





TYPICAL CHARACTERISTIC CURVES – 5 V VERSION

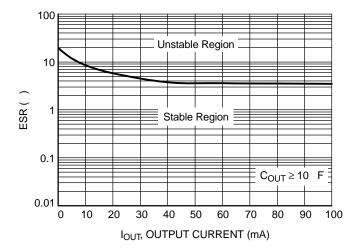
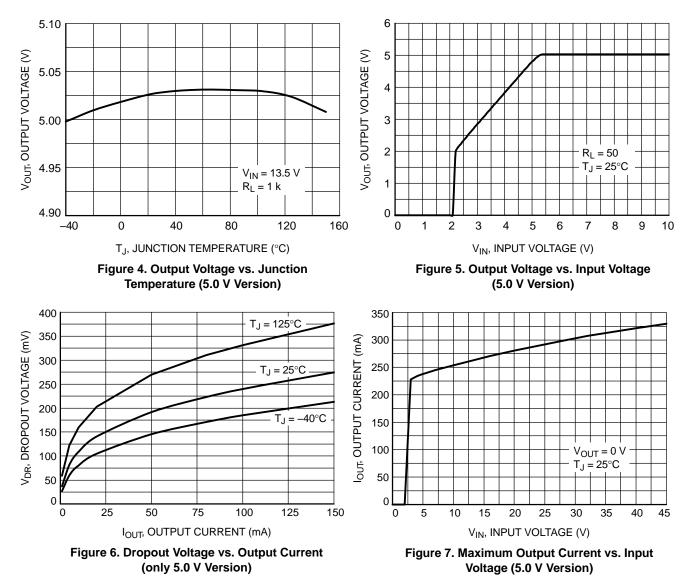
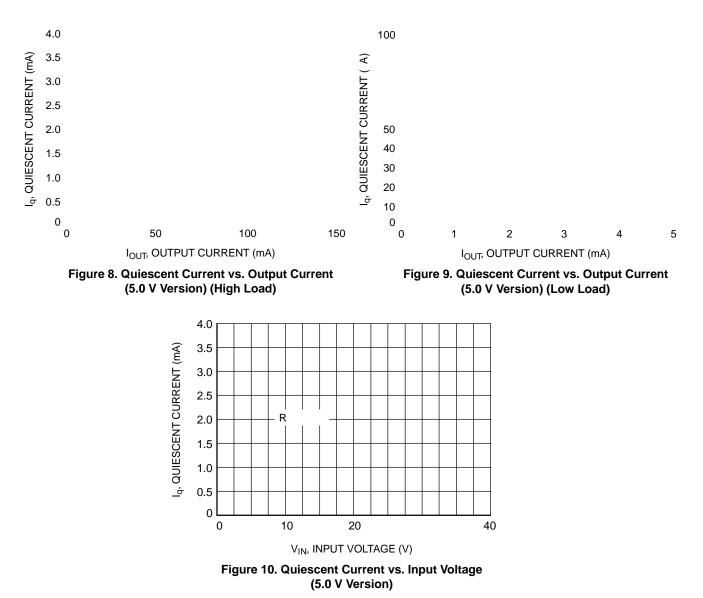


Figure 3. Output Stability with Output Capacitor ESR (5.0 V Version)

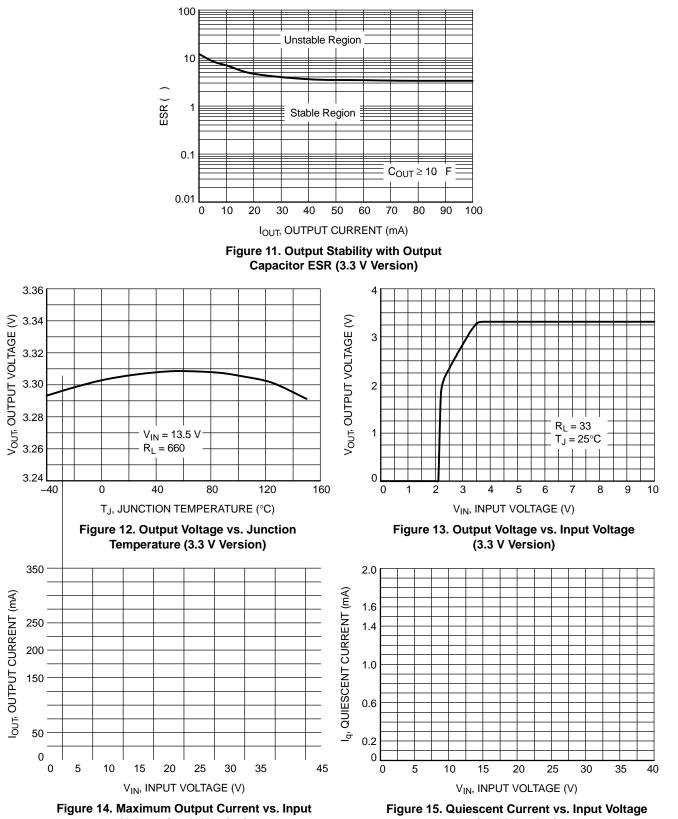




TYPICAL CHARACTERISTIC CURVES - 5 V VERSION (continued)



TYPICAL CHARACTERISTIC CURVES – 3.3 V VERSION



Voltage (3.3 V Version)

(3.3 V Version)

TYPICAL CHARACTERISTIC CURVES -

Circuit Description

The NCV4264–2C is is a low quiescent current consumption LDO regulator. Its output stage supplies 100 mA with $\pm 2.0\%$ output voltage accuracy.

