NX-Series Temperature Sensor

An NTC temperature sensor is included in all standard NX-Series IGBT modules. The integrated NTC allows accurate measurement of the modules baseplate temperature. A typical resistance versus temperature characteristic for the built-in thermistor is shown below along with some tabular data. The resistance of the thermistor as a function of base plate temperature is given by:

$$R_T = R_{T0} \bullet e^{\left[\frac{\beta \bullet (T_0 - T)}{T \bullet T_0}\right]}$$

Where: T_0 = Reference Temperature, usually 298K (25C)
T = Baseplate Temperature (K)
R_T = Thermistor resistance at temperature T
R_{T0} = Thermistor resistance at temperature T_o
β = Thermistor material constant

Note: All temperatures must be in K

The β and R_{T0} parameters are specified on the module data sheet. The above equation can also be solved for baseplate temperature T. This form of the equation is shown below and is useful in cases where the resistance of the thermistor is known and the corresponding base plate temperature must be computed.

$$T = \frac{1}{\frac{1}{\beta} \bullet \ln\left[\frac{R_T}{R_{T0}}\right] + \frac{1}{T_0}}$$

beta	**Rt (298K)**	
3375	5000	
Temperature (ºC)	Temperature K	Thermistor Resistance (Ω)
-50	223	226,821
-40	233	118,464
-30	243	65,269
-20	253	37,696
-10	263	22,699
0	273	14,186
10	283	9,165
20	293	6,101
30	303	4,171
40	313	2,922
50	323	2,093
60	333	1,529
70	343	1,138
80	353	861
90	363	662
100	373	516
110	383	407
120	393	325
130	403	263
140	413	215
150	423	177
160	433	147
170	443	123
180	453	104

Resistance –vs- Temperature Characteristic