

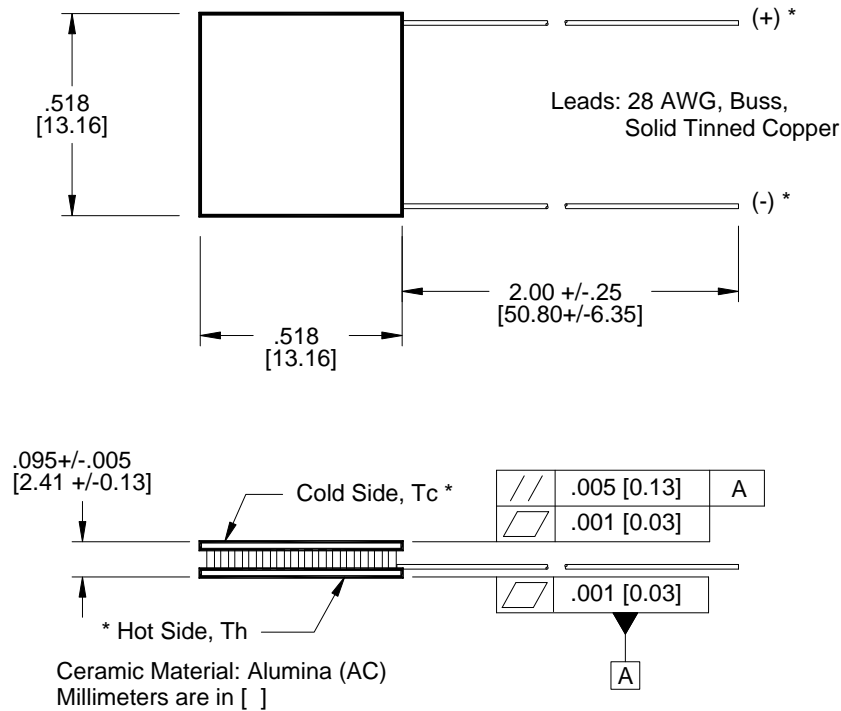
## NL1013T

Single-Stage Thermoelectric Module  
RoHS EU Compliant

### TYPICAL PERFORMANCE VALUES

Hot Side Temperature (°C)	27°C	50°C
$\Delta T_{max}$ (°C-dry Vac):	61	69
Qmax (watts):	4.8	5.4
I <sub>max</sub> (amps):	1.0	1.0
V <sub>max</sub> (vdc):	8.5	9.6
AC Resistance (ohms):	7.42	--
Device ZT	0.77	--

### MECHANICAL CHARACTERISTICS



## -01AC, -02AC, -03AC

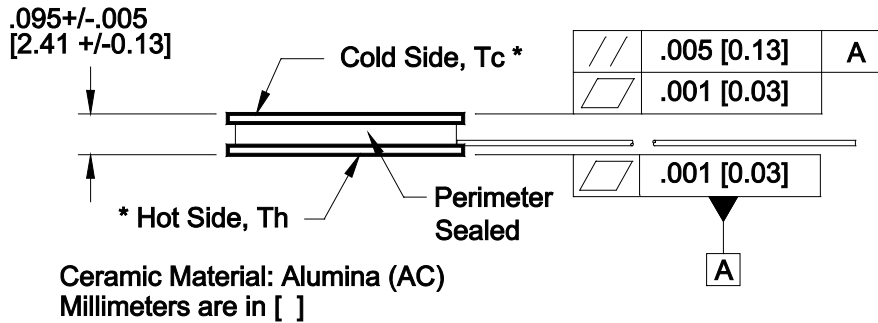
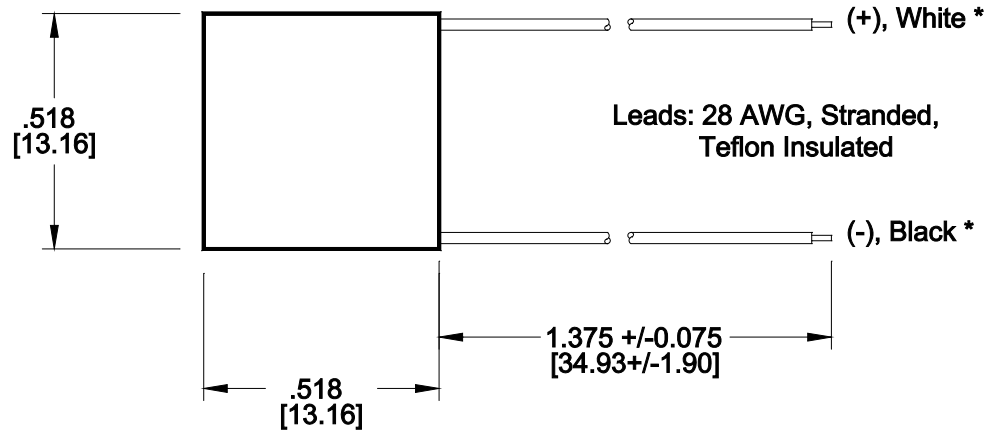
**\*NOTE: Cold side, hot side, positive leads, and negative leads are valid only for thermoelectric cooling. For power generation, refer to page 4.**

