



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

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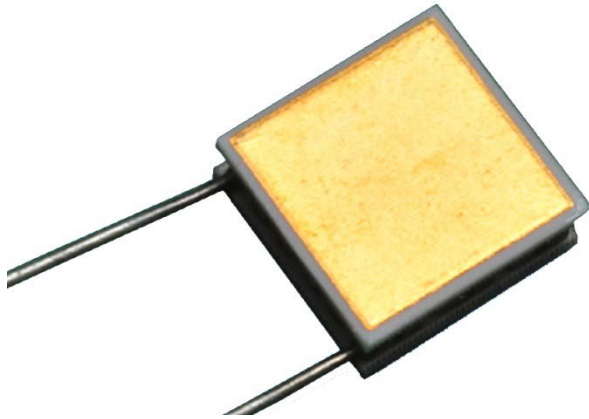
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





# Technical Data Sheet for NL1013T

## Single-Stage Thermoelectric Module



### NOMINAL PERFORMANCE IN VACUUM

Hot Side Temperature (°C)	27	50
$\Delta T_{max}$ (°C):	61	69
Q <sub>max</sub> (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	--

### PRODUCT FEATURES

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

### 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, RTV, Sealed, Special Wires

### OPERATION CAUTIONS

For maximum reliability, storage and operation below 130°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.

### INSTALLATION

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

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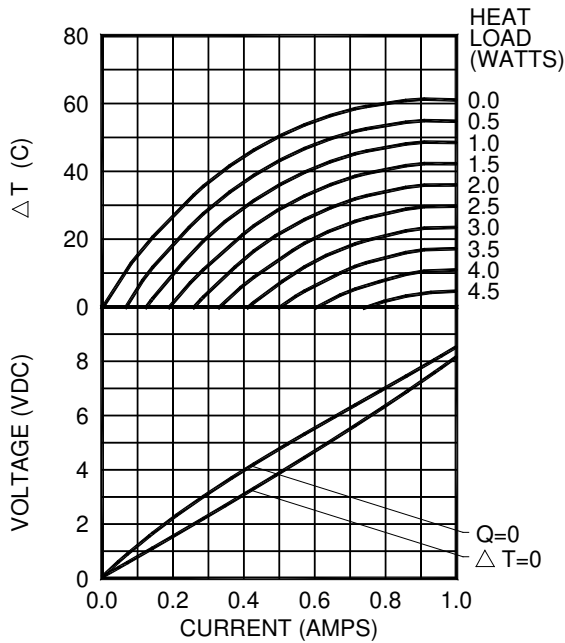
Marlow Industries China, II-VI  
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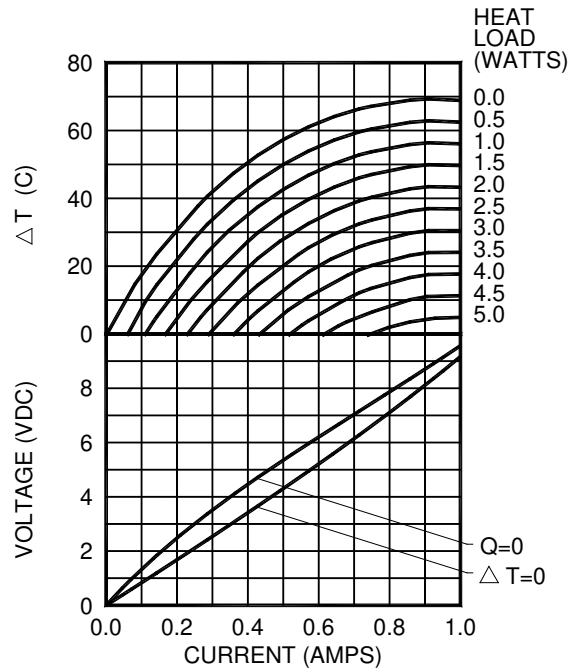


