

Mini-TECs

Type	Model No.	I _{max} (A)	V _{max} (volts)			ΔT _{max} (°C)			Q _{cmax} (watts)		
			T _h = 27 °C	T _h = 50 °C	T _h = 70 °C	T _h = 27 °C	T _h = 50 °C	T _h = 70 °C	T _h = 27 °C	T _h = 50 °C	T _h = 70 °C
Mini-TECs	KSHH012	1.0	1.5	1.7	1.8	77	87	95	0.8	0.9	0.9
	KSHH015	1.0	1.8	2.0	2.3	77	87	95	1.0	1.1	1.1
	KSHH018	1.0	2.2	2.5	2.7	77	87	95	1.2	1.3	1.4
	KSGH012	1.5	1.5	1.7	1.8	76	86	94	1.2	1.3	1.3
	KSGH015	1.5	1.9	2.1	2.3	76	86	94	1.5	1.6	1.7
	KSGH018	1.5	2.2	2.5	2.8	76	86	94	1.8	2.0	2.0
	KSAH012	2.3	1.6	1.8	2.0	74	85	92	1.7	1.8	1.8
	KSAH018	2.3	2.4	2.7	3.0	74	85	92	2.5	2.7	2.8
	KSAH023	2.3	3.0	3.4	3.7	74	85	92	3.3	3.5	3.6

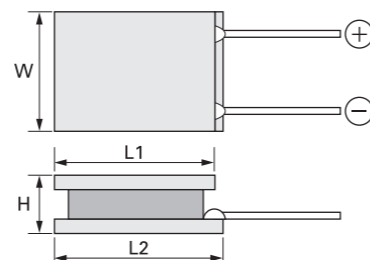
Micro-Modules

Type	Model No.	I _{max} (A)	V _{max} (volts)			ΔT _{max} (°C)			Q _{cmax} (watts)		
			T _h = 27 °C	T _h = 50 °C	T _h = 70 °C	T _h = 27 °C	T _h = 50 °C	T _h = 70 °C	T _h = 27 °C	T _h = 50 °C	T _h = 70 °C
Micro-Modules	KSMH018	2.3	2.3	2.6	2.8	76	86	92	2.7	2.9	3.0
	KSMH023	2.3	2.9	3.3	3.6	76	86	94	3.5	3.7	3.8
	KSMH029	2.3	3.6	4.1	4.5	76	86	94	4.3	4.7	4.8
	KSEH031	2.7	3.9	4.4	4.8	76	86	93	5.4	5.8	5.9
	KSEH035	2.7	4.4	5.0	5.5	76	86	94	6.1	6.6	6.7

Model No.	Top ceramics		Bottom ceramics		Height H(mm)	Height tolerance (±mm)	Ceramic material	Metallization	Terminal option		
	W(mm)	L1(mm)	W(mm)	L2(mm)					Lead wire	Pad	Post
KSHH012	1.6	1.6	1.6	2.2	0.8	0.1	Aluminum nitride(AIN)	Cu-Ni-Pd-Au		○	
KSHH015	1.8	1.8	2	2.6	0.9	0.1				○	
KSHH018	2	2	2	2.7	0.8	0.1				○	
KSGH012	1.6	1.6	1.6	2.2	0.7	0.1				○	
KSGH015	1.8	1.8	2	2.6	0.8	0.1				○	
KSGH018	2	2	2	2.7	0.7	0.1				○	
KSAH012	2.56	3.8	2.56	4.8	0.97	0.1	Alumina (Al ₂ O ₃)	Cu-Ni-Au	○	○	○
KSAH018	3.8	3.8	3.8	4.8	0.97	0.1			○	○	○
KSAH023	3.8	5.04	3.8	6.04	0.97	0.1			○	○	○

Model No.	Top ceramics		Bottom ceramics		Height H(mm)	Height tolerance (±mm)	Ceramic material	Metallization	Lead wire diameter (mm)
	W(mm)	L1(mm)	W(mm)	L2(mm)					
KSMH018	6.0	6.2	6.0	7.2	1.65	0.1	Alumina (Al ₂ O ₃)	Cu-Ni-Au	φ0.3
KSMH023	6.0	8.2	6.0	8.2	1.65	0.1			
KSMH029	6.0	10.2	6.0	10.2	1.65	0.1			
KSEH031	8.0	8.0	8.0	8.0	1.65	0.1			
KSEH035	6.0	12.2	6.0	12.2	1.65	0.1			

I_{max} : Maximum current ----- Current at ΔT_{max}, Q_c=0
 V_{max} : Maximum terminal voltage----- Terminal voltage at I_{max}, ΔT_{max} and Q_c=0
 ΔT_{max} : Maximum temperature difference ----- Temperature difference between the cold side and the hot side and the hot side ceramics
 Q_{cmax} : Maximum heat pumped at the cold side ----- Heat pumped at I_{max}, ΔT=0
 T_h : Hot side ceramics temperature ----- Ceramics temperature at the hot side



Other Specifications

- (1) Ceramics : All models can be assembled with alumina &/or aluminum nitride ceramics.
- (2) Assembly solder : SnSb (melting point: 232°C) is available, and AuSn (melting point: 280°C)
- (3) Pretinning : InSn (melting point: 117°C), BiSn (melting point: 138°C), SnAgCu (melting point: 217°C), SnSb (melting point: 232°C) are available.
- (4) ΔT_{max} : ΔT_{max} is measured in vacuum, ΔT_{max} in air or nitrogen is 5 to 6°C lower than in vacuum.

◆ All modules are 100% screened by temperature cycling(-40/+85°C).

◆ Mini-TECs have about 50% smaller footprint of Micro Module with retaining cooling performance.

Model List

Multi-stage Modules

Type	Model No.	I _{max} (A)	V _{max} (volts)			Δ T _{max} (°C)			Q _{cmax} (watts)		
			Th = 27 °C	Th = 50 °C	Th = 70 °C	Th = 27 °C	Th = 50 °C	Th = 70 °C	Th = 27 °C	Th = 50 °C	Th = 70 °C
Multi-stage Modules	K4MA010	4.6	14.6	16.3	17.9	129	145	160	6.2	6.9	7.4
	K5MA004	4.6	14.7	16.5	18.0	141	159	174	2.8	3.1	3.4
	K3MC011	5.0	7.4	8.3	9.1	117	132	145	6.5	7.2	7.7
	K4MC005	4.6	7.1	7.9	8.7	129	146	161	3.1	3.4	3.7
	K2M-006	2.7	0.9	1.0	1.1	96	109	120	0.8	0.9	1.0
	K2M-030	2.7	4.0	4.5	5.0	94	107	117	3.7	4.0	4.2
	K2M-034	2.7	4.5	5.0	5.5	94	106	116	4.3	4.7	5.0
	K3M-002	1.7	2.3	2.5	2.8	120	136	149	0.4	0.4	0.5

