



SCTB NORD

Last update: May 2009

PRODUCT GENERAL SPECIFICATION

ONE-STAGE STANDARD MODULES

TYPE	BASIC CHARACTERISTICS				DIMENSIONS, mm		
	I_{max} , A	U_{max} , V	Q_{cmax} , W	ΔT_{max} , K	Cold side	Hot side	Height
TM-63-0.8-3.0	3.0	7.6	13.0	72	15 x 30	15 x 30	3.4
TM-450-0.8-3.0	3.0	54.8	95.0	70	54.4 x 54.4	54.4 x 57.0	3.4
TM-17-1.0-2.5	2.5	2.1	3.0	73	12 x 12	12 x 12	4.2
TM-31-1.0-2.5	2.5	3.8	5.5	73	15 x 15	15 x 15	4.2
TM-63-1.0-2.5	2.5	7.6	10.9	73	15 x 30	15 x 30	4.2
TM-71-1.0-2.5	2.5	8.6	12.4	73	22.4 x 22.4	22.4 x 22.4	4.2
TM-127-1.0-2.5	2.5	15.5	22	73	30 x 30	30 x 30	4.2
TM-17-1.0-3.0	3.0	2.1	3.5	72	12 x 12	12 x 12	3.8
TM-23-1.0-3.0 *	3,0	2,0	4,8	71	15 x 15	15 x 15	3,6
TM-31-1.0-3.0	3.0	3.8	6.5	72	15 x 15	15 x 15	3.8
TM-63-1.0-3.0	3.0	7.6	13.1	72	15 x 30	15 x 30	3.8
TM-71-1.0-3.0	3.0	8.6	14.9	72	22.4 x 22.4	22.4 x 22.4	3.8
TM-127-1.0-3.0	3.0	15.5	26.5	72	30 x 30	30 x 30	3.8
TM-241-1.0-3.0	3.0	29.5	49.0	72	40 x 40	40 x 40	3.8
TM-17-1.0-3.9	3.9	2.1	4.6	71	12 x 12	12 x 12	3.6
TM-31-1.0-3.9	3.9	3.8	8.5	71	15 x 15	15 x 15	3.6
TM-63-1.0-3.9	3.9	7.6	17.1	71	15 x 30	15 x 30	3.6
TM-71-1.0-3.9	3.9	8.6	19.3	71	22.4 x 22.4	22.4 x 22.4	3.6
TM-127-1.0-3.9	3.9	15.5	34.5	71	30 x 30	30 x 30	3.6
TM-241-1.0-3.9	3.9	29.5	64	71	40 x 40	40 x 40	3.6
TM-71-1.0-3.9	4.5	8.6	22.0	71	22.4 x 22.4	22.4 x 22.4	3.6
TM-110-1.2-8.0	8.0	12.7	62.0	70	54.8 x 24.8	54.8 x 24.8	3.5
TM-144-1.2-8.0	8.0	16.5	81.0	69	16.2 x 72.4	16.8 x 76.7	2.7
TM-216-1.3-8.0	8.0	26.0	135.0	69	24.6 x 72.4	25.2 x 76.7	2.76
TM-7-1.4-3.7	3.7	0.9	1.9	73	12 x 12	12 x 12	4.7
TM-17-1.4-3.7	3.7	2.1	4.6	73	15 x 15	15 x 15	4.7
TM-31-1.4-3.7	3.7	3.8	8.5	73	20 x 20	20 x 20	4.7
TM-35-1.4-3.7	3.7	4.2	9.5	73	15 x 30	15 x 30	4.7
TM-63-1.4-3.7	3.7	7.6	17.1	73	20 x 40	20 x 40	4.7
TM-71-1.4-3.7	3.7	8.6	19.3	73	30 x 30	30 x 30	4.7
TM-127-1.4-3.7	3.7	15.5	34.5	73	40 x 40	40 x 40	4.7
TM-7-1.4-6.0	6.0	0.9	2.9	72	12 x 12	12 x 12	3.8
TM-17-1.4-6.0	6.0	2.1	7.1	72	15 x 15	15 x 15	3.8