### ORDERING OPTIONS

Model Number	Description
NL1013T-01AC	TEM, Top and Base Metallized Exterior
NL1013T-02AC	TEM, Base Metallized Exterior
NL1013T-03AC	TEM, No Metallized Exterior
NL1013T-04AC	TEM, No Metallized Exterior, Sealed, Special Wires

### PRODUCT FEATURES

- Maximum operating temperature is 85°C.
- Maximum process temperature is 220°C.
- Ceramic Material: Aluminum Oxide
- Metallized Exterior Surfaces are Au flash, suitable for soldering.
- RTV Sealing options available.

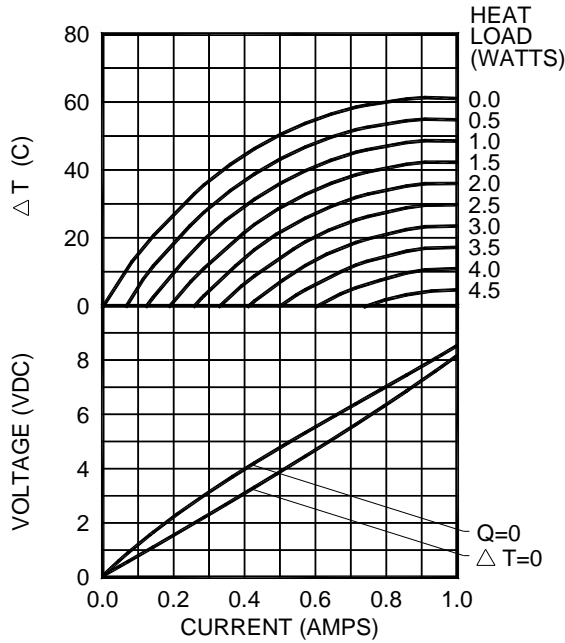


**-04AC**

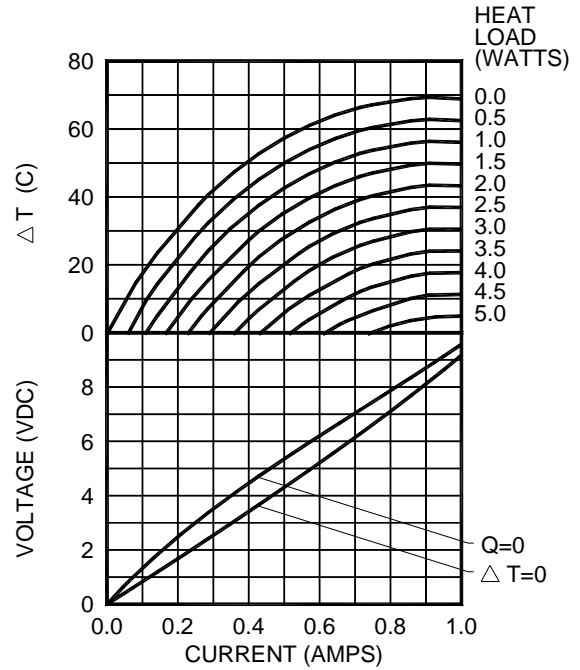
**\*NOTE:** Cold side, hot side, positive leads, and negative leads are valid only for thermoelectric cooling. For power generation, refer to page 4.

ENVIRONMENT:  $10^{-5}$  TORR VACUUM

Hot Side Temperature: 27°C



Hot Side Temperature: 50°C



For performance information in nitrogen or with hot side temperatures other than 27°C or 50°C, contact one of our Applications Engineers at 877-627-5691. • Marlow reserves the right to make product changes without notice.

Installation

Recommended mounting methods: Bonding with thermal epoxy or soldering with metallized ceramics. For additional information, please refer to our TEC Installation Guide.

Operation Cautions

For maximum reliability, storage and operation below 85°C in a non-condensing environment is recommended. To minimize thermal stress, use linear/proportional temperature control or a similar method rather than an ON/OFF method.

CONTACT US:

For customer support or general questions please contact a local office below or visit our website at [www.marlow.com](http://www.marlow.com).

Marlow Industries, Inc.  
 10451 Vista Park Road  
 Dallas Texas 75238-1645  
 214-340-4900 (tel)  
 214-341-5212 (fax)  
 877-627-5691 (tech support)  
[www.marlow.com](http://www.marlow.com)

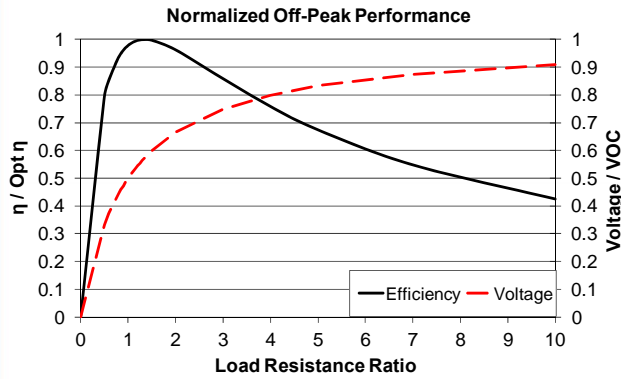
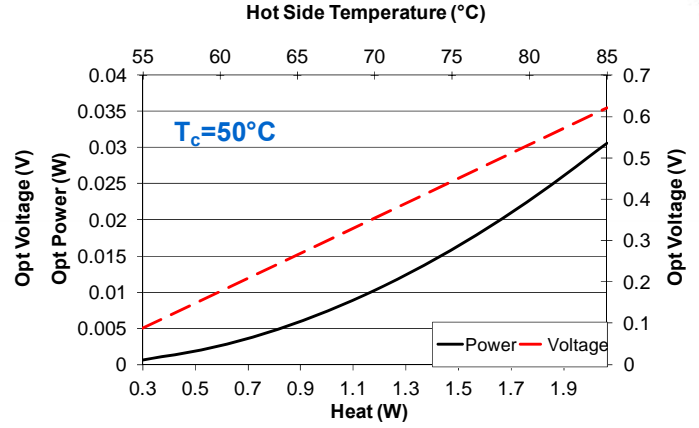
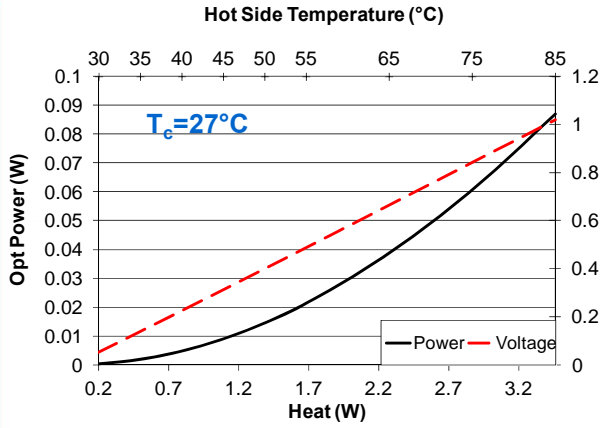
Marlow Industries Europe GmbH  
 Brunnenweg 19-21  
 64331 Weiterstadt  
 Germany  
 Tel.: +49 (0) 6150 5439 - 403  
 Fax: +49 (0) 6150 5439 - 400  
[info@marlow-europe.eu](mailto:info@marlow-europe.eu)

II-VI Japan Inc.  
 WBG Marive East 17F  
 2-6 Nakase, Mihama-ku  
 Chiba-Shi, Chiba 261-7117  
 Japan  
 81 43 297 2693 (tel)  
 81 43 297 3003 (fax)  
[center@ii-vi.co.jp](mailto:center@ii-vi.co.jp)  
[www.ii-vi.co.jp](http://www.ii-vi.co.jp)

II-VI Singapore Pte., Ltd.  
 Blk. 5012, Techplace II  
 #04-07 & 05-07/12, Ang Mo Kio Ave. 5  
 Singapore 569876  
 (65) 6481 8215 (tel)  
 (65) 6481 8702 (fax)  
[info@ii-vi.com.sg](mailto:info@ii-vi.com.sg)  
[www.ii-vi.com.sg](http://www.ii-vi.com.sg)

Marlow Industries China, II-VI  
 Technologies Beijing  
 A subsidiary of II-VI Incorporated  
 Rm 202, 1# Lize 2nd Middle Road  
 Wangjing, Chaoyang District  
 Beijing 100102 China  
 010-64398226 ext 105 (tel)  
 010-64399315 (fax)  
[info@iivibj.com](mailto:info@iivibj.com)

# TYPICAL PERFORMANCE CURVES



Hot Side Temperature (°C)	85	55	35
Cold Side Temperature (°C)	27	27	27
Optimum Efficiency, $\eta$ (%)	2.52	1.28	0.37
Optimum Power (W)	0.087	0.021	0.002
Optimum Voltage (V)	1.021	0.487	0.138
Load Resistance for Opt $\eta$ ( $\Omega$ )	12.00	11.20	10.65
Open Circuit Voltage, VOC (V)	1.79	0.85	0.24
Short Circuit Current (A)	0.20	0.10	0.03
Thermal Resistance (°C/W)	16.86	16.88	16.85

Power Generation performance information is given in a nitrogen environment and cold side temperatures of 27°C and 50°C. Module temperature does not include thermal resistance of heat sinks. For performance information in vacuum, other cold side temperatures, or specific heat sinks, consult one of our applications engineers.

## TYPICAL POWER GENERATION CONFIGURATION

EXAMPLE:

