

NCP3712ASNT1

Over Voltage Protected High Side Switch

This switch is primarily intended to protect loads from transients by isolating the load from the transient energy rather than absorbing it.

Features

- Capable of Switching Loads of up to 200 mA without External Rboost
- Switch Shuts Off in Response to an Over Voltage Input Transient
- Features Active Turn Off for Fast Input Transient Protection
- Flexible Over Voltage Protection Threshold Set with External Zener
- Automatic Recovery after Transient Decays Below Threshold
- Withstands Input Transients up to 105 V Peak
- Guaranteed Off State with $\overline{\text{Enbl}}$ Input
- ESD Resistant in Accordance with the 2000 V Human Body Model
- Extremely Low Saturation Voltage
- Pb-Free Packages are Available

Applications Include:

- High Voltage Transient Isolation
- Power Switching to Electronic Modules
- DC Power Distribution in Line Operated Equipment
- Buffering Sensitive Circuits from Poorly Regulated Power Supplies
- Pre-conditioning of Voltage Regulator Input Voltage

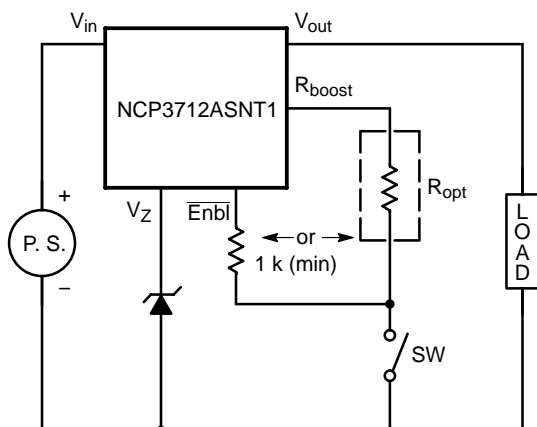


Figure 1. Typical Application Circuit



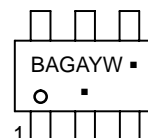
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MARKING DIAGRAM



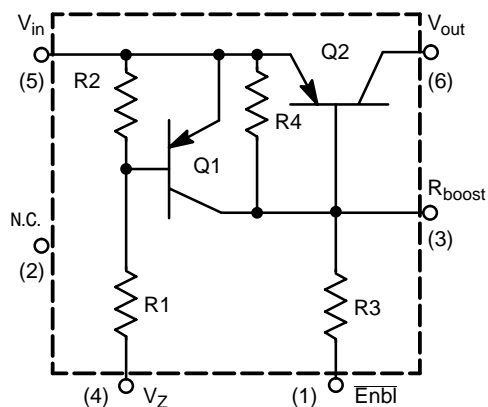
TSOP-6
CASE 318G



BAG = Device Code
A = Assembly Location
Y = Year
W = Work Week
▪ = Pb-Free Package

(Note: Microdot may be in either location)

INTERNAL CIRCUIT DIAGRAM/ PIN CONFIGURATION



ORDERING INFORMATION

Device	Package	Shipping†
NCP3712ASNT1	TSOP-6	3000/Tape & Reel
NCP3712ASNT1G	TSOP-6 (Pb-Free)	3000/Tape & Reel
NCP3712ASNT3	TSOP-6	10,000/Tape & Reel
NCP3712ASNT3G	TSOP-6 (Pb-Free)	10,000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

NCP3712ASNT1

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted) (Note 1)

Rating	Symbol	Value	Unit
Input-to-Output Voltage	V_{io}	105	V
Reverse Input-to-V _Z Voltage	$V_{in(rev)}$	-9.0	V
Reverse Input-to-Rboost Voltage	$V_{in(rev)}$	-5.0	V
Output Load Current – Continuous	I_{load}	-300	mA
Enbl Input Current – Continuous	I_{enbl}	5.0	mA
V _Z Input Current – Continuous	I_Z	3.0	mA
Rboost Input Current – Continuous	I_{boost}	10	mA
Junction Temperature	T_J	125	$^\circ\text{C}$
Operating Ambient Temperature Range	T_A	-40 to +85	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +150	$^\circ\text{C}$
Device Power Dissipation (Minimum Footprint)	P_D	300	mW
Derate Above 25 $^\circ\text{C}$	–	2.4	mW/ $^\circ\text{C}$
Latchup Performance:	Positive Negative	$I_{Latchup}$ 200 200	mA

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.

- This device contains ESD protection and exceeds the following tests:
Human Body Model 1500 V per MIL-STD-883, Method 3015.
Machine Model Method 150 V.

