

NTS4001N

Small Signal MOSFET

30 V, 270 mA, Single N-Channel, SC-70

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 ($T_J = 25^\circ\text{C}$ unless otherwise stated)

Parameter			Symbol	Value	Units
Drain-to-Source Voltage			V_{DS}	30	V
Gate-to-Source Voltage			V_{GS}	± 20	V
Continuous Drain Current (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	I_D	270	mA
		$T_A = 85^\circ\text{C}$		200	
Power Dissipation (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	P_D	330	mW
Pulsed Drain Current		$t = 10\ \mu\text{s}$	I_{DM}	200	mA
Operating Junction and Storage Temperature			T_J, T_{STG}	-55 to 150	$^\circ\text{C}$
Source Current (Body Diode)			I_S	270	mA
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			T_L	260	$^\circ\text{C}$

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

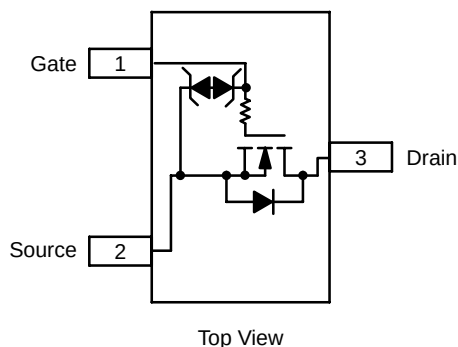


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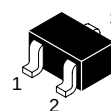
$V_{(BR)DS}$	$R_{DS(on)}$ TYP	I_D Max
30 V	1.0 Ω @ 4.0 V	270 mA
	1.5 Ω @ 2.5 V	

SC-70
SOT-323 (3 LEADS)

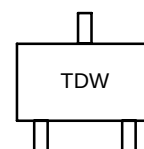


Top View

MARKING DIAGRAM

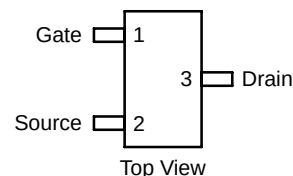


SC-70 / SOT-323
CASE 419
STYLE 8



TD = Device Code
W = Work Week

PIN ASSIGNMENT



Top View

ORDERING INFORMATION

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

NTS4001N

ELECTRICAL CHARACTERISTICS (T_J = 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 _{(BR)DSS}	V _{GS} = 0 V, I _D = 100 μA	30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J			60		mV/ °C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 30 V			1.0	μA
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±10 V			±1.0	μA

ON CHARACTERISTICS (Note 2)

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

CHARGES AND CAPACITANCES

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

SWITCHING CHARACTERISTICS (Note 3)

Turn-On Delay Time	t _{d(ON)}	V _{GS} = 4.5 V, V _{DD} = 5.0 V, I _D = 10 mA, R _G = 50 Ω		17		ns
Rise Time	t _r			23		
Turn-Off Delay Time	t _{d(OFF)}			94		
Fall Time	t _f			82		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 10 mA	T _J = 25°C		0.65	0.7	V
			T _J = 125°C		0.43		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _S /dt = 8.0 A/μs, I _S = 10 mA			5.0		ns

- Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
- Switching characteristics are independent of operating junction temperatures.

TYPICAL PERFORMANCE CURVES ($T_J = 25^\circ\text{C}$ unless otherwise noted)

