NTA4001N

Small Signal MOSFET

20 V, 238 mA, Single, N−Channel, Gate ESD Protection, SC−75

ON Semiconductor®

http://onsemi.com

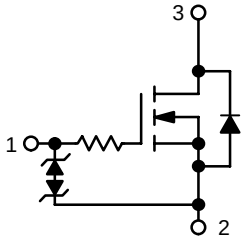
$V_{(BR)DSS}$	$R_{DS(on)}$ Typ @ V_{GS}	I_D MAX (Note 1)
20 V	1.5 Ω @ 4.5 V	238 mA
	2.2 Ω @ 2.5 V	

Features

- Low Gate Charge for Fast Switching
- Small 1.6 X 1.6 mm Footprint
- ESD Protected Gate
- Pb−Free Package for “Green Manufacturing” Compliance

Applications

- Power Management Load Switch
- Level Shift
- Portable Applications such as Cell Phones, Media Players, Digital Cameras, PDA’s, Video Games, Hand Held Computers, etc.

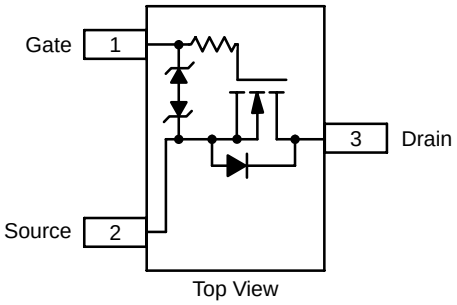


N−Channel

Maximum Ratings (T_J = 25°C unless otherwise stated)

Parameter		Symbol	Value	Unit
Drain−to−Source Voltage		V_{DSS}	20	V
Gate−to−Source Voltage		V_{GS}	±10	V
Continuous Drain Current (Note 1)	Steady State = 25°C	I_D	238	mA
Power Dissipation (Note 1)	Steady State = 25°C	P_D	300	mW
Pulsed Drain Current	$t_P \le 10$ μs	I_{DM}	714	mA
Operating Junction and Storage Temperature		T_J, T_{STG}	−55 to 150	°C
Continuous Source Current (Body Diode)		I_{SD}	238	mA
Lead Temperature for Soldering Purposes (1/8” from case for 10 s)		T_L	260	°C

SC−75 (3−Leads)

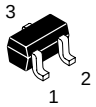


Top View

Thermal Resistance Ratings

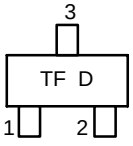
Parameter	Symbol	Max	Unit
Junction−to−Ambient – Steady State (Note 1)	$R_{\theta JA}$	416	°C/W

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



SC−75 / SOT−416
CASE 463
Style 5

MARKING DIAGRAM



TF = Specific Device Code
D = Date Code

ORDERING INFORMATION

Device	Package	Shipping
NTA4001NT1	SC−75	3000 / Tape & Reel
NTA4001NT1G	SC−75 Pb−Free	3000 / Tape & Reel

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Electrical Characteristics (T_J = 25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 100 μA	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 20 V			1.0	μA
Gate−to−Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±10 V			±100	μA
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} = 3 V, I_D = 100 μA	0.5	1.0	1.5	V
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 4.5 V, I_D = 10 mA		1.5	3.0	Ω
		V_{GS} = 2.5 V, I_D = 10 mA		2.2	3.5	
Forward Transconductance	g_{FS}	V_{DS} = 3 V, I_D = 10 mA		80		mS
CAPACITANCES						
Input Capacitance	C_{ISS}	V_{DS} = 5 V, f = 1 MHz, V_{GS} = 0 V		11.5		pF
Output Capacitance	C_{OSS}			10		
Reverse Transfer Capacitance	C_{RSS}			3.5		
SWITCHING CHARACTERISTICS (Note 3)						
Turn−On Delay Time	$t_{d(ON)}$	V_{GS} = 4.5 V, V_{DS} = 5 V, I_D = 10 mA, R_G = 10 Ω		13		ns
Rise Time	t_r			15		ns
Turn−Off Delay Time	$t_{d(OFF)}$			98		
Fall Time	t_f			60		
Drain−Source Diode Characteristics						
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 10 mA		0.66	0.8	V