TYPE	BASIC CHARACTERISTICS				DIMENSIONS, mm		
	I_{max} , A	U_{max} , V	Q_{cmax} , W	ΔT_{max} , K	Cold side	Hot side	Height
TM-31-1.4-6.0	6.0	3.8	12.9	72	20 x 20	20 x 20	3.8
TM-35-1.4-6.0	6.0	4.2	14.6	72	15 x 30	15 x 30	3.8
TM-63-1.4-6.0	6.0	7.6	26.0	72	20 x 40	20 x 40	3.8
TM-71-1.4-6.0	6.0	8.6	29.6	72	30 x 30	30 x 30	3.8
TM-127-1.4-6.0	6.0	15.5	53	72	40 x 40	40 x 40	3.8
TM-254-1.4-6.0	6.0	31.0	106	72	40 x 80	44 x 80	3.9
TM-35-1.4-8.0	8,0	4,2	19.0	72	15 x 30	15 x 30	3,4
TM-7-1.4-8.5	8.5	0.9	3.9	71	12 x 12	12 x 12	3.4
TM-17-1.4-8.5	8.5	2.1	9.5	71	15 x 15	15 x 15	3.4
TM-31-1.4-8.5	8.5	3.8	17.3	71	20 x 20	20 x 20	3.4
TM-35-1.4-8.5	8.5	4.2	19.9	71	15 x 30	15 x 30	3.4
TM-63-1.4-8.5	8.5	7.6	35.3	71	20 x 40	20 x 40	3.4
TM-69-1.4-8.5 *	8,5	7.8	46,0	75	35 x 35	35 x 35	3,4
TM-71-1.4-8.5	8.5	8.6	40.0	71	30 x 30	30 x 30	3.4
TM-127-1.4-8.5	8.5	15.5	72.0	71	40 x 40	40 x 40	3.4
TM-241-1.4-8.5	8.5	29.5	140	71	54.4 x 54.4	54.4 x 57	3.4
TM-31-1.4-9.0	9.0	3.8	17.3	71	30 x 30	30 x 30	3.5
TM-69-1.4-9.0	9,0	7,8	45,0	70	35 x 35	35 x 40	3,0
TM-71-1.4-9.0	8.7	9.2	46.0	74	30 x 30	30 x 30	3.4
TM-141-1.4-9.0	9.0	16.8	75.0	71	25 x 50	25 x 50	3.2
TM-153-1.4-9.0	9.0	19.8	93.0	71	30 x 55	30 x 55	3.9
TM-242-1.4-15.0	15.0	29.5	270.0	68	50 x 50	50 x 54	3.2
TM-241-1.5-10.0	10.0	29.5	160	69	55 x 55	55 x 55	3.4
TM-241-1.5-17.0	17.0	29.5	262.0	69	50 x 50	50 x 50	3.4
TM-127-1.6-9.0	9.0	15.5	75.0	69	56 x 56	56 x 56	3.5
TM-71-1.6-15.0	15.0	8.2	70.0	71	29.2 x 29.2	29.8 x 33.8	2.35
TM-127-1.6-15.0	15.0	15.4	120.0	69	39.8 x 39.8	39.8 x 39.8	3.2
TM-161-1.6-15.0	15.0	19.5	154.0	69	40 x 40	40 x 40	3.3
TM-241-1.6-15.0	15.0	29.5	230.0	68	50 x 50	50 x 50	3.75
TM-32-2.0-9.0	9.0	3.8	19.0	71	25.4x25.4	25.4x28.4	4.8
TM-71-2.0-12.0	12.0	8.6	59.0	73	40 x 40	40 x 40	3.8
TM-127-2.0-12.0	12.0	15.5	88.0	72	50 x 50	50 x 54	3.8
TM-32-2.0-15.0	15.0	3.8	31.0	71	25.4x25.4	25.4x28.4	3.6
TM-71-2.0-15.0	15.0	8.6	74.0	72	40 x 40	40 x 40	3.6
TM-127-2.0-15.0	15.0	15.5	110.0	69	56 x 56	56 x 56	3.5
TMR-127-2.0-15.0	15.0	15.5	110.0	71	50 x 50	50 x 54	3.6
TM-75-2.5-20.0	20.0	10.0	100.0	70	37,4 x 54.8	37,4 x 59	3.2
TM-70-2.5-15.5	15,5	8,6	76,0	70	36,4 x 50.2	36.4 x 54.4	4,7
TM-70-2.5-24.0	24.0	8.5	115.0	69	36,4 x 50.2	36.4 x 54.4	3.2
TM-18-5.0-60.0	60.0	2.2	72.5	71	40 x 40	40 x 40	4.5
TM-18-5.0-75.0	75.0	2.2	89.0	71	40 x 40	40 x 40	4.2

