NUS1204MN

Overvoltage Protection IC with Integrated MOSFET

This device represents a new level of safety and integration by combining the NCP304 overvoltage protection circuit (OVP) with a −12 V P−Channel power MOSFET. It is specifically designed to protect sensitive electronic circuitry from overvoltage transients and power supply faults. During such hazardous events, the IC quickly disconnects the input supply from the load, thus protecting the load before any damage can occur.

The OVP IC is optimized for applications using an external AC−DC

June, 2006 − Rev. 1

Publication Order Number:
NUS1204MN/D

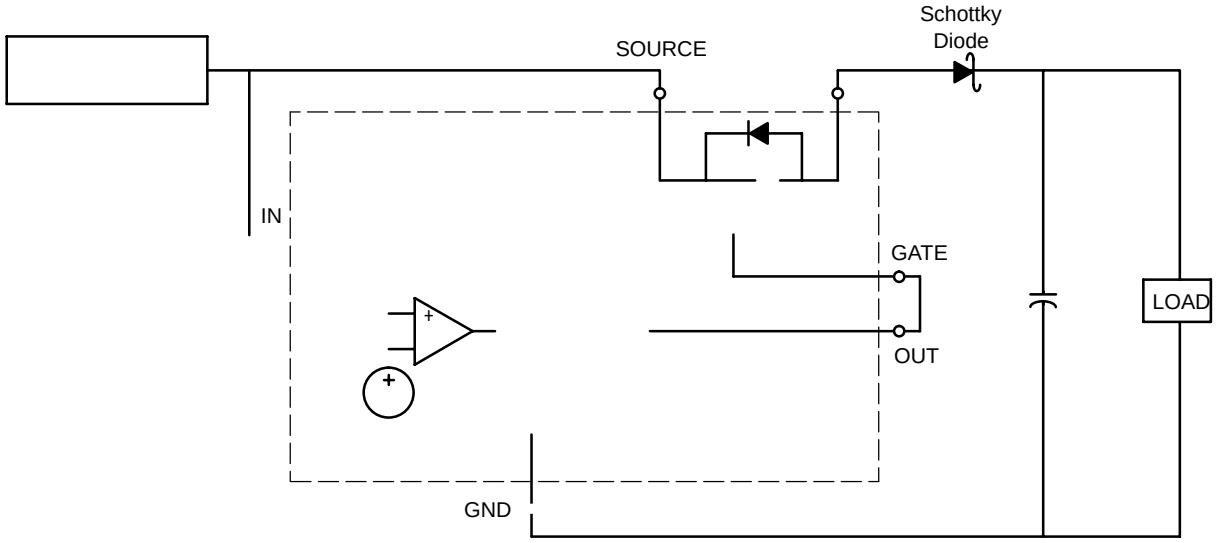

Figure 1. Simplified Schematic

MAXIMUM RATINGS (T_A = 25°C unless otherwise stated)

Rating	Pin	Symbol	Min	Max	Unit
OUT Voltage to GND	2	V_O	−0.3	12	V
Input Pin Voltage to GND	4	V_{input}	−0.3	12	V
Maximum Power Dissipation (Note 1)	−	P_D	−	0.96	W
Thermal Resistance Junction−to−Air (Note 1) OVP IC P−Channel FET	−	$R_{\theta JA}$	−	130 130	°C/W
Junction Temperature	−	T_J	−	150	°C
Operating Ambient Temperature	−	T_A	−40	85	°C
Storage Temperature Range	−	T_{stg}	−65	150	°C
ESD Performance (HBM) (Note 2)	2,3,4	−	2.5	−	kV
Drain−to−Source Voltage		V_{DSS}		−12	V
Gate−to−Source Voltage		V_{GS}	−8	8	V
Continuous Drain Current, Steady State, T_A = 25°C (Note 1)		I_D		−0.6	A

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Surface−mounted on FR4 board using 1 inch sq pad size (Cu area = 1.127 in sq [1 oz] including traces).
2. Human body model (HBM): MIL STD 883C Method 3015−7, (R = 1500 Ω, C = 100 pF, F = 3 pulses delay 1 s).

ELECTRICAL CHARACTERISTICS (T_A= 25°C, Vcc = 6.0 V, unless otherwise specified)

Characteristic	Symbol	Min	Typ	Max	Unit
Input Threshold (Pin 4, V_{in} Increasing)	V_{TH}	4.630	4.725	4.820	V
Input Threshold Hysteresis (Pin 4, V_{in} Decreasing)	V_{HYS}	0.135	0.225	0.315	V
Supply Current (Pin 4) (V_{in} = 4.34 V) (V_{in} = 6.5 V)	I_{in}	 − −	 − −	 3.0 3.9	μA
Minimum Operating Voltage (Pin 4) (Note 3) (T_A = 25°C) (T_A = −40°C to 85°C)	$V_{in(min)}$	 − −	 0.55 0.65	 0.70 0.80	V
Output Voltage High (V_{in} = 8.0 V; I_{Source} = 1.0 mA) Output Voltage High (V_{in} = 8.0 V; I_{Source} = 0.25 mA) Output Voltage High (V_{in} = 8.0 V; I_{Source} = 0 mA)	V_{oh}	V_{in}−1.0 V_{in}−0.25 V_{in}−0.1	−	−	V
Output Voltage Low (Input < 4.5 V; I_{Sink} = 0 mA; CNTRL = 0 V)	V_{ol}	−	−	0.1	V
Propagation Delay Input to Output Complementary Output NCP304 Series Output Transition, High to Low Output Transition, Low to High	 t_{pHL} t_{pLH}	 − −	 10 21	 − 60	μs

3. Guaranteed by design.

P−CHANNEL MOSFET (T_A= 25°C, unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Units
Drain to Source On Resistance V_{GS} = −4.5 V, I_D = 600 mA V_{GS} = −4.5 V, I_D = 1.0 A	$R_{DS(on)}$		 75 75	 100 100	mΩ
Zero Gate Voltage Drain Current V_{GS} = −4.5 V, V_{GS} = 0 V, V_{DS} = −10 V	I_{DSS}			 −1.0	μA
Turn On Delay (Note 4) V_{GS} = −4.5 V	t_{on}		 5.5		ns
Turn Off Delay (Note 4) V_{GS} = −4.5 V	t_{off}		 20		ns
Input Capacitance V_{GS} = 0 V, f = 1.0 MHz, V_{DS} = −10 V	C_{in}		 531		pF
Gate to Source Leakage Current V_{GS} = 8.0 V, V_{DS} = 0 V	I_{GSS}		 ±10		nA
Drain to Source Breakdown Voltage V_{GS} = 0 V, I_D = −250 μA	$V_{(BR)DSS}$	 −12			V
Gate Threshold Voltage V_{GS} = V_{DS}, I_D = −250 μA	$V_{(GS)th}$	 −0.4	 −0.7	 −1.0	V

4. Switching characteristics are independent of operating junction temperature.