Maximum dropout voltage is 500 mV at 100 mA load current. It is internally protected against 45 V input transients, input supply reversal, output overcurrent faults, and excess die temperature. No external components are required to enable these features.

Regulator

The error amplifier compares the reference voltage to a sample of the output voltage (V_{OUT}) and drives the base of a PNP series pass transistor by a buffer. The reference is a bandgap design to give it a temperature–stable output. Saturation control of the PNP is a function of the load current and input voltage. Oversaturation of the output power device is prevented, and quiescent current in the ground pin is minimized.

Regulator Stability Considerations

The input capacitor C_{IN} in Figure 2 is necessary for compensating input line reactance. Possible oscillations caused by input inductance and input capacitance can be damped by using a resistor of approximately 1 in series with CIN. The output or compensation capacitor, COUT helps determine three main characteristics of a linear regulator: startup delay, load transient response and loop stability. Tantalum, aluminum electrolytic, film, or ceramic capacitors are all acceptable solutions, however, attention must be paid to ESR constraints. The capacitor manufacturer's data sheet usually provides this information. The value for the output capacitor COUT shown in Figure 2 should work for most applications; however, it is not necessarily the optimized solution. Stability is guaranteed at values of $C_{OUT} \ge 10$ F, with an ESR \leq 3.5 for the 5.0 V Version with an ESR \leq 3.35 for the 3.3 V Version within the operating temperature range. Actual limits are shown in a graph in the Typical Performance Characteristics section.

Calculating Power Dissipation in a Single Output Linear Regulator

The maximum power dissipation for a single output regulator (Figure 3) is:

 $P_{D(max)} = [V_{IN(max)} - V_{OUT(min)}] * I_{OUT(max)} + V_{IN(max)} * I_{q}$ (eq. 1)

Where:

V_{IN(max)} is the maximum input voltage,

VOUT(min) is the minimum output voltage,

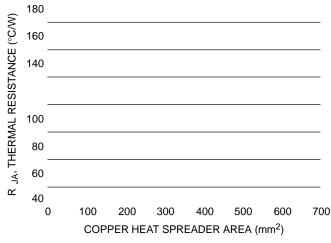
 $I_{OUT(max)}$ is the maximum output current for the application, and I_q is the quiescent current the regulator consumes at $I_{OUT(max)}$. Once the value of $P_{D(max)}$ is known, the maximum permissible value of R $_{JA}$ can be calculated:

P
$$JA = \frac{(150^{\circ}C - T_A)}{PD}$$
 (eq. 2)

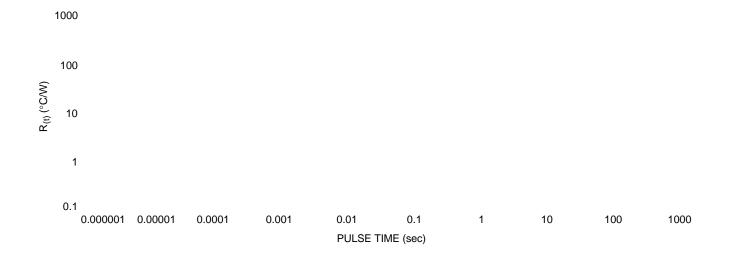
The value of R $_{JA}$ can then be compared with those in the package section of the data sheet. Those packages with R $_{JA}$'s less than the calculated value in Equation 2 will keep the die temperature below 150°C. In some cases, none of the packages will be sufficient to dissipate the heat generated by the IC, and an external heat sink will be required. The current flow and voltages are shown in the Measurement Circuit Diagram.

Heat Sinks

A heat sink effectively increases the surface area of the package to improve the flow of heat away from the IC and into the surrounding air. Each material in the heat flow path between the IC and the outside environment will have a thermal resistance. Like series electrical resistances, these resistances are summed to determine the value of R _{JA}:



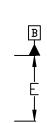






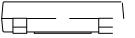


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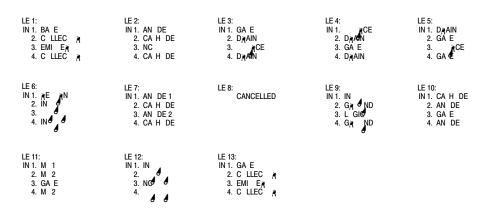
	MILLIMETERS			
DIM	MIN.	NDM.	MAX.	
A	1.50	1.63	1.75	
A1	0.02	0.06	0.10	
b				
D	6.30	6.50	6.70	
E	3.30	3.50	3.70	
e	2.30 BSC			

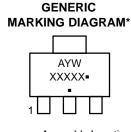
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- A = Assembly Location
- Y = Year
- W = Work Week
- XXXXX = Specific Device Code
- = Pb Free Package
- (Note: Microdot may be in either location) *This information is generic. Please refer to device data sheet for actual part marking. Pb Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

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