* - with a centre hole

TWO-STAGE STANDARD MODULES

TYPE	BASIC CHARACTERISTICS				DIMENSIONS, mm		
	I_{\max} , A	U_{\max} , V	Q_{cmax} , W	ΔT_{\max} , K	Cold side	Hot side	Height
2TM-127-31-5.0	5.0	15.5	17.0	95	40 x 40	40 x 40	11.7
2TM-127-63-6.5	6.5	16.0	35.0	86	40 x 40	40 x 40	7.5
2TM-127-63-9.5	9.5	15.5	59.0	82	56 x 56	56 x 56	7.0

SPECIAL DESIGN MODULES

ROUND MODULES

TYPE	BASIC CHARACTERISTICS				DIMENSIONS, mm	
	I_{\max} , A	U_{\max} , V	Q_{cmax} , W	ΔT_{\max} , K	Diameter (\varnothing)	Height
TM-257-1.4-6.0	6.0	31.4	110.0	71	62	4.16

ONE-STAGE MICROMODULES

TYPE	BASIC CHARACTERISTICS				DIMENSIONS, mm			
	I_{\max} , A	U_{\max} , V	Q_{cmax} , W	ΔT_{\max} , K	A	B	C	Height
TM-7-0.3-0.3	0.3	0.8	0.15	72	2.0	2.0	3.0	1.79
TM-8-0.3-0.3	0.3	0.8	0.15	71	2.0	2.0	3.0	1.79
TM-2-0.3-0.5	0.5	0.23	0.07	71	1.2	1.2	1.5	1.5
TM-2-0.4-3.0	3.0	0.37	0.67	72	2.5	1.5	2.5	1.0
TM-11-0.4-1.1	1.1	1.25	0.88	71	6.4	2.4	2.4	1.65
TM-18-0.4-1.4	1.4	2.1	1.6	72	3.8	3.8	5.0	1.15
TM-8-0.5-2.0	2.0	0.95	1.1	71	4.0	4.0	5.0	1.0
TM-4-0.6-1.2	1.2	0.5	0.32	72	2.0	4.0	4.0	2.6
TM-8-0.6-1.2	1.2	1.0	0.65	72	4.0	4.0	6.0	2.6
TM-12-0.6-1.2	1.2	1.5	1.0	72	4.0	6.0	6.0	2.6
TM-18-0.6-1.2	1.2	2.2	1.5	72	6.0	6.0	8.1	2.6
TM-32-0.6-1.2	1.2	3.9	2.6	72	8.0	8.0	10.0	2.6
TM-4-0.6-1.5	1.5	0.5	0.4	72	2.0	4.0	4.0	2.3
TM-8-0.6-1.5	1.5	1.0	0.8	72	4.0	4.0	6.0	2.3
TM-12-0.6-1.5	1.5	1.5	1.3	72	4.0	6.0	6.0	2.3
TM-18-0.6-1.5	1.5	2.2	1.85	72	6.0	6.0	8.1	2.65
TM-32-0.6-1.5	1.5	3.9	3.3	72	8.0	8.0	10.0	2.6
TM-18-0.6-2.0	2.0	2.2	2.4	72	6.0	6.0	7.2	1.65
TM-23-0.6-2.0	2.0	3.0	3.4	72	6.0	8.2	8.2	1.65
TM-29-0.6-2.0	2.0	3.4	4.0	72	6.0	10.2	10.2	2.0
TM-47-0.6-2.0	2.0	5.4	6.8	72	8.0	12.0	12.0	1.6
TM-79-0.6-2.0	2.0	9.6	11.0	72	10.0	15.0	15.0	1.57
TM-32-0.6-2.2	2.2	3.8	5.0	72	8.0	8.0	10.0	2.58
TM-18-0.6-2.4	2.4	2.2	2.9	72	6.0	6.0	7.2	1.65
TM-29-0.6-2.4	2.4	3.4	4.8	72	6.0	10.2	10.2	1.65
TM-41-0.6-2.4	2.4	5.0	6.7	72	6.0	14.0	14.0	1.65
TM-119-0.6-2.4	2.4	14.5	19.5	72	10.0	24.0	24.0	1.65

