

# MOSFET – Single, N-Channel, Gate ESD Protection, Small Signal, SC-75

**20 V, 238 mA**

## NTA4001N, NVA4001N

### Features

- Low Gate Charge for Fast Switching
- Small 1.6 x 1.6 mm Footprint
- ESD Protected Gate
- AEC-Q101 Qualified and PPAP Capable – NVA4001N
- These Devices are Pb-Free and are RoHS Compliant

### 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.

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

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

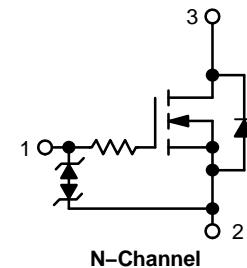
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### THERMAL RESISTANCE RATINGS

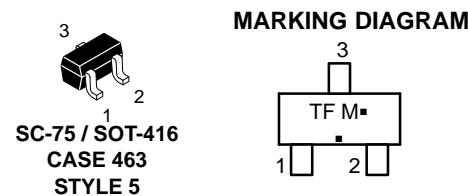
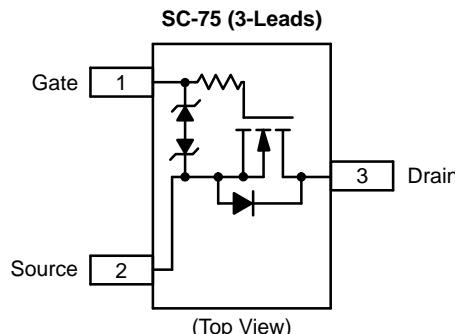
Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	416	$^\circ\text{C/W}$

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

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



### PIN CONNECTIONS



### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

# NTA4001N, NVA4001N

ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}} = 0 \text{ V}, I_D = 100 \mu\text{A}$	20			V
Zero Gate Voltage Drain Current	$I_{\text{DSS}}$	$V_{\text{GS}} = 0 \text{ V}, V_{\text{DS}} = 20 \text{ V}$			1.0	$\mu\text{A}$
Gate-to-Source Leakage Current	$I_{\text{GSS}}$	$V_{\text{DS}} = 0 \text{ V}, V_{\text{GS}} = \pm 10 \text{ V}$			$\pm 100$	$\mu\text{A}$
<b>ON CHARACTERISTICS</b> (Note 2)						
Gate Threshold Voltage	$V_{\text{GS}(\text{TH})}$	$V_{\text{DS}} = 3 \text{ V}, I_D = 100 \mu\text{A}$	0.5	1.0	1.5	V
Drain-to-Source On Resistance	$R_{\text{DS}(\text{on})}$	$V_{\text{GS}} = 4.5 \text{ V}, I_D = 10 \text{ mA}$		1.5	3.0	$\Omega$
		$V_{\text{GS}} = 2.5 \text{ V}, I_D = 10 \text{ mA}$		2.2	3.5	
Forward Transconductance	$g_{\text{FS}}$	$V_{\text{DS}} = 3 \text{ V}, I_D = 10 \text{ mA}$		80		$\text{mS}$
<b>CAPACITANCES</b>						
Input Capacitance	$C_{\text{ISS}}$	$V_{\text{DS}} = 5 \text{ V}, f = 1 \text{ MHz}, V_{\text{GS}} = 0 \text{ V}$		11.5	20	$\text{pF}$
Output Capacitance	$C_{\text{OSS}}$			10	15	
Reverse Transfer Capacitance	$C_{\text{RSS}}$			3.5	6.0	
<b>SWITCHING CHARACTERISTICS</b> (Note 3)						
Turn-On Delay Time	$t_{\text{d}(\text{ON})}$	$V_{\text{GS}} = 4.5 \text{ V}, V_{\text{DS}} = 5 \text{ V}, I_D = 10 \text{ mA}, R_G = 10 \Omega$		13		ns
Rise Time	$t_r$			15		ns
Turn-Off Delay Time	$t_{\text{d}(\text{OFF})}$			98		
Fall Time	$t_f$			60		
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Forward Diode Voltage	$V_{\text{SD}}$	$V_{\text{GS}} = 0 \text{ V}, I_S = 10 \text{ mA}$		0.66	0.8	V

