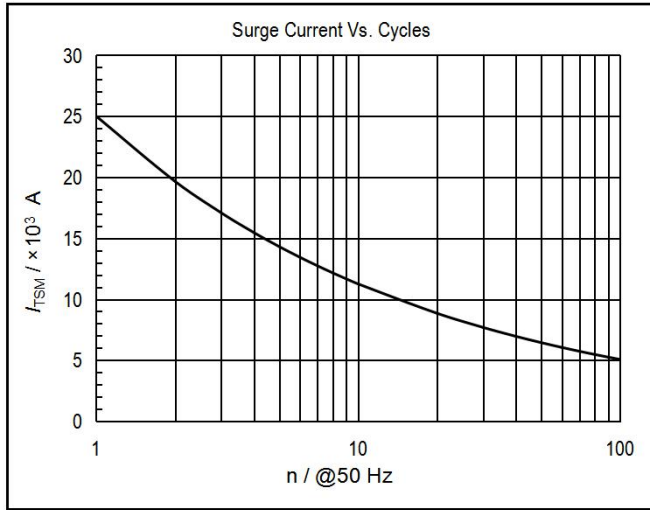
Dynamic Parameters

Symb.	Parameter	Condition	Min	Typ.	Max	Unit
dv/dt	Critical rate of rise of off-state voltage	$T_{vj} = 125\text{ }^{\circ}\text{C}$, $V_{DM} = 0.67 V_{DRM}$, $f = 50\text{ Hz}$	1000	-	-	V/ μs
di/dt	Critical rate of rise of on-state current	$T_{vj} = 125\text{ }^{\circ}\text{C}$, $V_{DM} = 0.67 V_{DRM}$, $f = 50\text{ Hz}$ $I_{TM} = 2000\text{ A}$, $I_{FG} = 2\text{ A}$, $tr = 0.5\text{ }\mu\text{s}$	-	-	200	A/ μs
t_q	Turn-off time	$T_{vj} = 125\text{ }^{\circ}\text{C}$, $V_{DM} = 0.67 V_{DRM}$, $I_T = 2000\text{ A}$ $dv/dt = 20\text{ V}/\mu\text{s}$, $V_R = 200\text{ V}$, $-di/dt = 10\text{ A}/\mu\text{s}$	-	250	-	μs
Q_{rr}	Reverse recovery charge	$T_{vj} = 125\text{ }^{\circ}\text{C}$, $-di/dt = 10\text{ A}/\mu\text{s}$, $I_T = 2000\text{ A}$, $V_R = 200\text{ V}$	-	2500	-	μC

Gate Parameters

Symb.	Parameter	Condition	Min	Typ.	Max	Unit
I_{GT}	Gate trigger gate	$T_{vj} = 25\text{ }^{\circ}\text{C}$	-	-	300	mA
V_{GT}	Gate trigger voltage	$T_{vj} = 25\text{ }^{\circ}\text{C}$	-	-	3	V
V_{GD}	Gate non-trigger voltage	$T_{vj} = 125\text{ }^{\circ}\text{C}$, $V_D = 0.4 V_{DRM}$	0.3	-	-	V
V_{FGM}	Peak forward gate voltage		-	-	12	V
V_{RGM}	Peak reverse gate voltage		-	-	5	V
I_{FGM}	Peak forward gate current		-	-	4	A
P_{GM}	Gate power losses		-	-	20	W
$P_{G(AV)}$	Gate power losses (mean)		-	-	4	W