TM-95-0.6-3.9	3.9	11.8	22	70	12.0	16.0	16.0	1.65
TM-35-0.7-2.8	2.8	4.3	7.0	72	6.0	12.2	12.2	1.7
TM-26-0.8-4.8	4.8	3.2	8.1	72	8.0	12.0	12.0	1.65
TM-29-0.8-4.8	4.8	3.6	9.0	72	8.0	12.2	12.2	1.65
TM-39-0.8-6.0	5.9	4.5	14.5	97	6.9	15.1	15.1	1.65
TM-7-1.0-2.5	2.5	0.9	1.3	73	8.0	8.0	10.0	4.2
TM-7-1.0-3.0	3.0	0.9	1.5	72	8.0	8.0	10.0	3.8
TM-7-1.0-3.9	3.9	0.9	1.9	71	8.0	8.0	10.0	3.6

THE FOLLOWING SYMBOLS ARE USED IN THE ABOVE TABLES

I_{\max} – Input current resulting in greatest ΔT_{\max} , (A)

U_{\max} – Input Voltage at ΔT_{\max} , (V)

$Q_{c\max}$ – Maximum heat pumping capacity at I_{\max} , $\Delta T = 0$ K, (W)

ΔT_{\max} – Maximum temperature difference a module can achieve at $I = I_{\max}$ and $Q_c = 0$, (K)

POWER GENERATING MODULES

Module operating properties are given at hot side temperature 175°C and cold side temperature 50°C. Under these conditions maximum efficiency of electric power generation is around 3% for all presented modules. Efficiency is determined as W_{load}/Q_{hot} , where W_{load} is an output power, Q is a heat flow through the module.

TYPE	Operating properties						DIMENSIONS, mm		
	U_{oc} , V	R_{in} , Ohm	R_{load} , Ohm	W_{load} , W	U_{load} , V	Λ_m , W/°C	Cold side	Hot side	Height
TMG-18-5.0-1.3	1.0	0.04	0.04	6.7	0.5	2.3	40 x 40	40 x 40	4.2
TMG-111-1.4-1.2	6.0	2.0	2.0	4.6	3.0	1.00	35 x 40	35 x 40	2.95
TMG-127-1.0-1.3	6.4	5.0	5.0	2.1	3.2	0.53	30 x 30	30 x 30	3.6
TMG-127-1.0-1.6	6.4	6.5	6.5	1.6	3.2	0.41	30 x 30	30 x 30	3.8
TMG-127-1.0-2.0	6.4	7.8	8.0	1.3	3.3	0.34	30 x 30	30 x 30	4.2
TMG-127-1.4-1.2	6.4	2.3	2.3	4.5	3.2	1.15	40 x 40	40 x 40	3.4
TMG-127-1.4-1.6	6.4	3.3	3.3	3.1	3.2	0.81	40 x 40	40 x 40	3.8
TMG-127-1.4-2.5	6.4	4.7	4.7	2.2	3.2	0.50	40 x 40	40 x 40	4.7
TMG-127-2.0-1.3	6.4	1.3	1.3	7.9	3.2	2.02	50 x 50	50 x 54	3.6
TMG-127-2.0-1.6	6.4	1.6	1.6	6.4	3.2	1.62	50 x 50	50 x 54	3.8
TMG-241-1.0-1.3	12.1	10.1	10	3.6	6.0	1.00	40 x 40	40 x 40	3.6
TMG-241-1.0-1.6	12.1	13.0	13.0	2.8	6.0	0.78	40 x 40	40 x 40	3.8
TMG-241-1.4-1.2	11.5	4.5	7.0	7.0	7.0	2.18	54.4 x 54.4	54.4 x 57	3.4
TMG-254-1.4-1.2	11.5	4.8	7.0	7.0	7.0	2.30	40 x 80	44 x 80	3.5
TMG-254-1.4-1.6	12.8	6.55	7.2	6.2	6.7	1.60	40 x 80	44 x 80	3.9
TMG-450-0.8-1.0	21.0	21.5	28.0	5.0	12.0	1.45	54.4 x 54.4	54.4 x 57.0	3.4

Designations:

U_{oc} – open circuit voltage, (V)

R_{in} – module internal resistance at 110°C, (Ohm)

R_{load} – matched load resistance, (Ohm)