2. Pulse Test: pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .

3. Switching characteristics are independent of operating junction temperatures.

## TYPICAL PERFORMANCE CURVES

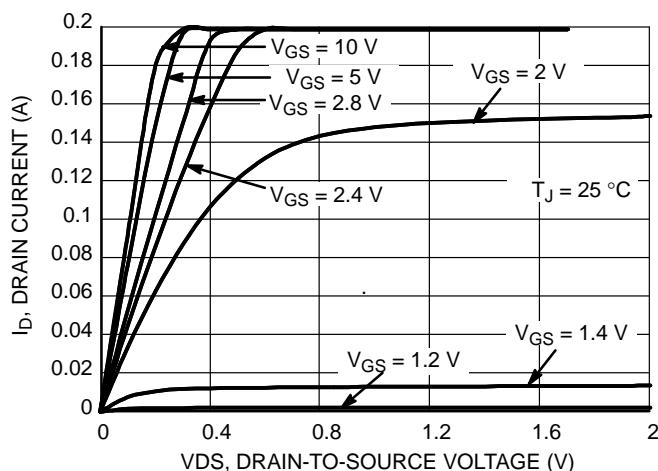


Figure 1. On-region Characteristics

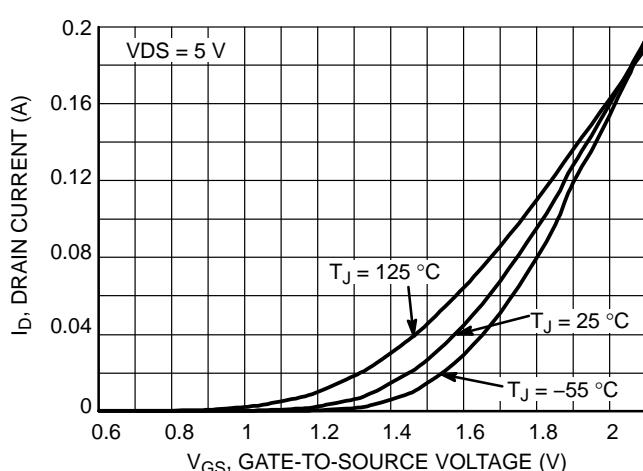


Figure 2. Transfer Characteristics

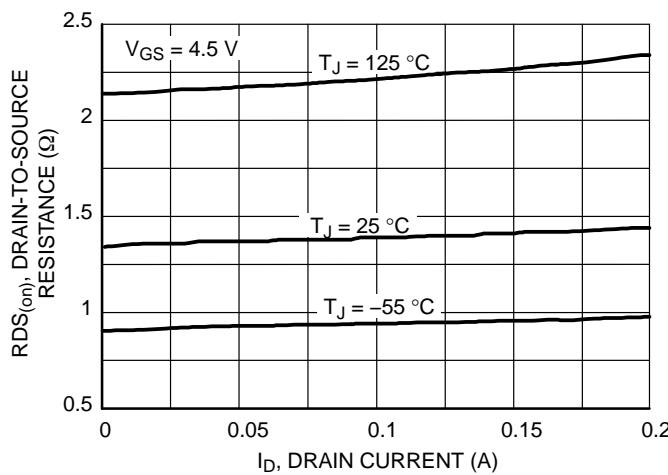


Figure 3. On-resistance versus Drain Current and Temperature

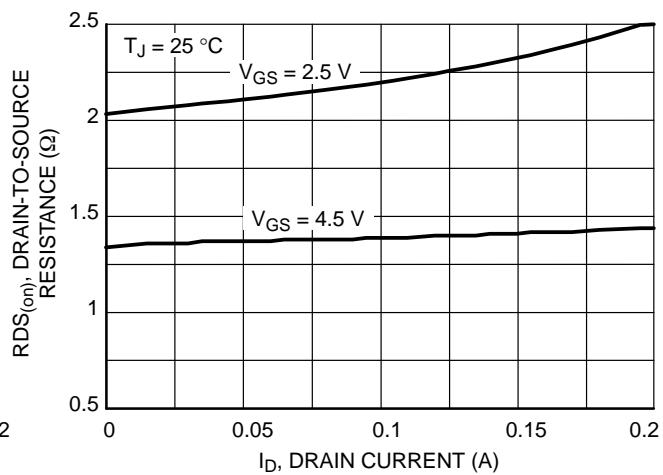


Figure 4. On-resistance versus Drain Current and Gate Voltage

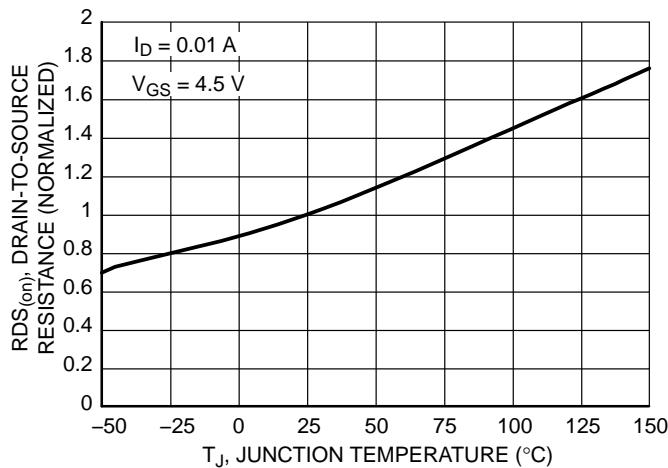


Figure 5. On-resistance Variation with Temperature

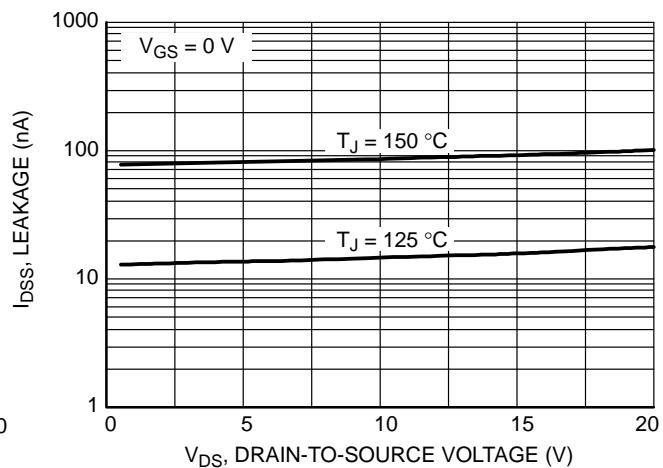


Figure 6. Drain-to-Source Leakage Current versus Voltage