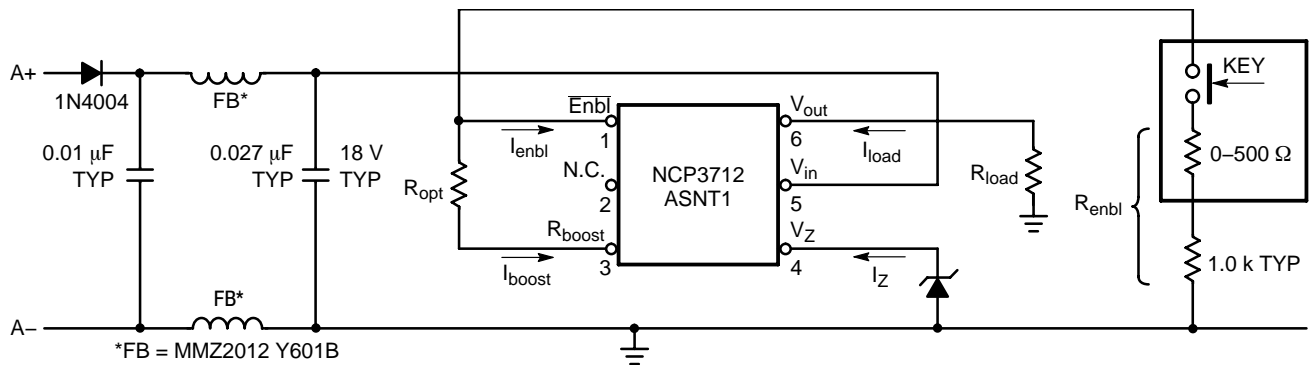


Figure 2. Typical Applications Circuit for Load Dump Transient Protection

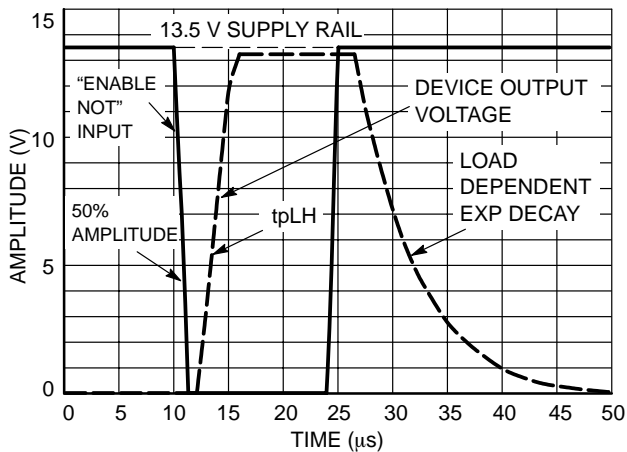


Figure 3. Enable NOT Switching Waveforms

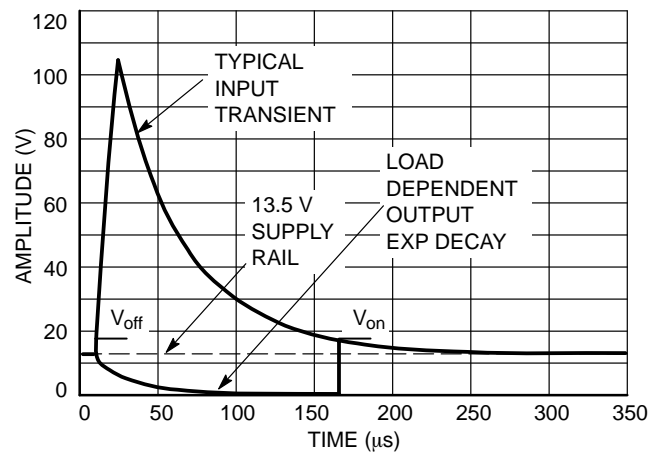


Figure 4. Load Dump Waveforms

NCP3712ASNT1

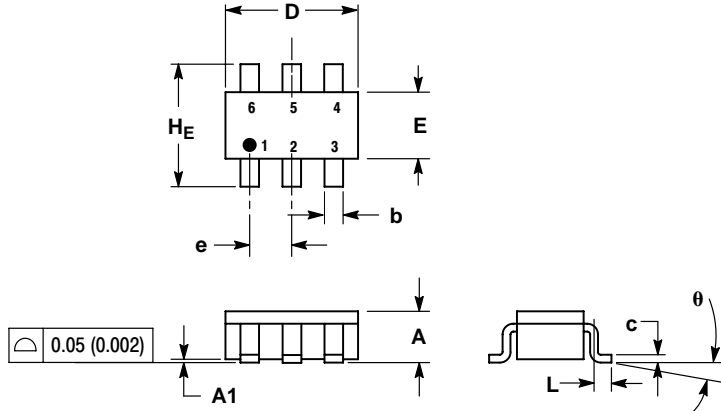
ELECTRICAL CHARACTERISTICS ($V_{in} = 12.5 V_{DC}$ Ref to Gnd, $T_A = 25^\circ C$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Input–Output Breakdown Voltage (@ $I_{out} = 200 \mu A$)	$V_{(BRio)}$	105	–	–	Vdc
Output Reverse Breakdown Voltage (@ $I_{out} = -1.0 mA$ Pulse)	$V_{(-BRout)}$	–	–0.7	–	Vdc
Output Leakage Current ($V_{in} = V_{enbl} = 30 V$, $T_A = 25^\circ C$)	$I_{load(off)}$	–	–	–100	μA_{dc}
Guaranteed “Off” State “ENBL NOT” Voltage ($I_O \leq 100 \mu A$)	$V_{enbl(off)}$	13	–	–	Vdc
Required “Off” State I_z Current ($R_{load} = 100 \Omega$)	$I_{z(off)}$	150	–	–	μA_{dc}
$V_{in(off)}$ ($V_z = 16 V$, $I_{load} = 100 mA$, $R_{enbl} = 1500 \Omega$)	V_{off}	15.5	–	18.7	Vdc
ON CHARACTERISTICS					
Input–Output On Voltage ($I_O = 100 mA$, $I_{enbl} = -3.0 mA$)	$V_{io(on)}$	–	0.2	0.5	Vdc
Output Load Current — Continuous ($I_{enbl} = -3.0 mA$, $V_{io(on)} = 0.5 V_{dc}$) ($I_{boost} = -9.0 mA$, $V_{io(on)} = 0.5 V_{dc}$) ($I_{boost} = -9.0 mA$, $V_{io(on)} = 0.6 V_{dc}$)	$I_{o(on)}$	– – –	– – –	–200 –200 –300	mA_{dc}
$V_{in(on)}$ ($V_z = 16 V$, $I_{load} = 100 mA$, $R_{enbl} = 1500 \Omega$)	V_{on}	8.5	–	10.5	Vdc
“ENBL NOT” Input Current ($I_O = 100 mA$, $V_{io(on)} = 0.35 V_{dc}$, $R_{enbl} = 1500 \Omega$)	I_{enbl}	–	–	–1.0	mA_{dc}
SWITCHING CHARACTERISTICS					
Propagation Delay Time: Hi to Lo Prop Delay; Fig. 3 ($V_{in} = V_{enbl} = 13.5 V$) Lo to Hi Prop Delay; Fig. 3 ($V_{in} = 13.5 V$, $V_{enbl} = 0 V$)	t_{PHL} t_{PLH}	– –	1.5 1.5	– –	μS
Transition Times: Fall Time; Fig. 4 ($V_{in} = V_{enbl} = 13.5 V$) Rise Time; Fig. 4 ($V_{in} = V_{enbl} = 0 V$)	t_f t_r	– –	75 400	– –	nS
INTERNAL RESISTORS					
Input Leakage Resistor	R2	7.0	10	13	$k\Omega$
Input Resistor	R1	3.3	4.7	6.1	$k\Omega$
Output Leakage Resistor	R4	1.4	2.4	3.2	$k\Omega$
Enable Input Resistor	R3	1.4	2.4	3.2	$k\Omega$

NCP3712ASNT1

PACKAGE DIMENSIONS

TSOP-6
CASE 318G-02
ISSUE S

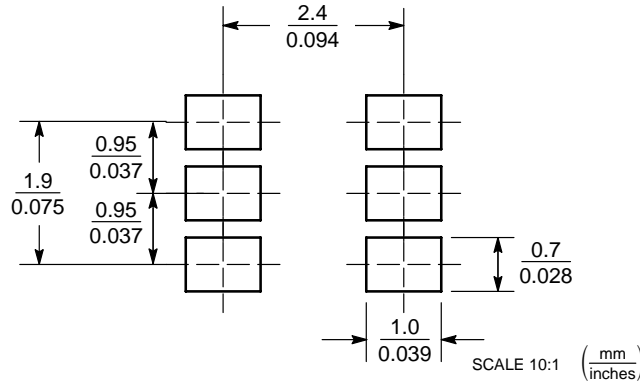


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.25	0.38	0.50	0.010	0.014	0.020
c	0.10	0.18	0.26	0.004	0.007	0.010
D	2.90	3.00	3.10	0.114	0.118	0.122
E	1.30	1.50	1.70	0.051	0.059	0.067
e	0.85	0.95	1.05	0.034	0.037	0.041
L	0.20	0.40	0.60	0.008	0.016	0.024
H_E	2.50	2.75	3.00	0.099	0.108	0.118
θ	0°	—	10°	0°	—	10°

SOLDERING FOOTPRINT*



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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