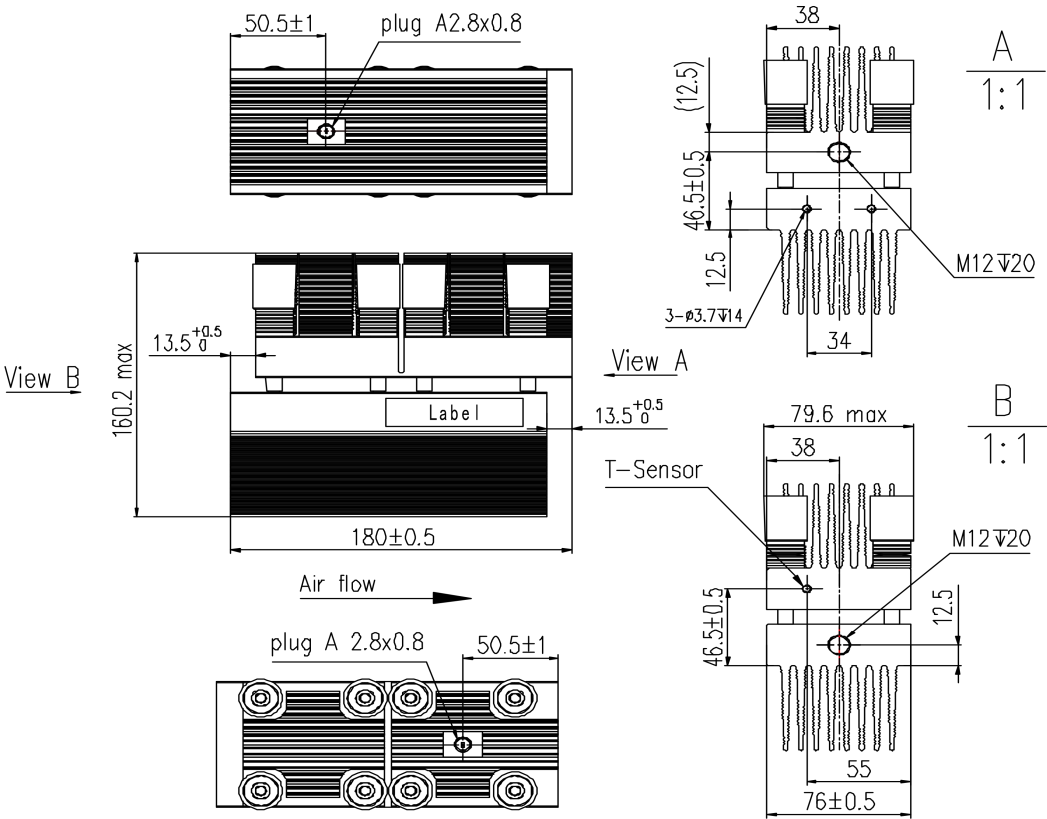
Analytical elements of transient thermal impedance $Z_{thJA}, V=2m/s$				
Pos.n	1	2	3	4
$R_{thn} [^{\circ}C/W]$	0.0115	0.0128	0.1582	0.1844
$T_n [S]$	0.5200	4.3654	316.7480	535.1240
Analytical function:		$Z_{thJC} = \sum_{n=1}^{n_{max}} R_{thn} [1 - e^{-\frac{t}{\tau_n}}]$		

Analytical elements of transient thermal impedance $Z_{thJA}, V=6m/s$				
Pos.n	1	2	3	4
$R_{thn} [^{\circ}C/W]$	0.0116	0.0124	0.1582	0.1844
$T_n [S]$	0.5282	4.3903	174.2670	319.5610
Analytical function:		$Z_{thJC} = \sum_{n=1}^{n_{max}} R_{thn} [1 - e^{-\frac{t}{\tau_n}}]$		

Analytical elements of transient thermal impedance Z_{thJS}				
Pos.n	1	2	3	4
$R_{thn} [^{\circ}C/W]$	0.0018	0.0044	0.0220	0.0015
$T_n [S]$	0.0008	0.1000	4.2000	360
Analytical function:		$Z_{thJC} = \sum_{n=1}^{n_{max}} R_{thn} [1 - e^{-\frac{t}{\tau_n}}]$		

Environmental parameter

Storage temperature	-40	25	130	℃
Operating temperature	-20	25	80	℃
Humidity	0	-	80	%
Class of pollution	-	II	-	-



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