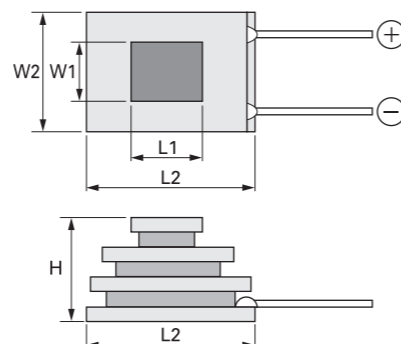
Multi-purpose Modules

Type	Model No.	I _{max} (A)	V _{max} (volts)			Δ T _{max} (°C)			Q _{cmax} (watts)		
			Th = 27 °C	Th = 50 °C	Th = 70 °C	Th = 27 °C	Th = 50 °C	Th = 70 °C	Th = 27 °C	Th = 50 °C	Th = 70 °C
Multi-purpose Modules	KSM-04007C	4.0	0.8	0.9	1.0	64	73	81	2.0	2.2	2.5
	KSM-04017C	4.0	2.0	2.2	2.5	64	73	81	4.8	5.4	6.0
	KSM-04031C	4.0	3.6	4.1	4.5	64	73	81	8.7	9.9	10.9
	KSM-04071C	4.0	8.3	9.2	10.2	64	73	81	19.9	22.6	24.9
	KSM-04127C	4.0	14.8	16.7	18.3	64	73	81	35.6	40.4	44.5
	KSM-06007C	6.0	0.8	0.9	1.0	64	73	81	3.0	3.4	3.7
	KSM-06017C	6.0	2.0	2.2	2.4	64	73	81	7.2	8.2	9.0
	KSM-06031C	6.0	3.6	4.1	4.5	64	73	81	13.1	14.9	16.4
	KSM-06071C	6.0	8.3	9.2	10.2	64	73	81	30.0	34.1	37.6
	KSM-06127C	6.0	14.7	16.5	18.2	64	73	81	53.8	61.0	67.2

Model No.	Top ceramics		Bottom ceramics		Height H (mm)	Height tolerance (±mm)	Ceramic material	Metallization
	W1(mm)	L1(mm)	W2(mm)	L2(mm)				
K4MA010	8.5	13.0	19.25	20.75	8.2	0.5	Aluminum nitride(AIN)	Cu-Ni-Au
K5MA004	6.6	11.0	19.25	20.75	10.3	0.6		
K3MC011	8.5	13.0	21.5	28.0	7.3	0.4		
K4MC005	6.6	11.0	21.5	28.0	9.4	0.5		
K2M-006	4.05	4.05	4.05	4.05	3.0	0.2	Alumina (Al ₂ O ₃)	
K2M-030	8.05	8.05	8.05	8.05	3.0	0.2		
K2M-034	6.05	12.05	6.05	12.05	3.0	0.2		
K3M-002	3.0	3.0	6.0	6.0	4.3	0.3		

Model No.	Top ceramics		Bottom ceramics		Height H(mm)	Height tolerance (±mm)	Ceramic material	Metallization	Lead wire
	W(mm)	L1(mm)	W(mm)	L2(mm)					
KSM-04007C	10.3	10.3	10.3	12.2	4.65	0.15	Alumina (Al ₂ O ₃)	Nil	20AWG
KSM-04017C	15.0	15.0	15.0	17.0	4.65	0.15			
KSM-04031C	20.0	20.0	20.0	22.0	4.65	0.15			
KSM-04071C	30.0	30.0	30.0	31.5	4.65	0.15			
KSM-04127C	40.0	40.0	40.0	41.5	4.65	0.15			
KSM-06007C	10.3	10.3	10.3	12.2	3.8	0.15		20AWG	
KSM-06017C	15.0	15.0	15.0	17.0	3.8	0.15			
KSM-06031C	20.0	20.0	20.0	22.0	3.8	0.15			
KSM-06071C	30.0	30.0	30.0	31.5	3.8	0.15			
KSM-06127C	40.0	40.0	40.0	41.5	3.8	0.15			

I_{max} : Maximum current ----- Current at ΔT_{max}, Q_c=0
 V_{max} : Maximum terminal voltage----- Terminal voltage at I_{max}, ΔT_{max} and Q_c=0
 ΔT_{max} : Maximum temperature difference ----- Temperature difference between the cold side and the hot side and the hot side ceramics
 Q_{cmax} : Maximum heat pumped at the cold side ----- Heat pumped at I_{max}, ΔT=0
 Th : Hot side ceramics temperature ----- Ceramics temperature at the hot side



Multi-stage Modules

- ◆ High performance sintered thermoelements are used.
- ◆ Pretinning is available for bottom ceramics.
- ◆ Lead wire is tinned annealed copper wire.
- ◆ RoHS compliant

Multi-purpose Modules

- ◆ ΔT_{max} is described as the value in nitrogen.
- ◆ Multi-purpose Modules are 100% screened.
- ◆ SnAgCu (melting point: 217°C) is used as assembly solder.
- ◆ Average ±0.025mm height allowance is available by lapping.
- ◆ Lead wire is insulated with lead free heat resistant PVC.
- ◆ RoHS compliant