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

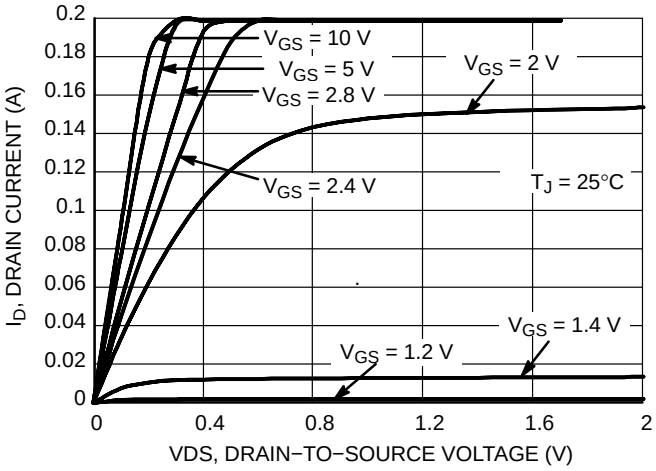


Figure 1. On−region Characteristics

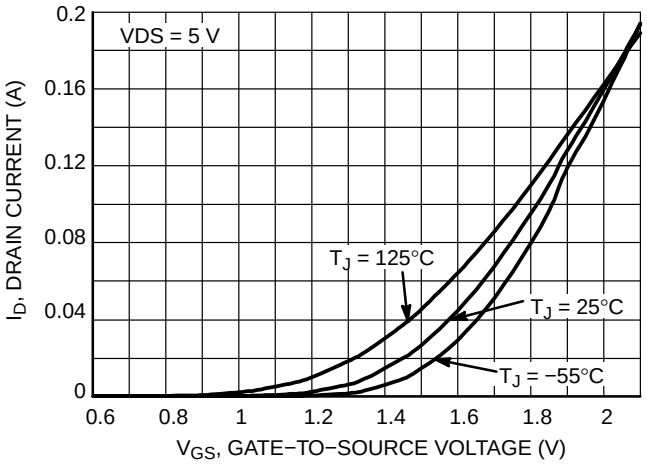


Figure 2. Transfer Characteristics

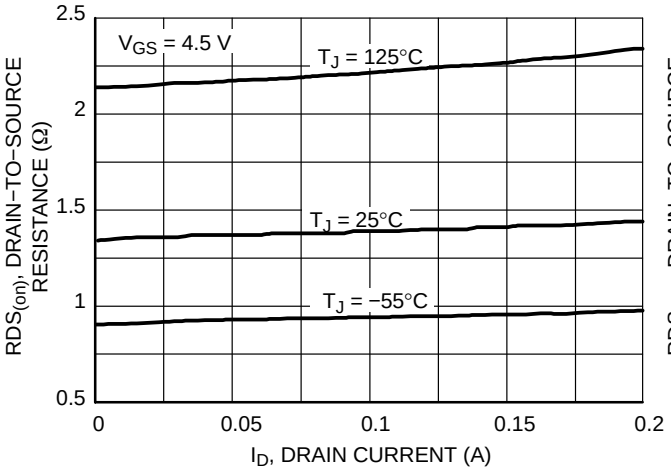


Figure 3. On−resistance versus Drain Current and Temperature

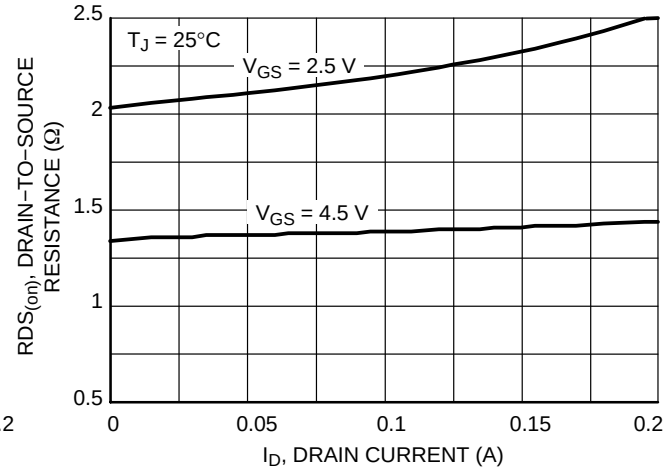


Figure 4. On−resistance versus Drain Current and Gate Voltage

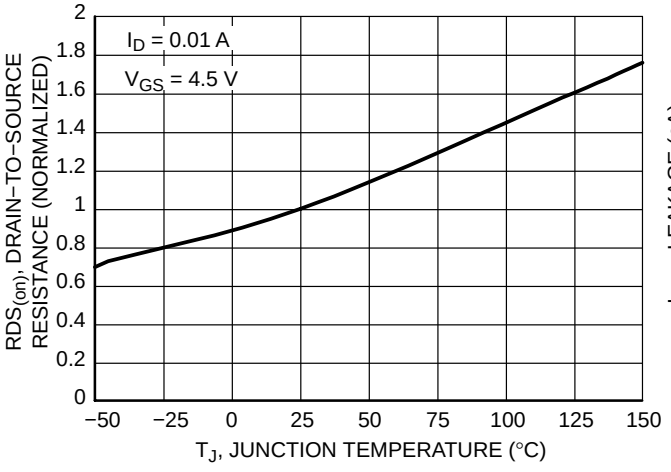


