

# NTS4001N

### Features

- Low Gate Charge for Fast Switching
- Small Footprint – 30% Smaller than TSOP-6
- ESD Protected Gate
- Pb-Free Package for Green Manufacturing (G Suffix)

### Applications

- Low Side Load Switch
- Li-Ion Battery Supplied Devices – Cell Phones, PDAs, DSC
- Buck Converters
- Level Shifts

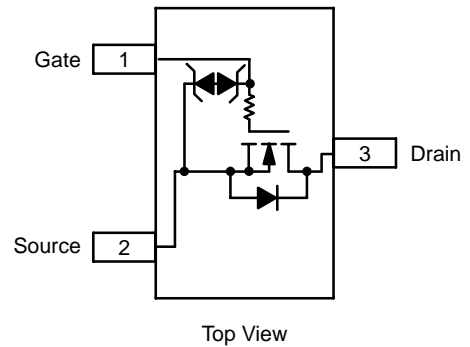
### MAXIMUM RATINGS (T<sub>J</sub> = 25°C unless otherwise stated)

Parameter			Symbol	Value	Units
Drain-to-Source Voltage			V <sub>DSS</sub>	30	V
Gate-to-Source Voltage			V <sub>GS</sub>	±20	V
Continuous Drain Current (Note 1)	Steady State	T <sub>A</sub> = 25 °C	I <sub>D</sub>	270	mA
		T <sub>A</sub> = 85 °C		200	
Power Dissipation (Note 1)	Steady State	T <sub>A</sub> = 25 °C	P <sub>D</sub>	330	mW
Pulsed Drain Current		t = 10 μs	I <sub>DM</sub>	200	mA
Operating Junction and Storage Temperature			T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C
Source Current (Body Diode)			I <sub>S</sub>	270	mA
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			T <sub>L</sub>	260	°C

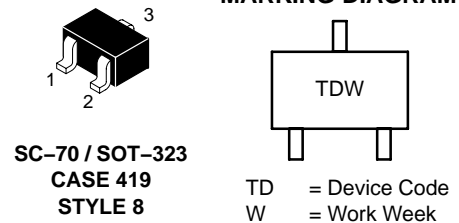
1. Surface mounted on FR4 board using 1 in sq. pad size (Cu area = 1.127 in sq. [1 oz] including traces).

V <sub>(BR)DSS</sub>	R <sub>DS(on)</sub> TYP	I <sub>D</sub> Max
30 V	1.0 Ω @ 4.0 V	270 mA
	1.5 Ω @ 2.5 V	

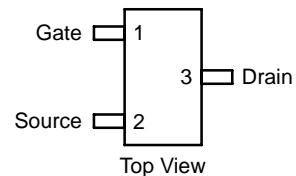
### SC-70 SOT-323 (3 LEADS)



### MARKING DIAGRAM



### PIN ASSIGNMENT



### ORDERING INFORMATION

Device	Package	Shipping
NTS4001NT1	SC-70	3000 Units/Reel
NTS4001NT1G	SC-70 (Pb-Free)	3000 Units/Reel



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## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise stated)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 100 μA	30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V <sub>(BR)DSS</sub> /T <sub>J</sub>			60		mV/°C
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 30 V			1.0	μA
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±10 V			±1.0	μA

### ON CHARACTERISTICS (Note 2)

Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 100 μA	0.8	1.2	1.5	V
Gate Threshold Temperature Coefficient	V <sub>GS(TH)</sub> /T <sub>J</sub>			-3.4		mV/°C
Drain-to-Source On Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 10 mA		1.0	1.5	Ω
		V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 10 mA		1.5	2.0	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 3.0 V, I <sub>D</sub> = 10 mA		80		mS

### CHARGES AND CAPACITANCES

Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> = 0 V, f = 1.0 MHz, V <sub>DS</sub> = 5.0 V		20	33	pF
Output Capacitance	C <sub>OSS</sub>			19	32	
Reverse Transfer Capacitance	C <sub>RSS</sub>			7.25	12	
Total Gate Charge	Q <sub>G(TOT)</sub>	V <sub>GS</sub> = 5.0 V, V <sub>DS</sub> = 24 V, I <sub>D</sub> = 0.1 A		0.9	1.3	nC
Threshold Gate Charge	Q <sub>G(TH)</sub>			0.2		
Gate-to-Source Charge	Q <sub>GS</sub>			0.3		
Gate-to-Drain Charge	Q <sub>GD</sub>			0.2		

### SWITCHING CHARACTERISTICS (Note 3)

Turn-On Delay Time	t <sub>d(ON)</sub>	V <sub>GS</sub> = 4.5 V, V <sub>DD</sub> = 5.0 V, I <sub>D</sub> = 10 mA, R <sub>G</sub> = 50 Ω		17		ns
Rise Time	t <sub>r</sub>			23		
Turn-Off Delay Time	t <sub>d(OFF)</sub>			94		
Fall Time	t <sub>f</sub>			82		

### DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 10 mA	T <sub>J</sub> = 25°C		0.65	0.7	V
			T <sub>J</sub> = 125°C		0.43		
Reverse Recovery Time	t <sub>RR</sub>	V <sub>GS</sub> = 0 V, dI <sub>S</sub> /dt = 8.0 A/μs, I <sub>S</sub> = 10 mA		5.0		ns	

2. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.

3. Switching characteristics are independent of operating junction temperatures.