# NTA4001N, NVA4001N

## TYPICAL PERFORMANCE CURVES

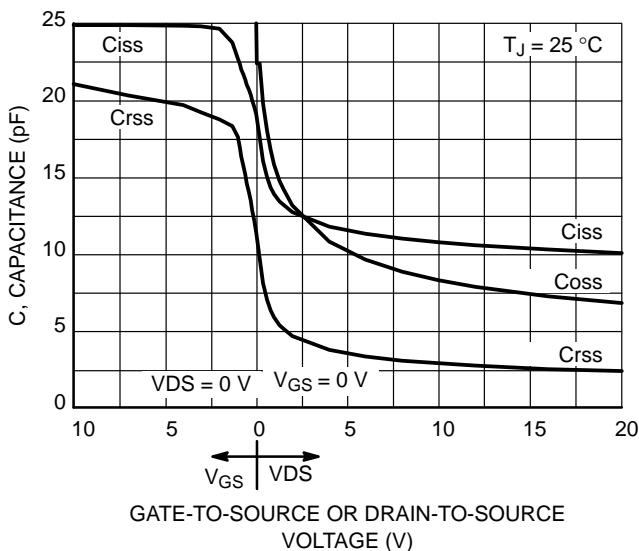


Figure 7. Capacitance Variation

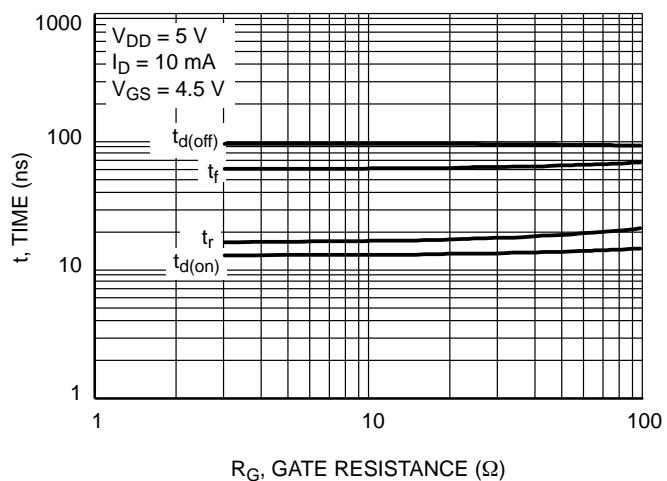


Figure 8. Resistive Switching Time Variation versus Gate Resistance

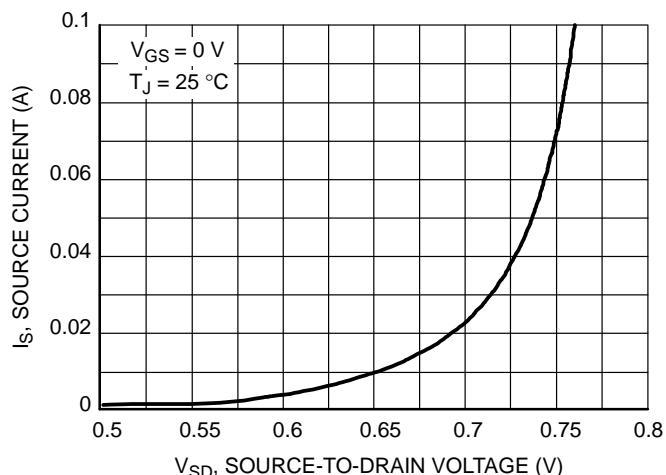


Figure 9. Diode Forward Voltage versus Current

## ORDERING INFORMATION

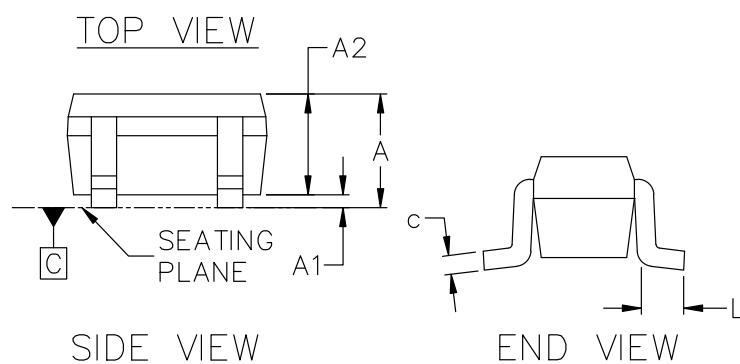
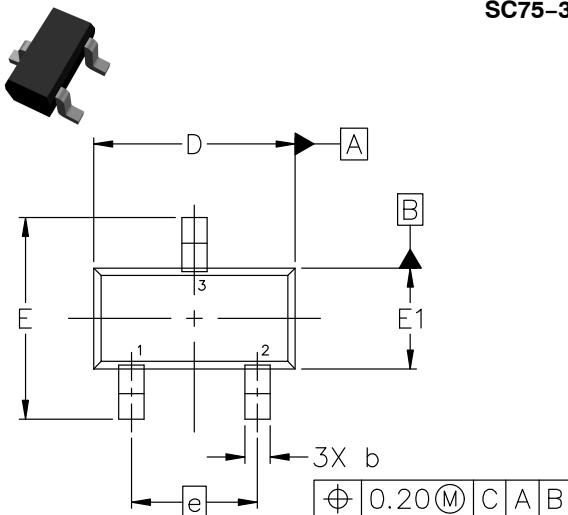
Order Number	Package	Shipping <sup>†</sup>
NTA4001NT1G	SC-75 (Pb-Free)	3000 / Tape & Reel
NVA4001NT1G	SC-75 (Pb-Free)	3000 / Tape & Reel

<sup>†</sup> 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](#).

**REVISION HISTORY**

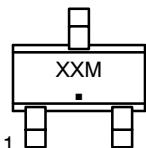
Revision	Description of Changes	Date