**ENVIRONMENT: 10<sup>-5</sup> TORR VACUUM**

Hot Side Temperature: 27°C

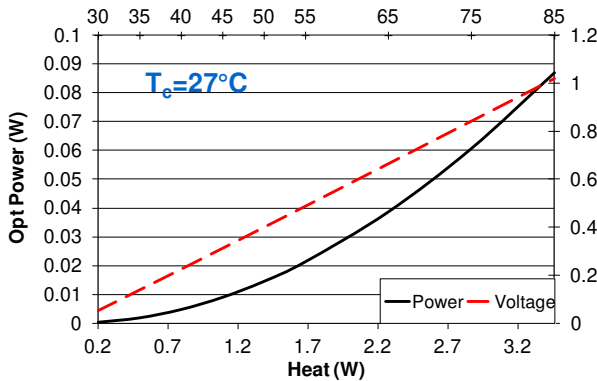


Hot Side Temperature: 50°C

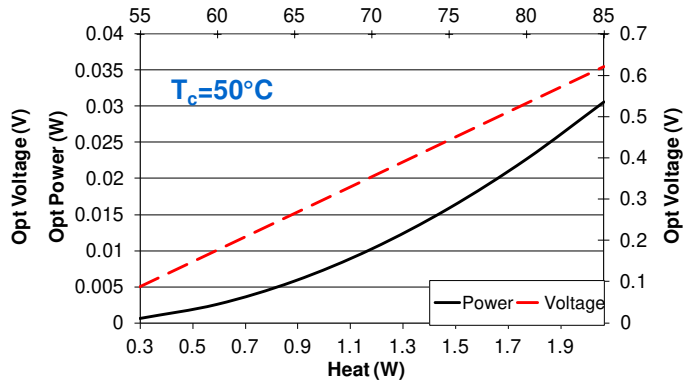


**POWER GENERATION PERFORMANCE CURVES**

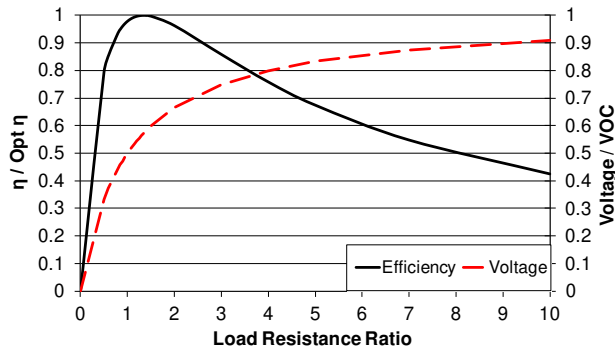
Hot Side Temperature (°C)



Hot Side Temperature (°C)



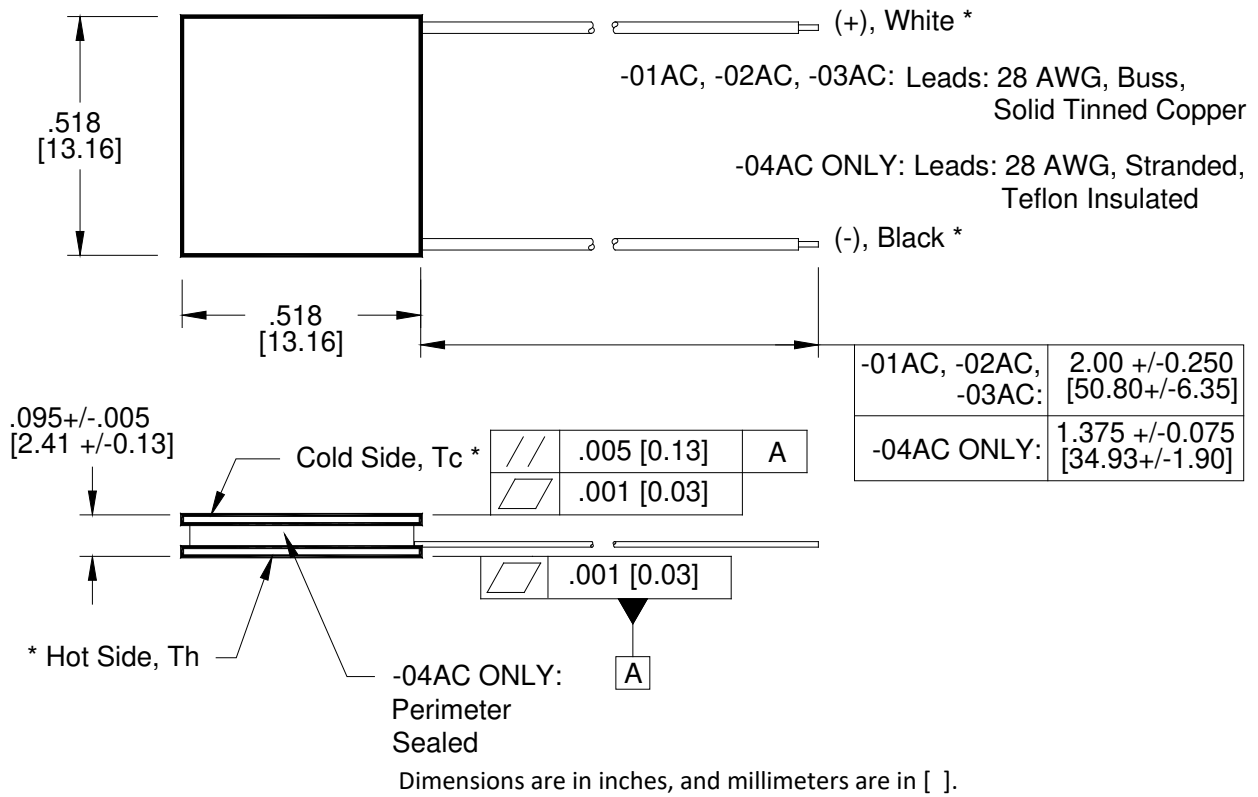
**Normalized Off-Peak Performance**



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, $V_{OC}$ (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



**MECHANICAL CHARACTERISTICS**



**\*NOTE: Cold side, hot side, positive leads, and negative leads are valid only for thermoelectric cooling. For power generation, see below.**

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

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:

