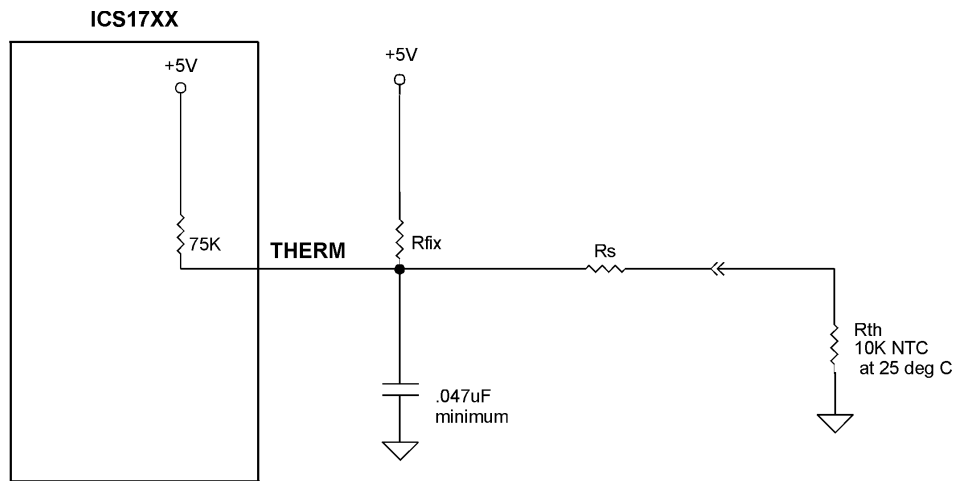# Application Note #:   AN0015

Device: **ICS1700A, ICS1702, ICS1712, ICS1718**

Description: Temperature Range Expansion

The THERM pin uses external resistors and a NTC thermistor input for sensing battery temperature. The settings in the table below are based on using the 10K NTC thermistor referenced in the datasheets. The cold/hot resistances are for the Semtec USA (Ishizuka Electronics, Corp.) part #AT 103-1 (2). The first setting is for cold battery charging below 10°C and for over-temperature shutdown above 45°C. By changing Rfix and adding Rs both the cold battery and the hot battery shutdown point are expanded to cover a wider temperature range.

Rs	Rfix	Typ. Temp Range	NTC cold/hot
0.0K	27K	10 to 45 deg C	18K/4.75K
1.8K	39K	5 to 51 deg C	22.0K/4.0K
3.3K	47K	4 to 58 deg C	23.0K/3.3K
4.3K	56K	1 to 60 deg C	26.1K/3.0K

Note: Expanding the temperature range for the ICS1702 and ICS1712 also desensitizes the temperature slope method, if used. Contact the Applications Department at Galaxy Power, Inc. for additional information to use temperature slope with expanded temperature range.