3	Rebranded the Data Sheet to <b>onsemi</b> format.	6/26/2025

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.



SIDE VIEW

END VIEW

GENERIC  
MARKING DIAGRAM\*

XX = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

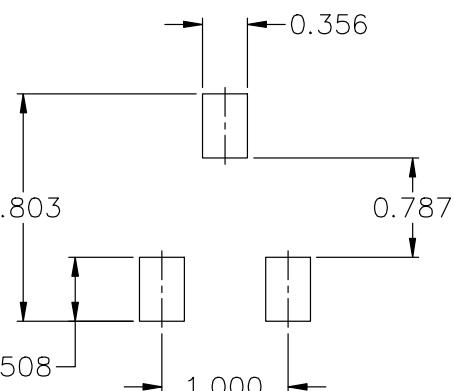
STYLE 1:  
PIN 1. BASE  
2. Emitter  
3. Collector

STYLE 2:  
PIN 1. ANODE  
2. N/C  
3. CATHODE

STYLE 3:  
PIN 1. ANODE  
2. ANODE  
3. CATHODE

STYLE 4:  
PIN 1. CATHODE  
2. CATHODE  
3. ANODE

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



## RECOMMENDED MOUNTING 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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DESCRIPTION:	SC75-3 1.60x0.80x0.80, 1.00P	PAGE 1 OF 1

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