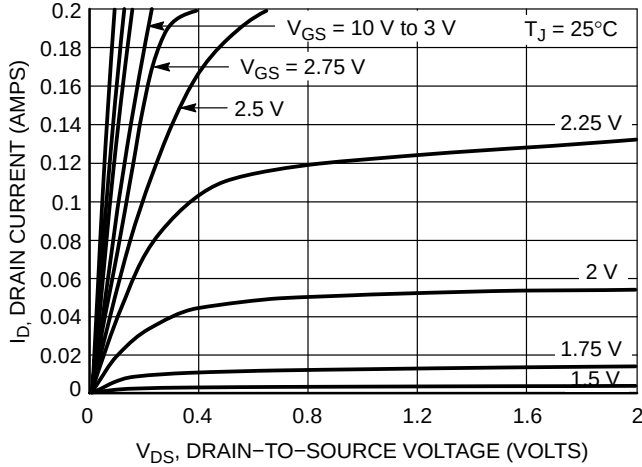


Figure 1. On-Region Characteristics

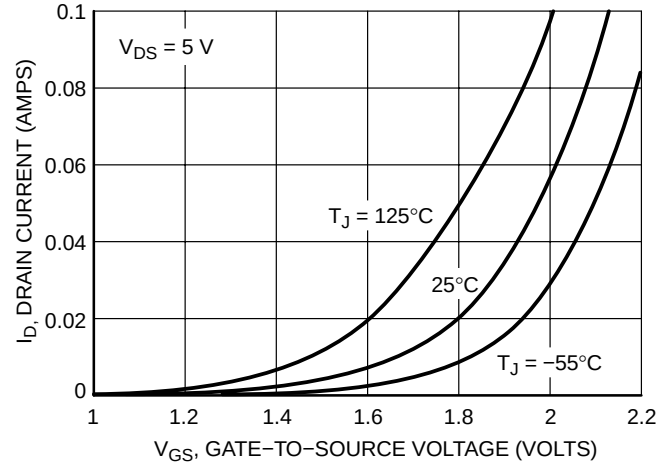


Figure 2. Transfer Characteristics

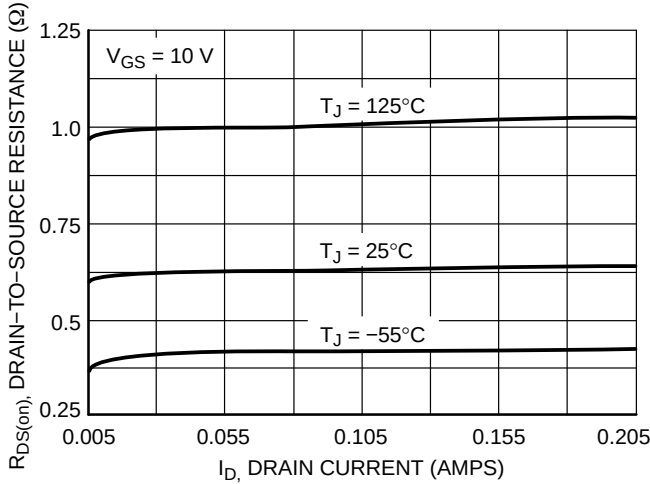


Figure 3. On-Resistance vs. Drain Current and Temperature

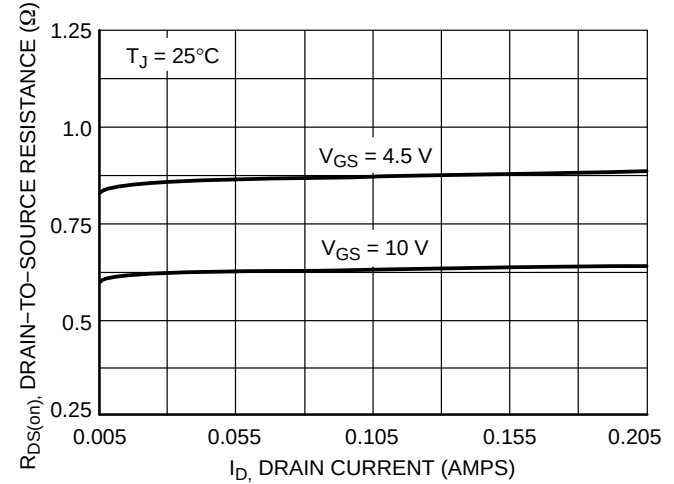


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

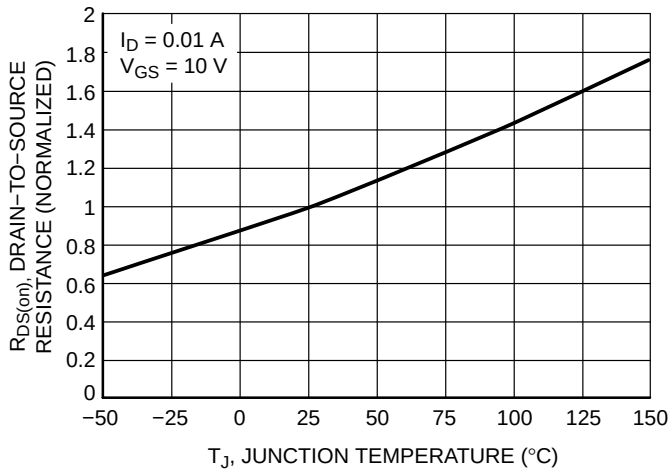


Figure 5. On-Resistance Variation with Temperature

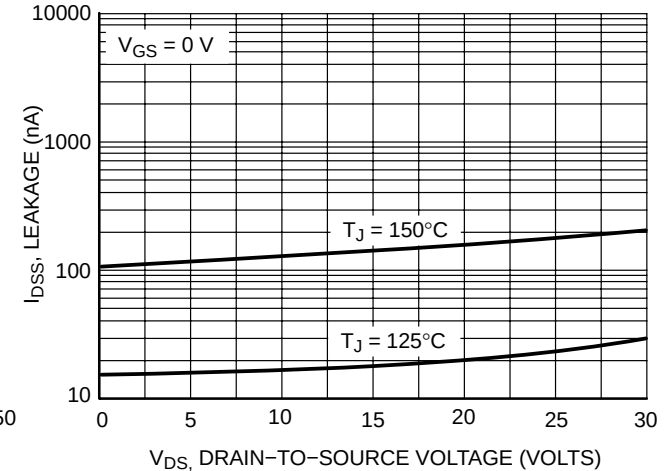
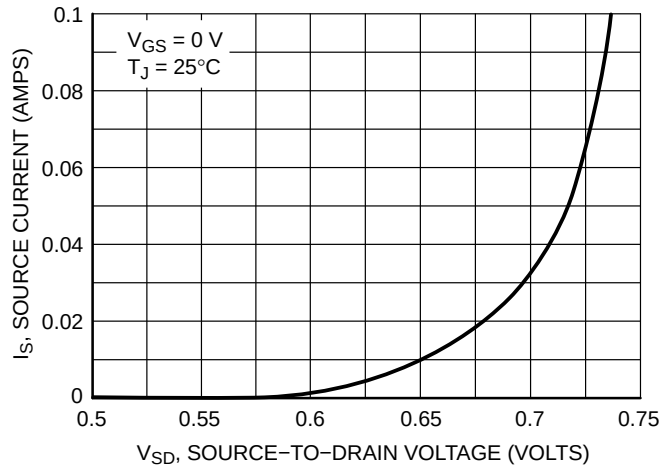
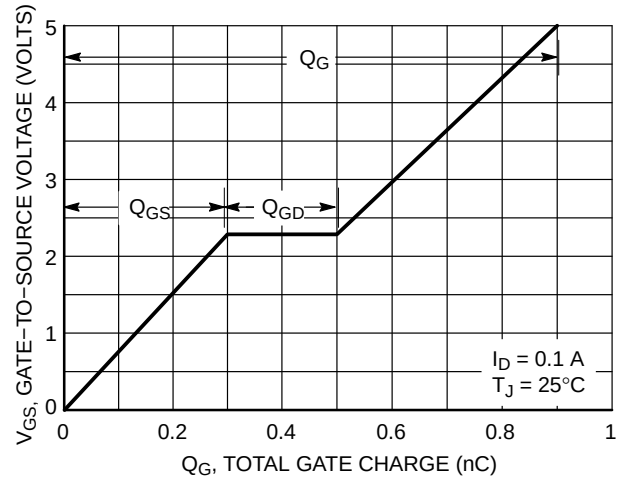
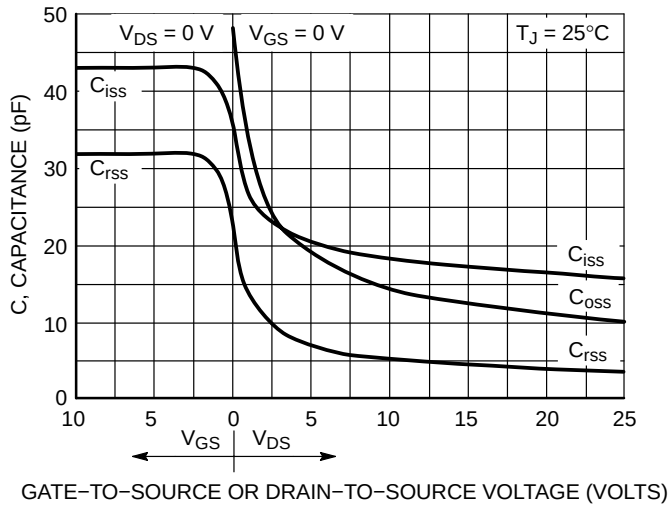


Figure 6. Drain-to-Source Leakage Current vs. Voltage

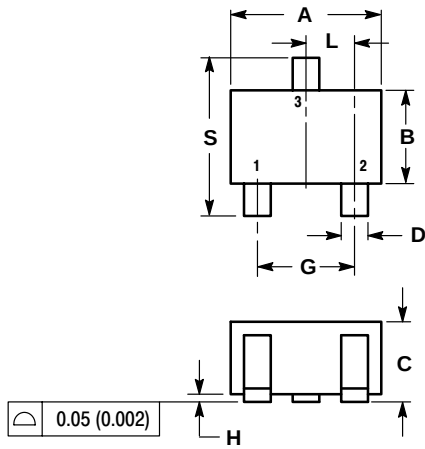
TYPICAL PERFORMANCE CURVES ($T_J = 25^\circ\text{C}$ unless otherwise noted)



NTS4001N

PACKAGE DIMENSIONS

SC-70 (SOT-323)
CASE 419-04
ISSUE L



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.032	0.040	0.80	1.00
D	0.012	0.016	0.30	0.40
G	0.047	0.055	1.20	1.40
H	0.000	0.004	0.00	0.10
J	0.004	0.010	0.10	0.25
K	0.017 REF		0.425 REF	
L	0.026 BSC		0.650 BSC	
N	0.028 REF		0.700 REF	
S	0.079	0.095	2.00	2.40

STYLE 8:

- PIN 1. GATE
2. SOURCE
3. DRAIN

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