U_{load} – output voltage, (V), corresponded to matched load

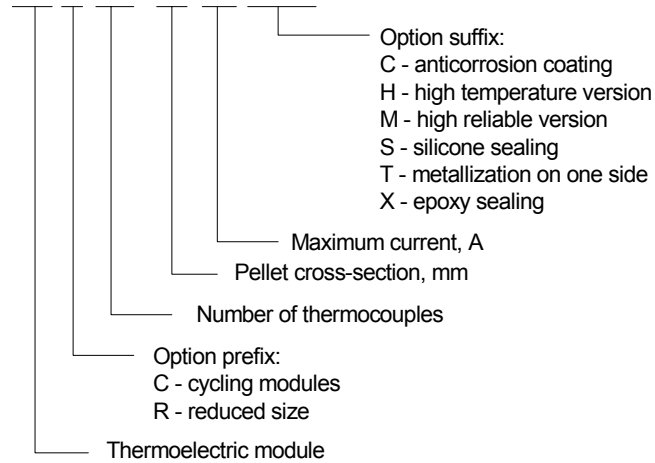
Λ_m – module thermal conductance at 110°C, (W/°C)

Notes:

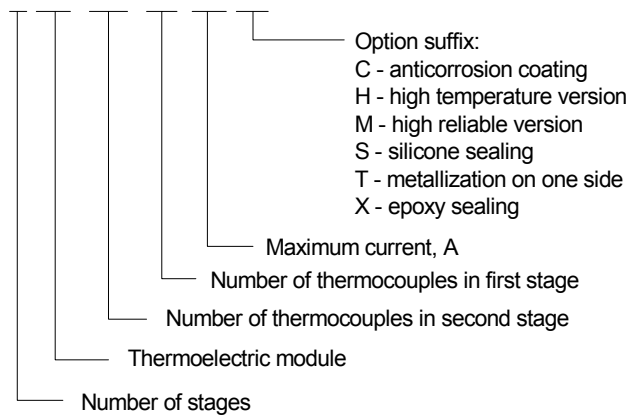
1. The open circuit voltage U_{oc} is the output voltage of the module without any load.
2. The match load is the module load when the load resistance R_{load} equals to the module's internal resistance R_{in} .
3. The output voltage and power will change with the load. Under match load the output power is at maximum under specified cold and hot side temperatures.
4. To get the best efficiency, the module should be mounted between flat and lapped faces and uniformly pressed with the force 120-150 N/cm² of module cold side surface.

HOW TO DECODE NORD'S MODULE MARKING:

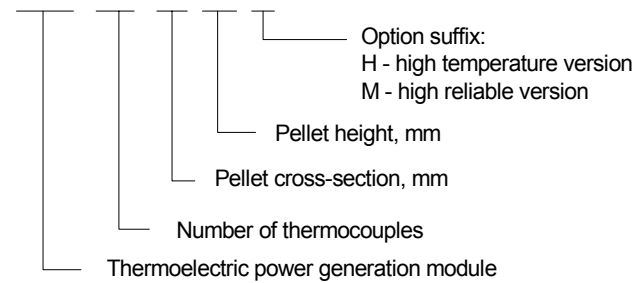
TMC-127-1.4-6.0 MHS



2TM-127-63-6.5 M



TMG-127-1.0-2.0 H



TECHNICAL DATA AND OPTIONS

1. Interior solders:
 - standard version – Pb/Sn (+ 183⁰ C m.p.t)
 - high temperature version (index H) – lead free solder (+ 230⁰ C m.p.t.)
2. Outer ceramic surfaces can be
 - lapped
 - Metallized
 - Au plated
 - tinned by solder in any combination In/Sn (+ 117⁰ C), Bi/Sn (+ 136⁰ C), Pb/Sn (+ 183⁰ C).
1. All modules are assembled with antidiffusion barriers onto the pellets and intended to long time operation up to + 150⁰ C for standard version and up to + 170⁰ C for high temperature version.
2. Module height tolerance is ± 0.2 mm (close-height tolerance of 0.02 mm is available).
3. Flatness and parallel variance not more than 0.02 mm.
4. Lead wires:
 - standard coolers – 18, 20 or 22 AWG stranded tinned copper in PVC insulation (Teflon and silicone insulation is available).
 - microcoolers – AWG 30 uninsulated solid wire.
5. Porch style lead wire attachment is available.

5. ADDITIONAL DATA

1. ***Reliability tests are based on the reliability program of Bellcore.***
2. ***All modules are assembled with using of no halide substances.***
3. ***All modules are subjected to both thermal cycling influence test and ultrasonic diagnostics.***
4. ***Thermal screening for control of temperature uniformity is provided upon request***

◆ SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

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