Figure 5. On−resistance Variation with Temperature

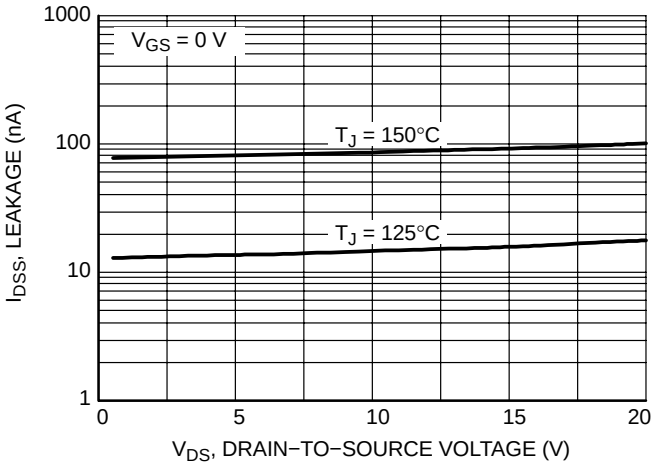


Figure 6. Drain−to−Source Leakage Current versus Voltage

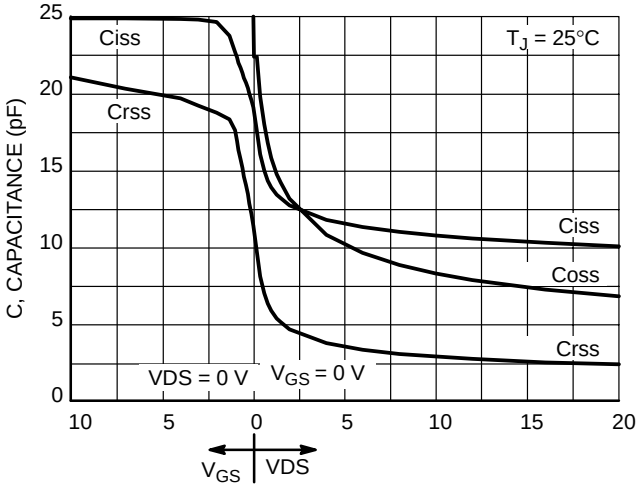


Figure 7. Capacitance Variation

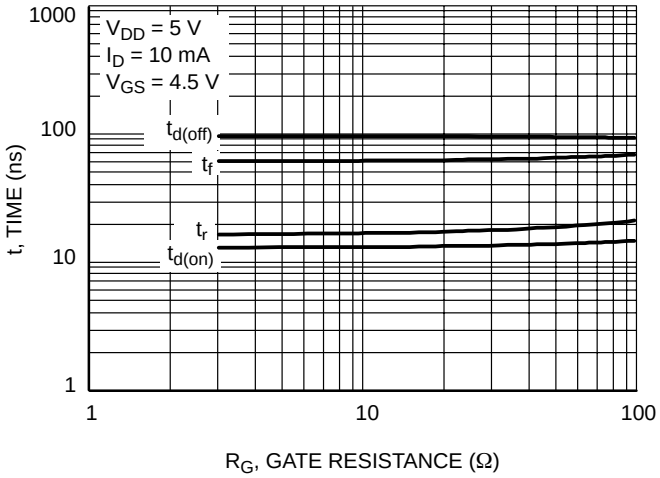


Figure 8. Resistive Switching Time Variation versus Gate Resistance

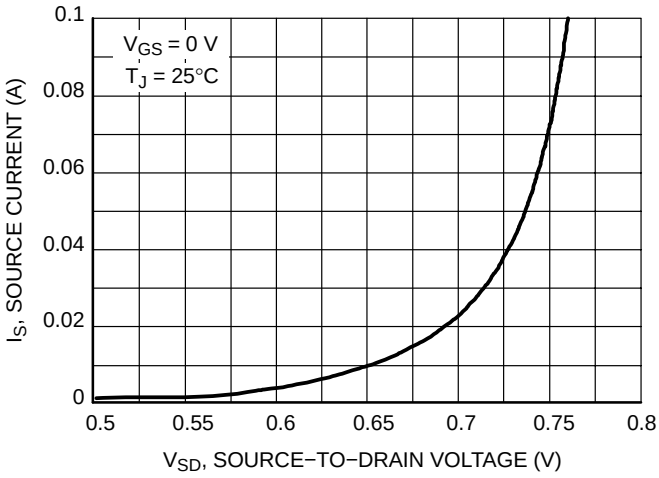
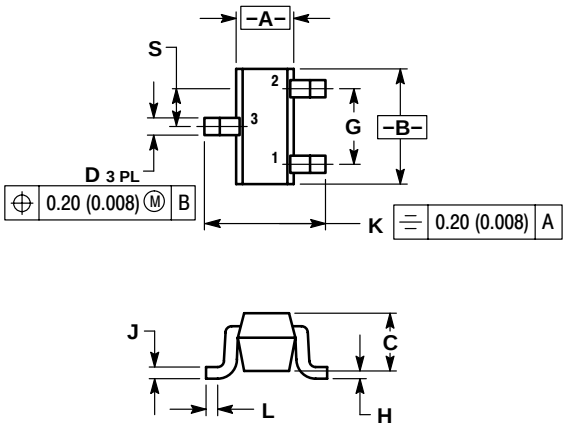


Figure 9. Diode Forward Voltage versus Current

PACKAGE DIMENSIONS

SC−75 / SOT−416
CASE 463−01
ISSUE C



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

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	0.70	0.90	0.028	0.035
B	1.40	1.80	0.055	0.071
C	0.60	0.90	0.024	0.035
D	0.15	0.30	0.006	0.012
G	1.00 BSC		0.039 BSC	
H	−−−	0.10	−−−	0.004
J	0.10	0.25	0.004	0.010
K	1.45	1.75	0.057	0.069
L	0.10	0.20	0.004	0.008
S	0.50 BSC		0.020 BSC	

STYLE 5:
PIN 1. GATE
2. SOURCE
3. DRAIN

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